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PHASMID STUDIES

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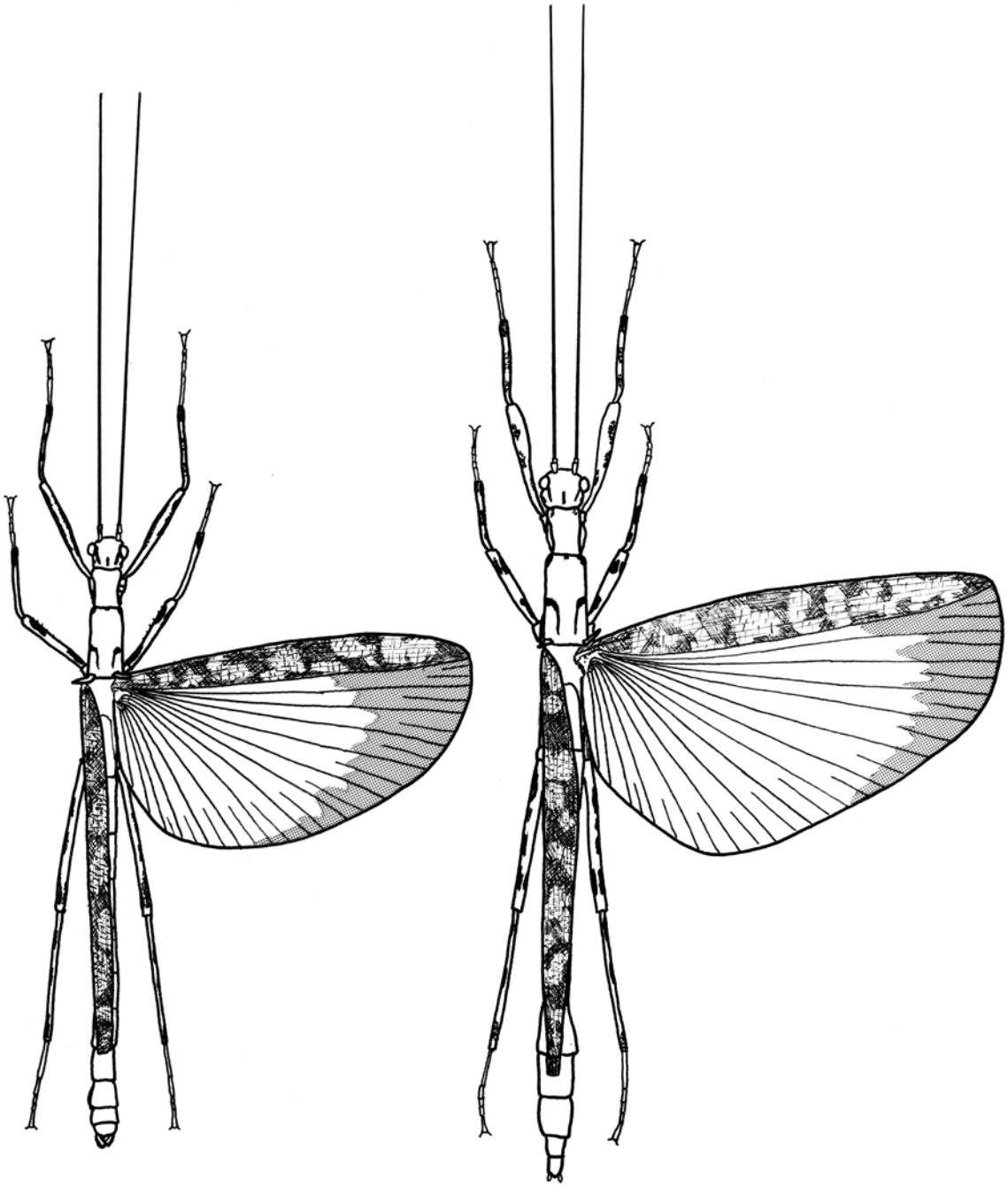
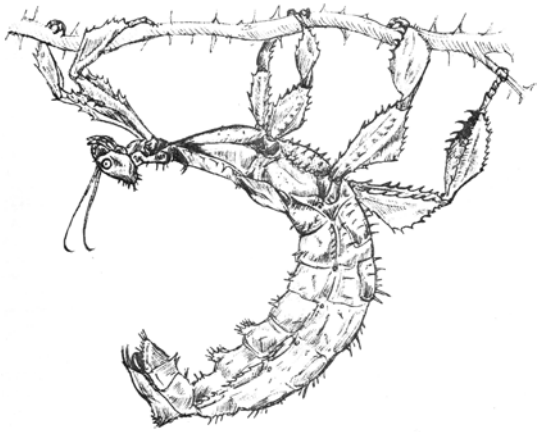


Produced by the Phasmid Study Group

The Phasmid Study Group.



The Phasmid Study Group (PSG) was formed in 1980 to foster the study of phasmids. The group currently has several hundred members worldwide. The membership ranges from young children to professional entomologists. The PSG holds regular meetings and presents displays at all the major entomological exhibitions in the U.K. The PSG places emphasis on study by rearing and captive breeding and has a panel of breeders who distribute livestock to other members. The PSG produces two publications which are issued free to members.

The Phasmid Study Group Newsletter is issued quarterly and contains news items, livestock information, details of exhibitions and meetings, and a variety of short articles on all aspects of phasmids.

Phasmid Studies is issued on-line and in print. Typically it is produced biannually, in March and September, but this is currently under review. It contains longer articles on all aspects of phasmids, with an emphasis on natural history, captive breeding, taxonomy, and behavioural studies. Each issue contains abstracts of papers from other recent publications.

Details of membership may be obtained from the **Treasurer and Membership Secretary, Paul Brock, "Papillon", 40 Thorndike Road, Slough, Berks, SL2 1SR, U.K.**
Annual subscription rates are currently: U.K. £12.00; Europe £14.00; Worldwide £15.00.

Phasma.

This is a Dutch-Belgian group with similar aims to the Phasmid Study Group. It produces a quarterly newsletter, *Phasma*, which is published in Dutch. Regular meetings are held in Belgium or the Netherlands.

Details of *Phasma* may be obtained from **Kristien Rabaey, Nieuwpoortkeiweg 39, B-8630 Veurne, Belgium.**

Contributions

1. Articles are welcome from anyone and the editor is prepared to offer advice and help to contributors. The editor would like to encourage people with no previous experience to write articles for *Phasmid Studies*.
2. Articles are reviewed by independent referees at the discretion of the editor.
3. Articles are accepted for publication in *Phasmid Studies* on the understanding that they may be translated and reproduced in *Phasma*.
4. Authors will be provided with a pdf file of their paper for distribution.
5. Contributions should be addressed to: **Dr. P.E. Bragg, 8 The Lane, Awsworth, Nottinghamshire, NG16 2QP, U.K.** or emailed to **Pbragg@aol.com** with "Phasmid Studies" in the subject box.

Instructions to authors

Articles for publication in *Phasmid Studies* may be submitted in printed form or by email, however if submitted by email authors are advised to contact the editor in advance. Refer to a recent copy of *Phasmid Studies* for layout of articles. In particular the following points should be noted.

1. The title should be followed by the author(s) name and address, an abstract, a list of key words, an introduction (if necessary), the main article, and finally a list of references.
2. The abstract should briefly summarise the article. For short articles one or two sentences should suffice; for longer articles the abstract should not exceed 400 words.
3. A list of key words should be given. These should cover the main topics in the article but there should not be more than 25 key words.
4. All titles and headings should be in bold print and not underlined. The main title and all side-headings should be aligned on the left hand side of the page. If the article is lengthy major headings may be created by using centred headings in bold print.
5. Paragraphs should be indented using a single tab setting (not character spaces).
6. The full stop at the end of sentences should be followed by a **double** space. Full stops not at the end of a sentence should be followed by a single space.
7. Scientific names should be in italics. On the first usage names should be given in full, followed by the name of the author. On subsequent occasions the genus should be abbreviated to a single letter followed by a full stop, and the author should be omitted.
8. English, not American, spellings should be used throughout.
9. Numbers between one and ten should be spelled out while numerals should be used for 11 and above; the exceptions to this are where measurements are involved, or in descriptions of insects, in both cases numerals may be used throughout.
10. Where measurements are given a space should not be left between numerals and units e.g. 6mm, not 6 mm.
11. References in the text should include the author and date, and page number if appropriate, these should be given in the form Smith (1982: 123), or (Smith, 1982: 123). In the references section, the names of authors and the volume numbers of journals should be printed in bold. Journal titles and book titles should be given **in full** (not abbreviated) and should be printed in italics.
12. Illustrations must have printed (not handwritten) labels.
13. Drawings should be in black ink and on separate sheets of paper, not with the text of the article. The size of reproduction will usually be determined by the editor. Usually drawings look better when reduced to about half their original size and contributors should bear this in mind. Scale lines must be used, not the magnification of the original drawing.
14. Proofs will be sent to the author to be checked before publication.
15. The abbreviation *PSG* may be used to refer to the *Phasmid Study Group*; with this exception, the full titles should be used for all organisations and publications.
16. Electronic submissions should be IBM compatible. Files should be in *WordPerfect* 5.1, or *Word*, or if written on a different word processor, the file must also be saved as *Dos Text* or as an ASCII file. Images should be submitted in Bit Map (BMP) or TIFF or JPEG format.
17. If the word processor used does not have a table facility then tables of measurements etc. should be laid out using tab settings (not character spaces).

Phasmid Studies

Volume 15, numbers 1 & 2.

Contents

Cover illustration: *Eurybistus belalongensis* Bragg, 2001 Male & Female - drawings by P.E. Bragg.

Biographies of Phasmatologists – 1. Henry Walter Bates.

P.E. Bragg, 8 The Lane, Awsworth, Nottinghamshire, NG16 2QP, U.K.

Abstract

Henry Walter Bates (1825-1892) was an explorer and prolific entomologist. Although he published only one paper on phasmids, it was a significant paper, increasing the number of known species by 10%. An index to the 52 species of phasmids described by Bates is provided.

Key words

Phasmida, Phasmatologist, H.W. Bates, Biography.

Henry Walter Bates (1825-1892)

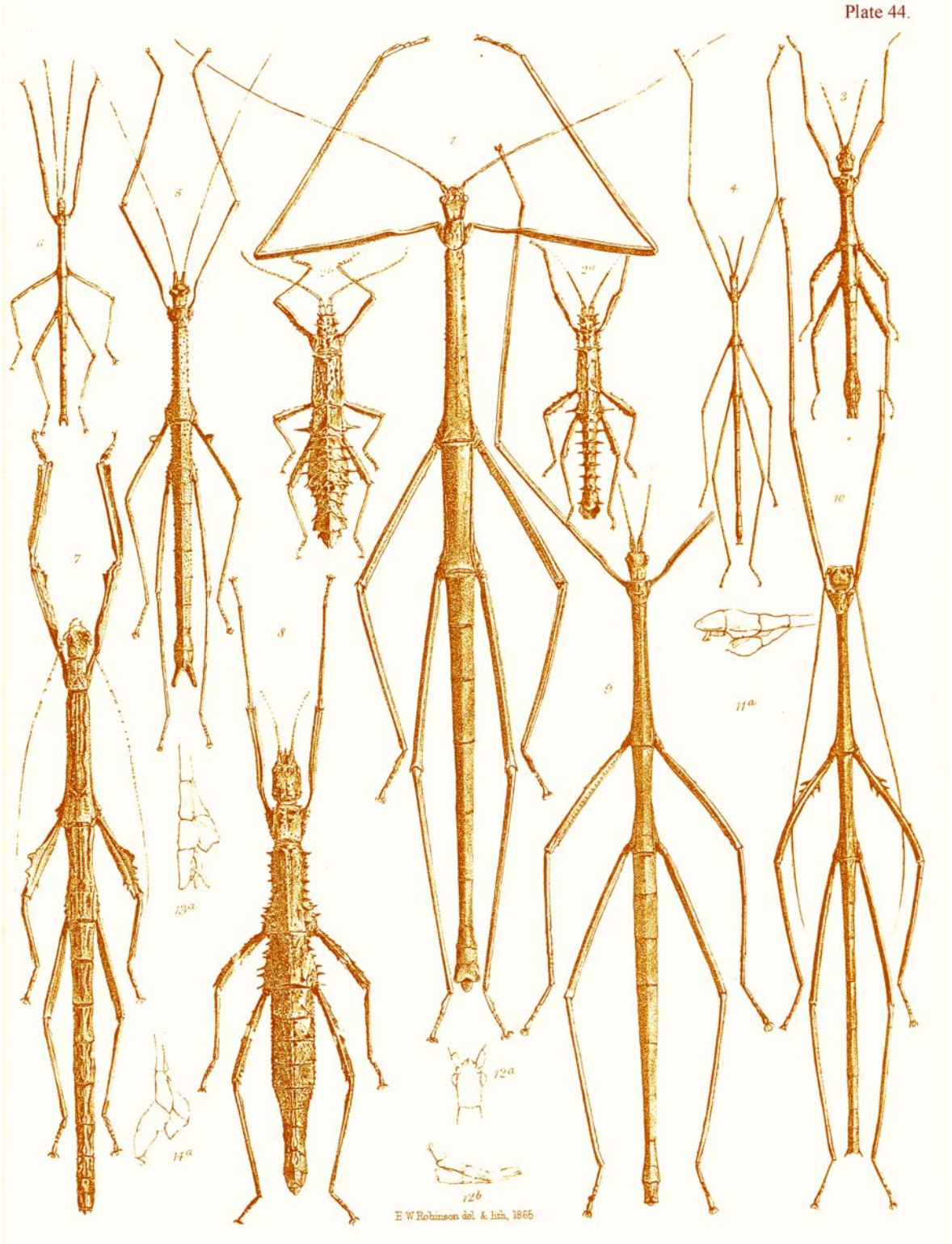
Henry Walter Bates, an English naturalist and explorer, was born in Leicester on 8th February 1825. At the age of thirteen he became apprentice to a hosier. He studied in his spare time, and collected insects in Charnwood Forest. In 1843 he published a short paper on beetles in *The Zoologist* magazine. He became friends with Alfred Russel Wallace, who was also a keen entomologist, and after reading William H. Edwards' book on his Amazon expedition they decided to visit the region themselves. On May 28th 1848, they arrived at Pará, Brazil, near the mouth of the Amazon River.

