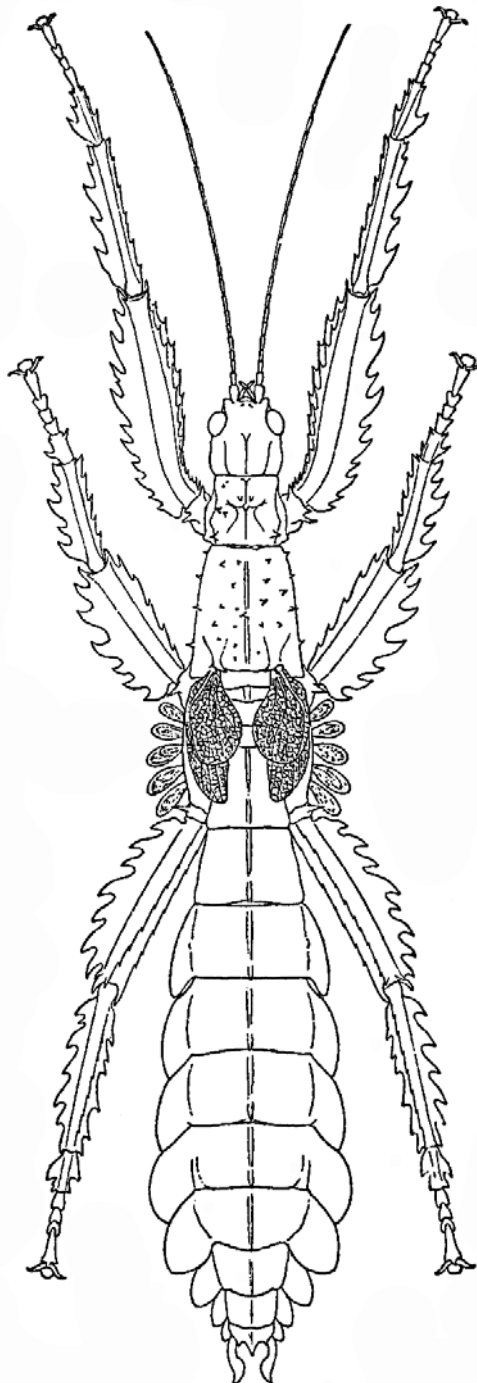


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PHASMID STUDIES

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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.

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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.
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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.
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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.
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Phasmid Studies

Volume 17, numbers 1 & 2.

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Biographies of Phasmatologists – 7. James Wood-Mason.

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Abstract

James Wood-Mason was a British zoologist who worked in the Indian Museum at Calcutta from 1877 to 1893. He started as an assistant to Professor John Anderson and later succeeded him as Director of the Museum. He made many collections of marine animals and Lepidoptera. He is best known in the entomological world for his work on mantids and phasmids. His life and phasmid work is outlined. He described 24 new species of phasmids and named three new genera.

Key words

Phasmida, Phasmatologist, Biography, Indian Museum, Calcutta, James Wood-Mason.

James Wood-Mason (December 1846- 6th May 1893)

James Wood-Mason was born in Gloucestershire in December 1846. His father was a medical doctor. James attended Charterhouse School and then Queen's College Oxford where he was a pupil of J.O. Westwood. He was interested in Natural History and Geology and in 1869 he went to India to become Assistant Curator at the Indian Museum in Calcutta. He was a Fellow of the Royal Entomological Society of London and remained a great admirer of Westwood's work.

Perhaps because he spent most of his adult life in India, it has been difficult to find information about Wood-Mason's private life. There were two brief anonymous obituaries in British entomological publications when he died (Anon, 1893a, 1893b), and a more detailed mention of his work in an obituary by his successor Alfred Alcock (1893) in the Proceedings of the Asiatic Society of Bengal that was subsequently reproduced in a book about the Indian Museum (Annandale, 1914). One obituary (Anon, 1893b) mentions that he was married and had "several children". None of the sources give his date of birth, and only one refers to his month of birth (Alcock, 1893). I have been unable to trace a picture of him. He died before celluloid photographic film was invented, so cameras were still rare, particularly outside Europe and the USA, and it is possible that he was never photographed or painted.

Shortly after his arrival in India, Wood-Mason joined the Asiatic Society of Bengal, the leading scientific society in India. He was a regular contributor to the Society's journal until he became ill toward the end of his life. In 1873 he became the society's Natural History Secretary and edited the Natural History section of the journal for most of the following 16 years. In 1887 he was elected vice-president of the society. He became Professor of Zoology and Comparative Anatomy in the Medical College of Bengal and in 1888 he was made a Fellow of the University of Calcutta.

In 1808 the Asiatic Society formed the first museum in India. In 1866 the British government turned the Asiatic Society Museum into the Imperial Museum by an Act of Parliament and soon it was renamed the Indian Museum. It moved to new buildings in 1875. The task of re-organising it as a multipurpose museum was entrusted to the Superintendent Dr. John Anderson and his assistant, James Wood-Mason. Having started as Assistant Curator in 1869, he became Deputy Superintendent, and when Dr. John Anderson retired in 1887, he became Superintendent of the Indian Museum, a position he held until his death.

James Wood-Mason became ill with Bright's disease, a kidney disease which causes back pain, vomiting, fever and oedema. Over a period of several years the effects on Wood-Mason became more severe and incapacitating, and on 5th April 1893, in a critical state of health, he left Calcutta to return to England. On the journey back to England, he died at sea on 6th May 1893 at the age of 47.

Wood-Mason was involved in several explorations. In 1872 he went to the Andaman Islands, working mainly on marine fauna, but he also collected at least two species of phasmids which he described the following year: *Bacillus hispidulus* and *Bacillus westwoodii*.

In March 1873 he set out to the Nicobars and other islands in the Bay of Bengal with the famous ornithologist Allan Octavian Hume, and with the geologists Dr. Ferdinand Stoliczka and Dr. Dougall.

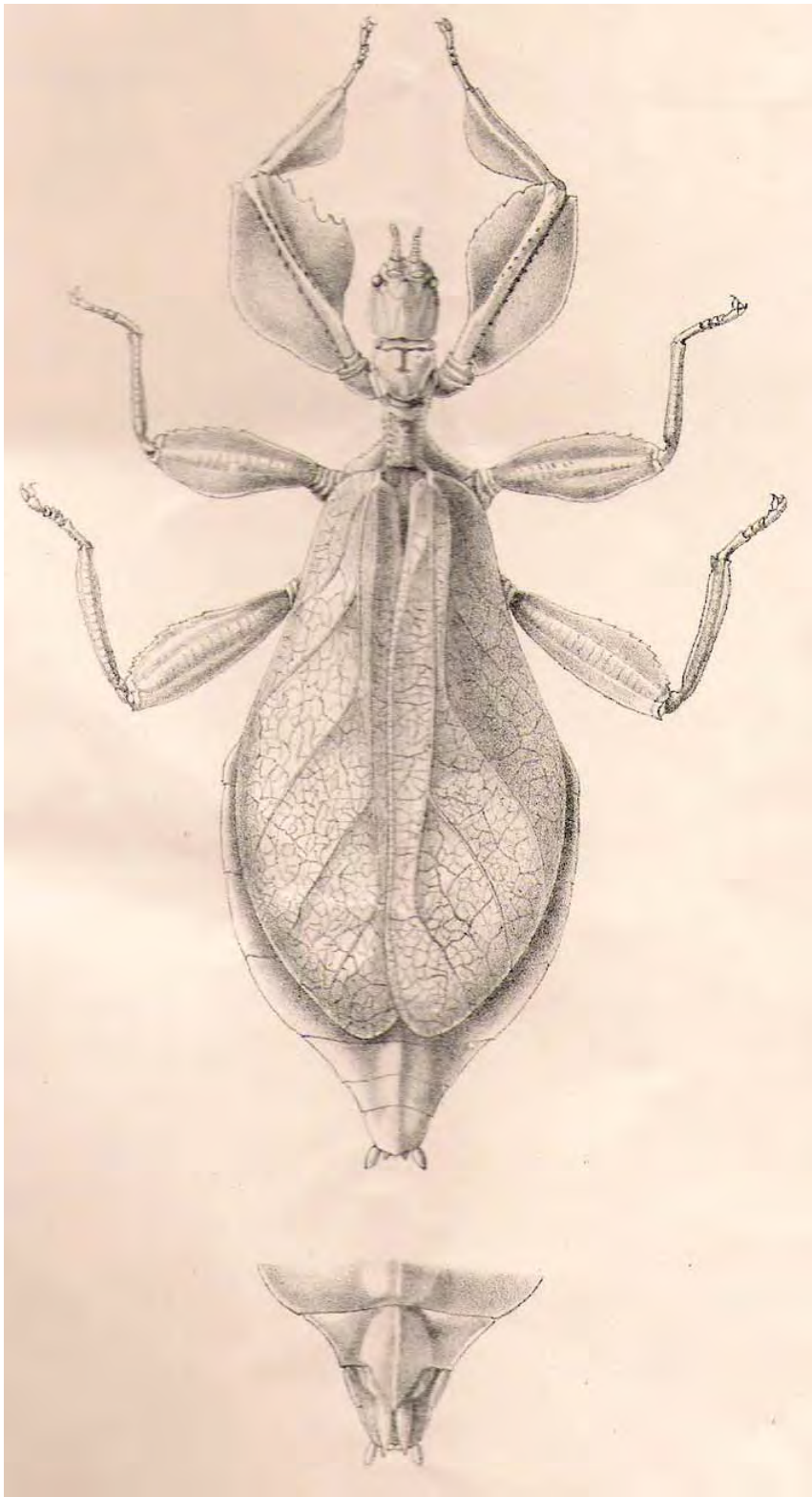


Figure 1. *Phyllium westwoodii* Wood-Mason, 1875; plate 17 from Wood-Mason's original description.

Wood-Mason travelled on Her Majesty's Indian Marine Survey Steamer *Investigator* in 1888, and worked on Crustacea in the latter part of his life. He described some new species of Crustaceans collected by the *Investigator*, some of which were not published until after his death. At least ten marine organisms have been named after Wood-Mason, many posthumously: *Bathybembyx woodmasoni* Smith, 1895, *Erugosquilla woodmasoni* (Kemp, 1911), *Scalpellum woodmasoni* Annandale, 1906, *Verum woodmasoni* (Annandale), *Rectopalicus woodmasoni* (Alcock, 1900), *Heterocarpus woodmasoni* Alcock, 1901, *Coryphaenoides woodmasoni* (Alcock, 1890), *Ichnopus woodmasoni* (Giles, 1890), *Bopyrione woodmasoni* (Chopra, 1923), *Thalamita woodmasoni* Alcock, 1899.

In addition to his work on phasmids, Wood-Mason published at least 20 papers on mantids, one of which also contained work on phasmids (Wood-Mason, 1877b). His last publication on phasmids was in 1879, but he continued publishing work on mantids almost until he died; his catalogue of mantids in the Indian Museum (Wood-Mason, 1889 & 1891) was his last mantis publication. He described at least 60 species and 14 genera of mantids, and created the valid family Eremiaphilidae.

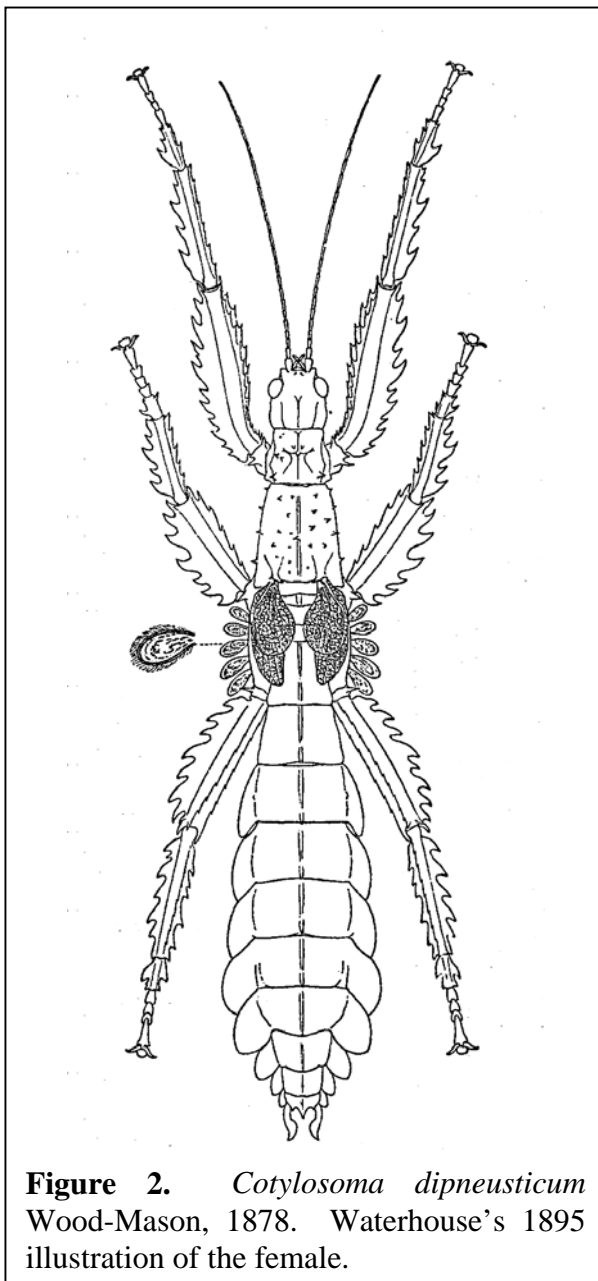


Figure 2. *Cotylosoma dipneusticum* Wood-Mason, 1878. Waterhouse's 1895 illustration of the female.

Phasmids of Wood-Mason

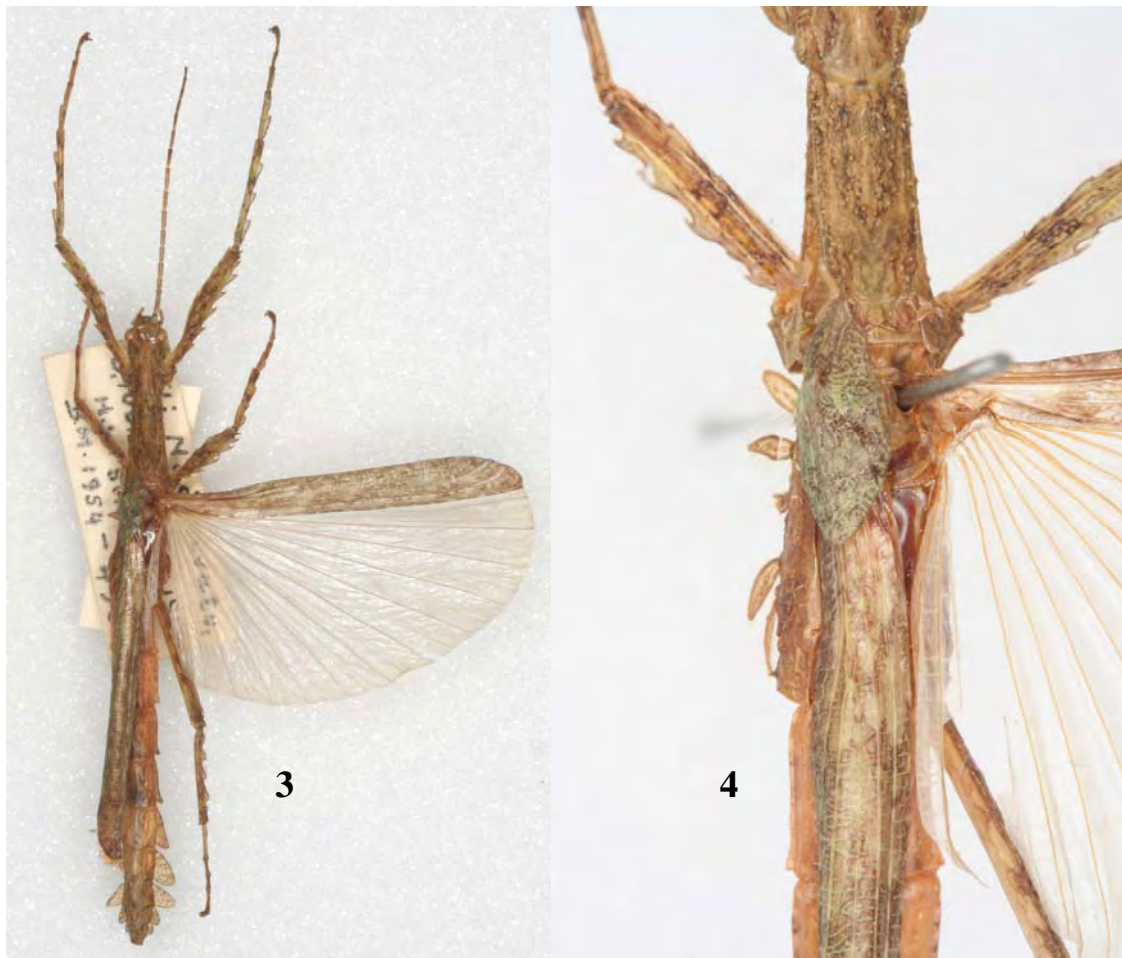
Wood-Mason described a total of 24 species and 3 genera of phasmids. Three of the new species that he described were named after J.O. Westwood. The majority of Wood-Mason's new species were from India and the neighbouring region, but he also described species from Australia (1), New Britain (2), Madagascar (2), Peninsular Malaysia (1) and "Borneo" (in error, actually Fiji). Almost all his species were illustrated until 1876, after 1876 only one paper was illustrated (Wood-Mason, 1877e) and the illustrations were not of new species.

