

**A review of African praying mantises (Dictyoptera: Mantodea)
incorporating molecular and morphological data**

A thesis submitted in fulfilment of the academic requirements for the degree of

MASTER OF SCIENCE

at

RHODES UNIVERSITY

by

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2024

Ethics approval number: 2019-0165-305 (Rhodes University, South Africa)

Acknowledgements

To my supervisors, Prof Shelley Edwards and Prof Martin H. Villet. I cannot thank you two enough for all the scientific guidance and support that you provided, more importantly for the patience and understanding you had when life's distractions presented themselves.

There are so many people that I should acknowledge throughout the course of the past few years, particularly all those who helped with sampling, consider this a general thank you to friends and colleagues. I would like to express my gratitude to Helen James (Albany Museum) for her willingness to sample in Angola, and Gay Wabeke and her enthusiastic son, Luke, for the many specimens from Limpopo.

A final thanks to the Department of Zoology and Entomology, Rhodes University, for funding and research facilities, and the National Research Foundation (NRF) of South Africa for providing a grant-holder linked bursary (NRF Thuthuka Research Grant TTK160602167413).

Abstract

Praying mantises (Dictyoptera: Mantodea) are an iconic group of predatory insects, comprising around 2500 species globally, that occur in all zoogeographic regions except the poles. Their presence in the social psyche of many cultures has existed for millennia, but until the past decade, Mantodea has received little attention from the scientific community as the constituent species are of little economic or medical importance. Africa is rich in praying mantis diversity, accounting for approximately 45% of all described species, yet it remains largely under-sampled compared to the New World and Asian regions. Recent exploration of Gabon and Central African Republic have proved fruitful, with new species descriptions being major highlights. A recent re-cataloguing of southern African praying mantises has proved useful as specimen identifications were checked, new distributions were recorded, and most importantly, it was revealed that museum collections have significantly more diversity than previously recorded. A meta-analysis of African praying mantises was conducted; we present a species checklist to the countries of Africa, including Madagascar and surrounding islands. Currently, 17 families, 182 genera, and 1104 species occur in Africa.

Historically, the classification of praying mantises was based solely on morphological features, and the novelty of the field at the time made it unclear which characteristics were of taxonomic importance. The onset of molecular systematics brought attention to incongruences between morphological and molecular phylogenies, believed to be attributed to convergent evolution masking the underlying evolutionary processes that occurred. Significant progress has been made in the past two decades regarding Mantodean classification and most described genera have their phylogenetic position. With the addition of more African taxa, we present mantodean phylogenies for molecular and morphological data. Molecular phylogenies were estimated through Bayesian Inference and Maximum Likelihood analyses using two nuclear (28S and H3) and two mitochondrial markers (16S and COI) for 210 individuals that represented 24 of the 29 families globally. Morphological phylogenies were estimated through Maximum Likelihood analyses of a morphological data matrix comprising 149 characters for 248 individuals that represent 24 families. The same data matrix was used to produce a key to all African mantodean families, accompanied by their descriptions.

Keywords:

Biogeography, checklist, distribution, historical review, sampling bias, systematics, taxonomy.

Table of Contents

Title page.....	1
Acknowledgements.....	2
Abstract.....	3
Table of contents.....	4
List of figures, tables, and appendices	6
CHAPTER 1 – Historical Review.....	10-25
Introduction	10
Current state of African Mantodea.....	12
Discussion.....	18
Taxonomic history.....	18
African species	21
Synonyms.....	22
African diversity and taxonomic contributors	23
Conclusions	25
CHAPTER 2 – Molecular Data	27-54
Introduction	27
Morphological vs genetic approaches	27
The current classification.....	28
Methods.....	30
Results.....	42
Bayesian Inference phylogeny	43
Maximum Likelihood phylogeny.....	44

Discussion.....	48
The relationships of praying mantis families	48
The position of African taxa	51
Conclusions	54
CHAPTER 3 – Morphological Data.....	55-81
Introduction	55
Morphological diversity	55
Classification and Nomenclature	57
Methods.....	58
Results.....	59
Family Descriptions.....	59
Phenetic analyses.....	60
Key to families.....	68
Discussion.....	71
Data matrix and character list	71
Informative characteristics	72
Phenetics.....	77
Key to families.....	79
Conclusions	81
FINAL REMARKS.....	82-83
References	84
Appendices.....	97-245

LIST OF FIGURES

Figure 1.1. Progression of African mantodean species descriptions per year, from 1758 until the start of 2024. Yearly descriptions are represented by the right y-axis with cumulative descriptions of species and synonyms represented by the left y-axis. Only extant, accepted names and synonyms of the respective names were plotted 13

Figure 1.2. Reported biodiversity of praying mantis genera by African country. 1:South Africa, 2:Lesotho, 3:Eswatini, 4:Botswana, 5:Namibia, 6:Zimbabwe, 7:Mozambique, 8:Angola, 9:Zambia, 10:Malawi, 11:Madagascar, 12:Equatorial Guinea, 13:Gabon, 14:Republic of the Congo, 15:Democratic Republic of the Congo, 16:Tanzania, 17:Uganda, 18:Kenya, 19:Rwanda, 20:Burundi, 21:Somalia, 22:Ethiopia, 23:Djibouti, 24:Eritrea, 25:South Sudan, 26:Sudan, 27:Egypt, 28:Libya, 29:Chad, 30:Central African Republic, 31:Cameroon, 32:Nigeria, 33:Niger, 34:Algeria, 35:Tunisia, 36:Morocco, 37:Western Sahara, 38:Mauritania, 39:Mali, 40:Benin, 41:Togo, 42:Ghana, 43:Burkina Faso, 44:Ivory Coast, 45:Liberia, 46:Sierra Leone, 47:Guinea, 48:Guinea-Bissau, 49:Gambia, 50:Senegal, 51:Cabo Verde, 52: São Tome and Principe, 53: Comoros 16

Figure 1.3. Reported family distribution of African praying mantis genera by country, separated by family. Countries numbered as in Figure 1.2 17

Figure 2.1. Stick diagram summarising the current status quo of praying mantis superfamilies. Black triangles represent that multiple families are present in that superfamily. Epaphroditoidea (Epaphroditidae + Majangidae) only has molecular data associated with Epaphroditidae and relates to Majangellidae through morphological data. Dotted lines represent the three positions where Haanioidea has been placed in previous studies..... 30

Figure 2.2. Molecular phylogeny of 210 praying mantises representing 24 of the 29 families globally based on four genes: 28S, 16S, H3, and COI. The phylogeny was produced from the Bayesian Inference topology showing posterior probabilities, combined with corresponding bootstrap likelihood from the Maximum Likelihood topology. Branch terminals indicate species names, the families and subfamilies are labelled accordingly, and branches are coloured by superfamily: Black=outgroup, blue=Thespoidea, purple=Acanthopoidea, pink=Chroicopteroidea, gold=Gonypetoidea, orange=Nanomantoidea, red=Epaphroditoidea, brown=Eremiaphiloidea, turquoise=Hoplocoryphoidea, yellow=Miomantoidea, grey=Galinthiadoidea, peach=Hymenopoidea, green=Mantoidea. Names of African taxa are in bold and individuals from this study are marked with their specimen identification 'Gen_XXX' 44

Figure 3.1. Phylogeny produced from the Maximum Likelihood analysis based on 149 morphological characters showing nodal support. Families and species are indicated on branch terminals, branches are coloured by superfamily as per Fig 2.2, and African taxa are marked with an asterisk (*) 68

LIST OF TABLES

Table 1.1. Top contributors to African praying mantis descriptions, their respective nationalities, and total contribution as of the start of 2023. Taxonomic contributions were made by 83 authors, but the top ten contributors cumulatively described ~72% (793/1104) of all known praying mantis species in Africa	13
Table 1.2. Family level comparison of major taxonomic revisions and classification systems of Mantodea.....	20
Table 2.1. Metadata from GenBank, showing specimen identification and corresponding accession numbers for genes associated with this study. Listed alphabetically, with cockroaches before praying mantises.....	32
Table 2.2. Specimen identifications and locality data associated with taxa sampled in this study, listed numerically by specimen I.D. RSA = Republic of South Africa	40
Table 2.3. Primer sequences used for 28S, 16S, and H3 genes.....	42
Table 2.4. Amplification profiles use for 28S, 16S, and H3 genes	42
Table 3.1. Key to extant, adult praying mantises. This key is based on the classification scheme proposed by Schwarz and Roy (2019) and incorporates morphological characters of 248 praying mantis species from a revised version of Wieland’s (2013) database. The decision tree is depicted at the end of the key - note that red dots represent an endpoint in the decision tree, when a family has been identified.....	68

LIST OF APPENDICES

Appendix 1.1. Species Inventory of African Mantodea accompanied by known distributions, following the most recent classification proposed by Schwarz & Roy (2019). This species list was compiled from a meta-analysis of Mantodea Species File (Otte & Spearman 2005), GBIF (GBIF.org 2020), and multiple published papers and may be incomplete. Synonyms are marked with an equality symbol (=)	97
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Appendix 2.1. Molecular phylogeny produced from the Bayesian Inference analysis based on four genes, showing nodal support. Families and species are indicated on branch terminals, branches are coloured by superfamily as per Fig 2.2, and individuals from this study are marked with an asterisk (*) 143

Appendix 2.2. Molecular phylogeny produced from the Maximum Likelihood analysis based on four genes, showing nodal support. Families and species are indicated on branch terminals, branches are coloured by superfamily as per Fig 2.2, and individuals from this study are marked with an asterisk (*) 145

Appendix 3.1. Consensus bootstrap based on 15 morphological characteristics of the head. Families are indicated on branch terminals and branches are coloured by superfamily as per Fig 2.2 (following Schwarz and Roy (2019)) 147

Appendix 3.2. Consensus bootstrap based on 12 morphological characteristics of the thorax. Families are indicated on branch terminals and branches are coloured by superfamily as per Fig 2.2 (following Schwarz and Roy (2019)) 148

Appendix 3.3. Consensus bootstrap based on 32 morphological characteristics of the abdomen. Families are indicated on branch terminals and branches are coloured by superfamily as per Fig 2.2 (following Schwarz and Roy (2019)) 149

Appendix 3.4. Consensus bootstrap based on 39 morphological characteristics of the forelegs. Families are indicated on branch terminals and branches are coloured by superfamily as per Fig 2.2 (following Schwarz and Roy (2019)) 150

Appendix 3.5. Consensus bootstrap based on 18 morphological characteristics of the walking legs. Families are indicated on branch terminals and branches are coloured by superfamily as per Fig 2.2 (following Schwarz and Roy (2019)) 152

Appendix 3.6. Consensus bootstrap based on 29 morphological characteristics of the wings. Families are indicated on branch terminals and branches are coloured by superfamily as per Fig 2.2 (following Schwarz and Roy (2019)) 153

Appendix 3.7. Family descriptions of current mantodean families. A character matrix coding for 149 morphological characters of 248 species was used to represent the ~2500 praying mantis species globally. Terminology follows Brannoch et al (2017) 154

Appendix 3.8. List of 149 morphological characters and states, adapted from Wieland (2013) and augmented for African taxa 214

Appendix 3.9. Supplementary images and diagrams related to the key to extant, adult praying mantises (Fig. 3.1) 241

Chapter 1

The current systematic state of African praying mantises

INTRODUCTION

The name Mantodea was derived from the Greek word “*μαντος*” which means “prophet” or “soothsayer”, reflecting their upright posture and how they hold their forelegs in front of their head as if in prayer, hence the English vernacular name: praying mantis. Praying mantises have attracted the attention of humans for millennia and hold spiritual symbolism in many cultures: in Greek cultures, the praying mantis was believed to possess the ability to predict the future; in China, the mantis is a symbol of stillness of mind as this insect is believed to never make a move unless it needs to; and in certain African cultures the praying mantis is viewed as the oldest symbol of God and it is considered a good omen if one enters your house (Greyvenstein et al. 2020a).

Despite such vivid existences in the social psyche, these iconic predators receive little attention in the scientific community because constituent species are of little economic or known medical importance (Rivera 2010). Globally, there are approximately 2500 species of praying mantises distributed in 29 families and 449 genera, with the highest abundances and diversities situated near warm, tropical, and subtropical regions (Giglio-Tos 1914a, Otte & Spearman 2005, Schwarz & Roy 2019). Within the superorder Dictyoptera, there is strong morphological and molecular support that Mantodea is the monophyletic sister group to Blattaria (cockroaches and termites) that differentiated approximately 300 mya during the Palaeozoic era (Svenson & Whiting 2004, 2009, Klass & Meier 2005, Ware et al. 2008, Wieland 2013, Legendre et al. 2015). Although our current interpretation of the higher taxonomy of Mantodea is robust to new evidence, the family-level classification is not yet satisfactory in the light of the phylogenetic evidence (Rivera 2010, Wieland 2013, Schwarz & Roy 2019). Taxonomic revisions of genera and species complexes are among the global topics reviewed in mantodean publications, which may be attributed to molecular data providing new evidence for relationships that were not obvious from morphological data alone (Battiston et al. 2014, Lombardo et al. 2014, Svenson et al. 2015, Brannoch & Svenson 2016, Moulin et al. 2017, Moulin 2018b, Roy 2020).

Traditionally, praying mantis classification was based primarily on morphological features, specifically: foreleg morphology, body proportions, genitalia, and abdominal structures (Brannoch et al. 2017).

Advances in the past two decades have provided new evidence that previous interpretations of mantodean classification did not necessarily reveal the underlying evolutionary processes at play and that this order requires further taxonomic revision. A good start in this direction has provided a new interpretation of the phylogeny and many new species have been recently described, but few African species have been included (Svenson & Whiting 2004, Yager & Svenson 2008, Legendre et al. 2015, Svenson et al. 2015, Agudelo & Rafael 2016, Schwarz & Ehrmann 2017, Zhang et al. 2018). There is potential for taxonomic discovery in Africa (Moulin et al. 2017, Moulin 2018a, 2018b, 2020, Roy 2020) and by inventorying this order we can further add to the taxonomic knowledge of praying mantises at large (Greyvenstein et al. 2020b, 2021b, 2021a).

Several attempts were made to catalogue the order in Africa but many newly discovered groups did not fit the contemporary classification system (Kirby 1904, Roy 1987, Kaltenbach 1996, 1998). Mantodea has received more attention but there is currently a strong bias towards the New World and Asian regions, and to ornamented and plant-mimicking groups like Galinthiidae Giglio-Tos, 1919, Hymenopodidae Giglio-Tos, 1915, and Empusidae Burmeister, 1838 (Svenson & Whiting 2004, Yager & Svenson 2008, Legendre et al. 2015, Svenson et al. 2015, Agudelo & Rafael 2016, Schwarz & Ehrmann 2017). Despite this, praying mantis enthusiasts and breeders produce praiseworthy non-peer-reviewed literature predominantly discussing behaviour and life-history, with a few basic morphological descriptions. For example, there is an undescribed (possibly only unidentified) species of *Sphodromantis* Stål, 1871 from central Africa that is popular in the pet trade and goes by the English vernacular name 'Congo Blue Flash' (Exotic Pets 2024, US Mantis 2024). This demonstrates that there are clear knowledge gaps to fill, specifically in describing and cataloguing praying mantises (with localities) in understudied regions, as this is a prerequisite for further taxonomic, conservation, and ecological studies.

As yet, there are no reported cases of non-indigenous praying mantises in Africa, but several African mantis species have been documented in various other countries (Fea 2011, Marabuto 2014, Nisip et al. 2019). Most of their introductions seem to be accidental but some may be deliberate as praying mantises can be used as generalist control agents of mobile garden pests (Crowder & Snyder 2010, Nisip et al. 2019). Non-native mantises can go undetected after establishment due to their cryptic nature and camouflaged appearance (Nisip et al. 2019). The ecological impacts of introduced praying mantises are small compared to other invasive invertebrates but still pose a threat to native species and community structure. *Miomantis caffra* Saussure, 1871 and *Miomantis paykullii* Stål, 1871 are African praying mantises that have become invasive in several countries and have been observed to adversely affect

native communities (Fea 2011, Marabuto 2014, Nisip et al. 2019). *Miomantis caffra* can competitively exclude native praying mantises, both by outcompeting them for food resources, and by reproductive interference through heterospecific mate attraction and hybridization (Crowder & Snyder 2010, Fea 2011). Invasive African praying mantises pose less of a threat to community structure as the functional role of a generalist predator is being filled by the invasive mantises, but they may pose unknown threats to native praying mantis diversity.

This chapter aims to summarize literature and document the current taxonomic state of African Mantodea by presenting an inventory of all recognized species and their known geopolitical distributions, including a historical review of the order and major African contributors.

CURRENT STATE OF AFRICAN MANTODEA

There are 1104 recognised species and subspecies (including 207 synonyms) of praying mantis in Africa, including Madagascar and other surrounding islands (all of which are hereon collectively referred to as “Africa” or “African”). These species fall into 17 families and 168 genera (including 70 synonyms) (Appendix 1.1). There were two singleton records of Neotropical praying mantises recorded in “East Africa” (Photinaidae and Acanthopidae), but this most likely an error or an accidental introduction and will be omitted from any analyses.

Contributions to African mantodean taxonomy were made by 83 authors, but approximately 72% (793/1104) of the species descriptions were made by the top ten taxonomic contributors, who were predominantly based in Europe (Table 1.1). The first two African mantises were described by Carolus Linnaeus (1707-1778) in 1758 with approximately 57% of species being described between the late 1870s and the 1930s, largely due to Max Beier (1903-1979) and Ermanno Giglio-Tos (1865-1926), who described 128 and 214 species, respectively. Some 121 valid species (11% of the fauna) have at least one synonym, with a total of 207 synonyms present across all African praying mantis species. The majority of synonyms occurred in the most speciose families that occupy larger geographical ranges (Mantidae: *Sphodromantis*, *Polyspilota*; Miomantidae: *Miomantis*), groups that displayed a higher degree of sexual dimorphism (brachypterous Eremiaphilids; Hymenopodidae: *Anasigerpes*, *Oxypilus*; Miomantidae: *Cilnia*, *Miomantis*), and groups that were of taxonomical interest in the past (particularly those with ornamented head features and striking colours: Empusidae: *Dilatempusa*, *Empusa*; Hymenopodidae: *Anasigerpes*, *Oxypilus*; Galinthiidae: *Harpagomantis*) (Fig. 1.1).

Table 1.1. Top contributors to African praying mantis descriptions, their respective nationality, and total contribution as of the start of 2023. Taxonomic contributions were made by 83 authors, but the top ten contributors cumulatively described ~72% (793/1104) of all known praying mantis species in Africa.

Author	Country	Contribution
Ermanno Giglio-Tos	Italy	214
Roger Roy	France	134
Max Beier	Austria	128
Franz Werner	Austria	76
Henri de Saussure	Switzerland	59
Marcello La Greca	Italy	48
Yngve Sjöstedt	Sweden	36
Alfred Kaltenbach	Austria	34
Lucien Chopard	France	32
James Rehn	USA	32

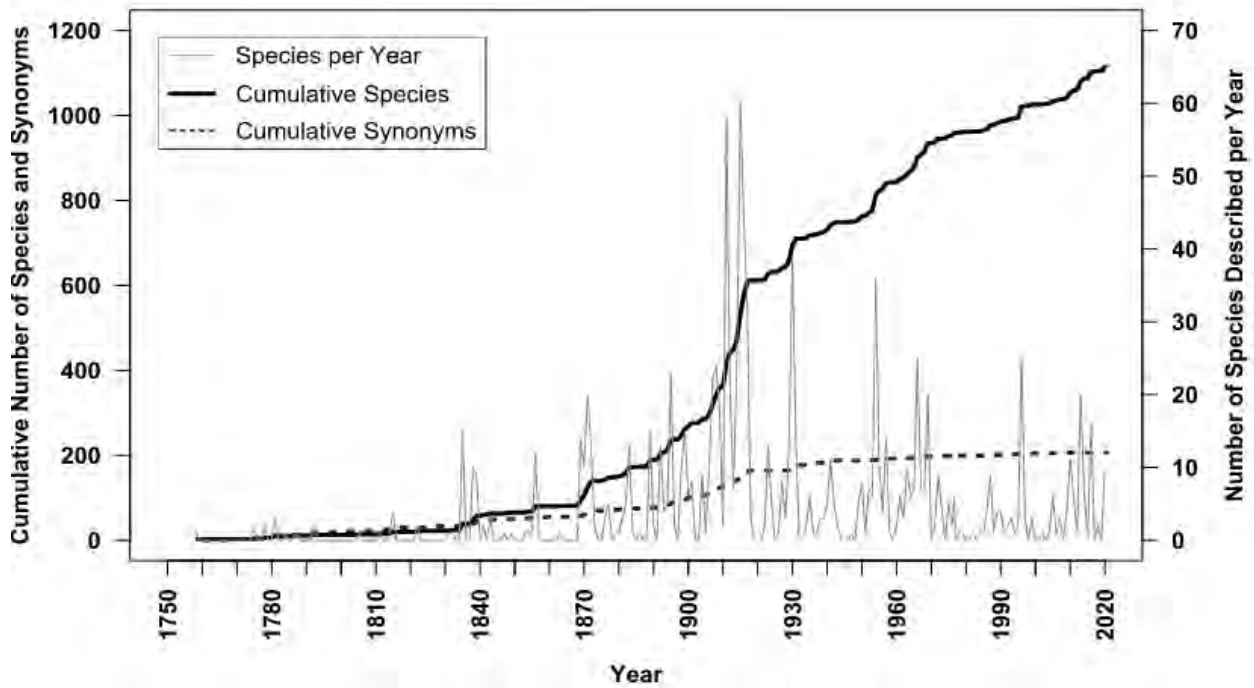


Figure 1.1. Progression of African Mantodean species descriptions per year, from 1758 until the start of 2024. Yearly descriptions are represented by the right y-axis with cumulative descriptions of species and

synonyms represented by the left y-axis. Only extant, accepted names and synonyms of the respective names were plotted.

African distribution

Due to vague locality data, we amalgamated several countries; Guinea and Guinea-Bissau shall collectively be referred to as 'Guinea', and Democratic Republic of Congo and Republic of the Congo shall be collectively referred to as 'Congo'. The overall recorded number of genera belonging to African praying mantises are greater nearer the equator, with countries below the equator also having a high diversity. Northern Africa, and somewhat western Africa, have a lower recorded diversity (Fig. 1.2; 1.3).

Chroicopteroidea. Family Chroicopterygidae has 122 recognised species in 29 genera and has been recorded in 29 countries: absent in the northern regions of Africa but present in most other countries, with the highest recorded densities in central and southern Africa.

Gonypetoidea. Family Gonypetidae has seven recognised species in one African genus. *Elaea solimani* has been recorded in northern and eastern Africa, although it is unclear how many of the other species have been recorded in Africa.

Nanomantoidea. Family Amorphoscelidae has 40 recognised species in seven genera and has been recorded in 32 countries: spread throughout Africa with the highest recorded densities in central Africa, somewhat missing in northern Africa. Family Nanomantidae has 42 recognised species in 14 genera and has been recorded in 25 countries: spread throughout Africa with the highest recorded species densities in southern and eastern Africa, somewhat missing in northern Africa.

Epaphroditoidea. Family Majangidae has 20 recognised species in four genera, all recorded in Madagascar.

Eremiaphiloidea. Family Amelidae has twelve recognised species in three genera and has been recorded in four countries: specifically, in northern Africa. Family Rivetinidae has 20 recognised species in five genera and has been recorded in 23 countries: spread throughout Africa, somewhat missing from western Africa. Family Toxoderidae has 70 recognised species in eleven genera and has been recorded in 35 countries: spread throughout Africa, with pockets of recorded species densities lower in southern and the border of central and western Africa, and higher near the 'Horn of Africa' and western Africa. Family Eremiaphilidae has 263 recognised species in 23 genera and has been recorded in 42 countries: evenly spread throughout Africa.

Hoplocoryphoidea. Family Hoplocoryphidae has 40 recognised species in three genera and has been recorded in 21 countries: scattered throughout Africa, becoming sparser northwards.

Miomantoidea. Family Miomantidae has 93 recognised species in seven genera and has been recorded in 32 countries: spread throughout Africa with the highest recorded species densities in eastern Africa, somewhat missing in northern Africa.

Galinthiadoidea. Family Galinthiadidae has 23 recognised species in four genera and has been recorded in 35 countries: spread throughout Africa with the highest recorded species densities along the equator, and somewhat absent in northern Africa.

Hymenopoidea. Family Hymenopodidae has 124 recognised species in 15 genera and has been recorded in 39 countries: absent in the northern regions of Africa but present in most other countries, with the highest recorded densities in central Africa. Family Empusidae has 22 recognised species in nine genera and has been recorded in 32 countries: spread throughout Africa, somewhat lacking in several southern African countries, with higher recorded densities near the 'Horn of Africa'.

Mantoidea. Family Dactylopterygidae has 13 recognised species in 3 genera and has been recorded in 21 countries. Family Mantidae has 151 recognised species in 20 genera and has been recorded in 40 countries: spread throughout Africa with the highest recorded species densities in central Africa, somewhat missing in northern Africa. Family Deroplatyidae has 48 recognised species in ten genera and has been recorded in 29 countries: absent in northern Africa and the northerly parts of western Africa, with the highest recorded species densities along the equator.

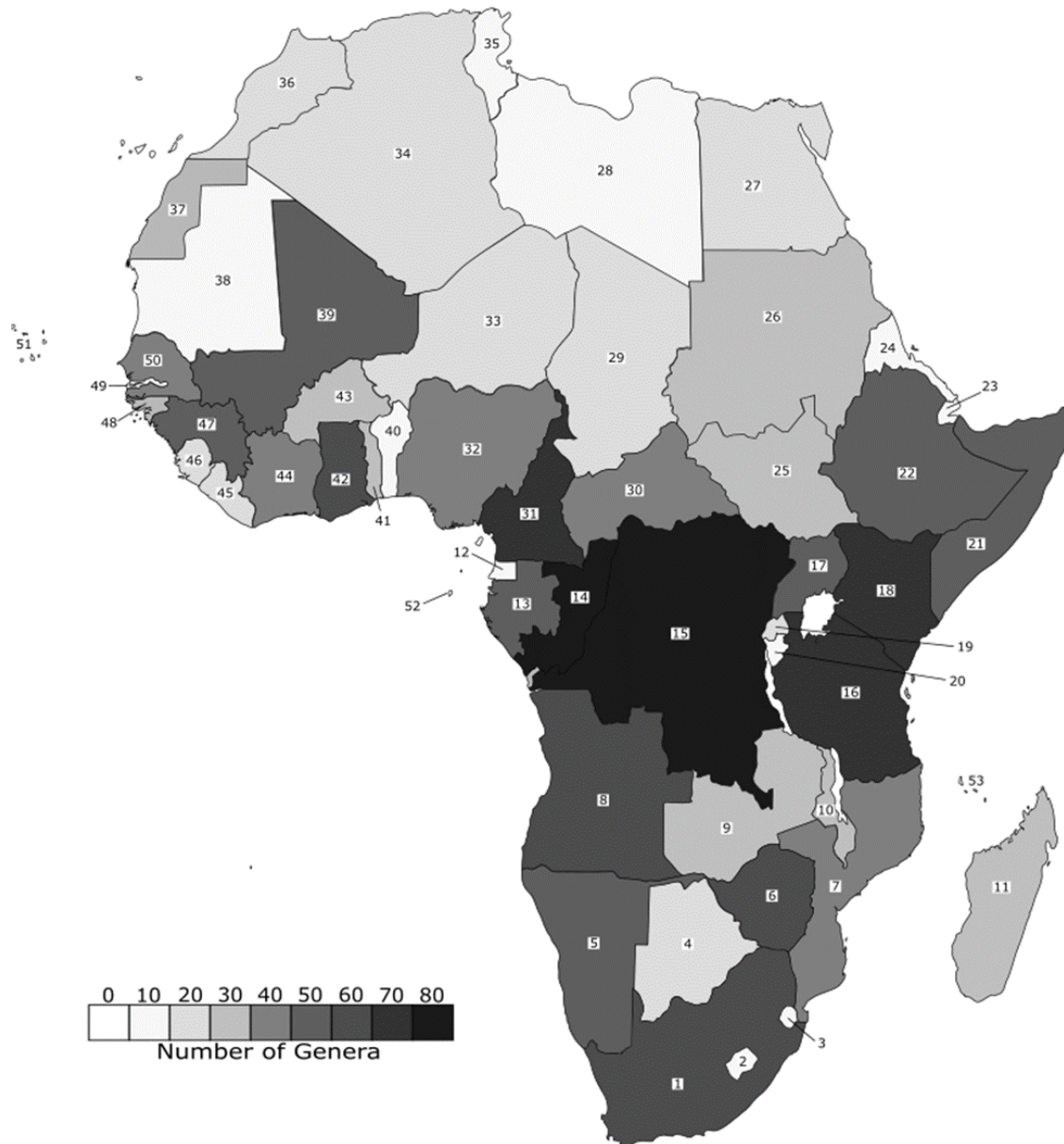


Figure 1.2. Reported biodiversity of praying mantis genera by African country. 1:South Africa, 2:Lesotho, 3:Eswatini, 4:Botswana, 5:Namibia, 6:Zimbabwe, 7:Mozambique, 8:Angola, 9:Zambia, 10:Malawi, 11:Madagascar, 12:Equatorial Guinea, 13:Gabon, 14:Republic of the Congo, 15:Democratic Republic of the Congo, 16:Tanzania, 17:Uganda, 18:Kenya, 19:Rwanda, 20:Burundi, 21:Somalia, 22:Ethiopia, 23:Djibouti, 24:Eritrea, 25:South Sudan, 26:Sudan, 27:Egypt, 28:Libya, 29:Chad, 30:Central African Republic, 31:Cameroon, 32:Nigeria, 33:Niger, 34:Algeria, 35:Tunisia, 36:Morocco, 37:Western Sahara, 38:Mauritania, 39:Mali, 40:Benin, 41:Togo, 42:Ghana, 43:Burkina Faso, 44:Ivory Coast, 45:Liberia, 46:Sierra Leone, 47:Guinea, 48:Guinea-Bissau, 49:Gambia, 50:Senegal, 51:Cabo Verde, 52: São Tome and Príncipe, 53: Comoros.

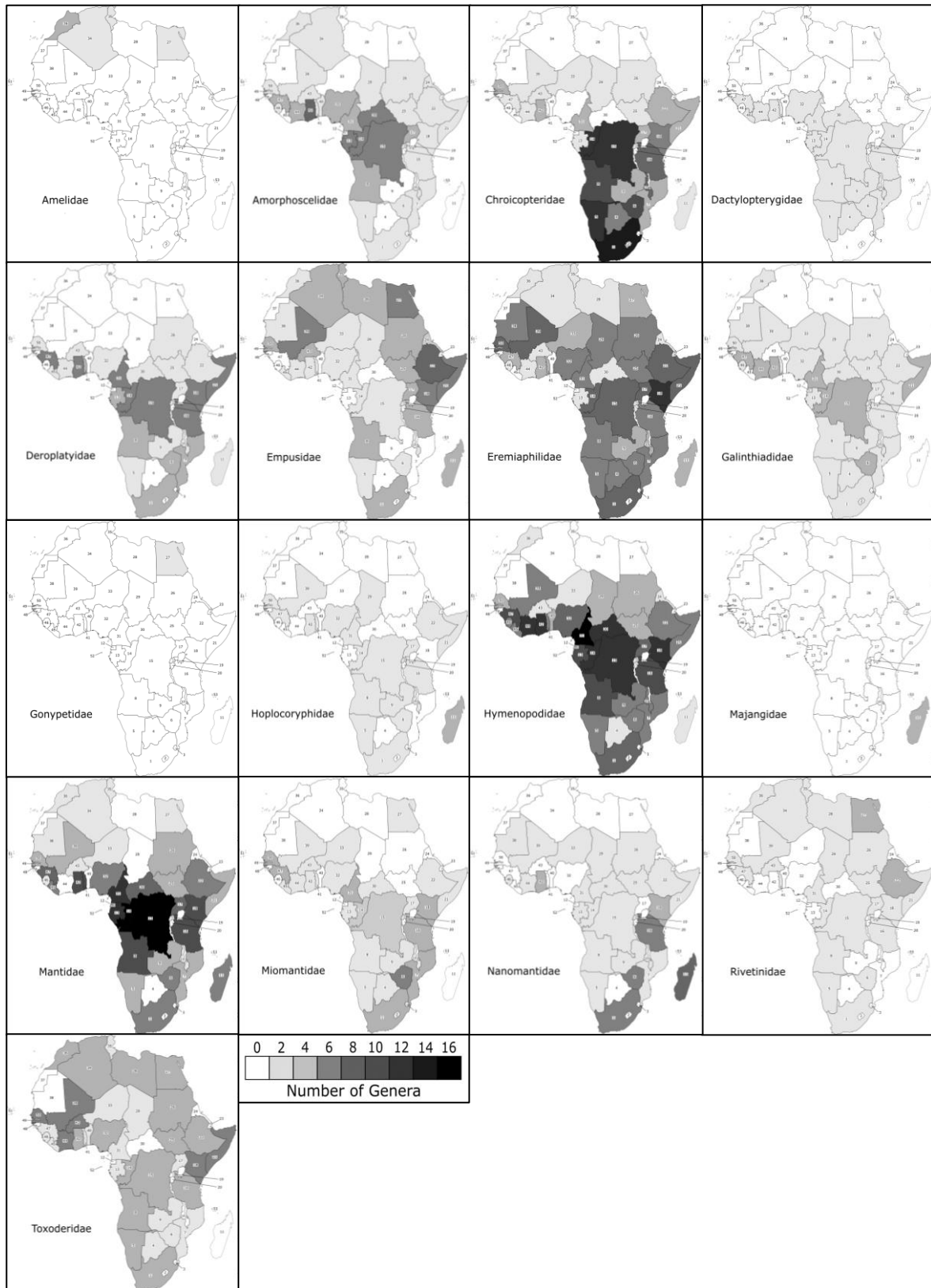


Figure 1.3. Reported family distribution of African praying mantis genera by country, separated by family. Countries numbered as in Figure 1.2.

DISCUSSION

Taxonomic history

Praying mantises were first classified by Linnaeus as a subgenus of *Gryllus* Linnaeus, 1758 in the order Orthoptera and later distinguished at genus level as *Mantis* Linnaeus, 1758 (Linnaeus 1757, 1758). However, this genus also encompassed mantisflies (Neuroptera: Mantispidae) and stick insects (Phasmida). Members of this group that did not have three pairs of legs adapted for walking were later removed and *Mantis* was reserved for those with raptorial forelegs (Lichtenstein 1802). Praying mantises were subsequently elevated to the family Mantidae Latreille, 1802 and mantisflies were mostly removed (Illiger 1798, Latreille 1802). Several decades later, praying mantises were elevated to ordinal rank as Mantodea (Burmeister 1838), which comprised four families with classification heavily weighted on pronotal length (Table 1.2). Later, tribes were introduced to improve the contemporary classification, which split praying mantises depending on whether they possessed lobed or unlobed walking legs (Saussure 1872). Later still, the abdominal terminalia were examined and genital structures were described, which led to praying mantises being placed in Dictyoptera along with cockroaches and termites (Chopard 1914).

Giglio-Tos demoted Mantodea to family level within Orthoptera as Mantidae, with 32 subfamilies and 110 tribes (Giglio-Tos 1917, 1927). This change was not supported by mantodean taxonomists at the time and Mantodea was soon after returned to ordinal rank (Hebard 1920, Werner 1923, Handlirsch 1925, 1930, Beier 1934a, 1934b, 1935a, 1935b, 1935c, 1935d). Various adjustments were made to Giglio-Tos's classification: many groups were raised to family rank and a total of 13 families were recognized (Chopard 1949), but this was soon reorganized into eight families with 28 subfamilies (Beier 1964, 1968) (Table 1.2). Various adjustments were made to these classifications over the years and resulted in an accepted morphological classification (Ehrmann 2002) that comprised 15 and 48 subfamilies globally, with a large portion of the classification heavily weighted on foreleg morphology, body proportions, genitalia, and abdominal structures.

The onset of molecular systematics has brought attention to incongruences between morphological and molecular phylogenies within Mantodea (Svenson & Whiting 2004, 2009, Yager & Svenson 2008, Legendre et al. 2015, Svenson et al. 2015, Brannoch & Svenson 2016, Rivera & Svenson 2016). This may be a result of dictyopteran synapomorphies and/or the cryptic and convergent morphology of praying mantises. One of the synapomorphies of Dictyoptera is the reduction of the ovipositor and refinement of the ootheca – reduction in morphology deprives taxonomists of potential classifying characteristics (Grimaldi 2003,

Grimaldi & Engel 2005). Praying mantises are also a highly diverse and cryptic order, with most of them relying on aggressive mimicry to capture prey and avoid predation (Svenson & Whiting 2004), potentially creating selective pressures that drove convergent evolution to mask phylogenetic patterns. Using genetic data is important since morphological classification does not necessarily reflect the underlying evolutionary processes within this order. Genetic techniques have identified many polyphylies in former classification systems (Giglio-Tos 1911a, 1911b, 1911c, 1911d, Otte & Spearman 2005) and have fuelled successful revisions of many families and subfamilies (Svenson & Whiting 2004, 2009, Yager & Svenson 2008, Legendre et al. 2015, Svenson et al. 2015, 2016, Agudelo & Rafael 2016, Rivera & Svenson 2016, Schwarz & Ehrmann 2017, Zhang et al. 2018, Greyvenstein et al. 2020b, Moulin 2020). The most recent approach to the phylogenetic classification of Mantodea, proposed by Schwarz and Roy (2019), incorporates both genetic and morphological data to produce the current phylogeny that recognizes 60 subfamilies in 29 families.

Historically, descriptions based on external morphological traits (e.g., pronotum length, colour, and lobate legs) drove mantodean taxonomy, which was improved with illustrations of abdominal and genital structures (Burmeister 1838, Saussure 1872, Chopard 1914, 1949). Recently, morphological features of praying mantises have been described thoroughly (Brannoch et al. 2017, Schwarz & Roy 2019), aiding the search for diagnostic apomorphies to assist morphological classification. The most recent phylogenetic framework for mantodean classification, proposed by Schwarz and Roy (2019), uses molecular phylogenies combined with morphological data, predominantly male genital structure, to better represent lineage relationships.

Table 1.2. Family level comparison of major taxonomic revisions and classification systems for Mantodea.

Burmeister 1838	Chopard 1949	Beier 1964	Ehrmann (& Roy) 2002	Schwarz & Roy 2019
Harpagidae				
	Choeradodidae			
	Orthoderidae			
	Vatidae			
			Iridopterygidae	
			Sibyllidae	
			Tarachodidae	
		Chaeteessidae	Chaeteessidae	Chaeteessidae
	Mantoididae	Mantoididae	Mantoididae	Mantoididae
	Metallyticidae	Metallyticidae	Metallyticidae	Metallyticidae
	Thespidae		Thespidae	Thespidae
				Angelidae
				Coptopterygidae
			Liturgusidae	Liturgusidae
				Photinidae
Acanthopidae			Acanthopidae	Acanthopidae
				Chroicopteridae
				Leptomantellidae
	Amorphoscelidae	Amorphoscelidae	Amorphoscelidae	Amorphoscelidae
				Nanomantidae
				Gonyptetidae
				Majangidae
				Epaphroditidae
				Haaniidae
				Rivetinidae
				Amelidae
	Eremiaphilidae	Eremiaphilidae	Eremiaphilidae	Eremiaphilidae
	Toxoderidae		Toxoderidae	Toxoderidae
				Hoplocoryphidae
				Miomantidae
				Galinthiidae
Empusidae	Empusidae	Empusidae	Empusidae	Empusidae
	Hymenopodidae	Hymenopodidae	Hymenopodidae	Hymenopodidae
				Dactylopterygidae
	Deroplatyidae			Deroplatyidae
Mantidae	Mantidae	Mantidae	Mantidae	Mantidae

African species

There are currently 1104 species of praying mantis described from Africa (Appendix 1). Initial attempts, in the mid-18th Century, at classifying African mantises were tentative due to the novelty of the field and the contemporary lack of a theory of biological classification, but soon gained momentum in the 1830s. Most species were described between the 1870s and the 1930s, with incremental growth continuing to the present (Fig. 1.1).

The first two African mantises were described by Linnaeus in 1758, and since then new species have been sporadic, with several additions predominantly by Lefèbvre, Burmeister, and Stål. Innovative taxonomical changes to praying mantis taxonomy began with the introduction of tribes and subtribes by de Saussure, with a personal contribution of 59 new species throughout his 30-year (1869-1899) career working on African mantises, and a further 18 in collaboration with Zehntner in 1895.

Mantodean taxonomy was an active field at the beginning of the 1900s, with major authors contributing to the rapidly growing species count. African expeditions were undertaken by Rehn, who explored north-east Africa in 1903; Sjöstedt, who explored eastern Africa, specifically higher altitudes like Mount Kilimanjaro, between 1910 and 1925; Werner, who explored Cameroon in 1928; and Chopard, who explored eastern Africa in 1919. These four taxonomists, amongst others, described many species and genera throughout their careers and made major contributions to the overall knowledge of praying mantises in Africa.

Around the same time, Beier and Giglio-Tos also started working on African praying mantises and were arguably the most influential mantodean taxonomists of their generation. Giglio-Tos had a short career in mantodean taxonomy but managed to describe 214 African species of praying mantises between 1907 and 1927 – published in his monograph, “*Das Tierreich: Orthoptera-Mantidae*” (Giglio-Tos 1907, 1911a, 1911c, 1911d, 1911b, 1912, 1914b, 1914a, 1914c, 1914d, 1915, 1916, 1917, 1927). Beier also made a major contribution to the knowledge of this taxon by describing 126 African praying mantises in 65 years through a series of books “*Genera Insectorum*” (Beier 1934a, 1934b, 1935a, 1935b, 1935c, 1935d, 1937) and several papers thereafter (Beier 1952, 1953a, 1953b, 1954, 1955, 1957a, 1957b).

In the mid-20th Century, La Greca, Roy, and Kaltenbach made strong contributions, specifically regarding Africa. La Greca described 39 African species himself and a further 13 in collaboration with Lombardo. Kaltenbach also described many African species and produced a variety of keys to the mantises of southern Africa that significantly contributed to the knowledge of this order in Africa (Kaltenbach 1996,

1998). The largest contributor to African mantis taxonomy during this era was Roy, who described 146 African species as of 2024, of which 32 were in collaboration with Gillon, Leston, Schütte, Schwarz, or Svenson.

Synonyms

Currently, 121 known African praying mantis species have at least one synonym, with a total of 207 synonyms present amongst all African species (Appendix 1). Synonyms are unevenly distributed amongst the African praying mantises; with a higher number of synonyms in more speciose families that are distributed over a wider geographical area, and in families that display increased levels of sexual dimorphism and have ornamented head structures that were of taxonomical fascination in the past.

Two-thirds of synonyms fall within the five most speciose families, and this is closely linked to their overall geographic distribution within Africa – a higher species count is expected to inhabit a larger geographic range, except for several genera within Eremiaphilidae that are localized to certain biogeographical regions, namely: Madagascar (*Paralygdamia* Saussure and Zehntner, 1895 and *Tuberculepsus* Roy, 2008) and northern Africa (*Eremiaphila*, Lefèbvre 1835). Praying mantis families that display a high degree of sexual dimorphism tend to have a higher proportion of synonyms associated with them, presumably from failure to associate the sexes. Approximately one-third of all known praying mantis species display significant degrees of sexual dimorphism (Yager 1990), and within this third, several groups have a high proportion of synonyms associated with these families: Eremiaphilidae, where there is high genetic diversity but few morphological differences; Hymenopodidae, where females have significantly larger pronota and are “giants” compared to males (Svenson et al. 2015, 2016); and Miomantidae, where there is a colour difference between the sexes and females’ wings are more leathery than males’ (Prete 1999). Species of Empusidae, Hymenopodidae, and Galinthiidae have ornamented structures on their heads and a large emphasis was placed on describing these groups in the past; therefore, these families of praying mantis received more interest than others, and naturally, acquired more synonyms as taxonomic investigations progressed. This may also be attributed to some of these groups having a wide distribution across a region that many taxonomists sampled. For instance, *Empusa pennata* Thunberg, 1815 (Empusidae) has 13 synonyms, described by eight authors, associated with its name.

In Africa, the general trend of the increased generation of synonyms coincides with increased rates of new species descriptions, suggesting that synonyms were largely created during taxonomic revisions (Fig. 1.1). This can be seen around the 1830s with works from Lefèbvre, Burmeister, and Stål, and again from the

1900s to the 1920s with works from Beier, Chopard, Giglio-Tos, Rehn, Sjöstedt, and Werner. Interestingly, the cumulative number of synonyms between the mid-1770s and the mid-1830s surpassed the cumulative number of accepted praying mantis species. After the 1940s, the production of synonyms reached a plateau, perhaps suggesting that a taxonomic consensus regarding what constitutes a species was reached, and/or that communication between authors increased. However, molecular systematics has provided us with a new perception of mantodean diversity, and this could influence the current synonym count as genetics reveals more about potentially masked or confusing traits that praying mantises could possess, like cryptic morphology or sexual dimorphism, respectively.

African diversity and taxonomic contributors

Africa is regarded as a biodiversity hotspot, and this may be attributed to its geographical location and the complexity and diversity of its bioregions – with many of them being unique to southern Africa (Treurnicht et al. 2017). African praying mantises constitute approximately 45% of the world’s described mantis species and assessing this diversity can be done more confidently at genus level rather than at species level, because of issues arising from number of synonyms, undescribed taxa, and vague locality data. An analysis of literature indicates that the highest diversity of mantis genera in Africa is situated along the tropics, specifically nearer the equator, with a decrease either side of the equator, where south of the tropics has a higher diversity than north of the tropics (Figs 1.2; 1.3).

The tropical regions of Africa are largely associated with higher temperatures, humidity, and rainfall. Countries here are predominantly associated with tropical forests and dense vegetation, sometimes transitioning into woodlands. These countries loosely include: Democratic Republic of the Congo (DRC), Republic of the Congo, Gabon, Equatorial Guinea, Nigeria, Cameroon, Central African Republic, South Sudan, Uganda, Kenya, Ethiopia, Somalia, Rwanda, Burundi, Ivory Coast, Togo, Liberia, and Benin. There is a relatively higher diversity of praying mantises in these countries compared to the rest of Africa, but it is unevenly spread between many countries in this bioregion; with DRC, Republic of the Congo, Cameroon, Kenya, and Tanzania having a much higher diversity than neighbouring countries with similar environmental and ecological conditions. It can be hypothesised that explorers who contributed to African mantodean taxonomy may have biased the sampling of certain countries depending on geographical distributions of language and which regions they visited, especially since many African countries at this time were colonized by European countries (Table 1.1). Cameroon and DRC were under European control from the 1870s, specifically German, British, French or Belgian rule, and this could have influenced the explorers that would visit these regions. This seems unlikely since many European countries that colonized

African countries with high praying mantis diversities also colonized African countries with a relatively lower diversity despite bordering each other: CAR (France, Germany, and Belgium), Congo (Belgium), Gabon (France), Nigeria (Britian), Ghana (Britian), Ivory Coast (France), and Liberia (USA). A large portion of praying mantises from tropical Africa were described by Werner (1928), an Austrian entomologist and herpetologist.

The aforementioned African countries with high praying mantis diversities also have larger land surface areas compared to neighbouring countries in this region, and this could explain a higher diversity of praying mantises here. Smaller countries, like Uganda, Burundi, Uganda, Gabon, Equatorial Guinea, Togo, and Benin, that neighbour larger ones may have been sampled but collectors may have used larger country names as specimen localities out of convenience, or these borders may not have been established in the past. This can be seen by vague locality data of specimens captured in DRC and Republic of the Congo that were labelled “Congo”, this will inevitably obscure provenance.

The predominant bioregions north of the equator are bushland thicket, leading to semi-desert, and eventually desert at the northernmost part of Africa – for the most part, these regions are hot and dry with little rainfall, but temperatures can be extremely cold at night. These regions have an overall low praying mantis diversity, largely due to the sparse vegetation biomass and harsh environmental conditions limiting their food supply. It is worth noting that despite the low diversity at genus level in these arid regions, the genus *Eremiaphila* Lefèbvre 1835, containing 101 African species, translates to ‘sand-loving’ and is well-adapted to cursorial living in desert environments, thus many countries north of the equator may not be accurately represented here.

Expeditions venturing into the eastern parts of Africa were common at the beginning of the 20th Century by naturalists representing several different nationalities: Rehn (USA), Sjöstedt (Sweden), and Chopard (France), but countries explored at the time were predominantly under Italian and British rule: Djibouti (France), Eritrea (Italy), Somalia (Italy), Kenya (Britian), Uganda (Britian), and Tanzania (Britian and Germany). Smaller countries like Eritrea and Djibouti have one and five recognized species of praying mantis within their borders respectively, and this could be due to under-sampling as they are smaller countries that are bordering larger ones that received more attention (e.g. Ethiopia, which was never colonised, and Somalia).

The overall higher praying mantis diversity south of the equator could be attributed to the warm, relatively humid environment, with frequent rainfall, specifically on the eastern coastline. Along the western

coastline, from Namibia to South Africa there is a large area of desert and semi-desert environments where temperatures are high, and rainfall is low (Bouvet et al. 2018). Both countries have a considerable number of praying mantis genera associated with them and this may be attributed to contributions by Alfred Kaltenbach (1996, 1998) an Austrian entomologist, who worked on these regions. Before Botswana's independence in 1966, it was under British rule and was considered one of the poorest and least developed countries in Africa (Acemoglu et al. 2002). This could potentially deter foreign naturalists from exploring these regions for several reasons and may explain the low praying mantis diversity compared to neighboring countries with similar woodland vegetation, like Zimbabwe and Zambia. Madagascar is predominantly tropical forest with high rainfall and humidity, it has quite a high diversity of praying mantises despite being geographically isolated from the main continent. This country also has an endemic family of praying mantises, Majangidae Giglio-Tos, 1915, that comprises ten species in four genera.

Sampling and research biases against Africa are present despite Africa's potential to carry a greater praying mantis diversity. Historically, inventorying African praying mantises was infrequent, but attempts were made that still provide valuable insight today (Rehn 1903, Kirby 1904, Sjöstedt 1910, 1924, Chopard 1914, Werner 1928, Kaltenbach 1996, 1998). Recently, Africa has been sampled more frequently (Tedrow et al. 2014, 2015, Moulin et al. 2017, Enan et al. 2017, Moulin 2018a, 2018b, 2020), and this may have stemmed from the improved understanding of the order globally (Svenson & Whiting 2004, 2009, Yager & Svenson 2008, Legendre et al. 2015, Svenson et al. 2015, Rivera & Svenson 2016, 2020, Svenson & Rodrigues 2017, Lin et al. 2022). Sampling biases affect other regions of Africa too, but it is emphasized nearer the equator. It seems that many expeditions prioritized more renowned countries but neglected smaller, bordering ones. It has become apparent that systematics was a predominantly Eurocentric occupation, at least for African mantodean taxonomy, and this can be seen by the major taxonomic contributors (Table 1.1) and the export of indigenous samples to the museums of foreign explorers.

CONCLUSIONS

Mantodean systematics has been a challenging task in the past, largely due to incongruences between morphological and genetic approaches. In the last two decades, a better understanding of the order has been achieved through combining genetic and genital morphological datasets, to the extent that almost all genera have their taxonomic position. For the first time since 2002, the order seems to be under control. This has sparked recent interest in many new researchers to pursue praying mantises, but despite

this, Africa remains largely understudied. We again place emphasis on the urgent need for a taxonomic revision of African Mantodea.

Chapter 2

The addition of African taxa into modern mantodean phylogenies

INTRODUCTION

Morphological vs genetic approaches

Historically, the classification of praying mantises was based on morphological features that often did not necessarily reflect the underlying ancestry of the order (Kirby 1904, Giglio-Tos 1927, Beier 1934a, 1934b, 1935a, 1935b, 1935c, 1935d, Kaltenbach 1996, 1998, Ehrmann 2002). Advances in genetic techniques have improved our understanding of the phylogeny of Mantodea: it has brought attention to knowledge-gaps and has provided a novel approach to resolving taxonomic uncertainties in morphological data. An energetic start was made to sequence praying mantis genes over the past decade, which has provided much-needed evidence for family-level relationships and has resolved many species complexes (Svenson & Whiting 2004, 2009, Yager & Svenson 2008, Legendre et al. 2015, Svenson & Rodrigues 2017, Rodrigues & Svenson 2018, Wang et al. 2020, Lin et al. 2022). Even with the success in molecule-based phylogenies, many praying mantises are represented only by specimens in museum collections that currently do not provide viable DNA for molecular analyses. This may potentially change as ancient and historical DNA become increasingly valuable (Raxworthy & Smith 2021, Jensen et al. 2022, Ferrari et al. 2023). About half the of the global number of mantis genera have molecular data associated with them, which leaves the systematic arrangement of many groups untested and provides scope for discovery.

Africa is rich and diverse in mantodean species, yet it is relatively under-sampled compared to the New World and Asia. Many authors have contributed to our current understanding of African praying mantises, yet only 83 of the >1100 species found in Africa have at least one partial gene sequence associated with them on GenBank. This clearly demonstrates the current research bias in African taxa. Recent exploration into Africa, specifically Gabon and Central African Republic, has produced promising results regarding mantis diversity and community structure, with new distribution records and new species discoveries being some highlights (Moulin et al. 2017, Moulin 2018a, 2018b, 2020). A recent resumption of cataloguing of South African mantises has revealed that the country has significantly more species than previously reported (Greyvenstein et al. 2020b, 2021b, 2021a, 2022, 2023). With the recent attention to this extremely diverse and species-rich continental fauna, new species are expected to be discovered that would greatly add to the understanding of the order.

There is an active effort towards adopting DNA barcoding for insect identification and discovery – because it is often portrayed as a solution to all taxonomic uncertainties (DeSalle & Goldstein 2019, Meierotto et al. 2019). There have been many successes in using DNA barcoding for insects, but also controversy regarding this method from a taxonomic perspective (Zamani et al. 2021). The success of species-level identification depends on the comprehensiveness of the database, with the most reliable way of obtaining these data being to acquire DNA from the holotype or perhaps a paratype. Often with praying mantises, holotypes can date back to the mid-eighteenth century and DNA is not yet salvageable from these specimens, but most newly described species have molecular data associated with their descriptions. Despite this, barcoding may be a valuable tool in the future, particularly regarding: nymphal specimens (of which some are impossible to identify to species level); moults that are often obtained when temporality housing a mantis nymph; and ootheca, which are also being developed as a means of morphological identification; or suggesting new species candidates in convergent groups (Witt et al. 2006, Smith et al. 2007, Hajibabaei et al. 2007).

There have been numerous and continuously improving attempts to construct mantodean phylogenies. The first, widely accepted morphology-based phylogeny was proposed by Beier (Beier 1934a, 1934b, 1935a, 1935b, 1935c, 1935d), with the most recent being that of Ehrmann and Roy (Ehrmann 2002). The onset of DNA-based phylogenies produced results that were rather contradictory to accepted Mantodean classification at the time. Early large-scale molecular studies produced many polyphyletic phylogenies (Svenson & Whiting 2004, 2009, Legendre et al. 2015, Svenson et al. 2015), but as time progressed and interest in praying mantis taxonomy grew, genera began to find their phylogenetic positions and our understanding of the order expanded. The currently accepted mantodean classification was proposed by Schwarz and Roy (2019), constructed with both molecular and morphological data, which appeared to resolve many uncertainties associated with unsequenced taxa.

The current classification

Praying mantises are the monophyletic sister-group to cockroaches and termites (Fig. 2.1) (Tautz et al. 2003, Grimaldi 2003, Inward et al. 2007, Ware et al. 2008, Béthoux & Wieland 2009, Legendre et al. 2015, Hörnig et al. 2017, Djernæs & Murienne 2022). It is agreed that the basal families within Mantodea are Chaeteessidae, Mantoididae, and Metallyticidae. Chaeteessidae is considered the most roach-like. The relationship between Mantoididae and Metallyticidae is still uncertain, although Metallyticidae is favored as more derived.

The 'earless praying mantises' (Amerimantodea) comprises the thespoid and acanthopoid groups (Thespidae, Acanthopidae, Angelidae, Liturgusidae, and Photinidae) and can be considered a paraphyletic sister grade subtending the rest of the praying mantises (Cernomantodea); it is largely taxonomically resolved (Svenson & Whiting 2004, 2009, Yager & Svenson 2008, Rivera & Svenson 2016, 2020, Schwarz & Roy 2019, Jensen et al. 2022). The upgrading of Thespidae to superfamily rank is still under debate (Rivera & Svenson 2016, 2020, Schwarz & Roy 2019), but their phylogenetic position in relation to other Mantodea remains the same except where Thespidae was placed as a sister-group to the Mantodidae and Metallyticidae, albeit with low support (Legendre et al. 2015).

Cernomantodea constitutes the remaining twenty families grouped into eleven superfamilies (Schwarz & Roy 2019). The most basal of this group is Nanomantodea (Chroicopteidae, Leptomantellidae, Amorhoscelidae, and Nanomantidae), a monophyletic sister group to the remaining superfamilies (Yager & Svenson 2008, Svenson & Whiting 2009, Legendre et al. 2015).

The most distal part of the mantodean phylogeny consists of Miomantidae, Galinthiidae, Empusidae, Hymenopodidae, Dactylopterygidae, Deroplatyidae and Mantidae – sometimes with Hoplocoryphidae closely related to Miomantidae or *Galinthias* (Yager & Svenson 2008, Svenson et al. 2015). Galinthiidae, Hymenopodidae and Empusidae seem to be understood (Roy & Stiewe 2014, Svenson et al. 2015), although the paraphyly of Deroplatyidae needs attention (Lin et al. 2022). Sandwiched between these two clades are several superfamilies (Schwarz & Roy 2019): Gonypetoidea (Gonypetidae), Epaphroditoidea (Majangidae and Epahproditidae), Haanioidea (Haaniidae), Eremiaphiloidea (Rivetinidae, Amelidae, Eremiaphilidae, and Toxoderidae) and Hoplocoryphoidea (Hoplocoryphidae). Multiple molecule-based studies of praying mantises have begun to elucidate family-level relationships and allowed their interpretation.

Nominally, 1104 species occur in Africa, spread amongst 17 families, but their relationship remains to be tested as so few have been sequenced so far. We present a phylogeny of praying mantises based on a quantitative analysis of molecular data. A robust phylogeny will allow us to i) test the monophyly of African praying mantis families and subfamilies, and ii) evaluate the classification scheme proposed by Schwarz and Roy (2019).

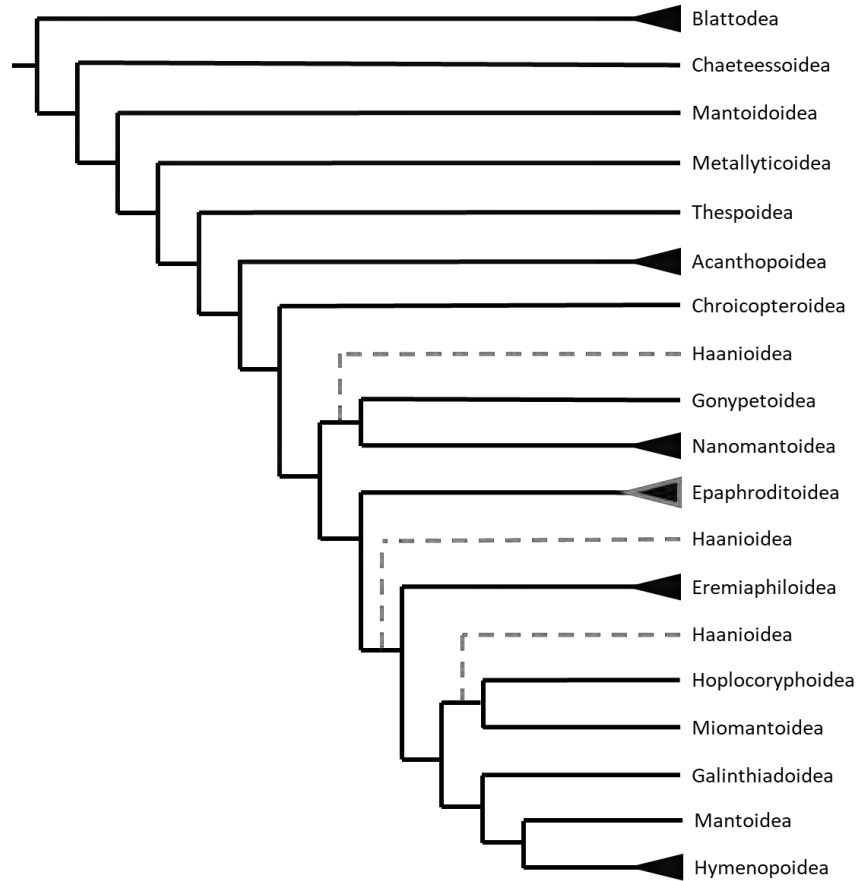


Figure 2.1. Stick diagram summarising the current status quo of praying mantis superfamilies. Black triangles represent that multiple families are present in that superfamily. Epaphroditoidea (Epaphroditidae + Majangidae) has molecular data associated only with Epaphroditidae and relates to Majangellidae through morphological data. Dotted lines represent the three positions where Haanioidea has been placed in previous studies.

METHODS

Thirty-seven specimens were captured in South Africa (Eastern Cape, KwaZulu Natal, Gauteng and Limpopo provinces), Angola (Moxico) and Namibia (Windhoek), and preserved in 95% ethanol. Sampling methods included sweep netting, light trapping, and active searching of the ground and vegetation. Specimens were identified through diagnostic keys and various online sources (Table 2.2), and voucher specimens were deposited at Albany Museum (Makhanda/Grahamstown, South Africa).