Wallace returned in 1852, but lost his collection in a shipwreck. Bates stayed in South America and explored almost the entire Amazon valley. When he arrived home eleven years later, in 1859, he had sent back over 14,000 species (mostly insects) of which 8,000 were new to science. Henry Bates is also known for his support for Darwin's and Wallace's theory of evolution by natural selection. His own theory of mimicry, which now bears his name (Batesian Mimicry), provided evidence for evolution by natural selection.

After his return to England he worked on Lepidoptera, and later Coleoptera; unable to work on both at once, he sold his Lepidoptera and subsequently concentrated mostly on cerambycids, carabids, and cicindelids, describing many hundreds of new species. In 1861 he married Sarah Ann Mason. From 1864 onwards, he worked as assistant secretary of the Royal Geographical Society. In 1865 he published a paper entitled *Descriptions of fifty-two new species of Phasmidae from the collection of Mr. W. Wilson Saunders, with remarks on the family*; this was his only paper on phasmids, although there is also a published note of a comment he made on a phasmid paper by Charles King (Bates, 1867). Despite publishing only one paper on phasmids, he increased the number of known species by almost ten percent. Bates was President of the Royal Entomological Society of London 1868-1869 and again in 1878-1879. In 1881 he was elected a fellow of the Royal Society. He died of bronchitis on 16th February 1892.

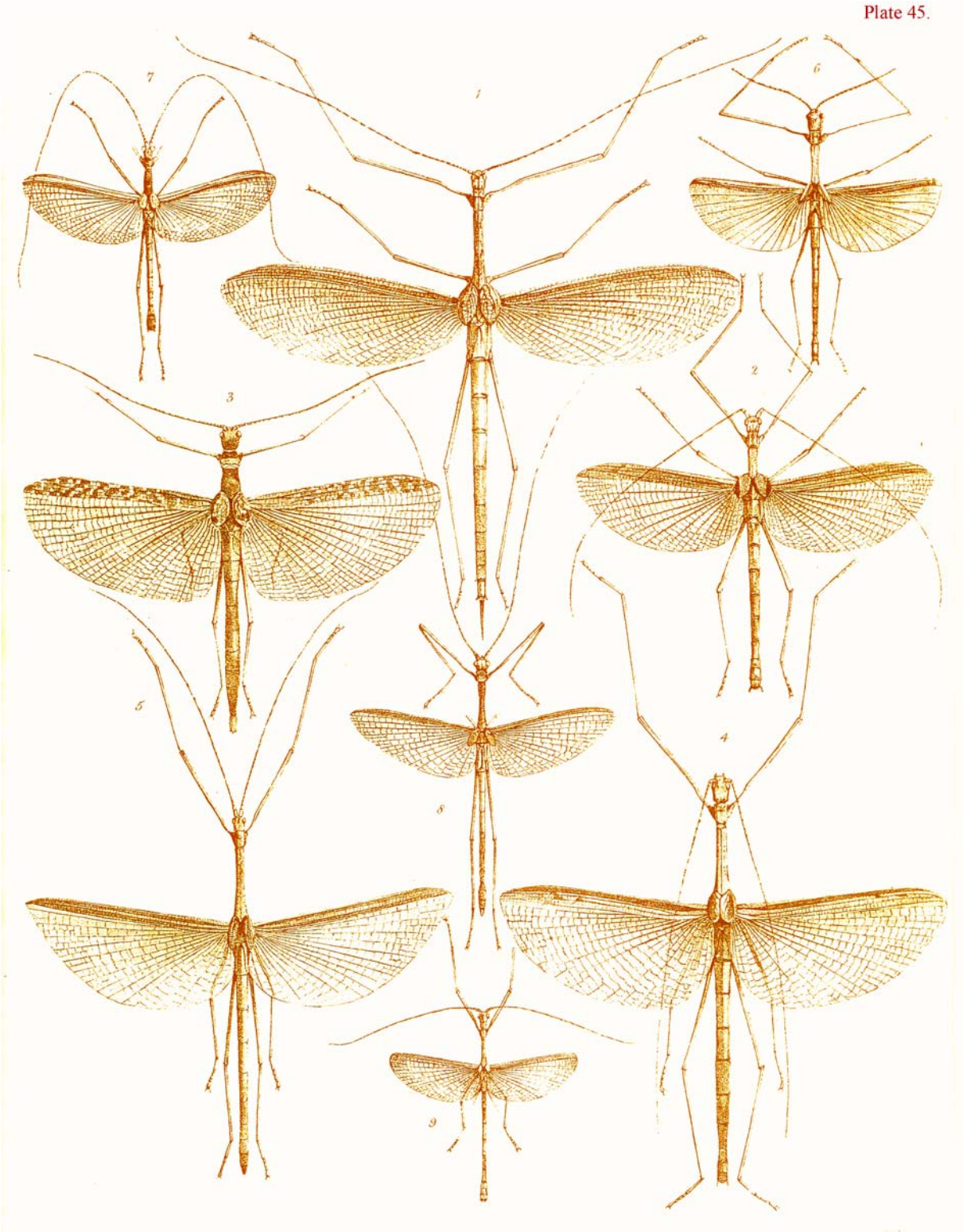
The phasmids of Bates

Bates' single paper on phasmids is an important work because in it he described 52 new species, at a time when only 606 phasmid names had been published. Bates (1865: 321) mentions "a total of 540 Phasmidae now known to science" – but quite a few of the 606 published names (Bragg, 1998) were already known to be synonyms, and there were probably some descriptions unknown to Bates.



The new species were described from specimens in the collection of W.W. Saunders who had built up a collection of specimens by purchasing them from several professional collectors. The majority were collected by Wallace in the Malay archipelago and New

Guinea, with others collected by Mouhot in Cambodia, Nietner in Sri Lanka, Russell in India, Bates in South America, and Guenzius and Gerard in S.E. Africa. Three species: *Acanthoderus mohoutii*, *Bacillus guenzii*, and *Lonchodes russellii*, were named after their



collectors.

In 1873 Mrs Ellen Hope purchased the Saunders collection of orthopteroids and Lepidoptera, a total of 22,133 specimens, including 559 phasmids, for £600 (Smith, 1986: 147). The collection added to the Hope collection at Oxford University Museum (OXUM).

Bates' paper is illustrated with two plates that show 21 of the 52 new species. They

were not drawn by Bates, who comments on the illustration of *Bacillus gramineus*: "The artist has represented the middle legs too long in the figure" (Bates, 1865: 326). Interestingly, I was recently working on some Indian specimens from Manchester Museum (MUME) and took some to Oxford (OXUM) to compare with Bates' specimen of *Necroscia acutipennis*. The specific name *acutipennis* means pointed wings, which is how they appear in the illustration (pl. 45.5); however, I found that Bates had not noticed that the wings are not fully open: when they are they are not pointed! Manchester Museum contains a number of specimens of both sexes of this species from Southern India, the species was previously only recorded from Sri Lanka, and for which the male is currently undescribed.

The paper is 38 pages long, plus two plates, and suffers from the lack of an index; I have therefore provided an index to species names below.

Index to phasmids described by Bates.

Other than his 1865 paper, Bates' only published contribution to the world of phasmids was made on the 4th March 1867, at a meeting of the Entomological Society of London; Bates (1867: 80) commented that the species reported by Charles King (1867: 78-80) from Jamaica was probably not *Anisomorpha buprestoides*. Bates was correct: King (1867: 79) describes wings on his phasmid.

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Biographies of Phasmatologists – 2. George Robert Gray.

P.E. Bragg, 8 The Lane, Awsworth, Nottinghamshire, NG16 2QP, U.K.

Abstract

George Robert Gray (1808-1872) was an English zoologist and author. His life and phasmid work is outlined. He described half the known species of phasmids at that time and is best known for his work on leaf insects and Australian phasmids. He also produced the first significant catalogue of world species.

Key words

Phasmida, Phasmatologist, G.R. Gray, Biography.

George Robert Gray (1808-1872)

George Robert Gray, an English zoologist and author, was born in Chelsea on 8th July 1808. He was born to a family of natural historians; his father, Samuel Gray, was a pharmacologist and botanist; his elder brother, John, went on to become Keeper of Zoology at the British Museum. In 1833 he was one of the founder members of the Entomological Society of London (now the Royal Entomological Society) and was Secretary in the first year.

Gray started work at the British Museum in 1831 and went on to became Senior Assistant of the Zoology Department. He contributed the entomological section to an English edition of Cuvier's *Animal Kingdom* in which he described his first phasmid, *Phyllium bioculatum* in 1832. He began his museum work by cataloguing insects, and published an *Entomology of Australia* (1833). In addition to his work on phasmids, Gray described many species of Lepidoptera and his book *Descriptions and Figures of some new Lepidopterous Insects chiefly from Nepal* (1846) is considered an important work.

Entomologists who are not familiar with Gray's life story may be unaware that he is most famous for his work on birds; he did relatively little work on insects. He was head of the ornithological section of the British Museum in London for forty-one years. Gray's most important publication was his *Genera of Birds* (1844-49), illustrated by David William Mitchell and Joseph Wolf, which included 46,000 references; it became a standard reference book. Gray's original description of *Locustella fasciolata* appeared in 1860, the species is commonly known as Gray's Grasshopper Warbler; the specimen had been collected by Alfred Russel Wallace in the Moluccas. Although a well known ornithologist, his contribution to phasmatology has also been recognised with three species of phasmids named after him *Haaniella grayii* (Westwood, 1859) [originally *Heteropteryx grayii*], *Diapherodes grayi* (Kaup, 1871) [originally *Aplopus grayi*], and *Anchiale grayi* (Montrouzier, 1855) [originally *Parapachymorpha grayi*].

George Gray died on 6th May 1872 at the age of 63.

The phasmids of Gray

Gray produced five publications dealing with phasmids over a period of eleven years, both the first and the last of these described new species of *Phyllium*. In addition to describing six new species of *Phyllium*, Gray is best known for his work on Australian species, and for producing a catalogue of all the known species. Prior to 1832 only 104 phasmids had been named; allowing for the fact that several species had been given two or three different names by different people, Gray more than doubled the number of known species by describing 86 new species. Perhaps more importantly**,** before Gray started work on phasmids only 11 genera had been described: Gray described 25 new genera.

List of phasmid genera described by Gray

Acanthoderus	1835: 14.	*Diapheromera*	1835: 18.	*Linocerus*	1835: 19.	*Prisomera*	1835: 15.
Acrophylla	1835: 38.	*Diura*	1833: 26.	*Pachymorpha*	1835: 21.	*Trigonoderus*	1833: 26.
Anisomorpha	1835: 18.	*Dinelytron*	1835: 27.	*Perlamorphus*	1835: 21.	*Tropidoderus*	1835: 31.
Aplopus	1835: 34.	*Extatosoma*	1833: 25.	*Phibalosoma*	1835: 42.	*Xeroderus*	1835: 32.
Cladomorphus	1835: 15.	*Heteronemia*	1835: 19.	*Platycrana*	1835: 36.		
Ctenomorpha	1833: 27.	*Heteropteryx*	1835: 32.	*Platytelus*	1835: 28.		
Diapherodes	1835: 33.	*Lonchodes*	1835: 19.	*Podacanthus*	1833: 26.		

After describing *Phyllium bioculatum* in 1832, the next 18 new species Gray described were all from Austraila. Thirteen of these were described and illustrated in *Entomology of Australia, part I, The monograph of the genus Phasma* (1833), along with four new genera, and a further five species in a paper the following year. The monograph illustrated, in colour, all Australian species known at that time, a total of 16. Unfortunately, after 1833 the only new species Gray illustrated were the *Phyllium* described in his final phasmid paper.

Gray's 48 page catalogue, *Synopsis of the species of insects belonging to the family of Phasmidae* (1835) listed and described all known species in the world, in addition he described a further 62 new species. He classified 126 species and listed a further six that he was unable to place in the correct genus. It is worth stressing that of the 132 species recognised by Gray, he had described 81 of them (61%). For the 126 species Gray (1835: 11) evaluated the distribution of phasmid species with the following results:

North America 3	Polynesia.....3
South America.....29	Australia.....27
West Indies.....8	Africa 2
Europe 3	Doubtful / unknown origin 10
India, China, Malay Islands.....41	

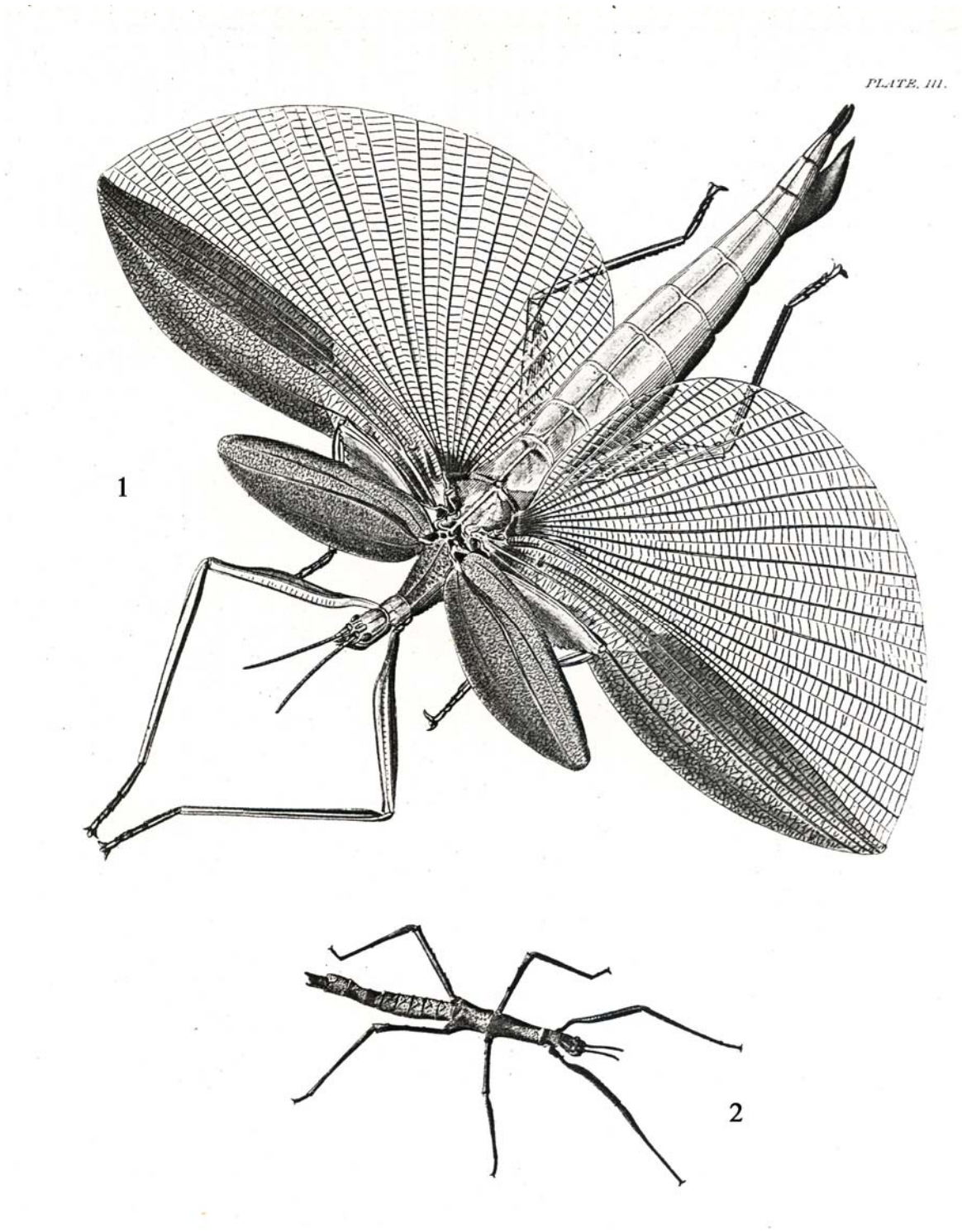
Below Gray's 86 species are listed alphabetically within each year group, with page numbers and plate numbers.