All but three of Wood-Mason's phasmid publications described new species. Two of his papers (1873b & 1873c) just described the male of what is now known as *Cuniculina insignis* (Wood-Mason, 1873): he had described the female earlier in the same year. The third publication (1877f) is an announcement of the discovery of stridulating organs in phasmids.

Cotylosoma dipneusticum Wood-Mason, 1878 is an interesting species in several respects. Firstly, the name of this species is credited to Wood-Mason, but he did not formally describe it; secondly, it was for many years reputed to be semi-aquatic; thirdly, it was described with what is probably the least precise measurement ever used for a phasmid; and finally, the locality he gave was completely wrong. Wood-Mason gave it the

name but made no more than a brief mention of the insect, and said that it was in the British Museum and came from Borneo.

The actual descriptive content of Wood-Mason's mention of this species consists of only one full sentence and part of two others: "The insect in question is closely related to the *Prisopi*", "From each side of the body, in fact, along the lower margins of the sides of the metathorax, there stand straight out five equal small but conspicuous ciliated oval plates", the sentence goes on to speculate about their function as gills, and "The insect, which is a female with rudimentary organs of flight, is between three and four inches in length." Nowadays such a description would not be valid – the description has to be sufficient to distinguish it from other known species – but for names created prior to 1931 the rules are not as strict so Wood-Mason's description is acceptable.



Figures 3-5.
Cotylosoma dipneusticum
3 & 4. Male.
5. Female holotype (right side of metathorax).

The specimen was only really described by Waterhouse (1895) – 17 years later – and even that was an illustration (see figure 2, above), not a written description. Waterhouse corrected the locality of the specimen: it is from Taviuni in the Fiji Islands. Waterhouse also cast doubt on the semi-aquatic nature of the insect. The first written description of the female was published by Redtenbacher (1908), thirty years after Wood-Mason's few words. The male (figs 3 & 4) remained unknown until it was described by Ragge in 1956. Wood-Mason's original specimen is in the Natural History Museum, London; all other specimens of phasmids described by Wood-Mason were originally in the Indian Museum, Calcutta. Unfortunately, getting information about the collection is difficult and has led to the erroneous assumption that all the type material had been lost. Recently, however, I have been able to confirm that some of Wood-Mason's original specimens are still present in the museum; work to trace other specimens is on-going.

Wood-Mason's last published work on phasmids was in 1879; from 1880 to 1883 he worked almost exclusively on Lepidoptera (Alcock, 1893).

Although no new species of phasmid has ever been named after Wood-Mason, he does have a genus named after him: *Woodmasonia* Brunner, 1907, with the type species *Bacillus oxytenes* Wood-Mason, 1873.

Genera of phasmids described by Wood-Mason

Cotylosoma Wood-Mason, 1878: 102.

Menaka Wood-Mason, 1877e: 342.

Parectatosoma Wood-Mason, 1879:117.

Menaka is considered to be a synonym of *Medaura* Stål, 1875; *Cotylosoma* and *Parectatosoma* are both valid genera. It is interesting to note that Wood-Mason's valid genera are not from India.

Lists of Wood-Mason's 24 species grouped alphabetically within each year

1873

furcillatus (*Baculum*) 1873: 54, pl. 5.6 & 5.6a (♀).
fuscolineatus (*Bacillus*)..... 1873a: 46, pl. 5.7, 5.7a-b (♂).
hispidulus (*Bacillus*) 1873a: 47, pl. 7.2, 7.2a-c (♂) & 7.3(♀).
insignis (*Bacillus* (*Baculum*)) 1873a: 51, pl. 5.1, 5.1a-b (♀) & 5.2 (♀).
laevigatus (*Bacillus*) 1873a: 49, pl. 5.4, 5.4a-c (♀ nymph).
oxytenes (*Bacillus*)1873a: 48, pl. 5.3 & 5.3a (♀).
penthesilea (*Bacillus* (*Baculum*))1873a: 52, pl. 5.5 & 5.5a (♀).
scabriusculus (*Bacillus*) 1873: 55, pl. 7.1 & 7.1a (♀).
westwoodii (*Bacillus*) 1873a: 50, pl. 6.3, 6.3a-b (♀).

1875

austeni (*Lonchodes*) 1875: 261.
westwoodii (*Phibalosoma*) 1875: 216.
westwoodii (*Phyllium*)1875: 218, pl. 17 (♀).

The holotype of *Lonchodes austeni* was illustrated by Wood-Mason, 1977e, pl. 3.4, 3.4a-b (♂).

1876

Lonchodes verrucifer 1876b: 47, pl.11.1-4 (♂) 11.5-6 (♀).

1877

<i>annamallayanum</i> (<i>Phibalosoma</i>)	1877d: 161.
<i>frenchi</i> (<i>Bacteria</i>)	1877b: 74.
<i>godama</i> (<i>Lonchodes</i>)	1877d: 162.
<i>menaka</i> (<i>Necroscia</i>)	1877c: 130.
<i>novae-britanniae</i> (<i>Phibalosoma</i>)	1877b: 75.
<i>novae-britanniae</i> (<i>Phyllium</i>)	1877b: 75.
<i>valgus</i> (<i>Lonchodes</i>)	1877a: 487.
<i>sinkiebensis</i> (<i>Bacteria</i>)	1877e: 343.

1878

<i>dipneusticum</i> (<i>Cotylosoma</i>)	1878: 101.
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1879

<i>echinus</i> (<i>Parectatosoma</i>)	1879: 118.
<i>hystrix</i> (<i>Parectatosoma</i>)	1879: 117.

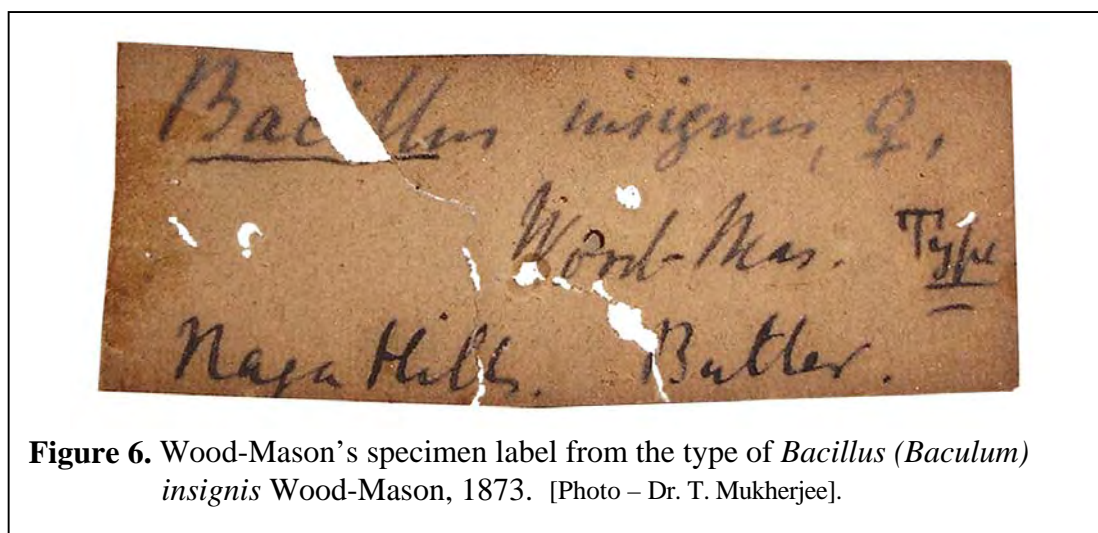


Figure 6. Wood-Mason's specimen label from the type of *Bacillus* (*Baculum*) *insignis* Wood-Mason, 1873. [Photo – Dr. T. Mukherjee].

Acknowledgements

I am grateful to the RESL librarian for locating the two British obituaries, to Dr Mukherjee (Kolkata) for locating the longer obituary and for providing the photograph of Wood-Mason's specimen label. I thank Martin Stiewe for information on the mantids described by Wood-Mason, and Judith Marshall for the illustration of *Phyllium westwoodii*.

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Biographies of Phasmatologists – 8. Robert Walter Campbell Shelford.

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Abstract

Although little of his published work was on phasmids, Robert Shelford's work is significant because of the large number of Bornean phasmid specimens that he collected for the museums in Sarawak, Oxford and Cambridge. His life and phasmid work is outlined.

Key words

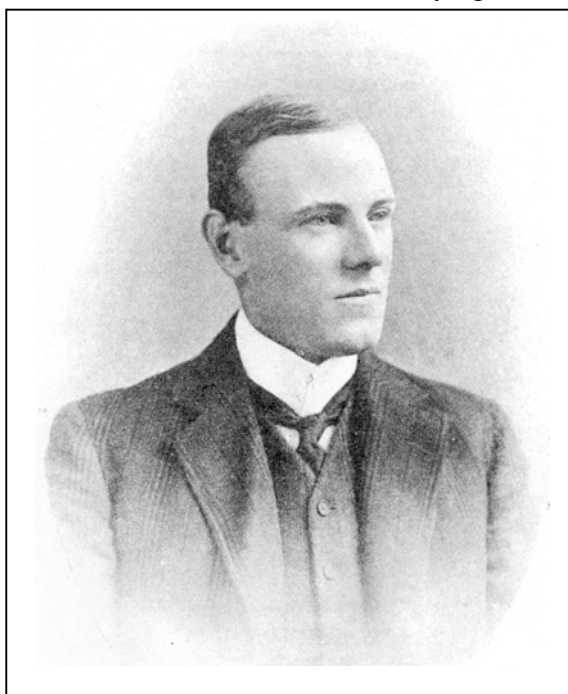
Phasmida, Phasmatologist, Robert Walter Campbell Shelford, Biography, Sarawak Museum.

Robert Walter Campbell Shelford (1872-1912)

Born 3rd August 1872 in Singapore, the son of a prominent British merchant. As a child, after an accident at the age of three, he developed a tubercular hip joint that incapacitated him for several years as a child. He became more mobile after an operation but was never able to participate in active sports as a child, although as an adult he enjoyed playing golf. The tuberculosis recurred in later life, and was the eventual cause of his death at an early age.

Shelford studied at King's College, London, and then at Emmanuel College, Cambridge. After graduating from Cambridge in 1895 he went to Yorkshire College in Leeds as a demonstrator in Biology. In 1897 he went to Sarawak as the Curator of the Sarawak Museum, a post he held for seven years. While he was at the Sarawak Museum quite a lot of specimens were sent to his old university at Cambridge.

In 1905 he left Sarawak Museum and returned to England. He went to Oxford and became an Assistant Curator of the Hope Department of Zoology at the University Museum. On his way back to England he collected many specimens which he gave to the Hope Collection in Oxford, in addition to "the vast collection of Bornean insects which he had presented [to the Hope Collection] during 1899-1901 while Curator of the Sarawak Museum" (Smith, 1986: 58).



It was at Oxford that he did most of his published research on phasmids. Most of his work at Oxford was on cockroaches, but he also worked on the other insects he had brought back from Borneo, and assisted in the library.

Shelford married Audrey Gurney from Bath on 25th June 1908. In April 1909 he slipped and the tubercular disease flared up and severely limited his work throughout the final three years of his life. Robert Shelford died at the age of 39 on 22nd June 1912.

Shelford's best-known publication, his book *A Naturalist in Borneo* (Shelford, 1916), was published several years after his death, having been completed by his Oxford colleague, Edward Poulton. The book was popular when originally published, and was reprinted in paperback by Oxford University Press in 1985.

Species named after Shelford

Shelford has had several Orthopteroid insects named after him. These include one Bornean mantis: *Deroplatys shelfordi* Kirby, 1903, one Bornean phasmid: *Baculofractum shelfordi* Bragg, 2005, two genera of cockroaches: *Shelfordella* Adelung, 1910 and *Shelfordina*

Hebard, 1929, and 17 species of cockroaches.

Shelford's phasmids

The vast majority of phasmid specimens in the Sarawak Museum in Kuching (SMSM) were collected during Shelford's time as curator, this is probably also the case for the majority of insect groups in the collection. Many of the Bornean specimens in both Oxford (OXUM) and Cambridge (CUMZ) University collections are also specimens collected during Shelford's time in Sarawak.

In 1901, Shelford briefly described the eggs of some phasmids that he referred to as "*Necroscia*, *Marmessoidea* and *Agondasoidea*". He also commented that "Phasmidae, notwithstanding their wonderful protective resemblance to sticks and leaves, are the staple form of diet of Trogons" [A family of birds].

In 1908 Shelford produced a catalogue of Central American phasmid species. This was based on Brunner (1907) & Redtenbacher's (1906 & 1908) publications, but includes some species that they omitted from their work.

Shelford only described five new species of Phasmida, based on work he did in Oxford. All were from South America and the descriptions were published in 1913, shortly after his death. These species are listed below.

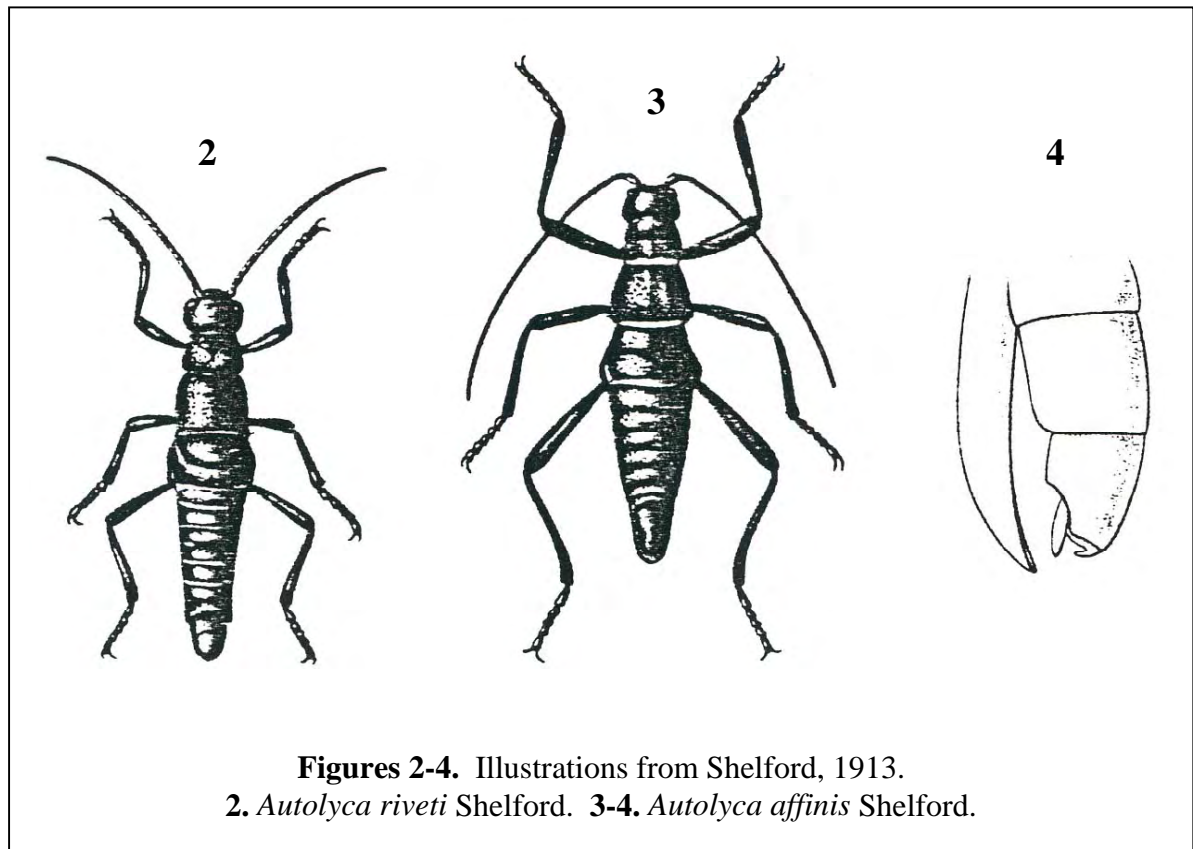
Autolyca affinis Shelford, 1913: 61, pl. 3.7 & 3.8.

Autolyca riveti Shelford, 1913: 60, pl. 3.6.

Libethra intermedia Shelford, 1913: 61.

Ocnophila nana Shelford, 1913: 61.

Ocnophila riveti Shelford, 1913: 62.



His book, *A Naturalist in Borneo*, Shelford (1916: 147-155, 215, & 315) includes several references to phasmids. Shelford's observations of Bornean insects are based on both observation in the wild, and in captivity. He comments on the nocturnal habits of many

phasmids, and refers to his observations on “some that I have kept in captivity”. He then goes on to say that “Most of the winged species of Phasmidae, especially some with brightly coloured wings, are diurnal feeders, or at any rate feed as readily during the day when in captivity as during the night”. He makes several observations about eggs of phasmids in Borneo, and also reveals that he was keeping in England “a small colony of an “Indian Stick-Insect that has bred parthenogenetically for several generations” at the time he was writing his book.



Figure 6. *Baculofractum shelfordi* Bragg, 2005, holotype & paratype.

Acknowledgement

I thank Dr. A. Chung for providing figure 6, the photograph of *Baculofractum shelfordi*.