Samples underwent a total genomic DNA extraction using the Qiagen DNeasy® kit, following the manufacturer’s protocol for animal tissue. Portions of two mitochondrial markers (16S rDNA, ~373 bp;

COI, ~624 bp) and two nuclear markers (28S rDNA, ~2078 bp; H3, ~288 bp) were selected for amplification and sequencing because they offer a spectrum of mutation rates that are pertinent to overlapping levels of taxonomic convergence. The COI gene proved troublesome to work with during the amplification process, with smudged bands appearing in the gel electrophoresis photographs for numerous species and amplification profiles. Hence, for time constraints, it was excluded from the sequences. Polymerase chain reactions (PCR) were conducted in a Veriti™ 96-well thermal cycler (Applied Biosystems by Thermo Fisher Scientific) at 25 µl volumes; 12.5 µl Ampliqon 2x Taq mastermix, 2 µl of each primer diluted to 10 µM, 6.5 µl PCR-grade ddH₂O, and 2 µl DNA extract at 15-90 ng/µl. Primers were selected from previous studies (Whiting 2002, Svenson & Whiting 2004, Legendre et al. 2008) (Table 2.3) using amplification profiles modified from published works (Whiting 2002, Svenson & Whiting 2004, 2009, Legendre et al. 2008) (Table 2.4). Gel electrophoresis was used to confirm visually that the PCR products amplified successfully (1% agarose solution containing ethidium bromide), and a negative control was implemented to test for contamination. Forward sequences were produced, after purification, at Macrogen Inc., Netherlands.

To contextualize the taxonomic position of the African praying mantises, a wide range of exemplars was chosen from the material available on the NCBI GenBank database (Benson et al. 2012, Meiklejohn et al. 2019). Each exemplar had to be represented by at least three out of the four target genes (28S, 16S, H3 and COI), which resulted in the selection of 173 ingroup exemplars representing 165 genera in 24 families (Table 2.1). Four cockroaches were also selected as outgroup exemplars.

Alignments were carried out in MEGA 7 using ClustalW with default settings (Kumar et al. 2016). Saturation tests were run for the protein coding genes using DAMBE. Model tests were carried out for each gene using IQtree v2.1.6 (Nguyen et al 2015) to determine which evolutionary model best fits the current dataset using the BIC criterion; 28S (GTR+I+G), 16S (GTR+I+G), H3 (GTR+I+G), COI codon 1+2 (GTR+I+G), COI codon 3 (TIM+G). A Bayesian Inference analysis (BI) was run on the partitioned dataset using MrBayes v3.2.7a for 40 million generations using four parallel chains, with a burn-in of 50%, and sampling trees every 2000 generations (Ronquist et al. 2012). A Maximum Likelihood analysis (ML) was run on the partitioned dataset using IQtree v2.1.6 for 20 thousand replicates, using ultrafast bootstrapping (Chernomor et al. 2016, Minh et al. 2022). Both BI and ML algorithms were run through the CIPRES Science Gateway (Miller et al. 2010).

Table 2.1. Metadata from GenBank, showing specimen identification and corresponding accession numbers for genes associated with this study. Listed alphabetically, with cockroaches before praying mantises.

Family	Taxon List	Specimen I.D.	28S	16S	H3	COI
Blaberidae	<i>Gromphadorhina porentosa</i>	B01	EF383626.1	-	AY491322.1	1EF383793.1
Blaberidae	<i>Gyna capucina</i>	BL048	FJ806517.1	FJ806138.1	-	FJ802744.1
Blattidae	<i>Blatta orientalis</i>	BL097	FJ806521.1	FJ806140.1	-	FJ802746.1
Cryptocercidae	<i>Cryptocercus relictus</i>	DBG2	MK909387.1	MK909278.1	MK909526.1	MK909557.1
Acanthopidae	<i>Acanthops falcata</i>	MN562	KU320480.1	KU320295.1	KU507823.1	KU507627.1
Acanthopidae	<i>Acontista gracilis</i>	MN511	KU320487.1	KU320301.1	KU507830.1	KU507634.1
Acanthopidae	<i>Decimiana tessellata</i>	MN436	KU320508.1	KU507852.1	-	KU507654.1
Acanthopidae	<i>Metilia boliviana</i>	MN311	FJ806680.1	FJ806282.1	FJ806838.1	FJ802881.1
Acanthopidae	<i>Pseudacanthops centralis</i>	MN531	KU320564.1	KU320360.1	KU507909.1	KU507709.1
Acanthopidae	<i>Raptrix occidentalis</i>	MN521	KU320572.1	KU320366.1	KU507917.1	KU507717.1
Amelidae	<i>Litaneutria minor</i>	MN045	AY491254.1	AY491133.1	AY491368.1	EF383818.1
Amorphoscelidae	<i>Amorphoscelis austrogermanica</i>	MN176	FJ806609.1	FJ806219.1	FJ806770.1	FJ802821.1
Amorphoscelidae	<i>Caudatoscelis marmorata</i>	MN239	EF383771.1	EF383444.1	EF384182.1	EF383925.1
Angelidae	<i>Angela sp_1</i>	MN355	KU557281.1	KU557272.1	KU557259.1	-
Angelidae	<i>Angela sp_2</i>	MN353	KU557280.1	KU557271.1	KU557258.1	KU557247.1
Angelidae	<i>Angela sp_3</i>	MN120	EF383704.1	EF383381.1	EF384120.1	EF383864.1
Chroicopteridae	<i>Bolbella punctigera</i>	MN189	FJ806615.1	FJ806225.1	FJ806776.1	FJ802827.1
Chroicopteridae	<i>Dystacta alticeps</i>	MN187	FJ806614.1	FJ806224.1	FJ806775.1	FJ802826.1
Chroicopteridae	<i>Dystactula grisea</i>	MN197	EF383741.1	EF383415.1	EF384153.1	EF383897.1
Chroicopteridae	<i>Entella delalandi</i>	MN183	FJ806612.1	FJ806222.1	FJ806773.1	FJ802824.1
Chroicopteridae	<i>Entelloptera saussurei</i>	MN182	EF383735.1	EF383409.1	EF384147.1	EF383891.1
Chroicopteridae	<i>Ligaria brevicollis_ignota</i>	MN138	FJ806591.1	FJ806205.1	FJ806755.1	FJ802809.1
Chroicopteridae	<i>Ligariella gracilis</i>	MN260	EF383781.1	EF383454.1	EF384192.1	EF383935.1
Chroicopteridae	<i>Ligentella beieri</i>	MN299	FJ806666.1	FJ806271.1	FJ806826.1	FJ802871.1

Chroicopteridae	<i>Namamantis nigropunctata</i>	MN302	FJ806670.1	FJ806274.1	FJ806829.1	FJ802873.1
Chroicopteridae	<i>Tarachina occidentalis</i>	MN237	EF383769.1	EF383442.1	EF384180.1	EF383923.1
Coptopterygidae	<i>Brunneria sp</i>	MN362	KU557282.1	-	KU557260.1	KU557248.1
Coptopterygidae	<i>Coptopteryx argentina</i>	MN609	KU320504.1	KU320316.1	KU507848.1	KU507650.1
Coptopterygidae	<i>Coptopteryx brevipennis</i>	MN545	KU320506.1	KU320318.1	KU507850.1	KU507652.1
Coptopterygidae	<i>Coptopteryx thoracica</i>	MN612	KU320507.1	KU320319.1	KU507851.1	KU507653.1
Dactylopterygidae	<i>Dactylopteryx flexuosa</i>	MN242	EF383773.1	EF383446.1	EF384184.1	EF383927.1
Dactylopterygidae	<i>Theopompella chopardi</i>	MN230	EF383764.1	EF383437.1	EF384175.1	EF383918.1
Deroplatyidae	<i>Danuria thunbergi</i>	MN277	EF383791.1	EF383464.1	EF384199.1	EF383945.1
Deroplatyidae	<i>Deroplatys truncata</i>	MN349	FJ806720.1	FJ806320.1	FJ806872.1	FJ802918.1
Deroplatyidae	<i>Euchomenella sp</i>	MN091	FJ806568.1	FJ806182.1	FJ806733.1	FJ802786.1
Deroplatyidae	<i>Leptocola stanleyana</i>	MN284	FJ806648.1	FJ806259.1	FJ806812.1	FJ802859.1
Deroplatyidae	<i>Popa spurca</i>	MN133	EF383710.1	EF383387.1	EF384126.1	EF383870.1
Deroplatyidae	<i>Stenopyga ziela</i>	MN235	EF383767.1	EF383440.1	EF384178.1	EF383921.1
Empusidae	<i>Empusa guttula</i>	MN132	EF383709.1	EF383386.1	EF384125.1	EF383869.1
Empusidae	<i>Gongylus gongylodes</i>	MN006	EF383634.1	EF383312.1	AY491331.1	EF383797.1
Empusidae	<i>Idolomantis diabolica</i>	MN193	EF383738.1	EF383412.1	EF384150.1	EF383894.1
Empusidae	<i>Idolomorpha dentifrons</i>	MN175	EF383731.1	EF383405.1	EF384143.1	EF383887.1
Epaphroditidae	<i>Epaphrodita musarum</i>	MN435	KR360581.1	KR360511.1	KY783805.1	KY783773.1
Epaphroditidae	<i>Gonatista jaiba</i>	MN440	MF414716.1	MF414709.1	MF414721.1	MF414718.1
Eremiaphilidae	<i>Antistia maculipennis</i>	MN305	FJ806674.1	FJ806276.1	FJ806832.1	FJ802875.1
Eremiaphilidae	<i>Didymocorypha lanceolata</i>	MN087	EF383687.1	EF383364.1	EF384103.1	EF383847.1
Eremiaphilidae	<i>Eremiaphila rotundipennis</i>	MN064	EF383668.1	EF383347.1	EF384086.1	EF383830.1
Eremiaphilidae	<i>Galepsus sp</i>	MN259	EF383780.1	EF383453.1	EF384191.1	EF383934.1
Eremiaphilidae	<i>Iris oratoria</i>	MN184	EF383739.1	EF383413.1	EF384151.1	EF383895.1
Eremiaphilidae	<i>Nothogalepsus planivertex</i>	MN174	FJ806608.1	FJ806218.1	FJ806769.1	FJ802820.1
Eremiaphilidae	<i>Paragalepsus toganus</i>	MN243	EF383774.1	EF383447.1	EF384185.1	EF383928.1
Eremiaphilidae	<i>Parathespis humbertiana</i>	PS75	JF792822.1	EF383455.1	-	EF383936.1
Eremiaphilidae	<i>Pyrgomantis jonesi</i>	MN224	EF383758.1	EF383431.1	EF384169.1	EF383912.1

Eremiaphilidae	<i>Schizocephala bicornis_1</i>	MN065	EF383669.1	EF383348.1	EF384087.1	EF383831.1
Eremiaphilidae	<i>Tarachodes afzelii</i>	MN158	FJ806604.1	FJ806214.1	FJ806765.1	FJ802817.1
Eremiaphilidae	<i>Tarachodula pantherina</i>	MN309	FJ806678.1	FJ806280.1	FJ806836.1	FJ802879.1
Galinthiadiidae	<i>Congoharpax aberrans</i>	MN229	EF383763.1	EF383436.1	EF384174.1	EF383917.1
Galinthiadiidae	<i>Galinthias ameona</i>	MN288	FJ806654.1	FJ806261.1	FJ806816.1	FJ802863.1
Galinthiadiidae	<i>Harpagomantis tricolor</i>	MN473	KR360595.1	KR360527.1	-	KR360618.1
Gonypetidae	<i>Bimantis malaccana</i>	MN331	FJ806700.1	FJ806302.1	FJ806857.1	FJ802900.1
Gonypetidae	<i>Elmantis trincomaliae</i>	MN261	FJ806639.1	FJ806250.1	FJ806801.1	FJ802853.1
Gonypetidae	<i>Gimantis insularis</i>	MN332	FJ806701.1	FJ806303.1	FJ806858.1	FJ802901.1
Gonypetidae	<i>Gonypeta borneana</i>	MN097	EF383691.1	EF383368.1	EF384107.1	EF383851.1
Gonypetidae	<i>Gonypetyllis semuncialis</i>	MN210	EF383749.1	EF383423.1	EF384161.1	EF383904.1
Gonypetidae	<i>Hapalopeza nitens</i>	MN316	FJ806685.1	FJ806287.1	FJ806843.1	FJ802886.1
Gonypetidae	<i>Humbertiella similis</i>	MN069	EF383672.1	EF383351.1	EF384090.1	EF383834.1
Gonypetidae	<i>Myrcinus tuberosus</i>	MN257	FJ806637.1	FJ806248.1	FJ806799.1	FJ802851.1
Hoplocoryphidae	<i>Hoplocorypha sp_1</i>	MN139	FJ806592.1	FJ806206.1	FJ806756.1	FJ802810.1
Hymenopodidae	<i>Acromantis insularis</i>	MN075	EF383677.1	EF383356.1	EF384095.1	EF383839.1
Hymenopodidae	<i>Anasigerpes bifasciata</i>	MN241	EF383772.1	EF383445.1	EF384183.1	EF383926.1
Hymenopodidae	<i>Anaxarcha limbata</i>	MN080	FJ806564.1	FJ806178.1	FJ806729.1	FJ802782.1
Hymenopodidae	<i>Ceratomantis kimberlae</i>	MN326	FJ806695.1	FJ806297.1	FJ806852.1	FJ802896.1
Hymenopodidae	<i>Chloroharpax modesta</i>	MN234	EF383766.1	EF383439.1	EF384177.1	EF383920.1
Hymenopodidae	<i>Chrysomantis cachani</i>	MN225	EF383759.1	EF383432.1	EF384170.1	EF383913.1
Hymenopodidae	<i>Citharomantis falcata</i>	MN102	EF383695.1	EF383372.1	EF384111.1	EF383855.1
Hymenopodidae	<i>Creobroter apicalis</i>	MN466	KR360589.1	KR360521.1	KR360681.1	KR360615.1
Hymenopodidae	<i>Ephestiasula sp</i>	MN063	EF383667.1	EF383346.1	EF384085.1	-
Hymenopodidae	<i>Hestiasula masoni</i>	MN297	FJ806665.1	FJ806270.1	FJ806825.1	-
Hymenopodidae	<i>Hymenopus cornatus</i>	MN010	EF383638.1	EF383316.1	AY491334.1	EF383800.1
Hymenopodidae	<i>Junodia amoena</i>	MN286	FJ806650.1	FJ806260.1	FJ806814.1	FJ802861.1
Hymenopodidae	<i>Otomantis scutigera</i>	MN155	FJ806597.1	FJ806211.1	FJ806761.1	FJ802816.1
Hymenopodidae	<i>Oxypiloidea subcornuta</i>	MN281	EF383792.1	EF383465.1	FJ806809.1	EF383946.1

Hymenopodidae	<i>Oxypilus transvalensis</i>	MN172	FJ806607.1	FJ806217.1	FJ806768.1	FJ802819.1
Hymenopodidae	<i>Panurgica fratercula</i>	MN227	EF383761.1	EF383434.1	EF384172.1	EF383915.1
Hymenopodidae	<i>Phyllocrania paradoxa</i>	MN011	EF383639.1	EF383317.1	-	EF383801.1
Hymenopodidae	<i>Phyllothelys westwoodi</i>	MN076	EF383678.1	EF383357.1	EF384096.1	EF383840.1
Hymenopodidae	<i>Pseudocreobotra ocellata</i>	MN231	EF383765.1	EF383438.1	EF384176.1	EF383919.1
Hymenopodidae	<i>Psychomantis boreensis</i>	MN468	KR360591.1	KR360523.1	KR360683.1	KR360617.1
Hymenopodidae	<i>Rhomantis sp</i>	MN106	EF383698.1	EF383375.1	EF384114.1	EF383858.1
Hymenopodidae	<i>Sibylla pretiosa</i>	MN173	EF383730.1	EF383404.1	EF384142.1	EF383886.1
Hymenopodidae	<i>Theopropus elegans</i>	MN094	FJ806571.1	FJ806185.1	FJ806735.1	FJ802789.1
Leptomantellidae	<i>Leptomantella albella</i>	MN319	FJ806688.1	FJ806290.1	FJ806846.1	FJ802889.1
Liturgusidae	<i>Hagiomantis superba</i>	MN215	EF383752.1	EF383426.1	EF384164.1	EF383907.1
Liturgusidae	<i>Liturgusa cursor</i>	MN620	KU320516.1	KU320326.1	KU507860.1	KU507662.1
Liturgusidae	<i>Liturgusa maya</i>	MN621	KU320519.1	KU320329.1	KU507863.1	KU507665.1
Mantidae	<i>Antemna rapax</i>	MN147	EF383716.1	EF383393.1	EF384132.1	EF384003.1
Mantidae	<i>Archimantis sobrina</i>	MN012	EF383640.1	EF383318.1	AY491336.1	EF383802.1
Mantidae	<i>Austrovates variegata</i>	MN084	EF383684.1	EF383362.1	EF384101.1	EF383845.1
Mantidae	<i>Camelomantis moultoni</i>	MN130	FJ806587.1	FJ806201.1	FJ806751.1	FJ802805.1
Mantidae	<i>Choeradodis rhombicollis</i>	MN016	EF383643.1	EF383481.1	AY491340.1	EF383805.1
Mantidae	<i>Choeradodis stalii</i>	MN127	EF383708.1	EF383385.1	EF384124.1	EF383868.1
Mantidae	<i>Hierodula schultzei</i>	MN044	EF383654.1	EF383333.1	AY491367.1	EF383817.1
Mantidae	<i>Hierodulella reticulata</i>	MN342	FJ806712.1	FJ806313.1	FJ806865.1	FJ802911.1
Mantidae	<i>Omomantis sp</i>	MN276	EF383790.1	EF383463.1	FJ806805.1	EF383944.1
Mantidae	<i>Orthodera novaezealandiae</i>	MN007	EF383635.1	EF383313.1	EF384078.1	EF383798.1
Mantidae	<i>Plistospilota guineensis</i>	MN236	EF383768.1	EF383441.1	EF383922.1	EF384179.1
Mantidae	<i>Polyspilota aeruginosa</i>	MN248	FJ806633.1	FJ806244.1	FJ806795.1	FJ802847.1
Mantidae	<i>Prohierodula ornatipennis</i>	MN249	EF383776.1	EF383449.1	EF384187.1	EF383930.1
Mantidae	<i>Pseudomantis albofimbriata</i>	MN314	FJ806683.1	FJ806285.1	FJ806841.1	FJ802884.1
Mantidae	<i>Pseudovates denticulata</i>	MN312	FJ806681.1	FJ806283.1	FJ806839.1	FJ802882.1
Mantidae	<i>Rhombodera stalii</i>	MN018	EF383644.1	EF383322.1	AY491342.1	EF383806.1

Mantidae	<i>Sphodromantis viridis</i>	MN013	FJ806538.1	FJ806154.1	AY491337.1	FJ802756.1
Mantidae	<i>Sphodropoda sp</i>	MN275	EF383789.1	EF383462.1	EF384198.1	EF383943.1
Mantidae	<i>Stagmomantis limbata</i>	MN031	EF383650.1	EF383328.1	AY491355.1	EF383812.1
Mantidae	<i>Statilia apicalis</i>	MN050	AY491259.1	EF383336.1	AY491372.1	EF383820.1
Mantidae	<i>Tamolonica tamolana</i>	MN020	EF383645.1	EF383323.1	AY491344.1	EF383807.1
Mantidae	<i>Tarachomantis caldwellii</i>	MN310	FJ806679.1	FJ806281.1	FJ806837.1	FJ802880.1
Miomantidae	<i>Cilnia humeralis</i>	MN308	FJ806677.1	FJ806279.1	FJ806835.1	FJ802878.1
Miomantidae	<i>Miomantis paykullii</i>	MN245	FJ806630.1	FJ806241.1	FJ806792.1	FJ802844.1
Miomantidae	<i>Parasphendale sp</i>	MN195	EF383740.1	EF383414.1	EF384152.1	EF383896.1
Nanomantidae	<i>Bolbe pygmea</i>	MN040	FJ806553.1	FJ806168.1	-	FJ802771.1
Nanomantidae	<i>Bolbena hottentotta</i>	MN258	FJ806638.1	FJ806249.1	FJ806800.1	FJ802852.1
Nanomantidae	<i>Calofulcinia sp</i>	MN251	EF383777.1	EF383450.1	EF384188.1	EF383931.1
Nanomantidae	<i>Chloromantis rhombica</i>	MN051	EF383657.1	EF383337.1	AY491373.1	EF383821.1
Nanomantidae	<i>Cliomantis cornuta</i>	MN055	FJ806559.1	FJ806174.1	AY491376.1	FJ802777.1
Nanomantidae	<i>Eomantis guttatipennis</i>	MN074	EF383676.1	EF383355.1	EF384094.1	EF383838.1
Nanomantidae	<i>Gyromantis occidentalis</i>	MN056	EF383660.1	EF383340.1	AY491377.1	EF383824.1
Nanomantidae	<i>Hapalomantis congica_katangica</i>	MN291	FJ806657.1	FJ806264.1	FJ806819.1	FJ802865.1
Nanomantidae	<i>Hapalomantis orba</i>	MN280	FJ806645.1	FJ806256.1	FJ806808.1	FJ802858.1
Nanomantidae	<i>Hyalomantis sp</i>	MN220	EF383757.1	EF383430.1	EF384168.1	EF383911.1
Nanomantidae	<i>Miromantis mirandula</i>	MN338	FJ806708.1	FJ806309.1	FJ806862.1	FJ802907.1
Nanomantidae	<i>Neomantis hyalina</i>	MN052	EF383658.1	EF383338.1	AY491374.1	EF383822.1
Nanomantidae	<i>Nilomantis edmundsi</i>	MN244	EF383775.1	EF383448.1	EF384186.1	EF383929.1
Nanomantidae	<i>Paraoxyphilus tasmaniensis</i>	MN022	AY491232.1	AY491111.1	AY491346.1	EF383808.1
Nanomantidae	<i>Paraoxyphilus verreauxii</i>	MN008	EF383636.1	EF383314.1	AY491332.1	FJ802755.1
Nanomantidae	<i>Sceptuchus simplex</i>	MN104	EF383697.1	EF383374.1	EF384113.1	EF383857.1
Nanomantidae	<i>Stenomantis novaeguinea</i>	MN039	AY491248.1	AY491128.1	AY491362.1	EF383814.1
Nanomantidae	<i>Tropidomantis tenera</i>	MN341	FJ806711.1	FJ806312.1	FJ806864.1	FJ802910.1
Nanomantidae	<i>Tylomantis sp</i>	MN047	AY491256.1	AY491135.1	AY491370.1	EF383819.1
Photinaidae	<i>Cardioptera squalodon</i>	MN539	KU320391.1	KU320307.1	KU507838.1	KU507640.1

Photinidae	<i>Chromatophotina sp</i>	MN603	KU320503.1	KU320315.1	KU507847.1	KU507649.1
Photinidae	<i>Hicetia sp</i>	MN502	KU320513.1	KU320323.1	KU507857.1	KU507659.1
Photinidae	<i>Metriomantis pilosella</i>	MN538	KU320531.1	KU320339.1	KU507875.1	KU507677.1
Photinidae	<i>Microphotina vitripennis</i>	MN357	KU557283.1	KU557273.1	KU557261.1	KU557249.1
Photinidae	<i>Orthoderella ornata</i>	MN129	FJ806586.1	FJ806200.1	FJ806750.1	FJ802804.1
Photinidae	<i>Paraphotina occidentalis</i>	MN356	KU557284.1	KU557274.1	KU557262.1	KU557250.1
Photinidae	<i>Photina sp</i>	MN295	FJ806662.1	FJ806268.1	FJ806823.1	FJ802869.1
Photinidae	<i>Photinella sp</i>	MN499	KU320561.1	KU320357.1	KU507906.1	KU507706.1
Photinidae	<i>Photiomantis planicephala</i>	MN761	KU320562.1	KU320358.1	KU507907.1	KU507707.1
Rivetinidae	<i>Deiphobe sp</i>	MN256	FJ806636.1	FJ806247.1	FJ806798.1	FJ802850.1
Rivetinidae	<i>Deiphobella laticeps</i>	MN066	EF383670.1	EF383349.1	EF384088.1	EF383832.1
Thespidae	<i>Anamiopteryx tuberculata</i>	MN714	KU320488.1	-	KU507832.1	KU507636.1
Thespidae	<i>Bantia weneri</i>	MN115	FJ806578.1	FJ806192.1	FJ806742.1	FJ802796.1
Thespidae	<i>Carrikerella sp</i>	MN561	KU320497.1	KU320311.1	KU507843.1	KU507645.1
Thespidae	<i>Eumiopteryx sp1</i>	MN560	KU320510.1	KU320320.1	KU507853.1	KU507655.1
Thespidae	<i>Eumusonia livida</i>	MN123	EF383706.1	EF383383.1	EF384122.1	EF383866.1
Thespidae	<i>Galapagia peruana</i>	MN494	KU320512.1	KU320322.1	KU507856.1	KU507658.1
Thespidae	<i>Leptomiopteryx dispar</i>	MN718	KU320514.1	KU320324.1	KU507858.1	KU507660.1
Thespidae	<i>Macromusonia conspersa</i>	MN567	KU320522.1	KU320332.1	KU507865.1	KU507668.1
Thespidae	<i>Mantillica nigricans</i>	MN495	KU320525.1	-	KU507868.1	KU507670.1
Thespidae	<i>Miobantia fuscata</i>	MN716	KU320538.1	KU320346.1	KU507882.1	KU507684.1
Thespidae	<i>Musonia sp</i>	MN721	KU320539.1	-	KU507884.1	KU507686.1
Thespidae	<i>Musoniella margheritae</i>	MN571	KU320541.1	KU320348.1	KU507886.1	KU507688.1
Thespidae	<i>Musoniola sp</i>	MN588	KU320546.1	-	KU507891.1	KU507693.1
Thespidae	<i>Oligonicella scudderi</i>	MN057	EF383661.1	EF383341.1	EF384080.1	EF383825.1
Thespidae	<i>Oligonyx insularis</i>	MN726	KU320556.1	KU320355.1	KU507901.1	KU507701.1
Thespidae	<i>Pseudomusonia sp</i>	MN720	KU320569.1	-	KU507914.1	KU507714.1
Thespidae	<i>Pseudopogonogaster kanjaris</i>	MN497	KU320570.1	KU320364.1	KU507915.1	KU507715.1
Thespidae	<i>Thesprotia graminis</i>	MN058	EF383662.1	EF383342.1	EF384081.1	EF383826.1

Thespidae	<i>Thesprotiella peruana</i>	MN269	FJ806640.1	FJ806251.1	FJ806802.1	FJ802854.1
Thespidae	<i>Thrinaconyx fumosus</i>	MN046	AY491255.1	FJ806170.1	AY491369.1	FJ802773.1
Toxoderidae	<i>Aethalochroa sp</i>	MN264	EF383783.1	EF383456.1	EF384193.1	EF383937.1
Toxoderidae	<i>Compsothespis sp</i>	MN282	FJ806646.1	FJ806257.1	FJ806810.1	-
Toxoderidae	<i>Heterochaetula fissispinis</i>	MN207	EF383746.1	EF383420.1	EF384158.1	EF383901.1
Toxoderidae	<i>Oxyothespis sp</i>	MN283	FJ806647.1	FJ806258.1	FJ806811.1	-
Toxoderidae	<i>Stenotoxodera porioni_1</i>	MN090	EF383689.1	EF383366.1	EF384105.1	EF383849.1
Toxoderidae	<i>Toxoderopsis taurus</i>	MN068	EF383671.1	EF383350.1	EF384089.1	EF383833.1
Chroicopteridae	<i>Dystactula grisea</i>	Gen_015	PQ226249	PQ226204		-
Chroicopteridae	<i>Tarachina sp</i>	Gen_069	PQ226263	PQ226217		-
Chroicopteridae	<i>Chroicopterina sp</i>	Gen_079	PQ226266	PQ226220		-
Chroicopteridae	<i>Chroicopterina sp</i>	Gen_090	-	PQ226221		-
Chroicopteridae	<i>Entelloptera rogenhoferi</i>	Gen_104	PQ226273	PQ226227		-
Deropladyidae	<i>Popa spurca</i>	Gen_008	PQ226246	PQ226199		-
Deropladyidae	<i>Popa spurca</i>	Gen_067	PQ226261	PQ226215		-
Deropladyidae	<i>Danuria sp</i>	Gen_092	PQ226268	PQ226222		-
Empusidae	<i>Hemiempusa capensis</i>	Gen_074	PQ226264	PQ226218		-
Empusidae	<i>Empusa guttula</i>	Gen_155	PQ226277	-		-
Eremiaphilidae	<i>Nothogalepsus planivertex</i>	Gen_019	PQ226250	PQ226205		-
Eremiaphilidae	<i>Galepsus sp</i>	Gen_022	PQ226251	PQ226206		-
Eremiaphilidae	<i>Galepsus sp</i>	Gen_024	PQ226252	-		-
Eremiaphilidae	<i>Galepsus sp</i>	Gen_028	PQ226254	PQ226208		-
Eremiaphilidae	<i>Galepsus sp</i>	Gen_038	PQ226256	PQ226210		-
Eremiaphilidae	<i>Tarachodina sp</i>	Gen_043	PQ226257	PQ226211		-
Eremiaphilidae	<i>Tarachodina sp</i>	Gen_051	PQ226258	PQ226212		-
Eremiaphilidae	<i>Tarachodina sp</i>	Gen_078	PQ226265	PQ226219		-
Eremiaphilidae	<i>Pyrgomantis sp</i>	Gen_095	PQ226269	PQ226223		-
Eremiaphilidae	<i>Tarachodina sp</i>	Gen_101	PQ226272	PQ226226		-
Eremiaphilidae	<i>Tarachodina sp</i>	Gen_105	PQ226274	-		-
Galinthiadiidae	<i>Galinthias amoena</i>	Gen_099	PQ226271	PQ226225		-

Hoplocoryphidae	<i>Hoplocorypha sp</i>	Gen_010	-	PQ226200	-
Hoplocoryphidae	<i>Hoplocorypha sp</i>	Gen_066	PQ226260	PQ226214	-
Hoplocoryphidae	<i>Hoplocorypha sp</i>	Gen_096	PQ226270	PQ226224	-
Hymenopodidae	<i>Sibylla pretiosa</i>	Gen_026	PQ226253	PQ226207	-
Hymenopodidae	<i>Oxypilus sp</i>	Gen_087	PQ226267	-	-
Hymenopodidae	<i>Phyllocrania paradoxa</i>	Gen_153	-	PQ226229	-
Hymenopodidae	<i>Sibylla pretiosa</i>	Gen_154	PQ226276	PQ226230	-
Mantidae	<i>Omomantis zebrata</i>	Gen_011	PQ226247	PQ226201	-
Mantidae	<i>Polyspilota sp</i>	Gen_052	PQ226259	PQ226213	-
Mantidae	<i>Sphodromantis sp</i>	Gen_129	PQ226275	PQ226228	-
Miomantidae	<i>Miomantis paykullii</i>	Gen_012	-	PQ226202	-
Miomantidae	<i>Miomantis paykullii</i>	Gen_013	PQ226248	PQ226203	-
Nanomantidae	<i>Hapalomantinae sp</i>	Gen_032	PQ226255	PQ226209	-
Nanomantidae	<i>Bolbena hottentotta</i>	Gen_068	PQ226262	PQ226216	-

Table 2.2. Specimen identifications and locality data associated with taxa sampled in this study, listed numerically by specimen I.D. RSA = Republic of South Africa.

Specimen I.D.	Family	Taxon	Locality	Latitude	Longitude
Gen_008	Deroplatyidae	<i>Popa spurca</i>	RSA, Eastern Cape	33° 28' 55" S	26° 31' 16" E
Gen_010	Hoplocoryphidae	<i>Hoplocorypha sp</i>	RSA, Eastern Cape	33° 19' 53" S	26° 31' 47" E
Gen_011	Mantidae	<i>Omomantis zebrata</i>	RSA, Gauteng	25° 55' 03" S	29° 14' 25" E
Gen_012	Miomantidae	<i>Miomantis paykullii</i>	RSA, Eastern Cape	33° 18' 27" S	26° 31' 06" E
Gen_013	Miomantidae	<i>Miomantis paykullii</i>	RSA, Eastern Cape	33° 18' 27" S	26° 31' 06" E
Gen_015	Chroicopteridae	<i>Dystactula grisea</i>	RSA, Eastern Cape	33° 18' 40" S	26° 30' 27" E
Gen_019	Eremiaphilidae	<i>Nothogalepsus planivertex</i>	RSA, Limpopo	24° 11' 58" S	31° 15' 09" E
Gen_022	Eremiaphilidae	<i>Galepsus sp</i>	RSA, Gauteng	25° 55' 03" S	29° 14' 25" E
Gen_024	Eremiaphilidae	<i>Galepsus sp</i>	RSA, Gauteng	25° 55' 03" S	29° 14' 25" E
Gen_026	Hymenopodidae	<i>Sibylla pretiosa</i>	RSA, Limpopo	23° 50' 02" S	30° 08' 36" E
Gen_028	Eremiaphilidae	<i>Galepsus sp</i>	RSA, Limpopo	24° 11' 58" S	31° 15' 09" E
Gen_032	Nanomantidae	<i>Hapalomantinae sp</i>	RSA, Limpopo	23° 50' 02" S	30° 08' 36" E
Gen_038	Eremiaphilidae	<i>Galepsus sp</i>	RSA, Limpopo	24° 11' 58" S	31° 15' 09" E
Gen_043	Eremiaphilidae	<i>Tarachodina sp</i>	RSA, Limpopo	24° 11' 58" S	31° 15' 09" E
Gen_051	Eremiaphilidae	<i>Tarachodina sp</i>	RSA, Limpopo	23° 50' 02" S	30° 08' 36" E
Gen_052	Mantidae	<i>Polyspilota sp</i>	RSA, Eastern Cape	33° 28' 55" S	26° 31' 16" E
Gen_066	Hoplocoryphidae	<i>Hoplocorypha sp</i>	Angola, Moxico	13° 31' 35" S	19° 16' 47" E
Gen_067	Deroplatyidae	<i>Popa spurca</i>	Angola, Moxico	13° 05' 32" S	18° 53' 38" E
Gen_068	Nanomantidae	<i>Bolbena hottentotta</i>	Angola, Moxico	13° 05' 32" S	18° 53' 38" E

Gen_069	Chroicopteridae	<i>Tarachina sp</i>	Angola, Moxico	13° 05' 32" S	18° 53' 38" E
Gen_072	Toxoderidae	<i>Oxyothespis sp</i>	Angola, Moxico	13° 05' 29" S	18° 53' 42" E
Gen_074	Empusidae	<i>Hemiempusa capensis</i>	RSA, Eastern Cape	33° 26' 04" S	26° 29' 02" E
Gen_078	Eremiaphilidae	<i>Tarachodina sp</i>	Angola, Moxico	14° 58' 23" S	21° 37' 43" E
Gen_079	Chroicopteridae	<i>Chroicopterina sp</i>	Angola, Moxico	14° 58' 23" S	21° 37' 43" E
Gen_087	Hymenopodidae	<i>Oxypilus sp</i>	Angola, Moxico	12° 34' 33" S	18° 39' 26" E
Gen_090	Chroicopteridae	<i>Chroicopterina sp</i>	Angola, Moxico	12° 34' 33" S	18° 39' 26" E
Gen_092	Deroplatyidae	<i>Danuria sp</i>	Angola, Moxico	13° 42' 43" S	21° 50' 06" E
Gen_095	Eremiaphilidae	<i>Pyrgomantis sp</i>	Angola, Moxico	13° 42' 29" S	21° 15' 44" E
Gen_096	Hoplocoryphidae	<i>Hoplocorypha sp</i>	Angola, Moxico	13° 42' 29" S	21° 15' 44" E
Gen_099	Galinthiidae	<i>Galinthias amoena</i>	RSA, Limpopo	24° 17' 49" S	30° 50' 58" E
Gen_101	Eremiaphilidae	<i>Tarachodina sp</i>	RSA, Limpopo	24° 34' 29" S	30° 99' 53" E
Gen_104	Chroicopteridae	<i>Entelloptera rogenhoferi</i>	RSA, Limpopo	24° 34' 29" S	30° 99' 53" E
Gen_105	Eremiaphilidae	<i>Tarachodina sp</i>	RSA, Limpopo	24° 17' 49" S	30° 50' 58" E
Gen_129	Mantidae	<i>Sphodromantis sp</i>	RSA, Limpopo	24° 17' 49" S	30° 50' 58" E
Gen_153	Hymenopodidae	<i>Phyllocrania paradoxa</i>	RSA, Eastern Cape	33° 30' 29" S	26° 49' 51" E
Gen_154	Hymenopodidae	<i>Sibylla pretiosa</i>	RSA, KwaZulu Natal	27° 33' 13" S	32° 39' 59" E
Gen_155	Empusidae	<i>Empusa guttula</i>	RSA, Eastern Cape	22° 15' ?? " S	24° 32' ?? " E

Table 2.3. Primer sequences used for 28S, 16S, and H3 genes.

Gene	Primer	Sequence
28S	28S rD3.2a	5'- AGT ACG TGA AAC CGT TCA SGG GT -3'
	28S B	5'- TCG GAA GGA ACC AGC TAC -3'
16S	16Sa	5'- CGC CTG TTT ATC AAA AAC AT -3'
	16Sb	5'- CTC CGG TTT GAA CTC AGA TCA -3'
H3	Hex AF	5'- ATG GCT CGC AAC AAG CAG ACG GC -3'
	Hex AR	5'- ATA TCC TTG GGC ATG ATG GTG AC -3'

Table 2.4. Amplification profiles used for 28S, 16S, and H3 genes.

Gene	Hot Start	Denature	Anneal	Extension	Final Extension	Cycles
28S	95°C (12 min)	95°C (30 sec)	54°C (45 sec)	72°C (1 min)	72°C (15 min)	35
16S	95°C (5 min)	95°C (30 sec)	48-50°C (30 sec)	72°C (1 min)	72°C (15 mins)	40
H3	94°C (12 min)	94°C (1 min)	54°C (1 min)	72°C (45 sec)	72°C (10 min)	35-40

RESULTS

A total of 177 individuals, representing 24 of the 29 praying mantis families globally, were used to represent the mantodean phylogeny in which the 37 new samples were placed (Table 2.1). Of the four genes selected, 28S accounted for a large portion of the data (2078/3363 bp, ~62%) and provided robust support for deeper, family-level relationships; 16S accounted for most of the signal at the familial and intrafamilial levels; H3 and COI provided stronger support at more terminal nodes. As the 28S gene accounted for most of the data, it can provide a solid foundation to build on, but may also dominate the effects of the other genes. The COI gene was not present in the dataset of the 37 praying mantises sequenced in this study as there were complications in getting its primers to work. This may have influenced the terminal placement or support values of some taxa, but the H3 gene alone was able to provide sufficient support for most taxa.

The molecular phylogeny produced by Bayesian Inference analysis (Appendix 2.1) showed that both the ingroup and outgroup are highly differentiated, and that there was a relatively high confidence in the relationships of most of the families and superfamilies. The basal-most groups have the highest confidence metrics, which lessened towards the more apical taxa. The Maximum Likelihood analysis (Appendix 2.2) depicts a similar topology to the BI tree except for the relationships of Epaphroditoidea

and Eremiaphiloidea. Obvious outliers positioned outside their traditional superfamily (*Hyalomantis sp.*, *Phyllocrania paradoxa*, *Parathespis humberiana*) or family, or under-represented within their family (*Amorphoscelis*, *Caudatoscelis*, *Leptomanella*, *Deiphobella*, *Deiphobe*, and *Litaneutria*), are addressed in the discussion.

Bayesian Inference phylogeny

Thespoidea is the basal-most clade of the ingroup, and sister-clade (posterior probability [pp] = 1.00) to the remaining Mantodea, followed sequentially by Acanthopoidea (pp = 1.00), and then Chroicopteroidea (pp = 1.00). Gonypetoidea is the sister-clade to Nanomantoidea (pp = 0.94), which together form a sister-clade to the remaining Mantodea (pp = 0.97). Epaphroditoidea (pp = 0.68), followed by Eremiaphiloidea (pp = 0.97), form successive sister-clades with the remaining Mantodea. Hoplocoryphoidea and Miomantoidea display a sister relationship with each other (pp = 0.96), and together form a sister-clade to the remaining Mantodea (pp = 0.96). The distal end of the Bayesian topology features a sister-relationship between Hymenopoidea and the paraphyletic Mantoidea (pp = 1.00), within which Galinthiadoidea is nestled (pp = 1.00).

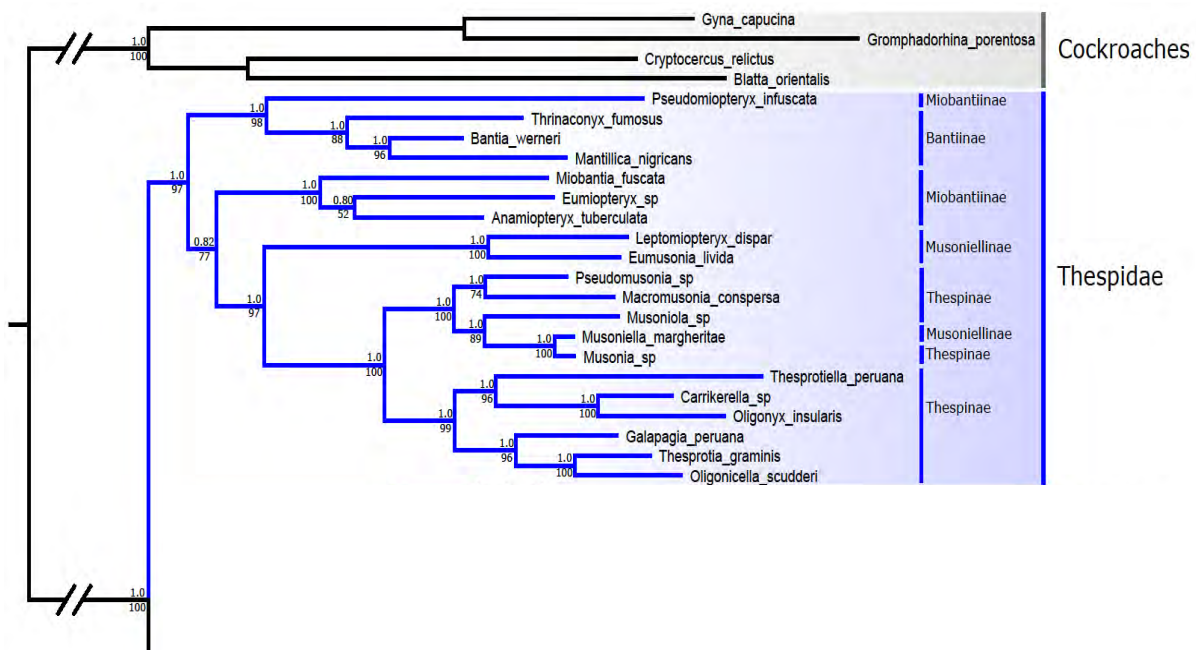
Due to the representation of allied families, Thespidae is a family on its own, representing the larger Thespoidea. Epaphroditoidea is only represented by the monophyletic Epaphroditidae and is lacking Majangidae (due to sampling). Chroicopteridae, Gonypetidae, Hoplocoryphidae, Miomantidae and Galinthiadiidae were all monophyletic.

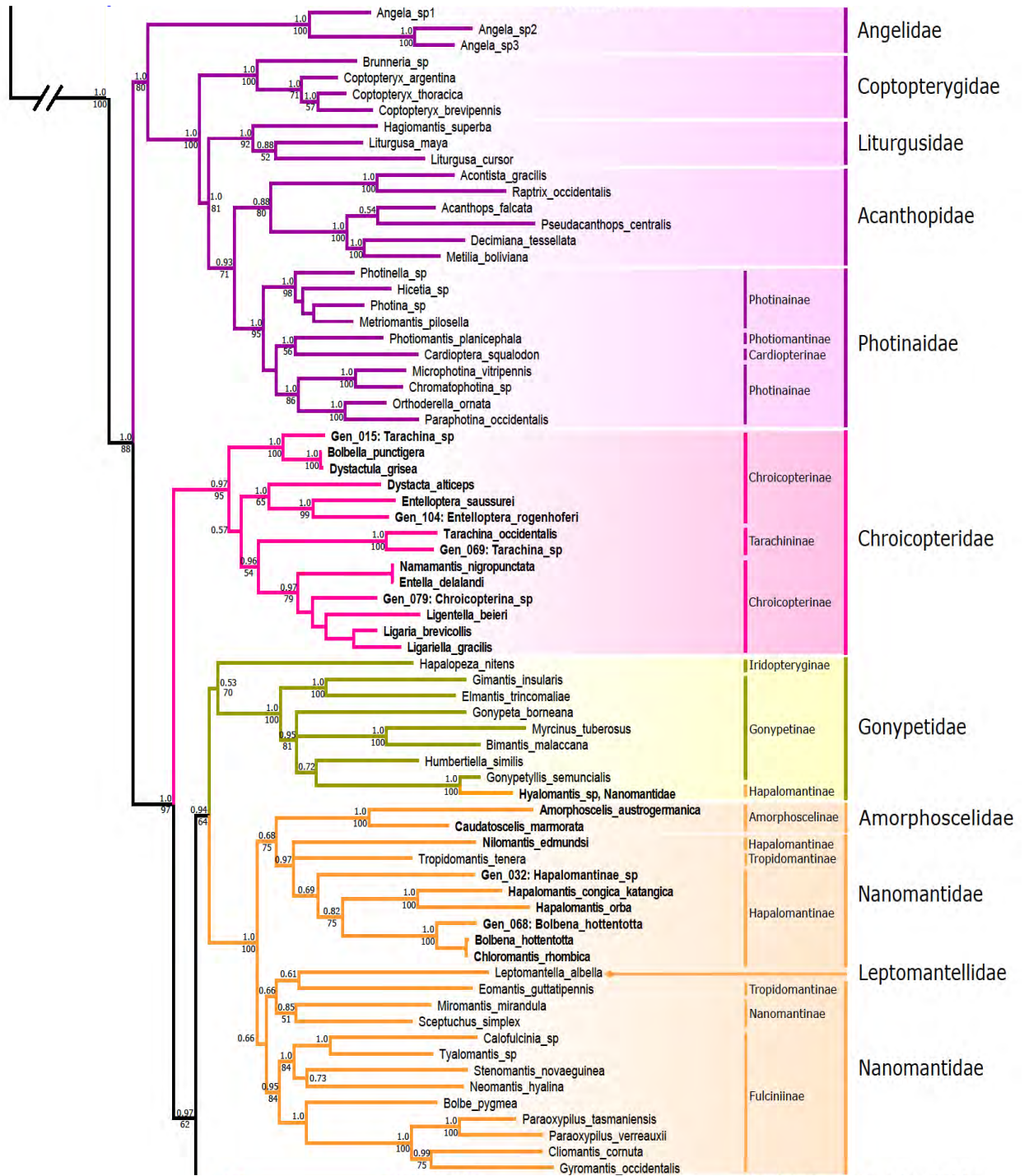
Families within Acanthopoidea all formed monophyletic groupings: Angelidae as the basal-most group (pp = 1.00), followed by Coptopterygidae (pp = 1.00), Liturgusidae (pp = 1.00), and then Acanthopidae, which is also sister to Photinidae (pp = 0.93). Nanomantoidea comprises Amorphoscelidae, Leptomantellidae and Nanomantidae. In this phylogeny, Nanomantidae formed a polyphyletic clade with Amorphoscelidae in one clade and Leptomantellidae in the other. Eremiaphiloidea and its constituent families (Rivetinidae, Amelidae, Eremiaphilidae, and Toxoderidae) clustered together, but only Toxoderidae formed a monophyletic clade. Within Hymenopoidea, Empusidae was monophyletic and formed a sister-clade with Hymenopodidae (pp = 0.99). Mantidae is monophyletic within Mantoidea, and Deroplatyidae formed a diphyletic grouping: one group directly outside the main Mantoidea clade (pp = 0.55), and the other forming a sister-relationship with Dactylopterygidae (pp = 0.84).

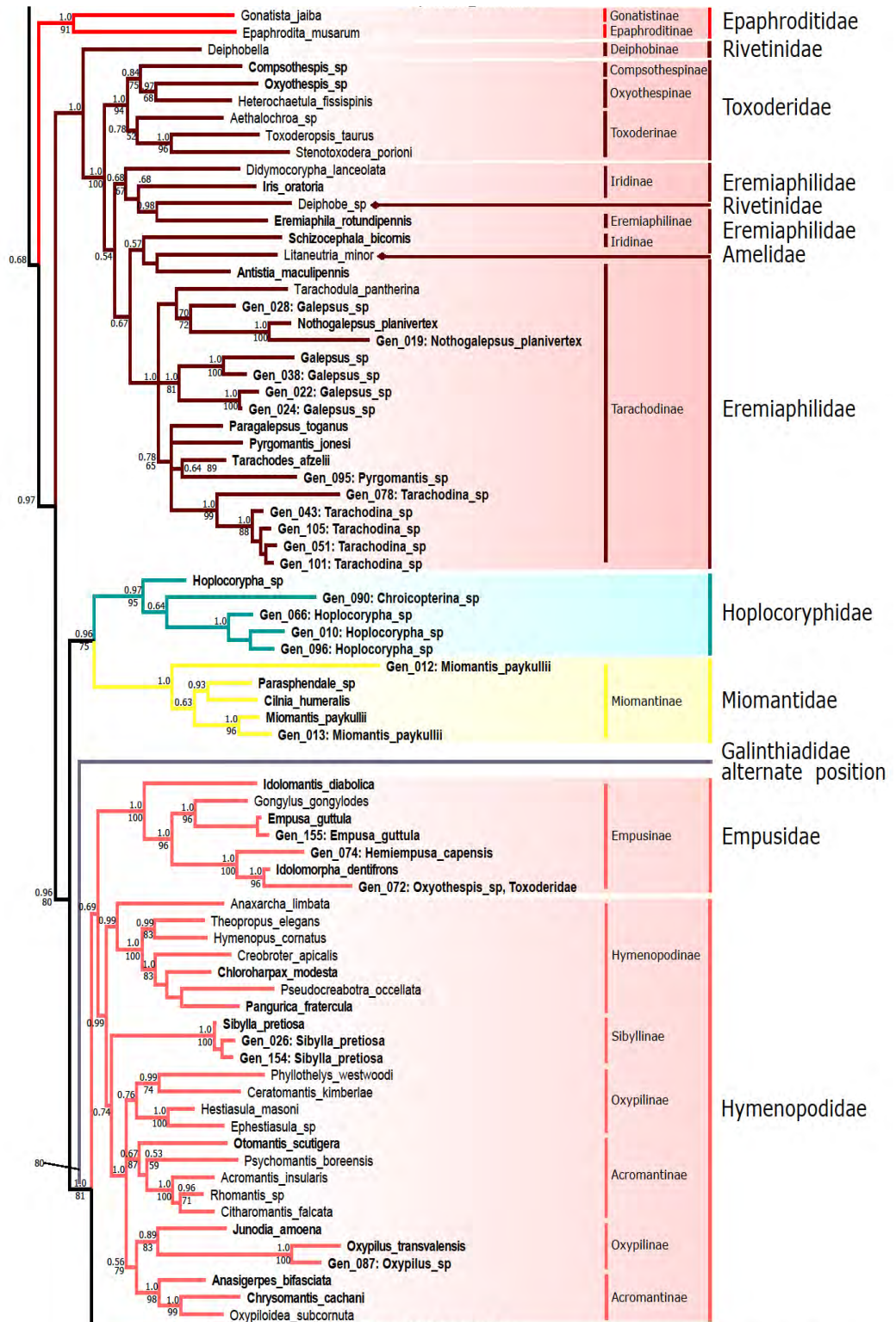
Maximum Likelihood phylogeny

Again, Thespoidea was the basal-most ingroup, and sister-clade (bootstrap probability [bp] = 100%) to the remaining Mantodea, followed sequentially by Acanthopoidea (bp = 88%), and Chroicopteroidea (bp = 97%). Epaphroditoidea+Gonypetoidea+Nanomantoidea formed a weakly supported sister-clade (bp = 62%) to the remaining Mantodea. Gonypetoidea and Nanomantoidea formed a poorly supported grouping (bp = 64%), and Epaphroditoidea may lie outside this (bp = 34%). Hoplocoryphoidea+Miomantoidea+Eremiaphiloidea grouped together (p = 80%) against the remaining Mantodea. Hoplocoryphoidea and Miomantoidea formed a weakly supported sister-clade (bp = 75%), and Eremiaphilloidea may reside outside this (bp = 54%). Galinthiadoidea formed a weak sister-clade (bp = 80%) to Mantoidea+Hymenopoidea, and Mantoidea formed a similar clade (bp = 81%) to Hymenopoidea+Mantidae (*partim*).

The monophyly of the families remained largely supported by the topology of the BI analysis, except for Nanomantidae, Hymenopoidea and Mantoidea. Here, Amorphoscelidae and Leptomantellidae are nested within Nanomatidae (bp = 75%). Empusidae remained monophyletic but was now nested within Hymenopodidae (bp = 58%). Mantidae and Dactylopterygidae probably are a sister-clade (bp = 57%) to each other, and Mantidae+Dactylopterygidae may form a sister relationship to Deroplatyidae (bp = 81%). Deroplatyidae was diphylectic and tentatively formed a sister-clade (bp = 44%) with Hymenopodidae+Deroplatyidae (*partim*).







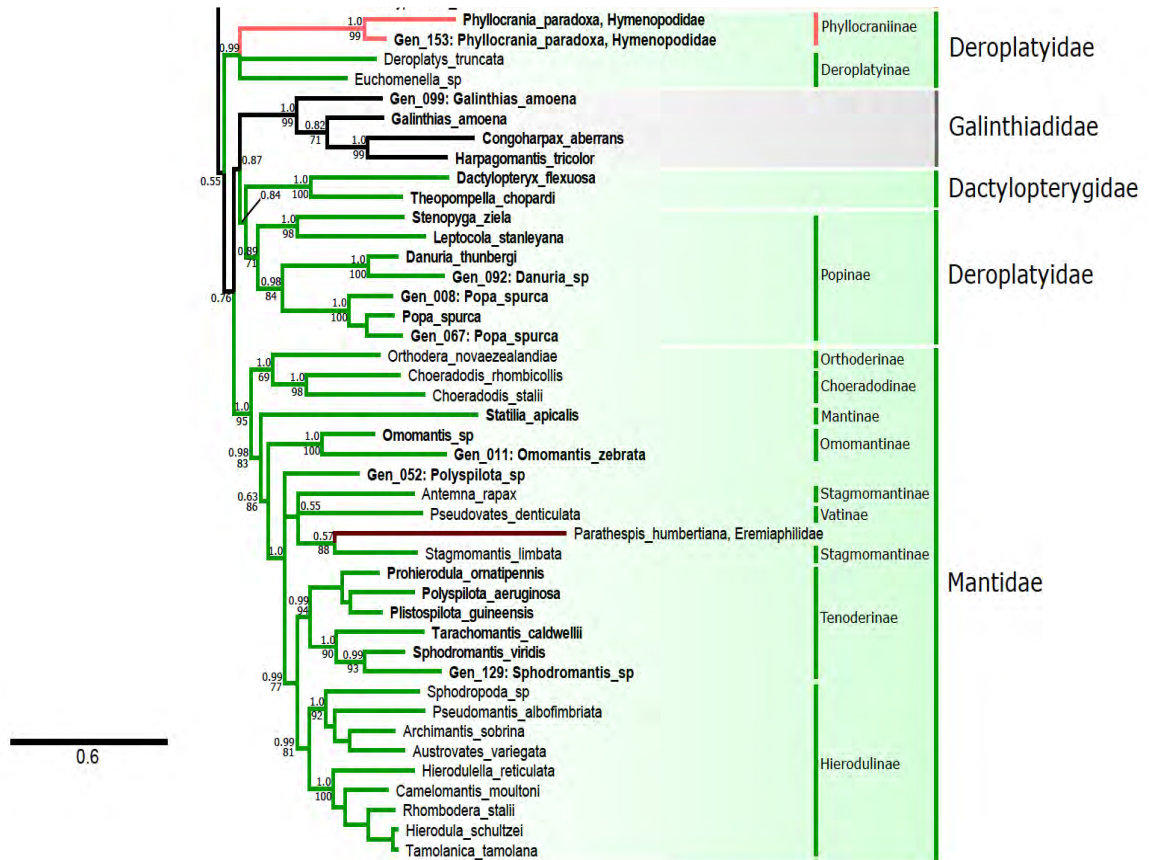


Figure 2.2. Molecular phylogeny of 210 praying mantises representing 24 of the 29 families globally based on four genes: 28S, 16S, H3, and COI. The phylogeny was produced from the Bayesian Inference topology showing posterior probabilities, combined with corresponding bootstrap likelihood from the Maximum Likelihood topology. Branch terminals indicate species names, the families and subfamilies are labelled accordingly, and branches are coloured by superfamily: Black=outgroup, blue=Thespoidea, purple=Acanthopoidea, pink=Chroicopteroidea, gold=Gonypetoidea, orange=Nanomantoidea, red=Epaphroditoidea, brown=Eremiaphiloidea, turquoise=Hoplocoryphoidea, yellow=Miomantoidea, grey=Galinthiadoidea, peach=Hymenopoidea, green=Mantoidea. Names of African taxa are in bold and individuals from this study are marked with their specimen identification 'Gen_XXX'.

DISCUSSION

The combination of two nuclear (28S rDNA and H3) and two mitochondrial (16S rDNA and COI) genes produced an overall tree topology that is largely congruent with those of previous studies that used many more genes (Svenson & Whiting 2004, 2009, Yager & Svenson 2008, Svenson et al. 2015, Rivera & Svenson 2016, Svenson & Rodrigues 2017, Zhang et al. 2018, Lin et al. 2022). Our results remained largely consistent with the classification proposed by Schwarz and Roy (2019).

Our original dataset contained Chaeteessidae, Mantoididae and Metallyticidae, but these groups were inconsistently placed with poor support in many of the runs. No African taxa that were sampled were associated with these families. There is evidence that they are the most basal groups within Mantodea and their phylogenetic placement is agreed upon, with the exception of Metallyticidae (Grimaldi 2003, Svenson & Whiting 2004, 2009, Yager & Svenson 2008, Wieland 2013, Rivera & Svenson 2016). Hence, they were regrettably removed from further analyses. The other two families that are not present in our topology are Haaniidae, being the only member of Haanioidea; and Majangidae, belonging to Epaphroditoidea together with Epaphroditidae. There have been no reports of Haaniidae being present in Africa, and this family has been resolved in three different phylogenetic positions: as a sister-clade to Gonypetoidea+Nanomantoidea (Legendre et al. 2015), being sister to Eremiaphiloidea+Calomantoidea (Svenson & Rodrigues 2017), and being positioned more basally than Gonypetidae (Wang et al. 2020). Majangidae is endemic to Madagascar, and as there is no genetic data available for this group, we assume that this family would group with Epaphroditidae.

Major differences between the BI and ML tree in this study are the placements of Epaphroditoidea and Eremiaphiloidea, and Galinthiidoidea. We chose to use the topology of the BI tree for the skeletal structure of our proposed phylogeny as it better reflected the established superfamily- and family-level relationships, and therefore gave more confidence to the placement of the genera that have not been investigated before (Fig. 2.2).

The relationships of praying mantis families

At the superfamily level, our topology seems robust with most nodes being highly supported (pp > 0.95), Gonypetoidea and Nanomantoidea being less so (pp = 0.94), and Epaphroditoidea not being well supported (pp = 0.68) but this could be because it is only represented by two individuals. Ignoring singleton taxa, the family-level relationships appear to be monophyletic (pp = 0.69-1.00) except in Deroplatyidae, which is diphyletic (pp = 0.89 and bp = 55%), and Nanomantidae with Amorphoscelidae

(bp = 75%) and Leptomantellidae (pp = 0.66) nested within it. Nodal support at a subfamily level is clade-specific, with some having high support (pp > 0.95) throughout, while others, especially in more derived groups, range considerably. There is high nodal support for most of the taxa at the genus and species level, which is reassuring for the scope of this study.

Thespidae has traditionally been included in Acanthopoidea as a sister-family to the remaining taxa within this group (Yager & Svenson 2008, Svenson & Whiting 2009, Rivera & Svenson 2016), and was debatably promoted to its own superfamily (Schwarz & Roy 2019, Rivera & Svenson 2020). We agree that Thespoidea remains ranked as a superfamily based on molecular evidence, and that Acanthopoidea+Cernomantodea is the immediate sister-clade (pp = 1.0, p = 100%). Within Thespidae, there is a strong case to be made for synonymizing Musonielleinae and Thespiinae based on molecular evidence (pp = 1.0 for all nodal supports) (Svenson & Whiting 2009, Rivera & Svenson 2016).

Our phylogeny supports the monophyly of Acanthopoidea, and each of its families. The relationships between these families is largely congruent with previous studies (Yager & Svenson 2008, Svenson & Whiting 2009, Legendre et al. 2015, Rivera & Svenson 2016). We bring attention to Angelidae, which has been under-represented in past studies, and recognize its position as the basal-most family within Acanthopoidea (Yager & Svenson 2008, Rivera & Svenson 2016).

Our placement of Chroicopteroidea (Chroicopteridae) as a monophyletic sister-clade to the remaining Mantodea is well supported (pp = 1.0). Although its position has been unstable in the past (Svenson & Whiting 2004, 2009, Yager & Svenson 2008, Legendre et al. 2015, Svenson & Rodrigues 2017) and morphological traits suggest that Chroicopteroidea is a sister of Nanomantoidea (Schwarz & Roy 2019). Our analysis strongly suggests that Nanomantoidea is sister to Gonypetoidea (pp = 0.94) and that these groups are more derived than Chroicopteroidea, which is congruent with other recent molecular studies (Legendre et al. 2015, Svenson & Rodrigues 2017). The topology depicted in our data reveals a polyphyletic grouping of Nanomantidae (pp = 1.00), and the presence of a stray *Hyalomantis* sp. (Hapalomantinae) in Gonypetidae. Svenson and Whiting (2009) revealed that Hapalomantinae and Tropicodantinae diverge from Nanomantinae and Fulciniinae – a similar grouping was found in our study, with one Tropicodantinae being placed in the unexpected clade. Molecule-based studies shed light on the family arrangements within Nanomantoidea – (Leptomantellidae+ (Nanomantidae+Amorphoscelidae)) – but more exemplars are needed to add bulk to the under-represented Amorphoscelid and Leptomantillid taxa to make any definitive assumptions regarding their placements considering the low support values (pp =

0.68 and 0.61 respectively) (Yager & Svenson 2008, Svenson & Whiting 2009, Legendre et al. 2015, Lin et al. 2022).