Gray, 1832

bioculatum (Phyllium) ..... 191, pl. 63.3.

Gray, 1833

brunneus (Bacillus) ..... 22, pl. 7.3.
childrenii (Trigonoderus) ..... 18, pl. 3.1
chronus (Diura) ..... 20, pl. 5.2.
coenosa (Bacteria) ..... 17, pl. 2.2.
fragilis (Bacteria) ..... 22, pl. 7.1.
hopii (Extatosoma) ..... 23, pl. 8.1.
japetus (Diura) ..... 20, pl. 5.1.
marginipennis (Ctenomorpha) ..... 16, pl. 1.2.
roseipennis (Diura) ..... 22, pl. 7.1.
spinicollis (Ctenomorpha) ..... 16, pl. 1.1.
squalidus (Bacillus) ..... 18, pl. 3.2.
typhaeus (Diura) ..... 21, pl. 6.2.
typhon (Podacanthus) ..... 17, pl. 2.1.



Black-and-white reproduction of Gray's plate 3 from *Entomology of Australia*, 1833 – the original plates were in colour.
Figure 1. *Trigonoderus childrenii*. **Figure 2.** *Bacillus squalidus*.

Gray, 1834

acheron (Phasma) ..... 46.
briareus (Phasma) ..... 45.
goliath (Phasma) ..... 45.
osiris (Phasma) ..... 46.
spinosum (Phasma) ..... 46.

Gray, 1835

acuticorne (Phasma) ..... 26.
aegyptiaca (Bacteria) ..... 18.
affinis (Platycrana) ..... 37.
annulipes (Platycrana) ..... 37.
armatum (Phasma) ..... 26.
beecheyi (Bacillus) ..... 21.
bennettii (Phasma) ..... 25.
brevipes (Lonchodes) ..... 19.
ceratocephalus (Cladomorphus) .. 15.
corniceps (Phasma) ..... 25.
cornutus (Prisopus) ..... 43.
dilatipes (Cladomorphus) ..... 15.
donovani (Phyllium) ..... 31.
dubius (Diapherodes) ..... 34.
dumerilii (Acanthoderus) ..... 14.
enceladus (Acrophylla) ..... 39.
fasciatum (Phasma) ..... 24.
flavo-maculatum (Phasma) ..... 25.
geniculatus (Lonchodes) ..... 19.
glabricollis (Diapherodes) ..... 27.
gorgon (Phyllium) ..... 31.
gracilis (Linocerus) ..... 20.
grylloides (Dinelytron) ..... 27.
haworthii (Ctenomorpha) ..... 41.
hieroglyphicus (Perlamorphus) .... 21.
hipponax (Dinelytron) ..... 27.
hopei (Phasma) ..... 25.
horridus (Platytelus) ..... 28.
indica (Bacteria) ..... 17.
kirbii (Xeroderus) ..... 32.
lepelletieri (Phibalosoma) ..... 42.
lineata (Bacteria) ..... 17.
longipes (Cladoxerus) ..... 42.
macleayi (Ctenomorpha) ..... 41.
maculatum (Phasma) ..... 26.
marginatum (Phasma) ..... 23.
mexicana (Heteronemia) ..... 19.
peleus (Perlamorphus) ..... 22.
perfoliatus (Cladomorphus) ..... 15.
phyllinus (Cladomorphus) ..... 15.
phyllopus (Prisomera) ..... 16.
pterodactylus (Lonchodes) ..... 19.
pulverulentus (Diapherodes) ..... 34.
punctata (Platycrana) ..... 37.
rafflesii (Platycrana) ..... 37.
rugicollis (Platycrana) ..... 38.
samouellei (Bacteria) ..... 43.
say (Diapheromera) ..... 18.
scabricollis (Diapherodes) ..... 34.
serratipes (Cladoxerus) ..... 42.
servillei (Phasma) ..... 26.
shuckardii (Dinelytron) ..... 43.
simplicitarsis (Bacteria) ..... 43.
spinicollis (Prisomera) ..... 16.
spinipes (Diapherodes) ..... 34.
spinosa (Bacteria) ..... 43.
stollii (Platycrana) ..... 38.
tessulata (Ctenomorpha) ..... 44.
tithonus (Phasma) ..... 23.
unicolor (Phasma) ..... 25.
viridiroseus (Podacanthus) ..... 43.
viridis (Bacteria) ..... 17.

Gray, 1843

agathyrsus (Phyllium) ..... 122.
bilobatum (Phyllium) ..... 120.
gelonus (Phyllium) ..... 121.
geryon (Phyllium) ..... 118.
scythe (Phyllium) ..... 123.

Gray's catalogue was the first significant catalogue of phasmids of the world and he tried to refer "....to every figure or description that exists in scientific works, whether I have myself seen individuals of the species or not" (Gray, 1835: 2 footnote). Gray gave a detailed history of the classification of phasmids but unfairly criticised Fabricius (1798) and Lichtenstein (1802) for not including all of Stoll's species. Gray was under the mistaken impression that Stoll's work was all produced in "1787" (Gray, 1835: 1) in fact part of it was not produced until 1813 (for details see Bragg, 1995); since this was long after Fabricius' and Lichtenstein's work, it was clearly impossible for them to have included these species! Gray goes on to give a detailed review of the biology of phasmids and even mentions stuffing them as a way of aiding colour preservation.

A note on authorship of *Phyllium bioculatum* Gray, 1832

Gray's first phasmid species, *Phyllium bioculatum* appeared in a book that was volume 15 of an English version of a series by the French scientist Georges Cuvier. The book was not a straightforward translation of Cuvier's because it had significant additional content.

The English series has the title: *The animal kingdom arranged in conformity with its organisation by the Baron Cuvier with supplementary additions to each order*. Two volumes, 14 and 15 of the series, dealt with insects and were marked "Volume the First" and "Volume the Second". The phasmids appear in the latter which has the main authors as Griffith & Pidgeon, and the full title *The class Insecta arranged by the Baron Cuvier, with supplementary additions to each order by Edward Griffith, F.L.S., A.S. &c. and Edward Pidgeon, Esq. and notices of new genera and species by George Gray, Esq. Volume the second.* The two volumes on insects were published in 1832 and contain new genera and species by Gray. In works with multiple authors there can be confusion over who was the author of new species. However, in this case there is a clear statement on page 780 that Gray is the author of the new taxa.

Acknowledgements

I am grateful to Berit Pederson (RESL librarian) for providing photographs of Gray.

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Gray's papers online

Gray (1833) and (1834) are available on the web.
http://home.swiftdsl.com.au/~pmiller/stick_insects/papers/gray1833/
http://home.swiftdsl.com.au/~pmiller/stick_insects/papers/gray1834/

A replacement name for *Microphasma* Zompro, 1999.

Oliver Zompro, Max-Planck-Institut für Limnologie, Arbeitsgruppe Tropenökologie, August-Thienemann-Straße 2, 24306 Plön, Germany.

Abstract

Microphasma Zompro, 1999, a genus of Phasmatodea, is preoccupied by *Microphasma* Woltereck, 1909 (Crustacea). *Miniphasma* **n.n.** is introduced as a replacement name.

Key words

Phasmida, *Microphasma*, *Miniphasma*, replacement name.

Microphasma Zompro, 1999 (Phasmatodea: Diapheromeridae: Pachymorphinae: Pachymorphini) was introduced to contain two of the smallest phasmids. *Microphasma prima* Zompro, 1999, the type species of *Microphasma* Zompro, 1999 and *Microphasma secunda* Zompro, 1999 inhabit the highlands of Sri Lanka. Now it has come to the author's attention that *Microphasma* is preoccupied by *Microphasma* Woltereck, 1909, a genus of the Microphasmatidae Stephensen & Pirlot, 1931, a family of the Crustacea: Malacostraca. It comprises only the type species *Microphasma agassizi* Woltereck, 1909. Since *Microphasma* Woltereck, 1909 has priority, *Microphasma* Zompro, 1999 is replaced here by *Miniphasma* **n.gen**., with the type species *Microphasma prima* Zompro, 1999.

Figure 1. Holotype of *Microphasma prima* Zompro, 1999.

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A redescription of *Sosibia lysippus* (Westwood, 1859).

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Abstract

Necroscia lysippus Westwood, 1859 was described from a single female without any fore legs. A specimen with fore legs has been found at Danum Valley, Sabah and is described and illustrated, along with an egg. The species is transferred to *Sosibia* Stål, 1875.

Key words

Phasmida, *Sosibia lysippus, Necroscia lysippus,* Redescription, Danum Valley, Sabah, Borneo.

Introduction

Westwood (1859) described *Necroscia lysippus* from a single female specimen that had been collected in Borneo by Alfred Russell Wallace. Most of Wallace's time in Borneo was spent in what is now Sarawak, but there is no information about the origin of the specimen other than 'Borneo'. The specimen lacked fore legs when Westwood described the species and there are no subsequent records of this species. Based on Westwood's description and illustration only, Redtenbacher (1908: 545) transferred the species to *Sipyloidea* Brunner, 1893.

In November 2005 Darren Mann collected a small number of phasmids at Danum Valley, Sabah (fig. 8); these included a female specimen of *lysippus* which was identified by direct comparison with the holotype. The specimen has short, widened fore legs that lead me to transfer the species to the genus *Sosibia* Stål, 1875.

Sosibia lysippus (Westwood, 1859) comb.nov.

Necroscia lysippus Westwood, 1859: 136, pl. 39.3 (♀). Holotype ♀ (OXUM, 666) Borneo, coll. Wallace.

Necroscia (?) lysippus Westwood; Kirby, 1904b: 378.

Sipyloidea lysippus Westwood; Redtenbacher, 1908: 545; Bragg, 2001: 602; Otte & Brock, 2005: 319.

Material examined

BORNEO, ♀ Holotype (OXUM, Type No. 666) Wallace.

SABAH, Danum valley, Danum 1, ♀ (OXUM) at night. D.J. Mann, 07.xi.2005.

The holotype lacks fore legs and has a piece of wood inserted in the abdomen. The following description is based on the specimen collected by Darren Mann.

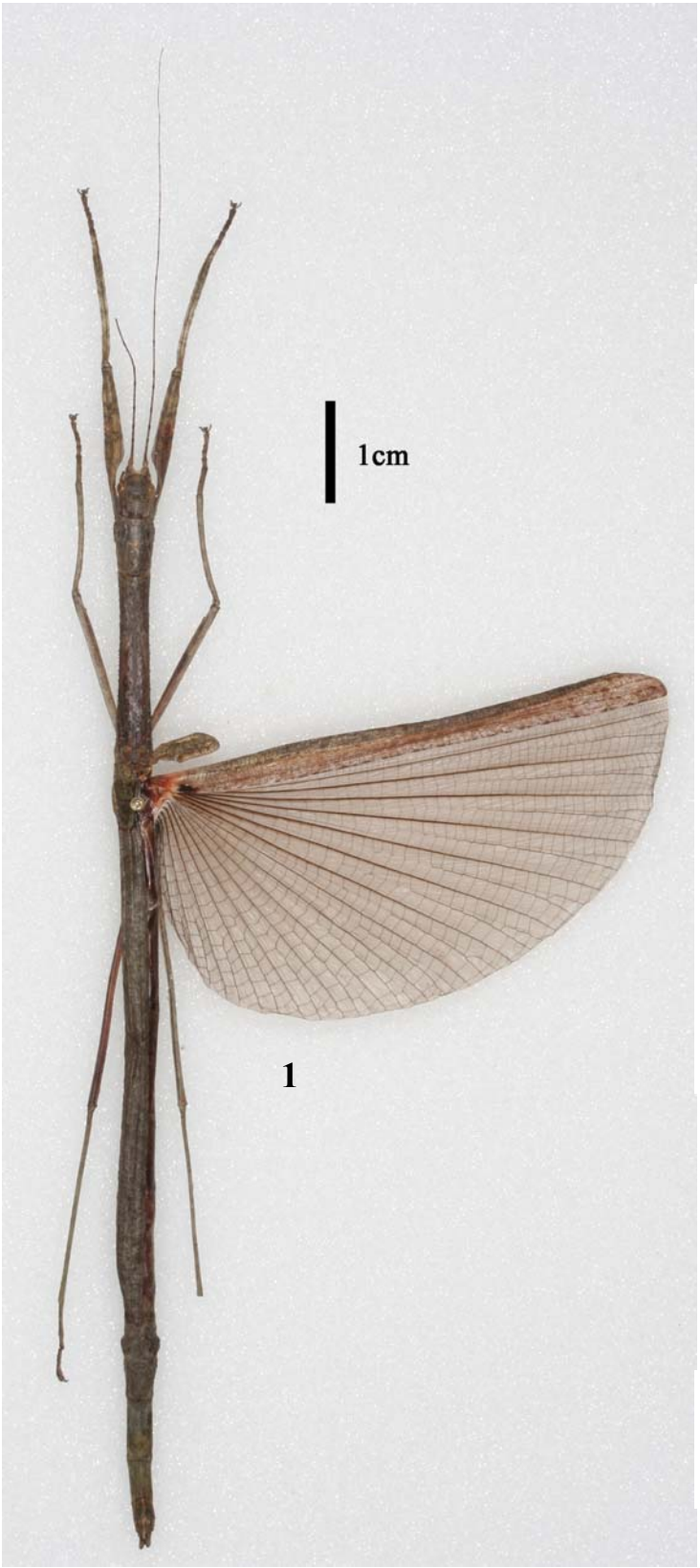
Female (figs 1-5)

Head, body and legs almost uniformly greyish-brown. Antennae brown with dark bands. Costal area of wing greyish-brown, rest of costal area brown, anal region translucent brown with dark brown veins; base of anal region red with blackened area posterior to this. [Westwood's holotype has a body that is mainly light brown with some darker markings, otherwise the coloration is similar.]