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New record of *Hermarchus leytensis* Zompro, with notes on its life history (Phasmatodea: Phasmatidae).

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Abstract

The Philippine endemic phasmid *Hermarchus leytensis* Zompro, 1997 is newly recorded from Mindanao island (Mount Apo). Furthermore, egg, nymphal and adult stages are briefly described along with some notes on the life history of the species in laboratory conditions. The female has an 9-instar developmental cycle, and a high total egg production (2375 eggs). The male is still unknown.

Key words

Phasmida, Phasmatodea, *Hermarchus leytensis*, morphology, biology, developmental stage, instar, Philippines.

Introduction

The phasmid *Hermarchus leytensis* was described by Zompro (1997) based upon a single female specimen from Mount Balocaue, in the Philippine island of Leyte. The species has so far never been found after the original description, and represents the only Philippine species currently in the genus *Hermarchus* Stål, 1875, which is primarily restricted to Melanesia (Hennemann & Conle, 2006). Here *H. leytensis* is recorded for the first time from southern Mindanao, where populations occur in montane forest habitats. Beyond the examination of preserved specimens, several eggs were obtained from wild captured females by the Cabale family (Bacolod, Philippines), and rearing took place in order to describe some aspects of the reproductive biology of the species.

Eggs were kept on a layer of humid soil; the insects were reared in ventilated cages in the laboratory. The species taxonomy and scientific nomenclature follow Brock (2007). Abbreviations for collections (according to Evenhuis & Samuelson, 2007): MCFS = Museo Civico di Storia Naturale, Ferrara, Italy; MGC = Marco Gottardo personal collection, Rovigo, Italy; MSNG = Museo Civico di Storia Naturale "Giacomo Doria", Genova, Italy.

***Hermarchus leytensis* Zompro, 1997 (figs 2-4)**

Hermarchus leytensis Zompro, 1997: 38; Otte & Brock, 2005: 155.

Material

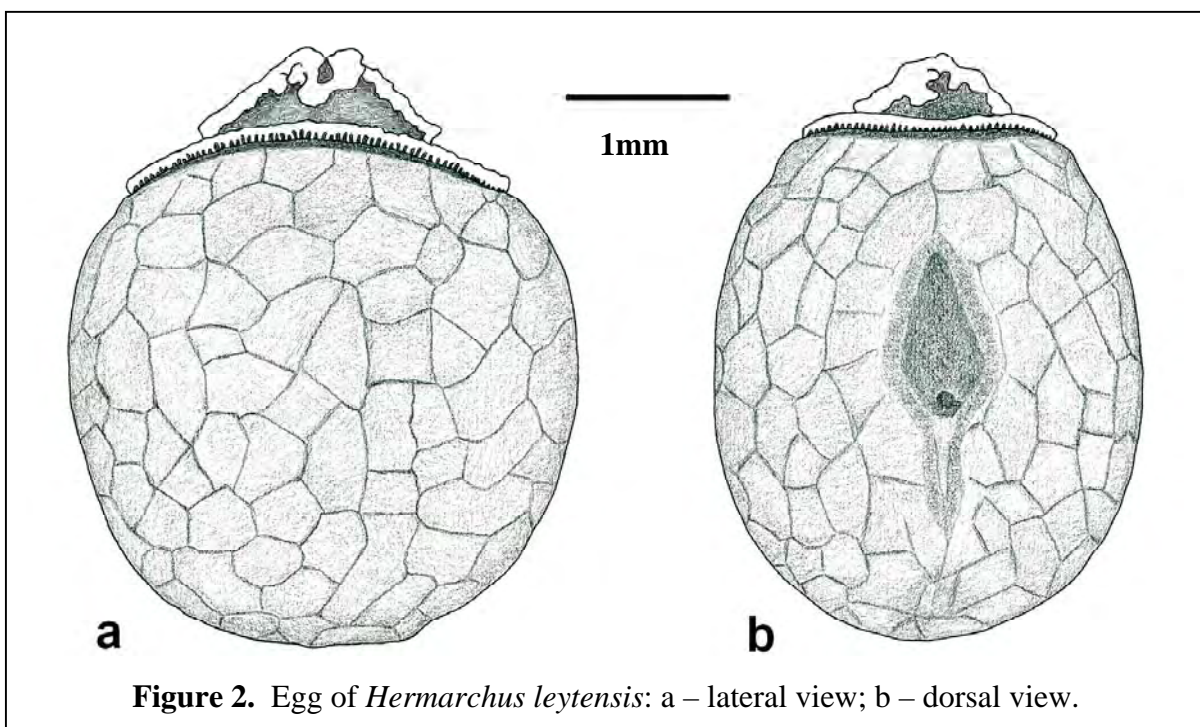
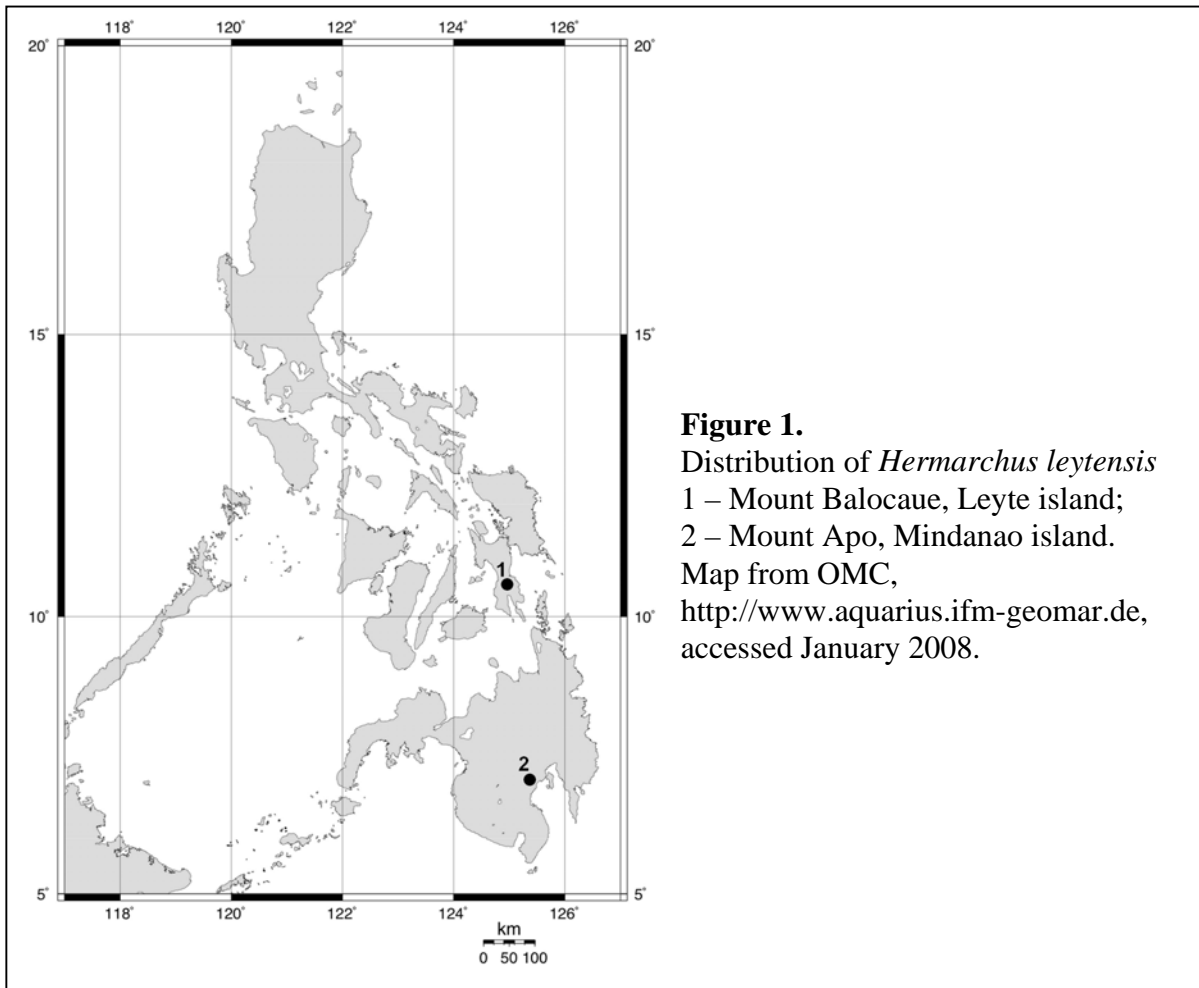
7♀♀ and several eggs (MGC), ♀(MCFS), ♀(MSNG) Philippines, Mindanao Island, Mt. Apo, 1300m, 27.iii.2006–10.iv.2006, leg. R. Cabale. ♀ and several eggs (MGC) reared by M. Gottardo, origin Mt. Apo.

Distribution

This species is only known from the Philippine islands of Leyte: Mount Balocaue (Zompro, 1997) and Mindanao: Mount Apo (fig 1).

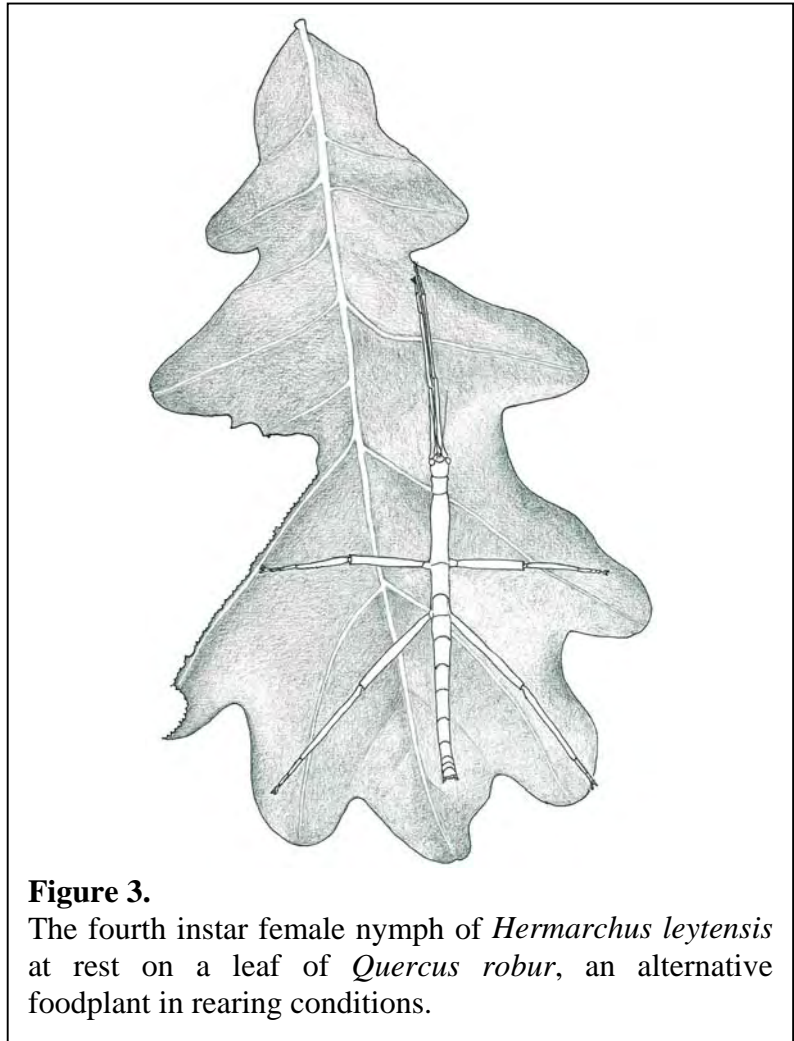
Egg (fig 2)

Length: 2.6-3.1mm, width: 2.1-2.4mm, height: 2.3-2.8mm. Shape is circular in lateral aspect, and oval in cross-section. The capsule surface is strongly pitted, with numerous irregular shallow impressions delimited by raised ridges. The micropylar plate is longer than wide, lance-shaped. The internal micropylar plate is closed. The operculum is higher than wide, strongly convex, with a prominent and irregular capitulum. The coloration is variable from greyish brown to dark green, with collar and part of capitulum mid-brown.



Nymph (fig 3)

The first instar nymph is very slender; body length: 13.5-16.2mm. The general colour is yellowish brown. The dorsal surface of head is green, with two mid brown lateral bands. The legs are covered by weakly developed light brown patches. All following instars differ moderately in chromatic characters from previous instar; the body and legs are usually light green. In the female, most of the nymphal development is characterized by a slender habitus (fig 3): the mesothorax is parallel-sided, about four times length of pronotum; the abdominal segments II to VII are clearly longer than wide. However, this condition will not be retained in the adult female. From the sixth instar the mesothorax starts to expand laterally, and the body becomes increasingly broad.

**Figure 3.**

The fourth instar female nymph of *Hermarchus leytensis* at rest on a leaf of *Quercus robur*, an alternative foodplant in rearing conditions.

Adult (fig 4)

The female is the only sex known (fig 4). This is a broad phasmid, smooth and glossy in appearance; body length: 127.8-147.6mm (including the subgenital plate). The dorsal and lateral surfaces of the body are mainly apple green, while the ventral surface and legs are slightly darker. The head is strongly globose dorsally; the antennae are dark brown, filiform, longer than fore femora. The mesothorax is still four times length of pronotum, but bell-shaped, essentially broadened in the anterior third. The legs are armed with numerous spines. All abdominal segments are now wider than long, and the lateral margins of tergites are slightly projecting perpendicularly. The abdominal sternite VII is only slightly swollen medioposteriorly, lacking a praeopercular organ. The subgenital plate is keeled and acutely pointed, extending beyond abdominal segment X.

Notes on the life history of *Hermarchus leytensis* in laboratory conditions

The duration (in days) of the developmental stages is shown in table 1. Of nine nymphs hatched, only one female was reared to the adult stage. Newly hatched nymphs were active mainly at night, and started to feed about 2-5 days after emergence. At this stage a high mortality rate was observed (about 89%), probably due to the reluctance of the insects to accept an alternative foodplant; also nymphs easily died at temperatures above 30°C. The female has eight nymphal instars; the development of instars lasted from 13-19 days. The female started oviposition 16 days after the final moult, and remained reproductively active

until two days before death; eggs were laid singly, and flicked actively a few metres away from the female. During this period, the female laid a mean of 11.2 eggs per day. However, about 31 days before death a strong decrease in the oviposition rate was observed, with a mean production of six eggs per day: compared with normal eggs, these were smaller, with a larger and broader micropylar plate, and laid mainly with detached opercula. The female produced a total of 2375 eggs during her lifetime.



Figure 4. Adult female of *Hermarkus leytensis*, body length 140.9mm.

No data on foodplants in natural habitats are available. In rearing conditions the species feeds on *Hypericum* spp. (Guttiferae), *Quercus* spp. (Fagaceae), *Psidium guajava* (Myrtaceae) and *Rubus ulmifolius* (Rosaceae).

Defensive behaviour: when disturbed the adult female actively used the spinose hind legs to stab. No secretion has been emitted from the prothoracic exocrine glands.

Table 1. Duration (in days) of egg, nymphal, and adult stages of *Hermarchus leytensis* over one developmental cycle.

Stages	Duration (days)	Mean temperature (°C)
Egg	112-140	25.2
Female, 1 st -8 th instar nymph	99	25.0
Female, adult (9 th instar)	229	22.5

Concluding remarks

Hennemann & Conle (2006) pointed out that *Hermarchus* Stål, 1875 is restricted to the following Pacific islands: Fiji, Tonga, Vanuatu, New Caledonia, New Hebrides and western French Polynesia. Moreover, these authors accommodated all New Guinean species originally described in *Hermarchus* in the new genus *Macrophasma* Hennemann & Conle, 2006. When Zompro (1997) described *H. leytensis*, he linked it to the New Guinean species *Macrophasma lyratus* (Redtenbacher, 1908). However, the female of *H. leytensis* differs from the diagnosis of *Macrophasma* in some characters of the body and egg morphology. Further affinities will be investigated following the identification of the male of this species.

Acknowledgements

I am very grateful to Frank H. Hennemann for helpful discussions on the systematics within the subfamily Phasmatinae. Thanks also to Oliver Zompro for information on the holotype of *H. leytensis*. The manuscript benefited from the invaluable advice of Phil E. Bragg.

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Notes on *Necroschia affinis* (Gray, 1835), *Necroschia fragilis* (Redtenbacher, 1908) and *Necroschia pallida* (Redtenbacher, 1908).

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Abstract

Necroschia affinis (Gray, 1835) was originally described from India. The holotype of *affinis* lacks the abdomen and consequently this species cannot be reliably distinguished from several similar species. Lectotypes are selected for *Necroschia pallida* (Redtenbacher, 1908) and *Necroschia fragilis* (Redtenbacher, 1908), and both species are illustrated. *Necroschia pallida* (Redtenbacher, 1908) is reinstated as a valid species. It is proposed that *Necroschia fragilis* (Redtenbacher, 1908) be used for the species that occurs in Peninsular Malaysia and Singapore. A two-legged *N. pallida* is recorded: the first record of a two-legged phasmid found in the wild. The eggs of *N. fragilis* and *N. pallida* both have an exceptionally large pseudocapitulum; both eggs are illustrated.

Key words

Phasmida, *Necroschia affinis*, *Necroschia fragilis*, *Necroschia pallida*, Lectotype, Borneo, Peninsular Malaysia, India.