The placement of Eremiaphiloidea seems to be recurrently unresolved in molecular studies (Svenson & Whiting 2004, 2009, Yager & Svenson 2008, Legendre et al. 2015, Jensen et al. 2022), specifically with respect to Miomantoidea and Hoplocoryphoidea, which were also under-represented in previous studies. Arguments for Eremiaphiloidea being a sister-clade to Miomantoidea+Hoplocoryphoidea, or that Eremiaphiloidea is more ancestral are both supported by molecular evidence (Svenson & Whiting 2004, 2009, Yager & Svenson 2008, Legendre et al. 2015, Svenson & Rodrigues 2017). We are in favour of the latter as our study shows strong nodal support for this case (pp = 0.97), and evidence from males' genital structures could suggest a similar scenario (Schwarz & Roy 2019). The monophyly of Eremiaphiloidea is supported in our study (pp = 1.0 and bp = 100%), with the exception of one individual which grouped within Mantidae in both the BI and MI phylogenies – we consider this specimen to be misidentified and therefore does belong within Mantidae. Toxoderidae remains monophyletic (pp = 1.0 and bp = 94%), but the monophyly of Eremiaphilidae is questionable as the one Amelidae and two Rivetinidae exemplars grouped unexpectedly within Eremiaphilidae. The removal of these three taxa would result in a monophyletic grouping of Eremiaphilidae. Schwarz and Roy (2019) treated Toxoderidae as its own family, sister to Eremiaphilidae, based on morphological data, which differs from its previous position as a sub-clade of Eremiaphilidae based on molecular data (Yager & Svenson 2008, Svenson & Whiting 2009, Legendre et al. 2015). Our topology, with the removal of Amelidae and Rivetinidae, shows that Toxoderidae and Eremiaphilidae form a well-supported sister-clade (pp = 1.0 and bp = 100%). We leave this for further investigation.

Many studies show a close relationship between Hoplocoryphoidea (Hoplocoryphidae) and Miomantoidea (Miomantidae); the position of Hoplocoryphoidea remains largely unresolved where Miomantoidea is consistently grouped as a sister-clade to Galinthiadoidea+Mantoidea+Hymenopoidea (Yager & Svenson 2008, Svenson & Whiting 2009, Legendre et al. 2015, Svenson & Rodrigues 2017). Our results are largely congruent with past studies and show strong support (pp = 0.96) that Miomantoidea+Hoplocoryphoidea is a sister-clade to Galinthiadoidea+Mantoidea+Hymenopoidea. Epaphroditoidea is largely under-represented in many molecular studies; Epaphroditidae has been represented in two studies whereas Majangidae has no molecular data associated with it (Svenson et al. 2015, Svenson & Rodrigues 2017). The phylogenetic position of Epaphroditidae has been previously

resolved (Svenson et al. 2015, Svenson & Rodrigues 2017), and our study confirms this, although with low confidence (pp = 0.68).

The general consensus is that Mantoidea (Deroplatyidae, Dactylopterygidae and Mantidae) is a sister-group to Hymenopoidea (Empusidae and Hymenopodidae) at the most distal node of the mantodean phylogeny, but the phylogenetic topology of the families lacks consistency and Galinthiadoidea (Galinthiidae) often nests within Mantoidea (Svenson & Whiting 2004, 2009, Yager & Svenson 2008, Legendre et al. 2015, Lin et al. 2022). Empusidae, Hymenopodidae, Mantidae and Galinthiidae are well supported and monophyletic. However, Deroplatyidae is diphyletic and Dactylopterygidae is underrepresented in this study. The diphyletic relationships of Deroplatyidae within Mantoidea is of interest, especially since it has resolved similarly in the past (Svenson & Whiting 2009, Legendre et al. 2015, Svenson et al. 2015). Deroplatyidae consists of two subfamilies, Deroplatyinae and Popinae; Deroplatyinae has grouped with *Phyllocrania paradoxa* (Hymenopodidae) outside the conventional Mantoidea, and Popinae has formed a sister clade with Dactylopterygidae within Mantoidea. Popinae has historically claded with Dactylopterygidae (Svenson & Whiting 2009), as has Galinthiidae (Legendre et al. 2015). Our phylogeny, at the family level, is not robust enough to resolve Mantoidea and consensus remains to be reached. If we consider Galinthiidae as part of Mantoidea and the grouping of *Phyllocrania* with Deroplatyinae as aberrant or artefactual, we could consider the notion of Hymenopoidea and Mantoidea being sister-clades. Alternately, Galinthiidae could assume a position as an immediate sister-group to Mantoidea+Hymenopoidea (bp = 80%).

The positions of African taxa

Taxa from our study comprises 37 specimens that fall into ten families (Table 2.2). No African taxa appeared in Thespididae, Angelidae, Coptoterygidae, Liturgusidae, Acanthopidae, or Photinaidae which was expected because these are Neotropical families. Members of Chroicopteridae, to which five of our specimens belong, are endemic to Africa, and surrounding islands – although in our topology *Chroicopterina sp* (Gen_090) was unexpectedly placed in Hopolocoryphidae. The same morphospecies (Gen_079) grouped as expected in Chroicopteridae, which suggests potential contamination of the Gen_090 sample. Alternatively, Gen_090 was missing the 28S gene in this phylogeny as it did not sequence neatly, and this marker accounted for a major proportion of the total nucleotide count.

Several African species belong to Gonypetidae but none of them were collected in this study. One stray Nanomantid (*Hyalomantis sp.*) was consistently placed in Gonypetidae in multiple runs of the BI and ML

topology. This individual was accessioned for a published study but not included in their analysis (Svenson & Whiting 2009). When BLASTed, it showed some similarity to Nanomantidae, except for its 28S gene which closely resembled several genera within Gonypetidae. We are acting on the premise that it is a misidentified Gonypetidae that is closely related to *Gonypetyllis semuncialis* (pp = 1.0, bp = 100%). Leptomantellidae is not an African family, but Amorphoscelidae and Nanomantidae are; however, our study only sequenced taxa belonging to Nanomantidae, specifically the clade constituting Hapalomantinae and Tropicodantinae. The five individuals belonging to Hapalomantinae are all species that occur in Africa where none of the Tropicodantinae are found in Africa. *Miomantis mirandula* (Nanomantinae) and *Cliomantis cornuta* (Fulciinae) do not occur in Africa, but other species of their genera have been recorded in Africa: *M. thalassina* in Madagascar and *C. africanus* in Zanzibar). These are the only records of Nanomantinae and Fulciinae in Africa.

Species belonging to Amelidae, Rivetinidae, Toxoderidae and Eremiaphilidae are present in Africa, but our collecting mostly produced those found in the latter – a member of Toxoderidae was grouped unexpectedly and is discussed below. These eleven specimens were all grouped in Tarachodinae, which is the most diverse subfamily. The three *Galepsus* species grouped with strong nodal support, but this genus is species rich (67 species in four subgenera), and we did not assign finer classification to them. Highly diverse genera are not an isolated case in Eremiaphilidae; *Tarachodes* is another genus (62 species in five subgenera) that we believe is represented by five of our specimens, although identified on to subtribe (Tarachodina). Another example of a diverse genus within this group is *Eremiaphila*, a genus of desert-dwelling mantises that comprise some 74 species (and more subspecies) without any partitioning within the genus. Eremiaphilidae as a whole, but specifically the three aforementioned genera, would hugely benefit from a global revision as the constituents display high intraspecific morphological variability and combined with low interspecific differences between species (Roy 2018, Moulin 2018b, Greyvenstein et al. 2020b).

This is also encouraged with Miomantidae (73 spp.) and Hoplocoryphidae (37 spp.) as there are few molecular data associated with these diverse taxa (Svenson & Whiting 2004, Yager & Svenson 2008, Legendre et al. 2015, Svenson & Rodrigues 2017). There are three genera and 42 species within Hoplocoryphidae, of which 37 species are placed in *Hoplocorypha*, and little work has been on this group overall (Werner 1913, Deeleman-Reinhold 1957, Roy 1966). As a result, many online sequences associated with this genus are labelled “*Hoplocorypha* sp.” as the authors are not confident in their species identification. There are no molecular data associated with the other two genera.

Understandably, Hoplocoryphidae might not have received much attention in the past as it is inconspicuous and ground-dwelling, but Miomantidae is of ecological relevance. Like Hoplocoryphidae, Miomantidae has the vast majority (73 of 94) of its species within a single genus, *Miomantis*. This Afrotropical genus has been reported as becoming invasive in St Helena, Australia, New Zealand, Portugal, and Europe – often invasive organisms tend to get more attention, but the effects of this praying mantis are not very alarming in comparison to other organisms (Fea 2011, Fea et al. 2013, Marabuto 2014, Haug et al. 2020).

Our study produced three taxa that grouped with Empusidae, although we are confident in the positioning of only two (*Hemiempusa capensis* and *Empusa guttula*); the third specimen was identified as *Oxyothespis* (Toxoderidae). This specimen had viable molecular data for only the H3 and 16S genes; we do not believe that it had a large influence on the branching or nodal support of Empusidae and should be disregarded. Our data added three genera belonging to Hymenopodidae, which is a diverse family but most of its constituents have been reported nearer to equatorial regions. It seems that *Phyllocrania* grouped unexpectedly in our BI analysis; our specimen (*Phyllocrania paradoxa*) grouped with exemplar from GenBank, but they were placed in Deroplatyidae when they should be positioned in Hymenopodidae. *Phyllocrania paradoxa* has been placed in Deroplatyidae before (Legendre et al. 2015), and interestingly, the *Phyllocrania* specimen adopted in this study is different from the one used in 2015 based on the GenBank accession numbers. Within Mantidae, two of our species grouped correctly (*Sphodromantis* sp. and *Omomantis zebrata*), but what we believe to be *Polyspiloita* did not group accordingly. When BLASTed, *Polyspiloita aeruginosa* was the top result for 28S, though the same cannot be said for 16S and H3 – this could indicate potential contamination of the samples. Alternatively, this sample lacks the COI gene, which provides large support at more terminal nodes, which may account for the unexpected placement of the taxon.

Deroplatyidae often displays diphyly in studies, or a few individuals are positioned with the Hymenopodids (Yager & Svenson 2008, 2008, Svenson & Whiting 2009, Legendre et al. 2015, Lin et al. 2022). Of the two subfamilies, Popinae has been placed within Mantoidea in past molecular studies, where Deroplatyinae usually has unexpected, and inconsistent, relationships with Hymenopodidae. The three Deroplatyids sampled in our study fell into Popinae, which is reassuring for the placement of these taxa in an African perspective especially since all species associated with this subfamily are endemic to Africa. Deroplatyinae is not present in Africa, but are found in India, southern China, and Indonesian regions. There is a strong case to be made that the diphyly of Deroplatyidae is a result of the two subfamilies being distantly related.

Popinae is confined to Afrotropical regions and is not present in northern Africa, where Deroplatyinae has not been recorded west of India – suggesting that Deroplatyidae began to speciate approximately 150 mya as the Indian plate broke from the supercontinent, Gondwana (Ali & Aitchison 2008). Further investigation will reveal whether African Deroplatyids are distantly-related cousins to those found in Asia, or if the Asian Deroplatyids belong to Hymenopoidea.

CONCLUSIONS

The molecular phylogeny produced here is largely congruent to those in past studies and is in accordance with the classification scheme that we followed (Schwarz & Roy 2019b). Our study provides evidence supporting the classification of Thespoidea at the superfamily level, the position of Epaphroditoidea has been resolved previously and we maintain this position based on our topology, whereas the position of Eremiaphiloidea has not been resolved but we concur with studies where Eremiaphiloidea is placed outside Calomantodea. To maintain monophyly of Mantoidea and Hymenopoidea as sister-clades, we believe that Galinthiidae should be recognized as part of Mantoidea or alternatively placed independently as seen in the ML topology (Appendix 2.2). Our results agree with the monophyly of all mantodean families where there is sufficient data to provide confidence, apart from Deroplatyidae.

The introduction of additional African taxa aligns with the currently accepted mantodean phylogeny, although there was an intriguing grouping of African taxa in Eremiaphildae but we believe this is because of insufficient available molecular data associated with the highly diverse *Tarachodes* group, and similarly with Hoplocoryphidae. The relatively apical position of the additional taxa within their families partly explains this, and indicates the repeated colonization of Africa by various groups. In this context, the endemic family Chroicopteridae represents an interesting local radiation.

Chapter 3

Encoding and extrapolating the external morphology of Mantodea

INTRODUCTION

The formal classification of praying mantises began in the mid-18th Century, and the descriptions were rather uninformative as it was not yet clear what morphological characteristics were taxonomically important (Linnaeus 1758, Latreille 1802, Lichtenstein 1802, Saussure 1872, Stål 1877, Rehn 1903, Kirby 1904). With the influx of newly described species by Giglio-Tos and Beier, Mantodea, for the most time, appeared to be understood (Giglio-Tos 1927, Beier 1934a, 1934b, 1935a, 1935b, 1935c, 1935d). The number of families grew as well-defined groups were distinguished, but the relationship between them was often obscured by the conservation of the praying mantis body plan and a high degree of morphological convergence relating to predation.

Morphological diversity

Despite their conservative body plan, praying mantises are a highly diverse order, many of which rely on specialized morphological features and/or behaviours to avoid predation and capture prey, potentially creating selective pressures that drove convergent evolution to mask phylogenetic patterns (Svenson & Whiting 2009, Tedrow et al. 2015). A common morphological feature of praying mantises is their resemblance to various types of vegetation that camouflages them against predators and facilitates a form of aggressive mimicry to capture prey (O'hanlon et al. 2013). Ignoring the general coloration of green and brown being beneficial, complex morphological mimicry has been observed in praying mantises, with some noteworthy mentions being those that mimic dead leaves (Deroplatyidae: *Deroplatys*, Acanthopidae: *Acanthops*, Hymenopodidae: *Phyllocrania*), broad-leaf foliage (Mantidae: *Choeradodis*, *Rhombodera*, *Asiadodis*), sticks or twigs (Coptopterygidae: *Brunneria*, Hoplocoryphidae: *Hoplocorypha*, Deroplatyidae: *Popa*), grasses (Toxoderidae: *Oxythespis*, Thespiidae: *Thesprotia*, Eremiaphilidae: *Pyrgomantis*), flowers (Hymenopodidae: *Hymenopus*, Galinthiidae: *Harpagomantis*), lichen and bark (Hymenopodidae: *Majangella*, Eremiaphilidae: *Tarachodes*, Epaphroditidae: *Gonatista*), desert sand or pebbles (Eremiaphilidae: *Eremiaphila*), bird droppings (Hymenopodidae: *Ceratomantis*), and even wasps (Mantoididae: *Vespa mantoida*) (Agudelo et al. 2019, Hawkeswood & Sömmung 2019, Svenson & Rodrigues 2019, Oufiero 2020, Liu et al. 2022). Studies have revealed that *Hymenopus coronatus* (Hymenopidae) is visually indistinguishable from its sympatric flowers to hymenopteran pollinators of that

flower. Wild pollinators tended to visit the praying mantis over the actual flower - it is suspected that the orchid mantis absorbs ultraviolet rays and emits them more strongly than the actual flower, hence attracting prey (O'hanlon et al. 2013).

Ethologically, bark mantises (many of which are dorso-ventrally flattened) tend to hug the surface they are on when confronted. Similarly, the swaying from side to side displayed by some praying mantises could be interpreted as foliage moving in the wind to break their rigid structure, but this behaviour might also allow them to achieve better depth perception (Watanabe & Yano 2013, Shih et al. 2019, Hawkeswood & Sommung 2019, Pohl et al. 2022). *Vespamantoida wherleyi* (Mantoididae) has a unique form of wasp mimicry that has not been documented in other groups, resembling the morphology, coloration, and behaviours of a vespid wasp (Svenson & Rodrigues 2019). Crypsis and imitation are fundamental aspects of many species of praying mantises, with plant-mimicking groups, among others, having nymphal stages that imitate ants by being black and curling their abdomens dorsally (Nelson et al. 2006, Haug et al. 2020).

The high degree of morphological variation displayed in praying mantises is linked to environmental and behavioural adaptations to avoid predation and secure food, and is not necessarily associated with their geographical ranges. Mantodeans vary greatly in their hunting behaviours, with a spectrum ranging from ambushing to active searching, with each strategy having adapted morphologies associated with them (Svenson & Whiting 2004, O'hanlon et al. 2013, Rivera & Callohuari 2020). Praying mantises that employ ambush strategies to capture prey tend to have larger forelegs in proportion to their body length compared to other mantises, and often rely on aggressive mimicry to deceive their prey. Ambush hunters, with sit-and-wait strategies, can afford to expend resources on elaborate decorations and more robust hunting equipment as sedentary lifestyles are more energy-conserving. Conversely, praying mantises that employ an active hunting strategy are generally thinner, without elaborate features that could restrict movement, have longer cursorial legs, and often have smaller forelegs in proportion to their body size. A novel form of active hunting is displayed by *Carrikerella simpira* (Thespidae) - with spearlike foretibial structures, these mantises were observed scratching for, and impaling prey rather than grasping it between their forefemur and foretibia (Rivera & Callohuari 2020). Some families employ certain hunting strategies more frequently than others; plant-mimicking groups like Hymenopodidae tend to be ambush predators (O'hanlon et al. 2013, Svenson et al. 2015), and cursorial desert mantises belonging to Eremiaphilidae tend to be active hunters (Doganlar 2007). These mantises share common morphological characteristics at a family level, but hunting strategies employed by them represent a spectrum, as

opposed to distinctive categories (e.g. species of Sibyllinae are active hunters belonging to Hymenopodidae, typically known for being flower-mimics).

The morphological diversity within Mantodea is also attributed to the degree of sexual dimorphism displayed in various groups. Females of many groups are significantly larger than their male counterparts, seen strongly in *Hymenopus* (Hymenopodidae), where females can reach twice the length of males - it was found that males reached adulthood faster than females, suggesting different evolutionary processes shaping sexual development and lifecycles (Rivera & Svenson 2016, Mirzaee et al. 2022). Within many Arthropod species, increased female body size is proportional to increased fecundity, but this was not the underlying factor for gigantism in *Hymenopus* females - a larger size correlated more strongly to increased predation success (Svenson et al. 2016). Females of many species have also been reported to have larger foreleg proportions than males, adding to increased predation success, and it is also hypothesized, for certain species, to increase the probability of successfully cannibalizing of the male during copulation. Females in many groups of praying mantises display brachypterous or apterous states (Agudelo 2014, Cassar 2020, Schwarz 2021), and there is a decreased wing length in females even when they are macropterous. Antennae of Mantodean females tend to be shorter than those of males, which are sometimes modified as in males of Empusidae that have bilobate antennae that allow them to better detect the pheromones released by mature females (Svenson et al. 2015). Male praying mantises are more mobile than their female counterparts, and this is reflected in their morphology, often misleading taxonomists in the past.

For these reasons, Mantodea has historically been a challenging group to classify using morphological traits alone, clearly demonstrated by conflicting phylogenies, the number of synonyms associated with the order, and under-informative species descriptions.

Classification and Nomenclature

Molecular phylogenies have revealed novel clades among praying mantises, enabling taxonomists to discern previously overlooked morphological characteristics that may not have been apparent at the time (Schwarz & Roy 2019). While all morphological structures of praying mantises offer taxonomic information to varying degrees, those of the head, forelegs, thorax (cyclopean ear and pronotum), and genitalia appear to hold universal relevance (Brannoch et al. 2017, Schwarz & Roy 2019). Historically, there were conflicting species descriptions because each author had their own, albeit consistent, biases in measuring and describing praying mantises - which raised obvious concerns. A current consensus has been reached

regarding the names of mantodean body parts, how these structures should be quantified or categorized, and the way in which descriptions should be structured for the reader to extract information in a straightforward manner (Brannoch et al. 2017).

The first modern quantitative reconstruction of mantodean phylogeny, using morphological data, was produced by Wieland (2013) and used the classification proposed by Ehrmann and Roy (Ehrmann 2002). This dataset consisted of 152 morphological characters coded for 122 praying mantis species globally, of which 53 occur in African. There were fifteen globally recognized families of praying mantis at the time and all of them were represented in this dataset, including all of the African families. The current classification scheme has 29 families, of which 17 contain African taxa, to which Wieland's dataset translates beautifully, with 14 families represented: two species in Amelidae, four in Amorphoscelidae, six in Chroicopteridae, four in Deroplatyidae, six in Empusidae, eleven in Eremiaphilidae, two in Galinthiidae, one in Hoplocoryphidae, five in Hymenopodidae, three in Mantidae, two in Miomantidae, one in Nanomantidae, one in Rivetinidae, and five in Toxoderidae.

Since this initial publication, it remains unclear if this morphological dataset is being updated. In the decade since, relationships between various taxa have been revised in the light of the combined morphological and molecular data, so that most, if not all, genera are placed near their phylogenetic relatives. With recent growing interest in African Mantodea (Moulin et al. 2017, Moulin 2018a, 2018b, 2020, Greyvenstein et al. 2020b, 2021b, 2021a, 2022, 2023), it is pressing that Wieland's dataset be updated and morphological data be extrapolated from it.

Recent exploration into Africa has produced several new species and distribution records (Moulin et al. 2017, Moulin 2018a, 2018b, 2020), and re-cataloguing of southern African museum collection is revealing new distribution ranges that were not previously recorded in literature (Greyvenstein et al. 2020, 2022). The lack of knowledge regarding African Mantodea leaves much scope for potential discovery.

METHODS

Wieland's dataset was expanded to include data from fifteen southern African species that were collected for this study and were not already coded, and a further 112 species from published descriptions and images globally, that were also not previously coded. The scoring of character states was limited by the detail of the descriptions and photographs, therefore some putative autapomorphies and synapomorphies of various groups were carried through where data, and specimens, were unavailable. The dataset now consists of 149 morphological character states coded for 248 praying mantises and one

cockroach; 133 genera from 25 from the 29 mantodean families have data associated with them. Wieland's terminology was updated to follow that of Brannoch *et al.* (2017) which includes detailed diagrams of praying mantis morphology, and phrasing was reworded into a more sentence-like format that was used to generate family descriptions using DDescription Language for TAXonomy software (DELTA v1.02) (Dalwitz *et al.* 2013). A key to families was also produced by identifying informative morphological characteristics at a family level from this dataset.

Morphological data were pulled from Wieland's dataset, and unweighted Maximum Likelihood (ML) analyses were run to produce morphological topologies (Trifinopoulos *et al.* 2016). The ML analysis was run on the dataset using IQtree v2.1.6 for 20 000 generations, using ultrafast bootstrapping (Minh *et al.* 2022). Maximum Likelihood analyses were also run on subsets of the dataset (head, thorax, abdomen, forelegs, walking legs, and wings) to probe which of these better grouped the families; here, ultrafast bootstrapping was used for 10 000 generations. The ML analyses were run through the CIPRES Science Gateway (Miller *et al.* 2010).

RESULTS

Family Descriptions

Family descriptions were generated from the augmented data matrix originally compiled by Wieland (2013) and are scored for most of the families (Appendix 3.7). Four families (Angelidae, Coptopterygidae, Dactylopterygidae, and Leptomantellidae) are encoded only for synapomorphies and autapomorphies compiled from literature; five families (Chaeteessidae, Majangidae, Epaphroditidae, Amelidae and Hoplocoryphidae) are represented only by one taxon each (with Chaeteessidae being only one extant genus as a representative of the family); and Liturgusidae is represented by several genera, although the detail provided in the descriptions only partially describes the taxa.

Acanthopoidea is represented by three of the five constituent families: Acanthopidae, Liturgusidae, and Photinidae. Nanomantoidea is represented by two of its three families: Amorphoscelidae and Nanomantidae. Eremiaphiloidea is represented by all four subordinate families: Amelidae, Eremiaphilidae, Rivetinae, and Toxoderidae. Epaphroditoidea is represented by both families: Epaphroditidae and Majangidae. Hymenopoidea is represented by both families: Empusidae and Hymenopodidae. The three families of Mantoidea are represented by Deroplatyidae and Mantidae. The remaining superfamilies only have one family each.

Phylogenetic analyses

The ML analysis produced a topology (Appendix 2.1) from 149 morphological characters, showing nodal support through bootstrap probability (bp). Most of the oldest superfamilies are monophyletic, and the apical clade comprises mostly of Mantoidea and Hymenopoidea, with those in the middle being more chaotic. Chaeteessidae is the sister-clade to the remaining Mantodea, followed by Mantoididae (bp = 99%) and then Metallyticidae (bp = 97%) sequentially. Acanthopoidea is monophyletic, as are its constituent families, and forms the basal-most clade of Artimantodea and is sister-group to the remaining Mantodea (bp = 100%). Gonypetidae (*partim*), Nanomantodea (Nanomantidae (*partim*)+Amorphoscelidae), and the remaining Mantodea form three clades at the same node. A clade comprising a monophyletic Thespidae+Haaniidae, Hoplocoryphidae and Epaphroditidae (each being the only representative of their respective family), Chroicopteridae (*partim*), and Gonypetidae (*partim*) together form a sister-group (bp = 43%) to the remaining Mantodea. Gonypetidae (*partim*) forms a sister-clade (bp = 52%) to the remaining Mantodea, followed by Chroicopteridae (*partim*) (bp = 53%) and then Eremiaphiloidea (Amelidae+Eremiaphilidae+Rivetinidae) (bp = 85%) sequentially. The remaining taxa form a polyphyletic cluster at the apical end of the tree, with several families forming paraphyletic clades, and Galinthiidae being the only monophyletic family (bp = 95%).

Maximum Likelihood analyses were run on six subsets of the datasheet encoding for praying mantis morphology (Appendix 3.1 – 3.7): head, thorax, abdomen, forelegs, walking legs, and wings. None of these topologies showed much resemblance to current phylogenies or morphological classifications, which was expected as there were only 12- to 39- character states encoded for each subset. However, there was some degree of family grouping among several subsets of data, with some families grouping more consistently than others between subsets.

Head (15 characters, Appendix 3.1). Empusidae, Hymenopodidae, and Galinthiidae grouped well but there was little clear grouping in any other family. All members of Empusidae have a median head process on their vertex, this process is also present in most Hymenopodidae (excl. *Nemotha* and *Odontomantis*), and is only sometimes seen in Acanthopidae (*Callibia*) and Chroicopteridae (*Amphecostephanus*). The shape of the process in Empusidae is symmetrical and rather large, but the shape may vary considerably in Hymenopodidae. All members Galinthiidae and Haaniidae have processes or spines near the lateral ocellus, with some Eremiaphilids (*Didymocorypha*, *Antistia*, and *Pyrgomantis*) and Hymenopodids (*Theopropus*, *Oxypilus*, and *Ceratomantis*) also possessing this trait.

Transverse folding of the lower frons is absent in all praying mantises except Metallyticidae and Miomantidae. The clypeuses of Empusidae and Galinthiidae have ridges, a trait that is also present in some Rivetiniids, Toxoderids, Hymenopodids, and Mantids. The presence of non-visual elongations of the compound eye are present in all Galinthiidae, many Hymenopodids and Toxoderids, and sometime in Acanthopidae (*Decimiana* and *Acanthops*), Eremiaphilidae (*Episcomantis*), and Deroplatyidae (*Danuria*).

Thorax (12 characters, Appendix 3.2). Chaeteessidae, Mantoididae and Metallyticidae grouped basally. Some members of Eremiaphilidae grouped somewhat basally and so did Eremiaphilidae (*partim*) + Nanomantodea (*partim*), and another grouping consisted of some Thespidae and some Acanthopidae.

Ventral sclerites were completely missing in some families (Mantoididae, Metallyticidae, Amorphoscelidae, Amelidae and Eremiaphilidae), one sclerite was present in Chaeteessidae, and two were present in the remaining families. Most Toxoderids and Nanomantids have two sclerites present, but they can be secondarily missing in some genera (*Compsothespis* and *Calamothespis*; and *Ilomantis*, *Milomantis*, *Gyromantis*, and *Paraoxyphilus*, respectively). The median connection of the intercervical sclerite is lacking in Chaeteessidae, Mantoididae, Metallyticidae, and Amorphoscelidae, and this can also be true for many Nanomantids and Eremiaphilids. The same families did not form a torus intercervicalis except for Metallyticidae. The external hearing organ is absent in Chaeteessidae, Mantoididae, Metallyticidae, Thespidae, and Acanthopodea, but it is present in all remaining Mantodea.

The pronotum length was longer than wide in all praying mantises, with more basal taxa displaying a pronotum on the shorter end of the spectrum, but shorter pronotums were also found in several genera of other families. Only Dactylopterygidae possessed the adaptation where the dorsal edge of the forefemur merged with the edge of the pronotum. Lamellar expansions of the pronotum would seem like an informative characteristic but this was not true at family level as only select genera within each family had significantly large expansions (Thespidae, Galinthiidae, Empusidae, Hymenopodidae, Mantidae, and Deroplatyidae).

Abdomen (32 characters, Appendix 3.3). Chaeteessidae, Mantoididae and Metallyticidae grouped basally; Thespidae grouped with Photinaidae near the base of the tree; and Acanthopidae also grouped near Thespidae + Photinaidae. Gonyptetidae appeared several times, twice with Nanomantidae; and Majangidae + Haaniidae + Epaphroditidae were grouped closely with Nanomantidae + Gonyptetidae. Some Empusids grouped with some Hymenopodids at the apex of the topology, forming a sister clade to some Mantidae and some Deroplatyidae.

The supra-anal plate is elongated in Thespidae, Epaphroditidae and Hoplocoryphidae, and some members of Nanomantidae, Rivetinidae, and Mantidae. Haaniidae and Amelidae have supra-anal plates that are as long as they are wide, and so can some genera within Photinaidae, Nanomantidae, Eremiaphilidae, Toxoderidae, and Miomantidae - there are no data on Chaeteessidae. The supra-anal plate is almost rectangular in Metallyticidae, rounded or semicircular in some families (Mantoididae, Amorphoscelidae, Majangidae, Empusidae, Hymenopodidae, Dactylopterygidae, and Deroplatyidae), and triangular in the rest. There are no data on Chaeteessidae, and the remaining families have genera having either semicircular or triangular supra-anal plates (Nanomantidae, Gonypetidae, Eremiaphilidae, Galinthiidae, and Mantidae).

Females of Majangidae and Haaniidae all possess lateral lobe-like expansions; this state can also be found in most Empusidae some members of Thespidae, Acanthopidae, Nanomantidae, Gonypetidae, Galinthiidae, Hymenopodidae, Mantidae and Deroplatyidae. All females of Haaniidae have dorsal lobe-like expansions, and this is also present in some Hymenopodidae (*Oxypilus*), Empusidae (*Hemiempusa*), Toxoderidae (*Toxodera*), Eremiaphilidae (*Tarachodes*), and Nanomantidae (*Paraoxypilus* and *Gyromantis*). All Majangidae, along with some Acanthopids, Gonypetids, Haaniids, Galinthiads, Empusids, Hymenopodids, and Mantids have lateral lobe-like expansions protruding from the sternites.

The shape of the cerci is cylindrical in Chaeteessidae, Angelidae, Coptopterygidae, Photinaidae, Toxoderidae, and Hoplocoryphidae, in many Eremiaphilids, and occasionally in Thespidae (*Thrinaconyx*) and Mantidae (*Archimantis*). A large portion of informative data can be obtained from the thirteen characters associated with male genitalia as these traits are not masked by convergent evolution and largely portray the evolutionary history of the order.

Forelegs (39 characters, Appendix 3.4) Metallyticidae grouped basally while Empusidae was positioned apically. Amorphoscelidae and Thespidae formed monophyletic groups, Liturgusidae made two groups, and Mantidae + Deroplatyidae grouped together often – other families occasionally grouped throughout the topology.

The position of the tibial spur groove separates Chaeteessidae, Mantoididae, and Metallyticidae as their groove is situated at the base of the femur; this is also sometimes expressed in Acanthopidae (*Callibia* and *Raptrix*) and Hymenopodidae (*Metacromantis*). Hoplocoryphidae have their groove located distally, as do most Thespids and Amorphoscelids, and some members of Toxoderidae (*Compsotespis*), Empusidae (*Hypsicorypha* and *Idolomorpha*), Hymenopodidae (*Ceratocrania*), and Deroplatyidae (*Mythomantis*,

Phasmomantella, *Euchomenella*, and *Leptocola*). The remaining mantodeans have their tibial groove located medially or in the proximal third of the forefemur. All praying mantises have a defined femoral brush except for Metallyticidae, where the setae are standing far apart.

Anteroventral spines of the forefemur display a pattern of alternating lengths (long, short, long, ...) in most praying mantises; are almost equal lengths in Mantoididae, Metallyticidae, Eremiaphilidae, and sometimes in Gonypetidae (*Theompompa*); an alternating pattern (1 long, 3 short, 1 long, ...) in Empusidae; either large and plate-like or absent in Amorphoscelidae; Nanomantidae usually displays the common simple alternating pattern but *Gyromantis* and *Paraoxyphilus* have short/blunt spines that are proximally shifted together.

The number of posteroventral spines on the forefemur is informative at distinguishing between several families: Amorphoscelidae lacks spines altogether; Thespidae ranges between one and four; four spines are present in Mantoididae, Metallyticidae, Liturgusidae, Nanomantidae, Gonypetidae, Amelidae, Hoplocoryphidae, Miomantidae, Hymenopodidae, Dactylopterygidae, Mantidae and Deroplatyidae; five spines are present in Coptopterygidae and Photinaidae; Acanthopidae have a minimum of five spines; Chaeteessidae have a minimum of six spines; Toxoderidae ranges between four and eight; and Epaphroditidae ranges between six and twelve, with the remaining praying mantises possessing four to six spines. The posteroventral spines of Empusidae are positioned on an elevated, which is also true for some Acanthopidae and Hymenopodidae which can also be positioned in individual sockets.

The number of discoidal spines is informative for Metallyticidae and Amorphoscelidae that possess one discoidal spine; Chaeteessidae and some Nanomantids that possesses two; Mantoididae, Coptopterygidae, Hoplocoryphidae and some Nanomantids possess three; the remaining mantodeans have four discoidal spines except for some families that can have three or four (Photinaidae, Acanthopidae, Chroicopteridae, Gonypetidae, Toxoderidae, and Hymenopodidae). Mantoididae and Amorphoscelidae have their proximal (or only) discoidal spine standing on an elevated socket.

All mantodeans but Amorphoscelidae have antero- and posteroventral spines on their foretibia. Anteroventral spines of the forefemur increase in length distally in most mantodeans; increase in length distally, become short then increase again in Chaeteessidae; and are irregularly positioned or reduced to a single spine in Haaniidae.

Walking legs (18 characters, Appendix 3.5). Chaeteessidae, Mantoididae, and Metallyticidae grouped somewhat basally along with most of Eremiaphilidae, where Galinthiidae and many Hymenopodidae grouped apically. Amorphoscelidae made two clear groupings, and Thespidae (*partim*) made one.

The genicular spine is absent in Thespidae, Amorphoscelidae, Epaphroditidae, Haaniidae, Amelidae, Hoplocoryphidae and most Nanomantids (excl. *Ciulfina* and *Stenomantis*), and is absent in some Photinidae (*Orthoderella*), Toxoderidae (*Oxyopsis* and *Toxodera*), and several Mantidae. Lobe-like expansions can be found on the meso- and metathoracic forefemur of Epaphroditidae and Galinthiidae, but can also be present in some Acanthopids, Toxoderids, Empusids, Hymenopodids, Mantids, and Derplatyids.

The mesothoracic tarsomere 5 of some mantodeans is as long as, or longer than, the remaining tarsomeres collectively and this is true for Thespidae, Eremiaphilidae, Haaniidae and Hoplocoryphidae, and for some Liturgusids, Amorphoscelids, Gonypetids, Nanomantids, Empusidae, Hymenopodidae, Mantidae and Deroplatyidae. A similar phylogenetic distribution is true for the metathoracic tarsomere 5, with Chaeteessidae, Metallyticidae, Majangidae and Rivetinidae also possessing this trait, and it also occurs in some Acanthopidae, Chroicopteridae and Eremiaphilidae. Tarsomeres 1-3 lacking a v-shaped notch are present in Chaeteessidae, Mantoididae and Haaniidae, and it is sometimes lacking in Thespidae (*Thrinaconyx*), Nanomantidae (*Ciulfina*) and Eremiaphilidae (*Eremiaphila*). Tarsomere 4 is enlarged compared to the previous tarsomere (t3) in most mantodeans, but are of similar size in Mantoididae, Metallyticidae, Amorphoscelidae, Rivetinidae, Amelidae, Eremiaphilidae and Hoplocoryphidae, and sometimes in Chroicopteridae, Nanomantidae, Gonypetidae, Toxoderidae, Empusidae and Mantidae. The medial euplantula is present on tarsomere 5 in Chroicopteridae, Majangidae, Epaphroditidae, Rivetinidae, Amelidae, Hoplocoryphidae, Miomantidae and Empusidae; and in some Nanomantidae, Gonypetidae, Eremiaphilidae, Toxoderidae, Hymenopodidae, Mantidae and Deroplatyidae; six families lack data.

Wings (29 characters, Appendix 3.6). Chaeteessidae, Mantoidea, and Metallyticidae grouped together, although not basally. Toxoderidae (*partim*) grouped apically, Amorphoscelidae made two clear groupings, similarly with Empusidae, and some Hymenopodidae formed a tight group.

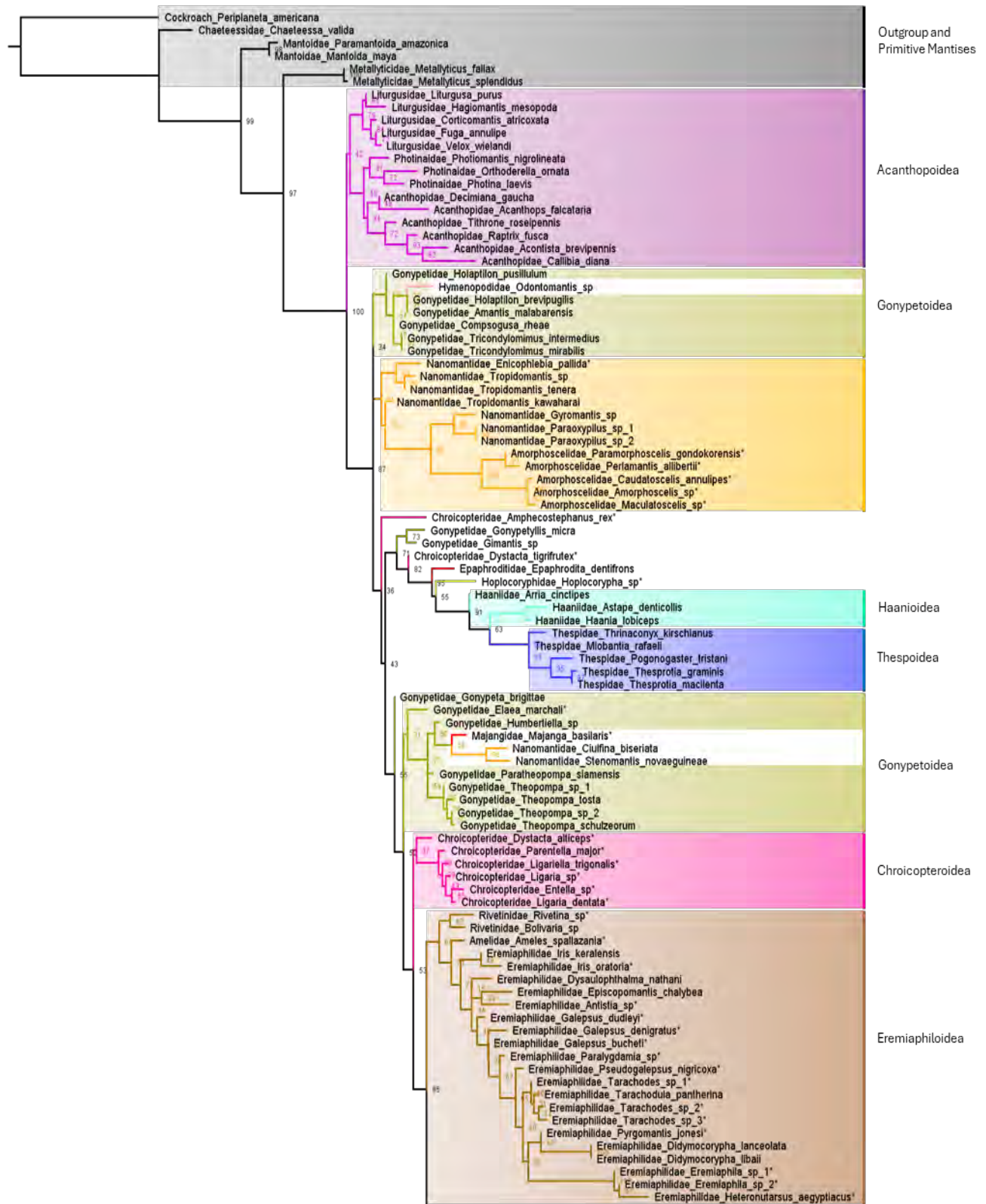
The wing length of praying mantises can vary from not having wings, to possessing wing-buds or even fully developed wings extending past the tip of the abdomen – with each length having a technical name. To avoid ambiguity from various descriptions, we use the following terms: apterous = wings absent; macropterous = wings extend past the tip of the abdomen; brachypterous = all forms of wing length that

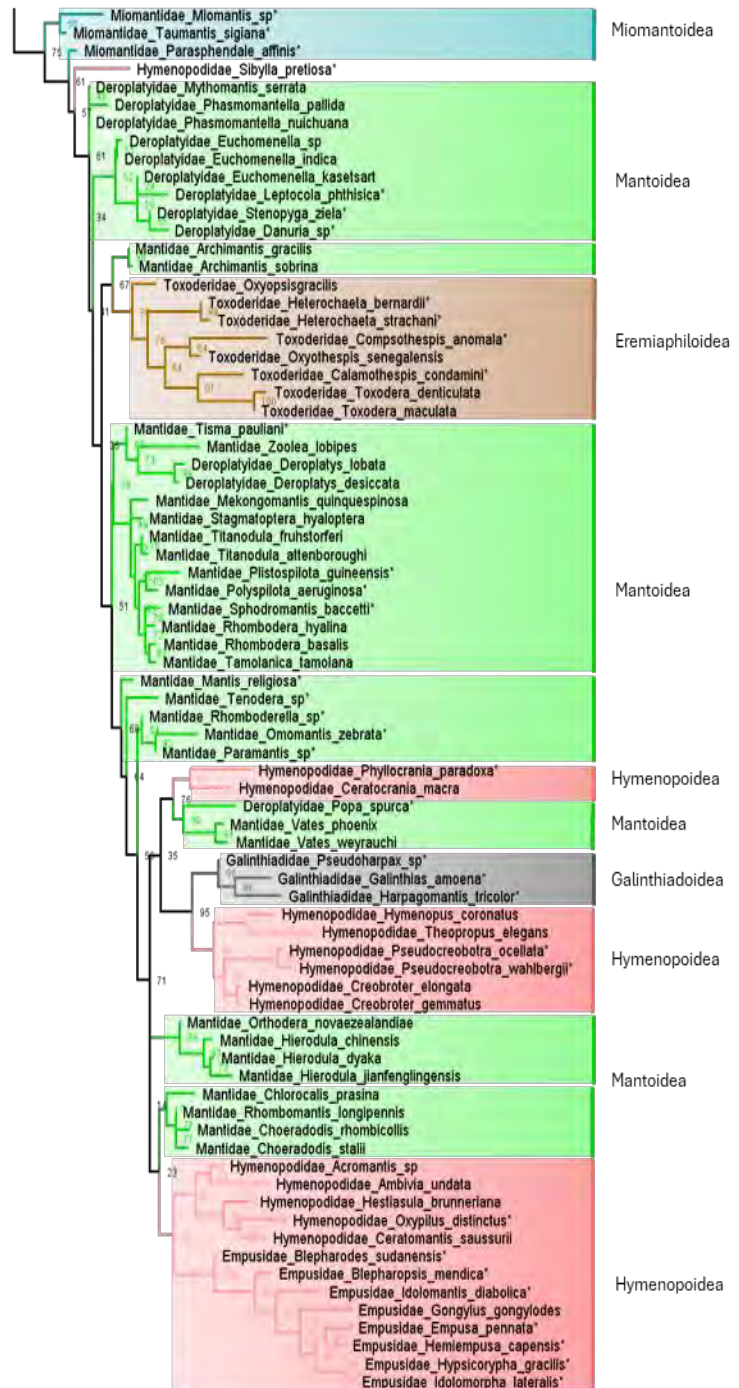
do not fall into the two aforementioned categories. Macropterous females are present in Chaeteessidae, Mantoididae, Metallyticidae, Leptomantellidae, Amorphoscelidae, Galinthiidae, most of Empusidae, and some Gonypetidae, Haaniidae, Dactylopterygidae, Mantidae and Deroplatyidae. Apterous females are present in Thespidae and Hoplocoryphidae, and some Gonypetids, Haaniids, Rivertinids, and Hymenopodids. Adult males are generally macropterous or brachypterous, but some Gonypetids and Rivertinids are apterous.

The main vein of the forewing is bent distally, with one point of inflection in Mantoididae, Thespidae, Photinidae, Chroicopteridae, Amorphoscelidae, Majangidae, Haaniidae, Amelidae, Eremiaphilidae and Galinthiidae. The main vein is at least partially sigmoid, with two points of inflection, in Chaeteessidae, Metallyticidae, Epaphroditidae, Rivertinidae and Hoplocoryphidae. There are no data on Angelidae, Chroicopteridae, Liturgusidae, Leptomantellidae and Dactylopterygidae, and the remaining families comprise genera with either state.

The remigulum of the forewing is not crossed by anal veins in Chaeteessidae, Mantoididae, Metallyticidae, Thespidae, Photinidae and Haaniidae, and some members of Acanthopidae, Chroicopteridae and Eremiaphilidae. There are no data present for Angelidae, Coptopterygidae, Liturgusidae, Leptomantellidae and Dactylopterygidae.

The hindwing branching of the male CuA is not present in Eremiphiloidea (excl. some Eremiaphilids) and some members of Acanthopidae and Galinthiidae. A similar state occurs in most females, with some Chroicopteridae, Amorphoscelidae, Mantidae and Deroplatyidae not displaying any branching of CuA. The male anal veins branch more than eight times in Metallyticidae, Toxoderidae, Miomantidae, Galinthiidae and Empusidae, and in some Acanthopidae, Chroicopteridae, Amorphoscelidae, Gonypetidae, Eremiaphilidae, Hymenopodidae, Mantidae and Deroplatyidae. There are no data for Angelidae, Coptopterygidae, Liturgusidae, Leptomantellidae or Dactylopterygidae, and the males of the remaining families have 5-8 anal veins, but Eremiaphilidae (*Eremiaphila*) and Mantidae (*Tenodera*) can have fewer than 5 branches. Some females display less hindwing branching of the anal vein than their male counterparts.





0.2

Figure 3.1. Phylogeny produced from the Maximum Likelihood analysis based on 149 morphological characters showing nodal support. Families and species are indicated on branch terminals, branches are coloured by superfamily, and African taxa are marked with an asterisk (*).

Key to families

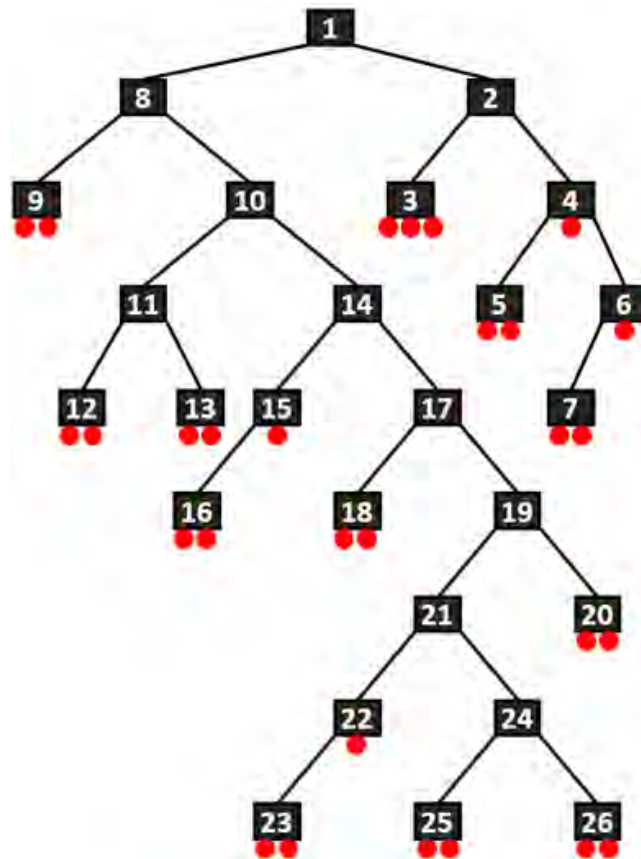
A key to families was produced from morphological features of 248 adult praying mantises (Table 3.1) following the classification scheme of Schwarz and Roy (2019) and is limited to adult praying mantises of either sex. The key produced is not strictly dichotomous, it totalled 26 decisions to split 29 families, the number of decisions required to identify any given praying mantis family ranged between three and nine, with a mean number of decisions to reach a consensus being 5.3 – against a theoretical minimum of 4.7 steps (= $\log(26)/\log(2)$).

Table 3.1. Key to extant, adult praying mantises. This key is based on the classification scheme proposed by Schwarz and Roy (2019) and incorporates morphological characters of 248 praying mantis species from a revised version of Wieland’s (2013) database. The decision tree is depicted at the end of the key - note that red dots represent an endpoint in the decision tree, when a family has been identified. Refer to supplementary images and diagrams found in appendix 3.9.

1. External hearing organ present.....	2
External hearing organ absent.....	8
2. Anterior duplicature of pronotum covering caudal part of head.....	3
Anterior duplicature of pronotum not covering any part of head.....	4
3. One discoidal spine present on forefemur.....	Metallyticidae
Two discoidal spines present on forefemur.....	Chaeteessidae
Three discoidal spines present on forefemur.....	Mantoididae
4. Between one and four posteroventral spines present on forefemur.....	5
Five posteroventral spines present on forefemur.....	6
Six or more posteroventral spines present on forefemur.....	Acanthopidae
5. Cerci cylindrical, at least until last cercomere.....	Thespidae
Cerci flattened, or at least in distal half.....	Angelidae
6. Metazone twice the length of prozone, or longer.....	7
Metazone longer than prozone, but shorter than twice the length.....	Photinaidae
7. Three discoidal spines present on forefemur.....	Coptopterygidae
Four discoidal spines present on forefemur.....	Liturgusidae
8. Absence of ventral cervical sclerites.....	9
Presence of ventral cervical sclerites.....	10
9. One discoidal spines present on forefemur.....	Amorphoscelidae

Four discoidal spines present on forefemur.....	Eremiaphilidae
10. Foretibia with decumbent posteroventral spines, and/or the presence of a median head process on the vertex.....	11
Lacking both decumbent posteroventral spines on the foretibia and a median head process on the vertex.....	14
11. Supra-anal plate is rounded to semicircular in shape.....	12
Supra-anal plate is triangular to trapezoidal in shape.....	13
12. Anteroventral spines of forefemur alternating in a 1-3-1 pattern, with one long spine followed by three short spines, then again by a long spine.....	Empusidae
Anteroventral spines of the forefemur distinctly alternating in the proximal half; with one long spine followed by one short spine, then again by a long spine.....	Hymenopodidae
13. Eyes bulging laterally, outside the head outline.....	Majangidae
Eyes protruding dorsally, with the presence of non-visual elongations.....	Galinthiidae
14. Supra-anal plate wider than long.....	15
Supra-anal plate elongated, or at least as long as it is wide.....	17
15. Edge of prothorax merging smoothly with the dorsal edge of the forefemur.....	Dactylopterygidae
No such adaptations present.....	16
16. Pronotum, excluding lamellar expansions, at least five times longer than wide.....	Deroplatyidae
Pronotum longer than wide, but not larger than five times as long.....	Mantidae
17. Distal-most cercomere of the cerci is elongated, at least twice the length of the preceding cercomere.....	18
Distal-most cercomere of the cerci being similar in length or shorter than the preceding cercomere.....	19
18. Four discoidal- and four posteroventral spines present on forefemur.....	Leptomantellidae
Two or three discoidal spines present on the forefemur. If four are present, then in combination with five posteroventral spines on the forefemur.....	Nanomantidae
19. Shape of cerci is cylindrical, or at least until last cercomere.....	20
Shape of cerci is flattened, or at least in the distal half.....	21
20. Tibial spur one fifth the length of foretibia, or longer.....	Toxoderidae
Tibial spur shorter than one fifth the length of foretibia.....	Hoplocoryphidae
21. Crenulation present medioventral of posteroventral spines of forefemur.....	22
Crenulation absent in posteroventral spines of forefemur.....	24

22. First and fourth discoidal spines are shortest and of equal length, second spine is longer, and third spine is longest.....23
 Discoidal spines of forefemur not following aforementioned arrangement.....**Gonypetidae**
23. Posteroventral margins of forecoxa are denticulated.....**Miomantidae**
 Posteroventral margins of forecoxa are smooth.....**Epaphroditidae**
24. Hindwing with an eyespot.....25
 Hindwing lacking an eyespot.....26
25. First and second discoidal spines of equal length, third spine is longest, fourth spine is shortest.....**Haaniidae**
 First, second, and third discoidal spines becoming gradually longer, with fourth spine being the shortest.....**Rivetinidae**
26. Metafemur elongated and enlarged with a jumping-like function.....**Amelidae**
 No such aforementioned adaptation.....**Chroicopteridae**



DISCUSSION

Data matrix and character list

The augmented matrix now comprises 149 characters (Appendix 3.8). Some characters were merged to reduce redundancy when generating a character list. Instead of ‘head process’ *present vs absent* and then ‘head process’ *shape A, B, or C*, we propose ‘head process’ *missing (i.e. shape 0), shape A, shape B, or shape C*. The ‘presence vs absence’ characters were retained in the datasheet as they are useful for other purposes (e.g., constructing a key) that Wieland presumably had in mind when compiling the datasheet in this format. New characters were added to the datasheet, although some were not used in the analyses as very few items (species, genera, etc.) were scored, which would further increase ambiguity: ‘posteroventral margins of forecoxa’ *denticulated vs smooth (not denticulated)*; ‘cerci length’ *longer vs shorter than half the abdomen length*; ‘wing venation’ with *pseudovein vs elongated stigma vs ellipsoid*. Thirteen synapomorphies characters from the male genitalia (Schwarz & Roy 2019), that were not previously coded, were added to the datasheet and carried down through the relevant groups – this eliminated the need to observe these characters individually on each specimen, especially since most of the specimens are in depositories, abroad.

The posterior margins of the forecoxa are denticulated and considered a synapomorphy of some derived mantodean families belonging to Calomantodea (Dactylopterygidae, Deroplatyidae, Empusidae, Galinthiadidae, Hymenopodidae, Mantidae, and Miomantidae) but it is not certain whether this state is present in Hoplocoryphidae. The phylogenetic position of Hoplocoryphidae is largely unresolved, and often displays a close relationship to Miomantidae which is resolved as an outgroup of Mantoidea + Hymenopoidea (Yager & Svenson 2008, Svenson & Whiting 2009, Legendre et al. 2015, Svenson & Rodrigues 2017). Future studies could shed some light on Hoplocoryphidae, particularly its relationship to Calomantodea.

Cercus length being greater than half of the abdomen length and foretibia being posteroventrally curved seem to be plesiomorphic traits that are present in *Chaeteessa* (Chaeteessidae) and were added to the dataset but were excluded from further analyses due to uncertainty – the cerci length of some nymphs is almost equally as long (*Amporphoscelis*, *Caudatoscelis*, *Maculatoscelis*, and presumably the entire subfamily of Amorphoscelinae).

A pseudo-vein is present in Blattodea and is considered a plesiomorphy trait of Mantodea, and is present in members belonging to Artimantodea (Chaeteesidae, Mantoididae, and Metallyticidae). Families

belonging to Amerimantodea (Thespidae, Angelidae, Coptopterygidae, Liturgusidae, Photinidae, and Acanthopidae) have an elongated stigma on the wings. The remaining families all possess a wing venation that is somewhat ellipsoid.

Informative characteristics

The morphological dataset revealed several informative characteristics that differentiated families. A large portion of informative characteristics were closely associated with crypsis and mimesis, and these were largely present on the head, abdomen, and walking legs. Features of the wings and walking legs provided little other information at a family level, except for some insight into habitat preferences and hunting strategies.

A combination of morphological features of the head were informative at differentiating Hymenopoidea and Galinthiidae from the remaining Mantodea but was uninformative for most other groups. Empusidae and Galinthiidae can easily be differentiated from each other easily through a combination of vertexes and spines, ridges, and eye shape – but this is not always the case for Hymenopodidae (Appendix 3.1).

These three families all contain either a median head process and/or spine(s) near the lateral ocellus. All species of Empusidae have a medium head process which is defined as ‘strong and massive’ and no spines near the lateral ocellus, where Galinthiidae is lacking a head process but contains spines, but Hymenopodidae can have either, both, or none. Ridges on the lower frons and clypeus are also informative at differentiating these three families. Species belonging to Empusidae have a single median ridge on the lower frons where those in Galinthiidae have two parallel ridges, and Hymenopodidae can have either of the two previous states as well as three ridges or lacking ridges completely. While all species of Empusidae and Galinthiidae bear ridges on their clypeus, Hymenopodidae may contain ridges or lack them completely. Empusidae has oval-to-globular shaped eyes that fit the outline of the head, whereas Galinthiidae has cone shaped eyes that protrude the head dorsally, and Hymenopodidae may possess either eye shape or position, and the eyes can also bulge laterally.

Some species belonging to other families may contain several of the aforementioned traits, but in combination they are particular to Empusidae, Hymenopodidae, and Galinthiidae. Other species containing similar traits are also closely associated with a plant-mimicking lifestyle (e.g. Toxoderidae, Acanthopidae, and some Eremiaphilids). It is hypothesised that head processes and cone-shaped eyes, often with non-visual elongations, help to break the outline of the head against vegetation and improves

crypsis (Svenson et al. 2015). Empusidae and Hymenopodidae both belong to Hymenopoidea so we expect some extent of pleisiomorphy despite the obvious size differences of the two families. However, Galinthiidae and Hymenopodidae look similar, although slightly more distantly related, so we would expect analogous morphological features between the two (Roy & Stiewe 2014, Svenson et al. 2015, Greyvenstein et al. 2021b). We observed that Empusidae and Galinthiidae did not group together, but Hymenopodidae did group closely with both. This may be a result of underlying genetics with Empusidae and convergent evolution with Galinthiidae, or that Hymenopodidae is highly speciose and diverse in morphology.

The antennae appear to be somewhat informative but were largely excluded in our analyses as they tend to be easily damaged and useful data is lost. Chaeteessidae is the only family having antennae longer than the body, but this ancestral trait is also present in *Elaea marchali* (Gonypetidae). Males and females of the same species may display varying lengths and counts of antennomeres on their antennae. Typically, males have a greater number as this would assist in finding a mate as they are more mobile (Holwell et al. 2007). With male Empusids, these traits are exaggerated and the antennae shape is modified (bilobate) to better detect pheromones (Svenson et al. 2015).

A combination of morphological features of the thorax were informative at differentiating the primitive mantises (Chaeteessoidea, Mantoidoidea, and Metallyticoidea), the earless mantises (Thespoidea and Acanthopoidea), Nanomantoidea, and Eremiaphiloidea (Appendix 3.2).

The absence of an external hearing organ on the ventral thorax is considered a pleisiomorphic trait within Mantodea which separates the more primitive mantises and the earless mantises from the remaining families in the order. The earless mantises are differentiated from the primitive mantises by i) the anterior duplicature not covering the caudal part of the head, ii) the pronotum length being twice as long as it is wide, and iii) the basisternite and pre-episternite of the prosternum are fused into a T-shaped sclerite that is elongated into a post-cervical plate. The short and wide prothorax is evident in many basal taxa, and the elongated pronotum seems to have evolved several times independently in more derived praying mantises (Schwarz & Roy 2019). A longer pronotum with an anterior duplicature that does not cover the caudal part of the head and intercervical sclerites would facilitate more head movement, as seen in many of the more derived praying mantises which may help spot prey when employing an ambush hunting strategy.

Chaeteessidae can be differentiated from Mantoididae and Metallyticidae by having three ventral sclerites whilst they are missing in Mantoididae and Metallyticidae – three ventral sclerites has seemed to re-emerge in some species of Nanomantidae and Toxoderidae. In Metallyticidae, the intercervical sclerites form a torus intercervicals, but this is not the case for Chaeteessidae and Mantoididae. There are few informative characteristics of the thorax that differ between the earless mantises, with the exception of Photinidae having a prozone shorter than half the length of the metazone, but this state is also expressed in some species of Thespidae and Acanthopidae.

Most Eremiaphiloidea and Nanomantoidea formed an amalgamated grouping presumably because some families within each superfamily were missing ventral sclerites, and this state is only also present in Mantoididae and Metallyticidae. Families within Eremiaphiloidea and Nanomantoidea contained insufficient informative characteristics on the thorax to differentiate between each other. Although not represented in the phylogeny generated due to lack of sufficient data, the pronotum of Dactylopterydae merges with the dorsal edge of the forefemur which allows them to tuck their forelegs into their pronotum which is suited to their bark-dwelling lifestyle (Schwarz 2021).

The existing taxonomy of praying mantises has given limited attention to the features of the thorax (Wieland 2013, Rivera & Svenson 2016, 2020, Brannoch et al. 2017, Schwarz & Roy 2019), possibly due to a scarcity of informative characteristics in this region or the conserved nature of these traits. Alternatively, this emphasis may be attributed to the presence of more informative characteristics on other body parts, or a combination of both factors.

Features of the abdomen provide a wealth of information regarding praying mantises at the family level (Appendix 3.3). However, as the abdomen is largely conducive to reproduction, many informative characteristics are dependent on sex. Primitive mantises, earless mantises, and Gonyoidea+Nanomantoidea were differentiated from the remaining Mantodea through a combination of traits.