Body long and slender, of uniform width except for swollen 6th abdominal segment; fore legs notably short. Head slightly granulose. Pronotum and mesonotum granulose; metanotum and abdominal tergites covered by the wings (1st-5th) smooth, beyond the wings (6th-10th) rugulose. Mesosternum, metasternum, mesopleura, and metapleura sharply granulose. Legs setose, particularly the fore legs. Measurements are given in table 1.

Head 1.5 times longer than wide. Antennae much longer than fore legs (broken, so full length unknown); with basal segment flattened, almost as wide as long; second segment twice as long as wide, slightly swollen; remainder slender. Pronotum almost twice as long as wide. Mesonotum six times longer than wide. Median segment slightly longer than metanotum. Abdominal segments 2-5 of equal length, three times longer than wide; 6th with a verrucose

swelling, 6th and 7th each 20% shorter than their preceding segment; 8th only slightly more than half the length of 7th segment; 9th about half as long as 8th; 10th as long as 9th with the apex narrowed and rounded. Cerci with broadened apices. Operculum reaching almost to end of 10th tergite, with apex rounded. Praeopercular organ a setose, raised "Y" shape (fig 2).



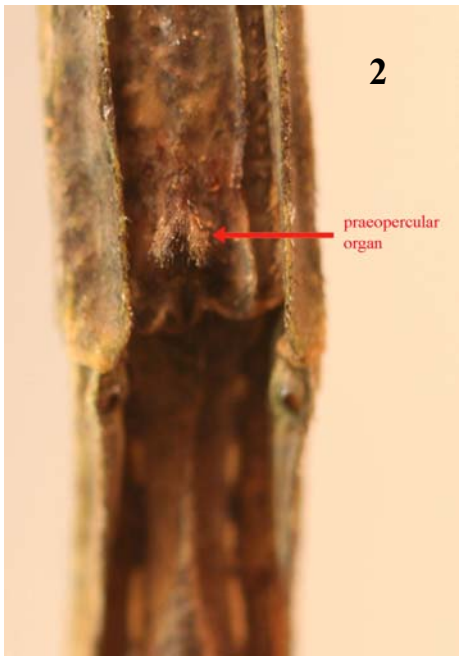
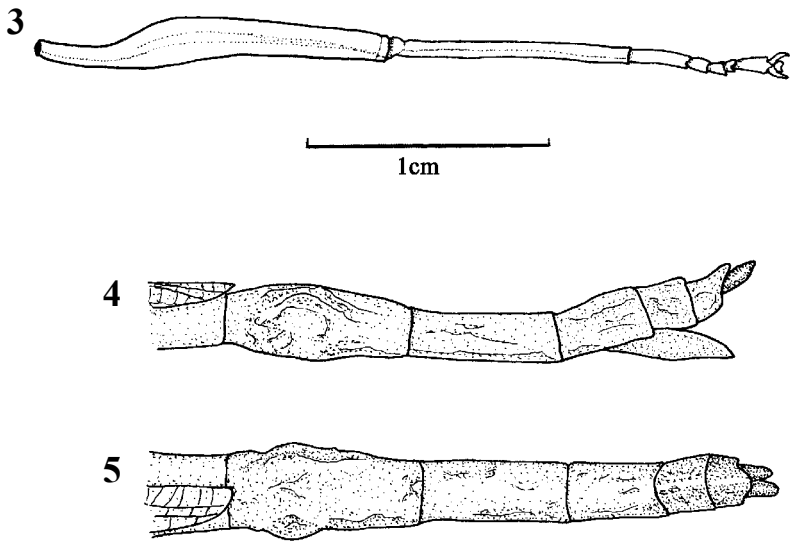


Figure 2.
Underside of abdomen with praeopercular organ arrowed.

Figure 1.
Sosibia lysippus (Westwood), female from Danum valley.

Elytra about twice as long as wide, with a slight hump. Wings reach to apex of 5th abdominal segment.

Fore legs very short, fore femur broad (fig 3). Tibiae of fore and mid legs clearly shorter than femora; tibia and femur of hind legs of almost equal length. All legs with dorso-posterior carina very indistinct and medio-ventral distinct; basal tarsomere very slightly longer than 2-4 combined. Fore leg with femur only three times length of head; tibia only three quarters length of femur; tarsus more than half as long as tibia. Fore femur triangular in cross-section; posterior and dorsal surfaces on same plane, same width as broadened ventral surface, anterior surface about half as wide. Mid and hind femora slender, with a small pair of lobes at the apex of the medio-ventral carinae. Hind legs reach to apex of 6th abdominal segment.



Figures 3-5. *Sosibia lysippus* (Westwood) female from Danum valley.
3. Right fore leg. **4.** Lateral view of abdomen. **5.** Dorsal view of abdomen.

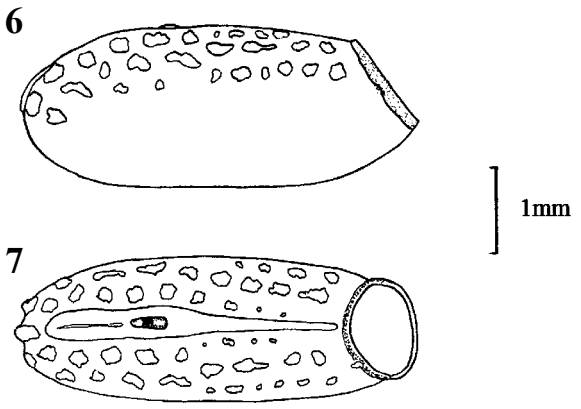
Table 1. Female *Sosibia lysippus* (Westwood). Measurements in mm.

Total length	104	Fore femur	14.1
Antennae	>41	Fore tibia	10.3
Head	4.9	Fore tarsus	6.5
Pronotum	5.5	Mid femur	13.9
Mesonotum	18.0	Mid tibia	10.4
Metanotum	5.9	Mid tarsus	6.6
Median segment	7.6	Hind femur	20.6
Fore wing	6.0	Hind tibia	19.2
Hind wing	51.0	Hind tarsus	7.7

Egg (figs 6-7)
The following description is based on a single egg removed from the body cavity; the egg appears to be well developed.

Capsule uniformly mid brown; approximately cylindrical with ventral side slightly flattened, polar end approximately hemispherical, operculum strongly tilted towards the dorsal surface with an opercular angle of about +40°. Surface of capsule smooth on ventral half and with low-lying, flat-topped, irregular projections on dorsal half. Micropylar plate very narrow,

polar end rounded, opercular end narrowing to a thin line that reaches the opercular collar. Operculum flat, slightly higher than wide. Capsule length 4.6mm, height 1.9mm, width 1.7mm; operculum width 0.95mm, height 1.10mm.



Figures 6-7. Egg.
6. Lateral view.
7. Dorsal view.

Figure 8. Distribution map. Danum Valley is the only specific locality recorded for *Sosibia lysippus*.

Comments on the taxonomy

Based on examination of this specimen, and photographs of the lectotype of *Sosibia macera* Redtenbacher, 1908, it is likely that these are the same species.

The egg, which was removed from the body, is similar to the eggs laid by an unidentified species of Bornean *Sosibia* in my collection, and to those of *Sosibia esacus* (Westwood, 1859) and *Sosibia solida* Redtenbacher, 1908 illustrated by Seow-Choen (2000: plates 79e & 81e). These eggs are strikingly different from the spherical egg of the type species, *Sosibia nigrispina* Stål, 1875. This, combined with the spinose head and strongly humped elytra of the type species, suggests that the genus may need splitting when more is known about the other species.

Acknowledgement

Thanks to Darren Mann (OXUM) for the loan of the specimen.

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Notes on the genera *Andropromachus* Carl, 1913 and *Spinohirasea* Zompro, 2001.

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Abstract

A review of the genera *Spinohirasea* Zompro, 2001 and *Andropromachus* Carl, 1913 is provided. *Spinohirasea* Zompro, 2001 has erroneously been synonymised with *Spiniphasma* Chen & He, 2000. The latter genus is shown to be a junior synonym of *Andropromachus* Carl, 1913 (**syn. nov.**) and consequently *Spinohirasea* Zompro is re-established as a valid genus (**stat. rev.**). *Spinohirasea crassithorax* Zompro, 2001 is a junior synonym of *Menexenus bengalensis* Brunner von Wattenwyl, 1907 (**syn. nov.**), hence *M. bengalensis* Brunner von Wattenwyl is transferred to *Spinohirasea* Zompro, 2001 (**comb. nov,**). The eggs of *Spinohirasea bengalensis* (Brunner von Wattenwyl) are described and illustrated for the first time. Illustrations and measurements of the female and male of *S. bengalensis* (Brunner von Wattenwyl) are provided, along with notes on the origin of the culture-stock PSG 272, captive breeding, alternative food plants and biology. *Menexenus modificatus* Brunner von Wattenwyl, 1907 was erroneously synonymised with *Neohirasea maerens* (Brunner von Wattenwyl, 1907) and is here shown to represent a synonym of *Promachus (?) bicolor* Kirby, 1904 (**syn. nov.**). Lectotypes are designated for *Andropromachus bicolor* (Kirby, 1904) and *Menexenus modificatus* Brunner von Wattenwyl, 1907.

Key words

Phasmatodea, Lonchodinae, Vietnam, *Andropromachus*, *Spinohirasea*, *Spiniphasma*, *Neohirasea, Qiongphasma, Pseudocentema, Spinohirasea bengalensis* **comb. nov.,** *Andropromachus bicolor*, *Menexenus modificatus*, lectotypes, new synonyms, egg.

Introduction

Since 2005 a beautiful and strikingly spiny species of the Lonchodinae from Vietnam has been successfully reared in captivity. This was identified as *Spiniphasma crassithorax* (Zompro, 2001) and included on the Phasmid Study Group culture-list as culture No. 272. Subsequent comparison of captive reared specimens with the type-specimens of *Menexenus bengalensis* Brunner von Wattenwyl, 1907 from the Gulf of Bengal in NHMW and MNHN have shown these to be the same species. Consequently, *Spinohirasea crassithorax* Zompro, 2001 is a junior synonym of Brunner von Wattenwyl's species, the valid name being *Spinohirasea bengalensis* (Brunner von Wattenwyl, 1907) **new combination**.

Whilst identifying the cultured species and checking species in closely related genera, it became obvious that *Spinohirasea* Zompro, 2001 was erroneously synonymised with *Spiniphasma* Chen & He, 2000, a genus described from SW-China. Comparison has shown *Spiniphasma* Chen & He to represent a synonym of *Andropromachus* Carl, 1913 (**new synonym**) and *Spinohirasea* to be a valid genus, which is therefore re-established (**revised status**).

The present paper provides a review of the genera *Andropromachus* Carl, 1913 and *Spinohirasea* Zompro, 2001 along with a key to the genera of the "*Neohirasea*-complex", clarifies the identity and synonymy of *S. bengalensis* (Brunner von Wattenwyl, 1907) and provides a description and illustration of the previously unknown egg of this striking genus, along with notes on the biology and culturing of *S. bengalensis*.

Abbreviations

BMNH: Natural History Museum, London / England.
IEZU: Institute of Entomology, Zhongshuan University / China.
MNHN: Museum d'Histoire Naturelle, Paris / France.
NHMW: Naturhistorisches Museum, Vienna / Austria.
ZMFK Zoologisches Museum "Alexander König", Bonn / Germany.
FH: Private collection of Frank H. Hennemann, Kaiserslautern / Germany.
PEB: Private collection of Phil E. Bragg, Nottingham / England.
HT: Holotype

PT: Paratype
ST: Syntype
LT: Lectotype
PLT: Paralectotype

Andropromachus Carl, 1913 (see figs. 1-3)

Type-species: *Andropromachus scutatus* Carl, 1913: 49, by subsequent designation of Zompro, 2001a: 68.