Introduction

Necroschia affinis (Gray, 1835) was originally described from India. It has since been recorded from Borneo and Peninsular Malaysia, but there are no subsequent records from India. Examination of specimens in several museums has shown that material treated as *affinis* by several authors consists of more than one species. The only type specimen of *affinis* is the holotype male in the Natural History Museum, London (BMNH); it lacks the abdomen, and is therefore indistinguishable from several similar species of *Necroschia*.

Although Brock (1999; 96) speculates that the locality for *affinis* is “likely to be Malaysia” there is no valid reason to assume this to be the case. In 1835 Gray described three species from “India Orientali” [East Indies] and two are almost certainly from Malaysia; however, *affinis* was described from “India”, not India Orientali. Gray also described material from Ceylon (Sri Lanka) so it is quite possible that some material did come from India.

Necroschia affinis was recorded from Borneo and Peninsular Malaysia by Redtenbacher (1908: 525). In 1935 Günther synonymised the Bornean species *Necroschia pallida* (Redtenbacher, 1908) with *affinis* (Gray, 1835). However, Borneo could not be the origin of the specimen that Gray described in 1835 because there was no British presence in Borneo until the arrival of James Brooke in 1838.

The specimens of “*Necroschia affinis*” from Borneo and from Peninsular Malaysia are different species. The species from Peninsular Malaysia and Singapore, treated as *affinis* by Brock (1999) & Seow-Choen (2000), is identical to *Necroschia fragilis* (Redtenbacher, 1908). With Gray specifying India, rather than the East Indies, and the current impossibility of distinguishing *affinis* (Gray), I propose that *fragilis* (Redtenbacher) be used for the Peninsular Malaysian species.

The Bornean specimens in Berlin (ZMHB) and Vienna (NHMW) that Redtenbacher (1908: 525) recorded as *affinis* are the same species as *Necroschia pallida* (Redtenbacher, 1908). The Bornean *Necroschia pallida* is clearly different from the Peninsular Malaysian *N. fragilis*. *Necroschia pallida* is therefore reinstated as a valid species, and a lectotype is selected.

Although *fragilis* and *pallida* have a very similar habitus they may be distinguished by the features given in table 1.

Specimens in my own collection are individually numbered and prefixed by PEB-. For the examined material, handwritten data is shown in italics and printed data in normal print.

Table 1. Features to distinguish <i>N. fragilis</i> and <i>N. pallida</i>.		
	<i>fragilis</i>	<i>pallida</i>
Hind legs of female	Exceed the abdominal apex.	Not reaching the abdominal apex.
Shape of cerci (both sexes)	Slightly clubbed, rounded apex.	Slender, taper to a point.
Relative lengths of abdominal terga in male.	8th & 9th of similar length.	9th longer than 8th.
Pseudocapitulum of egg	Convex.	Flat.

Necroschia affinis (Gray, 1835) (fig 1).

Platycrana affinis Gray, 1835: 37. Holotype ♂ (BMNH) India.

Necroschia affinis (Gray); Westwood, 1859: 142.

Aruanoidea affinis (Gray); Kirby, 1904: 379.

The three references above all relate to the holotype. All other references to *affinis* relate to *Necroschia fragilis*, *Necroschia pallida*, or other species of *Necroschia*; none are of Indian origin.



Figure 1. *Necroschia affinis* (Gray, 1835), holotype male.

***Necroschia fragilis* (Redtenbacher, 1908)** (figs 2-11).

Aruanoidea fragilis Redtenbacher, 1908: 528; Brock, 1998: 30. Lectotype: ♂ (NHMW, data below), Paralectotype ♂ (NHMW, data below). [Synonymised with *Necroschia affinis* (Gray) by Brock, 1996: 90.]

Necroschia affinis; Seow-Choen *et al.*, 1994: 10; Brock, 1996: 90; Seow-Choen *et al.*, 1996: 44 fig (♀); Tay & Seow-Choen, 1996: 185; Brock, 1999: 190, plate 18 (♀); Seow-Choen, 2000: 22, plate 59 a (♂), b-c (♀), d (egg); Otte & Brock, 2005: 210.

Aruanoidea confusa Redtenbacher, 1908: 525; Brock, 1998: 22. Holotype ♀ (NHMW, 1037) Singapore, Bukit Timah, 1871, leg. Ransont. Synonymised with *Necroschia affinis* (Gray) by Brock, 1996: 90.

[*Aruanoidea fragilis* Hausleithner, 1991: 221 – probable misidentification].

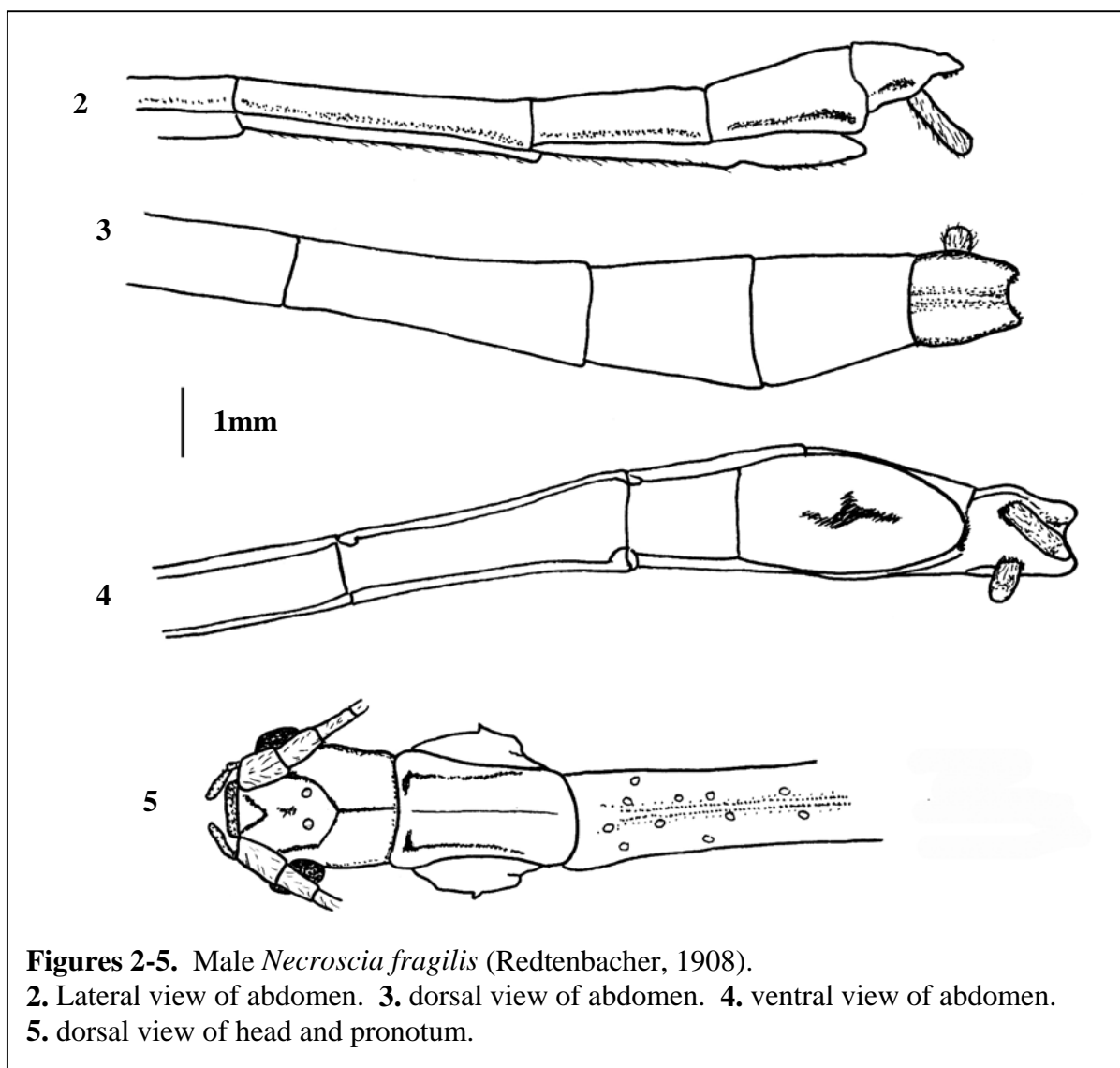
Material examined

♂ Lectotype [here selected] (NHMW, 1049) 24.443; Coll. Br.v.W. Perak, Jachau leg.; det. Redtenb. *Aruanoidea fragilis*.

♂ Paralectotype (NHMW, 1049) Grubaur 1902 Kwala Kangsar, Perak; Mus. Ceas. Vindobon.; det. Redtenb. *Aruanoidea fragilis*.

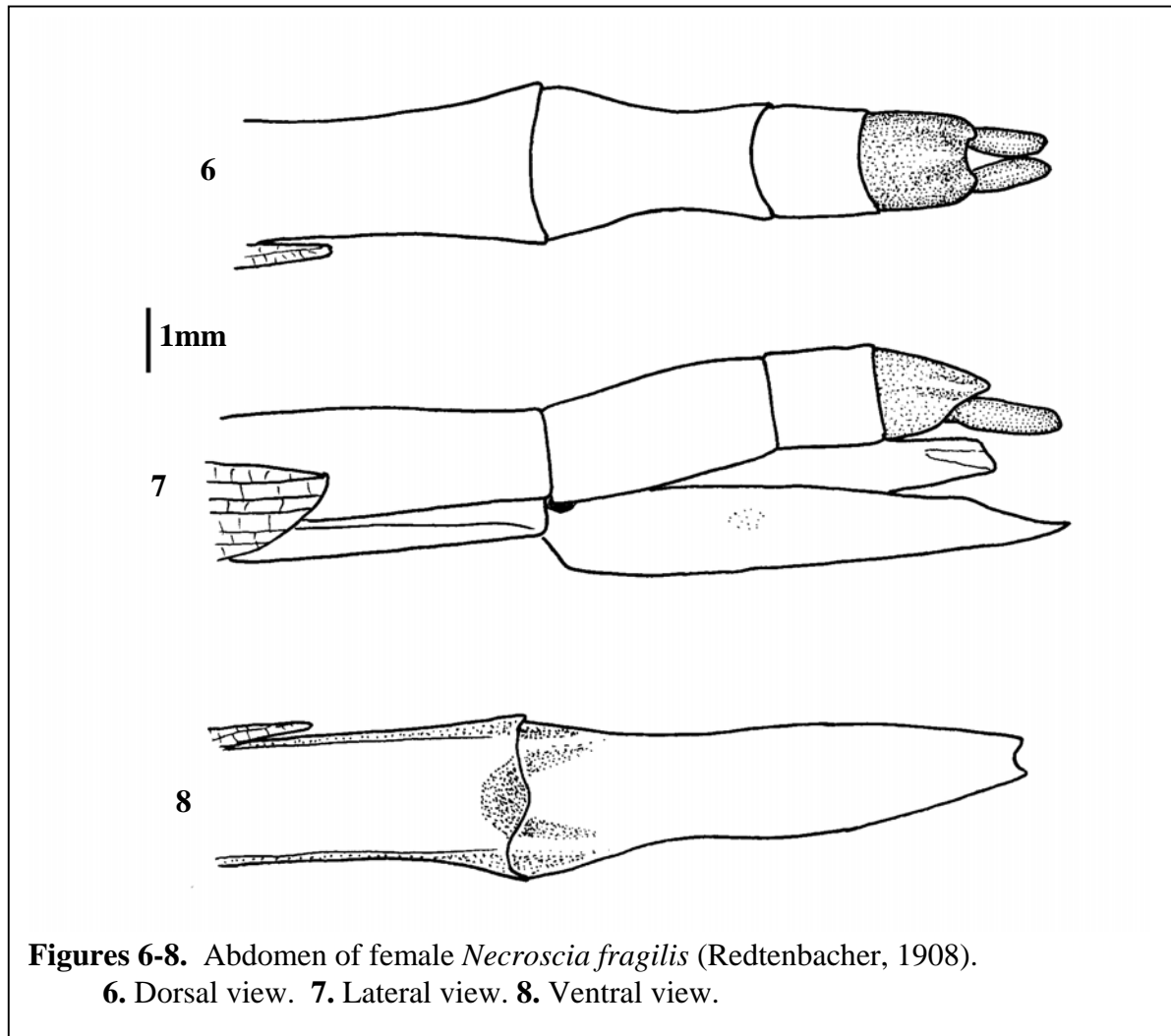
♂ (P.D. Brock) W. Malaysia: Cameron Highlands, 12.i.1992, via Wong; *Necroschia affinis* (Gray).

♀ & egg (PEB-3285) West Malaysia [no date]. Bought from dealer, iv.2002, price £2.00.



I borrowed Paul Brock's male specimen and took it to NHMW to compare it with the type material of *fragilis*. Illustrations included here are of Brock's male (figs 2-5), and my own female and egg (figs 6-11).

Because I was concentrating on Bornean material, I omitted to examine the holotype of *Aruanoidea confusa* Redtenbacher. However, it is likely that Brock was correct to associate it with *fragilis* (Brock synonymised *fragilis* and *confusa* under the name *affinis*). I also failed to check Redtenbacher's specimen(s) of "*affinis*" from Perak (Redtenbacher, 1908: 525); this material is also likely to be *fragilis*.



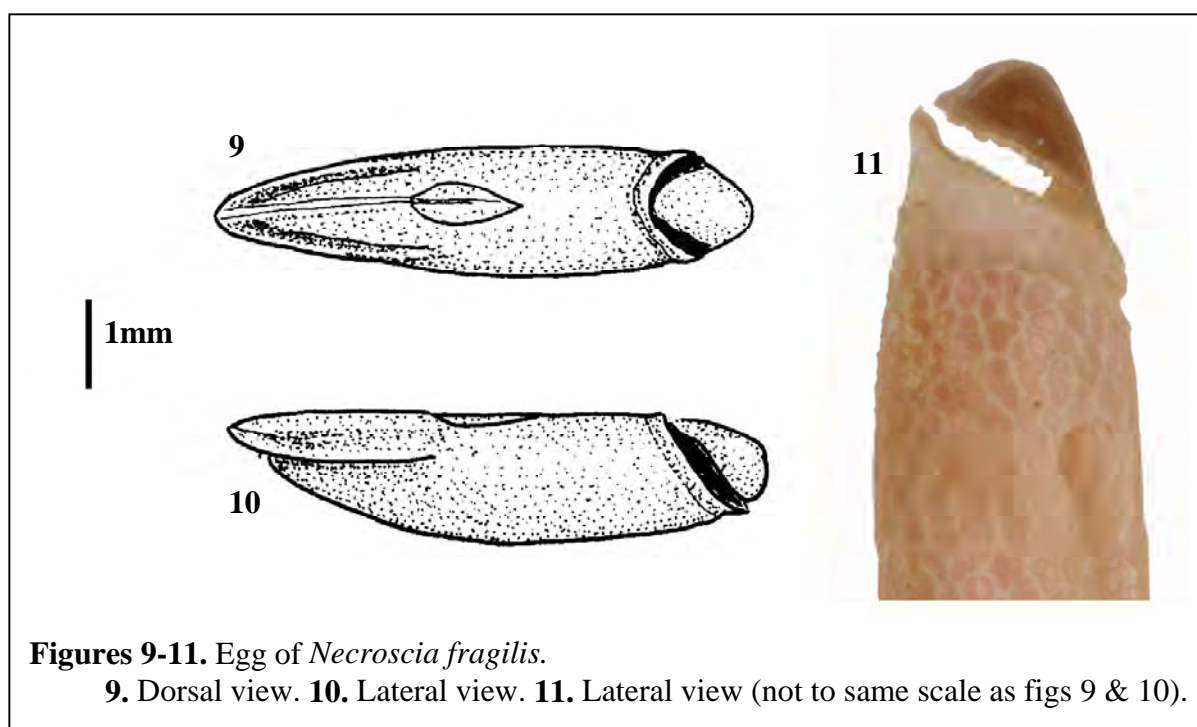
Figures 6-8. Abdomen of female *Necroschia fragilis* (Redtenbacher, 1908).

6. Dorsal view. **7.** Lateral view. **8.** Ventral view.

Hausleithner (1991: 221) recorded two males of *fragilis* from Kinabalu Park, Sabah: this is probably a misidentification. There are two relatively common species of green *Necroschia* in the Park HQ area; the male of one is very similar to *fragilis*, but may be distinguished by examination of the anal segment (specimens of this unidentified species are coded 1990/M in my collection).

Egg (figs 9-11)

The examined egg was removed from the genital operculum i.e. it was ready to be laid when the insect was killed. The operculum of the egg has a large, strongly convex, plate-like pseudocapitulum mounted on a stalk; it is so large that it was initially mistaken for a partly detached operculum (fig. 11). Capsule pale brown with a cream micropylar plate. Length 6.2mm, height 1.6mm, width 1.4mm.



Figures 9-11. Egg of *Necroschia fragilis*.
9. Dorsal view. **10.** Lateral view. **11.** Lateral view (not to same scale as figs 9 & 10).

***Necroschia pallida* (Redtenbacher, 1908)** (figs 12-26).

Aruanoidea pallida Redtenbacher, 1908: 524; Brock, 1998: 48. Lectotype ♀ (NHMW, data below); Paralectotypes: ♀ (NHMW, data below); other(s) [including ♂] (MNHN) Sabah, Kinabalu.

Aruanoidea affinis Redtenbacher, 1908: 525 [in part – Bornean material only].