Many groups relying on crypsis or mimesis can be differentiated by various forms of lobe-like expansions (e.g. Majangidae and Haaniidae, and some Thespidae, Acanthopidae, Amorphoscelidae, Nanomantidae, Toxoderidae, Galinthiidae, Empusidae, Hymenopodidae, Mantidae, Deroplatyidae). The length and of the supra-anal plate, in combination with the presence of ridges, is an informative set of characteristics at family level. Acanthopoidea are distinguished from most other mantises as their supra-anal plate is a triangular shape and is wider than long, this combination is also present in Chroicopteridae, and

sometimes in Rivetiniidae, Eremiaphilidae, Toxoderidae, Galinthiidae, and Mantidae. Hymenopoidea and Mantoidea (*partim*) are distinguished from most other mantises as their supra-anal plate is a semicircular shape and is wider than long, this combination is also present in Majangidae and Mantoidae, and sometimes in Galinthiidae, Eremiaphilidae and Nanomantidae. A triangular supra-anal plate that is longer than wide is characteristic of Thespidae, Epaphroditidae, and Hoplocoryphidae, and sometimes present in Rivetiniidae and Mantidae. Ridges on the supra-anal plate can be used to further differentiate between families and are lacking in all Mantoididae, Metallyticidae, Amorphoscelidae, Amelidae, Miomantidae, Galinthiidae, and Mantoididae, while they are present in all Thespidae, Photinaidae, Majangidae, Haaniidae, Rivetiniidae, and Hoplocoryphidae.

A large portion of informative data can be obtained from the thirteen characters associated with male genitalia as these traits are not masked by convergent evolution and largely portray the evolutionary history of the order (Jensen et al. 2009, Schwarz & Roy 2019). Structures of female genitalia are found to delimit species (Brannoch et al. 2017). It would be beneficial to build up the database of the female morphological traits and include them in further morphological studies, especially since they shape the ootheca, which are useful for higher-level delimitation (Rivera & Svenson 2016).

The predatory lifestyle of the praying mantis order is distinctly reflected in the highly informative nature of its raptorial foreleg, particularly at the family level. Most superfamilies and families formed clear groupings, but Gonypetidae, Eremiaphilidae, and Hymenopodidae displayed polyphyletic groupings (Appendix 3.4).

All mantises have a longer forefemur than foretibia, and the position of the tibial spur groove on the forefemur is indicative of the proportional length of the foretibia. The plesiomorphic characteristic of having a relatively longer foretibia length is advantageous for a mobile, opportunistic lifestyle, commonly referred to as a generalist hunting strategy (Svenson & Whiting 2004). This characteristic is seen in Chaeteessidae, Mantoididae, and Metallyticidae, as well as in several other more derived families, but is not as distinct in the more advanced groups. Many more derived families adopt an ambush hunting strategy (Svenson & Whiting 2004, Svenson et al. 2015), and their foretibia is also relatively long when compared to the forefemur, and the proportion of the entire foreleg proportional to the body is also larger than most mantises. This is believed to be associated with energy trade-off and prey-capture success. Ambush hunters rely more on crypsis and aggressive mimicry compared to other mantises, and exhibit a lower degree of mobility (O'hanlon et al. 2013, Svenson et al. 2015). This reduced mobility allows them to invest more energy and resources in developing larger forelegs, contributing to an extended reach and a

heightened success rate in capturing prey (Prete et al. 1990, Prete 1999). Cursoriality has evolved a number of times, independently, in several praying mantis families (Svenson & Whiting 2004). Cursorial species, and many grass mimicking groups, have a foretibia less than a third the length of the forefemur. This helps conceal the grass mimicking groups, many of which are also cursorial, and consumes less energy when actively hunting prey as the forelegs are lighter. The benefits of being faster outweigh the lower prey-capture success rate as many cursorial species can have multiple attempts at capturing the same prey item (Prete 1999).

The number and position of discoidal spines and posteroventral spines on the forefemur are largely conserved at a family level, which is useful for delimitation and can provide information on hunting strategies. The number and length of antero- and postero-ventral spines on the forefemur is closely related to hunting strategies employed. Increased number and length assist in prey capture success (Prete 1999) and are common in ambush hunters, and many cursorial hunters have fewer and/or smaller spines. While the majority of praying mantis families typically feature three or four discoidal spines, *Metallyticidae* and *Amorphoscelidae* possess only one discoidal spine, whereas *Chaeteessidae* and certain *Nanomantidae* have two (Wieland 2013, Schwarz & Roy 2019). Additionally, the positioning and length of the discoidal spines allows further delineation at, and beyond, the family level.

Features of the walking legs are rather uninformative at the family level (Appendix 3.5). The genicular spine does not seem to have any special function (Schwarz & Roy 2019) although it is retained in most mantodeans which can be useful as a second, confirming characteristic, especially if it is absent (e.g. all *Thespidae*, *Amorphoscelidae*, *Epaphroditidae*, *Haaniidae*, *Amelidae*, *Hoplocoryphidae*, and some *Photinaidae*, *Nanomantidae*, *Toxoderidae*, and *Mantidae*). Several families may have lobe-like expansions on their walking meso- and metathoracic femurs (e.g. all *Epaphroditidae* and *Galinthiidae*, and some *Toxoderidae*, *Empusidae*, *Hymenopodidae*, *Mantidae*, and *Deroplatyidae*) and some species of *Hymenopodidae*, *Mantidae*, and *Deroplatyidae* have them on their tibia too. These structures are associated with crypsis and mimicry (Svenson et al. 2015) and their position on the femur can be used for higher level differentiation.

The forewings of praying mantises are more conservative than the hindwings, which is valuable when delimiting more basal families. The elongation of the hindwing has allowed improved flight, especially in males. The wings are supported from different branches of the CuA, CuP, and anal veins, which appear to have rapidly radiated as the wings elongated. While these features may offer more meaningful information at higher taxonomic levels, they lack the precision needed at a family level (Appendix 3.6).

However, they are valuable contributors when classifying specimens from fossil records (Béthoux & Wieland 2009, Demers-Potvin et al. 2021).

Females belonging to Thespidae and Hoplocoryphidae are apterous, and so are a few individuals in Coptopterygidae, Nanomantidae, and Hymenopodidae, but their male counterparts are usually macropterous or at least brachypterous. Winglessness has evolved in Thespidae and Hoplocoryphidae due to their conspicuous lifestyles, often mimicking lichen, grass, and similar environments (Rivera & Callohuari 2020). In these cases, wings do not contribute to their behavioural strategies, leading to their reduction or absence as an adaptive trait. The absence or presence of wings in stick insects, along with the reappearance of wings in more derived species, can serve as a distinctive characteristic (Whiting et al. 2003, Zeng et al. 2020, Bank & Bradler 2022). While Mantodea belongs to Polyneoptera and often shares ecological niches with stick insects, and based on their evolution, the question of whether winglessness is a reversible loss in mantises (as it appears to be in Phasmida) remains unclear.

Phylogenetics

This study produced an unweighted topology based on 149 morphological characteristics for 248 individuals (Fig. 3.1) whereas Wieland (2013) used 152 morphological characteristics from 122 individuals to produce an unweighted and a weighted topology and followed the phylogeny of Ehrmann (2002). Wieland's (2013) unweighted analysis (analysis I) produced a low-resolution topology with many distal clades; this data was automatically reweighted (Rescaled Consistency Index) and produced a topology (analysis II) that was more resolved, many monophyletic taxa from analysis I were recovered there, and most families/superfamilies formed distinctive clades; the strict consensus cladogram resulted in an almost fully resolved topology with distinctive clades. The strict consensus topology produced by Wieland (2013) was not congruent with molecular topologies at the time (Svenson & Whiting 2004, 2009, Yager & Svenson 2008) nor was it congruent with recent molecular ones (Svenson & Whiting 2004, Yager & Svenson 2008, 2008, Svenson & Rodrigues 2017, Rodrigues & Svenson 2018, Wang et al. 2020, Lin et al. 2022) – similarly, the topologies in analyses I and II were also poorly congruent with historical and recent molecular studies. With the updated matrix of morphological characteristics, and additional taxa, we produced a topology that is loosely congruent with morphological studies: basal superfamilies are mostly monophyletic but distal ones are polyphyletic, and families are largely monophyletic. It is unclear whether the increased number of taxa represented in this study, or the modifications to the morphological characteristics within the data matrix (or both) produced a topology differing significantly to Wieland's

(2013). However, it could benefit from a reweighted analysis as seen in Wieland (2013) which provided more resolution.

More primitive families (Chaeteessidae, Mantoidae, and Metallyticidae) were positioned basally in this study, similar to what was found in Wieland's (2013) morphological phylogeny and in recent molecular studies, although the placement of Metallyticidae is sometimes oddly positioned (Ehrmann 2002, Grimaldi 2003, Svenson & Whiting 2004, 2009, Klass & Meier 2005, 2005, Inward et al. 2007, Ware et al. 2008, Béthoux & Wieland 2009, Legendre et al. 2015, Hörnig et al. 2017, Djernæs & Muriene 2022).

This study positioned Acanthopoidea as a monophyletic (bp = 100%) sister group to the remaining Mantodea, and its constituent families were also revealed to be monophyletic but with low support values. The family arrangement seen within Acanthopoidea is largely congruent with previous studies (Rivera & Svenson 2016, 2020), but this study lacks morphological data on Angelidae and Coptopterygidae. Thespidae was also revealed to be monophyletic (bp = 98%) but it was positioned medially on the topology in a small heterogeneous clade – similar was seen in Wieland's (2013) morphological topology. However, Thespidae is typically positioned near Acanthopoidea because of their shared earless trait (Rivera & Svenson 2016, 2020, Schwarz & Roy 2019). In our topologies produced from morphological features, we found that Thespidae and families of Acanthopoidea: formed distinctive clades when comparing the foreleg (Appendix 3.4); formed close groupings when comparing the thorax (Appendix 3.2), abdomen (Appendix 3.3), and wings (Appendix 3.6); and showed inconsistent grouping when comparing the head (Appendix 3.1) and walking legs (Appendix 3.5). This indicates that future analyses may assign greater weightings to features of the forelegs, thorax, abdomen, and wings. Such an approach could potentially position these families together while simultaneously differentiating them from each other.

The augmented data set places three clades on the next node: Gonypetidae (*partim*), Nanomantoidea (*partim*), and the remaining mantodeans. Many studies support that Gonypetidae and Nanomantoidea are closely related, often being sister-clades (Svenson & Whiting 2004, 2009, Legendre et al. 2015, Svenson & Rodrigues 2017). This relationship is seen once again with Nanomantidae (*partim*) being nested within Gonypetidae further along in the topology. Between the two Gonypetoidea-Nanomantoidea clades there is a relatively small heterogeneous clade comprising six families, often with high nodal support (bp = 63-95%). The apical end of this clade is comprised of a monophyletic Thespidae as sister-clade (bp = 63%) to a monophyletic Haaniidae. The only representative of Hoplocoryphidae is also within this clade

and, under the current classification, it is closely related to Miomantidae, which is situated more apically, despite these two groups looking dissimilar.

Chroicopteridae formed a poorly supported sister-clade (bp = 53%) to the remainder of Mantodea. Usually this family is placed more basally than Gonypetoidea and Nanomantoidea (Yager & Svenson 2008, Svenson & Whiting 2009, Legendre et al. 2015, Svenson & Rodrigues 2017), but the opposite is true here.

Eremiaphiloidea (*partim*) forms a monophyletic sister-clade ($p = 85\%$) to the remaining Mantodea which is somewhat congruent to previous molecular studies although its position is largely unresolved (Svenson & Whiting 2004, 2009, Yager & Svenson 2008, Legendre et al. 2015, Svenson & Rodrigues 2017). Toxoderidae has been treated as its own family, sister to Eremiaphilidae based on morphological data (Schwarz & Roy 2019), which is contradictory to previous molecular studies where it is a subclade of Eremiaphilidae (Yager & Svenson 2008, Svenson & Whiting 2009, Legendre et al. 2015). Our study grouped Toxoderidae as a monophyletic clade nested within Mantoidea, suggesting that the morphology of Toxoderidae is different to Eremiaphilidae, but to place Toxoderidae in a different superfamily would be untimely.

Miomantidae is largely resolved as sister-clade to Galinthiidae + Mantoidea + Hymenopoidea (Yager & Svenson 2008, Svenson & Whiting 2009, Legendre et al. 2015, Svenson & Rodrigues 2017), which is also true from our study (bp = 75%).

The apical clades of this topology comprise of Mantoidea, Hymenopoidea, and Galinthiidae which is congruent with most published phylogenies (Svenson & Whiting 2004, 2009, Yager & Svenson 2008, Legendre et al. 2015, Svenson & Rodrigues 2017, Liu et al. 2022). These studies also reveal that the position of Galinthiidae remains unstable, although it is often removed from Hymenopodidae and resides within Mantoidea. Our morphological study showed Mantoidea and Hymenopoidea to be paraphyletic at the apical-most clade, where the general notion is that they form sister-clades. The monophyletic Empusidae and Hymenopodidae (*partim*) are associated, as are the majority of Mantidae and Deroplatyidae, but some Mantids are placed within the Hymenopoidea, and a stray Hymenopodidae forms the basal clade of this group.

Key to families

The selection of character states for a key is tedious, especially among Arthropods that often have inconspicuous traits, hence balancing accuracy, efficiency, and usability becomes important. Room for

error increases with the length of a key as there are more decisions where a mistake can be made, and similarly with more choices per decision. Dichotomous keys are considered the most popular as they aim to reduce the mean number of decisions to identify an organism by, ideally, halving the group at each decision, thus increasing overall efficiency (Sinh et al. 2017). Dichotomous keys assume that the group at hand can be split somewhat evenly at each step (and with a sufficiently large character matrix this is true) and that all characters are weighted evenly. Usability emerges when selecting which informative character states are practical: some character states are easier to distinguish whilst others may require specialised expertise or equipment, and if a group can be split with either, then rather select the former to save time and improve accuracy. Key-making should also consider whether the taxon-group at hand displays sexual dimorphism or phenotypic plasticity, and which body parts are most likely to be damaged over time and compromise identification.

This study produced a key that follows the classification scheme of Schwarz and Roy (2019) and is applicable for adult praying mantises of either sex. Some praying mantises had vibrant colours on their inner forecoxa and forefemur (e.g. *Polyspilota* sp.) or on their wings (e.g. *Omomantis zebrata*) which faded after preservation (but bands and patterns remain), so we avoided using coloration as an identification characteristic in this key. The degree of sexual dimorphism has been established to vary considerably amongst most praying mantises, thus we only used character states that were found to be identical in both males and females: wing characters were largely excluded, except in groups where both males and females were at least brachypterous; genitalia, by default, was excluded despite it being a highly informative source of characteristics at many levels; body proportions were selected over body lengths as many females are significantly larger than their male counterparts; antennae were also excluded as they varied between sex in some groups and they are prone to post-preservation damage, like the male stylus.

Our key does not split the taxa evenly at each decision, nor does it follow a strictly dichotomous branching as there were two decisions where three options were available, but these were simple integer-based decisions involving numbers of spines, which seemed redundant to pose twice (Table 3.1). Our key totalled 26 decisions to split 29 families, the number of decisions required to identify any given praying mantis family ranged between three and nine, with the mean number of decisions per identification being 5.3 steps. The ideal dichotomous key would consist of 28 decisions in total, with four-to-five decisions to identify any given taxon. Given the initial restrictions of this key and the diversity of mantodeans, we produced an updated key to mantodean families. We are aware that only 133 of the 449 mantodean genera are coded in the dataset, and therefore may be incomplete in some instances.

CONCLUSIONS

The updated classification scheme of Schwarz and Roy (2019) entertained the idea of constructing a Mantodean phylogeny based on morphological characters alone, but our morphological topology is not congruent with recent molecular phylogenies. The position of the most basal and apical superfamilies showed similarity to recent molecular phylogenies, and many families maintained their monophyly. Much further work is required before morphological datasets can produce phylogenies consistent with genetic ones. Despite this, morphological data is highly relevant in mantodean classification, especially when combined with molecular data. Informative morphological features to delimitate between families were predominantly associated with the forelegs and abdomen; the head, abdomen, and walking legs dissociated many plant-mimicking groups; and the wings and thorax grouped many basal taxa.

Final Remarks

Chapter one offers a comprehensive historical literature review of Mantodea, shedding light on the current taxonomic status of African praying mantises. By providing an exhaustive inventory of all recognised species along with their geopolitical distributions. The chapter also identifies sampling biases in Africa and addresses past impediments, particularly in relation to praying mantis taxonomy and classification. The incongruence between morphological and molecular classifications serves as a crucial foundation, setting the stage for the subsequent molecular and morphological studies in later chapters.

Chapter two presents a robust phylogeny of praying mantises built on a quantitative analysis of molecular data. This analysis involved 37 specimens captured from South Africa, Angola, and Namibia, with an additional 173 ingroup exemplars and four cockroaches included in the study to thoroughly test the monophyly of African praying mantis clades against the currently accepted classification scheme. The phylogeny produced here is largely congruent to those in past studies and the monophyly of all families is maintained, apart from Deroplatyidae. The phylogenetic position of Galinthiadidae remains unresolved in the current literature, presenting an intriguing aspect in our phylogenetic study. Notably, the Bayesian Inference (BI) and Maximum Likelihood (ML) trees yield distinct placements for this family using the same data, with both positions having been previously reported in the literature. This observation warrants further investigation, but we propose that Galinthiadidae should be recognised as part of Mantoidea to maintain its monophyly from Hymenoptera (BI), or Galinthiadidae is to assume an independent placement (ML).

Chapter three focused on encoding the external morphological characteristics of praying mantises into a comprehensive data matrix. This matrix served as the foundation where family descriptions were generated and a key to families was produced. The matrix was also used to identify taxonomically important morphological features and construct a morphological phylogeny. The family descriptions and key to families were successful, but much work is required before morphological datasets can produce phylogenies consistent with genetic ones. It is posited that the underlying evolutionary process of praying mantises is obscured by convergent evolution, which has led to the emergence of diverse hunting strategies, mimicry, and sexual dimorphism observed throughout the order. Genital structures of the male are rather complex and are currently recognised as the best method of discerning between mantodean taxa at various levels. Morphological data remains highly relevant in the African perspective as taxonomy was traditionally a Eurocentric concept and many specimens collected from African countries were

deposited in museums of visiting nations. This leaves potential gaps in local taxonomic research and representation. Additionally, our current molecular methods lack the capability to sequence DNA from ancient and historical specimens.

The primary goal of this thesis was to enhance our understanding of African praying mantises by utilizing both molecular and morphological datasets, aiming to unravel the deeper phylogenetic relationships within Mantodea. It is hoped that this work will serve as an inspiration for other researchers to delve more deeply into this fascinating order, fostering further comprehensive investigations in the field. For instance, several *Tarachodes* species were observed to clade together, posing a challenge to identify beyond the genus level. This finding emphasizes the need for increased attention and research focused on this grossly speciose group from an African perspective. Similar attention is warranted for *Hoplocorypha*, another taxonomically intricate genus, urging us to delve deeper into its study and classification. Additionally, a compelling argument can be put forth supporting the diphyly of Deroplatyidae, suggesting that the geographical isolation of its two subfamilies commenced around 150 mya, triggering speciation by the separation of the Indian plate from Gondwana.

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Appendices

Appendix 1.1. Species Inventory of African Mantodea accompanied by known distributions, following the most recent classification proposed by Schwarz & Roy (2019). This species list was compiled from a meta-analysis of Mantodea Species File (Otte & Spearman 2005), and multiple published papers and may be incomplete. Synonyms are marked with an equality symbol (=).

Taxon List	African Distribution
AMELIDAE Westwood, 1889	
Amelinae Westwood, 1889	
Amelini Westwood, 1889	
<i>Ameles</i> Burmeister, 1838	
= <i>Apterameles</i> Beier, 1950	
= <i>Parameles</i> Saussure, 1869	
<i>aegyptiaca</i> Werner, 1913	Egypt
<i>assoi</i> Bolívar, 1873	Morocco, Tunisia
<i>dumonti</i> Chopard, 1943	Morocco, Tunisia
<i>maroccana</i> Uvarov, 1931	Morocco
<i>modesta</i> Bolívar, 1914	Morocco
<i>moralesi</i> Bolívar, 1936	Morocco
<i>spallanzania</i> Rossi, 1792	Morocco
<i>Apteromantis</i> Werner, 1931	
<i>bolivari</i> Werner, 1923	Algeria, Morocco
<i>Pseudoyersinia</i> Kirby, 1904	
<i>inaspectata</i> Lombardo, 1986	Algeria
<i>kabilica</i> Lombardo, 1986	Algeria
<i>occidentalis</i> Bolívar, 1914	Morocco
<i>salvinae</i> Lombardo, 1986	Algeria
AMORPHOSCELIDAE Stål, 1877	
Amorphoscelinae Stål, 1877	
Amorphoscelini Stål, 1877	
<i>Amorphoscelis</i> Stål, 1871	
<i>abyssinica</i> Giglio-Tos, 1913	Ethiopia, Somalia, Tanzania
<i>angolica</i> Beier, 1969	Angola, Central African Republic
<i>austrogermanica</i> Werner, 1923	Namibia, Tanzania, South Africa
= <i>A. beieri</i> Roy, 1962	
<i>chopardi</i> Roy, 1962	Ivory Coast, Ghana
<i>elegans</i> Giglio-Tos, 1914	Guinea, Ghana
= <i>A. monodonota</i> Roy, 1963	

Taxon List	African Distribution
<i>griffinii</i> Giglio-Tos, 1913	Ivory Coast, Cameroon, Gabon, Central African Republic, Congo, Rwanda
<i>grisea</i> Bolívar, 1908	Ivory Coast, Cameroon, Guinea, Congo, Gabon, Uganda, Central African Republic
<i>hamata</i> Roy, 2009	Kenya
<i>kenyensis</i> Stiewe, 2009	Kenya, Somalia
<i>lamottei</i> Roy, 1963	Congo, Gabon, Ghana, Guinea, Ivory Coast, Tanzania, Uganda, Central African Republic
<i>laxeretis</i> Karsch, 1894	Congo, Gabon, Ghana, Ivory Coast, Sierra Leone, Equatorial Guinea
= <i>A. horni</i> Giglio-Tos, 1914	
<i>machadoi</i> Beier, 1969	Angola
<i>morini</i> Roy, 2013	Congo
<i>nigriventer</i> Beier, 1930	Ivory Coast, Guinea, Ghana
<i>nubeculosa</i> Werner, 1908	Cameroon
<i>opaca</i> Bolívar, 1908	Cameroon
<i>orientalis</i> Giglio-Tos, 1914	Kenya, Somalia, Tanzania
= <i>A. turkanensis</i> Chopard, 1938	
<i>pallida</i> Giglio-Tos, 1914	Cameroon, Kenya, Nigeria
<i>pinheyi</i> Roy, 2007	Mozambique
<i>pulchella</i> Giglio-Tos, 1914	Angola, Congo, Kenya, Tanzania, Uganda, Zimbabwe
= <i>A. ugandanus</i> Beier, 1931	
<i>pulchra</i> Bolívar, 1908	Congo, Ivory Coast, Gabon, Ghana, Cameroon, Sierra Leone, Uganda
<i>punctata</i> Roy, 1962	Ethiopia, Eritrea
<i>tigrina</i> Giglio-Tos, 1914	Benin, Guinea, Cameroon, Nigeria, Senegal, Ivory Coast, Burkina Faso, Sudan
<i>tuberculata</i> Roy, 1963	Malawi, Mozambique, Namibia, Tanzania, South Africa, Zimbabwe
<i>villiersi</i> Roy, 1984	Congo, Central African Republic
<i>Bolivaroscelis</i> Roy, 1973	
<i>bolivarii</i> Giglio-Tos, 1913	Cameroon, Congo, Gabon, Central African Republic
<i>carinata</i> Beier, 1908	Cameroon, Gabon
<i>weneri</i> Roy, 1962	Cameroon, Ghana
<i>Caudatoscelis</i> Roy, 1973	
<i>annulipes</i> Karsch, 1892	Congo, Ghana
= <i>C. micacea</i> Bolívar, 1908	
<i>caudata</i> Giglio-Tos, 1913	Congo, Gabon, Central African Republic
<i>collarti</i> Roy, 1964	Congo, Ghana, Uganda
<i>lagrecai</i> Roy, 1964	Ghana, Nigeria
<i>marmorata</i> Roy, 1965	Ghana, Ivory Coast, Nigeria

Taxon List	African Distribution
<i>Gigliotoscelis</i> Roy, 1973 <i>simulans</i> Giglio-Tos, 1913	Ghana, Guinea, Congo, Cameroon, Ivory Coast, Gabon, Togo, Central African Republic
<i>Maculatосcelis</i> Roy, 1973 <i>ascalaphoides</i> Bolívar, 1908	Angola, Ghana, Guinea, Cameroon, Congo, Tanzania, Central African Republic, Gabon
<i>gilloni</i> Roy, 1964	Ivory Coast
<i>maculata</i> Roy, 1965	Ivory Coast, Ghana
Perlamantinae Giglio-Tos, 1913	
Perlamantini Giglio-Tos, 1913	
<i>Paramorphoscelis</i> Werner, 1907 <i>gondokorensis</i> Werner, 1907	Angola, Burkina Faso, Ghana, Guinea, Nigeria, Senegal, Sudan, Uganda
<i>Perlamantis</i> Guérin-Méneville, 1843 = <i>Discothera</i> Bonnet & Finot, 1884	
<i>algerica</i> Giglio-Tos, 1914	Algeria
<i>allibertii</i> , Guérin-Méneville, 1843	Algeria, Libya, Morocco, Tunisia
= <i>P. tunetana</i> Bonnet & Finot, 1884	
CHROICOPTERIDAE Giglio-Tos, 1915	
Tarachininae Giglio-Tos, 1915	
Gonypetellini Schwarz & Roy, 2019	
<i>Gonypetella</i> Giglio-Tos, 1915	
<i>atra</i> Giglio-Tos, 1915	Uganda
<i>atrocephala</i> Beier, 1930	South Africa
<i>australis</i> Giglio-Tos, 1915	Angola, Namibia
<i>carinata</i> Kaltenbach, 1990	Kenya, Tanzania
<i>deletrix</i> Rehn, 1927	Angola, Botswana, Namibia, South Africa, Zimbabwe
<i>flavicornis</i> Sjöstedt, 1909	Kenya, Rwanda, Ruwenzori, Tanzania
= <i>G. ugandensis</i> Werner, 1916	
<i>fusca</i> Giglio-Tos, 1915	Uganda
<i>fuscipes</i> Sjöstedt, 1909	Ethiopia, Malawi, Tanzania
<i>infumata</i> Saussure, 1872	Congo
<i>ivoirensis</i> Gillon & Roy, 1969	Ivory Coast
<i>kilimandjarica hyaloptera</i> Kaltenbach, 1990	Tanzania
<i>kilimandjarica kilimandjarica</i> Sjöstedt, 1909	Angola, Botswana, Congo, Kenya, South Africa, Tanzania, Uganda, Zambia, Zimbabwe
= <i>G. kilimandjarica similis</i> Giglio-Tos, 1915	
<i>punctata</i> Giglio-Tos, 1915	Cameroon, Congo, Kenya, Uganda
<i>Telomantis</i> Giglio-Tos, 1915	

Taxon List	African Distribution
<i>lamperti</i> Werner, 1906	Kenya, Madagascar, Malawi, Tanzania
= <i>T. madagassica</i> Paulian, 1957	
= <i>T. usambarica</i> Sjöstedt, 1909	
<i>robusta</i> Beier, 1950	Congo
Tarachinini Giglio-Tos, 1915	
<i>Tarachina</i> Werner, 1907	
<i>brevipennis</i> Beier, 1954	Ethiopia, Kenya
<i>congica</i> Beier, 1954	Congo
<i>constricta</i> Werner, 1923	Namibia
<i>occidentalis</i> Giglio-Tos, 1915	Burkina Faso, Cameroon, Senegal
= <i>T. nana</i> Sjöstedt, 1930	
<i>rammei</i> Werner, 1928	Cameroon
<i>raphidioides</i> Werner, 1907	Ethiopia, Kenya, Somalia, Sudan, Tanzania, Uganda
<i>schultzei</i> Karny, 1908	Namibia, South Africa, Zimbabwe
= <i>T. australis</i> Giglio-Tos, 1915	
<i>seriepunctata</i> Beier, 1954	Angola, Congo
<i>transvaalensis</i> Beier, 1953	South Africa, Zimbabwe, Namibia
<i>wernerii</i> Chopard, 1914	Ethiopia, Kenya, Somalia, Tanzania
<i>zernyi</i> Beier, 1954	Tanzania
Chroicopterinae Giglio-Tos, 1915	
Bolbellini Schwarz & Roy, 2019	
<i>Bolbella</i> Giglio-Tos, 1915	
<i>affinis</i> Kaltenbach, 1996	South Africa
<i>brevis</i> Beier, 1953	South Africa
<i>kaltenbachi</i> Stiewe, 2007	South Africa
<i>punctigera</i> Stål, 1871	Comoros, Lesotho, South Africa
= <i>B. debilitata</i> Westwood, 1889	
= <i>B. natalensis</i> Saussure, 1871	
<i>rhodesiaca</i> Beier, 1930	South Africa, Zimbabwe
<i>uhligi</i> Stiewe, 2007	South Tropical Africa, Zimbabwe
<i>Dystactula</i> Giglio-Tos, 1927	
= <i>Dystactella</i> Giglio-Tos, 1915	
<i>grisea</i> Giglio-Tos, 1915	Namibia, Mozambique, South Africa, Zimbabwe
= <i>D. royi</i> Kaltenbach, 1996	
<i>kaltenbachi</i> Roy, 2006	Malawi
<i>natalensis</i> Kaltenbach, 1996	South Africa
Chroicopterini Giglio-Tos, 1915	
<i>Achlaenella</i> Giglio-Tos, 1915	
<i>adolphifrederici</i> Rehn, 1914	Congo
<i>Achlaena</i> Karsch, 1892	

Taxon List	African Distribution
= <i>Auchmomantis</i> Werner, 1908	
<i>grandis</i> Westwood, 1889	Cameroon, Congo, Gabon, Guinea, Ghana, Ivory Coast
=A. <i>chrysichroma</i> Karsch, 1892	
=A. <i>mutica</i> Giglio-Tos, 1915	
=A. <i>rhodii</i> Werner, 1908	
<i>Amphecostephanus</i> Rehn, 1912	
<i>rex</i> Rehn, 1912	Angola, Malawi
<i>Betamantis</i> Giglio-Tos, 1915	
<i>aliena</i> Werner, 1906	Tanzania
<i>marginella</i> Thunberg, 1815	Kenya
<i>Bisanthe</i> Stål, 1876	
<i>lagrecai</i> Kaltenbach, 1996	South Africa, Zimbabwe
<i>menyharthi menyharthi</i> Brancsik, 1895	Mozambique, Zambia, Zimbabwe
<i>menyharthi raggei</i> Kaltenbach, 1994	Botswana, Zimbabwe
<i>pulchripennis</i> Stål, 1876	Botswana, Namibia, South Africa, Zimbabwe
<i>tricolor</i> Werner, 1923	Botswana, Namibia, South Africa
<i>Carvilia</i> Stål, 1876	
= <i>Palaeophotina</i> Werner, 1923	
<i>gracilis</i> Kaltenbach, 1996	South Africa
<i>obscura</i> Fabricius, 1781	Africa
<i>saussurii</i> Stål, 1876	Namibia
=C. <i>kuhlgatzi</i> Karny, 1908	
=C. <i>schneideri</i> Werner, 1923	
<i>Chopardentella</i> Kaltenbach, 1996	
<i>royi</i> Kaltenbach, 1996	Congo
<i>Chroicoptera</i> Stål, 1871	
= <i>Alphamantis</i> Giglio-Tos, 1915	
<i>longa</i> Giglio-Tos, 1915	South Africa
<i>saussurei</i> Giglio-Tos, 1915	Lesotho, South Africa
<i>vidua</i> Stål 1856	Namibia, South Africa
<i>Congomantis</i> Werner, 1929	
<i>Dystacta</i> Saussure, 1871	
<i>alticeps</i> Schaum, 1853	Angola, Botswana, Congo, Malawi, Mozambique, Namibia, South Africa, Tanzania, Zimbabwe
=D. <i>marmorata</i> Schulthess-Rechberg, 1899	
=D. <i>ornatipennis</i> Beier, 1935	
=D. <i>paradoxa</i> Saussure, 1871	
=D. <i>stali</i> Karny, 1908	
<i>Entella (Entella)</i> Stål, 1877	
= <i>Metentella</i> Giglio-Tos, 1915	
= <i>Micrentella</i> Giglio-Tos, 1915	

Taxon List	African Distribution
= <i>Ommatentella</i> Werner, 1923	
<i>angolensis</i> Beier, 1937	Angola
<i>angolica</i> Beier, 1969	Angola
<i>brunni</i> Werner, 1923	Namibia
<i>congica</i> Giglio-Tos, 1915	Congo, South Africa
<i>delalandi</i> Saussure, 1870	Namibia, South Africa, Tanzania, Zimbabwe
<i>exilis</i> Giglio-Tos, 1915	South Africa
<i>femina</i> Karny, 1908	Namibia
<i>fuliginosa</i> Werner, 1923	South-West Africa
<i>grandis</i> Giglio-Tos, 1915	Tanzania
<i>machadoi</i> Beier, 1969	Angola
<i>meruensis</i> Sjöstedt, 1909	Kenya, Tanzania
<i>minor</i> Giglio-Tos, 1915	Tanzania
<i>natalica</i> Beier, 1955	South Africa
<i>nebulosa</i> Serville, 1839	South Africa
<i>obscura</i> Beier, 1969	Angola
<i>orientalis</i> Giglio-Tos, 1915	Mozambique, South Africa, Tanzania
<i>personata</i> Beier, 1954	Congo
<i>pusilla</i> Beier, 1953	South Africa, Zimbabwe
<i>reussi</i> Giglio-Tos, 1915	Tanzania
<i>rudebecki</i> Beier, 1955	Lesotho
<i>rukwaensis</i> Kaltenbach, 1990	Tanzania
<i>stegmanni</i> Rehn, 1914	Congo, Tanzania
<i>taborana</i> Giglio-Tos, 1915	South Africa, Tanzania
<i>transvaalica</i> Beier, 1955	South Africa, Zimbabwe
<i>vitticeps</i> Sjöstedt, 1909	Kenya, Mozambique, Tanzania
Entella (Euentella) Kaltenbach, 1996	
<i>gaerdesi</i> Kaltenbach, 1996	Angola, Namibia
Entelloptera Beier, 1942	
= <i>Pictomantis</i> Sjöstedt, 1930	
<i>rogenhoferi maesta</i> Rehn, 1927	South Africa, Tanzania, Zimbabwe
<i>rogenhoferi rogenhoferi</i> Saussure, 1872	South Africa
Geothespis Giglio-Tos, 1916	
<i>australis</i> Giglio-Tos, 1916	Namibia, South Africa
Ligaria Stål, 1877	
= <i>Ligariona</i> Giglio-Tos, 1915	
= <i>Pseudentella</i> Beier, 1955	
<i>aberrans</i> Karny, 1908	Botswana, Namibia, Zimbabwe
<i>affinis</i> Kaltenbach, 1996	Botswana, Mozambique, South Africa, Zambia, Zimbabwe
<i>backlundii</i> Kaltenbach, 1996	Zambia

Taxon List	African Distribution
<i>brevicollis brevicollis</i> Stål, 1877 =L. <i>brevicollis umtalica</i> Giglio-Tos, 1915	Mozambique, South Africa, Zimbabwe
<i>brevicollis ignota</i> Kaltenbach, 1996	Botswana, Malawi, Namibia, Zambia
<i>brevis</i> Giglio-Tos, 1915	Kenya, Tanzania, Uganda
<i>chopardi</i> Giglio-Tos, 1915	Ethiopia, Kenya, Namibia, South Africa, Zimbabwe
<i>clara</i> Serville, 1839	Senegal
<i>costalis</i> Werner, 1909	Congo
<i>culicivora</i> Giglio-Tos, 1915	Angola
<i>dentata</i> Giglio-Tos, 1915	Angola, Namibia
<i>denticollis</i> Werner, 1916	Ethiopia, Tanzania
<i>inexpectata</i> Kaltenbach, 1996	Namibia, Zimbabwe
<i>jeanneli</i> Chopard, 1914	Kenya
<i>quadrinotata</i> Chopard, 1914	Ethiopia, Kenya, South Africa, Tanzania, Zambia, Zimbabwe
<i>quadripunctata</i> Stål, 1877	Ethiopia, Kenya, South Africa, Namibia, Tanzania, Zambia, Zimbabwe
=L. <i>fortis</i> Karny, 1908	
=L. <i>jucunda</i> Saussure, 1899	
Ligariella Giglio-Tos, 1915	
<i>australis</i> Giglio-Tos, 1915	South Africa
<i>beieri</i> Kaltenbach, 1996	Namibia
<i>bicornuta</i> Kaltenbach, 1996	Namibia
<i>bolivari</i> Giglio-Tos, 1915	South Africa
<i>diabolica</i> Beier, 1969	Angola
<i>trigonalis</i> Saussure, 1899	Namibia, South Africa
<i>gracilis</i> Karny, 1908	Namibia, South Africa
Ligentella Kaltenbach, 1996	
<i>lacualis</i> Kaltenbach, 1996	Congo, Rwanda
<i>zairensis</i> Kaltenbach, 1996	Congo
<i>beieri</i> Kaltenbach, 1996	Congo
Macracanthopus Uvarov, 1940	
<i>schoutedeni</i> Chopard, 1929	Angola, Congo
<i>seydeli</i> Roy, 1995	Angola, Congo, Zimbabwe
Namamantis Kaltenbach, 1996	
<i>cruciata</i> Beier, 1953	South Africa
<i>nigropunctata</i> Kaltenbach, 1996	South Africa
Paraligaria Beier, 1969	
<i>malawica</i> Beier, 1969	Malawi
Parentella Giglio-Tos, 1915	
<i>benguelae</i> Saussure, 1869	Angola
<i>laticollis</i> Karny, 1908	Botswana, Namibia

Taxon List	African Distribution
<i>major</i> Giglio-Tos, 1915	Burkina Faso, Cameroon, Ghana, Niger, Senegal
<i>parva</i> Saussure, 1899	Tanzania
<i>producta</i> Rehn, 1901	Somalia
<i>Pseudodystacta</i> Kaltenbach, 1996	
<i>braueri</i> Karny, 1908	Namibia, South Africa
<i>Rhachimantis</i> Giglio-Tos, 1915	
<i>carinata</i> Giglio-Tos, 1915	East Africa
<i>Sphaeromantis</i> Schulthess, 1898	
<i>spinicollis</i> Beier, 1930	Somalia
<i>spinulosa</i> Schulthess-Schindler, 1898	Somalia
DACTYLOPTERYGIDAE Giglio-Tos, 1915	
Dactylopteryginae Giglio-Tos, 1898	
Dactylopterygini Giglio-Tos, 1898	
<i>Dactylopteryx</i> Karsch, 1892	
= <i>Phloeomantis</i> Giglio-Tos, 1915	
<i>flexuosa</i> Karsch, 1892	Cameroon, Congo, Gabon, Ghana, Ivory Coast, Central African Republic
= <i>D. angusticollis</i> Sjöstedt, 1900	
<i>intermedia</i> Beier, 1963	Cameroon
<i>orientalis</i> Werner, 1906	Mozambique, Tanzania
<i>Theopompella</i> Giglio-Tos, 1917	
<i>aurivillii</i> Sjöstedt, 1900	Angola, Bioko, Cameroon, Congo, Gabon, Kenya, Malawi, Tanzania, Togo, Central African Republic, Equatorial Guinea
<i>chopardi</i> Roy, 1963	Ghana, Guinea, Ivory Coast, Liberia
<i>congica</i> Rehn, 1949	Congo
<i>elegans</i> La Greca & Lombardo, 1993	Congo, Nigeria
<i>fusca</i> Giglio-Tos, 1917	Cameroon, Congo, Ghana, Guinea, Ivory Coast, Rwanda, Tanzania, Zambia, Zimbabwe
<i>heterochroa</i> Gerstaecker, 1883	Cameroon, Congo, Gabon, Kenya, Nigeria, Central African Republic
= <i>T. nebulosa</i> Bolívar, 1908	
<i>orientalis</i> Giglio-Tos, 1917	Tanzania
<i>pallida</i> Giglio-Tos, 1916	Cameroon, Congo, Gabon, Namibia, Central African Republic
<i>westwoodi</i> Kirby, 1904	Cameroon, Ghana, Guinea, Ivory Coast, South Africa, Tanzania, Togo
<i>Zouza</i> Strand, 1911	
= <i>Jalla</i> Giglio-Tos, 1907	
= <i>Tosa</i> Navas, 1931	

Taxon List	African Distribution
<i>radiosa</i> Giglio-Tos, 1907	Botswana, Mozambique, Namibia, South Africa, Zambia, Zimbabwe
DEROPLATYIDAE Westwood, 1889	
Popinae Brunner de Wattenwyl, 1893	
Leptocolini Giglio-Tos, 1916	
<i>Afrothespis</i> Roy, 2006	
<i>kenyana</i> Roy & Schwarz, 2014	Kenya
<i>rhodesiaca</i> Beier, 1973	Malawi, Zimbabwe
= <i>A. dudleyi</i> Roy, 2006	
<i>Agrionopsis</i> Werner, 1908	
<i>bacilliformis</i> Rehn, 1914	West and South Africa
<i>brachyptera</i> Beier, 1942	Tanzania
<i>congica</i> Giglio-Tos, 1916	Congo
<i>distanti</i> Kirby, 1899	Congo, South Africa, Zambia, Zimbabwe, East Africa
<i>modesta</i> Werner, 1908	Congo, Kenya, Tanzania, Uganda
<i>Euchomena</i> Saussure, 1870	
<i>madecassa</i> Saussure, 1870	Comoros, Madagascar
<i>Leptocola</i> Gerstaecker, 1883	
<i>fragilis</i> Giglio-Tos, 1916	Togo
<i>giraffa</i> Karsch, 1894	Cameroon
<i>gracilis</i> Lombardo, 1989	Somalia
<i>gracillima</i> Gerstaecker, 1883	Cameroon, Nigeria
<i>phthisica</i> Saussure, 1869	Angola, Burkina Faso, Ghana, Guinea, Kenya, Senegal, Tanzania, Togo
<i>seriepunctata</i> Karsch, 1892	Angola, Congo
<i>stanleyana</i> Westwood, 1889	Cameroon, Congo, Gabon, Mozambique, Namibia, Tanzania, Togo
= <i>L. lignea</i> Karsch, 1892	
= <i>L. tenuissima</i> Karsch, 1892	
<i>Stenopyga (Agriomantis)</i> Giglio-Tos, 1916	
<i>casta</i> Gerstaecker, 1883	Cameroon
<i>Stenopyga (Stenopyga)</i> Karsch, 1892	
= <i>Phitrus</i> Karsch, 1892	
<i>belinga</i> Roy, 1973	Gabon
<i>extera</i> Karsch, 1892	Cameroon, Liberia
= <i>S. lobulipes</i> Karsch, 1892	
<i>ipassa</i> Roy, 1973	Central African Republic, Gabon
<i>tenera</i> Werner, 1908	East Africa
<i>ziela</i> Roy, 1963	Congo, Ghana, Guinea, Central African Republic, Gabon, Ivory Coast
<i>Stenopyga (Stenopygella)</i> Giglio-Tos, 1916	

Taxon List	African Distribution
<i>orientalis</i> Giglio-Tos, 1916	Kenya, Tanzania
<i>reticulata</i> Werner, 1916	Cameroon, Tanzania
<i>usambarica</i> Beier, 1935	Tanzania
Popini Brunner de Wattenwyl, 1893	
<i>Danuria (Danuria)</i> Stål, 1856	
= <i>Daniuria</i> Kirby, 1904	
= <i>Paradanuria</i> La Greca, 1954	
<i>angusticollis</i> Beier, 1931	Somalia, Tanzania
<i>buchholzi</i> Gerstaecker, 1883	Cameroon, Congo, Ghana, Guinea, Nigeria, Senegal, Togo, Uganda
<i>contorta</i> Sjöstedt, 1912	Kenya, Tanzania
<i>fusca</i> Giglio-Tos, 1914	Uganda
<i>gracilis</i> Schulthess-Schindler, 1899	Angola, Congo, Somalia
= <i>D. kuangana</i> Giglio-Tos, 1914	
<i>impannosa</i> Karsch, 1899	Ethiopia, Sudan
= <i>D. schweinfurthi</i> Werner, 1907	
<i>obscuripennis</i> Chopard, 1914	Uganda
<i>sublineata</i> Werner, 1929	Mozambique
<i>thunbergi</i> Stål, 1856	Congo, Ethiopia, Kenya, Mozambique, Namibia, South Africa, Tanzania, Zambia, Zimbabwe
<i>Danuria (Danuriodes)</i> Giglio-Tos, 1907	
<i>affinis</i> Giglio-Tos, 1914	Tanzania
<i>barbozae</i> Bolívar, 1889	Angola, Congo, Kenya, Tanzania
= <i>D. angolensis</i> Rehn, 1912	
= <i>D. superciliaris</i> Gerstaecker, 1869	
<i>congica</i> Giglio-Tos, 1917	Congo
<i>kilimandjarica</i> Sjöstedt, 1909	Congo, Kenya, Malawi, Namibia, Rwanda, Tanzania, Zambia
= <i>D. zambesica</i> Giglio-Tos, 1914	
<i>serratodentata</i> Karsch, 1899	Angola, Congo, Kenya, Tanzania
<i>Macrodanuria</i> Sjöstedt, 1900	
<i>baculiformis</i> Sjöstedt, 1912	Ghana
<i>elongata</i> Borre, 1883	Cameroon, Ivory Coast, Gabon, Ghana, Guinea, Central African Republic
<i>phasmoides</i> Sjöstedt, 1900	Ghana
<i>Macropopa</i> Giglio-Tos, 1914	
<i>lobata</i> Giglio-Tos, 1914	Somalia
<i>Neodanuria</i> La Greca & Lombardo, 1987	
<i>bolauana</i> Saussure, 1869	Kenya, Somalia, South Africa, Tanzania
= <i>N. caffra</i> Westwood, 1889	
<i>simonettai</i> La Greca & Lombardo, 1986	Somalia

Taxon List	African Distribution
<i>Popa</i> Stål, 1856	
<i>gracilis</i> Lombardo, 1989	Angola, Congo, Somalia
<i>spurca crassa</i> Giglio-Tos, 1917	Congo, Namibia, South Africa
<i>spurca pallida</i> Saussure & Zehntner, 1895	Congo, Namibia, South Africa
<i>spurca spurca</i> Stål, 1856	Angola, Cameroon, Congo, Ghana, Guinea, Namibia, South Africa, Togo, Zimbabwe
= <i>P. spurca batesi</i> Saussure & Zehntner, 1895	
= <i>P. spurca servillei</i> Giglio-Tos, 1907	
= <i>P. spurca stuhlmanni</i> Rehn, 1911	
= <i>P. spurca undata</i> Fabricius, 1793	
EMPUSIDAE Burmeister, 1838	
Blepharodinae Giglio-Tos, 1919	
Blephardini Giglio-Tos, 1919	
<i>Blepharodes</i> Bolívar, 1890	
= <i>Phlaebarodes</i> Giglio-Tos, 1917	
<i>candelarius</i> Bolívar, 1890	Chad, Ethiopia, Somalia
= <i>B. kotschyi</i> Schulthess, 1894	
<i>cornutus cornutus</i> Schulthess, 1894	Ethiopia, Kenya, Somalia, Sudan
<i>cornutus minor</i> Kevan, 1954	Kenya
<i>parumspinosus</i> Beier, 1930	Burkina Faso, Chad, Mauritania, Nigeria, Senegal, Sudan
<i>sudanensis</i> Werner, 1907	Kenya, Somalia, Sudan
<i>Blepharopsis</i> Rehn, 1902	
= <i>Blepharis</i> Serville, 1831	
<i>mendica mendica</i> Fabricius, 1775	Algeria, Chad, Egypt, Ethiopia, Libya, Mauritania, Morocco, Niger, Somalia, Sudan, Tunisia
= <i>B. mendica marmorata</i> Olivier, 1792	
<i>mendica nuda</i> Giglio-Tos, 1917	Eritrea, Ethiopia, Somalia
Empusinae Burmeister, 1838	
Empusini Burmeister, 1838	
<i>Chopardempusa</i> Paulian, 1958	
<i>neglecta</i> Paulian, 1958	Madagascar
<i>Dilatempusa</i> Roy, 2004	
<i>aegyptiaca</i> Giglio-Tos, 1917	Burkina Faso, Egypt, Ethiopia, Mauritania, Sudan
= <i>D. dilaticollis</i> Lombardo, 1992	
= <i>D. megaloccephala</i> Gistel, 1856	
= <i>D. murati</i> Chopard, 1940	
<i>Empusa</i> Illiger, 1798	
= <i>Ampusa</i> Rambur, 1839	
= <i>Phantoma</i> Risso, 1826	
<i>binotata</i> Serville, 1839	Namibia
<i>fasciata</i> Brulle, 1832	Algeria, Egypt, Ethiopia

Taxon List	African Distribution
<i>guttula</i> Thunberg, 1815 = <i>E. dolosa</i> Serville, 1839	Algeria, Angola, Botswana, Burkina Faso, Cameroon, Chad, Egypt, Ethiopia, Kenya, Libya, Madagascar, Mauritania, Namibia, Senegal, Somalia, South Africa, Tanzania, Tunisia
<i>hedenborgii</i> Stål, 1871 = <i>E. hyalina</i> Charpentier, 1835 = <i>E. pentinicornis</i> Linne, 1767	Cameroon, South Africa, Eritrea, Egypt, Ethiopia, Kenya, Senegal, Somalia, Sudan,
<i>pennata</i> Thunberg, 1815 = <i>E. brachyptera</i> Fischer-Waldheim, 1846 = <i>E. clavata</i> Goeze, 1778	Algeria, Libya, Morocco
<i>=E. egena</i> Charpentier, 1841 <i>=E. europaea</i> Fieber, 1853 <i>=E. humbertiana</i> Saussure, 1869 <i>=E. occidentalis</i> Fieber, 1853 <i>=E. pauperata</i> Fabricius, 1781	
<i>=E. pectinata</i> Drury, 1770 <i>=E. servillei</i> Saussure, 1872 <i>=E. spuria</i> Goeze, 1778 <i>=E. tricornis</i> Goeze, 1778	
<i>=E. unicornis</i> Saussure, 1781 <i>=E. variabilis</i> Risso, 1826 <i>spinosa</i> Krauss, 1902	Angola, Namibia, South Africa
<i>=S. fronticornis</i> Stoll, 1813 <i>=S. nympa</i> Stoll, 1813 <i>=S. purpuripennis</i> Serville, 1839 <i>=S. wahlbergi</i> Stål, 1856	
Hemiempusa Saussure & Zehntner, 1895	
<i>capensis</i> Burmeister, 1838 = <i>H. phantasma</i> Rehn, 1949	Angola, Ethiopia, Namibia, South Africa, Congo, Ghana, Ivory Coast, Kenya, Ruanda, Tanzania, Uganda, Zambia, Zimbabwe
Hypsicorypha Krauss, 1892	
<i>gracilis</i> Burmeister, 1838 = <i>H. guichardi</i> La Greca, 1952 = <i>H. juliae</i> Krauss, 1892 = <i>H. longifrons</i> Saussure, 1870	Algeria, Egypt, Libya, Niger, Somalia, Tunisia
Idolomorpha Burmeister, 1838	
<i>dentifrons</i> Saussure & Zehntner, 1895	Ethiopia, Kenya, Mozambique, Namibia, Rwanda, Somalia, South Africa, Sudan, Tanzania, Uganda
<i>lateralis</i> Burmeister, 1838	

Taxon List	African Distribution
<i>=I. defoliata</i> Serville, 1839	Angola, Burkina Faso, Ghana, Cameroon, Ivory Coast, Kenya, Liberia, Mozambique, Senegal, Sierra Leone, Sudan, Tanzania, Togo
<i>madagascariensis</i> Westwood, 1889	Madagascar
<i>sagitta</i> Sjöstedt, 1900	Congo
Idolomantini Ehrmann & Roy, 2002	
<i>Idolomantis</i> Uvarov, 1940	
<i>=Idolum</i> Saussure, 1869	
<i>diabolica</i> Saussure, 1869	Ethiopia, Kenya, Malawi, Somalia, South Africa, Tanzania, Uganda
<i>=I. diabroticum</i> Shelford, 1903	
EREMIAPHILIDAE Saussure, 1869	
Eremiaphilinae Saussure, 1869	
Saussure , 1869	
<i>Eremiaphila</i> Lefèbvre, 1835	
<i>=Centromantis</i> Werner, 1904	
<i>=Eremophila</i> Burmeister, 1838	
<i>andresi</i> Werner, 1910	Egypt, Libya
<i>anubis</i> , Lefèbvre, 1835	Egypt
<i>arabica</i> Saussure, 1871	Egypt
<i>=E. dawydowi</i> Werner, 1905	
<i>aristidis</i> Lucas, 1880	Egypt
<i>audouini</i> , Lefèbvre, 1835	Egypt
<i>barbara</i> Brisout, 1854	Egypt
<i>berndstiewi</i> Stiewe, 2004	Egypt
<i>bifasciata</i> Chopard, 1940	Chad
<i>bovei</i> , Lefèbvre, 1835	Chad, Egypt
<i>brevipennis</i> Saussure, 1871	Egypt
<i>cairina</i> Giglio-Tos, 1916	Egypt
<i>cerisyi</i> , Lefèbvre, 1835	Egypt
<i>collenettei</i> Beier, 1930	Somalia
<i>cordofana</i> Werner, 1907	Kenya, Sudan, Uganda
<i>dentata</i> Saussure, 1871	Egypt
<i>denticollis denticollis</i> Lucas, 1855	Algeria, Morocco, Tunisia
<i>denticollis tunetana</i> Werner, 1904	Tunisia
<i>foureaui</i> Bolívar, 1905	Algeria, Tunisia
<i>genei</i> , Lefèbvre, 1835	Egypt
<i>=E. burmeisteri</i> Saussure, 1871	
<i>=E. laevipennis</i> Werner, 1905	
<i>gigas</i> Beier, 1930	Egypt, Sudan
<i>hebraica</i> , Lefèbvre, 1835	Egypt

Taxon List	African Distribution
<i>hedenborgii</i> Stål, 1871	Sudan
<i>heluanensis</i> Werner, 1904	Egypt, Libya
= <i>E. hralil</i> Lefèbvre, 1835	
= <i>E. libyca</i> Werner, 1906	
<i>hralili</i> , Lefèbvre, 1835	Egypt
<i>khamsini</i> , Lefèbvre, 1835	Egypt
<i>kheychi</i> , Lefèbvre, 1835	Egypt
<i>klunzingeri</i> Werner, 1906	Egypt
<i>laeviceps</i> Chopard, 1934	Algeria, Libya
= <i>E. gracilis</i> Chopard, 1940	
<i>Lefebvrii</i> , Lefèbvre, 1838	Egypt
= <i>E. sabulosa</i> Saussure, 1871	
<i>luxor</i> , Lefèbvre, 1835	Egypt
<i>maculipennis</i> Chopard, 1940	Mauritania
<i>monodi</i> Chopard, 1941	Algeria, Niger
<i>moretti maculata</i> Morales & Agacino, 1947	West Sahara
<i>moretti moretti</i> Bolívar, 1886	Sahara
<i>mzabi</i> Chopard, 1941	Algeria
<i>nilotica</i> Saussure, 1871	Egypt
<i>nvoa</i> Giglio-Tos, 1916	Ethiopia, Eritrea
<i>numida</i> Saussure, 1872	Algeria
<i>petiti</i> , Lefèbvre, 1835	Egypt
<i>pierrei</i> Chopard, 1954	Algeria
<i>pyramidum</i> Werner, 1904	Egypt, Libya
<i>rectangulata</i> Chopard, 1941	Senegal
<i>reticulata</i> Chopard, 1941	Burkina Faso, Mali, Niger
<i>rohlfsi</i> Werner, 1906	Egypt, Libya
<i>rotunidpennis</i> Kirby, 1904	Egypt, Libya
<i>rufipennis</i> Uvarov, 1929	Egypt
<i>rufula</i> Chopard, 1941	Morocco
<i>savignyi</i> , Lefèbvre, 1835	Egypt, Libya
<i>somalica</i> Rehn, 1901	Somalia
<i>spinulosa</i> Schulthess-Schindler, 1898	Algeria, Chad, Morocco
<i>tuberculifera</i> Chopard, 1941	Algeria
<i>yphon</i> , Lefèbvre, 1835	Algeria, Chad, Egypt, Libya, Mauritania,
= <i>E. ehrenbergi</i> Burmeister, 1838	Niger, Nigeria,
<i>voltaensis</i> Sjöstedt, 1930	Burkina Faso, Senegal
<i>weneri</i> Giglio-Tos, 1916	Sudan
<i>wettsteini</i> Werner, 1918	Sudan
<i>zetterstedti</i> , Lefèbvre, 1835	Egypt

Taxon List	African Distribution
<i>Heteronutarsus</i> Lefèbvre, 1835	
= <i>Heteronyphotarsus</i> Saussure, 1871	
= <i>Heteronytarsus</i> Brulle, 1835	
<i>aegyptiacus</i> , Lefèbvre, 1835	Egypt, Sudan
<i>albipennis</i> Chopard, 1941	Niger
<i>arenivagus</i> Chopard, 1955	Mauritania, Niger
<i>zlotarevskyi</i> Chopard, 1940	Chad
Iridinae Westwood, 1889	
Iridini Westwood, 1889	
<i>Paroxyophthalmus</i> Wood-Mason, 1889	
<i>collaris</i> Saussure, 1872	Chad, Sudan
<i>nigericus</i> Giglio-Tos, 1917	Burkina Faso, Nigeria, Niger
<i>ornatus</i> Werner, 1918	Sudan
<i>savatier</i> Rochebrune, 1883	Gambia, Senegal
<i>Episcopomantis</i> Uvarov, 1940	
= <i>Episcopus</i> Saussure, 1871	
<i>chalybea</i> Burmeister, 1838	Angola, Botswana, Kenya, Namibia, South Africa, Zimbabwe
<i>congica</i> Roy, 1968	Congo
<i>Iris</i> Saussure, 1869	
<i>caeca</i> Uvarov, 1931	Egypt
<i>deserti</i> Uvarov, 1923	Algeria, Chad, Tunisia
<i>oratoria</i> Linnaeus, 1758	Algeria, Egypt, Chad, Mozambique, Tunisia
= <i>I. bella</i> Germar, 1817	
= <i>I. dentata</i> Goeze, 1778	
= <i>I. minima</i> Charpentier, 1825	
<i>orientalis</i> Wood-Mason, 1882	Egypt, Morocco, Tunisia
<i>senegalensis</i> Beier, 1931	Mauritania, Niger, Senegal, Chad
= <i>I. longicollis</i> Chopard, 1940	
Schizocephalini Serville, 1831	
<i>Schizocephala</i> Serville, 1831	
<i>bicornis</i> Linne, 1758	South Africa
= <i>S. oculata</i> Fabricius, 1781	
= <i>S. stricta</i> Olivier, 1792	
Tarachodinae Giglio-Tos, 1917	
Oxyelaeini Schwarz & Roy, 2019	
<i>Charieis</i> Burr, 1900	
<i>peeli</i> Burr, 1900	Ethiopia, Kenya, Somalia
<i>Oxyelaea</i> Giglio-Tos, 1917	
<i>elegans</i> Giglio-Tos, 1917	Congo, South Africa
<i>heteromorpha</i> Beier, 1930	Kenya, Uganda, Somalia

Taxon List	African Distribution
<i>stefaniae</i> Lombardo, 1989	Somalia
Tarachodini Giglio-Tos, 1917	
<i>Antistia</i> Stål, 1876	
<i>maculipennis</i> Stål 1876	Botswana, Namibia, South Africa, Eswatini, Tanzania
= <i>A. signata</i> Karny, 1908	
<i>parva</i> Beier, 1953	Namibia, South Africa
<i>robusta</i> Kaltenbach, 1966	South Africa
<i>vicina</i> Kaltenbach, 1966	South Africa
<i>Ariusia</i> Stål, 1877	
= <i>Charieisilla</i> Giglio-Tos, 1907	
<i>conspersa</i> Stål 1877	Angola, Namibia, South Africa, Zambia, Zimbabwe
= <i>A. cara</i> Giglio-Tos, 1907	
<i>Galepsus (Galepsus)</i> Stål, 1877	
<i>affinis</i> Giglio-Tos, 1911	Cameroon
<i>binotatus</i> La Greca, 1950	Ethiopia, Kenya, Somalia
<i>brunneri</i> Giglio-Tos, 1911	Cameroon
<i>coronatus</i> La Greca, 1952	Ethiopia
<i>dubius</i> Giglio-Tos, 1911	Kenya
<i>feae</i> Giglio-Tos, 1911	Guinea, Nigeria
<i>globiceps</i> Beier, 1942	Cameroon, Congo, Central African Republic, Gabon, Nigeria
<i>inermis</i> Giglio-Tos, 1916	Angola, Mozambique, Tanzania
<i>konakrynus</i> Giglio-Tos, 1911	Cameroon, Ivory Coast, Ghana, Guinea
<i>laticeps</i> Werner, 1907	Cameroon, Nigeria, Central African Republic, Congo, Gabon
<i>montanus</i> Werner, 1907	Tanzania
<i>nigricoxa</i> Giglio-Tos, 1927	Sub Saharan East Africa
<i>nyassensis</i> Giglio-Tos, 1911	Tanzania
<i>tenuis</i> Stål 1877	Congo
<i>thomsoni</i> Werner, 1923	Namibia
<i>Galepsus (Lygdamia)</i> Stål, 1877	
<i>brincki</i> Beier, 1955	Namibia
<i>cacuminatus</i> Beier, 1954	Congo
<i>culminans</i> Beier, 1954	Congo
<i>lenticularis</i> Saussure, 1872	Angola, Botswana, Mozambique, Namibia, South Africa, Zambia, Zimbabwe
<i>nimulensis</i> Giglio-Tos, 1916	Cameroon, Nigeria, Senegal, Uganda
<i>oxycephalus</i> Gerstaecker, 1883	Gabon, Guinea
<i>scorteccii</i> La Greca, 1956	Somalia
<i>signatus</i> Beier, 1954	Congo
<i>trilobus</i> Giglio-Tos, 1911	Tanzania