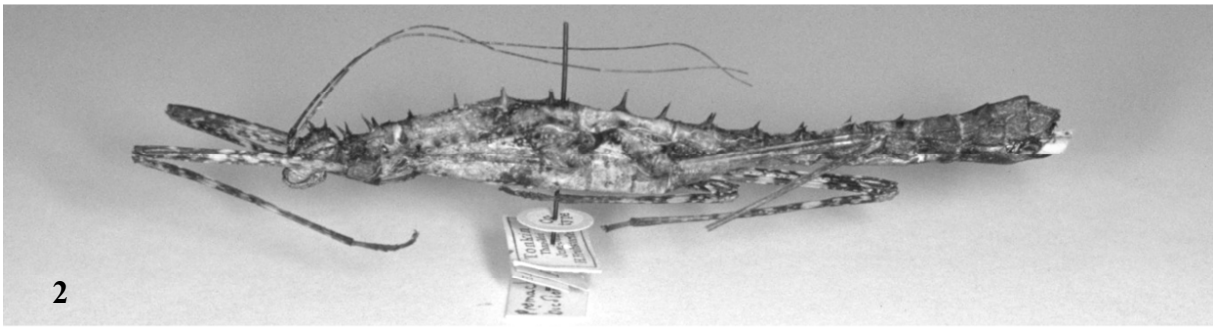
Andropromachus Carl, 1913: 48, pl. 1: 1 & 3; Zompro, 2001a: 68; Otte & Brock, 2005: 46.
Promachus (?), Kirby, 1904: 377.
Promachus, Brunner von Wattenwyl, 1907: 292. (in part - **not** Stål, 1875).
Spiniphasma Chen & He, 2000: 32, fig. 7-2. (Type-species: *Spiniphasma guangxiense* Chen & He, 2000, by original designation). **new synonym.**

Description
Moderately sized and rather robust Lonchodinae, with a spinose head and dorsal body surface and a swollen mesothorax. Thorax and most of abdomen with a longitudinal median carina dorsally. Head indistinctly longer than wide, vertex convex, ± conical and spinose. No ocelli. Eyes small and projecting hemispherically. Antennae filiform, projecting over abdominal tergite VI (♀♀) or reaching to apex of abdomen (♂♂). Pronotum slightly longer than the head, rectangular and spinose. Mesothorax conspicuously swollen medially and constricted anteriorly. Mesonotum with a fine, longitudinal median carina and covered with numerous prominent spines. Metathorax rectangular and slightly constricted medially. Metanotum about as wide as long and armed with several prominent spines. Mesopleura unarmed, metapleura with distinct spines. Sterna unarmed. Median segment slightly shorter than metanotum, spinose. Abdominal segments II-VII of ♂♂ parallel-sided and slightly longer than wide. Abdominal segments of ♀♀ quadrate or slightly shorter than wide and roughly parallel-sided (III-V may be gently broadened). Posterior margin of tergites II-V (sometimes also on VI-VII) of both sexes with distinct spines, VII-IX of ♀♀ each with a posteromedian hump. Posterolateral angles of tergites II-IX ± expanded triangularly (may be indistinct in ♂♂). Sternites unarmed. Females with a distinct praeopercular organ on sternite VII. Anal segment slightly tectiform in ♂♂ with two short, finger-like appendices apically. Cerci small and slightly dorsoventrally flattened. Males with a distinct, well sclerotized vomer. Subgenital plate of ♂♂ small and cup-like, in ♀♀ short, scoop-like, pointed apically and roughly reaching apex of anal segment. Legs long and moderately slender; profemora compressed and curved basally and about as long as pro- and mesonotum combined; hind legs projecting considerably beyond apex of abdomen. Femora almost quadrate in cross-section and broader than corresponding tibiae. Ventral carinae of all femora with 2-3 sub-apical teeth. Medioventral carina of femora indistinct and unarmed. Basitarsi elongate, about as long as following three tarsomeres combined; all unarmed.

Differentiation
Similar and closely related to *Spinohirasea* Zompro, 2001 but distinguished by: the convex and spinose vertex; more slender body; relatively longer body segments and longer basitarsus of both sexes, as well as the slender mesofemora and single hooked vomer of males.

The spinose vertex is shared with the Chinese *Qiongphasma* Chen, He & Li, 2002, but this genus differs by the flat head, slender mesothorax and differently structured genitalia of males.

1



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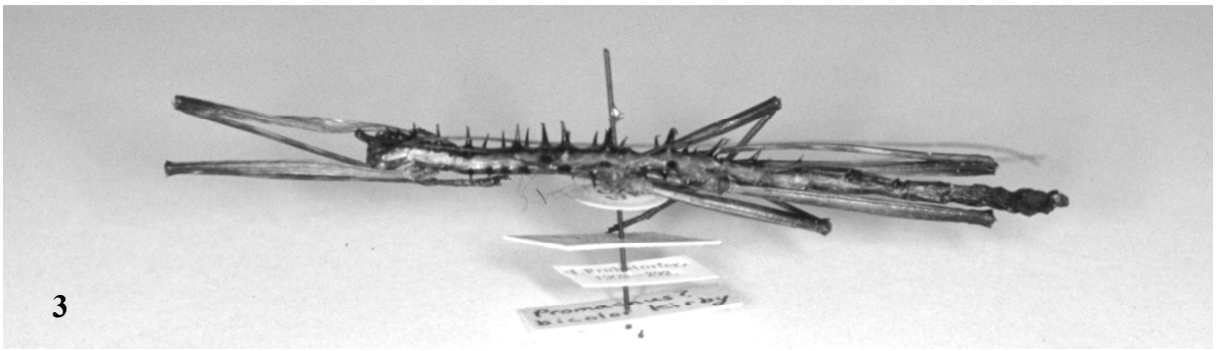

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Fig. 1. *Andropromachus scutatus* Carl, 1913, ♀ (reproduced from Carl, 1913, plate 1: 3).
Fig. 2. *Andropromachus bicolor* (Kirby, 1904), ♀ ST (BMNH).
Fig. 3. *Andropromachus bicolor* (Kirby, 1904), ♂ ST (BMNH).

Comments

Carl (1913: 48) described *Andropromachus* in the tribe Necrosciini and included two species, the newly described *Andropromachus scutatus* Carl, 1913 and *Promachus* (?) *bicolor* Kirby, 1904, both from Northern Vietnam. Subsequently, Zompro (2001a: 68) designated *A. scutatus* Carl as the type-species and transferred *Andropromachus* to Lonchodinae. *Spiniphasma* Chen & He, 2000 from the Guangxi Province of South China was described based on the female only and is obviously a junior synonym of *Andropromachus* Carl (**new synonym**).

The genus is well characterized by the convex and spinose head of both sexes.

Distribution

N-Vietnam and SW-China (Guangxi Province).

Species included

1. *Promachus* (?) *bicolor* Kirby, 1904: 377 (♂, ♀). LT (here designated) ♂: Tonkin, Than-Moi, Juni-Juli, H. Fruhstorfer; H. Fruhstorfer. 1902-292.; *Promachus ? bicolor* Kby. (BMNH). PLT ♀: Tonkin, Than-Moi, Juni-Juli, H. Fruhstorfer; H. Fruhstorfer. 1902-292.; *Promachus ? bicolour* Kby. (BMNH).

= *Menexenus modificatus* Brunner von Wattenwyl, 1907: 245. (♂). LT (here designated) ♂: Tonkin, Than-Moi, Juni-Juli, H. Fruhstorfer; Coll.Br.v.W.; det. Br.v.W. *Menexenus modificatus* Br., 24.337 (NHMW, No. 457 – the more complete specimen). PLT ♂: Tonkin, Than-Moi, Juni-Juli, H. Fruhstorfer; Coll.Br.v.W.; det. Br.v.W. *Menexenus modificatus* Br. (NHMW, No. 457). **new synonym**.

Comments: *Menexenus modificatus* Brunner von Wattenwyl, 1907 was synonymised in error with *Neohirasea maerens* (Brunner von Wattenwyl, 1907) by Hausleithner (1992: 432). A lectotype is selected (above) for *Menexenus modificatus* Brunner von Wattenwyl, 1907 in order to fix and validate the newly recognized synonymy with *Promachus (?) bicolor* Kirby, 1904.

2. *Spiniphasma guangxiense* Chen & He, 2000: 32, fig. 7-2 (♀). HT ♀: SW-China, Guangxi Province, Wuming, 23.V.1963 leg. Yang Chikun (IEZU). PT ♀: SW-China, Guangxi Province, Huaping, 12.VI.1963, leg. Yang Chikun (IEZU).

3. *Andropromachus scutatus* Carl, 1913: 49, pl. 1: 1 & 3 (♀). HT, ♀: Tonkin, Baudet; *Andropromachus scutatus* Carl (MHNG).

4. *Promachus tonkinensis* Brunner von Wattenwyl, 1907: 300 (♂). HT ♂: Tonkin (NHMW – not traced)

Comments: As already noted by Carl (1913: 49), *Promachus tonkinensis* Brunner von Wattenwyl, 1907 might be a junior synonym of *Andropromachus bicolor* (Kirby, 1904). This however cannot be confirmed without seeing Brunner von Wattenwyl's male holotype which has not been traced in NHMW. The brief original description by Brunner von Wattenwyl matches very well with *A. bicolor* (Kirby), except for the fact that the conspicuous longitudinal median stripe on the dorsal body surface of males of *bicolor* is not mentioned. The three specimens from Than-Moi in MHNG and recorded by Carl (1913: 51) clearly represent this species.

Spinohirasea Zompro, 2001 **stat. rev.**

Type-species: *Spinohirasea crassithorax* Zompro, 2001a: 68, by original designation.

Spinohirasea Zompro, 2001a: 67. (Type-species: *Spinohirasea crassithorax* Zompro, 2001a: 68, by original designation).
Menexenus, Brunner von Wattenwyl, 1907: 243. (in part –not *Menexenus* Stål, 1875)
Condyloscelis Redtenbacher, in litt.
[not *Spiniphasma* Chen & He, 2000: 32, fig. 7-2, **erroneous synonym** of Otte & Brock, 2005: 324]

Description

Moderately sized, broad Lonchodinae, with a spinose dorsal body surface and a gently swollen mesothorax. Head longer than wide, vertex flat and unarmed. No ocelli. Eyes small and projecting hemispherically. Antennae filiform, projecting over abdominal tergite VII. Pronotum slightly shorter than the head, trapezoidal with anterior margin narrower than posterior margin, spinose. Mesothorax gently swollen medially and slightly gradually widened towards the posterior. Mesonotum with a fine longitudinal median carina and covered with numerous prominent spines. Metathorax rectangular. Metanotum slightly convex, 1.5x wider than long and armed with several prominent spines. Mesopleura with a few minute spines, metapleura with distinct spines. Sterna unarmed. Median segment indistinctly (♀♀) or almost 1.5x shorter than metanotum (♂♂), broader than long, spinose. Abdominal segments II-VII of ♂♂ almost parallel-sided and roughly quadrate; those of ♀♀

distinctly wider than long, II-IV increasingly broadened, V-VIII gradually narrowing. Posterior margin of tergites II-V of both sexes with distinct spines, V-IX of ♀♀ each with a posteromedian hump. Posterolateral angles of tergites II-IX of ♀♀ expanded triangularly. Sternites unarmed. Females with a very prominent praeopercular organ on sternite VII. Anal segment with a longitudinal median carina in ♀♀, flat and with two short, finger-like appendices in ♂♂. Cerci small and slightly dorsoventrally flattened. Males with a highly specialized vomer, bearing four terminal hooks. Subgenital plate of ♂♂ small and cup-like, in ♀♀ short, scoop-like, pointed apically and not reaching apex of anal segment. Legs long and moderately strong; profemora slightly compressed interobasally and longer than mesothorax; hind legs projecting considerably over apex of abdomen. Femora almost quadrate in cross-section considerably broader than corresponding tibiae. Mesofemora of ♂♂ distinctly thickened. All femora of ♂♂ with several teeth on antero- and posteroventral carinae; in ♀♀ only with 2-3 minute teeth sub-apically. Medioventral carina of femora indistinct and unarmed. Basitarsi about as long as following two tarsomeres combined; all unarmed.

Differentiation

Closely related to *Andropromachus* Carl, 1913, *Qiongphasma* Chen & He, 2002 and *Neohirasea* Rehn, 1904. It shares the prominently spinose dorsal body surface and complex praeopercular organ of females with the very similar genus *Andropromachus*. It however differs by: the flat and unarmed head, broader body and relatively shorter (transverse in females) abdominal segments II-VII in both sexes; as well as the distinctly broadened, ventrally spinose meso- and metafemora and prominent, highly specialized, 4-dentate vomer of males.

The Chinese *Qiongphasma* Chen, He & Li, 2002 is only known from the male and differs from *Spinohirasea* by the decidedly larger size and stick-like body, spinose head, basally curved profemora as well as the slender mesothorax and mesofemora.

From *Neohirasea* Rehn it differs by: the more robust body and distinctly swollen mesothorax of both sexes; broadened and swollen abdominal segments II-VII and prominent, complex praeopercular organ of females, as well as the broadened, ventrally dentate mesofemora and highly specialized vomer of males which bears four terminal hooks. The eggs differ from those of *Neohirasea* Rehn by: the considerably larger size, strongly rugose capsule surface and having the micropylar plate distinctly displaced towards the polar area. Convergences with *Neohirasea maerens* (Brunner von Wattenwyl, 1907) concerning the body spination are obvious and emphasise the close relationship between *Spinohirasea* and *Neohirasea*.

Comments

Zompro (2001a: 68) established *Spinohirasea* for the new species *S. crassithorax* from Northern Vietnam and placed it in the tribe Menexenini Günther, 1953, which is not an available tribal name (see discussion below). As closely related, Zompro mentioned the genera *Andropromachus* Carl, 1913, *Neohirasea* Rehn, 1904, *Menexenus* Stål, 1875 and *Echinoclonia* Carl, 1913. *Echinoclonia* Carl is however a member of the subfamily Necrosciinae and a junior synonym of *Parastheneboea* Brunner von Wattenwyl, 1907, hence not closely related. *Menexenus* Stål (Type-species: *Acanthoderus lacertinus* Westwood, 1848: 80, pl. 39.6 ♀) is at once distinguished from *Spinohirasea* Zompro, *Andropromachus* Carl and *Neohirasea* Rehn by the convex and keeled subgenital plate, strongly reduced vomer, and the distinctly tectiform and split anal segment of males which forms two separate, distally elongated semi-tergites. Furthermore, the eggs of *Menexenus* Stål possess a distinct capitulum, which is not present in *Neohirasea* and *Spinohirasea* (eggs of *Andropromachus*

are not known). Consequently, a close relationship between *Menexenus* Stål and these genera is rather unlikely.

Otte & Brock (2005: 324) erroneously synonymised *Spinohirasea* Zompro with *Spiniphasma* Chen & He, 2000, a genus described from the Guangxi Province of South China and a junior synonym of *Andropromachus* Carl, 1913 (**new synonym** – see above).

This genus shows a high degree of specialisation of the genitalia, particularly the praeopercular organ in females, and the vomer in males. The praeopercular organ of females is formed by two prominently raised, rounded and swollen median elevations and two rounded, longitudinal lateral carinae. The median elevations are densely covered with short bristles at the apices. The vomer of males is very prominent with the basal section semicircular and on the right bears four unequal terminal hooks.