Necroschia affinis Günther, 1935: 13; Bragg, 2001: 571; Otte & Brock, 2005: 210.

[Synonymised in error with *Necroschia affinis* (Gray, 1835) by Günther, 1935: 13. **Corrected here**]

[Not *Aruanoidea pallida*; Günther, 1932: 70. **Misidentification**].

Material examined

Lectotype [**here selected**] ♀ (NHMW, 1030) 19.604; Coll. Br.v.W. Kina Balu, Borneo Staudinger.; det. Redtenb. *Aruanoidea pallida*.

Paralectotype ♀ (NHMW, 1030) Coll. Br.v.W. Kina Balu, Borneo Staudinger.; det. Redtenb. *Aruanoidea pallida*.

♂ (NHMW) 21.945; Coll. Br.v.W. Kina Balu, Borneo Staudinger; det. Redtenb. *Aruanoidea affinis*.

♂ (NHMW) Borneo; Mus. Ceas. Vindobon; det. Redtenb. *Aruanoidea affinis*.

2♂♂ (SMTD) Kinabalu, Borneo.

♂ (SMTD) Kinabalu, Borneo; *Aruanoidea affinis* Gray, *K.B.*

♀ (ZMHB) Borneo; *affinis* Brunner det. [rest of data not recorded]

2♂♂ (ZMUH) Kinabalu, Borneo; *pallida* Günther det. [rest of data not recorded].

2♀♀ (PEB-2376, PEB-2392), ♂ (PEB-2378) BRUNEI, Teraja, waterfall trail. P.E. Bragg, 03.xi.1994.

4♀♀ (PEB-2388, PEB-2389, PEB-2390, PEB-2391), 2♂♂ (PEB-2380, PEB-2381) BRUNEI, Badas, swamp forest. P.E. Bragg, 31.x.1994.

♂ (PEB-3116) SABAH, Sepilok, Arboretum. P.E. Bragg, 07.viii.2001.

♀ & eggs (PEB-3554), ♂ (PEB-3555) SABAH, Sepilok, Arboretum. P.E. Bragg, 13.xii.2006.

2♂♂ (PEB-3563, PEB-3564) SABAH, Sepilok, Orang Utan Centre. P.E. Bragg, 15.xii.2006.

♂ (PEB-3581) SABAH, Crocker Range, Kota Kinabalu-Tanbunan road. coll. S. Chew, 26.ix.2006.

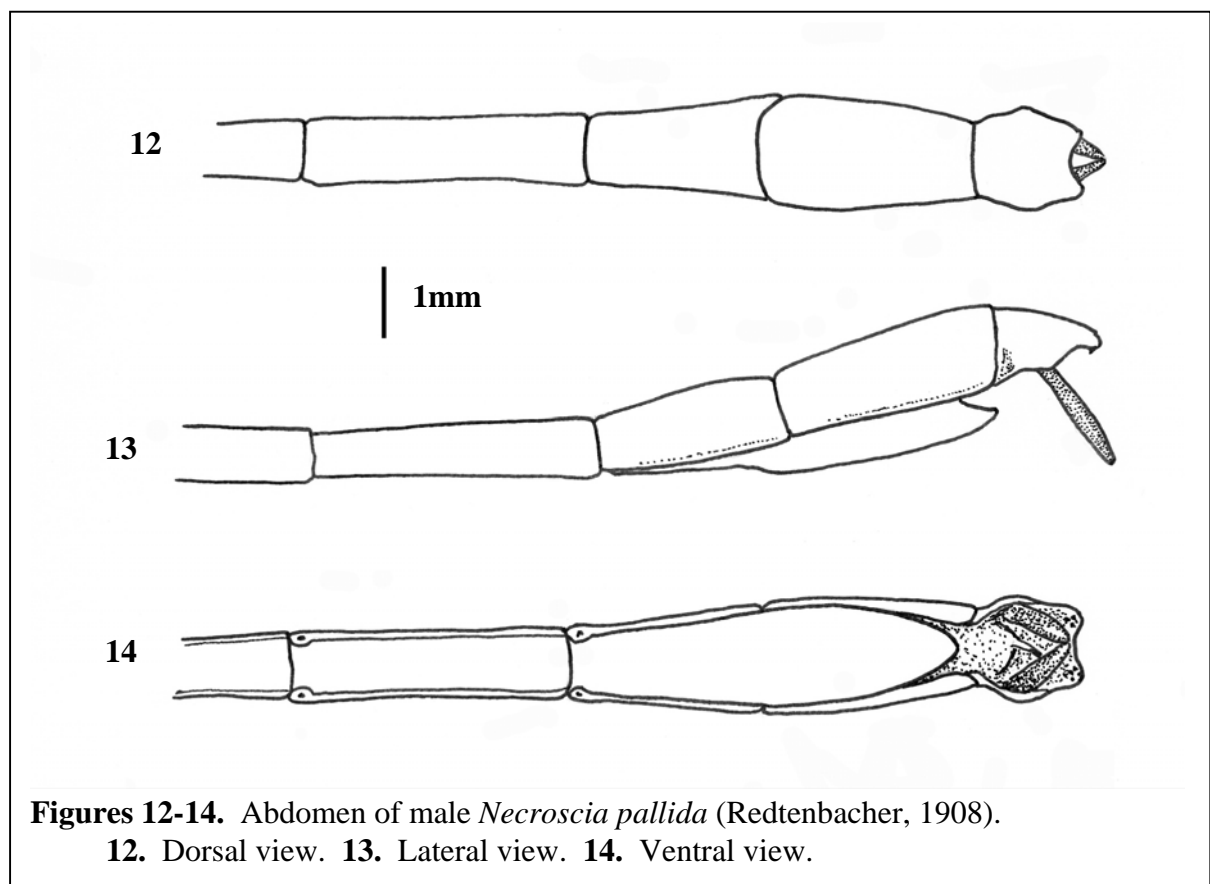
- ♂ (PEB-891), ♀ & egg (PEB-1003) SARAWAK, Mt Serapi, 180m. P.E. Bragg, 26.vii.1991.
 ♂ (PEB-1533) SARAWAK, Kuching, 4.5 mile. P.E. Bragg, 28.vii.1992.
 ♀ (PEB-2375), ♂ (PEB-2384) SARAWAK, 15km NE of Selangau. P.E. Bragg, 26.x.1994.
 ♀ (PEB-2377), ♂ (PEB-2386) SARAWAK, Tarum (near Debak). P.E. Bragg, 05.xi.1994.
 2♂♂ (PEB-2382, PEB-2383) SARAWAK, Tarum (near Debak). P.E. Bragg, 25.x.1994.
 ♂ (PEB-2385) SARAWAK, Betong, along roadside. P.E. Bragg, 25.x.1994.

This species has been misidentified on a number of occasions. Some of the confusion is perhaps partly due to Brunner and Redtenbacher labelling some specimens of *pallida* as *affinis*. Two males of *pallida* in NHMW were labelled as *affinis* by Redtenbacher. A female in Berlin (ZMHB) was misidentified by Brunner: it is labelled “*affinis* Brunner det.”

I have not examined the type material in Paris (MNHN), which should include at least one male, but since Redtenbacher did not recognise his males of “*affinis*” as belonging with the *pallida* females, it is quite possible that the MNHN material is a different species.

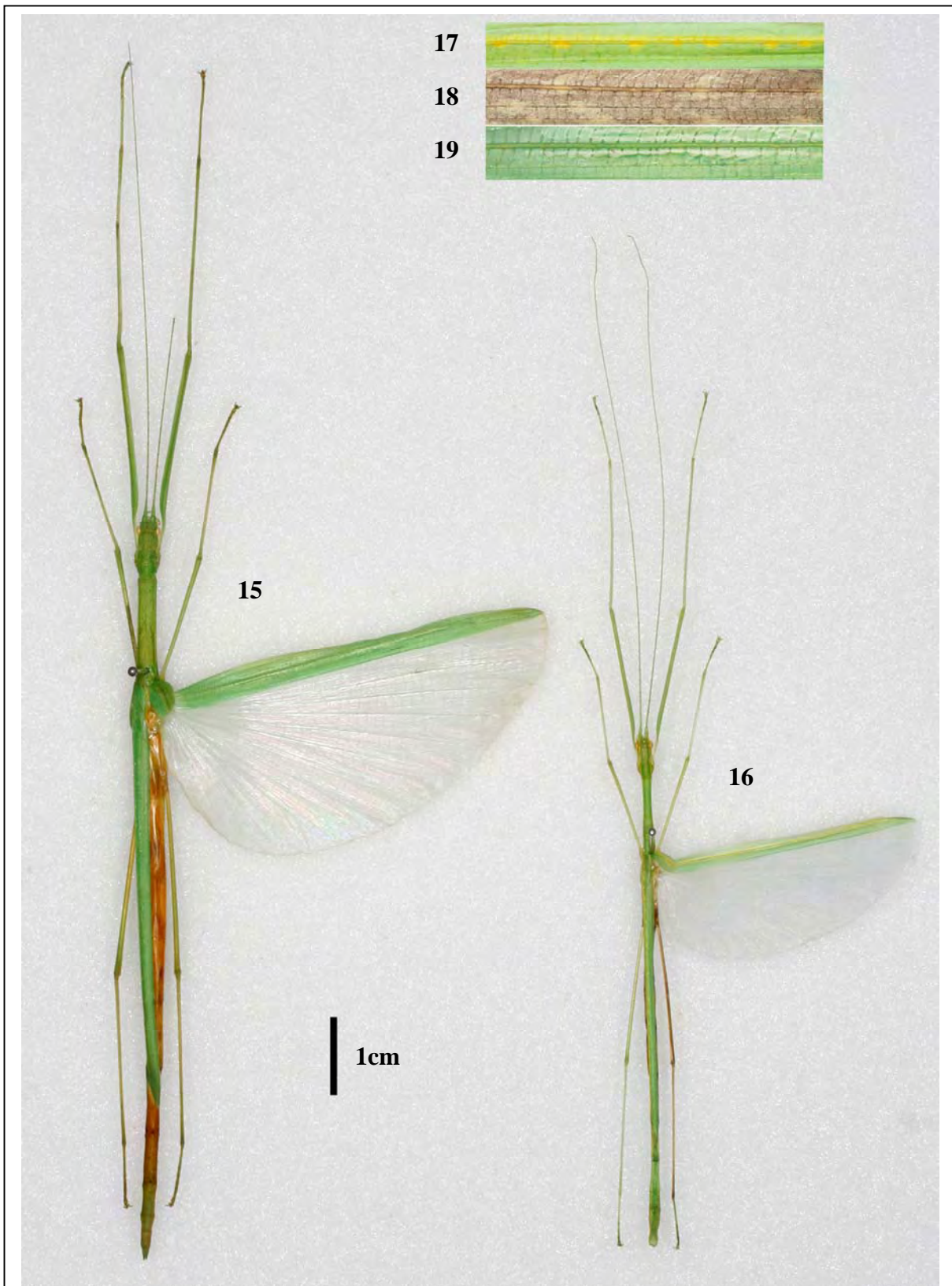
Two male specimens of “*pallida* det. Günther” in Hamburg (ZMUH) are correctly identified; these specimens have not previously been recorded. However, the female specimen of “*pallida*” in ZMUH that was recorded from Bukit Obat (Günther, 1932) is a different species; this is currently unidentified and I have 2♀♀ and 1♂ in my own collection that have been assigned the code 1994/Z.

I have not examined the male and female “*affinis*” that Günther recorded from Tibang in 1935 (specimens in Stockholm: NHRS). I have not examined the female, from Samarinda in Kalimantan, which was recorded by Giglio-Tos (1910: 49) as a doubtful specimen of *Aruanoidea affinis* (specimen in Torino: MRSN). The identities of these three specimens are unclear; they may be *pallida* or they may be one, or more, of the similar species of *Necroschia* which occur in Borneo.



Figures 12-14. Abdomen of male *Necroschia pallida* (Redtenbacher, 1908).

12. Dorsal view. **13.** Lateral view. **14.** Ventral view.



Figures 15-19. *Necroschia pallida* (Redtenbacher, 1908).

15. Female. **16.** Male.

17-19. Portions of costal region of the hind wings(not to same scale).

17. Male. **18.** Brown female. **19.** Green female.

Diagnosis

There are at least seven species of *Necroschia* in Borneo that have a very similar habitus and coloration. The relative lengths of the legs and wings are useful characteristics for helping to distinguish some of these species. However, these features alone are not sufficient to distinguish all the species, detailed examination of the ocelli, anal segment, cerci, and praeopercular organ is necessary.

Both sexes: Body, legs and costal region of wing mid-green, or occasionally brown; anal region of wings clear; eyes pale cream. Lacking distinct ocelli. Mesonotum sparingly granulose with a fine median longitudinal carina. Cerci cylindrical, slightly constricted at the base, apex tapering to a point. Full measurements for the largest specimen of each sex in my collection are given in table 2.

	♂	♀		♂	♀
Total length	68.5	101	Fore femur	19.9	27.9
Antennae	71	88	Fore tibia	20.1	29.6
Head	2.6	4.4	Fore tarsus	8.4	11.2
Pronotum	2.6	4.0	Mid femur	13.1	17.5
Mesonotum	10.9	14.5	Mid tibia	11.9	15.6
Metanotum	4.6	6.9	Mid tarsus	5.7	6.6
Median segment	4.8	8.0	Hind femur	19.3	25.7
Fore wing	4.2	6.9	Hind tibia	19.0	23.9
Hind wing	35	55	Hind tarsus	7.2	8.6

Male (figs 12-14,16-17 & 20): No brown males have yet been found, all are green. Head, thorax and tegmina with a narrow pale yellow stripe, costal vein of hind wing with yellow spots along the length (fig 17), and a few yellow spots occur on the tegmina in addition to the stripe. Hind legs just reaching apex of abdomen; in a few cases the legs exceed the abdomen by up to 1mm, probably due to shrinkage of the abdomen during preservation. Wings to distal end of 5th abdominal segment. Anal segment with an apical notch (fig 17). Vomer with a single spine curving to the right (fig 20). Body length 61.5-68.5mm.

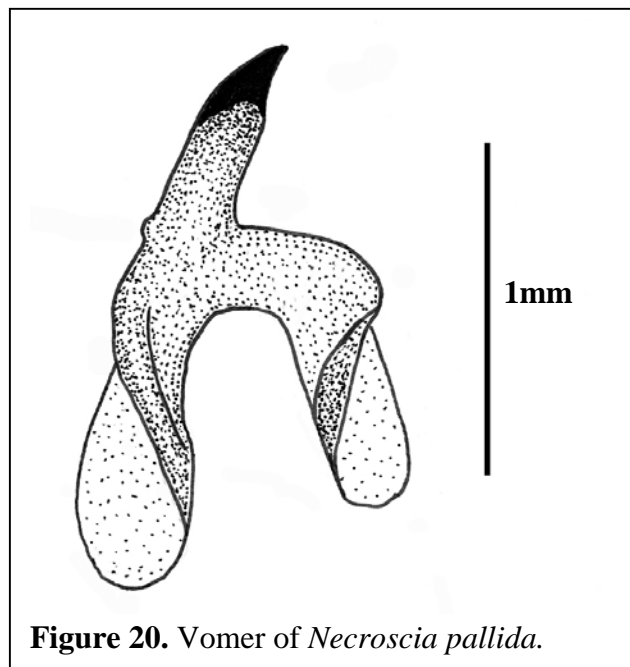
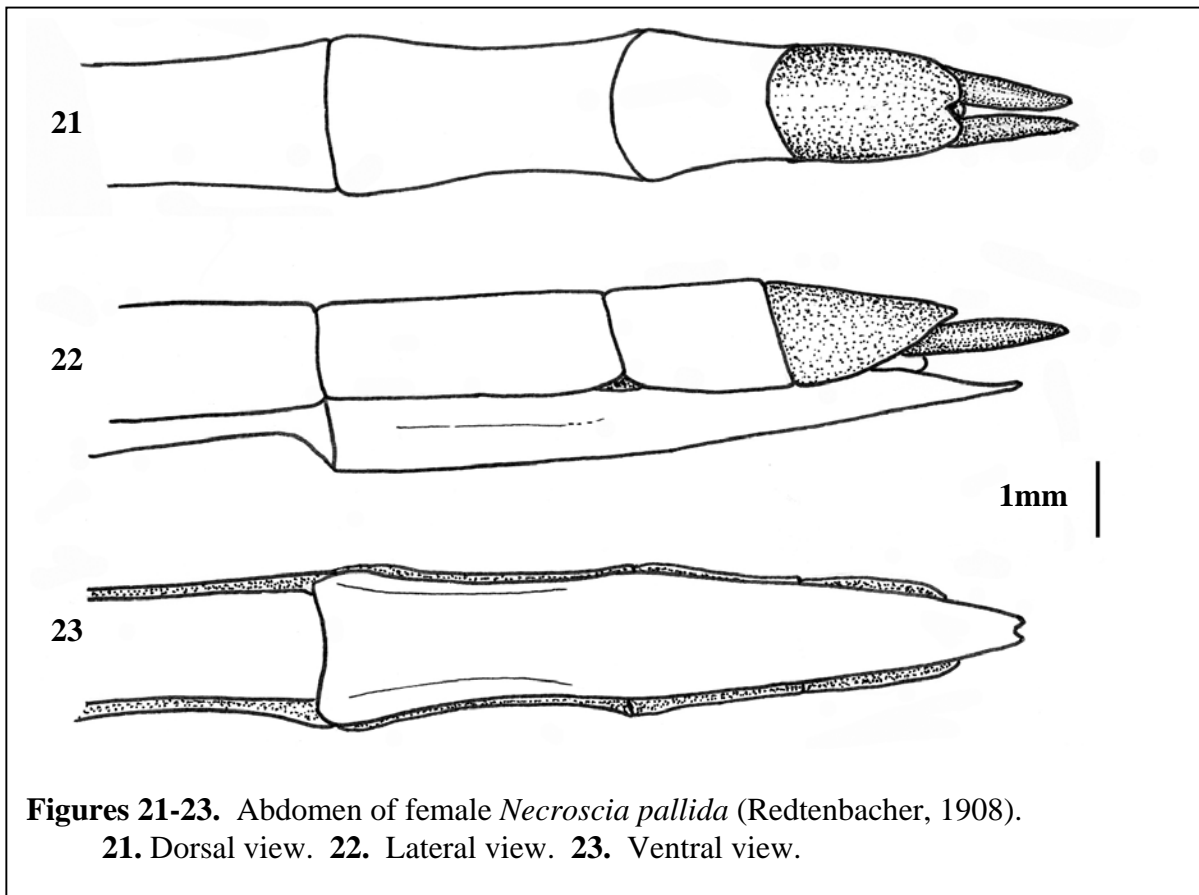