Taxon List	African Distribution
<i>Galepsus (Onchogalepsus)</i> Beier, 1954	
<i>aberrans</i> Kaltenbach, 1966	Namibia
<i>angloensis</i> Werner, 1907	Angola, Mozambique, South Africa
<i>bioculatus abyssinicus</i> Beier, 1961	Ethiopia
<i>bioculatus bioculatus</i> Beier, 1957	BBurundi, Congo
<i>bispinosus</i> Beier, 1957	Congo
<i>capensis</i> Beier, 1930	South Africa
<i>capitatus</i> Saussure, 1869	Cameroon, Ethiopia, Kenya, South Africa, Tanzania, Zimbabwe
<i>centralis</i> Beier, 1957	Congo, South Africa, Tanzania
<i>cliquennoisi</i> Roy, 2005	Comoros
<i>damaranus damaranus</i> Giglio-Tos, 1911	Angola, Congo, Namibia, Zimbabwe
<i>damaranus orientalis</i> Kaltenbach, 1966	Namibia, South Africa, Zimbabwe
<i>decipiens</i> Beier, 1950	Congo
<i>diversus</i> Giglio-Tos, 1911	Kenya, Tanzania, Uganda
<i>erythraeus</i> Giglio-Tos, 1911	Ethiopia
<i>fallaciosus</i> Beier, 1957	Congo
<i>fallax</i> La Greca, 1955	BBurundi, Rwanda
<i>femoratus</i> Giglio-Tos, 1911	Namibia, South Africa, Zimbabwe
<i>focki</i> Werner, 1923	Namibia, South Africa
<i>fumipennis</i> Beier, 1954	Congo
<i>gracilis</i> Giglio-Tos, 1911	Kenya, Tanzania, Uganda
<i>intermedius</i> Werner, 1907	Kenya, Mozambique, Namibia, South Africa, Zimbabwe
<i>letabaensis</i> Kaltenbach, 1966	South Africa
<i>machadoi</i> Beier, 1969	Angola
<i>malawiensis</i> Beier, 1969	Malawi
<i>meridionalis</i> Saussure, 1872	Congo, Namibia, Mozambique, South Africa, Tanzania, Zimbabwe
<i>minima</i> Werner, 1907	Tanzania
<i>minutus</i> Giglio-Tos, 1911	Ethiopia, Malawi, Tanzania
<i>pentheri</i> Giglio-Tos, 1911	Cameroon, Congo, Namibia, South Africa, Zambia
<i>rhodesicus</i> Beier, 1954	Zimbabwe, Zambia
<i>rouxi</i> Werner, 1929	Mozambique
<i>schwetzi</i> Beier, 1957	Angola, Congo
<i>sudanensis</i> Beier, 1954	Sudan
<i>supervacaneus</i> Beier, 1954	Tanzania
<i>transvaalensis</i> Beier, 1954	Congo, South Africa
<i>ulricae</i> Kaltenbach, 1966	Namibia
<i>wittei</i> Beier, 1954	Congo

Taxon List	African Distribution
<i>zambesicus</i> Giglio-Tos, 1911	South Africa
Galepsus (Syngalepsus) Beier, 1954	
<i>beieri</i> Kaltenbach, 1966	South Africa
<i>bipunctatus</i> Beier, 1931	Mozambique, South Africa
<i>birkenmeierae</i> Beier, 1969	Malawi
<i>denigratus</i> Beier, 1954	Angola, Congo
<i>bucheti</i> Moulin, 2018	Mauritania
<i>dudleyi</i> Moulin, 2018	Malawi
Metagalepsus Roy, 1971	
<i>occidentalis</i> Roy, 1972	Senegal
<i>stramineus</i> Sjöstedt, 1930	Burkina Faso, Senegal
Nesogalepsus Beier, 1954	
<i>hova</i> Saussure & Zehntner, 1895	Madagascar
Nothogalepsus Beier, 1969	
= <i>Alfredistia</i> Roy, 2003	
<i>planivertex</i> Beier, 1953	Malawi, Mozambique, Namibia, South Africa, Zimbabwe
=N. <i>reticulata</i> Roy, 2003	
Oxyophthalmellus Giglio-Tos, 1917	
<i>rehni</i> La Greca, 1952	Kenya, Somalia
<i>somalicus</i> , Rehn, 1911	Ethiopia, Kenya, Somalia, Tanzania
Paragalepsus Beier, 1930	
<i>bassari</i> Roy, 1972	Senegal
<i>gestri</i> Giglio-Tos, 1911	Ethiopia, Cameroon, Uganda
<i>nigericus</i> Beier, 1930	Cameroon, Nigeria
<i>toganus</i> Giglio-Tos, 1911	Sierra Leone, Togo
<i>vrydaghi</i> Beier, 1957	Congo
Paralygdamia Saussure & Zehntner, 1895	
<i>fisheri</i> Roy, 2016	Madagascar
<i>gigliotosi</i> Roy, 2016	Madagascar
<i>grandidieri</i> Roy, 2016	Madagascar
<i>ifatyensis</i> Roy, 2016	Madagascar
<i>madagascariensis</i> Serville, 1839	Madagascar
<i>madecassa</i> Saussure & Zehntner, 1895	Comoros, Madagascar
=P. <i>conspersus</i> Sjöstedt, 1930	
<i>nosyensis</i> Roy, 2016	Madagascar
<i>punctata</i> Roy, 2016	Madagascar
<i>sikorai</i> Beier, 1931	Madagascar
<i>wintreberti</i> Roy, 2016	Madagascar
Plastogalepsus Beier, 1954	
<i>kuhlgatzi</i> Werner, 1907	Kenya

Taxon List	African Distribution
= <i>P. taboranus</i> Giglio-Tos, 1911	
<i>Pseudogalepsus</i> Beier, 1954	
<i>dispar</i> Werner, 1907	Cameroon, Ethiopia, Kenya, Mozambique, Tanzania
<i>inermis</i> Giglio-Tos, 1911	Angola, Mozambique, Tanzania
<i>modestior</i> Schulthess-Rechberg, 1899	Congo, Ethiopia, Kenya, Somalia, Tanzania, Uganda
= <i>P. schulthessi</i> Rehn, 1901	
<i>modestus</i> Gerstaecker, 1869	Kenya, Tanzania
<i>nigricoxa</i> Beier, 1954	Tanzania
= <i>P. kilwanus</i> Giglio-Tos, 1911	
<i>Pyrgomantis</i> Gerstaecker, 1869	
<i>bisignata</i> Beier, 1957	Congo
<i>congica</i> Giglio-Tos, 1917	Angola, Congo, Tanzania
<i>curta</i> Beier, 1954	Tanzania
<i>fasciata</i> Giglio-Tos, 1917	Angola, Congo, Mozambique, South Africa, Tanzania
<i>jonesi</i> Kirby, 1904	Burkina Faso, Cameroon, Ghana, Nigeria, Niger, Senegal
= <i>P. nigerica</i> Giglio-Tos, 1917	
= <i>P. occidentalis</i> Giglio-Tos, 1917	
= <i>P. septentrionalis</i> Werner, 1907	
<i>longissima</i> Beier, 1957	Congo
<i>mabuia</i> Werner, 1907	Uganda
<i>mitrata</i> Beier, 1954	Congo
<i>nana</i> Sjöstedt, 1924	Congo, Rwanda, Burundi
<i>nasuta</i> Thunberg, 1784	Angola, Botswana, Cameroon, Kenya, Mozambique, Namibia, Somalia, South Africa, Tanzania, Zimbabwe
= <i>P. capensis</i> Gmelin, 1788	
<i>ornatipes</i> Bolívar, 1922	Ethiopia
<i>pallida</i> Giglio-Tos, 1917	Burkina Faso, Cameroon, Congo, Ghana, Guinea, Nigeria, Togo
<i>rhodesica</i> Giglio-Tos, 1917	Botswana, Namibia, South Africa, Zambia, Zimbabwe
<i>runifera</i> Beier, 1957	Congo
<i>signatifrons</i> Beier, 1954	Congo
<i>simillima</i> Beier, 1954	South Africa, Tanzania, Zimbabwe
<i>singularis</i> Gerstaecker, 1869	Kenya, South Africa, Tanzania
<i>wellmani</i> Rehn, 1912	Angola
<i>Tarachodella</i> Giglio-Tos, 1917	
<i>monticola</i> Giglio-Tos, 1917	Cameroon, Congo, Ghana
<i>Tarachodes (Barbachodes)</i> Beier, 1957	
<i>afzelii</i> Stål, 1871	

Taxon List	African Distribution
= <i>T. bandanus</i> Giglio-Tos, 1917	Burkina Faso, Cameroon, Congo, Ghana,
= <i>T. griffinii</i> Giglio-Tos, 1911	Guinea, Ivory Coast, Senegal, Sierra Leone,
= <i>T. irrorata</i> Gerstaecker, 1883	Togo
<i>Tarachodes (Chiropacha)</i> Charpentier, 1841	
<i>aestuans aestuans</i> Saussure, 1895	Ethiopia, Kenya, Somalia, Tanzania
= <i>T. aestuans media</i> Schulthess, 1898	
<i>aestuans orientalis</i> Giglio-Tos, 1911	Ethiopia, Kenya, Tanzania, Uganda
<i>gilvus</i> Charpentier, 1841	Cameroon, Chad, Congo, Sudan, Uganda
<i>maurus</i> Saussure, 1871	South Africa
<i>modesta</i> Schulthess, 1894	Kenya, Tanzania
= <i>T. modestus</i> Gerstaecker, 1873	
<i>obtusiceps</i> Stål, 1871	Kenya, Somalia, Sudan
<i>saussurei</i> Giglio-Tos, 1911	Burkina Faso, Cameroon, Chad, Ghana,
	Mauritania, Niger, Senegal
<i>smithi</i> Rehn, 1901	Chad, Kenya, Somalia
<i>Tarachodes (Chiropus)</i> Saussure, 1869	
<i>bispinosus</i> Kaltenbach, 1966	Namibia
<i>dives</i> Saussure, 1869	Angola, Namibia, South Africa, Sudan,
= <i>T. karnyi</i> Giglio-Tos, 1911	Zimbabwe
<i>sjostedti</i> Werner, 1907	
= <i>T. congolensis</i> Werner, 1915	Angola, Congo
= <i>T. pilosa</i> Sjöstedt, 1930	
<i>Tarachodes (Tarachodes)</i> Burmeister, 1838	
<i>abyssinicus</i> Beier, 1931	Ethiopia
<i>alluaudi</i> Chopard, 1914	Ethiopia, Kenya, Somalia, Tanzania, Uganda
<i>beieri</i> Kaltenbach, 1966	South Africa, Zimbabwe
<i>betakarschi</i> Otte & Spearman, 2005	Ethiopia, Kenya, Somalia, Tanzania
<i>bicornis</i> Giglio-Tos, 1911	Namibia, Zimbabwe
<i>brevipennis</i> Werner, 1915	Congo
<i>chopardi</i> Giglio-Tos, 1917	Congo, Tanzania
<i>circulifer</i> Beier, 1963	Tanzania
<i>circuliferoides</i> Kaltenbach, 1966	Botswana, Zimbabwe
<i>dauidi</i> Werner, 1929	Mozambique
<i>feae</i> Giglio-Tos, 1911	Congo, Gabon
<i>fraterculus</i> Rehn, 1912	Tanzania
<i>fuscipennis</i> Sjöstedt, 1930	Tanzania
<i>gibber</i> Beier, 1954	Congo
<i>gigas</i> Sjöstedt, 1930	Namibia
<i>griseus</i> Giglio-Tos, 1911	Ghana, Mozambique
<i>haedus</i> Beier, 1957	Tanzania

Taxon List	African Distribution
<i>insidiator</i> Wood-Mason, 1822	Congo, Kenya, Malawi, Namibia, South Africa, Eswatini, Tanzania, Zimbabwe
<i>karschi</i> Werner, 1907	Ethiopia, Kenya, Somalia, Tanzania
<i>lucubrans</i> Bruchell, 1822	Namibia, South Africa, Zimbabwe
<i>maurus</i> Stål, 1856	Cameroon, Malawi, Mozambique, Namibia, South Africa, Tanzania, Zambia, Zimbabwe
<i>monstrosus</i> Giglio-Tos, 1917	Ethiopiaa, Somalia, Uganda
<i>namibiensis</i> Kaltenbach, 1966	Namibia
<i>nubifer</i> Sjöstedt, 1930	Namibia
<i>obscuripennis</i> Chopard, 1940	Chad
<i>okahandyanus</i> Giglio-Tos, 1911	Namibia, Tanzania
<i>oxynotus oxynotus</i> La Greca, 1952	Somalia
<i>oxynotus tenuis</i> Lombardo, 1997	Ethiopia
<i>perloides</i> Burmeister, 1838	Namibia, South Africa
= <i>T. nympa</i> Stoll, 1813	
<i>pujoli</i> Roy, 2002	Central African Republic
<i>rhodesicus</i> Lombardo, 1997	Zimbabwe, Zambia
<i>robustus</i> Beier, 1930	Nigeria
<i>rotundiceps</i> Werner, 1907	Cameroon, Congo, Gabon
<i>sanctus sanctus</i> Saussure, 1871	Congo, Mozambique, Namibia, Somalia, South Africa, Tanzania, Zambia, Zimbabwe
<i>kibwezianus</i> Giglio-Tos, 1911	Angola, Congo, Kenya, Namibia, Somalia, South Africa, Tanzania, Zimbabwe
<i>severini</i> Werner, 1915	Cameroon, Congo
<i>taboranus</i> Sjöstedt, 1909	Tanzania
= <i>T. kuhlgatzi</i> Sjöstedt, 1909	
<i>tananus</i> Giglio-Tos, 1911	Kenya
<i>taramassi</i> Giglio-Tos, 1907	Kenya
<i>ugandensis</i> Werner, 1912	Uganda
<i>usambaricus</i> Sjöstedt, 1909	Tanzania
<i>vitreus</i> La Greca, 1950	Somalia
<i>basinotatus</i> Beier, 1957	Congo
<i>dissimulator</i> Wood-Mason, 1882	Cameroon, Ghana, Guinea, Ivory Coast, Togo, Central African Republic, Gabon
<i>gerstaeckeri</i> Werner, 1907	Cameroon, Congo, Ghana, Guinea, Ivory Coast, Central African Republic, Gabon
<i>griseus</i> Giglio-Tos, 1927	South Africa
<i>maculisternum</i> Sjöstedt, 1900	Cameroon
<i>natalensis</i> Kaltenbach, 1966	South Africa
<i>similis</i> Gillon & Roy, 1968	Ghana, Guinea, Ivory Coast
<i>Tuberculepsus</i> Roy, 2008	

Taxon List	African Distribution
<i>ambrensis</i> Roy & Schutte, 2010	Madagascar
<i>analabensis</i> Roy & Schutte, 2010	Madagascar
<i>andriai</i> Paulian, 1961	Madagascar
<i>beieri</i> Paulian, 1961	Madagascar
<i>masoalensis</i> Roy & Schutte, 2010	Madagascar
<i>nigricoxa</i> Roy & Schutte, 2010	Madagascar
<i>orangea</i> Roy & Schutte, 2010	Madagascar
<i>tuberculatus</i> Beier, 1931	Madagascar
GALINTHIADIDAE Giglio-Tos, 1919	
Galanthiaginae Giglio-Tos, 1919	
Galanthiadini Giglio-Tos, 1919	
<i>Congoharpax</i> La Greca, 1954	
<i>aberrans</i> La Greca, 1954	Cameroon, Congo, Ivory Coast, Gabon, Ghana, Guinea, Senegal, Togo, Central African Republic
= <i>C. lobipes</i> Chopard, 1954	
<i>boulardi</i> Roy, 1972	Central African Republic
<i>coiffaiti</i> Roy, 1972	Gabon
<i>judithae</i> Roy, 1972	Nigeria
<i>Galinthias</i> Stål, 1877	
= <i>Arabistania</i> Kocak & Kemal, 2008	
= <i>Attalia</i> Uvarov, 1936	
<i>amoena</i> Saussure, 1871	Angola, Cameroon, Congo, Kenya, Malawi, Mozambique, South Africa, Rwanda, Sierra Leone, Tanzania, Zimbabwe, Botswana, Central African Republic, Namibia, Uganda, Zambia
= <i>G. hyalina</i> Saussure, 1899	
= <i>G. usambarica</i> Sjöstedt, 1909	
<i>memensis</i> Sjöstedt, 1909	Kenya, Malawi, Somalia, Tanzania
<i>meruensis</i> Sjöstedt, 1909	Rwanda, Tanzania
<i>occidentalis</i> Beier, 1930	Cameroon, Ghana, Guinea, Ivory Coast, Morocco, Sierra Leone, Central African Republic, Gabon, Equatorial Guinea
<i>rhomboidalis</i> Roy & Stiewe, 2014	Kenya
<i>Harpagomantis</i> Kirby, 1899	
= <i>Australomantis</i> Rehn, 1901	
= <i>Harpax</i> Serville, 1831	
<i>discolor</i> Stål, 1877	Mozambique, South Africa, Zimbabwe
<i>tricolor</i> Linne, 1758	Botswana, South Africa, Lesotho, Mozambique, Namibia, Zimbabwe
= <i>H. cornuta</i> Olivier, 1792	
= <i>H. lobata</i> Fabricius, 1781	
= <i>H. paradoxa</i> Goeze, 1778	

Taxon List	African Distribution
<i>=H. quadricornis</i> Stoll, 1813	
<i>=H. spinocula</i> Serville, 1839	
<i>nana</i> Lucas, 1849	Missing distribution data
<i>Pseudoharpax</i> Saussure, 1870	
<i>abyssinicus</i> Beier, 1930	Ethiopia, Kenya, Somalia
<i>beieri</i> La Greca, 1950	Ethiopia
<i>crenaticollis</i> La Greca, 1954	BBurundi, Kenya, Rwanda, Tanzania
<i>dubius</i> La Greca, 1954	Congo
<i>erythraenus</i> Giglio-Tos, 1915	Ethiopia, Kenya
<i>francoisi</i> Bolívar, 1908	Angola, Cameroon, Guinea
<i>nigericus</i> Giglio-Tos, 1915	Niger
<i>parallelus</i> La Greca, 1954	Kenya
<i>ugandanus</i> Giglio-Tos, 1915	Angola, Kenya, Senegal, Uganda, Zambia,
<i>=P. laticollis</i> Beier, 1930	Zimbabwe
<i>virescens centralis</i> La Greca, 1954	Congo, Ethiopia, Rwanda, Senegal, Uganda
<i>virescens virescens</i> Serville, 1839	Burkina Faso, Cameroon, Chad, Ethiopia, Gambia, Ghana, Guinea, Ivory Coast, Kenya, Mauritania, Niger, Nigeria, Senegal, Somalia, Sudan, Togo, Uganda
GONYPETIDAE Westwood, 1889	
Gonypetinae Westwood, 1889	
Gonypetini Westwood, 1889	
<i>Elaea</i> Stål, 1871	
<i>solimani</i> Mohammad et al., 2011	
HOPLOCORYPHIDAE Giglio-Tos, 1916	
Hoplocoryphinae Giglio-Tos, 1916	
Hoplocoryphini Giglio-Tos, 1916	
<i>Apterocorypha</i> Roy, 1966	
<i>atra</i> Giglio-Tos, 1916	Madagascar
<i>aurita</i> Saussure & Zehntner, 1895	Madagascar
<i>bispina</i> Lombardo, 1985	Somalia
<i>Hoplocorypha</i> Stål, 1871	
<i>acuta</i> Giglio-Tos, 1916	Madagascar, Tanzania
<i>bicornis</i> Deeleman-Reinhold, 1957	South Africa
<i>boromensis</i> Brancsik, 1895	Mozambique, Zambia
<i>bottegi</i> Saussure, 1895	Ethiopia, Somalia, Tanzania
<i>boviformis</i> Rehn, 1912	Angola
<i>brevicollis</i> Beier, 1931	South Africa
<i>cacomana</i> Giglio-Tos, 1916	Congo, Tanzania
<i>carli</i> Giglio-Tos, 1916	Rwanda
<i>congica</i> Giglio-Tos, 1916	Angola, Congo

Taxon List	African Distribution
<i>dentata</i> Giglio-Tos, 1916	Kenya, Tanzania, Zimbabwe
<i>distinguenda</i> Beier, 1930	Nigeria
<i>foliata</i> Giglio-Tos, 1916	Tanzania
<i>fumosa</i> Giglio-Tos, 1916	Malawi, Mozambique, South Africa, Zimbabwe
<i>galeata</i> Saussure, 1870	Ethiopia, Kenya, Tanzania
<i>garuana</i> Giglio-Tos, 1916	Angola, Cameroon, Namibia, Tanzania, Togo
<i>hamulifera</i> Beier, 1954	Congo
<i>lacualis</i> Giglio-Tos, 1916	Congo, Somalia, Tanzania
<i>lobata</i> Roy, 1969	Senegal
<i>macra</i> Stål, 1856	Angola, Kenya, Namibia, South Africa, Tanzania, Uganda, Zambia
<i>mellea</i> Giglio-Tos, 1916	Ethiopia, Kenya, Tanzania
<i>nana</i> Sjöstedt, 1909	Namibia, South Africa, Uganda
<i>narocana</i> Giglio-Tos, 1916	Chad, Ethiopia, Kenya, Tanzania, Zambia
<i>nigerica</i> Beier, 1930	Burkina Faso, Ghana, Nigeria
<i>nigra</i> Giglio-Tos, 1916	Congo
<i>perplexa</i> Rehn, 1912	Angola, Congo, Namibia, Tanzania, Zimbabwe
<i>picea</i> Giglio-Tos, 1916	Kenya
<i>punctata</i> Giglio-Tos, 1916	Tanzania
<i>rapax</i> Saussure, 1881	Cameroon, Kenya, Namibia, Tanzania
<i>salfii</i> La Greca, 1939	Ethiopia, Somalia
<i>saussurii</i> Giglio-Tos, 1916	Kenya, Namibia, South Africa, Tanzania
<i>sordida</i> Giglio-Tos, 1916	Ethiopia, Kenya, Tanzania
<i>striata</i> Beier, 1930	Namibia, South Africa
<i>turneri</i> Beier, 1930	Namibia
<i>ugandana</i> Beier, 1930	Uganda
<i>vittata</i> Giglio-Tos, 1916	Malawi, Tanzania
<i>wittei</i> Beier, 1954	Congo
<i>Hoplocoryphella</i> Giglio-Tos, 1916	
<i>grandis</i> Brancsik, 1895	Botswana, Madagascar, South Africa, Tanzania, Zimbabwe
HYMENOPODIDAE Giglio-Tos, 1915	
Otomantini Giglio-Tos, 1915	
<i>Anasigerpes</i> Giglio-Tos, 1915	
= <i>Phylloharpax</i> Werner, 1915	
<i>amiети</i> Roy, 1963	Congo, Ivory Coast, Ghana, Sierra Leone, Central African Republic, Guinea

Taxon List	African Distribution
bifasciata Giglio-Tos, 1915	Angola, Cameroon, Congo, Gabon, Ghana, Ivory Coast, Nigeria, Central African Republic, Equatorial Guinea, Guinea
<i>centralis</i> Roy, 1966	Congo, Central African Republic, Uganda
<i>grilloti</i> Roy, 1978	Congo
<i>heydeni</i> Werner, 1908	Cameroon, Central African Republic, Congo, Ivory Coast, Kenya, Gabon Uganda
= <i>A. alluaudi</i> Chopard, 1914	
= <i>A. crassipes</i> Rehn, 1914	
= <i>A. modesta</i> Giglio-Tos, 1915	
= <i>A. roemeri</i> Werner, 1908	
<i>nigripes</i> Roy, 1967	Congo, Ghana, Ivory Coast
= <i>A. coxalis</i> Werner, 1915	
= <i>A. punctata</i> Roy, 1966	
<i>trifasciata</i> Giglio-Tos, 1915	East Africa
<i>unifasciata</i> Roy, 1979	Ivory Coast, Ghana, Guinea, Nigeria, Sierra Leone
<i>Chrysomantis</i> Giglio-Tos, 1915	
= <i>Anoplosigerpes</i> Werner, 1928	
= <i>Uvarovmantis</i> Beier, 1930	
<i>cachani</i> Roy, 1964	Central African Republic, Congo, Gabon, Ivory Coast, Ghana, Guinea
<i>congica</i> La Greca & Lombardo, 1987	Congo
<i>girardi</i> Gillon & Roy, 1968	Guinea, Ivory Coast
<i>royi</i> La Greca & Lombardo, 1987	Gabon, Ghana, Kenya, Ivory Coast, Uganda
<i>speciosa</i> Giglio-Tos, 1915	Angola, Central African Republic, Congo, Gabon, Ghana, Ivory Coast
= <i>C. centralis</i> La Greca & Lombardo, 1987	
= <i>C. cervoides</i> La Greca & Lombardo, 1987	
<i>tessmanni</i> Werner, 1928	Cameroon, Ghana, Nigeria
= <i>C. tristis</i> Beier, 1930	
<i>Otomantis</i> Bolívar, 1890	
= <i>Acanthomantis</i> Saussure & Zehntner, 1895	
<i>aurita</i> Saussure & Zehntner, 1895	Madagascar, Tanzania
<i>bolivari</i> Lombardo <i>et al.</i> , 2014	Kenya, Tanzania
<i>capirica</i> Giglio-Tos, 1915	Angola, Cameroon, Congo
= <i>O. xenocentrus</i> Werner, 1915	
<i>casiaca</i> Beier, 1934	Congo
<i>centralis</i> Lombardo <i>et al.</i> , 2014	Congo, Angola
<i>gracilus</i> Lombardo <i>et al.</i> , 2014	Congo
<i>minima</i> Stiewe, 2014	South Africa
<i>rendalli</i> Kirby, 1988	Malawi, South Africa, Tanzania, Zambia
<i>scutigera</i> Bolívar, 1890	

Taxon List	African Distribution
= <i>O. africana</i> Saussure & Zehntner, 1895	Eastern Africa, Malawi, Mozambique, South Africa, Tanzania
<i>trimacula</i> Lombardo <i>et al.</i> , 2014	Zambia, Malawi
<i>Oxypiloidea (Catasigerpes)</i> Giglio-Tos, 1927	
= <i>Sigerpes</i> Giglio-Tos, 1927	
<i>camerunensis</i> Giglio-Tos, 1915	Cameroon, Congo, Gabon, Ghana, Ivory Coast
<i>centrafricana</i> Roy, 2013	Central African Republic, Congo, Democratic Republic of the Congo, Gabon, Uganda
<i>congica</i> Giglio-Tos, 1915	Angola, Cameroon, Congo, Democratic Republic of the Congo
<i>granulata</i> Roy, 1965	Guinea
<i>ivoirensis</i> Roy, 2013	Ghana, Ivory Coast
<i>maldesi</i> Roy, 2013	Togo
<i>margarethae</i> Werner, 1912	Cameroon, Chad, Congo, Ethiopia, Gabon, Kenya, Namibia, Niger, Nigeria, Central African Republic, Sudan, Uganda, Eritrea
= <i>O. niloticus</i> Giglio-Tos, 1915	Morocco
<i>maroccana</i> Roy, 2013	Burka-Faso, Gambia, Ghana, Guinea, Ivory Coast, Liberia, Mali, Nigeria, Senegal, Sierra Leone, Togo
<i>occidentalis</i> Wood-Mason, 1879	Somalia
= <i>O. toganus</i> Giglio-Tos, 1915	Zimbabwe
<i>orientalis</i> Roy, 2013	
<i>sinuata</i> Roy, 2013	
<i>Oxypiloidea (Oxypiloidea)</i> Schulthess, 1898	
<i>acuminata</i> Kevan, 1954	Ethiopia, Kenya, Somalia, Tanzania
<i>angolica</i> Roy, 2013	Angola
<i>carvalhoi</i> Roy, 2013	Angola
<i>dargei</i> Roy, 2013	Tanzania, Uganda
<i>denticulata</i> Roy, 2013	Angola
<i>lobata</i> Schulthess-Schindler, 1898	Kenya, Somalia, Tanzania
= <i>O. erlangeri</i> Beier, 1931	
<i>murphyi</i> Roy, 2013	Malawi
<i>namibiana</i> Roy, 2013	Namibia, Zimbabwe
<i>tridens</i> Saussure, 1872	Angola, Botswana, Chad, Congo, Kenya, Mozambique, Namibia, South Africa, Sudan, Tanzania, Zimbabwe
= <i>O. subcornuta</i> Westwood, 1889	
<i>oxypiloidea</i> Beier, 1942	Tanzania
<i>brunneriana</i> Saussure, 1871	Kenya, Somalia, Sudan
<i>jeanneli</i> Chopard, 1938	Chad, Kenya
<i>mortuifolia</i> Saussure, 1899	Somalia, Tanzania
<i>nigerica</i> Giglio-Tos, 1915	Nigeria
Hymenopodinae Giglio-Tos, 1915	

Taxon List	African Distribution
Hymenopodini Giglio-Tos, 1915	
<i>Chlidonoptera</i> Karsch, 1892	
= <i>Anabomistria</i> Giglio-Tos, 1915	
= <i>Bomistria</i> Saussure, 1898	
<i>chopardi</i> Roy, 1964	Ivory Coast, Ghana, Guinea, Liberia, Sierra Leone
<i>lestoni</i> Roy & Leston, 1975	Cameroon, Ghana
<i>roxanae</i> Moulin 2020	Central African Republic, Congo
<i>vexillum</i> Karsch, 1892	Cameroon, Congo, Gabon, Tanzania, Uganda
= <i>C. lunata</i> Saussure, 1898	
<i>wernerii</i> Giglio-Tos, 1915	Kenya, Tanzania
<i>Chloroharpax</i> Werner, 1908	
<i>modesta</i> Gerstaecker, 1883	Cameroon, Congo, Ivory Coast, Gabon, Ghana, Guinea, Nigeria, Sierra Leone, Central African Republic
= <i>C. ocellifer</i> Werner, 1908	
<i>Panurgica</i> Karsch, 1896	
= <i>Mystipola</i> Saussure, 1898	
= <i>Propangurica</i> Giglio-Tos, 1915	
<i>basilewskyi</i> La Greca, 1954	Congo
<i>compressicollis</i> Saussure, 1898	Cameroon, Ghana, Togo
<i>duplex</i> Karsch, 1896	Cameroon, Liberia, Namibia, Togo
<i>faeae</i> Griffini, 1907	Angola, Cameroon, Gabon, Ghana, Guinea, Central African Republic, Equatorial Guinea
<i>fratercula</i> Rehn, 1912	Ghana, Guinea, Ivory Coast, Liberia
<i>fusca</i> Giglio-Tos, 1915	Cameroon, Gabon, Kenya
<i>langi</i> Rehn, 1949	Congo
<i>liberiana</i> Rehn, 1912	Liberia
<i>mende</i> Rehn, 1949	Sierra Leone
<i>rehni</i> La Greca, 1954	Congo, Gabon, Central African Republic
<i>Pseudocreobotra</i> Saussure, 1870	
= <i>Theomantis</i> Giglio-Tos, 1915	
<i>amarae</i> Rehn, 1901	Somalia
<i>ocellata</i> Beauvois, 1805	Angola, Benin, Burkina Faso, Cameroon, Congo, Democratic Republic of the Congo, Ethiopia, Ghana, Guinea, Ivory Coast, Kenya, Liberia, Mozambique, Nigeria, Senegal, Sierra Leone, South Africa, Tanzania, Togo, Uganda, Zimbabwe
= <i>P. ocellaria</i> Drury, 1773	
<i>wahlbergi</i> Stål, 1871	Angola, Congo, Ethiopia, Kenya, Malawi, Mozambique, South Africa, Tanzania, Uganda, Zambia, Zimbabwe
Oxypilinae Saussure, 1871	

Taxon List	African Distribution
Oxypilini Saussure, 1871	
<i>Junodia</i> Schulthess, 1899	
= <i>Euoxypilus</i> Giglio-Tos, 1915	
<i>amoena</i> Schulthess-Schindler, 1899	Ethiopia, Kenya, Mozambique, Tanzania
<i>beieri</i> Roy, 1972	Congo
<i>congica</i> Giglio-Tos, 1915	Congo, Democratic Republic of the Congo, Zambia, Zimbabwe
= <i>J. maculata</i> Roy, 1972	
<i>hararensis</i> Roy, 1972	Ethiopia, Somalia
<i>lameyi</i> Beier, 1942	Angola, Cameroon, Congo, Ghana, Guinea, Ivory Coast, Central African Republic, Gabon
= <i>J. olseni</i> Roy, 1965	
<i>maternaschulzei</i> Stiewe & Roy, 2010	Kenya
<i>spinosa</i> Roy, 1972	Congo
<i>stiewei</i> Roy, 2009	Kenya
<i>strigipennis</i> Westwood, 1889	Ethiopia, Mozambique, South Africa, Eswatini, Tanzania, Zambia, Zimbabwe
<i>vansomereni</i> Roy, 1972	Uganda
<i>vansoni</i> Roy, 2009	South Africa
<i>Oxypilus (Anoxypilus)</i> Giglio-Tos, 1915	
= <i>Setoxypilus</i> Roy, 1966	
<i>burri</i> Roy, 1969	Angola, Senegal
<i>capensis</i> Saussure, 1871	South Africa, Namibia, Zambia
= <i>O. nasutus</i> Fabricius, 1787	
<i>inscriptus</i> Beier, 1955	South Africa
<i>meruensis</i> Sjöstedt, 1909	Angola, Cameroon, Congo, Ethiopia, Kenya, Malawi, Mozambique, Namibia, Nigeria, South Africa, Sudan, Tanzania, Uganda, Zambia, Zimbabwe
= <i>O. nigericus</i> Beier, 1930	
<i>polyacanthus</i> Giglio-Tos, 1915	Angola, Congo, Democratic Republic of the Congo
= <i>O. basilewskyi</i> Roy, 1966	
<i>servillei</i> Roy & Stiewe, 2013	Columbia
<i>transvalensis</i> Giglio-Tos, 1915	Angola, Cameroon, Congo, Ethiopia, Kenya, Malawi, Mozambique, Namibia, Nigeria, South Africa, Sudan, Tanzania, Uganda, Zambia, Zimbabwe
<i>Oxypilus (Oxypilus)</i> Audinet-Serville, 1831	
<i>annulatus</i> Serville, 1831	Namibia, Senegal
= <i>O. distinctus</i> Beier, 1930	
<i>cherlonneixi</i> Roy, 1999	Gabon
<i>descampsi</i> Roy, 1966	Chad, Ethiopia, Kenya, Niger, Sudan
<i>enei</i> Roy, 1966	Cameroon, Nigeria, Togo

Taxon List	African Distribution
<i>falcatus</i> Roy, 1966	Cameroon, Central African Republic, Congo, Democratic Republic of the Congo, Sudan, Uganda
<i>flavicoxa</i> Roy, 1964	Ivory Coast, Liberia
<i>gillona</i> Roy, 1966	Ivory Coast
<i>guentheri</i> Roy, 1966	Cameroon, Nigeria
<i>hamatus</i> Roy, 1966	Benin, Ghana, Nigeria, Togo
<i>lamottei</i> Roy, 1966	Guinea, Liberia
<i>maculifemur</i> Roy & Stiewe, 2013	Tanzania
<i>montanus</i> Roy, 1999	BBurundi, Kenya, Rwanda, Tanzania, Uganda
<i>pallidus</i> Roy, 1966	Ivory Coast
<i>pierrei</i> Roy & Stiewe, 2013	Malawi
<i>raggei</i> Roy, 1969	Somalia
<i>tanzanicus</i> Roy, 1969	Tanzania
<i>villiersi</i> Roy, 1966	Benin, Ivory Coast
Phyllocraniinae Brunner de Wattenwyl, 1893	
Phyllocraniini Roy, 1996	
<i>Phyllocrania</i> Burmeister, 1838	
<i>illudens</i> Saussure & Zehntner, 1895	Madagascar
<i>insignis</i> Westwood, 1843	Cameroon, South Africa
<i>paradoxa</i> Burmeister, 1838	Angola, Burkina Faso, Cameroon, Congo, Ethiopia, Ghana, Guinea, Ivory Coast, Kenya, Namibia, Niokola-Koba, Madagascar, Malawi, Mozambique, Somalia, South Africa, Sudan, Tanzania, Togo, Uganda, Central African Republic, Zimbabwe
Sibyllinae Giglio-Tos, 1915	
Sibyllini Giglio-Tos, 1915	
<i>Leptosibylla</i> Roy, 1996	
<i>gracilis</i> Roy, 1996	Cameroon, Central African Republic
<i>Microsibylla</i> Villani, 2021	
<i>sechii</i> Villani, 2021	
<i>Presibylla</i> Bolívar, 1908	
<i>elegans</i> Bolívar, 1908	Cameroon, Congo, Gabon
<i>speciosa</i> Roy, 1996	Cameroon, Nigeria, Central African Republic
<i>Sibylla (Sibylla)</i> Stål, 1877	
<i>dives</i> Giglio-Tos, 1915	Angola, Congo, Tanzania, Uganda, Malawi, Zambia, Zimbabwe
<i>dolosa</i> Roy, 1975	Ghana
<i>gratiosa</i> Rehn, 1912	Congo, Ivory Coast, Guinea, Gabon, Ghana

Taxon List	African Distribution
<i>limbata</i> Giglio-Tos, 1915	Cameroon, Congo, Gabon, Ivory Coast, Ghana
<i>maculosa</i> Roy, 1966	Cameroon, Congo, Gabon
<i>marmorata</i> Roy, 1996	Cameroon, Central African Republic
<i>polyacantha</i> Gerstaecker, 1889	Congo
<i>pretiosa</i> Stål 1856	Cameroon, Congo, Ethiopia, Kenya, Tanzania, Malawi, Namibia, Somalia, South Africa, Eswatini, Uganda, Zambia
= <i>S. fuscosparsa</i> Stål, 1856	
<i>Sibylla (Sibyllopsis)</i> Roy, 1996	
<i>griffinii griffinii</i> Giglio-Tos, 1915	Benin, Cameroon, Ivory Coast, Gabon, Ghana, Guinea, Nigeria, Congo, Central African Republic, Liberia, Sierra Leone, Togo
<i>griffinii guineensis</i> Roy, 1965	Guinea, Ivory Coast, Liberia, Syria
<i>operosa</i> Roy, 1996	Liberia, Guinea, Ghana, Nigeria, Ivory Coast
<i>pannulata</i> Karsch, 1894	Angola, Cameroon, Congo, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Guinea, Nigeria, Central African Republic,
<i>punctata</i> Roy, 1996	Cameroon, Central African Republic, Democratic Republic of the Congo
<i>vanderplaetseni</i> Roy, 1963	Congo, Gabon, Ghana, Cameroon, Guinea, Ivory Coast, Central African Republic, Uganda
MAJANGIDAE Giglio-Tos, 1915	
Brancsikiinae Schwarz & Roy, 2019	
Brancsikiini Schwarz & Roy, 2019	
<i>Brancsikia</i> Schwarz & Roy 2019	
<i>aeroplana</i> Lamberton, 1911	Madagascar
<i>freyi</i> Brancsik, 1893	Madagascar
= <i>B. simplex</i> Beier, 1935	
<i>simplex</i> Beier, 1935	Madagascar
Majanginae Giglio-Tos, 1915	
Danuriellini Schwarz & Roy, 2019	
<i>Danuriella</i> Westwood, 1889	
= <i>Micropopa</i> Beier, 1929	
<i>altera</i> Beier, 1929	Madagascar
<i>andapensis</i> Roy, 2020	Madagascar
<i>andriai</i> Roy, 2020	Madagascar
<i>anjouanensis</i> Roy, 2020	Madagascar
<i>griveaudi</i> Roy, 2020	Madagascar
<i>irregularis</i> Westwood, 1889	Madagascar

Taxon List	African Distribution
<i>madagascariensis</i> Beier, 1929	Madagascar
<i>mayottensis</i> Roy, 2020	Madagascar
<i>marojejyensis</i> Paulian, 1961	Madagascar
<i>merigueti</i> Roy, 2020	Madagascar
<i>sogai</i> Roy, 2020	Madagascar
<i>tigrina</i> Roy, 2020	Madagascar
<i>viettei</i> Roy, 2020	Madagascar
Majangini Giglio-Tos, 1915	
<i>Liturgusella</i> Giglio-Tos, 1915	
<i>malagassa</i> Saussure & Zehntner, 1895	Madagascar
<i>Majanga</i> Wood-Mason, 1891	
= <i>Pantelica</i> Saussure & Zehntner, 1985	
<i>basilaris</i> Westwood, 1889	Madagascar
<i>spinosa</i> Giglio-Tos, 1915	Madagascar
<i>tricolor</i> Saussure & Zehntner, 1895	Madagascar
MANTIDAE Latreille, 1802	
Deromantinae Giglio-Tos, 1919	
Deromantini Giglio-Tos, 1919	
<i>Deromantis</i> Giglio-Tos, 1916	
<i>limbalicollis</i> Karsch, 1892	Cameroon, Gabon, Central African Republic
<i>Pseudostagmatoptera</i> Beier, 1931	
= <i>Reticulimantis</i> Roy, 1971	
<i>infuscata</i> Roy, 1973	Cameroon, Congo, Gabon
Hierodulinae Brunner de Wattenwyl, 1893	
Hierodulini Brunner de Wattenwyl, 1893	
<i>Tismomorpha</i> Roy, 1973	
<i>cherlonneixi</i> Roy, 1995	Congo
<i>inexpectata</i> La Greca, 1966	Congo
<i>reinhardi</i> Roy, 2012	Kenya
<i>vitripennis</i> Bolívar, 1908	Cameroon, Central African Republic, Congo, Gabon,
Mantinae Latreille, 1802	
Mantini Latreille, 1802	
<i>Mantilia</i> Roy, 1993	
<i>ehrmanni</i> Roy, 1993	Kenya
<i>Mantis</i> Linnaeus, 1758	
= <i>Mantes</i> Geoffroy, 1764	
<i>beieri</i> Roy, 1999	Congo
<i>callifera</i> Wood-Mason, 1882	Angola, Ghana, Guinea, Kenya, Madagascar, Tanzania, Togo
<i>emortualis</i> Saussure, 1869	Angola, Ghana, Guinea, Ivory Coast, Kenya

Taxon List	African Distribution
<i>insignis</i> Beier, 1954	Angola, Congo, Guinea
<i>religiosa eichleri</i> Bazyluk, 1960	Cameroon, Congo, Ethiopia, Ghana, Mozambique, Namibia, Nigeria, Somalia, South Africa, Sudan, Eswatini, Tanzania, Togo, Zimbabwe, Zambia
<i>religiosa major</i> Gerstaecker, 1873	Kenya
Statilia Stål, 1877	
<i>apicalis</i> Saussure, 1871	Congo, Ghana, Guinea
= <i>S. guineensis</i> Chopard, 1954	
= <i>Pseudomantis apicalis</i> , Saussure, 1869	
Omomantinae Giglio-Tos, 1916	
Omomantini Giglio-Tos, 1916	
Omomantis Saussure, 1899	
<i>sigma</i> Rehn, 1949	Congo, Central African Republic, Gabon
<i>tigrina</i> Giglio-Tos, 1916	Somalia, Tanzania
<i>zebrata</i> Charpentier, 1843	Botswana, Kenya, Mozambique, Namibia, South Africa, Zimbabwe
= <i>O. pardalina</i> Saussure, 1899	
= <i>O. saavis</i> Brancsik, 1895	
Tenoderinae Brunner de Wattenwyl, 1893	
Paramantini Roy, 1973	
Alalomantis Giglio-Tos, 1917	
<i>coxalis</i> Saussure & Zehntner, 1895	Congo, Ruwenzori, Uganda, Burundi
<i>muta</i> Wood-Mason, 1882	Uganda, Angola, Cameroon, Central African Republic, Congo, Gabon
Epitenodera Giglio-Tos, 1911	
<i>brevipennis</i> Saussure, 1871	Cameroon
<i>capitata capitata</i> Saussure, 1869	East Africa, Guinea, South Africa
<i>capitata ibana</i> Giglio-Tos, 1912	Mozambique
<i>capitata madimbana</i> Giglio-Tos, 1912	East Africa
<i>equatoriana</i> Le Greca, 1993	Sudan
<i>gambiensis</i> Beier, 1931	Burkina Faso
<i>herbacea herbacea</i> Serville, 1839	Namibia
<i>houyi</i> Werner, 1928	Burkina Faso, Cameroon, Nigeria, Senegal
<i>iringana</i> Giglio-Tos, 1912	Angola, Congo, Ethiopia, Kenya, Malawi, South Africa, Tanzania, Uganda
<i>nimbaba</i> Roy, 1963	Burkina Faso, Cameroon, Congo, Ghana, Guinea,
Mantasoa Mériguet, 2005	
<i>lebbei</i> Mériguet, 2005	Madagascar
Paramantis Roy, 1967	
<i>natalensis</i> Stål, 1856	

Taxon List	African Distribution
= <i>P. modesta</i> Werner, 1915	Angola, Cameroon, Congo, Ethiopia, Kenya, South Africa, Tanzania, Zimbabwe
<i>nyassana</i> Giglio-Tos, 1912	Congo, Kenya, Tanzania, Zimbabwe
<i>prasina</i> Serville, 1839	Angola, Comoros, Ghana, Guinea, Ivory Coast, Kenya, Madagascar, Mauritius, Tanzania, Togo, Mauritius
<i>sacra</i> Thunberg, 1815	Botswana, Cameroon, South Africa, Uganda
<i>togana</i> Giglio-Tos, 1912	Cameroon, Liberia, Tanzania, Togo
<i>victoriana</i> Werner, 1908	Angola, Cameroon, Congo, Ruwenzori, Tanzania, Uganda
= <i>P. mitiana</i> Giglio-Tos, 1912	
<i>viridis</i> Saussure, 1872	Cameroon, Congo, Madagascar, South Africa
<i>Rhomboderella</i> Giglio-Tos, 1912	
<i>gabonica</i> Roy, 1973	Gabon
<i>parmata</i> La Greca, 1955	Congo
<i>scutata</i> Bolívar, 1889	Angola, Congo, Kenya, Tanzania, Zimbabwe
<i>thorectes</i> Rehn, 1949	Congo, Zambia
<i>Sphodromantis</i> Stål, 1871	
<i>abessinia</i> Sjöstedt, 1930	Ethiopia, Somalia
<i>aethiopica</i> La Greca & Lombardo, 1987	Ethiopia
<i>annobonensis</i> Llorente, 1968	Ethiopia, Guinea, Equatorial Guinea
<i>aurea</i> Giglio-Tos, 1917	Ghana, Liberia
<i>aureoides</i> Roy, 2010	Cameroon, West-Central Tropical Africa, Africa
<i>baccettii</i> La Greca & Lombardo, 1987	Kenya, Somalia
<i>balachowskyi</i> La Greca, 1967	Central African Republic, Gabon, Congo
<i>biocellata</i> Werner, 1906	Angola, Cameroon, Central African Republic
<i>centralis</i> Rehn, 1914	Central African Republic, Ethiopia, Kenya, Rwanda, Tanzania, Uganda, Burundi
<i>citernii citernii</i> Giglio-Tos, 1917	Ethiopia, Somalia
<i>citernii kenya</i> La Greca & Lombardo, 1987	Kenya, Malawi, Uganda
<i>congica</i> Beier, 1931	Angola, Congo, Nigeria
<i>conspicua</i> La Greca, 1967	Burkina Faso, Senegal
<i>elegans</i> Sjöstedt, 1930	Burkina Faso, Congo, Ethiopia, Guinea, Mauretania, Niger, Senegal
<i>elongata</i> La Greca, 1969	Congo, Zambia
<i>fenestrata</i> Giglio-Tos, 1912	Kenya, Somalia
= <i>S. fulva</i> Giglio-Tos, 1912	
= <i>S. uebina</i> Giglio-Tos 1912	
<i>gastrica</i> Stål, 1858	Botswana, Ethiopia, Mozambique, Namibia, South Africa, Eswatini, Uganda, Zimbabwe
= <i>S. bicarinata</i> Saussure, 1869	

Taxon List	African Distribution
= <i>S. bioculata</i> Burmeister, 1838	
= <i>S. occidentalis</i> Werner, 1906	
<i>gestri</i> Giglio-Tos, 1912	Kenya, Somalia
<i>giubana</i> La Greca & Lombardo, 1987	Somalia
<i>gracilicollis gracilicollis</i> Beier, 1930	Central African Republic, Gabon, Ghana, Guinea, Nigeria, Senegal
= <i>S. gracilicollis gracilinota</i> Beier, 1935	
<i>gracilicollis centroccidentalis</i> Roy, 2010	Africa, West Central Tropical Africa, Central African Republic, Cameroon, Gabon
<i>gracilis</i> Lombardo, 1992	South Africa
<i>hyalina</i> La Greca, 1955	Central African Republic, Congo, Gabon
<i>kersteni</i> Gerstaecker, 1869	Kenya, Sudan, Tanzania
= <i>S. christina</i> Kirby, 1904	
<i>lagrecai</i> Lombardo, 1990	Kenya, Tanzania, Uganda
<i>lineola lineola</i> Burmeister, 1838	Angola, Burkina Faso, Cameroon, Congo, Ethiopia, Gabon, Ghana, Kenya, Mali
<i>lineola pinguis</i> Roy, 1968	Congo, Angola, Central African Republic, Gabon
<i>lineola speciosa</i> Roy, 1971	Sierra Leone
<i>obscura</i> Beier & Hocking, 1965	Tanzania
<i>pachinota</i> La Greca & Lombardo, 1987	Ethiopia, Sudan
<i>pardii</i> La Greca & Lombardo, 1987	Somalia
<i>pavonina</i> La Greca, 1956	Angola, Cameroon, Congo
<i>royi</i> La Greca, 1967	Burkina Faso, Mali, Mauretanius, Niger, Senegal
<i>rubrostigma</i> Werner, 1916	Kenya, Tanzania
<i>rudolfae rudolfae</i> Rehn, 1901	Ethiopia, Kenya, Somalia, Tanzania
<i>rudolfae andreinii</i> Giglio-Tos, 1912	Ethiopia
<i>socotrana</i> Roy, 2010	Africa, East Tropical Africa, Kenya,
<i>stigma</i> Roy, 2010	Africa, East Tropical Africa
<i>tenuidentata</i> Lombardo, 1992	Tanzania
<i>viridis barbara</i> La Greca, 1967	Algeria, Libya, Niger, Tunisia
<i>viridis inornata</i> Werner, 1923	Algeria, Burkina Faso, Cameroon, Morocco, Namibia, Niger, Senegal
<i>viridis meridionalis</i> La Greca, 1950	Ethiopia, Kenya, Somalia, Sudan, Tanzania
<i>viridis simplex</i> La Greca & Lombardo, 1987	Ethiopia, Somalia
<i>viridis viridis</i> Forskal, 1775	Egypt, Algeria, Arabia, Ethiopia, Kenya, Libya, Mauretanius, Morocco, Somalia, Sudan, Tanzania, Tunisia, Uganda
= <i>S. viridis bimaculata</i> Burmeister, 1838	
= <i>S. viridis cavibrachia</i> Werner, 1915	
= <i>S. viridis guttata</i> Thunberg, 1815	
= <i>S. viridis vischeri</i> Werner, 1933	

Taxon List	African Distribution
<i>weneri</i> Roy, 2010	Africa, West Central Tropical Africa, Cameroon
<i>Tarachomantis (Madamantis)</i> Mériguet, 2013	
<i>analamazoatra</i> Mériguet, 2013	Madagascar
<i>betsilia</i> Saussure & Zehntner, 1895	Madagascar
<i>confusa</i> Giglio-Tos, 1912	Madagascar
<i>marojeziensis</i> Mériguet, 2013	Madagascar
<i>sogai</i> Mériguet, 2013	Madagascar
<i>tsaratanana</i> Mériguet, 2013	Madagascar
<i>Tarachomantis (Tarachomantis)</i> Brancsik, 1893	
<i>alaotrana</i> Giglio-Tos, 1913	Madagascar
<i>betanimena</i> Saussure & Zehntner, 1895	Madagascar
<i>caldwelli</i> Bates, 1863	Madagascar
= <i>T. brunneri</i> Brancsik, 1892	
= <i>T. malagassa</i> Saussure & Zehntner, 1895	
= <i>T. roseinervis</i> Stål, 1877	
<i>hova</i> Saussure & Zehntner, 1895	Madagascar
<i>macula</i> Saussure & Zehntner, 1895	Madagascar
= <i>T. maculata</i> Saussure & Zehntner, 1895	
= <i>T. madecassa</i> Beier, 1935	
<i>rubiginosa</i> Saussure & Zehntner, 1895	Madagascar
<i>sakalava</i> Saussure & Zehntner, 1895	Madagascar
<i>Tisma</i> Giglio-Tos, 1917	
<i>acutipennis</i> Westwood, 1889	Madagascar
<i>chopardi</i> Roy, 2005	Madagascar
<i>freyi</i> Brancsik, 1892	Madagascar
<i>grandidieri</i> Saussure & Zehntner, 1895	Madagascar
<i>pauliani</i> Roy, 2005	Madagascar
<i>peyrierasi</i> Roy, 2005	Madagascar
<i>Tenoderini</i> Brunner de Wattenwyl, 1893	
<i>Cataspilota</i> Giglio-Tos, 1917	
= <i>Calospilota</i> Giglio-Tos, 1917	
<i>armicollis</i> Karsch, 1892	Cameroon
<i>calabarica</i> Westwood, 1889	Liberia, Niger, Cameroon, Central African Republic, Equatorial Guinea, Gabon
= <i>C. truncatipennis</i> Karsch, 1892	
= <i>C. westwoodi</i> Giglio-Tos, 1911	
<i>guineensis</i> Giglio-Tos, 1911	Guinea
<i>lolodorfana</i> Giglio-Tos, 1911	Cameroon, Congo, Nigeria, Central African Republic, Gabon
<i>misana</i> Giglio-Tos, 1911	Ghana, Guinea, Nigeria, Togo
<i>pulchra</i> Roy, 1991	Cameroon, Central African Republic

Taxon List	African Distribution
<i>tristis</i> Giglio-Tos, 1911	Cameroon
<i>Plistospilota</i> Giglio-Tos, 1911	
<i>camerunensis</i> Giglio-Tos, 1917	Cameroon
<i>congica</i> Giglio-Tos, 1911	Congo
<i>gasconi</i> Rochebrune, 1884	Gambia, Senegal
<i>guineensis</i> Roy, 1965	Ghana, Guinea, Ivory Coast, Liberia
<i>insignis</i> Wood-Mason, 1882	Cameroon
<i>mabirica</i> Giglio-Tos, 1917	Congo, Uganda
<i>maxima</i> Giglio-Tos, 1917	Cameroon, Congo, Ivory Coast
<i>nigerica</i> Giglio-Tos, 1917	Angola, Cameroon, Nigeria
<i>validissima</i> Gerstaecker, 1883	Cameroon, Congo, Gabon, Ghana, Ivory Coast
<i>Polyspilota</i> Burmeister, 1838	
<i>aeruginosa aeruginosa</i> Goeze, 1778	Angola, Cameroon, Congo, Gabon, Ghana, Madagascar, South Africa, Tanzania, Cape Verde, Central African Republic, Comoros, Guinea, Kenya, Liberia, Namibia, Uganda, Zimbabwe
= <i>P. aeruginosa adspersa</i> Lichtenstein, 1802	
= <i>P. aeruginosa catenata</i> Burmeister, 1838	
= <i>P. aeruginosa marginata</i> Fabricius, 1798	
= <i>P. aeruginosa nebulosa</i> Thunberg, 1815	
= <i>P. aeruginosa pustulata</i> Stoll, 1813	
= <i>P. aeruginosa rubromaculata</i> Goeze, 1778	
= <i>P. aeruginosa signata</i> Thunberg, 1815	
= <i>P. aeruginosa ugandanus</i> Rehn, 1912	
= <i>P. aeruginosa varia</i> Burmeister, 1839	
= <i>P. aeruginosa vicina</i> Serville, 1839	
<i>aeruginosa fuscoirrorata</i> Saussure, 1899	-
<i>aeruginosa variegata</i> Oliver, 1792	-
<i>aeruginosa viridis</i> Saussure, 1899	-
<i>caffra caffra</i> Westwood, 1889	South Africa, Zimbabwe
<i>caffra transvaaliana</i> Giglio-Tos, 1911	-
<i>comorana</i> Giglio-Tos, 1911	Comoros, Mozambique
= <i>P. fallax</i> Giglio-Tos, 1912	
<i>griffinii</i> Giglio-Tos, 1911	Cameroon, Gabon
<i>magna</i> Giglio-Tos, 1911	South Africa
<i>montana</i> Beier, 1931	Ethiopia
<i>pavani</i> La Greca, 1966	Congo, Gabon
<i>robusta</i> Roy, 1989	Madagascar
<i>saussurei</i> Bormans, 1881	Angola, Congo, Ghana, Tanzania
<i>seychelliana</i> Giglio-Tos, 1911	Seychelles
<i>voelzkowiana</i> Saussure, 1899	Seychelles
<i>Prohierodula</i> Bolívar, 1908	
<i>brunnea</i> La Greca, 1956	Congo

Taxon List	African Distribution
<i>congica</i> Beier, 1942	Congo
<i>duchaillui</i> Rehn, 1960	Nigeria
<i>enghoffi</i> Lombardo, 1997	Uganda
<i>flavipennis</i> Karsch, 1892	Congo
<i>grassei</i> Roy, 1965	Central African Republic, Congo, Uganda, Gabon
<i>laticollis</i> Karsch, 1892	Cameroon, Central African Republic, Congo, Uganda, Gabon
<i>lineata</i> Roy, 1967	Congo
<i>mundamensis</i> Giglio-Tos, 1911	Cameroon, Central African Republic, Congo, Gabon
<i>nigrispinis</i> Roy, 1967	Congo
<i>ornatipennis</i> Bolívar, 1893	Congo, Ghana, Ivory Coast, Nigeria, Sierra Leone
<i>picta</i> Gerstaecker, 1883	Gabon, Cameroon, Central African Republic, Equatorial Guinea
<i>viridimarginata</i> La Greca, 1956	Congo, Central African Republic, Gabon
Tenodera Burmeister, 1838	
= <i>Paratenodera</i> Giglio-Tos, 1912	
<i>superstitiosa superstitiosa</i> Fabricius, 1781	Angola, Burkina Faso, Cameroon, Ghana, Ivory Coast, Namibia, Morocco, South Africa, Tanzania, Togo, Senegal, Somalia,
<i>superstitiosa bokiana</i> Giglio-Tos, 1907	Cameroon, South Africa
= <i>T. superstitiosa madagascariensis</i> Saussure & Zehntner, 1895	
MIOMANTIDAE Westwood, 1889	
Miomantinae Westwood, 1889	
Miomantini Westwood, 1889	
<i>Cilnia</i> Stål, 1876	
= <i>Leomantis</i> Rehn, 1903	
<i>chopardi</i> Werner, 1927	Botswana, Mozambique, Namibia, South Africa, Zimbabwe
= <i>C. cochlearis</i> Sjöstedt, 1930	
<i>humeralis femoralis</i> Werner, 1906	Tanzania
<i>humeralis humeralis</i> Saussure, 1871	Angola, Congo, Malawi, Mozambique, Namibia, South Africa
= <i>C. humeralis brevipennis</i> Schulthess-Rechberg, 1899	
= <i>C. humeralis ignota</i> Rehn, 1904	
= <i>C. humeralis latipes</i> Stål, 1876	
<i>Miomantis</i> Saussure, 1870	
= <i>Calidomantis</i> Rehn, 1901	
= <i>Oreomantis</i> Uvarov, 1935	

Taxon List	African Distribution
<i>abyssinica</i> Giglio-Tos, 1911	Ethiopia, Rwanda, Tanzania, Burundi
= <i>M. lamalis</i> Rehn, 1914	
<i>acuticeps</i> Beier, 1969	Angola, Malawi, Zimbabwe
<i>aequalis</i> Rehn, 1904	South Africa, Tanzania
= <i>M. equalis</i> Otte, 1978	
<i>affinis</i> Sjöstedt, 1909	Kenya, Tanzania
<i>alata</i> Giglio-Tos, 1917	Tanzania
<i>amanica</i> Giglio-Tos, 1911	Tanzania
<i>andreinii</i> Giglio-Tos, 1917	Ethiopia
<i>annulipes</i> Werner, 1916	Tanzania, Uganda
<i>assignata</i> Rehn, 1914	Central African Republic
<i>aurantiaca</i> Giglio-Tos, 1911	Kenya, Tanzania
<i>aurea</i> Giglio-Tos, 1917	Ghana, Guinea, Ivory Coast
<i>australis</i> Beier, 1930	Namibia
<i>binotata</i> Giglio-Tos, 1911	Kenya, Malawi, Rwanda, Tanzania, Togo, Uganda
<i>bintumanensis</i> Roy, 1971	Sierra Leone
<i>brachyptera</i> Saussure, 1899	South Africa
<i>brevipennis</i> Saussure, 1872	Central African Republic, South Africa, Tanzania
<i>brunni</i> Giglio-Tos, 1911	Angola, Congo, Kenya, Ruwenzori, Uganda
= <i>M. hosi</i> a Rehn, 1912	
<i>buettneri</i> Giglio-Tos, 1911	South Africa, Uganda
<i>caffra</i> Saussure, 1871	South Africa, Eswatini
<i>cinnabarina</i> Giglio-Tos, 1911	Tanzania
<i>ciprianii</i> La Greca, 1939	Congo
<i>coxalis</i> Saussure, 1898	Angola, Lesotho, Namibia, South Africa
<i>devylderi</i> Sjöstedt, 1924	Congo
<i>diademata</i> Werner, 1916	Cameroon
<i>exilis</i> Giglio-Tos, 1911	Angola, Botswana, Ethiopia, Kenya, Namibia, Somalia, South Africa
<i>fallax</i> Giglio-Tos, 1917	Kenya, Tanzania
<i>feminina</i> Beier, 1930	Ethiopia
<i>fenestrata</i> Fabricius, 1781	Congo, Lesotho, Mozambique, Namibia, Ruwenzori, Somalia, South Africa
= <i>M. crystalina</i> Lichtenstein, 1796	
= <i>M. marginalis</i> Saussure, 1871	
= <i>M. minor</i> Giglio-Tos, 1911	
= <i>M. nana</i> Stoll, 1813	
<i>gracilus</i> Karsch, 1892	Cameroon
<i>gyldenstolpei</i> Sjöstedt, 1924	Uganda
<i>helenae</i> Giglio-Tos, 1914	Malawi, South Africa, Uganda, Zimbabwe