Distribution: Vietnam & "Bengal".

Species included

1. *Menexenus bengalensis* Brunner von Wattenwyl, 1907: 246.
   = *Spinohirasea crassithorax* Zompro, 2001a: 68. **new synonym.**

Spinohirasea bengalensis (Brunner von Wattenwyl, 1907) **n. comb.** (figs. 4-8)

Menexenus bengalensis Brunner von Wattenwyl, 1907: 246. LT ♂: Museum Paris, Bengale, Diard & Duvaucel 1815, Coll. Br.v.W., det. Br.v.W. *Menexenus bengalensis*, 23.349 (NHMW, No.463). PLT ♂: Museum Paris, Bengale, Diard & Duvaucel 1815, Type, 154. *Condyloscelis bengalensis* Redt. Type! (MNHN). PLT ♀: Museum Paris, Bengale, Diard & Duvaucel 1815, *Condyloscelis bengalensis* Redt., recte *Menexenus bengalensis* Br. (MNHN).

Neohirasea bengalensis, Hausleithner, 1992: 432, fig. 6c [lectotype designation]; Brock, 1998: 17; Otte & Brock, 2005: 217.

Spinohirasea crassithorax Zompro, 2001a: 68, figs. 1-7. HT ♂: Vietnam, südl. Nordvietnam, Provinz Ha Tinh, Tieflandregenwald nahe Dorf Ky Thuong, Funde auf Exkursion entlang des Baches Bau Tay, N 18°00´E 106°06´, ca 180 m ü. NN, 10.VII.1997, leg. T. Ziegler, in copula (ZMFK). PT ♀: same data, in copula (ZMFK). **new synonym.**

Spiniphasma crassithorax, Otte & Brock, 2005: 324; Bresseel, 2005: 7; Bragg, 2006: 10.

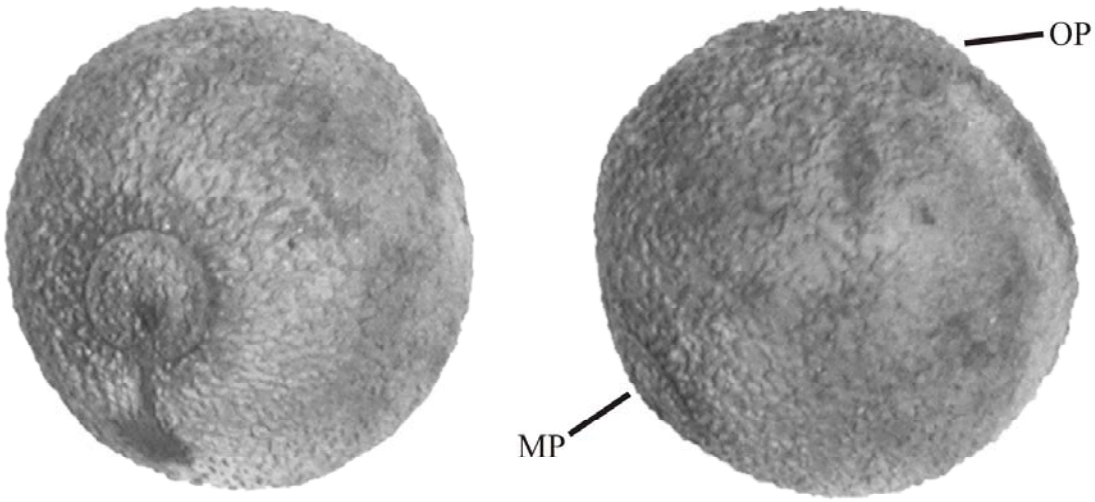
Material examined

2 ♂♂, 1 ♀, 1 ♀ (4th instar), eggs (FH, No's 0593-1 to 4 & E): ex Zucht F. Hennemann, 2006, Central Vietnam; 1 ♂ (PEB-3536), 1 ♀ (PEB-3535), eggs (PEB-3537) captive reared, P.E. Bragg, 2006, Central Vietnam.

Eggs (figs. 4 & 5)

Large in relation to size of the adult female, almost spherical. Entire capsule surface roughly granulose and irregularly covered with ridges. These ridges arranged radially around micropylar plate. Polar area with a conspicuous oval, almost smooth, blackish brown marking. Operculum almost circular, slightly convex, structured like capsule and rather small in relation to capsule size. Micropylar plate distinctly displaced towards the polar end; small, covering about ¼ of the dorsal capsule surface, shield-shaped and with a deep, narrow posteromedian gap. Outer margin with a narrow dark brown line. Micropylar cup placed in the anterior tip of the gap and almost in the centre of the plate. Median line distinct and marked by a bold blackish brown stripe, which reaches as far as to the marking of the polar area. Internal micropylar plate open with a deep posteromedian gap. General colouration of capsule and operculum creamish brown, occasionally with darker markings laterally.

Measurements: length 3.9mm, width 3.8mm, height 3.8mm, diameter of operculum 1.7mm, length of micropylar plate 0.9mm.



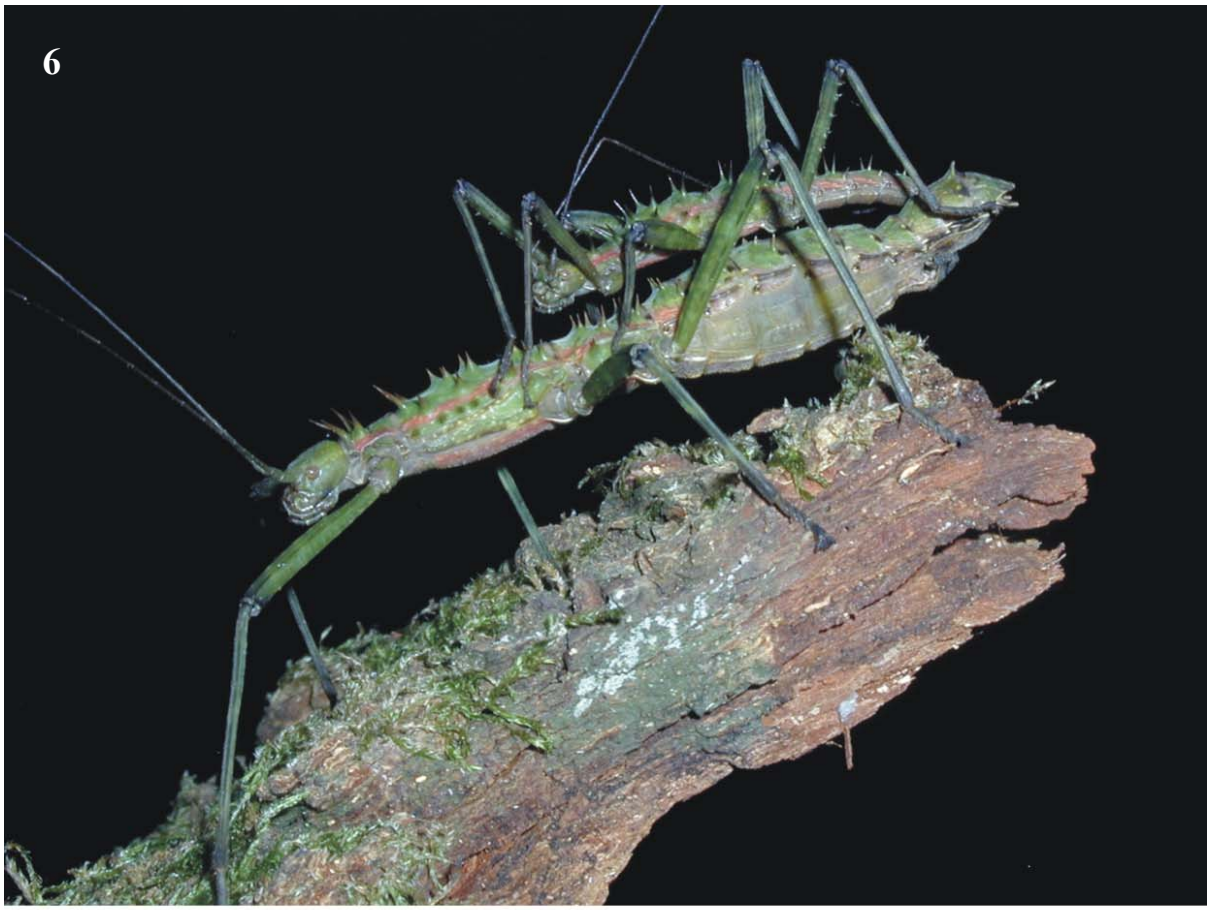
Figs. 4-5. Egg of *Spinohirasea bengalensis* (Brunner von Wattenwyl, 1907).
4. Dorsal view. **5.** Lateral view.

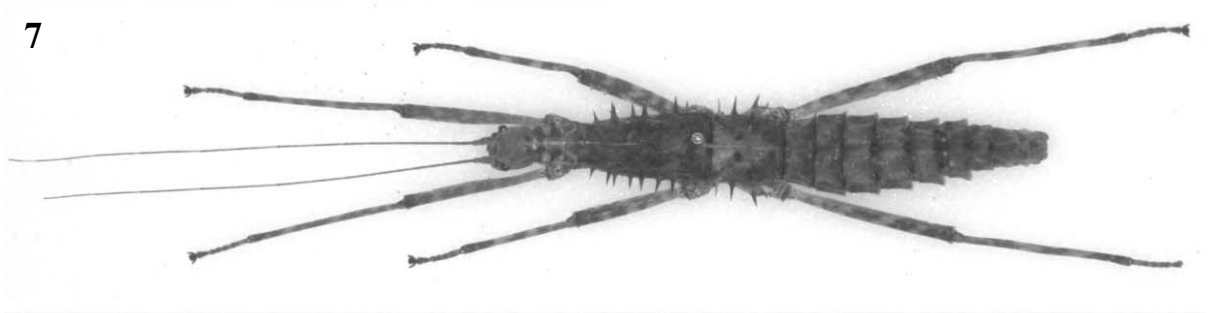
Comments

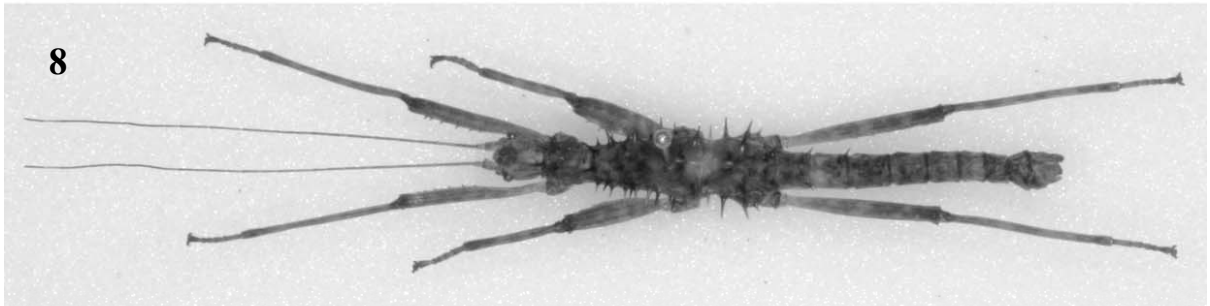
Brunner von Wattenwyl (1907: 246) originally described *Menexenus bengalensis* from two males and one female with the limited and doubtful data „Bengale“ in MNHN. One of the males was retained by Brunner von Wattenwyl and is now housed in NHMW. This specimen was subsequently selected as the LT of *M. bengalensis* by Hausleithner (1992: 432) who transferred this species to the genus *Neohirasea* Rehn, 1904. All three type specimens are in rather poor condition and have shrunken and lost their natural colours due to a former preservation in ethanol, probably the reason why the ♀ PLT in particular is considerably shorter than recently collected and captive reared material. Brunner von Wattenwyl (1907: 246) cited body lengths of 43.0 mm for the male and 65.0 mm for the female.

Spinohirasea crassithorax Zompro, 2001 was described from a male and female collected in the Ha Tinh Province of northeast Vietnam close to the border to Laos. Comparison with the type specimens of *Menexenus bengalensis* Brunner von Wattenwyl, in NHMW and MNHN leave no doubt that *S. crassithorax* Zompro is the same species and consequently a junior synonym. In describing *S. crassithorax*, Zompro provided detailed descriptions of the male and female of *Menexenus bengalensis* Brunner von Wattenwyl.

Due to Brunner von Wattenwyl (1907) and Zompro (2001a) both describing the colouration based on discoloured preserved specimens, a description of the rather pretty colouration of live insects appears warranted. It is more or less identical in both sexes. General colouration of the head, body and legs bright mid to dark green or greenish pale brown (darkening with age). Legs gently annulated with slightly darker green, knees black. A red stripe is running along the entire lateral body surface (less distinct on abdomen), beginning on the pronotum and ending on abdominal tergite IX. Meso- and metasternum red with pale yellow spots. All larger spines of the body with brown tips. Antennae dark green basally but soon becoming black and with a white transverse band just before the apex. Eyes mid-brown.







Figs. 6-8. *Spinohirasea bengalensis* (Brunner von Wattenwyl, 1907).
6. Live pair; **7.** ♀ (coll. PEB, photo by P.E. Bragg); **8.** ♂ (coll. PEB, photo by P.E. Bragg).

Culture history & breeding

Bresseel (2005) provided brief information on the captive breeding, and biology of the present culture-stock of *S. bengalensis*. It has proven rather easy to rear in captivity and was subsequently (Bragg, 2006: 10) included on the Phasmid Study Group culture-list as culture No. 272 "*Spiniphasma crassithorax* (Zompro)". Although Bresseel recorded the origin as Cambodia, enquiries suggest that this was a mistake by the dealer when Bresseel received the

original culture stock. It seems the original specimens of the present culture-stock were collected by Sergey Ryabov (Director of the Tula Zooexotarium, Russia) in Central Vietnam in 2002 or 2003.

Alternative food plants readily accepted in captivity are: bramble (*Rubus fruticosus*, Rosaceae), raspberry (*Rubus idaeus*, Rosaceae), rose (*Rosa* spp., Rosaceae), hypericum (*Hypericum patulum*, Hypericaceae) and oak (*Quercus rubus* & *Q. petraea*, Fagaceae). In moderate humidity and temperatures of 22-28°C this species is easy to rear but not very productive. A daily spray of fresh water is appreciated by both nymphs and adults, and plenty of humidity during the night is recommended to ensure successful moulting. The incubation time for eggs is 4-6 months and the hatching rates are high, being close to 100%.