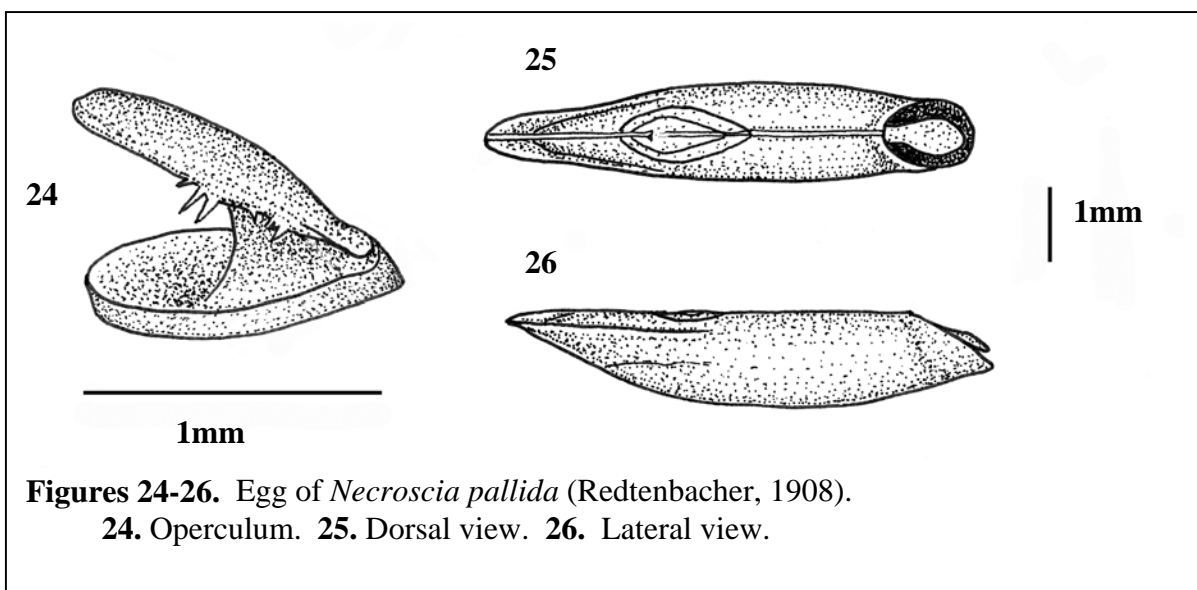
Figure 20. Vomer of *Necroschia pallida*.

Female (figs 15, 18-19 & 21-23): Two of the 11 females were brown; none have the yellow markings found in the male. Hind legs just reaching the end of 7th abdominal segment. Wings reaching half way along 6th abdominal segment (some appear to reach the 7th segment due to distorted or shrunken abdomens). Lacking an obvious praeopercular

organ. Body length 85-101mm.



Egg (figs 24-26): Capsule very pale brown with a cream micropylar plate. Length 7.1mm, height 1.4mm, width 1.4mm. The egg has a large flat pseudocapitulum that is attached to the operculum at the dorsal end (fig 24). The pseudocapitulum could be mistaken for the operculum but is recognisable because it is slightly too small to be the operculum.



Distribution & habitat

All the specimens that I have collected are from lowland rainforest areas. One specimen in my collection (PEB-3581), which I did not collect, was collected at an unspecified point along the Kota Kinabalu to Tanbunan road and could therefore be from either lowland or montane forest. The distribution map (fig 27) shows the known localities; the specimen from the Kota Kinabalu to Tanbunan road is plotted at approximately the mid point. Based on specimens that I have personally collected in Borneo, *Necroschia pallida* is almost as abundant as *Necroschia prasina* (Audinet-Serville) (24 and 28 specimens respectively), and both are much more common than any other species in the genus (from 1 to 7 specimens).

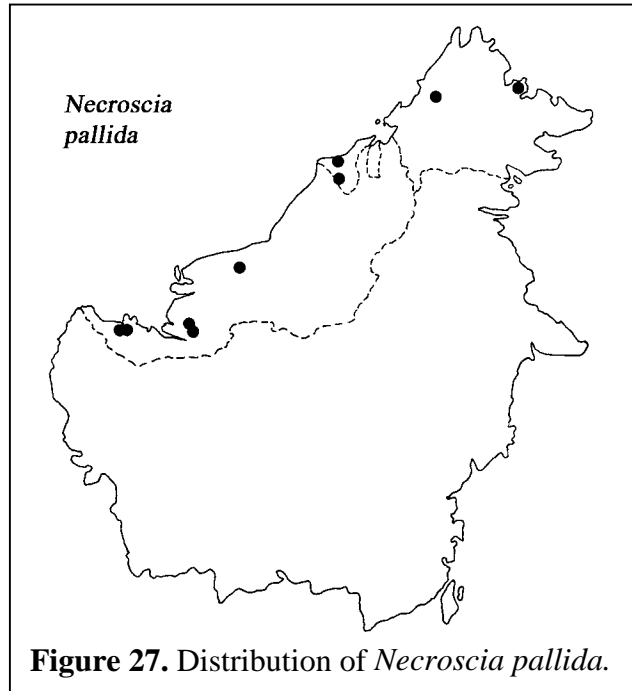


Figure 27. Distribution of *Necroschia pallida*.

Notes

Two male specimens, collected at Sepilok on 15th December 2006, are particularly memorable. PEB-3564 had three legs when found, something I have only encountered twice before in the wild: in a male *Carausius chani*, and in a female *Phobaeticus kirbyi*. The three-legged *N. pallida* had a right mid leg and both hind legs present. What was more startling was the second male PEB-3563 which was on the adjacent branch of the same tree – it had only two legs: left hind leg, and right mid leg. I believe this is the first record of a two-legged phasmid being found in the wild. To find two such phasmids in close proximity suggests a common cause for the leg loss. In captivity phasmids usually lose legs either by interaction with other phasmids in a crowded cage, or because of difficulty shedding their skin. In the wild both of these causes are unlikely, when unconfined they should be able to select suitable conditions to shed their skin. There had been heavy rain earlier in the evening and it was still raining slightly when they were found, both were in exposed position, so it is conceivable that the leg loss was caused by heavy rain. A more likely explanation is predation by small predators, perhaps ants; a large predator is unlikely to have lost both phasmids. If they were attacked while sheltering during the heavy rain escape would have been more difficult than normal.

All the examined specimens are green, or were clearly originally green, except for two of the four females from Badas swamp forest (PEB-2388, PEB-2389) that were brown when they were found. This coloration should not be confused with specimens that are discoloured due to preservation. One of my females (PEB-2377) was originally green but has lost all the green except for a few veins on the costal region of the wings; the resulting colour is similar to the brown specimens but easily recognisable under magnification.

The paralectotype has a pinkish tinge to the anal region of the wings; this not present in any other examined specimen of this species.

Acknowledgements

I thank staff at Dresden (SMTD) for the loan of their specimens, and Paul Brock (Brockenhurst, UK) for the loan of his male specimen.

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Notes on *Necroschia haanii* Kirby, 1904 from Borneo, including a new synonym.

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Abstract

The female of *Necroschia haanii* Kirby, 1904 is briefly redescribed, the male and egg are described for the first time; all are illustrated. The type material of *N. haanii* is discussed, and a lectotype is selected. *Aruanoidea schoenbergi* Redtenbacher, 1908 is a new synonym of *N. haanii*.

Key words

Phasmida, *Necroschia haanii*, *Aruanoidea schoenbergi*, Lectotype, New synonym, Borneo.

Introduction

In 1842 de Haan described three variants of *Necroschia punctata* (Gray, 1835). In 1904, Kirby named two new species based on de Haan's descriptions and material in the collection of the Natural History Museum, London (BMNH): *Necroschia haanii* from Borneo, and *N. horsfieldii* from Java. The only subsequent record of *Necroschia haanii* is my own record for Kalimantan (Bragg, 2001). Redtenbacher (1908) treated all de Haan's material as *punctata*. The status of *punctata* in Borneo has recently been reviewed (Bragg, 2007).

Kirby did not redescribe *Necroschia haanii*, he indicated it as a new replacement name (by using *n.n.* – an abbreviation of *nomen novum*) for de Haan's *Phasma* (*Necroschia*) *punctata* variation a; he indicated there was material in BMNH but did not indicate that it was type material. However, there is no evidence that Kirby had seen de Haan's material, so he was really basing the new species on the BMNH specimen and de Haan's written description.

Kirby's specimen, which is clearly labelled, in BMNH must therefore be considered a type specimen, along with de Haan's material; both specimens are female.

When I isolated and catalogued the type material (Bragg, 1996) in the Leiden Museum (RMNH) some types presented particular difficulty. Many of de Haan's specimens did not have locality labels; in most cases this was not a problem because his specimens were easily recognisable as the only specimens of a particular species, or the only old specimens. However, in the case of *N. haanii*, there were a number of specimens of an appropriate age but without any data, these were grouped, with specimens from several Indonesian islands, under the heading of *punctata*. De Haan's description of his *punctata* variations are so brief that it was not possible to identify the individual specimens with certainty. It is possible that the specimen that I selected may not even be from Borneo. In view of the uncertainty regarding the identification of the RMNH type, and the fact that Kirby's species is really based on the BMNH specimen, I am selecting the BMNH specimen as the lectotype.

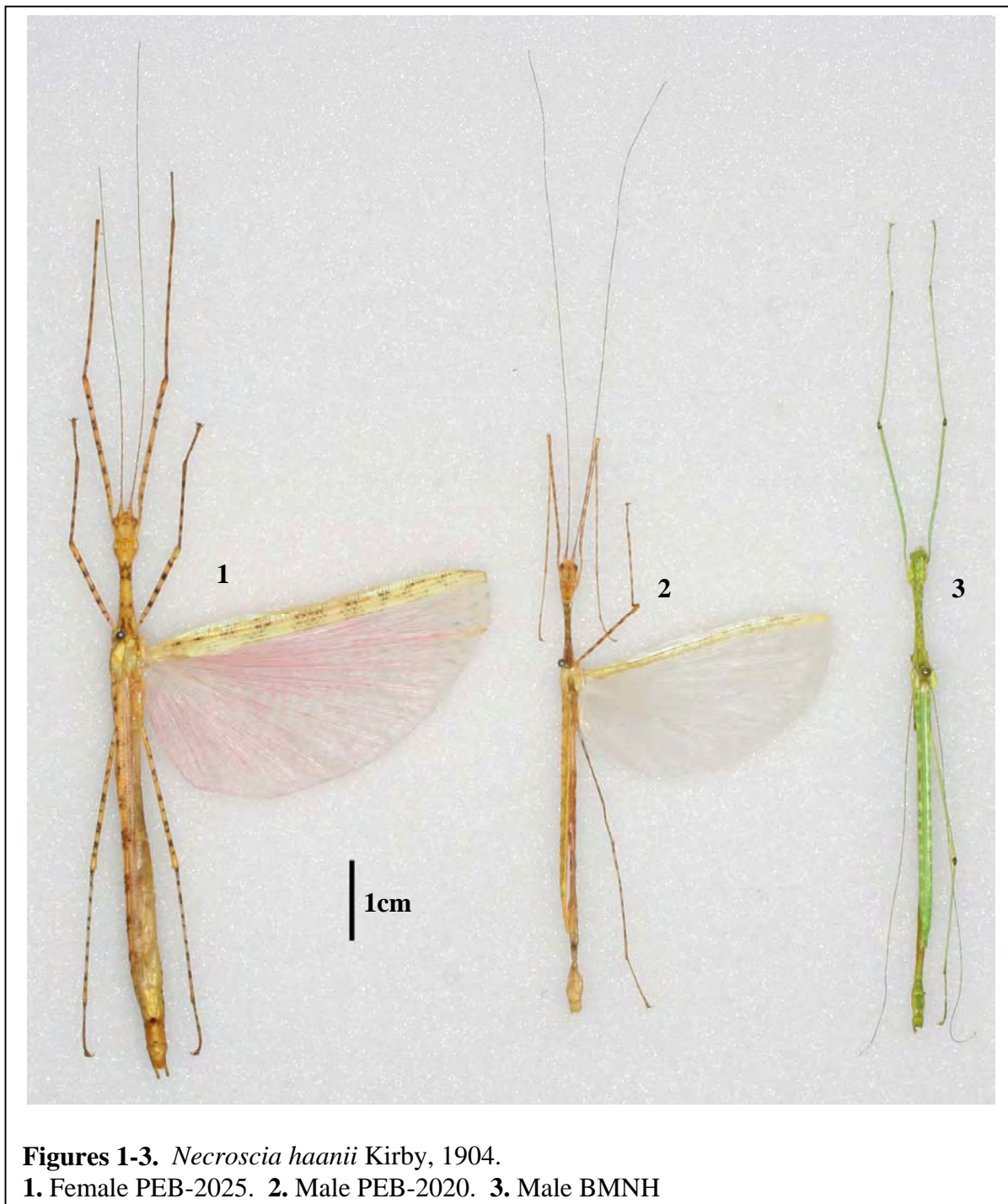
When it was described by de Haan, and when named by Kirby, only the female of *N. haanii* was known. However, on a visit to Berlin (ZMHB) I borrowed the holotype of *Aruanoidea schoenbergi* Redtenbacher, 1908. Comparison with my material from Kalimantan showed that *schoenbergi* is the male of *haanii*. Another male was located amongst some unidentified material in the BMNH collection. The adults are briefly redescribed, the egg is described, and the adults and egg are illustrated here for the first time. Specimens in my collection are prefixed PEB- and individually numbered.

***Necroschia haanii* Kirby, 1904**

Necroschia haanii Kirby, 1904: 376; Bragg, 1996: 111; Bragg, 2001: 573; Otte & Brock, 2005: 212. A replacement name for *Phasma (Necroschia) punctatum*, var. a.; de Haan, 1842: 121 [not Gray, 1835]. Lectotype [here selected] ♀ (BMNH, 56.44) Sarawak. Paralectotype: ♀ (RMNH) Kalimantan, Pontianak, coll. Diard.

Aruanoidea schoenbergi Redtenbacher, 1908: 527. Holotype ♂ (ZMHB) S.O.-BORNEO. Wahnes S., Wolf v. Schoenberg V. **New synonym.**

Necroschia schoenbergi (Redtenbacher, 1908); Bragg, 2001: 576; Zompro, 2005: 280; Otte & Brock, 2005: 215.