Taxon List	African Distribution
<i>kibweziana</i> Giglio-Tos, 1911	Kenya, Ruwenzori, South Africa, Tanzania, Uganda
<i>kilimandjarica</i> Stostedt, 1909 = <i>M. irrorata</i> Giglio-Tos, 1911	Kenya, Tanzania, Uganda
<i>lacualis</i> Giglio-Tos, 1911	Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Somalia, Tanzania, Uganda, Burundi
<i>lamtoensis</i> Gillon & Roy, 1968	Burkina Faso, Ivory Coast, Ghana
<i>longicollis</i> Saussure, 1898	Kenya, Uganda
<i>menelikii</i> Bormans, 1881	Somalia
= <i>M. cormantiella</i> Bormans, 1881	
<i>milmilena</i> Giglio-Tos, 1917	Congo, Ethiopia, Somalia, Togo
<i>minuta</i> Giglio-Tos, 1911	South Africa
<i>misana</i> Giglio-Tos, 1911	Angola, Cameroon, Congo, Guinea, Togo
<i>moerana</i> Giglio-Tos, 1917	Central African Republic, Kenya, Tanzania, Uganda
<i>mombasica</i> Giglio-Tos, 1911	Kenya, Rwanda, Tanzania, Burundi
<i>monacha</i> Fabricius, 1787	Mozambique, South Africa
= <i>M. forficata</i> Stoll, 1813	
= <i>M. vitrata</i> Olivier, 1792	
<i>mantana</i> Giglio-Tos, 1911	Kenya, Rwanda, Tanzania, Uganda, Burundi
<i>multipunctata</i> Werner, 1915	Congo
<i>nairobiensis</i> Bolívar, 1922	Kenya
<i>natalica</i> Beier, 1930	Namibia, South Africa, Zimbabwe
<i>nyassensis</i> Saussure, 1898	Southeast Africa
<i>ornata</i> Giglio-Tos, 1911	Kenya, Tanzania
<i>paykullii</i> Stål 1871	Burkina Faso, Cameroon, Egypt, Ghana, Israel, Kenya, Niger, Senegal, Togo, South Africa, Mauritius
= <i>M. pharaonica</i> Saussure, 1898	
= <i>M. pharaonis</i> Kirby, 1904	
= <i>M. savignyi</i> Saussure, 1872	
= <i>M. senegalensis</i> Schulthess-Rechberg, 1899	
<i>pellucia</i> Saussure, 1870	Senegal
<i>planivertex</i> Sjöstedt, 1909	Tanzania
<i>prasina</i> Burmeister, 1838	South Africa
<i>preussi</i> Karsch, 1892	Cameroon, Central African Republic, Gabon
<i>pygmaea</i> Giglio-Tos, 1917	Ethiopia, Kenya, Rwanda, Tanzania, Uganda, Burundi
<i>quadripunctata</i> Saussure, 1898	Congo, Mozambique, Namibia, South Africa, Tanzania, Uganda, Zimbabwe
<i>rebeli</i> Beier, 1929	Tanzania
<i>rehni</i> Giglio-Tos, 1911	Mozambique

Taxon List	African Distribution
<i>rouxi</i> Werner, 1926	Ivory Coast
<i>rubra</i> Beier, 1929	Tanzania
<i>sangarana</i> Giglio-Tos, 1911	Tanzania
<i>saussurei</i> Schulthess-Rechberg, 1899	Mozambique, Somalia, South Africa, Zimbabwe
<i>scabricollis</i> Gerstaecker, 1883	Angola, Ghana
<i>semialata</i> Saussure, 1872	Namibia, South Africa, Eswatini, Tanzania, Zimbabwe
<i>sjostedti</i> Giglio-Tos, 1927	Tanzania
<i>steelae</i> Uvarov, 1935	Cameroon
<i>tangana</i> Giglio-Tos, 1911	Kenya, Tanzania
<i>tenuis</i> Giglio-Tos, 1917	Kenya, Tanzania
<i>togana</i> Giglio-Tos, 1917	Cameroon, Ghana, Guinea, Ivory Coast, Togo
<i>usambarica</i> Giglio-Tos, 1911	Tanzania
<i>vitrea</i> Giglio-Tos, 1917	Kenya, Tanzania
<i>wittei</i> Beier, 1954	Congo, Rwanda, Burundi
Neocilnia Beier, 1930	
<i>gracilus</i> Beier, 1930	South Africa
Paracilnia Werner, 1909	
= <i>Zulumantis</i> Sjöstedt, 1930	
<i>neavei</i> Werner, 1909	Congo, Tanzania, Zimbabwe
Parasphendale Schulthess, 1898	
<i>affinis</i> Giglio-Tos, 1915	Ethiopia, Kenya, Somalia
<i>africana</i> Giglio-Tos, 1915	Kenya, Somalia, Tanzania
<i>agrionina</i> Gerstaecker, 1869	Ethiopia, Kenya, Tanzania
<i>albicosta</i> Chopard, 1938	Ethiopia, Kenya
<i>arabukosokokei</i> Borer and Ehrmann, 2022	Kenya
<i>costalis</i> Kirby, 1904	Ethiopia, Kenya, Somalia, Tanzania, Uganda, Zimbabwe
<i>ghindada</i> Giglio-Tos, 1915	Ethiopia, Mozambique, Somalia
<i>gracilicollis</i> Beier, 1930	Central African Republic, Gabon, Ghana, Guinea, Nigeria, Senegal, Zimbabwe
<i>minor</i> Schulthess-Schildler, 1898	Ethiopia, Kenya, Somalia
<i>scioana</i> Giglio-Tos, 1915	Somalia
<i>stali</i> Sjöstedt, 1930	Tanzania, Kenya, Zimbabwe
<i>vincta</i> Gerstaecker, 1869	Ethiopia, Kenya, Tanzania
Taumantis Giglio-Tos, 1917	
<i>cephalotes</i> Gerstaecker, 1883	Cameroon
<i>globiceps</i> Beier, 1969	Malawi, South Africa, Zambia, Zimbabwe
<i>sigiana</i> Giglio-Tos, 1911	Tanzania, Kenya

Taxon List	African Distribution
= <i>T. ehrmannii</i> Lombardo, 1991	
Solygiinae Giglio-Tos, 1919	
Solygiini Giglio-Tos, 1919	
<i>Solygia</i> Stål, 1877	
<i>sulcatifrons</i> Serville, 1839	Burkina Faso, Cameroon, Guinea, Senegal,
= <i>S. grandis</i> Saussure, 1869	South Africa, Togo
NANOMANTIDAE Brunner de Wattenwyl, 1893	
Fulciniinae Ehrmann & Roy, 2002	
Paraoxyopilini Saussure, 1872	
<i>Exparoxyopilus</i> Beier, 1929	
<i>africanus</i> Beier, 1929	Zanzibar (Island off Tanzania)
Hapalomantinae Beier, 1964	
Hapalomantini Beier, 1964	
<i>Bolbena (Bolbena)</i> Giglio-Tos, 1915	
<i>assimilis</i> Kaltenbach, 1996	Namibia
<i>hottentotta</i> Karyn, 1908	Angola, Kenya, Namibia, South Africa
<i>maraisi</i> Kaltenbach, 1996	Namibia, Zimbabwe
<i>minor</i> Giglio-Tos, 1915	Namibia
<i>orientalis</i> Beier, 1930	Somalia
<i>minutissima</i> Karyn, 1908	Namibia, South Africa, Zimbabwe
<i>Bolbula</i> Giglio-Tos, 1915	
<i>debilis</i> Giglio-Tos, 1915	Tanzania
<i>exigua</i> Giglio-Tos, 1915	Tanzania
<i>widenmanni</i> Werner, 1906	Tanzania
<i>Hapalogymnes</i> Kaltenbach, 1996	
<i>gymnes</i> Rehn, 1927	South Africa, Zimbabwe
<i>Hapalomantis (Bolbira)</i> Giglio-Tos, 1915	
<i>congica</i> Giglio-Tos, 1915	Congo
<i>katangica</i> Beier, 1935	Angola, Congo, Tanzania
<i>lacualis</i> Giglio-Tos, 1915	Angola, Malawi
<i>Hapalomantis (Hapalomantis)</i> Stål, 1871	
= <i>Eubolbe</i> Giglio-Tos, 1915	
<i>minima</i> Werner, 1906	Angola, Kenya, Rwanda, South Africa,
	Tanzania, Zimbabwe
<i>abyssinica</i> Beier, 1931	Ethiopia, Somalia
<i>orba</i> Stål 1856	Kenya, Mozambique, South Africa, Tanzania
= <i>H. meridionalis</i> Saussure, 1871	
<i>rhombochir</i> Werner, 1908	Angola, Bioko, Ghana, Kenya
Nilomantini Ehrmann & Roy, 2002	
<i>Chloromantis</i> Kaltenbach, 1998	
<i>impunctata</i> Werner, 1929	Mozambique

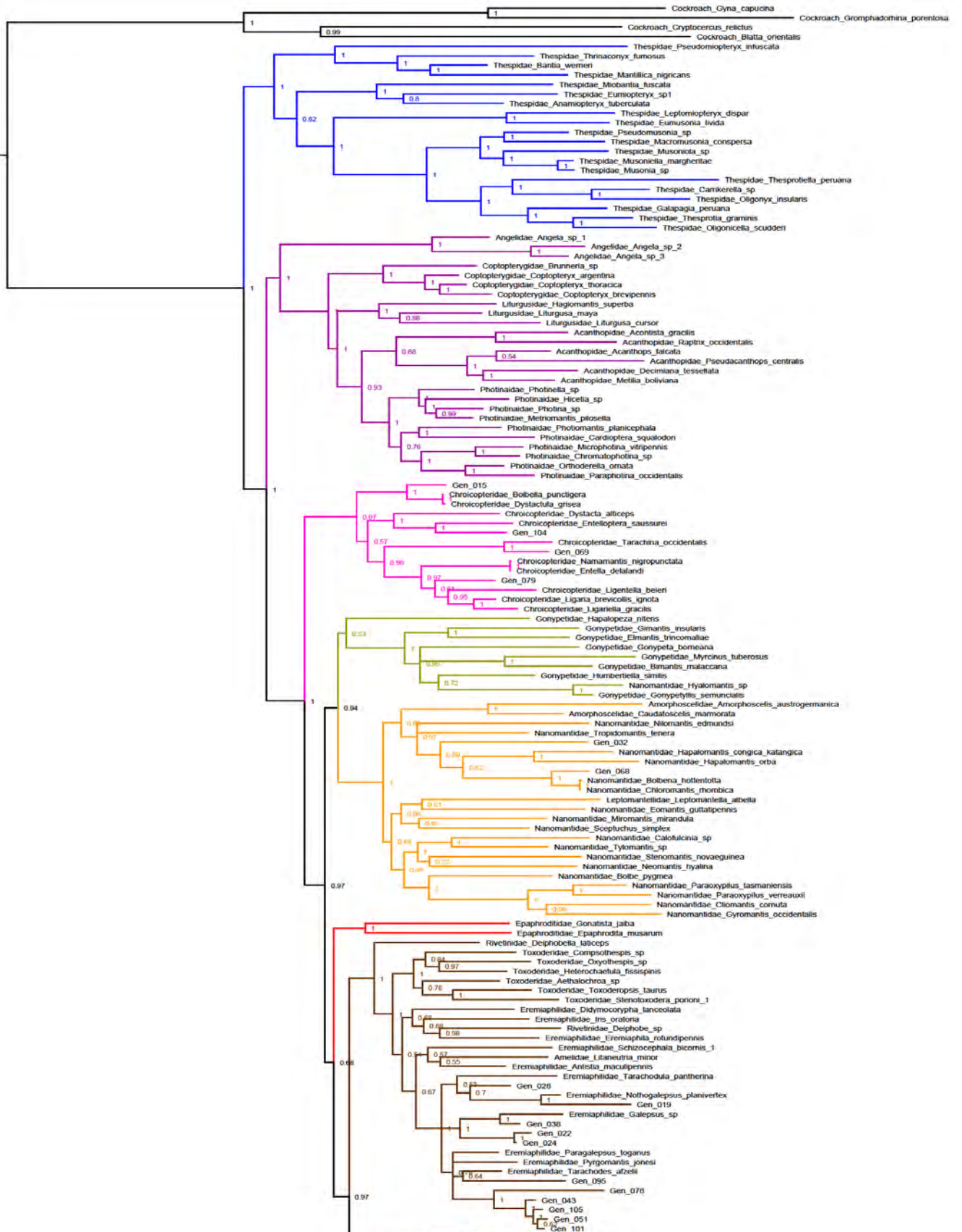
Taxon List	African Distribution
<i>rhombrica</i> Giglio-Tos, 1915	Tanzania, South Africa, Zimbabwe
Cornucollis Brannoch & Svenson, 2016	
<i>masoalenis</i> Brannoch & Svenson, 2016	Madagascar
Enicophlebia Westwood, 1889	
<i>hilara</i> Saussure & Zehntner, 1895	Madagascar
<i>pallida</i> Westwood, 1889	Madagascar
Hyalomantis Giglio-Tos, 1915	
<i>antsingica</i> Svenson & Roy, 2011	Madagascar
<i>madagascariensis</i> Saussure, 1870	Madagascar
= <i>H. punctata</i> Giglio-Tos, 1915	
<i>murzini</i> Svenson & Roy, 2011	Madagascar
<i>whitingi</i> Svenson & Roy, 2011	Madagascar
Ilomantis Giglio-Tos, 1915	
<i>thalassina</i> Saussure, 1899	Madagascar
Melomantis Giglio-Tos, 1915	
<i>africana</i> Werner, 1906	Kenya, Sierra Leone, Tanzania
<i>asema</i> Beier, 1969	Malawi
Negromantis Giglio-Tos, 1915	
= <i>Luteomantis</i> Sjöstedt, 1924	
= <i>Mimomantis</i> Giglio-Tos, 1915	
<i>gracilus</i> Giglio-Tos, 1915	Cameroon, Madagascar, Central African Republic
<i>gracillima</i> Kaltenbach, 1996	Rwanda, South Africa, Zambia, Zimbabwe
<i>lutescens</i> Sjöstedt, 1900	Cameroon, Central African Republic
<i>modesta</i> Giglio-Tos, 1915	Cameroon, Gabon, Ghana, Ivory Coast
Nilomantis Werner, 1907	
= <i>Cryptomantis</i> Giglio-Tos, 1915	
<i>edmundsi</i> Roy & Leston, 1975	Ghana, South Africa
<i>floweri</i> Werner, 1907	Chad, Ethiopia, Mauritania, Niger, Sudan
= <i>H. arabica</i> Beier, 1930	
= <i>H. tenella</i> Giglio-Tos, 1915	
Platycalymma Westwood, 1889	
= <i>Ichromantis</i> Paulian, 1957	
<i>annulicornis</i> Roy & Svenson, 2011	Madagascar
<i>befasica</i> Paulian, 1957	Madagascar
<i>dichroica</i> Paulian, 1957	Madagascar
<i>latipennis</i> Westwood, 1889	Madagascar
<i>mahafalica</i> Roy & Svenson, 2011	Madagascar
<i>viettei</i> Roy & Svenson, 2011	Madagascar
RIVETINIDAE Ehrmann & Roy, 2002	
Rivetiniinae Ehrmann & Roy, 2002	

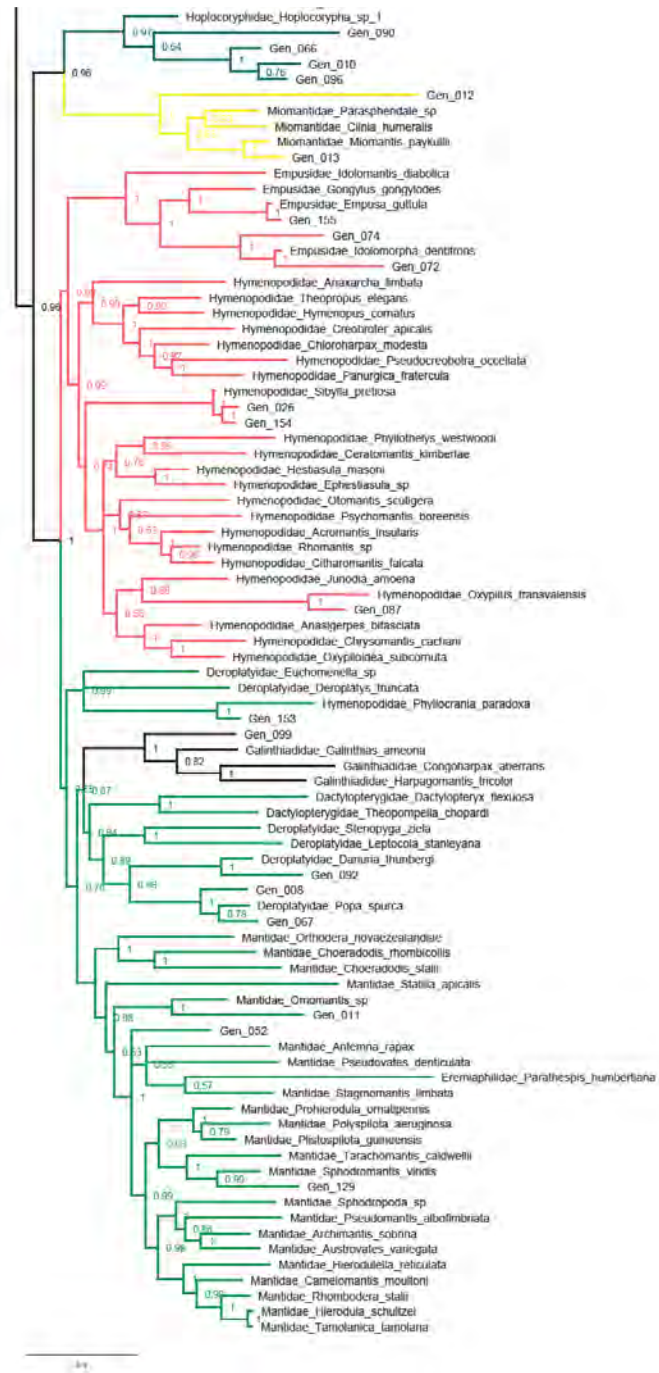
Taxon List	African Distribution
Ischnomantini Giglio-Tos, 1916	
<i>Eremoplana</i> Stål, 1877	
<i>guerini</i> Reiche & Fairmaire, 1847	Ethiopia
<i>infelix</i> Uvarov, 1924	Egypt
= <i>E. ocellata</i> Uvarov, 1924	
<i>Ischnomantis</i> Stål, 1877	
<i>aethiopica</i> Giglio-Tos, 1916	Ethiopia, Somalia
<i>fasciata</i> Giglio-Tos, 1916	Egypt, Ethiopia
<i>fatiloqua</i> Stål 1856	Angola, Congo, Namibia, South Africa, Zimbabwe
<i>flavescens</i> Chopard, 1940	Chad
<i>gigas</i> Saussure, 1870	Burkina Faso, Cameroon, Mauretanius, Senegal, Sudan, Togo
<i>gracilis</i> Giglio-Tos, 1916	Kenya, Somalia
<i>grandis</i> Saussure, 1869	Kenya, Somalia, South Africa
<i>media</i> Rehn, 1901	Ethiopia, Kenya, Somalia
<i>perfida</i> , Guérin-Méneville, 1849	Ethiopia, Egypt, Sudan
= <i>I. attarensis</i> Werner, 1907	
<i>spinigera</i> Schulthess-Schindler, 1898	Ethiopia, Kenya, Somalia, Uganda
<i>usambarica</i> Sjöstedt, 1909	Tanzania
<i>wernerii</i> Giglio-Tos, 1916	Burkina Faso, Cameroon, Guinea, Togo
Rivetinini Ehrmann & Roy	
<i>Geomantis</i> Pantel, 1896	
<i>algerica</i> Giglio-Tos, 1916	Algeria
<i>larvoides</i> Pantel, 1896	Morocco, Tunisia, North Africa
<i>Microthespis</i> Werner, 1908	
<i>dmitriewi</i> Werner, 1908	Ethiopia, Somalia
<i>Rivetina</i> Berland & Chopard, 1922	
= <i>Eufishcheriella</i> Giglio-Tos, 1927	
= <i>Fisheria</i> Saussure, 1869	
= <i>Kinzelbachia</i> Harz, 1988	
<i>baetica baetica</i> Rambur, 1839	Libya
<i>baetica tenuidentata</i> La Greca & Lombardo, 1982	Algeria, Egypt, Libya, Morocco, Senegal, Tunisia
<i>grandis</i> Saussure, 1872	Guinea
TOXODERIDAE Saussure, 1869	
Compothespinae Giglio-Tos, 1913	
Compothespini Giglio-Tos, 1913	
<i>Compothespis</i> Saussure, 1872	
<i>abyssinica</i> Beier, 1961	Ethiopia
<i>anomala</i> Saussure, 1872	South Africa

Taxon List	African Distribution
<i>brevipennis</i> Lombardo, 1989	Somalia
<i>cinnabarina</i> Beier, 1955	South Africa
<i>ebneri</i> Werner, 1918	Sudan
<i>falcifera</i> Rehn, 1901	Kenya, Somalia
<i>hispida</i> Beier, 1954	Uganda
<i>kilwana</i> Giglio-Tos, 1913	South Africa
<i>marginipennis</i> Werner, 1917	Somalia, Tanzania
<i>michaelseni</i> Werner, 1923	Namibia, South Africa
<i>natalica</i> Westwood, 1889	South Africa
<i>occidentalis</i> Sjöstedt, 1930	Burkina Faso, Ghana, Guinea, Ivory Coast, Upper Volta
<i>zavattarii</i> La Greca, 1939	Ethiopia
Heterochaetinae Brunner de Wattenwyl, 1893	
Heterochaetini Brunner de Wattenwyl, 1893	
<i>Heterochaeta</i> Westwood, 1843	
= <i>Pseudochaeta</i> Kirby, 1904	
= <i>Stenovates</i> Saussure, 1872	
<i>bernardii</i> Roy, 1973	Angola, Cameroon, Congo, Gabon, Nigeria
<i>girardi</i> Roy, 1975	Ghana, Ivory Coast, Nigeria
<i>kumari</i> Roy, 1975	Ghana, Ivory Coast, Kenya, Nigeria, Senegal, Uganda
<i>lamellosa</i> Roy, 1976	Somalia
<i>occidentalis</i> Beier, 1963	Botswana, Kenya, Namibia, South Africa
<i>orientalis</i> Gerstaecker, 1883	Ethiopia, Kenya, Somalia, Sudan, Tanzania
<i>pantherina</i> Saussure, 1872	Angola, Egypt, Guinea, Niger, Somalia, Sudan
<i>reticulata</i> Roy, 1976	Congo, Tanzania, Zimbabwe
<i>strachani</i> Kirby, 1904	Benin, Burkina Faso, Ghana, Guinea, Mali, Nigeria, Liberia, Senegal, Sierra Leone
= <i>H. spectrum</i> Rehn, 1949	
<i>tenuipes</i> Westwood, 1841	Angola, Burkina Faso, Cameroon, Congo, Mauretania, Senegal
<i>zavattarii</i> La Greca, 1951	Ethiopia, Kenya, Tanzania
Oxyothespinae Giglio-Tos, 1916	
Oxyothespini Giglio-Tos, 1916	
<i>Acithespis</i> Giglio-Tos, 1916	
<i>gigas</i> Giglio-Tos, 1916	Burkina Faso, Gambia, Nigeria, Senegal
<i>Oxyothespis</i> Saussure, 1870	
= <i>Oxythespis</i> Saussure, 1871	
<i>acuticeps</i> Sjöstedt, 1930	Angola, Congo
<i>alata</i> Chopard, 1950	Niger
<i>brevicollis</i> Beier, 1930	Ethiopia

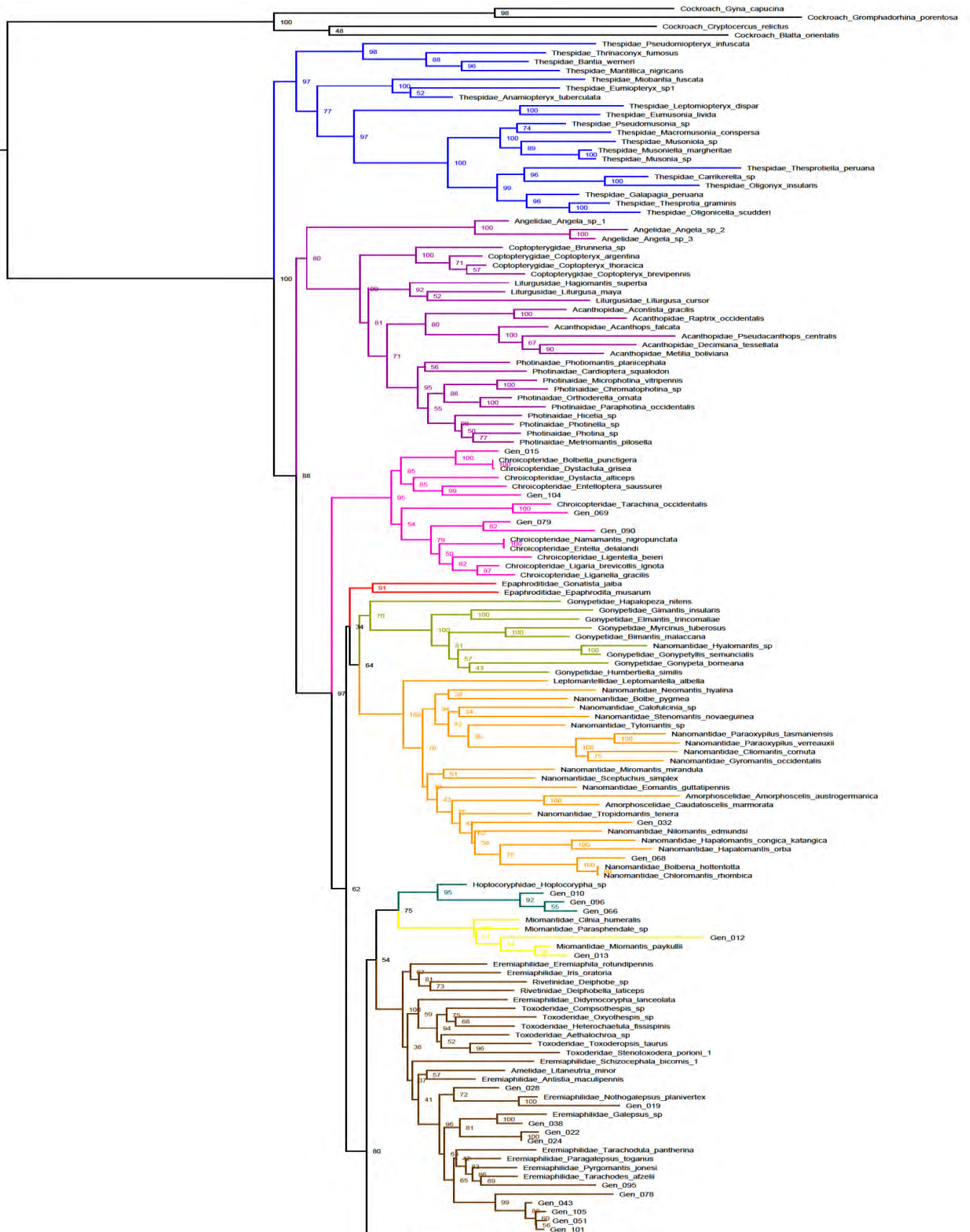
Taxon List	African Distribution
<i>brevipennis</i> Beier, 1930	Ivory Coast, Ghana
<i>dumonti</i> Beier, 1930	Ivory Coast, Ghana
<i>flavipennis</i> Chopard, 1941	Senegal
<i>longicollis</i> Beier, 1931	Ivory Coast, Kenya, Somalia
<i>longipennis</i> Chopard, 1941	Burkina Faso, Ghana, Ivory Coast, Mali, Nigeria
<i>mammilata</i> Sjöstedt, 1930	Ethiopia
<i>maroccana</i> Bolívar, 1908	Morocco
<i>meridionalis</i> Kaltenbach, 1996	Angola, Botswana
<i>nilotica nilotica</i> Giglio-Tos, 1916	Algeria, Chad, Morocco, Sudan
<i>noctivaga</i> La Greca, 1952	Ethiopia, Somalia
<i>parva</i> Beier, 1935	Ethiopia, Kenya, Somalia
<i>pellucida</i> Chopard, 1938	Kenya
<i>senegalensis</i> Saussure, 1870	Algeria, Cameroon, Chad, Libya, Senegal
<i>sudanensis</i> Giglio-Tos, 1916	Ethiopia, Sudan
<i>tricolor</i> Chopard, 1941	Libya
<i>villiersi</i> Chopard, 1950	Sudan
Paraseverinia Lombardo, 1991	
<i>finoti</i> Chopard, 1943	Algeria, Libya, Morocco
Severinia Finot, 1902	
<i>granulata</i> Saussure, 1870	Algeria, Kenya, Mauretania, Morocco, Niger, Senegal, Tunisia
<i>lemoroi</i> Finot, 1893	Algeria, Libya, Morocco, Tunisia
<i>ullrichi</i> Ehrman, 1996	Egypt
Sinaiella Uvarov, 1924	
<i>nebulosa</i> Uvarov, 1924	Egypt
Somalithespis Lombardo, 1991	
<i>minor</i> Giglio-Tos, 1916	Ethiopia, Somalia
Toxoderinae Saussure, 1869	
Aethalochroini Giglio-Tos, 1914	
Pareuthyphlebs Werner, 1928	
= <i>Xenomantis</i> Uvarov, 1939	
<i>somalica</i> Beier, 1930	Somalia
<i>uvarovi</i> La Greca, 1952	Somalia
Calamothespini Giglio-Tos, 1914	
Belomantis Giglio-Tos, 1914	
<i>helenae</i> Giglio-Tos, 1914	Angola, Burkina Faso, Ivory Coast, Togo
Calamothespis Werner, 1907	
= <i>Dorymantis</i> Giglio-Tos, 1914	
<i>adusta</i> Werner, 1907	Burkina Faso, Sudan, Togo, Zimbabwe
<i>aspoeckorum</i> Roy & Stiewe, 2016	Namibia

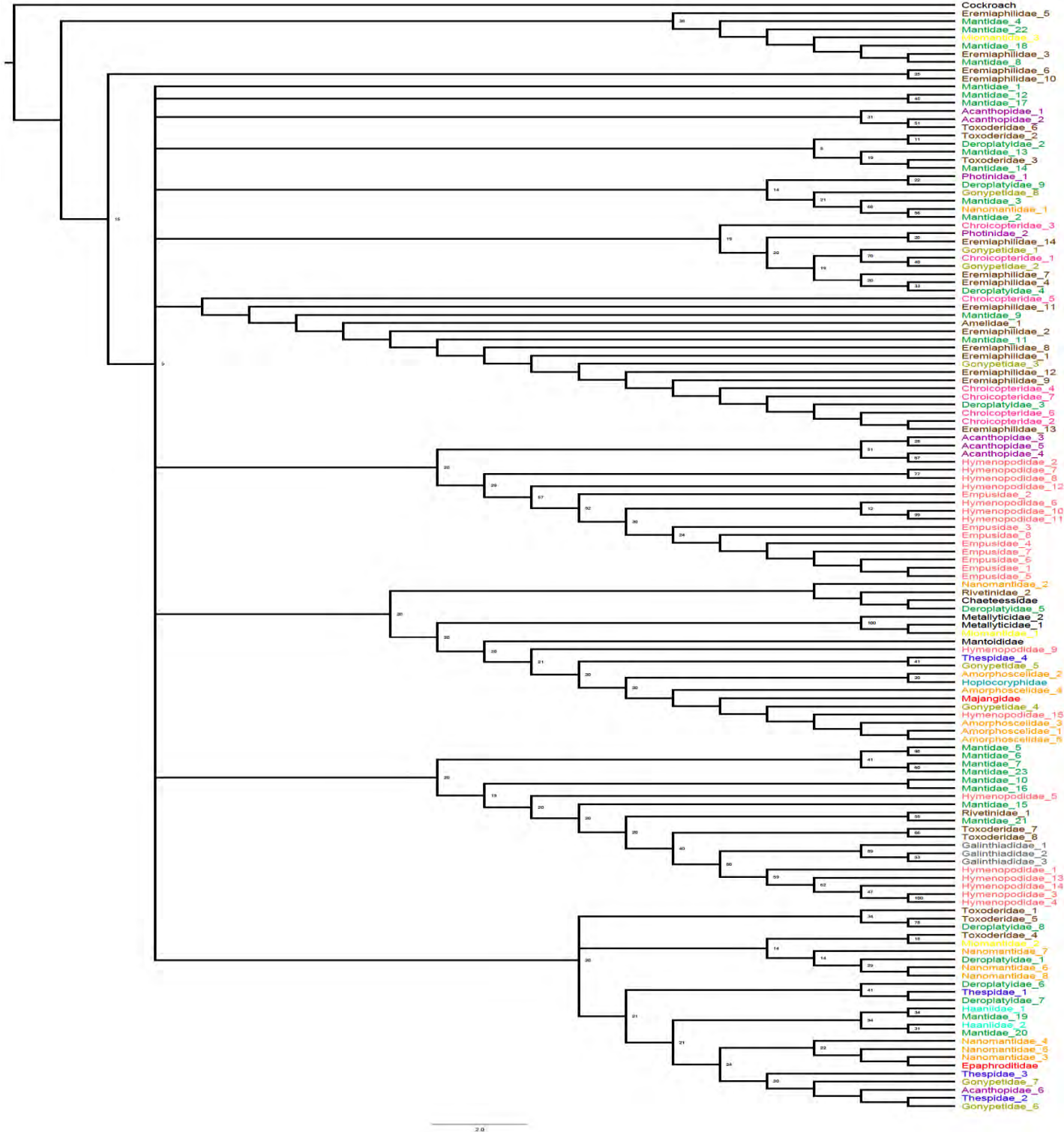
Taxon List	African Distribution
<i>condamini</i> Roy, 1969	Burkina Faso, Ghana, Ivory Coast, Senegal, Togo
<i>congica</i> Giglio-Tos, 1914	Congo
<i>guineensis</i> Roy & Stiewe, 2016	Guinea
<i>kibwezianus</i> Roy & Stiewe, 2016	Kenya
<i>lesnei</i> Roy & Stiewe, 2016	Mozambique
<i>lineatipennis</i> Werner, 1923	Namibia
<i>nathani</i> Roy & Stiewe, 2016	Zambia
<i>oxyops</i> Rehn, 1927	South Africa
<i>prosti</i> Roy & Stiewe, 2016	Burkina Faso
<i>rourei</i> Chopard, 1941	Chad
<i>subcornuta</i> La Greca, 1952	Somalia
<i>tanzaniensis</i> Roy & Stiewe, 2016	Tanzania
<i>taylori</i> La Greca, 1952	Somalia
<i>vansoni</i> Roy & Stiewe, 2016	South Africa
<i>vuattouxi</i> Gillon & Roy, 1968	Ivory Coast





Appendix 2.1. Molecular phylogeny produced from the Bayesian Inference analysis based on four genes, showing nodal support. Families and species are indicated on branch terminals, branches are coloured by superfamily as per Fig 2.2, and individuals from this study are marked with an asterisk (*).

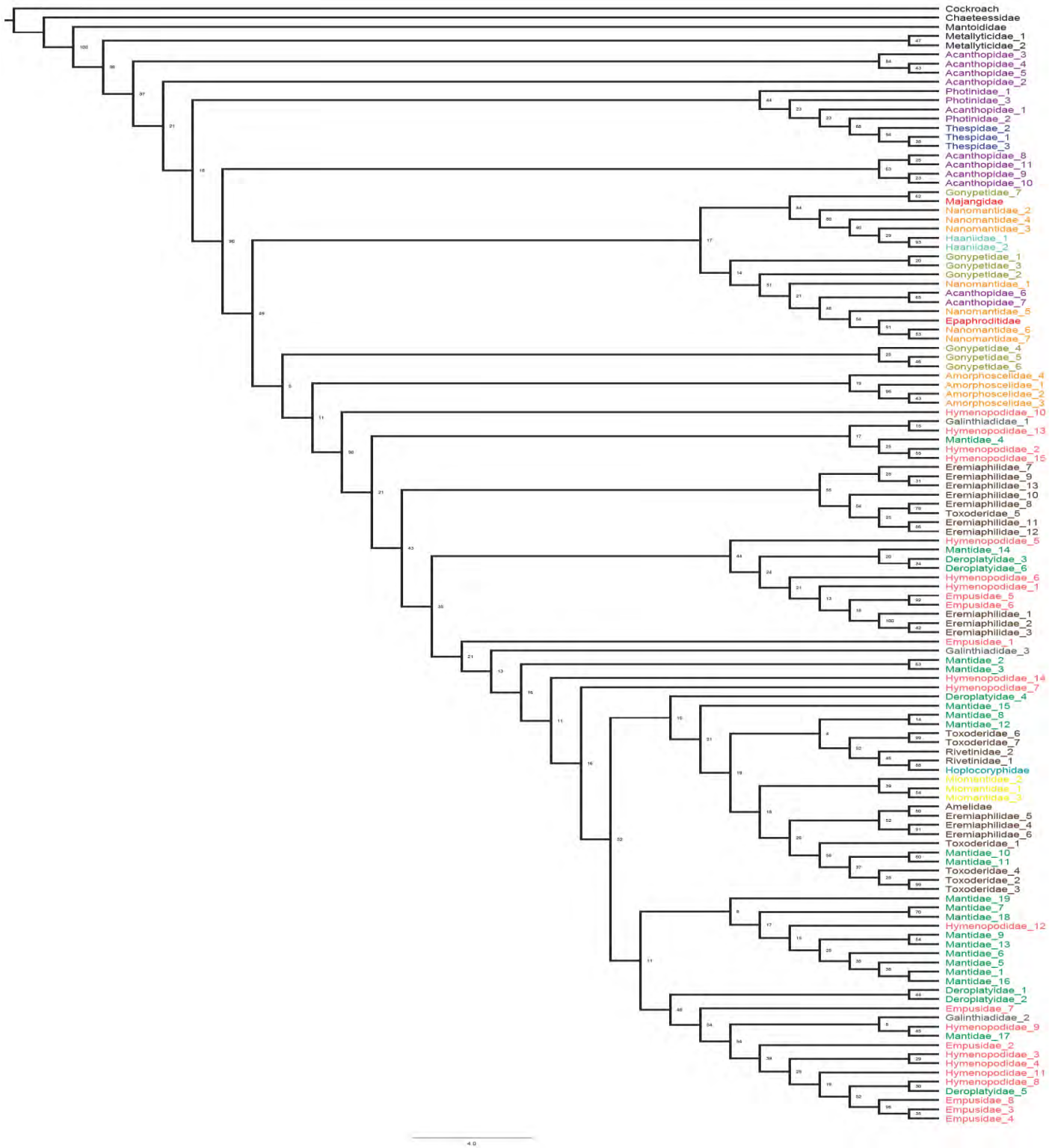




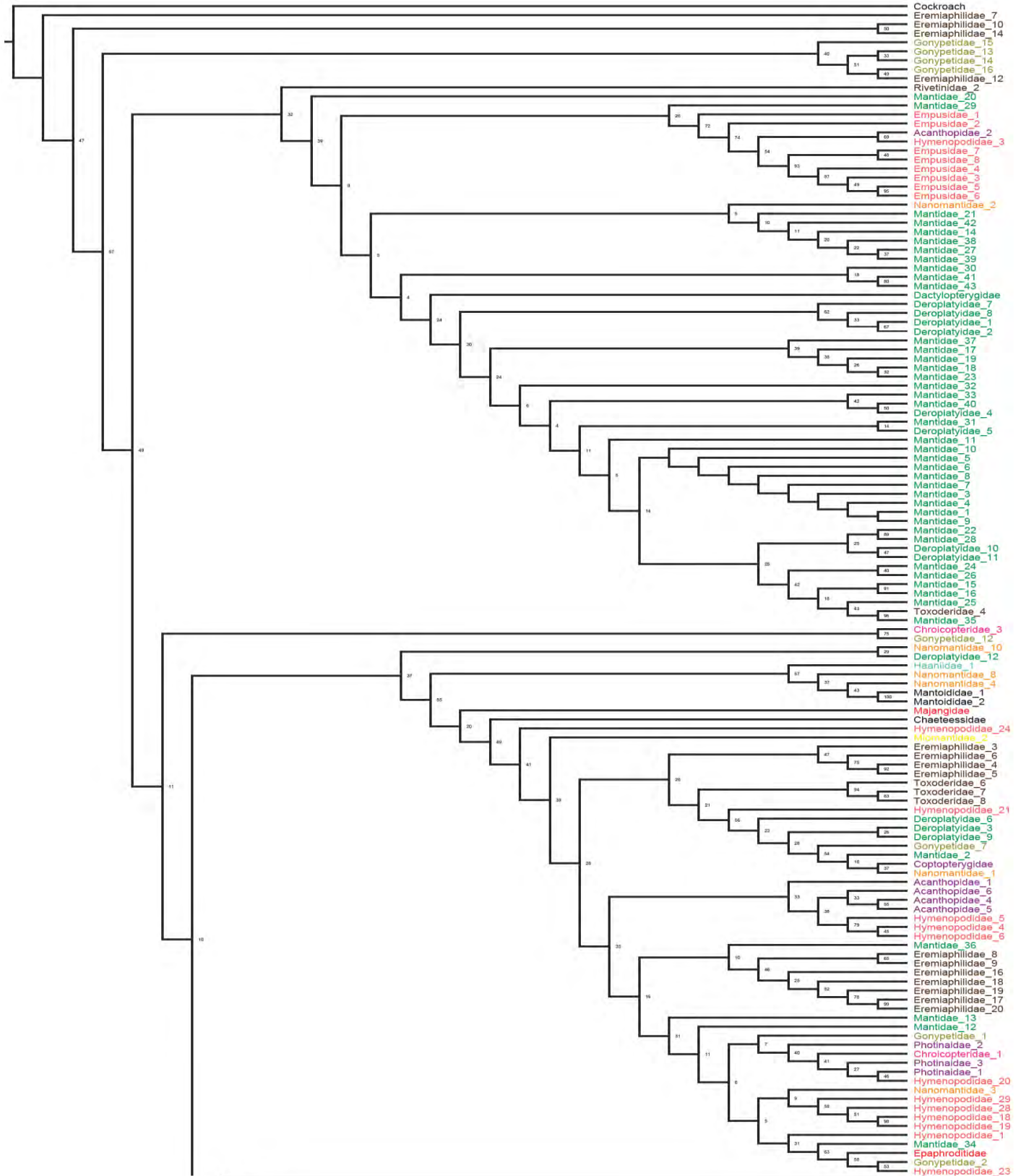
Appendix 3.1. Consensus bootstrap based on 15 morphological characteristics of the head. Families are indicated on branch terminals and branches are coloured by superfamily as per Fig 2.2 (following Schwarz and Roy (2019)).

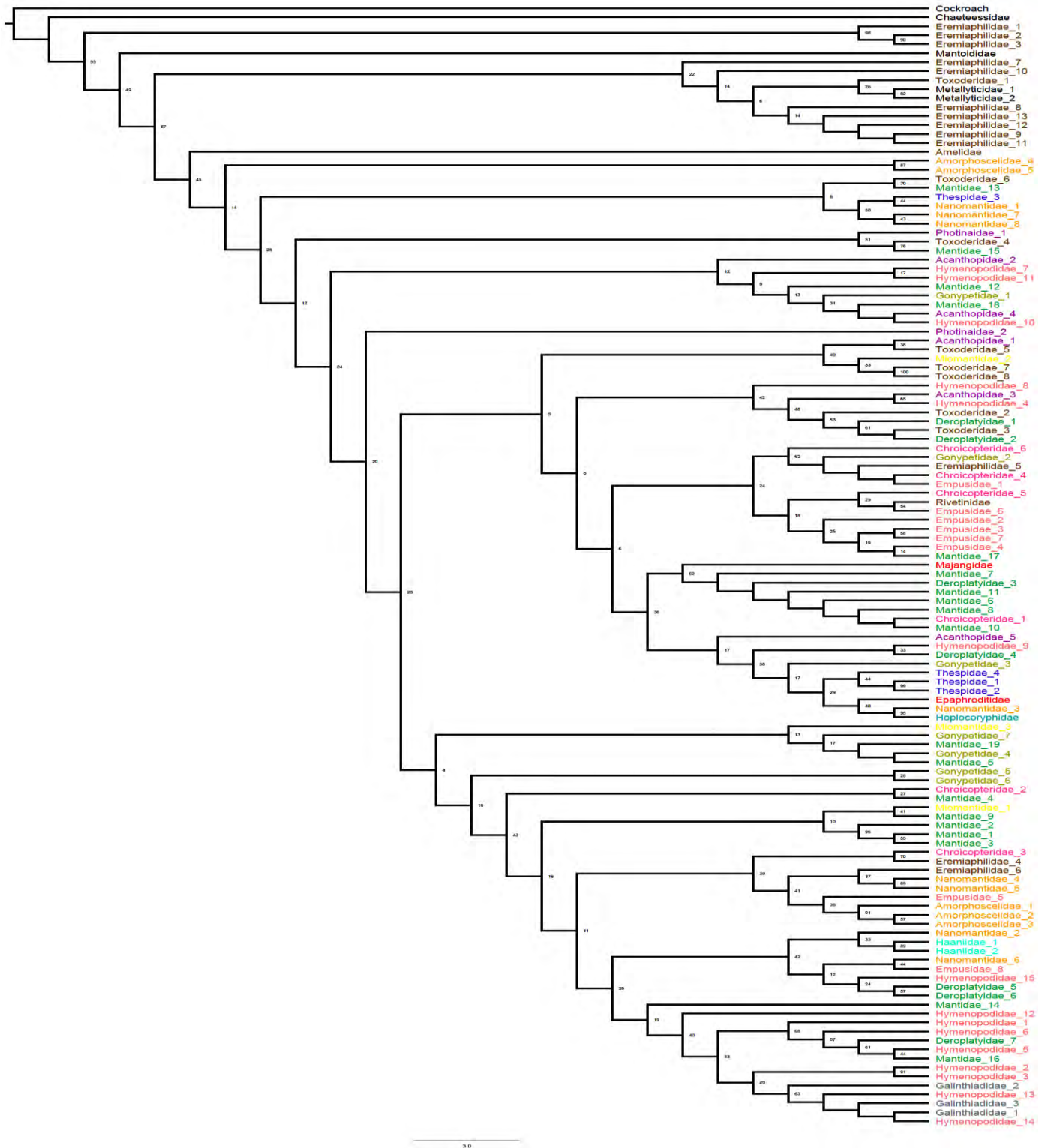


Appendix 3.2. Consensus bootstrap based on 12 morphological characteristics of the thorax. Families are indicated on branch terminals and branches are coloured by superfamily as per Fig 2.2 (following Schwarz and Roy (2019)).



Appendix 3.3. Consensus bootstrap based on 32 morphological characteristics of the abdomen. Families are indicated on branch terminals and branches are coloured by superfamily as per Fig 2.2 (following Schwarz and Roy (2019)).





Appendix 3.5. Consensus bootstrap based on 18 morphological characteristics of the walking legs. Families are indicated on branch terminals and branches are coloured by superfamily as per Fig 2.2 (following Schwarz and Roy (2019)).



Appendix 3.6. Consensus bootstrap based on 29 morphological characteristics of the wings. Families are indicated on branch terminals and branches are coloured by superfamily as per Fig 2.2 (following Schwarz and Roy (2019)).

Appendix 3.7. Family descriptions of current mantodean families. A character matrix coding for 149 morphological characters of 248 species was used to represent the ~2500 praying mantis species globally. Terminology follows Brannoch et al (2017).

CHAETEESIDAE

HEAD. Vertex lacking median head process; lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge strongly rounded or angled; not folded transversely; lacking ridges. Clypeus lacking ridges; folded transversely; juxtaocular bulges missing. Compound eye oval to globular; strong lateral bulging; lacking non-visual elongation.

THORAX. Ventral cervical sclerites present as one element. Intercervical sclerite lacking median connection; not forming torus intercervicals. Prosternum with basisternite and pre-episternites fused into short T-shaped sclerite that is not elongated into a plate. Pronotum longer than wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature covering caudal part of head at most; lamellar expansions narrower at widest point than half the width of pronotum at supracoxal furrow; prozone longer than half of length of metazone. External hearing organ absent.

FORELEGS. F= 2 DS/13-19 AvS/6+ PvS; T= 13-15 AvS/4-7 PvS. Coxa anterodistal apical lobes diverging; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove at base of femur; femoral brush flat (at most slightly elevated); setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines distinctly alternating positions, therefore standing in two distinct rows. Posteroventral spines positioned evenly on ventral surface of femur; all strongly elongated and surpassing the tibia when leg is folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines flanking a ventral depression for accommodating the distal posteroventral spine of the tibia when leg is folded; first two spines closer together than remaining spines. Proximal (or only) discoidal spine not standing on elevated socket. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur absent or forming a thickened seta-like spine. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows. Anteroventral spines becoming longer distally (becoming short in the distal third and increasing in length again); distal two or three spines inserting ventrally and pointing ventro-apicad.

Posteroventral spines becoming longer distad in the proximal third, then becoming short and increasing in length again; resembling anteroventral tibial spines. Tarsomere 1 no longer than remaining tarsomeres collectively; shorter than fore tibia.

WALKING LEGS. Genicular spine present; meso- and metafemur lacking lobe-like expansions; bearing articulated spines; meso- and metatibia lacking lobe-like expansions; bearing articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively; metatarsomere 1 the same length as or longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 without deep v-shaped notch or lateral spreading; ta2-ta4 with proximal elongation; ta4 enlarged compared to previous tarsomere (1.5x longer); ta5 without medial euplantula (a narrow longitudinal ventral suture at most). Ungues equally long; shorter than tarsomere ta5.

WINGS. Males and females macropterous. Forewings have a pseudo-vein; lacking ventral teeth on costal rim; main veins at least partially sigmoid (with two inflections). RA distal anterior branching towards C; not fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; not reaching posterior wing margin (vanishing early in wing membrane or fusing with other veins); remigulum not crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 4–5 branches.

ABDOMEN. Female tergites lacking lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions; sternites lacking lateral lobe-like expansions. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci strongly flattened as a whole or at least in distal half; distal cercomere smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated and conical, or slightly flattened).

Male genitalia, pda membranous; situated at apex of ventral phallomere; secondary distal process missing; paa missing; pda and paa fused; afa missing; afa lobes absent; afa flagellum missing; membrane not pilose; left phallomere partially sclerotized; without proximal lobe on right side of ventral phallomere; right phallomere with no or indistinct pilosity; ventral ridge of right phallomere not elongated.

MANTOIDIDAE

HEAD. Vertex lacking median head process; lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge strongly rounded or angled; not folded

transversely; lacking ridges. Clypeus lacking ridges; folded transversely; juxtaocular bulges missing. Compound eye oval to globular; strong lateral bulging; lacking non-visual elongation.

THORAX. Ventral cervical sclerites missing. Intercervical sclerite lacking median connection; not forming torus intercervicals. Prosternum with basisternite and pre-episternites fused into short T-shaped sclerite that is not elongated into a plate. Pronotum longer than wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature covering caudal part of head at most; lamellar expansions narrower at widest point than half the width of pronotum at supracoxal furrow; prozone longer than half of length of metazone. External hearing organ absent.

FORELEGS. F= 3 DS/13-19 AvS/4 PvS; T= 6-12 AvS/4-7 PvS. Coxa anterodistal apical lobes diverging; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove at base of femur; femoral brush flat (at most slightly elevated); setae of femoral brush standing far apart with area of grooming device not clearly defined. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines almost equal or only slightly alternating; proximal 5–10 spines distinctly alternating positions, therefore standing in two distinct rows. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines not separated by a depression; first two spines spaced evenly with remaining spines. Proximal (or only) discoidal spine standing on elevated socket; if 3 discoidal spines are present, then 1, 2 and 3 becoming gradually shorter; proximal two spines not standing closer together compared to remaining discoidal spine; distal two spines not standing closer together compared to remaining discoidal spine. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apicad. Posteroventral spines nearly equally long; resembling anteroventral tibial spines. Tarsomere 1 longer than remaining tarsomeres collectively; equal to or longer than fore tibia.

WALKING LEGS. Genicular spine present; meso- and metafemur lacking lobe-like expansions; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively; metatarsomere 1 no longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 without deep v-shaped notch or lateral spreading; ta2-ta4 with proximal elongation; ta4 similar size to ta3 (<1.5x as long); ta5 without medial euplantula (a narrow longitudinal ventral suture at most). Ungues equally long; shorter than tarsomere ta5.

WINGS. Males and females macropterous. Forewings have a pseudo-vein; lacking ventral teeth on costal rim; main veins distally bent or nearly straight (with one inflection). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; not reaching posterior wing margin (vanishing early in wing membrane or fusing with other veins); remigulum not crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 2–3 branches. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP at least partially sigmoid (with two inflections); A2 absent. Male RA not branched; CuA branching; anal veins with 5 to 8 anal veins (branches of A3 not counted individually); A3 branching once or twice. Female RA not branched; CuA branching; anal veins with 5 and 8 anal veins (including A1, branches of A3 not counted individually); A3 branched once or twice.

ABDOMEN. Supra-anal plate wider than long, transverse; lacking ridge; rounded or almost semicircular, possibly slightly pointed. Female tergites lacking lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions; sternites lacking lateral lobe-like expansions. Male coxosternite 9 asymmetrical; lacking dorsal process; bearing stylus. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci entirely cylindrical or at most only terminal cercomere flattened; distal cercomere smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated and conical, or slightly flattened).

Male genitalia situated at apex of ventral phallomere; secondary distal process missing; pda and paa fused; afa broad, triangular or sinuous, spiny; afa lobes simple; afa flagellum present; membrane not pilose; left phallomere partially sclerotized; without proximal lobe on right side of ventral phallomere; right phallomere with no or indistinct pilosity; ventral ridge of right phallomere not elongated.

METALLYTICOIDEA

HEAD. Vertex lacking median head process; lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge strongly rounded or angled; strongly folded transversely (nearly 90°); lacking ridges. Clypeus lacking ridges; folded transversely; juxtaocular bulges missing. Compound eye oval to globular; strong lateral bulging; lacking non-visual elongation.

THORAX. Ventral cervical sclerites missing. Intercervical sclerite lacking median connection; forming torus intercervicals. Prosternum with basisternite and pre-episternites fused into short T-shaped sclerite that is not elongated into a plate. Pronotum longer than wide (excluding lateral lamellar expansions); with edges

not merging smoothly with dorsal edge of fore femur; anterior duplicature covering caudal part of head at most; lamellar expansions narrower at widest point than half the width of pronotum at supracoxal furrow; prozone longer than half of length of metazone. External hearing organ absent; missing in male; missing in female.

FORELEGS. F= 1 DS/6-12 AvS/4 PvS; T= 6-12 AvS/4-7 PvS. Coxa anterodistal apical lobes diverging; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove at base of femur; femoral brush distinctly elevated; setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines almost equal or only slightly alternating; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternatingly cranial or caudal. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine several times longer and much thicker than remaining spines; proximal posteroventral spines not separated by a depression; first two spines closer together than remaining spines. Proximal (or only) discoidal spine not standing on elevated socket. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apical. Posteroventral spines becoming longer distad; resembling anteroventral tibial spines. Tarsomere 1 no longer than remaining tarsomeres collectively; shorter than fore tibia.

WALKING LEGS. Genicular spine present; meso- and metafemur lacking lobe-like expansions; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively; metatarsomere 1 the same length as or longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 with deep v-shaped notch and lateral spreading; ta2-ta4 with proximal elongation; ta4 similar size to ta3 (< 1.5 x as long); ta5 without medial euplantula (a narrow longitudinal ventral suture at most). Ungues equally long; shorter than tarsomere ta5.

WINGS. Males and females macropterous. Forewings have a pseudo-vein; lacking ventral teeth on costal rim; main veins at least partially sigmoid (with two inflections). RA distal anterior branching towards C; not fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA; CuA with 9 or more branches. A1 branched; almost or entirely reaching

posterior wing margin; remigulum not crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 6 or more branches. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP at least partially sigmoid (with two inflections). Male RA branching; CuA branching; anal veins with 8 or more anal veins (branches of A3 not counted individually); A3 branching 3–4 times. Female RA branching; CuA branching; anal veins with 5 and 8 anal veins (including A1, branches of A3 not counted individually); A3 branched 3–4 times.

ABDOMEN. Supra-anal plate wider than long, transverse; lacking ridge; almost rectangular. Female tergites lacking lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions; sternites lacking lateral lobe-like expansions. Male coxosternite 9 asymmetrical; lacking dorsal process; bearing stylus. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci entirely cylindrical or at most only terminal cercomere flattened; distal cercomere smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated and conical, or slightly flattened).

Male genitalia with one secondary distal process present; pda and paa not fused; afa long, acute and curved; afa lobes simple; afa flagellum present; membrane not pilose; left phallomere fully sclerotized; without proximal lobe on right side of ventral phallomere; right phallomere with no or indistinct pilosity; ventral ridge of right phallomere not elongated.

THESPIDAE

HEAD. Vertex lacking median head process; lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge straight or slightly rounded, or strongly rounded or angled; not folded transversely; lacking ridges. Clypeus lacking ridges; folded transversely; juxtaocular bulges missing, or present. Compound eye oval to globular; strong lateral bulging; lacking non-visual elongation.

THORAX. Ventral cervical sclerites present as two elements. Intercervical sclerite with median connection; forming torus intercervical, or not forming. Prosternum with basisternite and pre-episternites fused into T-shaped sclerite that is cranially elongated into a post-cervical plate. Pronotum at least twice as long as wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoxal furrow, or as wide at widest point as, or wider than, half the width of

pronotum at supracoxal furrow; prozone longer than half of length of metazone, or shorter than half of length of metazone. External hearing organ absent.

FORELEGS. F= 3-4 DS/6-12 AvS/1-4 PvS; T= 1-5 AvS/1-3 PvS. Coxa anterodistal apical lobes diverging, or closed, with overlapping medial edges; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove medially on anterior surface of femur, or distally of middle of femur; femoral brush flat (at most slightly elevated), or distinctly elevated; setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternately craniad or caudad. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines not separated by a depression; first two spines spaced evenly with remaining spines. Proximal (or only) discoidal spine not standing on elevated socket; if four discoidal spines are present, then 1 and 4 short (or of equal length), 2 longer, and 3 longest; proximal two spines not standing closer together compared to remaining discoidal spines; distal 2 spines not standing closer together compared to remaining discoidal spines; if 3 discoidal spines are present, then 1 short, 3 being longer and 2 longest, or 2 distinctly longer than 1, with 3 shortest; proximal two spines not standing closer together compared to remaining discoidal spine; distal two spines not standing closer together compared to remaining discoidal spine. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two rows (only a few spines distal spines shifted dorsad). Anteroventral spines alternating irregularly long, or spines irregularly positioned on tibia or only a single spine present; distal two or three spines inserting anteriorly to dorsally and distinctly pointing dorso-apicad. Posteroventral spines irregularly positioned on tibia or only a single spine present. Tarsomere 1 longer than remaining tarsomeres collectively; equal to or longer than fore tibia.

WALKING LEGS. Genicular spine absent; meso- and metafemur lacking lobe-like expansions; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 the same length as or longer than remaining tarsomeres collectively; metatarsomere 1 the same length as or longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 without deep v-shaped notch or lateral spreading, or with deep v-shaped notch and lateral spreading; ta2-ta4 with proximal elongation;

ta4 enlarged compared to ta3 (1.5x longer); ta5 without medial euplantula (a narrow longitudinal ventral suture at most). Ungues equally long; shorter than tarsomere ta5.

WINGS. Males macropterous, or brachypterous and females apterous. Forewings have an elongated stigma; lacking ventral teeth on costal rim; main veins distally bent or nearly straight (with one inflection). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; not reaching posterior wing margin (vanishing early in wing membrane or fusing with other veins); remigulum not crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 2–3 branches, or with 4–5 branches. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP not sigmoid (slightly curved or straight); A2 absent. Male RA not branched; CuA branching; anal veins with 5 to 8 anal veins (branches of A3 not counted individually); A3 branching once or twice.

ABDOMEN. Supra-anal plate longer than wide, elongated; with ridge; nearly triangular. Female tergites lacking lateral lobe-like expansions, or with lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims, or with dorsal lobe-like expansions (or distinctly pulled-out posterior rims). Sternites lacking ventral lobe-like expansions, or with ventral lobe-like expansions; sternites lacking lateral lobe-like expansions. Male coxosternite 9 asymmetrical; lacking dorsal process; bearing stylus. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci entirely cylindrical or at most only terminal cercomere flattened, or strongly flattened as a whole or at least in distal half; distal cercomere smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated and conical, or slightly flattened).

Male genitalia with one secondary distal process present; pda and paa not fused; afa long, acute and curved; afa lobes simple; afa flagellum present; membrane not pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere (not elongated); right phallomere with no or indistinct pilosity; ventral ridge of right phallomere not elongated.

ANGELIDAE

THORAX. Pronotum at least twice as long as wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoxal furrow; prozone longer than half of length of metazone. External hearing organ absent.