Biology

This species does not show any particular active defence, except dropping to the ground and quickly walking away if disturbed. The prominent body armature is an effective feature of passive defence. Mating takes place very frequently, with males usually staying on a female's back for their entire life, and continues until the death of one partner. Hence, adults are mostly found mating, as were the type specimens of *S. crassithorax* Zompro and two further couples in the Ha Tinh Province of Vietnam (Zompro, 2001a: 68). Adults are quite long-lived and easily exceed six months of age in captivity. Females are not prolific egg-layers and, due to the relatively large size of the eggs, on average only produce one per day, making a total of about 180 eggs. Newly hatched nymphs are brown and destitute of spines, but by the 2nd instar the typical body armature is clearly evident. Nymphs are brown with pale mottling and only tend to take on the bright green colouration of the adults with the final ecdysis.

Spinohirasea bengalensis Measurements in mm.	♂ HT of *crassithorax* (ZMFK)*	♀ PT of *crassithorax* (ZMFK)*	♂♂ (captive reared)	♀♀ (captive reared)
Body	47.0	77.0	43.0-48.5	69.0
Head	4.4	6.8	3.1-4.5	6.5
Pronotum	3.3	5.1	3.2-3.4	5.1
Mesonotum	9.2	18.5	8.9-9.4	15.0
Metanotum	3.8	4.5	3.5-3.9	4.4
Median segment	2.5	4.3	2.2-2.5	4.2
Profemora	14.0	21.8	11.2-12.9	17.8
Mesofemora	9.0	16.0	8.2-8.9	13.7
Metafemora	12.7	23.0	12.8-13.1	19.9
Protibiae	15.0	22.5	12.6-13.8	20.6
Mesotibiae	10.0	17.6	8.9-9.0	14.8
Metatibiae	11.4	25.8	14.6-15.0	21.7
Antennae	-	-	41.0	54.0

* = according to Zompro (2001a)

Distribution

This species has recently been recorded Zompro (2001a) from Northern Vietnam, Ha Tinh Province (Ky Thuong, Bau Hop brook 180m & Quang Binh, Den 280m) and Central Vietnam. Although there have so far not been any records from Laos this species almost certainly occurs there as well. The known records in Vietnam all relate to tropical lowland rainforest.

The type locality is "Bengale", which however is doubtful because there have not been

any records of *S. bengalensis* from the Gulf of Bengal since its original description by Brunner von Wattenwyl (1907: 246).

Discussion

The genera *Andropromachus* Carl, 1913 (= *Spiniphasma* Chen & He, 2000 **new synonym**), *Neohirasea* Rehn, 1904 (= *Paracentema* Redtenbacher, 1908, synonymised by Zompro, 2001a: 68) and *Spinohirasea* Zompro, 2001 are obviously closely related and together form a generic complex within the subfamily Lonchodinae Brunner v. Wattenwyl, 1893, here provisionally termed the "*Neohirasea*-complex". Zompro (2001a: 68) placed these genera in the tribe Menexenini Bradley & Galil, 1977, which is not an available name due to being an unnecessary replacement name for Neopromachini Günther, 1953. The name Menexi was first introduced by Brunner von Wattenwyl (1893: 81). Bradley & Galil (1977: 182) disregarded the fact that Günther (1953: 560) listed the type-genus *Menexenus* Stål, 1875 in Lonchodini and had thus synonymised the two tribes. Furthermore, they misinterpreted Günther's Neopromachini, which did not contain *Menexenus* but those genera of Lonchodinae in which females have a conspicuous bird beak-like ovipositor. These were recently assigned to Eurycanthinae by Zompro (2001b: 21).

Chen & He (in Chen, He & Li, 2002) described two genera from the Hainan Province, China, both of which appear to belong in the "*Neohirasea*-complex". Unfortunately, the type specimens were not available for examination, so no decision on their actual systematic position can be drawn with confidence. *Qiongphasma* Chen, He & Li, 2002 seems to be related to *Spinohirasea* Zompro, 2001 which is seen in the spinose body and shape of the male genitalia (for differentiation see above). The original description and illustration of the female genitalia of *Pseudocentema* Chen, He & Li, 2002 indicate this genus to be close to *Neohirasea* Rehn. Chen & He (2002: 107) distinguished it from *Paracentema* Redtenbacher, 1908, a synonym of *Neohirasea*, by the lack of a composite, spinose central swelling on the mesonotum, lack of teeth along the posterior margin of the anal segment, and lack of spines on the metanotum. The first two characters are however true for the type species of *Neohirasea*, *Phasma (Acanthoderus) japonicum* de Haan, 1842, which is why *Pseudocentema* is likely to represent a junior synonym. However, without having the holotype of the type species as well as males and eggs at hand for examination, no decision can be made with confidence.

Members of the "*Neohirasea*-complex" are moderately sized insects with the dorsal body surface more or less prominently spinose. Females are rather broad and stout, the abdominal segments being indistinctly longer than wide or even transverse. The anal segment of the male is flat or slightly tectiform, and has the posterior margin with a triangular posteromedian excavation and/or with two small, rounded or conical extensions. The vomer is well developed, sclerotized and bears 1-4 terminal hooks. The subgenital plate of females is small, flat and scoop-like or slightly keeled with the apex ± pointed. Eggs are more or less spherical, have a rather small, shield-shaped to almost circular micropylar plate and lack a stalked capitulum.

Another genus that appears to be closely related and might perhaps belong to this generic complex as well is *Acanthophasma* Chen & He, 2000 (Type-species: *Oxyartes varia* Chen & He, 1992). This was however only described from the male and the descriptions presented by Chen & He (1992 & 2000) do not allow any more precise positioning of the genus. Chen & He (2000: 33) placed it in close relation to *Oxyartes* Stål, 1875 (subfamily Necrosciinae), which is most certainly not the case. From the illustration of the type-species provided by Chen & He (2000: 33, fig. 7-3) it resembles *Andropromachus* Carl but differs by having small, squamiform alae.

A list and preliminary key to distinguish between the genera of the "*Neohirasea*-

complex" appear warranted and are presented below.

1. *Andropromachus* Carl, 1913: 48. Type-species: *Andropromachus scutatus* Carl, 1913: 49, pl. 1.1 & 1.3, by subsequent designation of Zompro, 2001a: 68.
   = *Spiniphasma* Chen & He, 2000: 32. Type-species: *Spiniphasma guangxiense* Chen & He, 2000: 32, fig. 1, by original designation. **new synonym.**
2. *Neohirasea* Rehn, 1904: 84. Type-species: *Phasma (Acanthoderus) japonicum* de Haan, 1842: 135, pl. 12: 4, by original designation.
   = *Paracentema* Redtenbacher, 1908: 477. Type-species: *Paracentema stephanus* Redtenbacher, 1908: 477, by monotypy. [Synonymised by Zompro, 2001a: 68]
3. *Pseudocentema* Chen, He & Li, 2002 : 106. Type-species: *Pseudocentema bispinatum* Chen & He (in: Chen, He & Li), 2002: 107, figs. 8a-b, by original designation.
4. *Qiongphasma* Chen, He & Li, 2002: 106. Type-species: *Qiongphasma jianfengense* Chen & He (in: Chen, He & Li), 2002: 106, figs. 7a-b, by original designation.
5. *Spinohirasea* Zompro, 2001a: 67. Type-species: *Spinohirasea crassithorax* Zompro, 2001a: 68, figs. 1-7, by original designation.

♀♀

1. Back of head flat and unarmed. 2
- Back of head strongly convex and spinose. ..... *Andropromachus*
2. Praeopercular organ indistinct. 3
- Sternite VII with a very prominent and complex praeopercular organ. ..... *Spinohirasea*
3. Metanotum with a pair of posterior spines. ..... *Neohirasea*
- Metanotum unarmed. ..... *Pseudocentema*

♂♂

1. Head unarmed. 3
- Head spinose. 2
2. Back of head flat; mesothorax slender. ..... *Qiongphasma*
- Back of head convex; mesothorax swollen medially. ..... *Andropromachus*
3. Mesofemora strongly broadened and spinose ventrally; vomer with four unequal terminal hooks . ..... *Spinohirasea*
- Mesofemora slender; not conspicuously spinose and ventrally unarmed except for minute sub-apical spines; vomer with a single terminal hook. ..... *Neohirasea*

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Thanks are due to Dr. C. Amedegnato & S. Poulain (MNHN), Dr. U. Aspöck (NHMW) for access to the corresponding collections. Joachim Bresseel (Meise, Belgium) is thanked for providing live specimens of *S. bengalensis* and information on captive breeding. Paul D. Brock (Slough, England) and Zhang Weiwei (Chongqing, China) kindly sent required literature. Dr. Phil E. Bragg (Nottinghamshire, England) kindly provided photos of preserved *Spinohirasea bengalensis* from his collection and made constructive comments on the manuscript.

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Reviews and Abstracts.

Book reviews

Phasmida Species File. Catalogue of Stick and Leaf Insects of the World by Otte, D. & Brock, P. D. (2005). Published by the Insect Diversity Association, Academy of Natural Sciences, Philadelphia. Ring-bound, 21x28cm, 414 pages. Price: US$75. ISBN 1-929014-08-2. **– Reviewed by Oliver Zompro.**

For almost two decades the species of the insect order Phasmatodea have aroused the interest of more and more enthusiasts. Many of them have engaged in taxonomic work, resulting in a considerable number of publications. But only two major publications, Bragg's 2001 "Phasmids of Borneo" and Zompro's 2004 "Revision of the genera of the Areolatae" dealt with the whole order. A catalogue, urgently required, was still missing. Otte & Brock have tried to fill this gap with the present work. Considering the high price, a high quality book would be expected, but a ring-bound collection of loose leaves is delivered. The cover becomes damaged after a little use. This method of binding is unsuitable for the demands placed on a book that is used frequently. The buyer would be well advised to cut and bind the book in a more suitable way.

On page two the book is called a "second edition"; this is not really correct, the previous edition did not fulfil the requirements of article 8.6 of the International Rules of Zoological Nomenclature. A consequence is that all taxonomic acts should be dated 2005, and not 2003 as implied in the introduction.

A number of errors were corrected by Brock (2006, *PSG Newsletter*, 105:14) and he included a link to a website (http://phasmida.orthoptera.org), where further errors and additions will be published. Considering the high price, a more thoroughly prepared manuscript would expected, since the value of such a catalogue is more or less solely defined by the correctness of its contents.

One chapter contains collections of references dealing with the biogeographical regions. The way of selection of these references is not obvious, minor generic revisions stand beside an unpublished thesis, and species lists of all groups of insects, while several important works are missing. One of the most important works on Nearctic phasmids (Zompro, 1998: Revision of Diapheromerinae) is not cited for the Nearctic, and another work dealing solely with this fauna (Helfer, 1987, *How to know the Grasshoppers, Cockroaches and their allies*) can only be found in the "General" section.

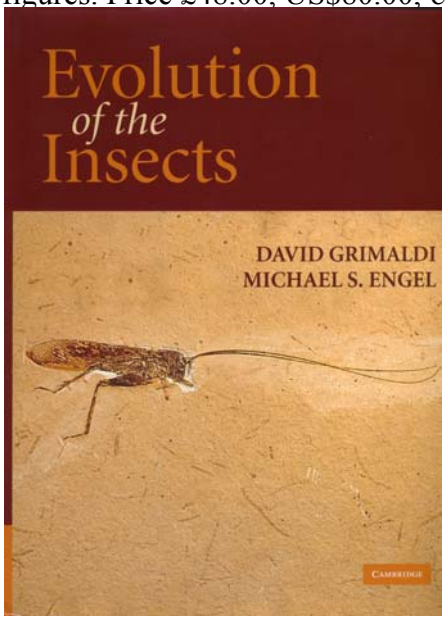
The sections "Type catalogs", "Taxonomic arrangement" and "List of genera" appear to be well done. However, the "Type catalogs" includes Bragg's 1995 unpublished database but makes no mention of the published *The Phasmid Database: version 1.6* (Bragg, 1998, ISBN 0-9531195-2-1), and the prominent rendering of self-creating tribal names such as Necrosciini – the single tribe in the subfamily Necrosciinae – is confusing. In the section "Taxa above the level of genus" almost all more recent important publications are missing.

In the main part "Genera and Species" many spelling mistakes like "dulterina" instead of "adulterina" (p. 228) could have been avoided with a careful review. This is also true for formating, *Athertonia* is placed as a valid genus under "T", instead of "A". On closer inspection it becomes obvious that this is a wrongly formatted synonym. The authors Stål, Sjöstedt, and Sinéty are all spelt incorrectly throughout the book. New names are proposed without highlighting these, and without a checklist of new names (e.g. *Ramulus neomodestus*). The weakest treatment concerns *Heteronemia*: 23 species are listed in this genus, which actually belong to various genera (*Heteronemia, Pseudosermyle, Baculum*, etc.) and families (Heteronemiidae, Diapheromeridae, Phasmatidae), almost without exception their actual assignment has already been published in major revisionary works. The book

seems to be full of notes which will be meaningless without a great deal of research e.g. in *Nearchus* – what does "Type species according to Bragg 1996, but not confirmed by MNS" mean? (there is no indication of the Bragg 1996 reference). Or for *Nearchus maximus maximus* what does "female type(s) confused by locality Laos, Siam" mean? There is nothing to state the conventions used in the text, for example there is confusion with dates e.g. under *Haaniella echinata* the reference "1990[91] Hausleithner" is given – does this mean published in 1990 or 1991, or not known? If it means published in one year but dated with the other, then which is which – and why is this not used for Audinet-Serville 1838 (a publication which was dated 1839)?

Systematics of Phasmatodea are changing, and the next few years will bring a considerable number of changes. Valuable as it is, this work is still premature, and, considering the high price, it cannot really be recommended. This might change if a further, thoroughly corrected, edition is published.