Figures 1-3. *Necroschia haanii* Kirby, 1904.
1. Female PEB-2025. **2.** Male PEB-2020. **3.** Male BMNH

Material examined:

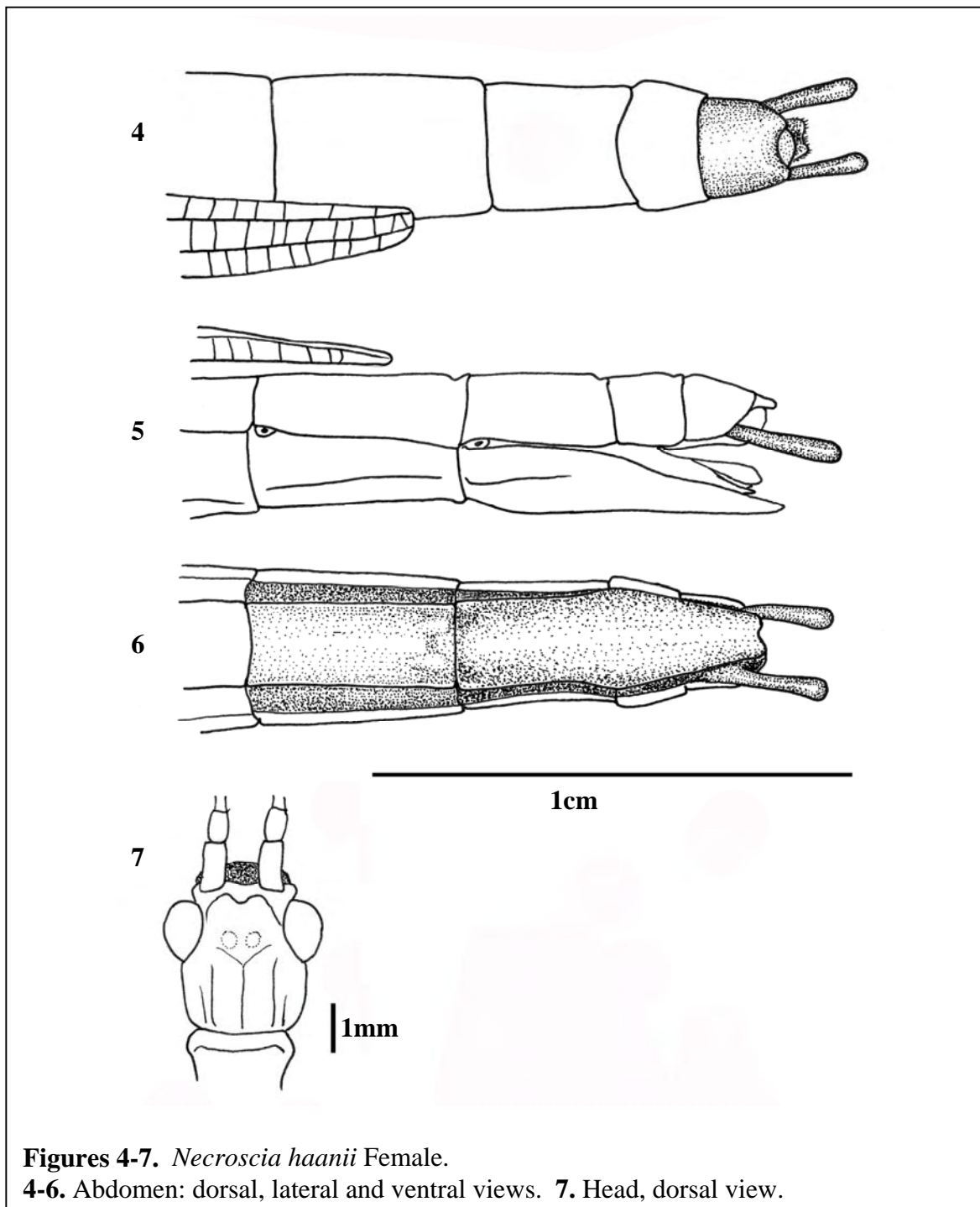
♀ Lectotype *Necrosia haanii* (BMNH 56.44) SARAWAK.

♂ Holotype *Aruanoidea schoenbergi* (ZMHB) S.O.-BORNEO, Wahnes S., Wolf v. Schoenberg V.

♂ (PEB-2020) KALIMANTAN Tengah, Sungai Sabangau, Kelambenkari. disturbed in daytime, P. Jenkins, 20.viii.1993;

♀ & eggs removed from the body (PEB-2025) KALIMANTAN Tengah, Sungai Sabangau, Kelambenkari. P.E. Bragg, 30.viii.1993.

♂ (BMNH BM1978-48) SABAH, Tawai plateau, 1300ft, 8 miles South of Telupid, 8.ix.1997, M.E. Bacchus.

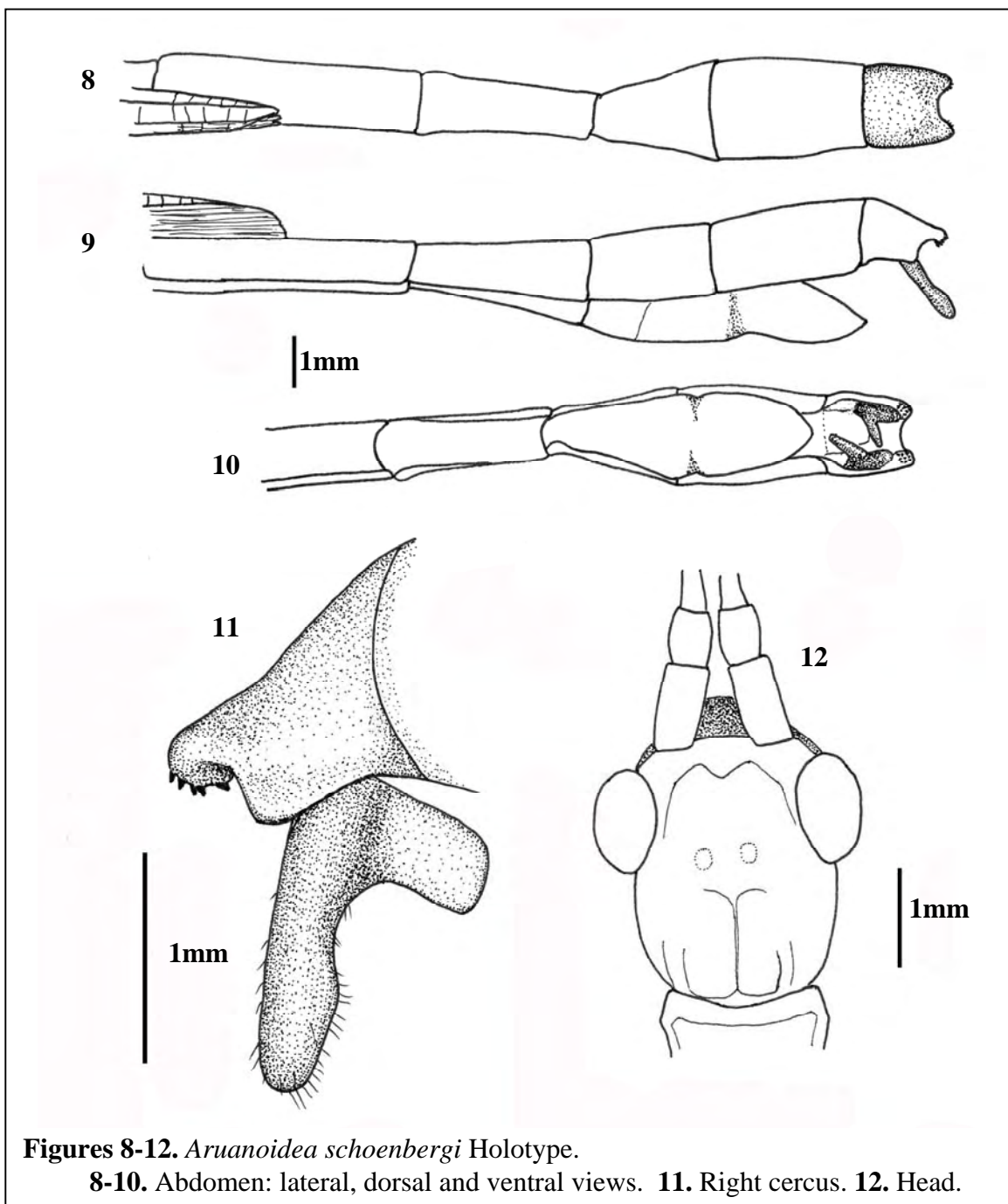


Female (figs 1 & 4-7)

Body, legs, and costal region of wings yellow with brown blotches (fig 1); anal region of wings pale pink. Measurements in table 1 are from my specimen only.

Head with two distinct ocelli. Mesonotum roughly granulose. Mesosternum and anterior half of metasternum granulose. Mesopleura and metapleura slightly granulose. Wings reaching to half way along seventh abdominal tergite. Seventh tergite about $\frac{3}{4}$ as long as 6th; 8th $\frac{1}{2}$ as long as 6th; 9th only slightly more than $\frac{1}{2}$ length of 8th; 10th about same length as 9th.

Tenth tergite with a semicircular apical notch; lamina supraanalis clearly visible, apex almost straight. Praeopercular organ consisting of a small pair of rounded, elongated, tubercles: almost a pair of short parallel ridges (fig 6). Operculum setose throughout its length, with only a very slightly notched apex. Cerci slightly clubbed.



Figures 8-12. *Aruanoidea schoenbergi* Holotype.

8-10. Abdomen: lateral, dorsal and ventral views. **11.** Right cercus. **12.** Head.

Male (figs 2-3 & 8-16)

Body coloration as in female, except BMNH male which is green with pale yellow blotches and black knee joints (fig 3). Anal region of the wing of *schoenbergi* HT has pink veins and a very faint pinkish tinge between the veins (region may have been pink originally); PEB-2020 has been decolourised by alcohol; anal region of BMNH male not examined.

Head with two distinct ocelli. Mesonotum roughly granulose. Mesosternum and anterior half of metasternum granulose. Mesopleura and metapleura slightly granulose. Wings reaching almost to end of 6th tergite.

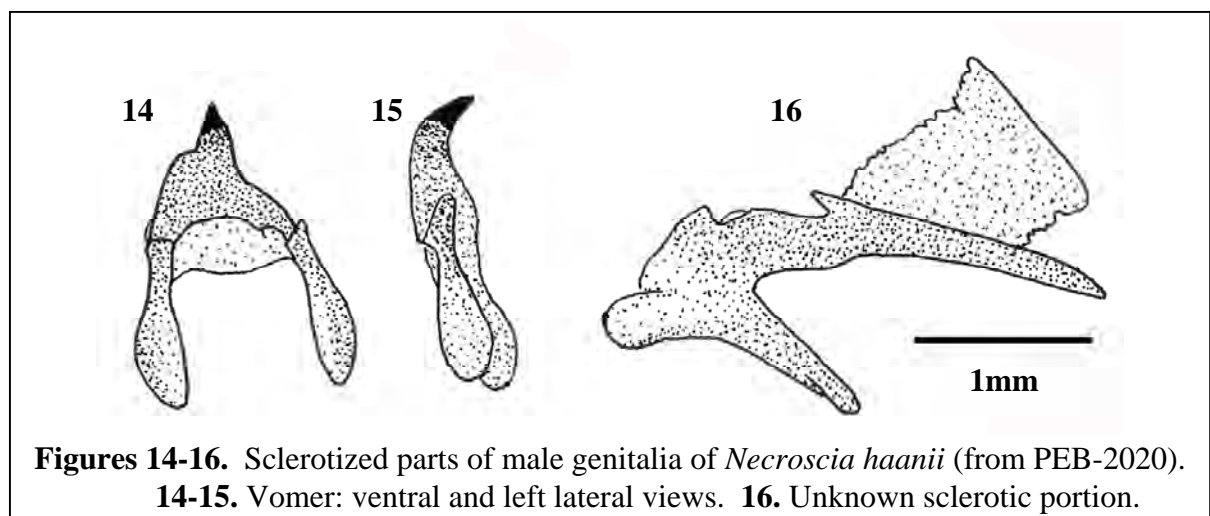
Tergites 2-5 of about equal length; 6th about $\frac{3}{4}$ length of 5th; 7th about two thirds length of 6th; 8th only slightly more than $\frac{1}{2}$ length of 7th; 9th almost as long as 7th; 10th slightly shorter than 8th. Anal segment with apical margin deeply indented so the segment appears to have two apical projections (figs 8 & 10).

Apical projections of anal segment with small spines on the ventral surface (HT of *schoenbergi* left 17, right 14; BMNH left 14 (some minute), right 10; PEB-2020 left 19, right 18). This species has very distinctive branched cerci (figs 10 & 11), the left and right cerci are the congruent. Vomer unispinose: the spine is strongly curved towards the dorsal surface and is offset to the right (figs 14 & 15). Another sclerotized part of the genitalia (fig 16) was isolated during preparation of the vomer, this was not visible externally and the original orientation is unknown.

Body length: 56-60mm (HT of *schoenbergi* actually measures 61mm but the abdomen has been lengthened by about 1mm by a repair). Measurements given in table 1 are from the HT of *schoenbergi*, except for the hind tarsi which are missing, this measurement was taken from PEB-2020.



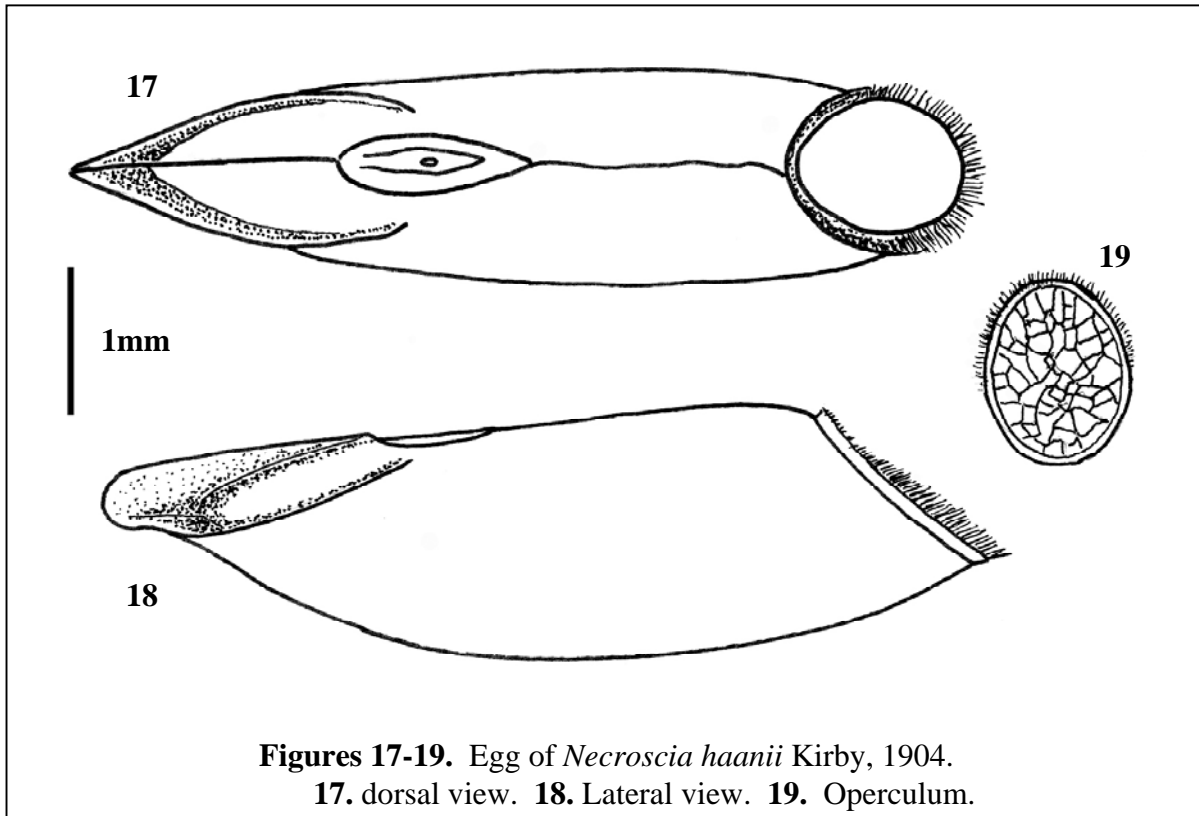
Figure 13. Holotype of *Aruanoidea schoenbergi*.



Figures 14-16. Sclerotized parts of male genitalia of *Necroschia haanii* (from PEB-2020).
14-15. Vomer: ventral and left lateral views. **16.** Unknown sclerotic portion.

Egg (figs 17-19)

The following is based on three eggs removed from PEB-2025; they were not fully hardened, and were slightly distorted during removal. Capsule a pointed cylinder with lateral and dorsal flanges on the polar end; surface rugulose. Micropylar plate about one third of the way from the polar end. Operculum flat, surrounded by a ring of setae on the collar. Length 6.1mm, height 1.6mm, width 1.4mm.



Figures 17-19. Egg of *Necroschia haanii* Kirby, 1904.
 17. dorsal view. 18. Lateral view. 19. Operculum.

Table 1. <i>Necroschia haanii</i> Kirby, 1904. Measurements in mm.					
	♂ ZMHB	♀ PEB-2025		♂ ZMHB	♀ PEB-2025
Total length	60	69	Fore femur	20.7	20.3
Antennae	62	>59	Fore tibia	19.6	19.6
Head	2.9	3.3	Fore tarsus	8.8	(5.6**)
Pronotum	2.4	3.4	Mid femur	12.6	11.6
Mesonotum	9.2	9.4	Mid tibia	10.9	10.6
Metanotum	4.3	6.0	Mid tarsus	5.4	5.4
Median segment	4.3	5.3	Hind femur	17.3	18.8
Fore wing	4.1	6.0	Hind tibia	16.7	17.0
Hind wing	34	44	Hind tarsus	(6.7*)	6.7

* hind tarsus of HT missing, measurement taken from PEB-2020.

** basal segment only, rest missing.

Distribution

The difficulty in identifying de Haan's specimen means there is no certainty that it is the same species as the lectotype, so Pontianak cannot be regarded as a known locality for *N. haanii*. The holotype of *schoenbergi* is from a rather vague "S.O.-Borneo" [Eastern Kalimantan], and the lectotype of *haanii* is an equally vague "Sarawak". Although there are only two specific localities known for this species, the five confirmed specimens of this species show a very wide distribution: Eastern Kalimantan, Central Kalimantan, Sabah, and Sarawak. The distribution map (fig 20) shows only the two specific localities: Kelambenkari and Telupid.