FORELEGS. F= 4 DS/1-5 AvS/5-6 PvS; T= ? AvS/4-7 PvS. Tibial spur groove on anterior surface in proximal third of femur; setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternately craniad or caudad. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines. Proximal (or only) discoidal spine not standing on elevated socket. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. With spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apicad. Posteroventral spines becoming longer distad.

WALKING LEGS. Genicular spine present; meso- and metafemur lacking lobe-like expansions; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Euplantulae of tarsomeres ta4 enlarged compared to ta3 (1.5x longer).

WINGS. Females brachypterous. Forewings have an elongated stigma; lacking ventral teeth on costal rim. RA distal anterior not branched; fused with RP. A2 absent.

ABDOMEN. Supra-anal plate wider than long, transverse; nearly triangular. Female tergites lacking lateral lobe-like expansions. Cerci strongly flattened as a whole or at least in distal half.

Male genitalia with one secondary distal process present; pda and paa not fused; afa long, acute and curved; afa lobes simple; afa flagellum present; membrane not pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with no or indistinct pilosity; ventral ridge of right phallomere not elongated.

COPTOPTERYGIDAE

THORAX. Pronotum at least twice as long as wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoxal furrow; prozone longer than half of length of metazone. External hearing organ absent.

FORELEGS. Lacking much data on foreleg spination, this family has three discoidal and five posteroventral spines on the fore femur. Setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternatingly craniad or caudad. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines. Proximal (or only) discoidal spine not standing on elevated socket. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. With spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apicad. Posteroventral spines becoming longer distad.

WALKING LEGS. Genicular spine present; meso- and metafemur lacking lobe-like expansions; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Euplantulae of tarsomeres ta4 enlarged compared to previous tarsomere (1.5x longer).

WINGS. Females brachypterous, or apterous. Forewings have an elongated stigma; lacking ventral teeth on costal rim. RA distal anterior not branched; fused with RP. A2 absent.

ABDOMEN. Supra-anal plate wider than long, transverse; nearly triangular. Females tergites lacking lateral lobe-like expansions. Cerci strongly flattened as a whole or at least in distal half.

Male genitalia with one secondary distal process present; pda and paa not fused; afa long, acute and curved; afa lobes simple; afa flagellum present; membrane not pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with no or indistinct pilosity; ventral ridge of right phallomere not elongated.

LITURGUSIDAE

HEAD. Vertex lacking median head process; lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge strongly rounded or angled. Compound eye oval to globular; slight lateral bulging; lacking non-visual elongation.

THORAX. Pronotum at least twice as long as wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar

expansions narrower at widest point than half the width of pronotum at supracoxal furrow; prozone longer than half of length of metazone. External hearing organ absent.

FORELEGS. F= 4 DS/13-19 AvS/4 PvS; T= 6-12 AvS/4-17 PvS. Tibial spur groove on anterior surface in proximal third of femur, or medially on anterior surface of femur; setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternately cranial or caudal. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines not separated by a depression; first two spines closer together than remaining spines. Proximal (or only) discoidal spine not standing on elevated socket. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apical. Posteroventral spines becoming longer distad; resembling anteroventral tibial spines. Tarsomere 1 no longer than remaining tarsomeres collectively, or longer than remaining tarsomeres collectively; shorter than fore tibia, or equal to or longer than fore tibia.

WALKING LEGS. Genicular spine present; meso- and metafemur lacking lobe-like expansions; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively, or the same length as or longer than remaining tarsomeres collectively; metatarsomere 1 no longer than remaining tarsomeres collectively, or the same length as or longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta4 enlarged compared to previous tarsomere (1.5x longer).

WINGS. Forewings have an elongated stigma; lacking ventral teeth on costal rim. RA distal anterior not branched; fused with RP. A2 absent.

ABDOMEN. Supra-anal plate wider than long, transverse; nearly triangular. Female tergites lacking lateral lobe-like expansions. Lacking stylus. Cerci entirely cylindrical or at most only terminal cercomere flattened.

Male genitalia with one secondary distal process present; pda and paa not fused; afa long, acute and curved; afa lobes simple; afa flagellum present; membrane not pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with no or indistinct pilosity; ventral ridge of right phallomere not elongated.

PHOTINAIDAE

HEAD. Vertex lacking median head process; lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge straight or slightly rounded, or strongly rounded or angled; not folded transversely; lacking ridges. Clypeus lacking ridges; not folded transversely, or folded transversely; juxtaocular bulges absent, or present. Compound eye oval to globular; fitting within outline of head, not bulging or protruding, or strong lateral bulging; lacking non-visual elongation.

THORAX. Ventral cervical sclerites present as two elements. Intercervical sclerite with median connection; not forming torus intercervicals, or forming torus intercervicals. Prosternum with basisternite and preepisternites fused into T-shaped sclerite that is cranially elongated into a post-cervical plate. Pronotum at least twice as long as wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoxal furrow; prozone shorter than half of length of metazone. External hearing organ absent.

FORELEGS. F= 3-4 DS/13-19 AvS/5 PvS; T= 13-19 AvS/13-21 PvS. Coxa anterodistal apical lobes diverging; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove on anterior surface in proximal third of femur; femoral brush flat (at most slightly elevated); setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternatingly cranial or caudad. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines flanking a ventral depression for accommodating the distal posteroventral spine of the tibia when leg is folded; first two spines closer together than remaining spines. Proximal (or only) discoidal spine not standing on elevated socket; if four discoidal spines are present, then 1 shortest, 2 and 4 longer (or of equal length), and 3

longest; proximal two spines not standing closer together compared to remaining discoidal spines; distal 2 spines not standing closer together compared to remaining discoidal spines; if 3 discoidal spines are present, then 2 distinctly longer than 1, with 3 shortest; proximal two spines not standing closer together compared to remaining discoidal spine; distal two spines not standing closer together compared to remaining discoidal spine. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apicad. Posteroventral spines becoming longer distad; resembling anteroventral tibial spines, or reduced in size and recumbent in the proximal half of tibia at most, much smaller and more closely arranged than anteroventral spines. Tarsomere 1 longer than remaining tarsomeres collectively; shorter than fore tibia.

WALKING LEGS. Genicular spine present, or absent; meso- and metafemur lacking lobe-like expansions; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively; metatarsomere 1 no longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 with deep v-shaped notch and lateral spreading; ta2-ta4 with proximal elongation; ta4 enlarged compared to ta3 (1.5x longer). Ungues equally long; shorter than tarsomere ta5.

WINGS. Males macropterous and females brachypterous. Forewings have an elongated stigma; lacking ventral teeth on costal rim; main veins distally bent or nearly straight (with one inflection). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; not reaching posterior wing margin (vanishing early in wing membrane or fusing with other veins); remigulum not crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 4–5 branches. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP at least partially sigmoid (with two inflections); A2 absent. Male RA not branched; CuA branching; anal veins with 5 to 8 anal veins (branches of A3 not counted individually); A3 branching once or twice. Female RA not branched; CuA branching; anal veins with 5 and 8 anal veins (including A1, branches of A3 not counted individually); A3 branched once or twice.

ABDOMEN. Supra-anal plate nearly as long as wide, roughly square, or wider than long, transverse; with ridge; nearly triangular. Female tergites lacking lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions; sternites

lacking lateral lobe-like expansions. Male coxosternite 9 asymmetrical; lacking dorsal process; bearing stylus. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci strongly flattened as a whole or at least in distal half.

Male genitalia with one secondary distal process present; pda and paa not fused; afa long, acute and curved; afa lobes simple; afa flagellum present; membrane not pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with no or indistinct pilosity; ventral ridge of right phallomere not elongated.

ACANTHOPIDAE

HEAD. Vertex lacking median head process, or with median head process symmetrical (strong and massive); lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge straight or slightly rounded, or strongly rounded or angled; not folded transversely; with two parallel ridges that may be pointed, or lacking ridges. Clypeus lacking ridges; folded transversely; juxtaocular bulges missing. Compound eye oval to globular; fitting within outline of head, not bulging or protruding, or strong lateral bulging; lacking non-visual elongation, or with non-visual elongation.

THORAX. Ventral cervical sclerites present as two elements. Intercervical sclerite with median connection; not forming torus intercervicals, or forming torus intercervicals. Prosternum with basisternite and pre-episternites fused into T-shaped sclerite that is cranially elongated into a post-cervical plate. Pronotum at least twice as long as wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoxal furrow; prozone longer than half of length of metazone, or shorter than half of length of metazone. External hearing organ absent.

FORELEGS. F= 3-4 DS/6-19 AvS/5+ PvS; T= 6-19 AvS/13-22 PvS. Coxa anterodistal apical lobes diverging, or closed, medial edges not overlapping; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove at base of femur, or on anterior surface in proximal third of femur; femoral brush flat (at most slightly elevated); setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternately cranial or caudad, or distinctly alternating positions,

therefore standing in two distinct rows. Posteroventral spines positioned evenly on ventral surface of femur, or positioned on an elevated ridge, or positioned individually on long sockets; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines not separated by a depression; first two spines closer together than remaining spines, or spaced evenly with remaining spines. Proximal (or only) discoidal spine not standing on elevated socket; if four discoidal spines are present, then 1 and 4 short (or of equal length), 2 longer, and 3 longest; proximal two spines not standing closer together compared to remaining discoidal spines; distal 2 spines standing closely together (sometimes positioned on a common elevation); if 3 discoidal spines are present, then 1 short, 3 being longer and 2 longest; proximal two spines not standing closer together compared to remaining discoidal spine; distal two spines not standing closer together compared to remaining discoidal spine. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding, or expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apical. Posteroventral spines becoming longer distad; resembling anteroventral tibial spines, or reduced in size and recumbent in the proximal half of tibia at most, much smaller and more closely arranged than anteroventral spines, or all smaller and more closely arranged than anteroventral spines and recumbent (almost parallel to tibia) along the entire tibia. Tarsomere 1 longer than remaining tarsomeres collectively; shorter than fore tibia.

WALKING LEGS. Genicular spine present; meso- and metafemur lacking lobe-like expansions, or with lobe-like expansions distally from middle or apically; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively; metatarsomere 1 no longer than remaining tarsomeres collectively, or the same length as or longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 with deep v-shaped notch and lateral spreading; ta2-ta4 with proximal elongation; ta4 enlarged compared to t3 (1.5x longer); ta5 without medial euplantula (a narrow longitudinal ventral suture at most). Ungues equally long; shorter than tarsomere ta5.

WINGS. Males macropterous and females macropterous, or brachypterous. Forewings have an elongated stigma; lacking ventral teeth on costal rim; main veins distally bent or nearly straight (with one inflection), or at least partially sigmoid (with two inflections). ScP ending beyond distal third of wing length; RA distal anterior not branched; fused with M; fused with RP. Costal area between C and ScP in proximal part of

wing as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; not reaching posterior wing margin (vanishing early in wing membrane or fusing with other veins), or almost or entirely reaching posterior wing margin; remigulum not crossed by anal veins, or crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 6 or more branches, or with 4–5 branches; stigma present. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP not sigmoid (slightly curved or straight), or at least partially sigmoid (with two inflections); A2 absent. Male RA not branched; CuA branching, or not branching; anal veins with 8 or more anal veins (branches of A3 not counted individually), or with 5 to 8 anal veins (branches of A3 not counted individually); A3 branching once or twice. Female RA not branched; CuA branching, or not branched; anal veins with 8 or more anal veins (including A1, branches of A3 not counted individually), or with 5 and 8 anal veins (including A1, branches of A3 not counted individually); A3 branched once or twice.

ABDOMEN. Supra-anal plate wider than long, transverse; lacking ridge, or with ridge; nearly triangular. Female tergites lacking lateral lobe-like expansions, or with lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions; sternites lacking lateral lobe-like expansions, or with lateral lobe-like expansions. Male coxosternite 9 asymmetrical; lacking dorsal process; bearing stylus, or lacking stylus. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci entirely cylindrical or at most only terminal cercomere flattened; distal cercomere smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated and conical, or slightly flattened), or strongly flattened and forming a strongly enlarged lobe (more than twice as long as preceding cercomere).

Male genitalia with one secondary distal process present; pda and paa not fused; afa long, acute and curved; afa lobes simple; afa flagellum present; membrane not pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with no or indistinct pilosity; ventral ridge of right phallomere not elongated.

CHROICOPTERIDAE

HEAD. Vertex lacking median head process, or with median head process symmetrical (strong and massive); lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge straight or slightly rounded; not folded transversely; lacking ridges. Clypeus lacking ridges; not folded transversely; juxtaocular bulges missing, or present. Compound eye oval to globular; fitting within outline of head, not bulging or protruding; lacking non-visual elongation.

THORAX. Ventral cervical sclerites present as two elements. Intercervical sclerite with median connection; forming torus intercervicals. Prosternum with basisternite and pre-episternites fused into T-shaped sclerite that is cranially elongated into a post-cervical plate. Pronotum at least twice as long as wide (excluding lateral lamellar expansions), or longer than wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoxal furrow; prozone longer than half of the length of metazone, or shorter than half of length of metazone. External hearing organ present.

FORELEGS. F= 3-4 DS/6-19 AvS/4-5 PvS; T= 6-12 AvS/4-12 PvS. Coxa anterodistal apical lobes diverging; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove on anterior surface in proximal third of femur; femoral brush flat (at most slightly elevated); setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternately craniad or caudad. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines not separated by a depression, or flanking a ventral depression for accommodating the distal posteroventral spine of the tibia when leg is folded; first two spines closer together than remaining spines, or spaced evenly with remaining spines. Proximal (or only) discoidal spine not standing on elevated socket; if four discoidal spines are present, then 1 and 4 short (or of equal length), 2 longer, and 3 longest, or 1 and 4 short (or of equal length), 2 and 3 distinctly longer (or of equal length), or 1 shortest, followed by 4, then 2, and 3 longest; proximal two spines standing closely together (sometimes sharing a common elevation), or not standing closer together compared to remaining discoidal spines; distal 2 spines not standing closer together compared to remaining discoidal spines. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apicad. Posteroventral spines becoming longer distad; resembling anteroventral tibial spines, or at normal distances from each other, resembling anteroventral spines, width between spines usually less than the diameter of one spine base) but recumbent. Tarsomere 1 no

longer than remaining tarsomeres collectively, or longer than remaining tarsomeres collectively; shorter than fore tibia.

WALKING LEGS. Genicular spine present; meso- and metafemur lacking lobe-like expansions; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively; metatarsomere 1 no longer than remaining tarsomeres collectively, or the same length as or longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 with deep v-shaped notch and lateral spreading; ta2-ta4 with proximal elongation; ta4 similar size to ta3 (<1.5x as long), or enlarged compared to ta3 (1.5x longer); ta5 with medial euplantula. Ungues equally long; shorter than tarsomere ta5.

WINGS. Males macropterous and females brachypterous. Forewings are somewhat ellipsoid; lacking ventral teeth on costal rim; main veins distally bent or nearly straight (with one inflection). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; not reaching posterior wing margin (vanishing early in wing membrane or fusing with other veins), or almost or entirely reaching posterior wing margin; remigulum not crossed by anal veins, or crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 2–3 branches, or with 4–5 branches. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP not sigmoid (slightly curved or straight), or at least partially sigmoid (with two inflections); A2 absent. Male RA not branched; CuA branching; anal veins with 8 or more anal veins (branches of A3 not counted individually), or with 5 to 8 anal veins (branches of A3 not counted individually); A3 branching once or twice, or branching 3–4 times. Female RA not branched; CuA branching, or not branched; anal veins with 5 and 8 anal veins (including A1, branches of A3 not counted individually); A3 branched once or twice.

ABDOMEN. Supra-anal plate wider than long, transverse; lacking ridge, or with ridge; nearly triangular. Female tergites lacking lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions; sternites lacking lateral lobe-like expansions. Male coxosternite 9 asymmetrical; lacking dorsal process; bearing stylus. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci entirely cylindrical or at most only terminal cercomere flattened; distal cercomere smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated and conical, or slightly flattened), or strongly flattened and forming a strongly enlarged lobe (more than twice as long as preceding cercomere).

Male genitalia with two secondary distal processes present (one slightly curved); pda and paa not fused; afa long, acute and curved; afa lobes bifurcate; afa flagellum present, or absent; membrane not pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with no or indistinct pilosity; ventral ridge of right phallomere not elongated.

LEPTOMANTELLIDAE

HEAD. Vertex lacking median head process.

THORAX. With edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head. External hearing organ present.

FORELEGS. Lacking much data on foreleg spination, this family has four discoidal and four to five posteroventral spines on the forefemur. Setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternately craniad or caudad. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines. Proximal (or only) discoidal spine not standing on elevated socket. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apicad. Posteroventral spines becoming longer distad.

WALKING LEGS. Genicular spine present; meso- and metafemur lacking lobe-like expansions; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Euplantulae of tarsomeres ta4 enlarged compared to ta3 (1.5x longer).

WINGS. Males and females macropterous. Forewings are somewhat ellipsoid; lacking ventral teeth on costal rim. RA distal anterior not branched; fused with RP. A2 absent.

ABDOMEN. Supra-anal plate wider than long, transverse. Females tergites lacking lateral lobe-like expansions. Cerci entirely cylindrical or at most only terminal cercomere flattened.

Male genitalia with two secondary distal processes present (one slightly curved); pda and paa not fused; afa long, acute and curved; afa lobes bifurcate; afa flagellum absent; membrane not pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with no or indistinct pilosity; ventral ridge of right phallomere not elongated.

HEAD. Vertex lacking median head process; lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge straight or slightly rounded, or strongly rounded or angled; not folded transversely; with a single median ridge, or lacking ridges. Clypeus lacking ridges; not folded transversely, or folded transversely; juxtaocular bulges absent, or present. Compound eye cone-shaped, in lateral view apparently positioned on a socket, or oval to globular; strong lateral bulging; lacking non-visual elongation.

THORAX. Ventral cervical sclerites missing, or present as one or two elements. Intercervical sclerite lacking median connection, or with median connection; not forming torus intercervicals, or forming torus intercervicals. Prosternum with basisternite and pre-episternites fused into T-shaped sclerite that is cranially elongated into a post-cervical plate. Pronotum at least twice as long as wide (excluding lateral lamellar expansions), or longer than wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoxal furrow; prozone longer than half of length of metazone, or shorter than half of length of metazone. External hearing organ present, or missing.

FORELEGS. F= 2-3 DS/6-19 AvS/4 PvS; T= 6-15 AvS/4-12 PvS. Coxa anterodistal apical lobes diverging; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove on anterior surface in proximal third of femur, or medially on anterior surface of femur; femoral brush flat (at most slightly elevated), or distinctly elevated; setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other, or arranged in two rows with proximal anteroventral spines short, blunt and standing in an alternating position closely together. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most, or proximally shifted together, small and blunt; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternately cranial or caudal, or distinctly alternating positions, therefore standing in two distinct rows. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is

folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines not separated by a depression, or flanking a ventral depression for accommodating the distal posteroventral spine of the tibia when leg is folded; first two spines closer together than remaining spines, or spaced evenly with remaining spines. Proximal (or only) discoidal spine not standing on elevated socket; if 3 discoidal spines are present, then 1 short, 3 being longer and 2 longest, or 2 distinctly longer than 1, with 3 shortest; proximal two spines standing closely together (sometimes sharing a common elevation); distal two spines standing closely together (sometimes sharing a common elevation), or not standing closer together compared to remaining discoidal spine. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows, or present anteroventrally and absent posteroventrally. Anteroventral spines nearly equally long, or increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apicad. Posteroventral spines becoming longer distad, or becoming longer distad in the proximal third, then becoming short and increasing in length again; resembling anteroventral tibial spines, or reduced in size and recumbent in the proximal half of tibia at most, much smaller and more closely arranged than anteroventral spines. Tarsomere 1 no longer than remaining tarsomeres collectively, or longer than remaining tarsomeres collectively; shorter than fore tibia, or equal to or longer than fore tibia.

WALKING LEGS. Genicular spine present, or absent; meso- and metafemur lacking lobe-like expansions; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively, or the same length as or longer than remaining tarsomeres collectively; metatarsomere 1 the same length as or longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 without deep v-shaped notch or lateral spreading, or with deep v-shaped notch and lateral spreading; ta2-ta4 with proximal elongation; ta4 similar size to ta3 (<1.5x as long), or enlarged compared to ta3 (1.5x longer); ta5 without medial euplantula (a narrow longitudinal ventral suture at most), or with medial euplantula. Ungues equally long; shorter than tarsomere ta5.

WINGS. Males macropterous, or brachypterous and females macropterous, or brachypterous, or apterous. Forewings are somewhat ellipsoid; lacking ventral teeth on costal rim; main veins distally bent or nearly straight (with one inflection), or at least partially sigmoid (with two inflections). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; almost or entirely reaching posterior wing margin; remigulum crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 2–3 branches, or with 4–5 branches. Hindwing, ScP ending beyond distal third of wing length;

crossveins between CuA and CuP not sigmoid (slightly curved or straight), or at least partially sigmoid (with two inflections); A2 absent. Male RA not branched; CuA branching; anal veins with 5 to 8 anal veins (branches of A3 not counted individually); A3 branching 3–4 times. Female RA not branched; CuA branching; anal veins with 5 and 8 anal veins (including A1, branches of A3 not counted individually); A3 branched 3–4 times.

ABDOMEN. Supra-anal plate nearly as long as wide, roughly square, or wider than long, transverse, or longer than wide, elongated; lacking ridge, or with ridge; nearly triangular, or rounded or almost semicircular, possibly slightly pointed. Female tergites lacking lateral lobe-like expansions, or with lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims, or with dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions; sternites lacking lateral lobe-like expansions. Male coxosternite 9 asymmetrical; lacking dorsal process; bearing stylus. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci entirely cylindrical or at most only terminal cercomere flattened; distal cercomere smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated and conical, or slightly flattened).

Male genitalia with two secondary distal processes present (one slightly curved); pda and paa not fused; afa long, acute and curved; afa lobes bifurcate; afa flagellum absent; membrane not pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with no or indistinct pilosity; ventral ridge of right phallomere not elongated.

AMORPHOSCELIDAE

HEAD. Vertex lacking median head process; lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge strongly rounded or angled; not folded transversely; lacking ridges. Clypeus lacking ridges; folded transversely; juxtaocular bulges present. Compound eye oval to globular; strong lateral bulging; lacking non-visual elongation.

THORAX. Ventral cervical sclerites missing. Intercervical sclerite lacking median connection; not forming torus intercervicals. Prosternum with basisternite and pre-episternites fused into short T-shaped sclerite that is not elongated into a plate. Pronotum wider than long (excluding lateral lamellar expansions), or longer than wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point

than half the width of pronotum at supracoxal furrow; prozone longer than half of length of metazone. External hearing organ present.

FORELEGS. F= 1DS/0-4AvS/0PvS; T= 0AvS/0PvS. Coxa anterodistal apical lobes diverging; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove medially on anterior surface of femur, or distally of middle of femur; femoral brush flat (at most slightly elevated), or distinctly elevated; setae of femoral brush standing closely together and forming a clearly defined area. Femur spination missing except for a single discoidal spine, or with only four anteroventral spines, posteroventral spines missing. Anteroventral spines large and plate-like flattened, or absent; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternatingly cranial or caudal. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines not separated by a depression. Proximal (or only) discoidal spine standing on elevated socket. Tibia lacking anteroventral spines; lacking posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present anteroventrally and absent posteroventrally, or absent except for tibial spur. Anteroventral spines nearly equally long; distal two or three spines inserting ventrally and pointing ventro-apical. Posteroventral spines becoming longer distad. Tarsomere 1 no longer than remaining tarsomeres collectively, or longer than remaining tarsomeres collectively; equal to or longer than fore tibia.

WALKING LEGS. Genicular spine absent; meso- and metafemur lacking lobe-like expansions; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively, or the same length as or longer than remaining tarsomeres collectively; metatarsomere 1 no longer than remaining tarsomeres collectively, or the same length as or longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 with deep v-shaped notch and lateral spreading; ta2-ta4 with proximal elongation; ta4 similar size to ta3 (<1.5x as long); ta5 without medial euplantula (a narrow longitudinal ventral suture at most). Ungues equally long; shorter than tarsomere ta5.

WINGS. Males and females macropterous. Forewings are somewhat ellipsoid; lacking ventral teeth on costal rim; main veins distally bent or nearly straight (with one inflection). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched, or branched; almost or entirely reaching

posterior wing margin; remigulum crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 6 or more branches, or with 4–5 branches. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP not sigmoid (slightly curved or straight), or at least partially sigmoid (with two inflections); A2 absent. Male RA not branched; CuA branching; anal veins with 8 or more anal veins (branches of A3 not counted individually), or with 5 to 8 anal veins (branches of A3 not counted individually); A3 branching 3–4 times. Female RA not branched; CuA branching, or not branched; anal veins with 8 or more anal veins (including A1, branches of A3 not counted individually), or with 5 and 8 anal veins (including A1, branches of A3 not counted individually); A3 branched 3–4 times.

ABDOMEN. Supra-anal plate wider than long, transverse; lacking ridge; rounded or almost semicircular, possibly slightly pointed. Female tergites lacking lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions; sternites lacking lateral lobe-like expansions. Male coxosternite 9 asymmetrical, or symmetrical; lacking dorsal process; bearing stylus, or lacking stylus. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci entirely cylindrical or at most only terminal cercomere flattened; distal cercomere strongly flattened but not forming a strongly enlarged lobe (less than twice as long as preceding cercomere), or strongly flattened and forming a strongly enlarged lobe (more than twice as long as preceding cercomere).

Male genitalia with two secondary distal processes present (one slightly curved); pda and paa not fused; afa long, acute and curved; afa lobes bifurcate; afa flagellum absent; membrane not pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with no or indistinct pilosity; ventral ridge of right phallomere not elongated.

GONYPETIDAE

HEAD. Vertex lacking median head process; lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge straight or slightly rounded, or strongly rounded or angled, or forming a prominent medial spine; not folded transversely; lacking ridges. Clypeus lacking ridges; not folded transversely, or folded transversely; juxtaocular bulges missing, or present. Compound eye oval to globular; fitting within outline of head, not bulging or protruding, or strong lateral bulging; lacking non-visual elongation.

THORAX. Ventral cervical sclerites present as two elements. Intercervical sclerite with median connection; not forming torus intercervicals, or forming torus intercervicals. Prosternum with basisternite and pre-

episternites fused into T-shaped sclerite that is cranially elongated into a post-cervical plate. Pronotum at least twice as long as wide (excluding lateral lamellar expansions), or longer than wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoxal furrow; prozone longer than half of length of metazone, or shorter than half of length of metazone. External hearing organ present.

FORELEGS. F= 3-4 DS/6-25 AvS/4 PvS; T= 6-12 AvS/4-17 PvS. Coxa anterodistal apical lobes diverging; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove on anterior surface in proximal third of femur; femoral brush flat (at most slightly elevated); setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines almost equal or only slightly alternating, or distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternatingly cranial or caudad. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines not separated by a depression, or flanking a ventral depression for accommodating the distal posteroventral spine of the tibia when leg is folded; first two spines closer together than remaining spines, or spaced evenly with remaining spines. Proximal (or only) discoidal spine not standing on elevated socket; if four discoidal spines are present, then 1 shortest, 2 and 4 longer (or of equal length), and 3 longest, or 1 and 4 short (or of equal length), 2 and 3 distinctly longer (or of equal length), or 1 shortest, followed by 4, then 2, and 3 longest; proximal two spines not standing closer together compared to remaining discoidal spines; distal 2 spines standing closely together (sometimes positioned on a common elevation), or not standing closer together compared to remaining discoidal spines. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apicad. Posteroventral spines becoming longer distad; resembling anteroventral tibial spines. Tarsomere 1 no longer than remaining tarsomeres collectively, or longer than remaining tarsomeres collectively; shorter than fore tibia, or equal to or longer than fore tibia.

WALKING LEGS. Genicular spine present; meso- and metafemur lacking lobe-like expansions; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively, or the same length as or longer than remaining tarsomeres collectively; metatarsomere 1 no longer than remaining tarsomeres collectively, or the same length as or longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 with deep v-shaped notch and lateral spreading; ta2-ta4 with proximal elongation; ta4 similar size to ta3 (<1.5x as long), or enlarged compared to ta3 (1.5x longer); ta5 without medial euplantula (a narrow longitudinal ventral suture at most), or with medial euplantula. Ungues equally long; shorter than tarsomere ta5.

WINGS. Males macropterous, or apterous and females macropterous, or apterous. Forewings are somewhat ellipsoid; lacking ventral teeth on costal rim; main veins distally bent or nearly straight (with one inflection), or at least partially sigmoid (with two inflections). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; not reaching posterior wing margin (vanishing early in wing membrane or fusing with other veins), or almost or entirely reaching posterior wing margin; remigulum crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 4–5 branches. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP at least partially sigmoid (with two inflections); A2 absent. Male RA branching, or not branched; CuA branching; anal veins with 8 or more anal veins (branches of A3 not counted individually), or with 5 to 8 anal veins (branches of A3 not counted individually); A3 branching once or twice, or branching 3–4 times. Female RA not branched; CuA branching; anal veins with less than 5 anal veins (including A1, branches of A3 not counted individually), or with 5 and 8 anal veins (including A1, branches of A3 not counted individually); A3 branched once or twice, or branched 3–4 times.

ABDOMEN. Supra-anal plate wider than long, transverse; lacking ridge, or with ridge; nearly triangular, or rounded or almost semicircular, possibly slightly pointed. Female tergites lacking lateral lobe-like expansions, or with lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions, or with ventral lobe-like expansions; sternites lacking lateral lobe-like expansions, or with lateral lobe-like expansions. Male coxosternite 9 asymmetrical; lacking dorsal process; bearing stylus. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci entirely cylindrical or at most only terminal cercomere flattened; distal cercomere smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated and conical, or slightly flattened).

Male genitalia with two secondary distal processes present (one slightly curved); pda and paa not fused; afa long, acute and curved; afa lobes bifurcate; afa flagellum missing; membrane not pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with no or indistinct pilosity; ventral ridge of right phallomere not elongated.

MAJANGIDAE

HEAD. Vertex lacking median head process; lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge strongly rounded or angled; not folded transversely; lacking ridges. Clypeus lacking ridges; folded transversely; juxtaocular bulges present. Compound eye oval to globular; strong lateral bulging; lacking non-visual elongation.

THORAX. Ventral cervical sclerites present as two elements. Intercervical sclerite with median connection; forming torus intercervicals. Prosternum with basisternite and pre-episternites fused into T-shaped sclerite that is cranially elongated into a post-cervical plate. Pronotum at least twice as long as wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoxal furrow; prozone shorter than half of length of metazone. External hearing organ present.

FORELEGS. F= 4 DS/13-19 AvS/4-5 PvS; T= 6-12 AvS/4-7 PvS. Coxa anterodistal apical lobes diverging; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove on anterior surface in proximal third of femur; femoral brush flat (at most slightly elevated); setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternately cranial or caudad. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines flanking a ventral depression for accommodating the distal posteroventral spine of the tibia when leg is folded; first two spines closer together than remaining spines. Proximal (or only) discoidal spine not standing on elevated socket; if four discoidal spines are present, then 1 and 4 short (or of equal length), 2 longer, and 3 longest; proximal two spines not standing closer together compared to remaining discoidal spines; distal 2 spines

not standing closer together compared to remaining discoidal spines. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apicad. Posteroventral spines becoming longer distad in the proximal third, then becoming short and increasing in length again; resembling anteroventral tibial spines. Tarsomere 1 longer than remaining tarsomeres collectively; shorter than fore tibia.

WALKING LEGS. Genicular spine present; meso- and metafemur lacking lobe-like expansions; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively; metatarsomere 1 the same length as or longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 with deep v-shaped notch and lateral spreading; ta2-ta4 with proximal elongation; ta4 enlarged compared to ta3 (1.5x longer); ta5 with medial euplantula. Ungues equally long; shorter than tarsomere ta5.

WINGS. Males macropterous and females brachypterous. Forewings are somewhat ellipsoid; lacking ventral teeth on costal rim; main veins distally bent or nearly straight (with one inflection). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; not reaching posterior wing margin (vanishing early in wing membrane or fusing with other veins); remigulum crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 4–5 branches. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP at least partially sigmoid (with two inflections); A2 absent. Male RA not branched; CuA branching; anal veins with 5 to 8 anal veins (branches of A3 not counted individually); A3 branching once or twice. Female RA not branched; CuA branching; anal veins with 5 and 8 anal veins (including A1, branches of A3 not counted individually); A3 branched once or twice.

ABDOMEN. Supra-anal plate wider than long, transverse; with ridge; rounded or almost semicircular, possibly slightly pointed. Female tergites with lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions; sternites with lateral lobe-like expansions. Male coxosternite 9 symmetrical; lacking dorsal process; bearing stylus. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci entirely cylindrical or at most only terminal cercomere flattened; distal cercomere smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated and conical, or slightly flattened).

Male genitalia with two secondary distal processes present (one slightly curved); pda and paa not fused; afa long, acute and curved; afa lobes bifurcate; afa flagellum missing; membrane not pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with no or indistinct pilosity; ventral ridge of right phallomere not elongated.

EPAPHRODITIDAE

HEAD. Vertex lacking median head process; lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge straight or slightly rounded; not folded transversely; lacking ridges. Clypeus lacking ridges; folded transversely; juxtaocular bulges present. Compound eye oval to globular; strong lateral bulging; lacking non-visual elongation.

THORAX. Ventral cervical sclerites present as two elements. Intercervical sclerite with median connection; forming torus intercervicals. Prosternum with basisternite and pre-episternites fused into T-shaped sclerite that is cranially elongated into a post-cervical plate. Pronotum at least twice as long as wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoaxal furrow; prozone shorter than half of length of metazone. External hearing organ present.

FORELEGS. F= 4 DS/13-19 AvS/6-12 PvS; T= 6-12 AvS/13-17 PvS. Coxa anterodistal apical lobes diverging; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove on anterior surface in proximal third of femur; femoral brush flat (at most slightly elevated); setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternately cranial or caudad. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines flanking a ventral depression for accommodating the distal posteroventral spine of the tibia when leg is folded; first two spines closer together than remaining spines. Proximal (or only) discoidal spine not standing on elevated socket; if four discoidal spines are present, then 1 and 4 short (or of equal length), 2 longer, and 3 longest; proximal two spines not standing closer together compared to remaining discoidal spines; distal 2 spines

standing closely together (sometimes positioned on a common elevation). Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apicad. Posteroventral spines becoming longer distad; reduced in size and recumbent in the proximal half of tibia at most, much smaller and more closely arranged than anteroventral spines.

WALKING LEGS. Genicular spine absent; meso- and metafemur with lobe-like expansions distally from middle or apically; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 the same length as or longer than remaining tarsomeres collectively; metatarsomere 1 the same length as or longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 with deep v-shaped notch and lateral spreading; ta2-ta4 with proximal elongation; ta4 enlarged compared to ta3 (1.5x longer); ta5 with medial euplantula. Ungues equally long; shorter than tarsomere ta5. Adult males macropterous.

WINGS. Males macropterous and females brachypterous. Forewings are somewhat ellipsoid; lacking ventral teeth on costal rim; main veins at least partially sigmoid (with two inflections). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; almost or entirely reaching posterior wing margin; remigulum crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 4–5 branches. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP at least partially sigmoid (with two inflections); A2 absent. Male RA not branched; CuA branching; anal veins with 5 to 8 anal veins (branches of A3 not counted individually); A3 branching once or twice.

ABDOMEN. Supra-anal plate longer than wide, elongated; nearly triangular. Female tergites lacking lateral lobe-like expansions. Male coxosternite 9 asymmetrical; lacking dorsal process; bearing stylus. Cerci entirely cylindrical or at most only terminal cercomere flattened.

Male genitalia with two secondary distal processes present (one slightly curved); pda and paa not fused; afa long, acute and curved; afa lobes bifurcate; afa flagellum absent; membrane not pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with no or indistinct pilosity; ventral ridge of right phallomere not elongated.

HAANIIDAE

HEAD. Vertex lacking median head process; bearing processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge strongly rounded or angled, or forming a prominent medial spine; not folded transversely; lacking ridges. Clypeus lacking ridges; folded transversely; juxtaocular bulges present. Compound eye oval to globular; strong lateral bulging; lacking non-visual elongation.

THORAX. Ventral cervical sclerites present as two elements. Intercervical sclerite with median connection; forming torus intercervicals. Prosternum with basisternite and pre-episternites fused into T-shaped sclerite that is cranially elongated into a post-cervical plate. Pronotum at least twice as long as wide (excluding lateral lamellar expansions), or longer than wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoxal furrow; prozone longer than half of length of metazone, or shorter than half of length of metazone. External hearing organ present.

FORELEGS. F= 4 DS/6-12 AvS/3-4 PvS; T= 6-12 AvS/1-7 PvS. Coxa anterodistal apical lobes diverging; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove medially on anterior surface of femur; femoral brush distinctly elevated; setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternatingly craniad or caudad. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines not separated by a depression; first two spines spaced evenly with remaining spines. Proximal (or only) discoidal spine not standing on elevated socket; if four discoidal spines are present, then 1 and 2 of equal length, 4 shortest, and 3 longest; proximal two spines not standing closer together compared to remaining discoidal spines; distal 2 spines not standing closer together compared to remaining discoidal spines. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two rows (only a few spines distal spines shifted dorsad). Anteroventral spines irregularly positioned on tibia or only a single spine present; distal two or three spines inserting anteriorly to dorsally and distinctly pointing dorso-apicad. Posteroventral spines irregularly positioned on

tibia or only a single spine present; oblique to a normal degree (resembling anteroventral spines) but with wide space between the spines. Tarsomere 1 longer than remaining tarsomeres collectively; shorter than fore tibia, or equal to or longer than fore tibia.

WALKING LEGS. Genicular spine absent; meso- and metafemur lacking lobe-like expansions; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 the same length as or longer than remaining tarsomeres collectively; metatarsomere 1 the same length as or longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 without deep v-shaped notch or lateral spreading; ta2-ta4 not proximally elongated; ta4 enlarged compared to ta3(1.5x longer); ta5 without medial euplantula (a narrow longitudinal ventral suture at most). Ungues equally long; shorter than tarsomere ta5.

WINGS. Males macropterous and females brachypterous, or apterous. Forewings are somewhat ellipsoid; lacking ventral teeth on costal rim; main veins distally bent or nearly straight (with one inflection). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA, or only slightly longer or as long as distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; almost or entirely reaching posterior wing margin; remigulum not crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 2–3 branches, or with 4–5 branches. A2 absent. A3 branching once or twice.

ABDOMEN. Supra-anal plate nearly as long as wide, roughly square; with ridge; nearly triangular. Female tergites with lateral lobe-like expansions; with dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions; sternites lacking lateral lobe-like expansions, or with lateral lobe-like expansions. Male coxosternite 9 symmetrical; bearing stylus. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci entirely cylindrical or at most only terminal cercomere flattened; distal cercomere smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated and conical, or slightly flattened).

Male genitalia with two secondary distal processes present (one slightly curved); pda and paa not fused; afa long, acute and curved; afa lobes bifurcate; afa flagellum missing; membrane not pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with no or indistinct pilosity; ventral ridge of right phallomere not elongated.

RIVETINIDAE

HEAD. Vertex lacking median head process; lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge strongly rounded or angled; not folded transversely; lacking ridges. Clypeus lacking ridges, or bearing ridges; folded transversely; juxtaocular bulges missing. Compound eye oval to globular; fitting within outline of head, not bulging or protruding, or strong lateral bulging; lacking non-visual elongation.

THORAX. Ventral cervical sclerites present as two elements. Intercervical sclerite with median connection; forming torus intercervicals. Prosternum with basisternite and pre-episternites fused into T-shaped sclerite that is cranially elongated into a post-cervical plate. Pronotum at least twice as long as wide (excluding lateral lamellar expansions), or longer than wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoxal furrow; prozone longer than half of the length of metazone. External hearing organ present.

FORELEGS. F= 4 DS/6-19 AvS/4-5 PvS; T= 6-12 AvS/8-12 PvS. Coxa anterodistal apical lobes diverging; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove on anterior surface in proximal third of femur; femoral brush flat (at most slightly elevated); setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternatingly cranial or caudad. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines flanking a ventral depression for accommodating the distal posteroventral spine of the tibia when leg is folded; first two spines closer together than remaining spines. Proximal (or only) discoidal spine not standing on elevated socket; if four discoidal spines are present, then 1, 2 and 3 becoming gradually longer, 4 much shorter than others; proximal two spines standing closely together (sometimes sharing a common elevation), or not standing closer together compared to remaining discoidal spines; distal 2 spines not standing closer together compared to remaining discoidal spines. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apical. Posteroventral spines becoming longer

distad; resembling anteroventral tibial spines. Tarsomere 1 longer than remaining tarsomeres collectively; shorter than fore tibia.

WALKING LEGS. Genicular spine present; meso- and metafemur lacking lobe-like expansions; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively; metatarsomere 1 the same length as or longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 with deep v-shaped notch and lateral spreading; ta2-ta4 with proximal elongation; ta4 similar size to ta3 (<1.5x as long); ta5 with medial euplantula. Ungues equally long; shorter than tarsomere ta5.

WINGS. Males macropterous, or brachypterous, or apterous and females brachypterous, or apterous. Forewings are somewhat ellipsoid; lacking ventral teeth on costal rim; main veins at least partially sigmoid (with two inflections). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; not reaching posterior wing margin (vanishing early in wing membrane or fusing with other veins); remigulum crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 2–3 branches, or with 4–5 branches. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP not sigmoid (slightly curved or straight); A2 absent. Male RA not branched; CuA branching; anal veins with 5 to 8 anal veins (branches of A3 not counted individually); A3 branching once or twice. Female RA branching, or not branched; CuA branching, or not branched; anal veins with 5 and 8 anal veins (including A1, branches of A3 not counted individually); A3 branched once or twice.

ABDOMEN. Supra-anal plate wider than long, transverse, or longer than wide, elongated; with ridge; nearly triangular. Female tergites lacking lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions; sternites lacking lateral lobe-like expansions. Male coxosternite 9 asymmetrical; lacking dorsal process; bearing stylus. Female sternite s6 not covering s7; s6 without ventral spines, or with strong ventral spines proximally; s7 without ventral spines. Cerci entirely cylindrical or at most only terminal cercomere flattened; distal cercomere smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated and conical, or slightly flattened).

Male genitalia with two secondary distal processes present (one slightly curved); pda and paa not fused; afa broad, triangular or sinuous, spiny, or long, acute and curved; afa lobes bifurcate; afa flagellum missing; lobo membranoso pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral

phallomere elongated; right phallomere with pronounced pilosity; ventral ridge of right phallomere elongated.

AMELIDAE

HEAD. Vertex lacking median head process; lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge straight or slightly rounded; not folded transversely; lacking ridges. Clypeus lacking ridges; not folded transversely; juxtaocular bulges missing. Compound eye oval to globular; fitting within outline of head, not bulging or protruding; lacking non-visual elongation.

THORAX. Ventral cervical sclerites missing. Intercervical sclerite with median connection; forming torus intercervicals. Prosternum with basisternite and pre-episternites fused into T-shaped sclerite that is cranially elongated into a post-cervical plate. Pronotum at least twice as long as wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoal furrow; prozone longer than half of the length of metazone. External hearing organ present.

FORELEGS. F= 4 DS/6-12 AvS/4 PvS; T= 6-12 AvS/8-12 PvS. Coxa anterodistal apical lobes diverging; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove on anterior surface in proximal third of femur; femoral brush flat (at most slightly elevated); setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternatingly cranial or caudad. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded, or the proximal two postero-ventral spines distinctly longer than the remaining postero-ventral spines. Proximal spine almost as long as remaining spines; proximal posteroventral spines flanking a ventral depression for accommodating the distal posteroventral spine of the tibia when leg is folded; first two spines closer together than remaining spines. Proximal (or only) discoidal spine not standing on elevated socket; if four discoidal spines are present, then 1 shortest, followed by 4, then 2, and 3 longest; proximal two spines not standing closer together compared to remaining discoidal spines; distal 2 spines not standing closer

together compared to remaining discoidal spines. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apicad. Posteroventral spines becoming longer distad; resembling anteroventral tibial spines. Tarsomere 1 longer than remaining tarsomeres collectively; shorter than fore tibia.

WALKING LEGS. Genicular spine absent; meso- and metafemur lacking lobe-like expansions; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively; metatarsomere 1 no longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 with deep v-shaped notch and lateral spreading; ta2-ta4 with proximal elongation; ta4 similar size to ta3 (<1.5x as long); ta5 with medial euplantula. Ungues equally long; shorter than tarsomere ta5.

WINGS. Males macropterous, or brachypterous and females brachypterous. Forewings are somewhat ellipsoid; lacking ventral teeth on costal rim; main veins distally bent or nearly straight (with one inflection). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; not reaching posterior wing margin (vanishing early in wing membrane or fusing with other veins); remigulum crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 4–5 branches. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP not sigmoid (slightly curved or straight); A2 absent. Male RA not branched; CuA not branching; anal veins with 5 to 8 anal veins (branches of A3 not counted individually); A3 branching once or twice. Female RA not branched; CuA not branched; anal veins with less than 5 anal veins (including A1, branches of A3 not counted individually); A3 branched once or twice.

ABDOMEN. Supra-anal plate nearly as long as wide, roughly square; lacking ridge; nearly triangular. Female tergites lacking lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions; sternites lacking lateral lobe-like expansions. Male coxosternite 9 asymmetrical; lacking dorsal process; bearing stylus. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci entirely cylindrical or at most only terminal cercomere flattened; distal cercomere smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated and conical, or slightly flattened).

Male genitalia with two secondary distal processes present (one slightly curved); pda and paa not fused; afa broad, triangular or sinuous, spiny, or long, acute and curved; afa lobes bifurcate; afa flagellum missing; membrane pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with pronounced pilosity; ventral ridge of right phallomere elongated.

EREMIAPHILIDAE

HEAD. Vertex lacking median head process; lacking processes or spines near area of lateral ocellus, or bearing processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide, or almost square, nearly as wide as long, or distinctly longer than wide; with dorsal edge straight or slightly rounded, or strongly rounded or angled; not folded transversely; lacking ridges. Clypeus lacking ridges; not folded transversely; juxtaocular bulges missing. Compound eye oval to globular; fitting within outline of head, not bulging or protruding, or slight lateral bulging, or protruding dorsally; lacking non-visual elongation, or with non-visual elongation.

THORAX. Ventral cervical sclerites missing. Intercervical sclerite lacking median connection, or with median connection; not forming torus intercervicals, or forming torus intercervicals. Prosternum with basisternite and pre-episternites fused into short T-shaped sclerite that is not elongated into a plate, or with basisternite and pre-episternites fused into T-shaped sclerite that is cranially elongated into a post-cervical plate. Pronotum at least twice as long as wide (excluding lateral lamellar expansions), or longer than wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoxal furrow; prozone longer than half of length of metazone, or shorter than half of length of metazone. External hearing organ present.

FORELEGS. F= 4 DS/6-25 AvS/4-5 PvS; T= 6-15 AvS/4-17 PvS. Coxa anterodistal apical lobes diverging; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove on anterior surface in proximal third of femur, or medially on anterior surface of femur; femoral brush flat (at most slightly elevated), or distinctly elevated; setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines almost equal or only slightly alternating; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternatingly craniad or caudad, or distinctly alternating positions, therefore standing in two distinct rows. Posteroventral spines positioned

evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded, or the proximal two postero-ventral spines distinctly longer than the remaining postero-ventral spines. Proximal spine almost as long as remaining spines; proximal posteroventral spines not separated by a depression, or flanking a ventral depression for accommodating the distal posteroventral spine of the tibia when leg is folded; first two spines closer together than remaining spines, or spaced evenly with remaining spines. Proximal (or only) discoidal spine not standing on elevated socket; if four discoidal spines are present, then 1 and 4 short (or of equal length), 2 longer, and 3 longest, or 1 shortest, 2 and 4 longer (or of equal length), and 3 longest, or 1 and 4 short (or of equal length), 2 and 3 distinctly longer (or of equal length), or 1 shortest, followed by 4, then 2, and 3 longest; proximal two spines standing closely together (sometimes sharing a common elevation), or not standing closer together compared to remaining discoidal spines; distal 2 spines not standing closer together compared to remaining discoidal spines. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apicad. Posteroventral spines becoming longer distad; resembling anteroventral tibial spines, or oblique to a normal degree (resembling anteroventral spines) but with wide space between the spines. Tarsomere 1 no longer than remaining tarsomeres collectively, or longer than remaining tarsomeres collectively; shorter than fore tibia, or equal to or longer than fore tibia.

WALKING LEGS. Genicular spine present; meso- and metafemur lacking lobe-like expansions; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively; metatarsomere 1 no longer than remaining tarsomeres collectively, or the same length as or longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 without deep v-shaped notch or lateral spreading, or with deep v-shaped notch and lateral spreading; ta2-ta4 not proximally elongated, or with proximal elongation; ta4 similar size to ta3 (<1.5x as long); ta5 without medial euplantula (a narrow longitudinal ventral suture at most), or with medial euplantula. Ungues equally long, or of different lengths (posterior longer than anterior); shorter than tarsomere ta5, or longer than tarsomere ta5.

WINGS. Males macropterous, or brachypterous and females brachypterous. Forewings are somewhat ellipsoid; lacking ventral teeth on costal rim; main veins distally bent or nearly straight (with one inflection). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part

of wing as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; not reaching posterior wing margin (vanishing early in wing membrane or fusing with other veins); remigulum not crossed by anal veins, or crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 4–5 branches. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP not sigmoid (slightly curved or straight), or at least partially sigmoid (with two inflections); A2 absent. Male RA branching, or not branched; CuA branching, or not branching; anal veins with 8 or more anal veins (branches of A3 not counted individually), or with fewer than 5 anal veins (including A1, branches of A3 not counted individually), or with 5 to 8 anal veins (branches of A3 not counted individually); A3 branching once or twice. Female RA not branched; CuA not branched; anal veins with 8 or more anal veins (including A1, branches of A3 not counted individually), or with less than 5 anal veins (including A1, branches of A3 not counted individually), or with 5 and 8 anal veins (including A1, branches of A3 not counted individually); A3 branched once or twice, or branched 3–4 times.

ABDOMEN. Supra-anal plate nearly as long as wide, roughly square, or wider than long, transverse; lacking ridge, or with ridge; nearly triangular, or rounded or almost semicircular, possibly slightly pointed. Female tergites lacking lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions; sternites lacking lateral lobe-like expansions. Male coxosternite 9 asymmetrical, or symmetrical; lacking dorsal process; bearing stylus. Female sternite s6 not covering s7, or covering s7; s6 without ventral spines; s7 without ventral spines, or with ventral spines. Cerci entirely cylindrical or at most only terminal cercomere flattened, or strongly flattened as a whole or at least in distal half; distal cercomere smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated into a coneshape, or slightly flattened), or strongly flattened but not forming a strongly enlarged lobe (less than twice as long as preceding cercomere), or strongly flattened and forming a strongly enlarged lobe (more than twice as long as preceding cercomere).

Male genitalia with two secondary distal processes present (one slightly curved); pda and paa not fused; afa broad, triangular or sinuous, spiny, or long, acute and curved; afa lobes bifurcate; afa flagellum absent; membrane pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with pronounced pilosity; ventral ridge of right phallomere elongated.

TOXODERIDAE

HEAD. Vertex lacking median head process; lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge straight or slightly rounded, or strongly rounded or angled; not folded transversely; with two parallel ridges that may be pointed, or lacking ridges. Clypeus lacking ridges, or bearing ridges; not folded transversely, or folded transversely; juxtaocular bulges missing, or present. Compound eye oval to globular; fitting within outline of head, not bulging or protruding, or strong lateral bulging; lacking non-visual elongation, or with non-visual elongation.

THORAX. Ventral cervical sclerites absent, or present as one or two elements. Intercervical sclerite with median connection; not forming torus intercervicals, or forming torus intercervicals. Prosternum with basisternite and pre-episternites fused into T-shaped sclerite that is cranially elongated into a post-cervical plate. Pronotum at least twice as long as wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoal furrow; prozone shorter than half of length of metazone. External hearing organ present.

FORELEGS. F= 3-4 DS/6-25 AvS/4-8 PvS; T= 6-15 AvS, 20-25/4-12 PvS. Coxa anterodistal apical lobes diverging; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove on anterior surface in proximal third of femur, or medially on anterior surface of femur, or distally of middle of femur; femoral brush flat (at most slightly elevated), or distinctly elevated; setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other, or arranged in two rows with anteroventral spines standing widely separated from each other, or arranged in two rows of very small but still pointed and elevated remnants of spines. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternatingly cranial or caudal. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded, or the proximal two postero-ventral spines distinctly longer than the remaining postero-ventral spines. Proximal spine almost as long as remaining spines; proximal posteroventral spines not separated by a depression, or flanking a ventral depression for accommodating the distal posteroventral spine of the tibia when leg is folded; first two spines spaced evenly with remaining spines. Proximal (or only) discoidal spine not standing on elevated socket; if four discoidal spines are present, then 1 shortest, 2 and 4 longer (or of equal length), and 3 longest; proximal two spines not standing closer together compared to remaining

discoidal spines; distal 2 spines not standing closer together compared to remaining discoidal spines; if 3 discoidal spines are present, then 1 short, 3 being longer and 2 longest, or 2 distinctly longer than 1, with 3 shortest; proximal two spines standing closely together (sometimes sharing a common elevation), or not standing closer together compared to remaining discoidal spine; distal two spines not standing closer together compared to remaining discoidal spine. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows, or absent except for tibial spur. Anteroventral spines increasing in length distally, or alternating irregularly long; distal two or three spines inserting ventrally and pointing ventro-apicad. Posteroventral spines becoming longer distad; resembling anteroventral tibial spines, or oblique to a normal degree (resembling anteroventral spines) but with wide space between the spines. Tarsomere 1 no longer than remaining tarsomeres collectively, or longer than remaining tarsomeres collectively; shorter than fore tibia, or equal to or longer than fore tibia.

WALKING LEGS. Genicular spine present, or absent; meso- and metafemur lacking lobe-like expansions, or with lobe-like expansions medially, or with lobe-like expansions distally from middle or apically; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively; metatarsomere 1 no longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 with deep v-shaped notch and lateral spreading; ta2-ta4 with proximal elongation; ta4 similar size to ta3 (<1.5x as long), or enlarged compared to previous tarsomere (1.5x longer); ta5 without medial euplantula (a narrow longitudinal ventral suture at most), or with medial euplantula. Ungues equally long; shorter than tarsomere ta5.

WINGS. Males brachypterous and females brachypterous. Forewings are somewhat ellipsoid; lacking ventral teeth on costal rim; main veins distally bent or nearly straight (with one inflection), or at least partially sigmoid (with two inflections). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; not reaching posterior wing margin (vanishing early in wing membrane or fusing with other veins), or almost or entirely reaching posterior wing margin; remigulum crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 4–5 branches. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP not sigmoid (slightly curved or straight), or at least partially sigmoid (with two inflections); A2 absent. Male RA not branched; CuA not branching; anal veins with 8 or more anal veins (branches of A3 not counted individually); A3 branching

once or twice. Female RA not branched; CuA not branched; anal veins with 8 or more anal veins (including A1, branches of A3 not counted individually); A3 branched once or twice.

ABDOMEN. Supra-anal plate nearly as long as wide, roughly square, or wider than long, transverse; lacking ridge, or with ridge; nearly triangular. Female tergites lacking lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims, or with dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions; sternites lacking lateral lobe-like expansions. Male coxosternite 9 asymmetrical; lacking dorsal process; bearing stylus. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci strongly flattened as a whole or at least in distal half; distal cercomere strongly flattened but not forming a strongly enlarged lobe (less than twice as long as preceding cercomere).

Male genitalia with two secondary distal processes present (one slightly curved); pda and paa not fused; afa broad, triangular or sinuous, spiny, or long, acute and curved; afa lobes bifurcate; afa flagellum missing; membrane pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with pronounced pilosity; ventral ridge of right phallomere elongated.

HOPLOCORYPHIDAE

HEAD. Vertex lacking median head process; lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; not folded transversely; lacking ridges. Clypeus lacking ridges; folded transversely; juxtaocular bulges present. Compound eye oval to globular; strong lateral bulging; lacking non-visual elongation.

THORAX. Ventral cervical sclerites present as two elements. Intercervical sclerite with median connection; forming torus intercervicals. Prosternum with basisternite and pre-episternites fused into T-shaped sclerite that is cranially elongated into a post-cervical plate. Pronotum at least twice as long as wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoaxal furrow; prozone shorter than half of length of metazone. External hearing organ present.

FORELEGS. F= 3 DS/6-12 AvS/4 PvS; T= 6-12 AvS/4-7 PvS. Coxa anterodistal apical lobes diverging; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove distally of middle of femur;

femoral brush flat (at most slightly elevated); setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternately cranial or caudad. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines not separated by a depression; first two spines spaced evenly with remaining spines. Proximal (or only) discoidal spine not standing on elevated socket; if 3 discoidal spines are present, then 2 distinctly longer than 1, with 3 shortest; proximal two spines standing closely together (sometimes sharing a common elevation); distal two spines not standing closer together compared to remaining discoidal spine. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apical. Posteroventral spines becoming longer distad; resembling anteroventral tibial spines. Tarsomere 1 longer than remaining tarsomeres collectively; shorter than fore tibia.

WALKING LEGS. Genicular spine absent; meso- and metafemur lacking lobe-like expansions; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 the same length as or longer than remaining tarsomeres collectively; metatarsomere 1 the same length as or longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 with deep v-shaped notch and lateral spreading; ta2-ta4 with proximal elongation; ta4 similar size to ta3 (<1.5x as long); ta5 with medial euplantula. Ungues equally long; shorter than tarsomere ta5.

WINGS. Males brachypterous, or apterous and females apterous. Forewings are somewhat ellipsoid; lacking ventral teeth on costal rim; main veins at least partially sigmoid (with two inflections). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; almost or entirely reaching posterior wing margin; remigulum crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 4–5 branches. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP at least partially sigmoid (with two inflections); A2 absent. Male RA not branched;

CuA not branching; anal veins with 5 to 8 anal veins (branches of A3 not counted individually); A3 branching once or twice.

ABDOMEN. Supra-anal plate longer than wide, elongated; with ridge; nearly triangular. Female tergites lacking lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions; sternites lacking lateral lobe-like expansions. Male coxosternite 9 asymmetrical; lacking dorsal process; bearing stylus. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci strongly flattened as a whole or at least in distal half; distal cercomere smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated and conical, or slightly flattened).

Male genitalia with two secondary distal processes present (one slightly curved); pda and paa not fused; afa lobes simple; afa flagellum missing; membrane pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with pronounced pilosity; ventral ridge of right phallomere elongated.

MIOMANTIDAE

HEAD. Vertex lacking median head process; lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge straight or slightly rounded, or strongly rounded or angled; strongly folded transversely (nearly 90°); lacking ridges. Clypeus lacking ridges; not folded transversely, or folded transversely; juxtaocular bulges missing. Compound eye oval to globular; fitting within outline of head, not bulging or protruding, or strong lateral bulging; lacking non-visual elongation.

THORAX. Ventral cervical sclerites present as two elements. Intercervical sclerite with median connection; forming torus intercervicals. Prosternum with basisternite and pre-episternites fused into T-shaped sclerite that is cranially elongated into a post-cervical plate. Pronotum at least twice as long as wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoaxal furrow; prozone shorter than half of length of metazone. External hearing organ present.

FORELEGS. F= 4 DS/6-19 AvS/4 PvS; T= 6-15 AvS /4-12 PvS. Coxa anterodistal apical lobes diverging; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove on anterior surface in

proximal third of femur; femoral brush flat (at most slightly elevated); setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternatingly cranial or caudad. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines flanking a ventral depression for accommodating the distal posteroventral spine of the tibia when leg is folded; first two spines closer together than remaining spines. Proximal (or only) discoidal spine not standing on elevated socket; if four discoidal spines are present, then 1 and 4 short (or of equal length), 2 longer, and 3 longest; proximal two spines not standing closer together compared to remaining discoidal spines; distal 2 spines standing closely together (sometimes positioned on a common elevation), or not standing closer together compared to remaining discoidal spines. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apical. Posteroventral spines becoming longer distad; resembling anteroventral tibial spines. Tarsomere 1 longer than remaining tarsomeres collectively; shorter than fore tibia.

WALKING LEGS. Genicular spine present; meso- and metafemur lacking lobe-like expansions; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively; metatarsomere 1 no longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 with deep v-shaped notch and lateral spreading; ta2-ta4 with proximal elongation; ta4 enlarged compared to ta3 (1.5x longer); ta5 with medial euplantula. Ungues equally long; shorter than tarsomere ta5.

WINGS. Males macropterous and females brachypterous. Forewings are somewhat ellipsoid; lacking ventral teeth on costal rim; main veins distally bent or nearly straight (with one inflection), or at least partially sigmoid (with two inflections). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part of as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; not reaching posterior wing margin (vanishing early in wing membrane or fusing with other veins), or almost or entirely reaching posterior wing margin; remigulum crossed by anal

veins; anal veins (including A1 and excluding jugal lobe) with 4–5 branches. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP not sigmoid (slightly curved or straight); A2 absent. Male RA not branched; CuA branching; anal veins with 8 or more anal veins (branches of A3 not counted individually); A3 branching 3–4 times. Female RA not branched; CuA branching; anal veins with 8 or more anal veins (including A1, branches of A3 not counted individually), or with 5 and 8 anal veins (including A1, branches of A3 not counted individually); A3 branched 3–4 times.

ABDOMEN. Supra-anal plate nearly as long as wide, roughly square, or wider than long, transverse; lacking ridge; nearly triangular. Female tergites lacking lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions; sternites lacking lateral lobe-like expansions. Male coxosternite 9 asymmetrical; lacking dorsal process; bearing stylus. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci entirely cylindrical or at most only terminal cercomere flattened; distal cercomere smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated and conical or slightly flattened).