Evolution of the Insects by David Grimaldi & Michael S. Engel (2005). Published by Cambridge University Press. Hardcover with dustcover, 232x300mm, 755 pages, almost 1000 figures. Price £48.00, US$80.00, €75.00. ISBN 0-521-82149-5. – **Reviewed by Oliver Zompro.**



Nowadays purely statistical and, almost as a rule, strongly contradicting "phylogenetic" speculations are usually highly acceptable, and the results welcome, in so called "high ranking" journals. The work of experienced specialists, with an insight in a group of insects developed over many years, counts much less. Nevertheless a book has been published that does not trust in computer games, but in some highly old-fashioned facts – fossils. Obviously this was a hard work for the authors of *Evolution of the Insects*. They had to cope with whole organisms, not just put some characters in a computer and afterwards choose one of the results presented. The authors managed to finish this project within four years.

The book is subdivided in 15 chapters. The first one, "Diversity and Evolution", discusses the age of insects and the immense benefit of the work with fossils, the number of species, and the ecological dominance of these organisms, which are actually the only group that really rules Earth, at least on the land. Insects form the majority of the biomass. Some species have a destructive impact on their environment, some are highly important for the decomposition of dead plant material, and some, like the termite *Macrotermes falciger*, create whole landscapes. Only a few species distribute human diseases, but they cause the death of millions of people. On the other hand, humans are dependent on insects because they fertilise plants of economical value. More or less the whole biosphere is dependent on insects. Various species concepts are presented and explained with two samples species. It follows a discussion about the number of insect species. Presumably about 100,000,000 species of insects have lived on earth up to now. In the subchapter "Reconstructing Evolutionary History" the history of insect taxonomy is described and relevant personalities like Linnaeus, Latreille, Darwin and Hennig are portrayed. Phylogenetic methods are explained.

The second chapter is dedicated to the fossil insects. The different ways of fossilisation and the possibilities of reconstructing fossil DNA are discussed. The third chapter, "Arthropods and the Origin of Insects", discusses the origin of insects. Related groups such

as Onychophora and Tardigrada are portrayed and an overview of the other groups of arthropods presented. Chapter 4, "The Insects" gives an overview of the morphology and anatomy of insects, and the most important authorities who provided the basis for insect research, like Handlirsch, Tillyard, Martynov, and others. Chapter 5, "Earliest Insects", characterises the basal groups of Insecta. The next chapter discusses the development of the insect wing and leads to the basal groups of winged insects. Chapter 7 is dedicated to the Polyneoptera. Again, after a short introduction, the individual orders are introduced. Here some negligence concerning the determination of species is obvious. Two of the grasshoppers presented are in fact members of the order Phasmatodea: figure 7.25 shows a female *Trychopeplus* (Phasmatodea: Diapheromeridae) and 7.28 a female *Asceles* (Phasmatodea: Phasmatidae). The Phasmatodea themselves have suffered a poor treatment. All important references are missing, especially those concerning the phylogeny and the fossil taxa. Instead some papers of minor importance are cited. The material figured is of the same poor quality. The specimens are often seriously damaged, even though they all belong to common species that almost all collections contain in a much better quality. The figured female of the walking leaf is actually just a female nymph. Nevertheless, some eggs are figured, but from different aspects some with, some without an operculum, but always without comment. The higher taxa of Phasmatodea mentioned originate from a publication by S. Bradler (2003) and do not correspond to the rules of the ICZN, hence they are invalid. The genus *Timema*, the only genus of the order Timematodea, is introduced as a phasmid. Within the Mantophasmatodea the legend to figure 7.57 uses a junior synonym and should read *Raptophasma kerneggeri*; the ventral spination of the fore- and mid-femora is not present in the original specimens nor in any other member of the subfamily.

The following chapters deal with the orders Paraneoptera, Psocoptera, Thysanoptera and Hemiptera, followed by the Holometabola. When discussing the beetles, a subchapter is dedicated to their ability to produce light, and the same ability of some Diptera is also mentioned, but nowhere it is mentioned that members of a hemimetabolous group is able to luminesce, namely the cockroaches. Chapter 14, "Insects become modern: The Cretaceous and Tertiary Periods" demonstrates the co-evolution of insects and flowering plants, and the geological reasons for the biogeography presented, furthermore the mass extinction at the end of the Cretaceous and the effects of asteroid impacts and volcanic eruptions. The list of active volcanoes on page 635 contains an error, "Mt. Punatubo" should read "Mt. Pinatubo". The influence of the mammals, which started to radiate rapidly in the Tertiary, on the insects is discussed. The last chapter, "Epilogue" draws attention to the human responsibility for the extinction of many species of insects. Noteworthy are the extensive glossary and the 70 pages of references.

The authors aim to provide extensive information, mainly for students, and this purpose is completely fulfilled. The text is pleasant to read, and the numerous illustrations are generally of high quality. A highlight is that in many chapters the leading scientists of the field concerned are introduced, giving more life to science. Unfortunately, as in most publications, very little information is given about the eggs of the insects, even though they have proven to be of an enormous benefit for phylogenetic works. But this can be excused here, the book is highly suitable to attract everybody who wants to have a deeper insight in this material. Considering the number of colour illustrations and pages the price appears very modest. All in all, this book is a milestone that should be present in every good library, public or private.

Phasmid Abstracts

The following abstracts briefly summarise articles that have recently appeared in other publications. Some of these may be available from local libraries. Others will be available in university or college libraries, many of these libraries allow non-members to use their facilities for reference purposes free of charge.

The editor of *Phasmid Studies* would welcome recent abstracts from authors so that they may be included in forthcoming issues. In the case of publications specialising in phasmids, such as *Phasma*, only the longer papers are summarised.

Bollens, T. (2006) Species report N°4: *Eurycnema versirubra*, PSG 28 (Audinet-Serville, 1838). *Phasma,* **16**(63): 4-5, & colour plate on page 23. [In Dutch]

Notes on rearing *Eurycnema versirubra* (Audinet-Serville, 1838).

Bragg, P.E. (2006) Biografie van een Phasmatoloog: George Robert Gray. *Phasma,* **16**(63): 10-13. [In Dutch]

Geroge Robert Gray (1808-1872) was an English zoologist and author. His life and phasmid work is outlined. He described half the known species of phasmids at that time and is best known for his work on leaf insects and Australian phasmids. He also produced the first significant catalogue of world species. [English version in *Phasmid Studies*, 15: 5-9.]

Brock, P.D. (2006) Three new species of South African stick insects (Phasmida). *Journal of Orthoptera Research*, **15**(1): 37-44.

Three new species from the Western Cape of South Africa are described and figured: *Clonaria cederbergensis, Clonaria montana* (Diapheromeridae: Pachymorphinae: Gratidiini) and *Macynia mcgregororum* (Bacillidae: Macyniinae: Macyniini). The first two species have close associations with the Cederberg Wilderness Area and Table Mountain, respectively. *Macynia mcgregororum* has been found near Citrusdal. Keys are provided.

Brock, P.D. (2007) The types of Phasmida in the Zoological Institute, Russian Academy of Sciences, St. Petersburg (ZMAS). *Zootaxa*, **1398**: 45-56.

Type specimens of 67 taxa of Phasmida (including probable type specimens of 24 taxa) have been located in the Zoological Institute, Russian Academy of Sciences, St. Petersburg. The species are listed alphabetically, with the number of specimens, sex and locality data.

Hennemann, F. & Conle, O. (2006) *Papuacocelus papuanus* n.gen., n.sp. – a new Eurycanthinae from Papua New Guinea, with notes on the genus *Dryococelus* Gurney, 1947 and description of the egg (Phasmatodea: Phasmatidae: Eurycanthinae). *Zootaxa,* **1375**: 31-49.

The new genus *Papuacocelus* n.gen. is described from Papua New Guinea (Morobe Province) and is related to *Dryococelus* Gurney, 1947, *Thaumatobactron* Günther, 1929 and *Eurycantha* Boisduval, 1835. The type-species *Papuacocelus papuanus* n.sp. is described and illustrated from both sexes. The male holotype is deposited in BMNH, the female paratype in the first author's collection.

The monotypic genus *Dryococelus* Gurney, 1947 (Type-species: *Karabidion australe* Montrouzier, 1855) is briefly discussed and the eggs are described and illustrated for the first time. Keys and a table are presented to distinguish *Dryococelus* Gurney, 1947, *Papuacocelus* n.gen., *Thaumatobactron* Günther, 1929 and *Eurycantha* Boisduval, 1835.

The beak-like ovipositor possessed by most females of Eurycanthinae is found to be formed by elongation of the anal segment and subgenital plate, and not as stated by former authors, by the subgenital plate and an elongated supraanal plate. A brief survey is provided of the beak-like ovipositors in Phasmatodea.

Hennemann, F. & Conle, O. (2006) The genus *Paracyphocrania* Redtenbacher, 1908 (Phasmatodea: Phasmatinae: Phasmatini). *Zoologische Mededelingen Leiden,* **80**(9): 91-101.

The little-known monotypic genus *Paracyphocrania* Redtenbacher, 1908 (Phasmatinae: Phasmatini) is reviewed and now comprises two species: *P. lativentris* Redtenbacher, 1908, and *P. tecticollis* (Redtenbacher, 1908) comb.nov., which are redescribed and illustrated. A neotype is designated for *P. lativentris* which is newly recorded from Sulawesi.

Lorrain, I. (2006) Phasmiden als assistenten in de psychotherapie. *Phasma,* **16**(62): 5-6. [In Dutch]

Phasmids as assistants in psychotherapy: This article describes the use of Phasmids in psychotherapy; not only to overcome phobias from insects or arachnids, starting with the well known Carausius morosus up to Extatosoma tiaratum; but also to open up people with autism by letting them take care of phasmids.

Maginnis, T.L. (2006) Leg regeneration stunts wing growth and hinders flight performance in a stick insect (*Sipyloidea sipylus*). *Proceedings of the Royal Society,* B **273**: 1811-1814.

Major morphological structures are sometimes produced not once, but twice. For example, stick insects routinely shed legs to escape a predator or tangled moult, and these legs are subsequently re-grown. The author shows that in *Sipyloidea sipylus,* re-growth of a leg during development causes adults to have disproportionately smaller wings and increases wing loading. These morphological consequences of leg regeneration led to significant reductions in several biologically relevant measures of individual flight performance. This previously unrecognized trade-off between legs and wings reveals the integrated nature of phasmid phenotypes, and the author proposes how this trade-off may have shaped phasmid evolution.

Maginnis, T.L. (2006) Het regenereren van poten overtroeft de groei van vleugels en belemmert het vliegvermogen van een wandelende tak (*Sipyloidea sipylus*). *Phasma,* **16**(63): 10-13. [in Dutch – translation of paper in *Proceedings of the Royal Society,* B **273**: 1811-1814.]

Pain, S. (2006) Return of the giants. *New Scientist,* 15th July, 2006: 42-45.

The story of the rediscovery of the Lord Howe Island phasmid, *Dryococelus australis,* on Ball's Pyramid in 2001, the collection of specimens in February 2003. The problems with rearing it and the prospects for reintroduction to Lord Howe Island are discussed.

Pull, C. (2006) Kweekbeschrijving van *Epidares nolimetangere* PSG 99 (de Haan, 1842). *Phasma,* **16**(62): 13-16, & 2 colour plates on page 17. [In Dutch]

Notes on rearing *Epidares nolimetangere* from Sarawak.

Rabaey, K. (2006) Biografie van Carl Brunner von Wattenwyl. *Phasma* **16**(62): 22-23. [In Dutch]

A short biography of Carl Brunner von Wattenwyl.

Rabaey, K. Simoens, R. & Hennemann, F. (2006) Species report N°3: PSG 268: *Leipohasma lucubense* (Brancsik, 1893) uit Madagascar. *Phasma* **16**(62): 7-8, & 2 colour plates on page 17. [In Dutch]

Leipohasma lucubense, a stick insect from Madagascar was brought into culture from material collected by Nicholas Cliquennois, a Phasma member who lives in Madagascar. He collected the species in October 2003, not in forests but on agricultural land with a lot of brushwood. He found two pairs in Nosy Komba, an island not far from Nosy Be (N.W. Madagascar) on a guava plant. He also saw nymphs on guava and on *Harunagana madagascariensis* and on another plant which he could not identify.

Rabaey, K. Simoens, R. & Hennemann, F. (2006) Species report N°3: PSG 270: *Peruphasma schultei* (Conle& Hennemann, 2005) Noord Peru. *Phasma,* **16**(62): 9-10, & 2 colour plates on page 17. [In Dutch]

Peruphasma schultei is a remarkable new phasmid from the Cordillera del Condor in Northern Peru. They are collected by Rainer Schulte who gave the eggs to Oskar Conle and Frank Hennemann who raised them successfully (2005-2006). The eggs produced by the F1 generation were distributed to many breeders all around the world for the beneficial project with INBICO to support the native people living in the El Condor National Park.

Wedmann, S., Bradler, S. & Rust, J. (2006) The first fossil leaf insect: 47 million years of specialised cryptic morphology and behavior. *Proceedings of the National Academy of Science,* **104**: 565-569.

Stick and leaf insects (insect order Phasmatodea) are represented primarily by twig-imitating slender forms. Only a small percentage (≈1%) of extant phasmids belong to the leaf insects (Phylliinae), which exhibit an extreme form of morphological and behavioural leaf mimicry. Fossils of phasmid insects are extremely rare worldwide. Here we report the first fossil leaf insect, *Eophyllium messelensis* n.gen., n.sp., from 47-million-year-old deposits at Messel in Germany. The new specimen, a male, is exquisitely preserved and displays the same foliaceous appearance as extant male leaf insects. Clearly, an advanced form of extant angiosperm leaf mimicry had already evolved early in the Eocene. We infer that this trait was combined with a special behaviour, catalepsy or "adaptive stillness," enabling *Eophyllium* to deceive visually oriented predators. Potential predators reported from the Eocene are birds, early

primates, and bats. The combination of primitive and derived characters revealed by *Eophyllium* allows the determination of its exact phylogenetic position and illuminates the evolution of leaf mimicry for this insect group. It provides direct evidence that Phylliinae originated at least 47 million years ago. *Eophyllium* enlarges the known geographical range of Phylliinae, currently restricted to south-east Asia, which is apparently a relict distribution. This fossil leaf insect bears considerable resemblance to extant individuals in size and cryptic morphology, indicating minimal change in 47 million years. This absence of evolutionary change is an outstanding example of morphological and, probably, behavioural stasis.