Male genitalia with two secondary distal processes present (one slightly curved); pda and paa not fused; afa long, acute and curved; afa lobes simple; afa flagellum missing; membrane pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with pronounced pilosity; ventral ridge of right phallomere elongated.

GALINTHIADIDAE

HEAD. Vertex lacking median head process; bearing processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge strongly rounded or angled, or forming a prominent medial spine; not folded transversely; with two parallel ridges that may be pointed. Clypeus bearing ridges; folded transversely; juxtaocular bulges missing. Compound eye cone-shaped, in lateral view apparently positioned on a socket; protruding dorsally; with non-visual elongation.

THORAX. Ventral cervical sclerites present as two elements. Intercervical sclerite with median connection; forming torus intercervicals. Prosternum with basisternite and pre-episternites fused into T-shaped sclerite that is cranially elongated into a post-cervical plate. Pronotum at least twice as long as wide (excluding lateral lamellar expansions), or longer than wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoxal furrow, or as

wide at widest point as or wider than half the width of pronotum at supracoxal furrow; prozone longer than half of length of metazone, or shorter than half of length of metazone. External hearing organ present.

FORELEGS. F= 4 DS/1-12 AvS/4-5 PvS; T= 6-15 AvS/8-17 PvS. Coxa anterodistal apical lobes diverging; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove on anterior surface in proximal third of femur; femoral brush flat (at most slightly elevated); setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other, or arranged in two rows with proximal anteroventral spines short, blunt and standing in an alternating position closely together. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternately craniad or caudad. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines not separated by a depression, or flanking a ventral depression for accommodating the distal posteroventral spine of the tibia when leg is folded; first two spines closer together than remaining spines. Proximal (or only) discoidal spine not standing on elevated socket; if four discoidal spines are present, then 1 and 4 short (or of equal length), 2 longer, and 3 longest; proximal two spines not standing closer together compared to remaining discoidal spines; distal 2 spines not standing closer together compared to remaining discoidal spines. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apicad. Posteroventral spines becoming longer distad; all smaller and more closely arranged than anteroventral spines and recumbent (almost parallel to tibia) along the entire tibia. Tarsomere 1 no longer than remaining tarsomeres collectively, or longer than remaining tarsomeres collectively; shorter than fore tibia.

WALKING LEGS. Genicular spine present; meso- and metafemur with lobe-like expansions distally from middle or apically; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively; metatarsomere 1 no longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 with deep v-shaped notch and lateral spreading; ta2-ta4 with proximal elongation; ta4 enlarged compared to ta3 (1.5x longer); ta5

without medial euplantula (a narrow longitudinal ventral suture at most). Ungues equally long; shorter than tarsomere ta5.

WINGS. Males macropterous and females macropterous. Forewings are somewhat ellipsoid; lacking ventral teeth on costal rim; main veins distally bent or nearly straight (with one inflection). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; not reaching posterior wing margin (vanishing early in wing membrane or fusing with other veins); remigulum crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 6 or more branches, or with 4–5 branches. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP not sigmoid (slightly curved or straight); A2 absent. Male RA not branched; CuA branching, or not branching; anal veins with 8 or more anal veins (branches of A3 not counted individually); A3 branching once or twice, or branching 3–4 times. Female RA not branched; CuA branching, or not branched; anal veins with 8 or more anal veins (including A1, branches of A3 not counted individually); A3 branched once or twice, or branched 3–4 times.

ABDOMEN. Supra-anal plate wider than long, transverse; lacking ridge; nearly triangular, or rounded or almost semicircular, possibly slightly pointed. Female tergites lacking lateral lobe-like expansions, or with lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions, or with ventral lobe-like expansions; sternites lacking lateral lobe-like expansions, or with lateral lobe-like expansions. Male coxosternite 9 asymmetrical; lacking dorsal process; bearing stylus. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci entirely cylindrical or at most only terminal cercomere flattened; distal cercomere smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated and conical, or slightly flattened).

Male genitalia with two secondary distal processes present (one slightly curved); pda and paa not fused; afa long, acute and curved; afa lobes simple; afa flagellum missing; membrane pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with pronounced pilosity; ventral ridge of right phallomere elongated.

EMPUSIDAE

HEAD. Vertex with median head process symmetrical (strong and massive); lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge forming

a prominent medial spine; not folded transversely; with a single median ridge. Clypeus bearing ridges; not folded transversely, or folded transversely; juxtaocular bulges missing. Compound eye oval to globular; fitting within outline of head, not bulging or protruding; lacking non-visual elongation.

THORAX. Ventral cervical sclerites present, two visible. Intercervical sclerite with median connection; not forming torus intercervicals, or forming torus intercervicals. Prosternum with basisternite and pre-episternites fused into T-shaped sclerite that is cranially elongated into a post-cervical plate. Pronotum at least twice as long as wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoxal furrow, or as wide at widest point as or wider than half the width of pronotum at supracoxal furrow; prozone shorter than half of length of metazone. External hearing organ present.

FORELEGS. F= 4 DS/13-26 AvS/5-6 PvS; T= 6-15 AvS/8-17 PvS. Coxa anterodistal apical lobes diverging, or closed, medial edges not overlapping, or closed, with overlapping medial edges; lacking lanceolate elongation on ventral anterodistal apical lobe, or with lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove on anterior surface in proximal third of femur, or medially on anterior surface of femur, or distally of middle of femur; femoral brush flat (at most slightly elevated), or distinctly elevated; setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines alternating in a 1-3-1 pattern, one spine being long, followed by three short spines and another long one, the medial of the three short spines often being slightly longer than the other two; proximal 5-10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternately craniad or caudad. Posteroventral spines positioned on an elevated ridge; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded, or all strongly elongated and surpassing the tibia when leg is folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines flanking a ventral depression for accommodating the distal posteroventral spine of the tibia when leg is folded; first two spines closer together than remaining spines. Proximal (or only) discoidal spine not standing on elevated socket; if four discoidal spines are present, then 1 and 4 short (or of equal length), 2 longer, and 3 longest, or 1 shortest, 2 and 4 longer (or of equal length), and 3 longest, or 1, 2 and 3 becoming gradually longer, 4 much shorter than others; proximal two spines standing closely together (sometimes sharing a common elevation), or not standing closer together compared to remaining discoidal spines; distal 2 spines standing closely together (sometimes positioned

on a common elevation). Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding, or expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apicad. Posteroventral spines becoming longer distad; resembling anteroventral tibial spines, or reduced in size and recumbent in the proximal half of tibia at most, much smaller and more closely arranged than anteroventral spines. Tarsomere 1 longer than remaining tarsomeres collectively; shorter than fore tibia.

WALKING LEGS. Genicular spine present; meso- and metafemur lacking lobe-like expansions, or with lobe-like expansions distally from middle or apically; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively, or the same length as or longer than remaining tarsomeres collectively; metatarsomere 1 no longer than remaining tarsomeres collectively, or the same length as or longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 with deep v-shaped notch and lateral spreading; ta2-ta4 with proximal elongation; ta4 similar size to ta3 (<1.5x as long), or enlarged compared to previous tarsomere (1.5x longer); ta5 with medial euplantula. Ungues equally long; shorter than tarsomere ta5.

WINGS. Males macropterous and females macropterous, or brachypterous. Forewings are somewhat ellipsoid; with ventral teeth on costal rim; main veins distally bent or nearly straight (with one inflection), or at least partially sigmoid (with two inflections). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; not reaching posterior wing margin (vanishing early in wing membrane or fusing with other veins); remigulum crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 4–5 branches. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP not sigmoid (slightly curved or straight), or at least partially sigmoid (with two inflections); A2 absent. Male RA branching, or not branched; CuA branching; anal veins with 8 or more anal veins (branches of A3 not counted individually); A3 branching 5 times or more, or branching 3–4 times. Female RA not branched; CuA branching; anal veins with 8 or more anal veins (including A1, branches of A3 not counted individually), or with 5 and 8 anal veins (including A1, branches of A3 not counted individually); A3 branched 5 times or more, or branched 3–4 times.

ABDOMEN. Supra-anal plate wider than long, transverse; lacking ridge, or with ridge; rounded or almost semicircular, possibly slightly pointed. Female tergites lacking lateral lobe-like expansions, or with lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites

lacking ventral lobe-like expansions, or with ventral lobe-like expansions; sternites lacking lateral lobe-like expansions, or with lateral lobe-like expansions. Male coxosternite 9 asymmetrical; lacking dorsal process, or with dorsal process; bearing stylus. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci entirely cylindrical or at most only terminal cercomere flattened; distal cercomere smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated and conical, or slightly flattened).

Male genitalia with two secondary distal processes present (one slightly curved); pda and paa not fused; afa long, acute and curved; afa lobes simple, or bifurcate, or truncate to bilobate; afa flagellum missing membrane pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with pronounced pilosity; ventral ridge of right phallomere elongated.

HYMENOPODIDAE

HEAD. Vertex lacking median head process, or with median head process symmetrical (strong and massive), or with median head process symmetrical and massive at the base, becoming asymmetrical, flat and lobelike distally, or with median head process symmetrical, in the shape of a small spur behind ocelli; lacking processes or spines near area of lateral ocellus, or bearing processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide; with dorsal edge strongly rounded or angled, or forming a prominent medial spine; not folded transversely; with a single median ridge, or with two parallel ridges that may be pointed, or with three discernible ridges, or lacking ridges. Clypeus lacking ridges, or bearing ridges; not folded transversely, or folded transversely; juxtaocular bulges missing, or present. Compound eye cone-shaped, in lateral view apparently positioned on a socket, or oval to globular; fitting within outline of head, not bulging or protruding, or strong lateral bulging, or protruding dorsally; lacking non-visual elongation, or with non-visual elongation.

THORAX. Ventral cervical sclerites present as two elements. Intercervical sclerite with median connection; not forming torus intercervicals, or forming torus intercervicals. Prosternum with basisternite and pre-pisternites fused into T-shaped sclerite that is cranially elongated into a post-cervical plate. Pronotum at least twice as long as wide (excluding lateral lamellar expansions), or longer than wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoxal furrow, or as wide at widest point as or wider than half the width of pronotum at

supracoxal furrow; prozone longer than half of length of metazone, or shorter than half of length of metazone. External hearing organ present.

FORELEGS. F= 3-4 DS/6-19 AvS/4 PvS; T= 6-19 AvS/4-22 PvS. Coxa anterodistal apical lobes diverging, or closed, medial edges not overlapping; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove at base of femur, or on anterior surface in proximal third of femur, or distally of middle of femur; femoral brush flat (at most slightly elevated), or distinctly elevated; setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternatingly cranial or caudad. Posteroventral spines positioned evenly on ventral surface of femur, or positioned on an elevated ridge, or positioned individually on long sockets; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines not separated by a depression, or flanking a ventral depression for accommodating the distal posteroventral spine of the tibia when leg is folded; first two spines closer together than remaining spines, or spaced evenly with remaining spines. Proximal (or only) discoidal spine not standing on elevated socket; if four discoidal spines are present, then 1 and 4 short (or of equal length), 2 longer, and 3 longest, or 1 shortest, 2 and 4 longer (or of equal length), and 3 longest, or 1, 2 and 3 becoming gradually longer, 4 much shorter than others, or 1 shortest, followed by 4, then 2, and 3 longest; proximal two spines not standing closer together compared to remaining discoidal spines; distal 2 spines standing closely together (sometimes positioned on a common elevation), or not standing closer together compared to remaining discoidal spines; if 3 discoidal spines are present, then 1 short, 3 being longer and 2 longest, or 2 distinctly longer than 1, with 3 shortest; proximal two spines not standing closer together compared to remaining discoidal spine; distal two spines standing closely together (sometimes sharing a common elevation). Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding, or expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apicad. Posteroventral spines becoming longer distad; resembling anteroventral tibial spines, or reduced in size and recumbent in the proximal half of tibia at most, much smaller and more closely arranged than anteroventral spines, or all smaller and more closely arranged than anteroventral spines and recumbent (almost parallel to tibia) along the entire tibia, or at normal distances from each other, resembling anteroventral spines, width between spines usually

less than the diameter of one spine base) but recumbent. Tarsomere 1 longer than remaining tarsomeres collectively; shorter than fore tibia.

WALKING LEGS. Genicular spine present; meso- and metafemur lacking lobe-like expansions, or with lobe-like expansions in proximal third, or with lobe-like expansions distally from middle or apically, or with lobe-like expansions along entire femur or several lobes placed along entire length; meso- and metatibia lacking lobe-like expansions, or with lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively, or the same length as or longer than remaining tarsomeres collectively; metatarsomere 1 no longer than remaining tarsomeres collectively, or the same length as or longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 with deep v-shaped notch and lateral spreading; ta2-ta4 with proximal elongation; ta4 enlarged compared to ta3 (1.5x longer); ta5 without medial euplantula (a narrow longitudinal ventral suture at most), or with medial euplantula. Ungues equally long; shorter than tarsomere ta5.

WINGS. Males macropterous and females macropterous, or apterous. Forewings are somewhat ellipsoid; lacking ventral teeth on costal rim; main veins distally bent or nearly straight (with one inflection), or at least partially sigmoid (with two inflections). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; almost or entirely reaching posterior wing margin; remigulum crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 2–3 branches, or with 4–5 branches. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP not sigmoid (slightly curved or straight), or at least partially sigmoid (with two inflections); A2 absent. Male RA branching, or not branched; CuA branching; anal veins with 8 or more anal veins (branches of A3 not counted individually), or with 5 to 8 anal veins (branches of A3 not counted individually); A3 branching 5 times or more, or branching once or twice, or branching 3–4 times. Female RA not branched; CuA branching; anal veins with 8 or more anal veins (including A1, branches of A3 not counted individually), or with 5 and 8 anal veins (including A1, branches of A3 not counted individually); A3 branched 5 times or more, or branched once or twice, or branched 3–4 times.

ABDOMEN. Supra-anal plate wider than long, transverse; lacking ridge, or with ridge; rounded or almost semicircular, possibly slightly pointed. Female tergites lacking lateral lobe-like expansions, or with lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims, or with dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions, or with ventral lobe-like expansions; sternites lacking lateral lobe-like expansions, or with

lateral lobe-like expansions. Male coxosternite 9 asymmetrical, or symmetrical; lacking dorsal process; bearing stylus, or lacking stylus. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci entirely cylindrical or at most only terminal cercomere flattened; distal cercomere smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated and conical, or slightly flattened).

Male genitalia with two secondary distal processes present (one slightly curved); pda and paa not fused; afa long, acute and curved; afa lobes simple, or bifurcate, or truncate to bilobate; afa flagellum missing; membrane pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with pronounced pilosity; ventral ridge of right phallomere elongated.

DACTYLOPTERYGIDAE

HEAD. Vertex lacking median head process. Clypeus with juxtaocular bulges missing, or present. Compound eye oval to globular.

THORAX. With edges merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; prozone shorter than half of length of metazone. External hearing organ present.

FORELEGS. Lacking much data on foreleg spination, this family has four discoidal and four posteroventral spines on the forefemur. Tibial spur groove on anterior surface in proximal third of femur, or medially on anterior surface of femur; setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternately cranial or caudad. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines. Proximal (or only) discoidal spine not standing on elevated socket. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apical. Posteroventral spines becoming longer distad.

WALKING LEGS. Genicular spine present; meso- and metafemur lacking lobe-like expansions; meso- and metatibia lacking lobe-like expansions; lacking articulated sturdy spines. Euplantulae of tarsomeres ta4 enlarged compared to ta3 (1.5x longer).

WINGS. Males macropterous females macropterous, or brachypterous. Forewings are somewhat ellipsoid; lacking ventral teeth on costal rim. RA distal anterior not branched; fused with RP. A2 absent.

ABDOMEN. Supra-anal plate wider than long, transverse; rounded or almost semicircular, possibly slightly pointed. Cerci entirely cylindrical or at most only terminal cercomere flattened.

Male genitalia with two secondary distal processes present (straight, triangular, with rounded apex); pda and paa not fused; afa long, acute and curved; afa lobes bifurcate; afa flagellum without flagellum; lobo membranoso pilose; left phallomere fully sclerotized; proximal lobe (bl) on right side of ventral phallomere elongated; right phallomere with pronounced pilosity; ventral ridge of right phallomere elongated.

MANTIDAE

HEAD. Vertex lacking median head process; lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide, or almost square, nearly as wide as long, or distinctly longer than wide; with dorsal edge straight or slightly rounded, or strongly rounded or angled; not folded transversely; with two parallel ridges that may be pointed, or lacking ridges. Clypeus lacking ridges, or bearing ridges; not folded transversely, or folded transversely; juxtaocular bulges missing, or with present. Compound eye oval to globular; fitting within outline of head, not bulging or protruding, or strong lateral bulging, or slight lateral bulging; lacking non-visual elongation.

THORAX. Ventral cervical sclerites present, two visible. Intercervical sclerite with median connection; forming torus intercervicals. Prosternum with basisternite and pre-episternites fused into T-shaped sclerite that is cranially elongated into a post-cervical plate. Pronotum at least twice as long as wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoxal furrow, or as wide at widest point as or wider than half the width of pronotum at supracoxal furrow; prozone shorter than half of length of metazone. External hearing organ present.

FORELEGS. F= 4 DS/13-19 AvS/4 PvS; T= 6-19 AvS/8-17 PvS. Coxa anterodistal apical lobes diverging, or closed, medial edges not overlapping, or closed, with overlapping medial edges; lacking lanceolate

elongation on ventral anterodistal apical lobe. Tibial spur groove on anterior surface in proximal third of femur, or medially on anterior surface of femur; femoral brush flat (at most slightly elevated); setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternatingly craniad or caudad. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines flanking a ventral depression for accommodating the distal posteroventral spine of the tibia when leg is folded; first two spines closer together than remaining spines, or spaced evenly with remaining spines. Proximal (or only) discoidal spine not standing on elevated socket; if four discoidal spines are present, then 1 and 4 short (or of equal length), 2 longer, and 3 longest, or 1 shortest, 2 and 4 longer (or of equal length), and 3 longest, or 1 and 2 of equal length, 4 shortest, and 3 longest, or 2 and 4 very short, 1 longer, and 3 longest, or 1, 2 and 3 becoming gradually longer, 4 much shorter than others; proximal two spines standing closely together (sometimes sharing a common elevation), or not standing closer together compared to remaining discoidal spines; distal 2 spines not standing closer together compared to remaining discoidal spines; if 3 discoidal spines are present, then 2 distinctly longer than 1, with 3 shortest; proximal two spines not standing closer together compared to remaining discoidal spine; distal two spines not standing closer together compared to remaining discoidal spine. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apicad. Posteroventral spines becoming longer distad; resembling anteroventral tibial spines, or reduced in size and recumbent in the proximal half of tibia at most, much smaller and more closely arranged than anteroventral spines. Tarsomere 1 longer than remaining tarsomeres collectively; shorter than fore tibia.

WALKING LEGS. Genicular spine present, or absent; meso- and metafemur lacking lobe-like expansions, or with lobe-like expansions distally from middle or apically, or with lobe-like expansions along entire femur or several lobes placed along entire length; meso- and metatibia lacking lobe-like expansions, or with lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively, or the same length as or longer than remaining tarsomeres collectively; metatarsomere 1 no longer than remaining tarsomeres collectively, or the same length as or longer than

remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 with deep v-shaped notch and lateral spreading; ta2-ta4 with proximal elongation; ta4 similar size to ta3 (<1.5x as long), or enlarged compared to previous tarsomere (1.5x longer); ta5 without medial euplantula (a narrow longitudinal ventral suture at most), or with medial euplantula. Ungues equally long; shorter than tarsomere ta5.

WINGS. Males macropterous and females macropterous, or brachypterous. Forewings are somewhat ellipsoid; lacking ventral teeth on costal rim, or with ventral teeth on costal rim; main veins distally bent or nearly straight (with one inflection), or at least partially sigmoid (with two inflections). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA; CuA with 9 or more branches, or with 0–8 branches. A1 unbranched; not reaching posterior wing margin (vanishing early in wing membrane or fusing with other veins), or almost or entirely reaching posterior wing margin; remigulum crossed by anal veins; anal veins (including A1 and excluding jugal lobe) with 6 or more branches, or with 4–5 branches. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP not sigmoid (slightly curved or straight), or at least partially sigmoid (with two inflections); A2 absent. Male RA not branched; CuA branching; anal veins with 8 or more anal veins (branches of A3 not counted individually), or with fewer than 5 anal veins (including A1, branches of A3 not counted individually); A3 branching 5 times or more, or branching 3–4 times. Female RA branching, or not branched; CuA branching, or not branched; anal veins with 8 or more anal veins (including A1, branches of A3 not counted individually), or with 5 and 8 anal veins (including A1, branches of A3 not counted individually); A3 branched 5 times or more, or branched 3–4 times.

ABDOMEN. Supra-anal plate wider than long, transverse, or longer than wide, elongated; lacking ridge; nearly triangular, or rounded or almost semicircular, possibly slightly pointed. Female tergites lacking lateral lobe-like expansions, or with lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions, or with ventral lobe-like expansions; sternites lacking lateral lobe-like expansions, or with lateral lobe-like expansions. Male coxosternite 9 asymmetrical; lacking dorsal process; bearing stylus. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci entirely cylindrical or at most only terminal cercomere flattened, or strongly flattened as a whole or at least in distal half; distal cercomere smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated and conical, or slightly flattened), or strongly flattened but not forming a strongly enlarged lobe (less than twice as long as preceding cercomere).

Male genitalia with two secondary distal processes present (straight, triangular, with rounded apex); pda and paa not fused; afa long, acute and curved; afa lobes bifurcate; afa flagellum missing; membrane pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with pronounced pilosity; ventral ridge of right phallomere elongated.

DEROPLATYIDAE

HEAD. Vertex lacking median head process; lacking processes or spines near area of lateral ocellus. Lower frons transverse, distinctly shorter than wide, or almost square, nearly as wide as long; with dorsal edge straight or slightly rounded, or strongly rounded or angled; not folded transversely; lacking ridges. Clypeus lacking ridges; not folded transversely, or folded transversely; juxtaocular bulges missing, or with juxtaocular bulges. Compound eye oval to globular; fitting within outline of head, not bulging or protruding, or strong lateral bulging, or slight lateral bulging; lacking non-visual elongation, or with non-visual elongation.

THORAX. Ventral cervical sclerites present as two elements. Intercervical sclerite with median connection; not forming torus intercervicals, or forming torus intercervicals. Prosternum with basisternite and pre-episternites fused into T-shaped sclerite that is cranially elongated into a post-cervical plate. Pronotum at least twice as long as wide (excluding lateral lamellar expansions); with edges not merging smoothly with dorsal edge of fore femur; anterior duplicature not covering head; lamellar expansions narrower at widest point than half the width of pronotum at supracoxal furrow, or as wide at widest point as or wider than half the width of pronotum at supracoxal furrow; prozone shorter than half of length of metazone. External hearing organ present.

FORELEGS. F= 4 DS/13-19 AvS/4 PvS; T= 6-19 AvS/4-12 PvS. Coxa anterodistal apical lobes diverging, or closed, medial edges not overlapping, or closed, with overlapping medial edges; lacking lanceolate elongation on ventral anterodistal apical lobe. Tibial spur groove on anterior surface in proximal third of femur, or medially on anterior surface of femur, or distally of middle of femur; femoral brush flat (at most slightly elevated), or distinctly elevated; setae of femoral brush standing closely together and forming a clearly defined area. Femur spination arranged in two rows with anteroventral spines standing close to each other. Anteroventral spines distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most; proximal 5–10 spines standing in a single row, the proximal spines alternating slightly at most or pointing alternately craniad or caudad. Posteroventral spines positioned evenly on ventral surface of femur; not strongly elongated (except for possibly the proximal

spine) and not dorsally surpassing the tibia when the leg is folded. Proximal spine almost as long as remaining spines; proximal posteroventral spines not separated by a depression, or flanking a ventral depression for accommodating the distal posteroventral spine of the tibia when leg is folded; first two spines closer together than remaining spines, or spaced evenly with remaining spines. Proximal (or only) discoidal spine not standing on elevated socket; if four discoidal spines are present, then 1 and 4 short (or of equal length), 2 longer, and 3 longest, or 1, 2 and 3 becoming gradually longer, 4 much shorter than others; proximal two spines standing closely together (sometimes sharing a common elevation), or not standing closer together compared to remaining discoidal spines; distal 2 spines not standing closer together compared to remaining discoidal spines. Tibia bearing anteroventral spines; bearing posteroventral spines; tibial spur present. Antero- and posteroventral edges not expanding; with spines present and positioned in two ventral rows. Anteroventral spines increasing in length distally; distal two or three spines inserting ventrally and pointing ventro-apicad. Posteroventral spines becoming longer distad, or becoming longer distad in the proximal third, then becoming short and increasing in length again; resembling anteroventral tibial spines. Tarsomere 1 no longer than remaining tarsomeres collectively, or longer than remaining tarsomeres collectively; shorter than fore tibia.

WALKING LEGS. Genicular spine present; meso- and metafemur lacking lobe-like expansions, or with lobe-like expansions distally from middle or apically, or with lobe-like expansions along entire femur or several lobes placed along entire length; meso- and metatibia lacking lobe-like expansions, or with lobe-like expansions; lacking articulated sturdy spines. Mesotarsomere 1 no longer than remaining tarsomeres collectively, or the same length as or longer than remaining tarsomeres collectively; metatarsomere 1 no longer than remaining tarsomeres collectively, or the same length as or longer than remaining tarsomeres collectively. Euplantulae of tarsomeres ta1-ta3 with deep v-shaped notch and lateral spreading; ta2-ta4 with proximal elongation; ta4 enlarged compared to ta3 (1.5x longer); ta5 without medial euplantula (a narrow longitudinal ventral suture at most), or with medial euplantula. Ungues equally long; shorter than tarsomere ta5.

WINGS. Males macropterous, or brachypterous and females macropterous, or brachypterous. Forewings are somewhat ellipsoid; lacking ventral teeth on costal rim; main veins distally bent or nearly straight (with one inflection), or at least partially sigmoid (with two inflections). RA distal anterior not branched; fused with RP. Costal area between C and ScP in proximal part of wing as long as or longer than distance between ScP and RA; CuA with 0–8 branches. A1 unbranched; not reaching posterior wing margin (vanishing early in wing membrane or fusing with other veins); remigulum crossed by anal veins; anal veins (including A1

and excluding jugal lobe) with 2–3 branches. Hindwing, ScP ending beyond distal third of wing length; crossveins between CuA and CuP at least partially sigmoid (with two inflections); A2 absent. Male RA not branched; CuA branching; anal veins with 8 or more anal veins (branches of A3 not counted individually), or with 5 to 8 anal veins (branches of A3 not counted individually); A3 branching once or twice, or branching 3–4 times. Female RA not branched; CuA branching, or not branched; anal veins with 8 or more anal veins (including A1, branches of A3 not counted individually), or with 5 and 8 anal veins (including A1, branches of A3 not counted individually); A3 branched once or twice.

ABDOMEN. Supra-anal plate wider than long, transverse; lacking ridge, or with ridge; rounded or almost semicircular, possibly slightly pointed. Female tergites lacking lateral lobe-like expansions, or with lateral lobe-like expansions; lacking dorsal lobe-like expansions or distinctly pulled-out posterior rims. Sternites lacking ventral lobe-like expansions; sternites lacking lateral lobe-like expansions. Male coxosternite 9 asymmetrical; lacking dorsal process; bearing stylus. Female sternite s6 not covering s7; s6 without ventral spines; s7 without ventral spines. Cerci entirely cylindrical or at most only terminal cercomere flattened; distal cercomere smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated and conical, or slightly flattened).

Male genitalia with pda and paa not fused; afa long, acute and curved; afa lobes bifurcate; afa flagellum missing; lobo membranoso pilose; left phallomere fully sclerotized; proximal lobe on right side of ventral phallomere elongated; right phallomere with pronounced pilosity; ventral ridge of right phallomere elongated.

Appendix 3.8. List of 149 morphological characters and states, adapted from Wieland (2013) and augmented for African taxa.

Median head process

- 1) absent
- 2) symmetrical, strong and massive
- 3) symmetrical, massive at the base and becoming asymmetrical (flat and lobe-like) distally
- 4) symmetrical, in the shape of a small spur behind ocelli

Processes or spines on lateral ocellus

- 1) present
- 2) absent

Development of anterior of ocellus

- 1) reduced to 2
- 2) normally developed with 3 present

Sulcus bordering lower frons

- 1) absent
- 2) present

Lower frons

- 1) transverse, distinctly shorter than wide
- 2) almost square, nearly as wide as long
- 3) distinctly longer than wide

Dorsal edge of lower frons

- 1) straight or slightly rounded

2) strongly rounded or angled

3) forming a prominent medial spine

Transverse folding of lower frons

1) strongly folded transversely (nearly 90°)

2) not folded transversely

Ridges on lower frons

1) with a single median ridge

2) with two parallel ridges that may be pointed

3) with three discernible ridges

4) lacking

Clypeus ridges

1) absent

2) present

Transverse folding of clypeus

1) absent

2) present

Juxtaocular bulges on clypeus

1) absent

2) present

Shape of Compound eye

1) reniform, partly wrapping around antennal bases

2) cone-shaped, in lateral view apparently positioned on a socket

3) oval to globular

Eye shape regarding head capsule

1) fitting within outline of head, not bulging or protruding

2) strong lateral bulging

3) slight lateral bulging

4) protruding dorsally

Non-visual elongation on eye

1) absent

2) present

Shape of male antennomeres

1) symmetrical without processes

2) asymmetrical and slightly extended to one side (*antenna imbricata*)

3) asymmetrical, pseudo-bipectinate (*antenna pectinata*)

4) asymmetrical, bipectinate (*antenna bipectinata*)

5) asymmetrical, bearing two rounded, flat, lobe-like extensions or an undivided, approximately heart-shaped lobe (*antenna lobata*)

Presence of ventral cervical sclerites

1) present, 2 visible

2) absent

3) present, one visible

Median connection of intercervical sclerite

1) absent

2) present

Formation of intercervical sclerites

1) not forming torus intercervicalis

2) forming torus intercervicalis

Sclerite of prosternum

1) basisternite and episternites not fused

2) basisternite and episternites fused into short T-shaped sclerite, not elongated into a plate

3) basisternite and episternites fused into T-shaped sclerite, elongated into a post-cervical plate

Pronotum length

1) wider than long (excluding lateral lamellar expansions)

2) at least twice as long as wide (excluding lateral lamellar expansions)

3) longer than wide (excluding lateral lamellar expansions)

Pronotum edges

1) not merging smoothly with dorsal edge of forefemur

2) merging smoothly with dorsal edge of forefemur

Anterior duplicature

1) covering caudal part of head at most

2) not covering head

3) covering head dorsally

Lamellar expansions

1) less wide at widest point than half the width of pronotum at supracoxal furrow

2) as wide at widest point as or wider than half the width of pronotum at supracoxal furrow

Supracoxal furrow of pronotum

- 1) absent
- 2) present

Length of prozone

- 1) longer than half of the length of metazone
- 2) shorter than half of length of metazone

External hearing organ

- 1) present
- 2) absent

External hearing organ of male

- 1) DK form in male
- 2) DNK form in male
- 3) DO form in male
- 4) POT form in male
- 5) missing in male (MSMT form)

External hearing organ of female

- 1) DK form in female
- 2) DNK form in female
- 3) DO form in female
- 4) POT form in female
- 5) missing in female (MSMT form)

Forecoxa with anterodistal apical lobes

- 1) diverging
- 2) closed, medial edges not overlapping
- 3) closed, with overlapping medial edges

Forecoxa with lanceolate elongation

- 1) lacking on ventral anterodistal apical lobe
- 2) present on ventral anterodistal apical lobe

Groove of tibial spur

- 1) absent
- 2) at base of femur
- 3) on anterior surface in proximal third of femur
- 4) medially on anterior surface of femur
- 5) distally of middle of femur

Femoral brush

- 1) lacking
- 2) flat (at most slightly elevated)
- 3) with distinctly elevated

Setae of femoral brush

- 1) standing closely together and forming a clearly defined area
- 2) standing far apart with area of grooming device not clearly defined

Forefemur spination

- 1) arranged in two rows with anteroventral spines standing close to each other
- 2) arranged in two rows with anteroventral spines standing widely separated from each other

3) arranged in two rows with proximal anteroventral spines short, blunt and standing in an alternating position closely together

4) missing except for a single discoidal spine

5) with only four anteroventral spines, posteroventral spines missing

6) arranged in two rows of very small but still pointed and elevated remnants of spines

Anteroventral spines

1) almost equal or only slightly alternating

2) distinctly alternating (one short spine followed by one long spine) with distal spines of an alternative pattern at most

3) alternating in a 1-3-1 pattern, one spine being long, followed by three short spines and another long one

4) proximally shifted together, small and blunt

5) large and plate-like flattened

6) absent

Proximal 5-10 anteroventral spines

1) standing in a single row, the proximal spines alternating slightly at most or pointing alternately cranial or caudal

2) distinctly alternating positions, therefore standing in two distinct rows

Largest number of anteroventral spines in male

1) absent

2) ranging between 13-19

3) ranging between 1-5

4) ranging between 6-12

5) ranging between 20-25

6) being 26 or more

Largest number of anteroventral spines in female

1) absent

2) ranging between 13-19

3) ranging between 1-5

4) ranging between 6-12

5) ranging between 20-25

6) being 26 or more

Posteroventral spines of forefemur

1) present (1-3 visible)

2) present (4 visible)

3) present (5 visible)

4) present (6 or more visible)

5) missing

Position of posteroventral spines

1) evenly spaced on ventral surface of femur

2) on an elevated ridge

3) individually placed in long sockets

Length of posteroventral spines

1) not strongly elongated (except for possibly the proximal spine) and

not dorsally surpassing the tibia when the leg is folded

2) all strongly elongated and surpassing the tibia when leg is folded

3) with the proximal two posteroventral spines distinctly longer than the remaining posteroventral spines

Proximal posteroventral spine

1) almost as long as remaining spines

2) several times longer and much thicker than remaining spines

Proximal posteroventral spines

1) not separated by a ventral depression

2) with a ventral depression for accommodating the distal posteroventral spine of the tibia when leg is folded

First two posteroventral spines

1) closer together than remaining spines

2) spaced evenly with remaining spines

Discoidal spines <Wieland character 55>

1) absent

2) present (1 visible)

3) present (2 visible)

4) present (3 visible)

5) present (4 visible)

Proximal (or only) discoidal spine

1) standing on elevated socket

2) not standing on elevated socket

If four discoidal spines are present, then their arrangement is

- 1) 1 and 4 short (or of equal length), 2 longer, and 3 longest
- 2) 1 shortest, 2 and 4 longer (or of equal length), and 3 longest
- 3) 1 and 4 short (or of equal length), 2 and 3 distinctly longer (or of equal length)
- 4) 1 and 2 of equal length, 4 shortest, and 3 longest
- 5) 2 and 4 very short, 1 longer, and 3 longest
- 6) 1, 2 and 3 becoming gradually longer, 4 much shorter than others
- 7) 1 shortest, followed by 4, then 2, and 3 longest

If four discoidal spines are present, then proximal two spines

- 1) standing closely together (sometimes sharing a common elevation)
- 2) not standing closer together compared to remaining discoidal spines

If four discoidal spines are present, then distal 2 spines

- 1) standing closely together (sometimes positioned on a common elevation)
- 2) not standing closer together compared to remaining discoidal spines

If three discoidal spines are present, then their arrangement is

- 1) 1 short, 3 being longer and 2 longest
- 2) 2 distinctly longer than 1, with 3 shortest
- 3) 1, 2 and 3 becoming gradually shorter

If three discoidal spines are present, then proximal two spines

- 1) standing closely together (sometimes sharing a common elevation)
- 2) not standing closer together compared to remaining discoidal spine

If three discoidal spines are present, then distal two spines

- 1) standing closely together (sometimes sharing a common elevation)

2) not standing closer together compared to remaining discoidal spine

Dorsal edge of foretibia

1) strongly curved, not parallel to ventral edge

2) straight, almost parallel to ventral edge

Anteroventral spines of foretibia

1) present

2) absent

Posteroventral spines of foretibia

1) present

2) absent

Foretibia

1) straight or curved (without strong medial folding)

2) with distal part of tibia strongly folded (almost 90° with respect to proximal tibia in lateral view)

Foretibia length

1) more than half as long as forefemur

2) half as long as forefemur or shorter

Tibial spur

1) absent

2) distinctly shorter than one fifth the length of foretibia (or forming the tip of the apical tibial lobe)

3) shorter than one fifth of foretibia but tibia very long and slender

4) one fifth as long as foretibia or longer

Antero- and posteroventral edges of foretibia

1) not expanding

2) expanding

Anteroventral spines of foretibia

1) present and positioned in two ventral rows

2) present and positioned in two rows (only a few spines distal spines shifted dorsad)

3) present anteroventrally and absent posteroventrally

4) absent except for tibial spur

Length of anteroventral spines of foretibia

1) nearly equally long

2) increasing in length distally

3) alternating irregularly long

4) spines irregularly positioned on tibia or only a single spine present

5) becoming longer distally (becoming short in the distal third and increasing in length again)

Distal two or three anteroventral spines of foretibia

1) inserting ventrally and pointing ventro-apicad

2) inserting anteriorly to dorsally and distinctly pointing dorso-apicad

Largest number of anteroventral spines in male

1) ranging between 1-5 (excluding tibial spur)

2) ranging between 6-12 (excluding tibial spur)

3) ranging between 13-15 (excluding tibial spur)

4) ranging between 16-19 (excluding tibial spur)

5) ranging between 20-25 (excluding tibial spur)

6) 26 or greater (excluding tibial spur)

Largest number of anteroventral spines in female

1) ranging between 1-5 (excluding tibial spur)

2) ranging between 6-12 (excluding tibial spur)

3) ranging between 13-15 (excluding tibial spur)

4) ranging between 16-19 (excluding tibial spur)

5) ranging between 20-25 (excluding tibial spur)

6) 26 or greater (excluding tibial spur)

Length of posteroventral spines of foretibia

1) nearly equally long

2) becoming longer distad

3) becoming longer distad in the proximal third, then becoming short and increasing in length again

4) irregularly positioned on tibia or only a single spine present

Orientation of posteroventral spines of foretibia

1) resembling anteroventral tibial spines <normal condition standing closely together with less than the width of one spine base between them, not recumbent>

2) reduced in size and recumbent in the proximal half of tibia at most, much smaller and more closely arranged than anteroventral spines

3) all smaller and more closely arranged than anteroventral spines and recumbent (almost parallel to tibia) along the entire tibia

4) at normal distances from each other, resembling anteroventral spines, width between spines usually less than the diameter of one spine base) but recumbent

5) oblique to a normal degree (resembling anteroventral spines) but with wide space between the spines (usually more than width of a spine base)

Largest number of posteroventral spines in male

- 1) ranging between 1-3 (excluding tibial spur)
- 2) ranging between 4-7 (excluding tibial spur)
- 3) ranging between 8-12 (excluding tibial spur)
- 4) ranging between 13-17 (excluding tibial spur)
- 5) ranging between 18-21 (excluding tibial spur)
- 6) 22 or greater (excluding tibial spur)

Largest number of posteroventral spines in female

- 1) ranging between 1-3 (excluding tibial spur)
- 2) ranging between 4-7 (excluding tibial spur)
- 3) ranging between 8-12 (excluding tibial spur)
- 4) ranging between 13-17 (excluding tibial spur)
- 5) ranging between 18-21 (excluding tibial spur)
- 6) 22 or greater (excluding tibial spur)

Foreleg with tarsomere 1

- 1) no longer than remaining tarsomeres collectively
- 2) longer than remaining tarsomeres collectively

Foreleg with tarsomere 1 <Wieland character 81>

1) shorter than foretibia

2) equal to or longer than foretibia

Genicular spine of meso- and metathoracic legs

1) present

2) absent

Meso- and metathoracic femur with lobe-like expansions

1) absent

2) present in proximal third

3) present medially

4) present distally from middle or apically

5) present along entire femur or several lobes placed along entire length

Meso- and metathoracic femur with articulated spines

1) present

2) absent

Meso- and metathoracic tibia with lobe-like expansions

1) absent

2) present

Meso- and metathoracic tibia with articulated spines

1) present

2) absent

Shape of meso- and metathoracic tibia

1) nearly parallel-sided

2) strongly asymmetrical in some areas and/or having a partially swollen appearance

Length of metathoracic tibia

1) no longer than metathoracic femur

2) longer than metathoracic femur

Mesothoracic tarsomere 1

1) no longer than remaining tarsomeres collectively

2) the same length as or longer than remaining tarsomeres collectively

Metathoracic tarsomere 1

1) no longer than remaining tarsomeres collectively

2) the same length as or longer than remaining tarsomeres collectively

Metathoracic tibia of male

1) longer than metathoracic femur

2) not longer than metathoracic femur

Metathoracic tibia of female

1) longer than metathoracic femur

2) not longer than metathoracic femur

Euplantulae of tarsomeres 2-4

1) not proximally elongated

2) with proximal elongation

Euplantulae of tarsomes 1-3

1) without deep v-shaped notch or lateral spreading

2) with deep v-shaped notch and lateral spreading

Euplantulae of tarsomere 4

- 1) similar size to previous tarsomere (<1.5x as long)
- 2) enlarged compared to previous tarsomere (1.5x longer)

Tarsomere 5

- 1) without medial euplantula (a narrow longitudinal ventral suture at most)
- 2) with medial euplantula

Arolium of tarsomere 5

- 1) present
- 2) absent

Anterior and posterior ungues of tarsomere 5

- 1) equally long
- 2) being different lengths

Length of ungues

- 1) shorter than tarsomere ta5
- 2) longer than tarsomere ta5

Wings of adult females

- 1) macropterous
- 2) brachypterous
- 3) apterous

Wings of adult male

- 1) macropterous
- 2) brachypterous

3) apterous

Forewing venation

1) with a pseudo-vein

2) with an elongated stigma

3) is somewhat ellipsoid

Coastal rim of forewing

1) lacking ventral teeth

2) with ventral teeth

Main veins of forewing

1) distally bent or nearly straight (with one inflection)

2) at least partially sigmoid (with two inflections)

ScP of forewing

1) ending proximal to middle of wing length

2) ending beyond distal third of wing length

RA distal anterior of forewing

1) branching towards C

2) not branched

RP and M of forewing

1) not fused

2) fused

Posterior branching of RA of forewing

1) fused with RP

2) not fused with RP

Area between C and ScP in proximal part of forewing

1) at least twice as long as distance between ScP and RA

2) only slightly longer or as long as distance between ScP and RA

CuA of forewing

1) with 9 or more branches

2) with 0-8 branches

CuP shape in male

1) simply curved (with one inflection)

2) sigmoidally curved (with two inflections)

CuP shape in female

1) simply curved (with one inflection)

2) sigmoidally curved (with two inflections)

Branching of A1 of forewing

1) unbranched

2) branched

Length of A1 of forewing

1) not reaching posterior wing margin (vanishing early in wing membrane or fusing with other veins)

2) almost or entirely reaching posterior wing margin

Remigulum of forewing

1) not crossed by anal veins

2) crossed by anal veins

Anal veins of forewing (including A1 and excluding remigulum)

- 1) with 6 or more branches
- 2) with 2-3 branches
- 3) with 4-5 branches

Stigma <Wieland character 118>

- 1) absent
- 2) present

ScP of hindwing

- 1) ending proximal of middle of wing length
- 2) ending beyond distal third of wing length

Crossveins between CuA and CuP of hindwing

- 1) not sigmoid (slightly curved or straight)
- 2) at least partially sigmoid (with two inflections)

A2 of hindwing <Wieland character 129>

- 1) simple
- 2) absent

Male RA of hindwing

- 1) branching
- 2) not branched

Male CuA of hindwing

- 1) branching
- 2) not branching

Male anal veins of hindwing

- 1) with 8 or more anal veins (branches of A3 not counted individually)
- 2) with fewer than 5 anal veins (including A1, branches of A3 not counted individually)
- 3) with 5 to 8 anal veins (branches of A3 not counted individually)

Male A3 of hindwing

- 1) branching 5 times or more
- 2) branching once or twice
- 3) branching 3-4 times

Female RA of hindwing

- 1) branching
- 2) not branched

Female CuA of hindwing

- 1) branching
- 2) not branched

Female anal veins of hindwing

- 1) with 8 or more anal veins (including A1, branches of A3 not counted individually)
- 2) with less than 5 anal veins (including A1, branches of A3 not counted individually)
- 3) with 5 and 8 anal veins (including A1, branches of A3 not counted individually)

Female A3 of hindwing

- 1) branched 5 times or more
- 2) branched once or twice
- 3) branched 3-4 times

Length of supra-anal plate

- 1) nearly as long as wide, roughly square
- 2) wider than long, transverse
- 3) longer than wide, elongated

Ridge of supra-anal plate

- 1) absent
- 2) present

Shape of supra-anal plate

- 1) notched and therefore with two rounded or pointed lobes
- 2) almost rectangular
- 3) nearly triangular
- 4) rounded or almost semicircular, possibly slightly pointed

Female tergites

- 1) lacking lateral lobe-like expansions
- 2) with lateral lobe-like expansions

Female tergites

- 1) lacking dorsal lobe-like expansions (or distinctly pulled-out posterior rims)
- 2) with dorsal lobe-like expansions (or distinctly pulled-out posterior rims)

Female sternites

- 1) lacking ventral lobe-like expansions
- 2) with ventral lobe-like expansions

Female sternites

1) lacking lateral lobe-like expansions

2) with lateral lobe-like expansions

Male coxosternite 9

1) asymmetrical

2) symmetrical

Male coxosternite 9 with dorsal process

1) absent

2) present

Male coxosternite 9 with stylus

1) present

2) absent

Female sternite 7

1) not covered by sternite 6

2) covered by sternite 6

Ventral spines of female sternite 7

1) absent

2) present

Ventral spines of female sternite 6

1) absent

2) present

Cerci shape in cross-section

1) entirely cylindrical or at most only terminal cercomere flattened

2) strongly flattened as a whole or at least in distal half

Distal cercomere

1) smaller than remaining cercomeres or less than twice as long as preceding cercomere (sometimes slightly elongated into a coneshape, or slightly flattened)

2) strongly flattened but not forming a strongly enlarged lobe (less than twice as long as preceding cercomere)

3) strongly flattened and forming a strongly enlarged lobe (more than twice as long as preceding cercomere)

Largest number of cercomeres in males

1) with 20-22 cercomeres

2) with 8 or fewer cercomeres

3) with 9-11 cercomeres

4) with 12-15 cercomeres

5) with 16-19 cercomeres

6) with 23 or more cercomeres

Largest number of cercomeres in females

1) with 20-22 cercomeres

2) with 8 or fewer cercomeres

3) with 9-11 cercomeres

4) with 12-15 cercomeres

5) with 16-19 cercomeres

6) with 23 or more cercomeres

Female ovipositor

- 1) entirely hidden
- 2) slightly protruding

Gonapophysis 8

- 1) not strongly sclerotized with hook-shaped distal ends
- 2) strongly sclerotized with hook-shaped distal ends

Male genitalia, pda

- 1) membranous
- 2) sclerotized

Male genitalia, position of pda

- 1) situated at apex of ventral phallomere
- 2) translocated to left side of ventral phallomere

Male genitalia, sdp

- 1) missing
- 2) present, one visible
- 3) present, two visible (one slightly curved)
- 4) present, two visible (straight, triangular, with rounded apex)

Male genitalia, paa

- 1) missing
- 2) rounded apical margin

Male genitalia, pda and paa

1) fused

2) not fused

Male genitalia, afa

1) missing

2) broad, triangular or sinuous, spiny

3) long, acute and curved

Male genitalia, afa lobes

1) absent

2) simple

3) bifurcate

4) truncate to bilobate

Male genitalia, afa <flagellum>

1) afa missing

2) with flagellum

3) without flagellum

Male genitalia, loa

1) not pilose

2) pilose

Male genitalia, left phallomere

1) partially sclerotized

2) fully sclerotized

Male genitalia, growths of left phallomere

- 1) without proximal lobe (bl) on right side of ventral phallomere
- 2) proximal lobe (bl) on right side of ventral phallomere (not elongated)
- 3) proximal lobe (bl) on right side of ventral phallomere elongated

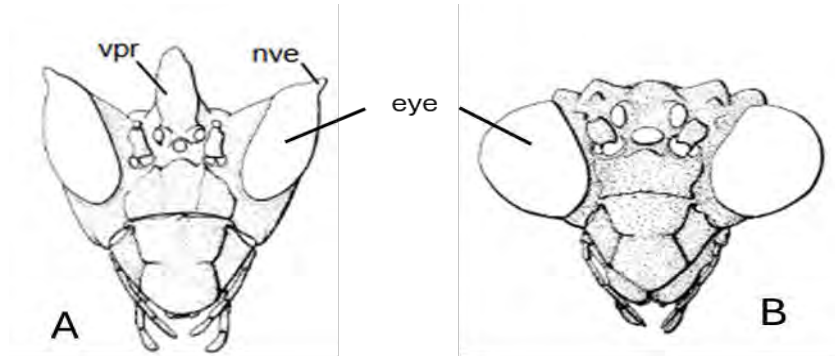
Male genitalia, right phallomere

- 1) with no or indistinct pilosity
- 2) with pronounced pilosity

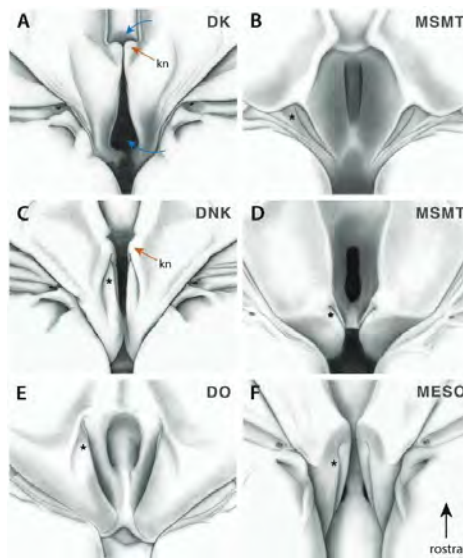
Male genitalia, ridge of right phallomere

- 1) not elongated
- 2) elongated

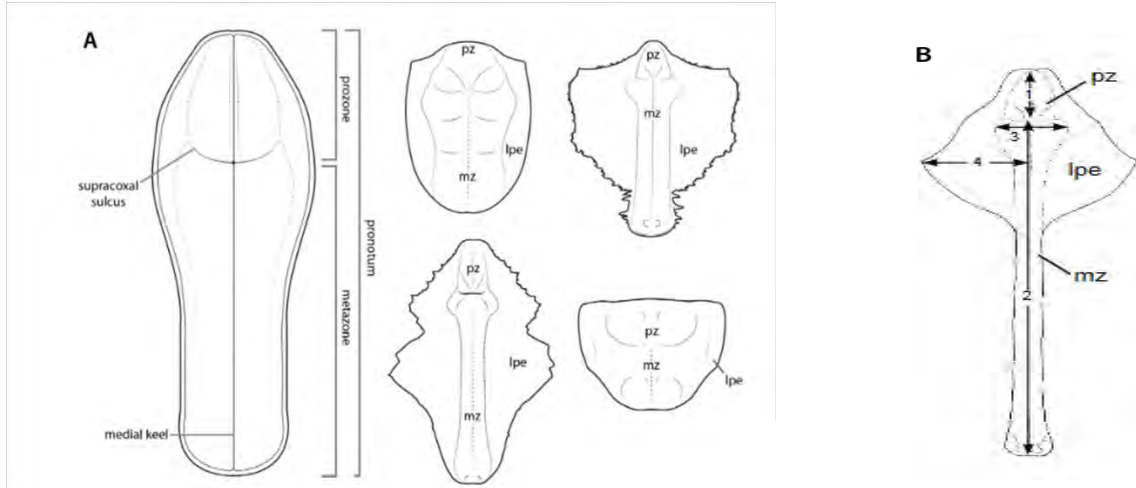
Appendix 3.9. Supplementary images and diagrams related to the key to extant, adult praying mantises (Fig. 3.1).



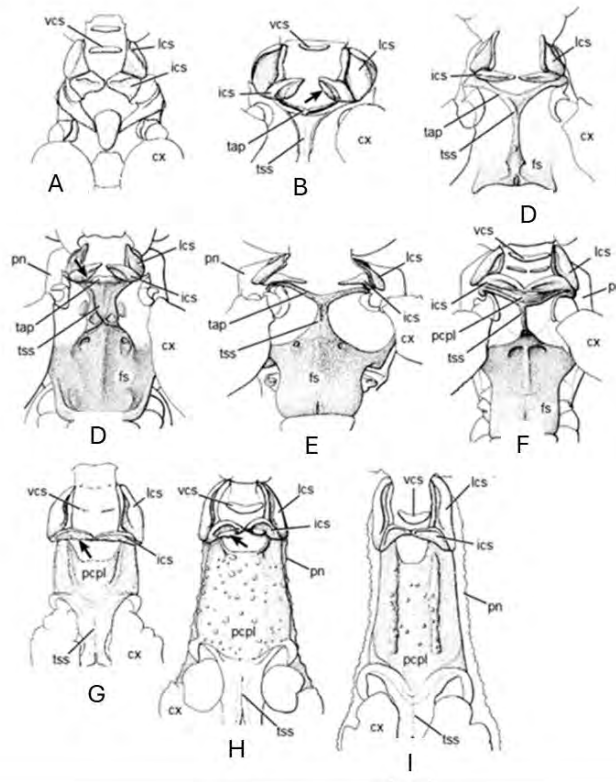
Annotated diagram of mantodean head showing the eye, non-visual elongation (nve), and the vertical process (vpr) (Wieland 2013). Relevant to decisions 10 and 13.



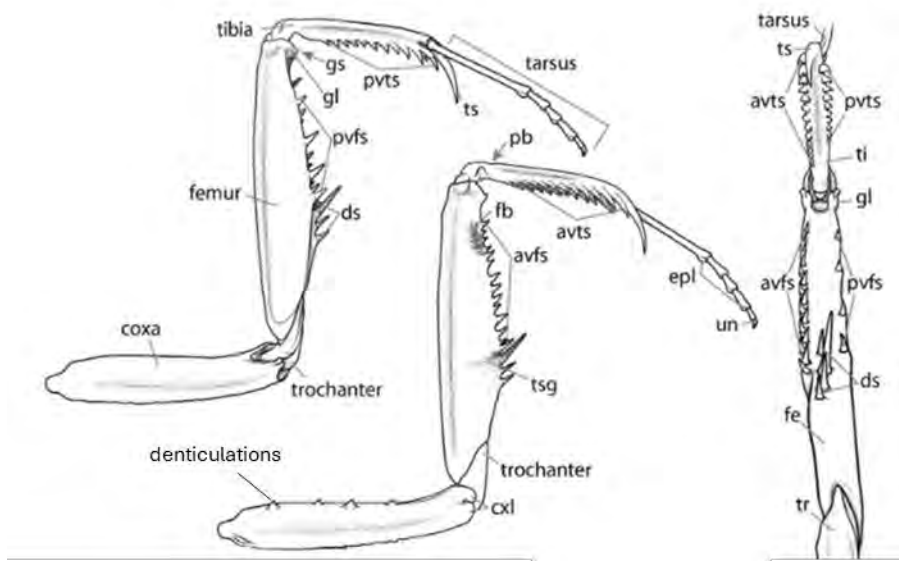
Various forms of external hearing organs in diagrams A (form DK), C (form DNK), E (form DO) and F (form MESO). External hearing organ absent (form MSMT) in diagrams B and D (Brannoch *et al.* 2017). Relevant to decision 1.



Annotated diagram of mantodean pronotum showing prozone (pz), metazone (mz), and lamellar expansions (lpe) (Brannoch *et al.* 2017). The width and length of each of these zones are depicted by horizontal and vertical arrows, respectively (Wieland 2013). Relevant to decisions 2, 6, and 16.



Annotated diagram showing various arrangements and number of ventral cervical sclerites (vcs) in diagrams A, B, F, G, H and I, and the lack of ventral cervical sclerites in diagrams C, D and E (Wieland 2013). Relevant to decision 8.



Annotated diagram showing the general shape of the mantodean foreleg and the position of the various spines (Brannoch *et al.* 2017). Relevant abbreviations: coxa (cx), trochanter (tr), femur (fe), tibia (ti), discoidal spines (ds), anteroventral femoral spines (avfs), posteroventral femoral spines (pvfs), anteroventral tibial spines (avts), posteroventral tibial spines (pvts), tibial spines (ts). Relevant to decisions 3, 4, 7, 9, 18 and 23.

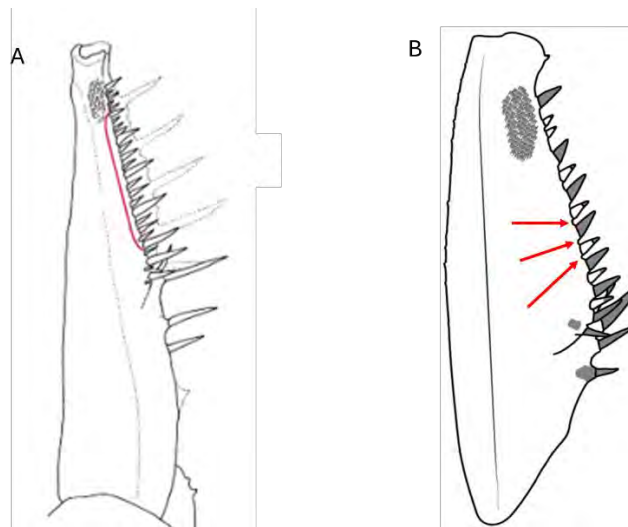


Diagram of anteroventral area of the forefemur showing 1-3-1 spine pattern in A (Svenson *et al.* 2015) and crenulations in between spines in B (Rodrigues *et al.* 2017). Relevant to decision 12 and 21.

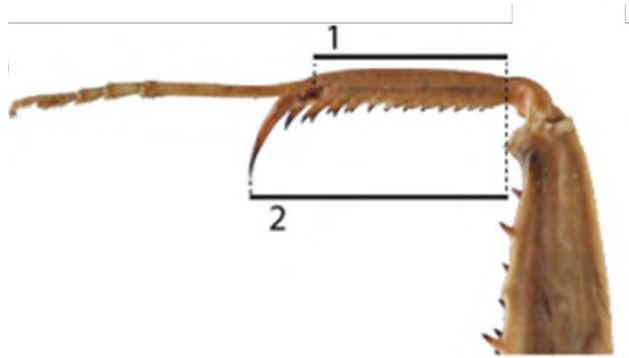


Photo of foretibia showing the length of tibia without the tibial spur (1) compared to with the tibial spur (2) (Brannoch *et al.* 2017). Relevant to decision 20.



Photograph showing the enlarged metafemur of Amelidae (Paolo *et al.* 2020). Relevant to decision 26.

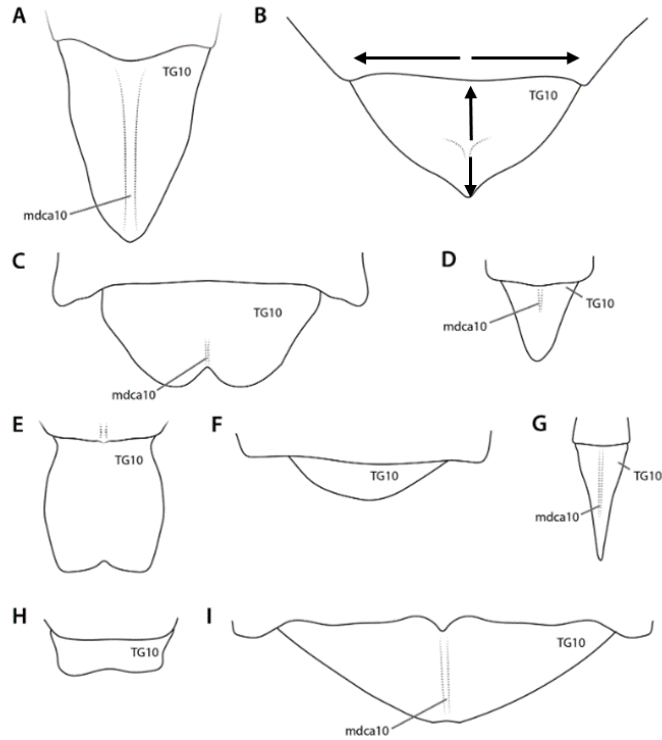
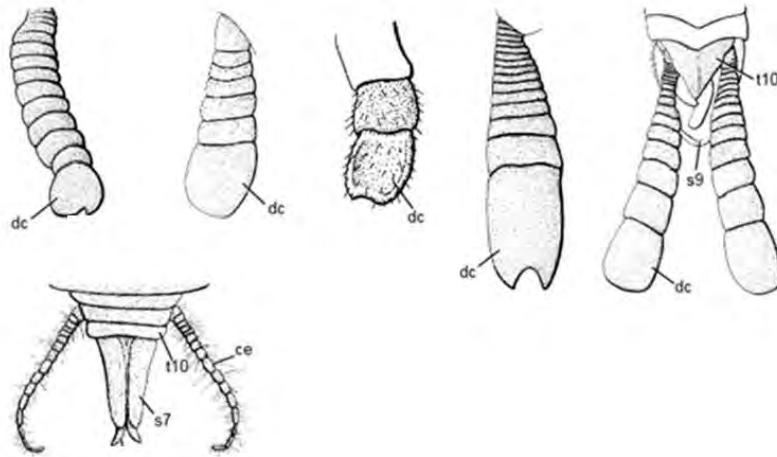


Diagram showing various shapes of the supra-anal plate (tergite 10, TG10) (Brannoch *et al.* 2017). Rounded to semicircular shapes are present in diagrams C, F and I; and triangular to trapezoidal shapes in diagrams A, B, D, E, G and H. The width and length of each of these zones are depicted by horizontal and vertical arrows, respectively. Relevant to decisions 11 and 14.



Annotated diagram showing various shapes of the mantodean cerci (ce) and distal cercomere (dc) (Wieland 2013). Relevant to decisions 5, 17 and 19.