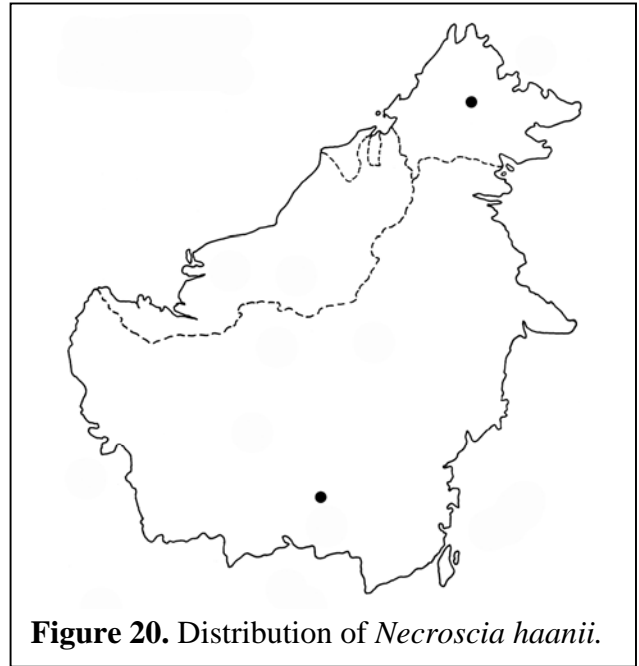


Figure 20. Distribution of *Necrosia haanii*.

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Lectotype designation for the type species of *Collossopus*, *C. grandidieri* Saussure, 1899 (Orthoptera: Tettigoniidae: Conocephalinae).

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Abstract

The male syntype of *Collossopus grandidieri* Saussure, 1899 preserved in the Museum d'Histoire Naturelle, Geneva (MHNG) is designated as the lectotype of this species. A supposed female syntype of this species in the Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt (SMFD) is identified as a specimen of *Oncodopus zonatus* Brongniart, 1897 and is shown not to be part of the type series.

Keywords

Orthoptera, Tettigoniidae, Conocephalinae, *Collossopus grandidieri*, *Oncodopus zonatus*, Madagascar, lectotype designation.

We have been working on a taxonomic revision of the endemic Madagascan genera *Oncodopus* Brongniart, 1897 and *Collossopus* Saussure, 1899 for several years. One of us (G.W. Beccaloni) collected a good series of specimens of *Collossopus* and *Oncodopus* in the southern half of Madagascar in both 2004 and 2007, and the other author (M. Ünal) has studied the specimens of these genera preserved in European museums, including the types. In the course of our study we have become aware that there is a problem regarding the putative syntypes of *Collossopus grandidieri* Saussure, 1899.

Saussure, describing the genus *Collossopus* and its type species *Collossopus grandidieri*, gave a description of both sexes but did not give any information about the number of syntypes or where they were preserved (Saussure, 1899: 627-628). We have found seven putative syntypes of *C. grandidieri* in three museums: one male and two females in the Museum d'Histoire Naturelle (MHNG), Geneva; three females in the Muséum National d'Histoire Naturelle, Paris (MNHN); and one female in the Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt (SMFD). The problem is that there are two species represented amongst these supposed syntypes. The male and two females in Geneva and the three females in the Paris agree exactly with Saussure's original description of *C. grandidieri* and his illustrations of this species (Saussure, 1899: 628 & Taf. 38: Figures 24-27), but, the single female in Frankfurt is a different species, which can easily be identified as *Oncodopus zonatus* Brongniart, 1897. It is clear that Saussure did not describe the characters of this female in the original description of *C. grandidieri*; for example, this species has a simple spine (with a single point) on the head, whilst the description of *Collossopus* Saussure, 1899 clearly states it has a trifid (three pointed) spine on the head. Furthermore, Saussure studied both sexes of both *O. zonatus* and *C. grandidieri* in the same paper (Saussure, 1899: 626-628 and Taf. 38, Figures 23-27). In fact, he described the female of *O. zonatus* for the first time (Saussure, 1899: 626-627). Therefore, it is difficult to believe that Saussure regarded the specimen preserved in Frankfurt as a syntype of *C. grandidieri*.

The data labels pinned under the syntypes preserved in Geneva and Paris, are identical to each other (as in fig. 1), but differ from the data labels of the female *O. zonatus* in Frankfurt (fig. 2). The female *O. zonatus* in Frankfurt has an identification label which reads "*Dynatopus grandidieri*" (fig. 2), whilst the other syntypes have identification labels which read "*Collossopus grandidieri*" [sic] (as in fig. 1). These labels are written in a different style. We therefore reject the notion that the female *O. zonatus* in Frankfurt is a syntype and in order to ensure nomenclatural stability we select the single male syntype in Geneva as the lectotype of *Collossopus grandidieri* Saussure, 1899.

***Colossopus grandidieri* Saussure, 1899**

Colossopus grandidieri Saussure, 1899: 628, Taf. 38: figures 24-27.

Lectotype: ♂ (MHNG) [here designated] Madagascar, leg. Grandidier. Paralectotypes (5♀♀): 2♀♀ (MHNG) Madagascar, leg. Grandidier; 3♀♀ (MNHN) Madagascar, leg. Grandidier.

Data labels from the lectotype are shown in fig. 1.

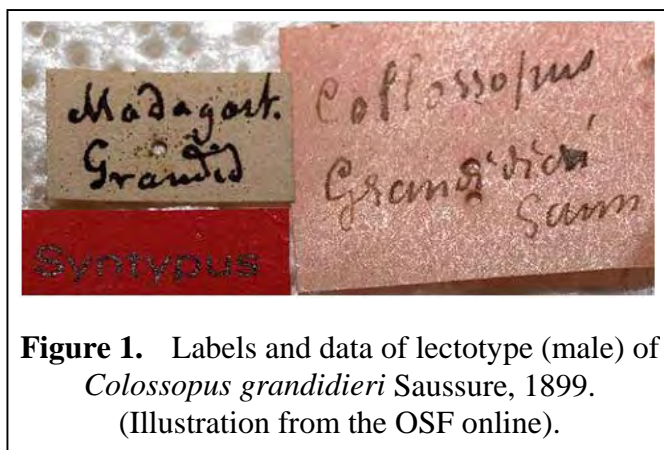


Figure 1. Labels and data of lectotype (male) of *Colossopus grandidieri* Saussure, 1899. (Illustration from the OSF online).

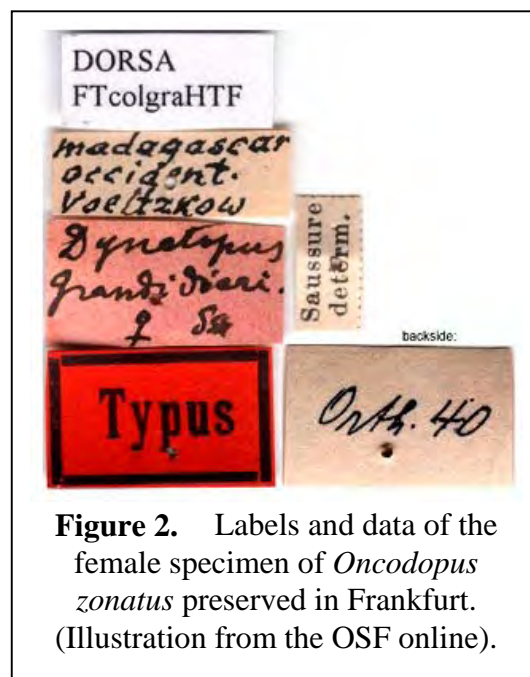


Figure 2. Labels and data of the female specimen of *Oncodopus zonatus* preserved in Frankfurt. (Illustration from the OSF online).

***Oncodopus zonatus* Brongniart, 1897**

Oncodopus zonatus Brongniart, 1897: 207-208, figs 38-39.

Material: 1♀ (SMFD) Madagascar, occident, leg. Voeltzkow.

This is labelled as "*Dynatopus grandidieri*" and was supposed to be one of the syntypes of *C. grandidieri* (Eades & Otte, 2008; Systax, 2003). The DORSA database actually states that it is the holotype of *C. grandidieri*, which is clearly incorrect since no holotype was designated by Saussure (1899), and at least one male and one female specimen were described by Saussure in the original description (Systax, 2003). *Dynatopus* is not a published name in Orthoptera; Saussure may have intended to describe it as a new genus and species. It is possible that this female *O. zonatus* specimen was examined by Saussure and described (as *O. zonatus*) in his 1899 paper. Data labels for this specimen are shown in fig. 2.

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Reviews and Abstracts.

Phasmid Abstracts

The following abstracts briefly summarise articles that have recently appeared in other publications, or articles published since 1992 that have only recently come to the attention of the editor. 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.

Bi D. & Wang, Z. (1998) Three New Species of Phasmatodea from Henan Province (Phasmatodea, Phasmatidae, Heteronemiinae). In: Shen, X.C. & Shi, Z. Y. [Eds.]: *The Fauna and Taxonomy of Insects in Henan 2. Insects of the Funiu Mountains Region*. Beijing: China Agricultural Sciencetech Press. pp. 9-13. [in Chinese].

The stick insects were obtained from Henan Province of China in the years 1984-1996. Among them 3 new species are described: *Baculum dolichocercatum*, *Phobaeticus longicornis*, *Micadina henanensis*. All type specimens are deposited in Shanghai Institute of Entomology, Chinese Academy of Science.

Bi, D.Y., Zhang, W.N. & Lau, C.S.K. (2001) Study on the Walking Stick Insects (Phasmatodea) and the genus *Sipyloidea* from Hong Kong District of China. *Entotaxonomia*, **23**(4): 253-258. [in Chinese].

In this paper, 9 species of walking stick insects (Phasmatodea) are reported from Hong Kong. They belong to 6 genera in 3 families, one species: *Sipyloidea shukayi*, is described as new to science. The key of Phasmatodea from Hong Kong and the key to the known species of the genus *Sipyloidea* from China are given. All the specimens are kept in the collections of Shanghai Institute of Entomology, Academia Sinica.

Bragg, P.E. (2007) Biografie van een Phasmatoloog: Henry Walter Bates. *Phasma*, **17**(67): 14-17. [in Dutch].

A translation of Bragg, P.E. (2007) Biographies of Phasmatologists – 1. Henry Walter Bates. *Phasmid Studies*, 15(1&2): 1-4. 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.

Bragg, P.E. (2008) Biografie van Phasmatologen – 4. William Forsell Kirby. *Phasma*, **18**(68): 7-12. [in Dutch]

A translation of Bragg, P.E. (2007) Biographies of Phasmatologists – 4. William Forsell Kirby. *Phasmid Studies*, 16(1): 5-10. William Forsell Kirby (1844-1912) was an English entomologist and folklorist. His life and phasmid work is outlined. He described 70 species and 22 genera of phasmids. His *Synonymic Catalogue of Orthoptera* was a complete catalogue of world species that has served phasmatologists for 100 years.

Bresseel, J. & Hennemann, F.H. (2008) Species report No.16: PSG 288 *Phasmotaenia godeffroyi* (Redtenbacher, 1908) uit Malaita, Solomon eilanden. *Phasma*, **18**(68): 16-21. [in Dutch]

Phasmotaenia godeffroyi (Redtenbacher, 1908) from Malaita, Solomon Islands is already quite widespread in European cultures. It was introduced as *Phasmotaenia australe* (Günther, 1933) in 2006 and is apparently relatively easy to breed in captivity. Information is provided on the classification, culture-history and origin of the culture-stock, breeding conditions and alternative food plants. Brief notes on the genus *Phasmotaenia* Návas, 1907, its species and synonyms are presented as well.

Cai, B. & Chen, S. (1999) Phasmatodea. In: Huang, B.K. [Ed.]: *Fauna of insects of the Fujian Province of China*. Vol. 1. Fuzhou: Fujian Science and Technology Publishing House. pp. 62-73. [in Chinese].

This paper recorded 22 species of walking sticks and one species is new recorded from Fujian Province. They belong to 2 families: Phasmatidae and Heteronemiidae, 4 subfamilies and 9 genera. One new species is described: *Baculum wuyishanense* Chen, **n.sp.** This new species is allied to *B. xingsbeeense* Chen & He, but differs in basal two joints of antennae yellow, the colour pattern of meso- and metathorax and the shape of anal segment are also different.

Chen, P.C. & Chen, S.C. (1998) A new species of genus *Sinophasma* (Phasmatodea: Heteronemiidae) from China. *Entomologica Sinica*, **5**(1): 47-49.

A new species: *Sinophasma largum* is described from China (Sichuan, Guizhou, Hunan, Hubei, and Guangxi Provinces). The type specimens are in the Institute of Zoology, Academia Sinica.

Chen S.C. (1992) A New Species of Walking Stick from Shanxi (Phasmida: Phasmatidae). *Journal of Beijing Forestry University, (English Ed.)*, **1**(1): 114-116.

This paper deals with a new species of walking stick from the Shanxi Province, China. The new species, *Baculum jinnanense*, is compared with related species of the genus *Baculum*. Figures of characteristics are provided. The type specimen is deposited in the Insect Collection of the Forest Resources College, Beijing Forestry University.

Chen S.C. (1993) Descriptions of a new record and two unknown sexes of walking sticks injurious to forest from China (Phasmida: Phasmatidae: Heteronemiidae). *Journal of Beijing Forestry University*, **15**(2): 87-89. [in Chinese].

Three species of Phasmida are reported. *Phobaeticus kirbyi* Brunner is a new record from China. The female of *Sinophasma longicauda* Bi, and the male of *Baculum pingiense* Chen & He are newly described. Four figures of characteristics are also provided.

Chen, S.C. (2002) A new species of *Paraclitumnus* from Henan (Phasmatodea: Phasmatidae). In: Shen X.C. & Zhao Y.Q. [Eds.]: *Insects of the Mountains Taihang and Tongbai Regions*. China Agricultural Sciencetech Press: Beijing, China. pp. 11-12.

Describes *Paraclitumnus henanensis* n.sp. from Henan, China. The two female types are in Beijing Forestry University.

Chen, S.C. & Chen, P.C. (1997) A new species of Heteronemiidae from Guangxi (Phasmatodea: Heteronemiidae). *Guangxi Sciences*, **4**(2): 124-125. [in Chinese].

A new species of *Sinophasma* Günther from Guangxi of China is reported. The two male type specimens of *Sinophasma latisectum* are deposited in the Institute of Zoology, Academia Sinica. This new species is similar to *S. klapperichi* Günther, but can be separated from it by the combination of the following characters: anal segment elongate and its median groove rather wide and deep; the shape of subgenital plate is quite different. The female is unknown.

Chen, S.C. & Chen, P.C. (1997) Descriptions of two new species and one unknown Female of the genus *Sinophasma* from Guangdong Province, China (Phasmatodea: Heteronemiidae). *Journal of Beijing Forestry University (English Ed.)*, **6**(2): 93-99.

Two new species and one unknown female of the genus *Sinophasma* from Guangdong Province, China are described. They are: *S. trispinosum* Chen & Chen, n.sp., *S. unispinosum* Chen & Chen, n.sp., and the female of *S. pseudomirabile* Chen & Chen. The type specimens are kept in the Zhongshan University, Guangzhou, and Beijing Forestry University, Beijing.

Chen, S.C. & Chen, P.C. (2000) Two new species of the Genus *Sosibia* from Guangdong Province, China (Phasmatodea: Heteronemiidae). *Acta Scientiarum Naturalium Universitatis Sunyatseni*, **39**(1): 121-122. [in Chinese].

Two new species of *Sosibia* Stål from Guangdong are described: *Sosibia guangdongensis* and *Sosibia truncata*. The type specimens are deposited in Zhongshan University.

Chen, S.C. & Chen, P.C. (2000) A new species of the Genus *Baculum* from Guangdong, China (Phasmatodea: Phasmatidae). *Acta Scientiarum Naturalium Universitatis Sunyatseni*, **39**(6): 129-130. [in Chinese].

A new species of the genus *Baculum* Saussure of the family Phasmatidae from Guangdong is described. The new species, *Baculum shenzhenense*, is allied to *B. asaphum* Chen & He but can be separated by the larger size teeth of fore femora, relatively developed different anal segment form, longer operculum and cerci. All the type specimens are kept in Zhongshan University, Guangzhou.

Chen, S.C. & He, Y.H. (1990) *Baculum album* – A new walking-stick injurious to forests in Sichuan. *Journal of Beijing Forestry University*, **12**(4): 54-56. [in Chinese].

This paper deals with a species of *Baculum* saussure from Sichuan. The species closely resembles the female of *B. insingnis* (Wood-Mason), but may be distinguished from the latter by the front femora with two series denticles, a very short median segment, a very long operculum, and the acuminate apex. The type specimens are kept at Beijing Forestry University.

Chen, S.C. & He, Y.H. (1993) A New Species of the Genus *Phobaeticus* From Anhui, China (Phasmida, Phasmatidae). *Journal of Beijing Forestry University*, **15**(4): 54-55. [in Chinese].

In this paper, a new species of the genus *Phobaeticus* from Anhui Province is described. *Phobaeticus yuexiensis* n.sp. is allied to *Phobaeticus sineiyi* Brunner, but it differs from the latter in that the femur of the front legs have more than 12 teeth; 1/3 of the middle tibia near the base is without any triangular lamellae; the median segment is shorter and the 6th sternite is pointed. The type specimen is deposited in the Insect Collection of Beijing Forestry University.

Chen, S.C. & He, Y.H. (1993) Seven New Species of Phasmida in Maoer Mountain of Guangxi. *Journal of the Guangxi Academy of Science*, **9**(1): 34-45. [in Chinese].

This paper is a report of stick insects from Maoershan Preserve, Xingan County, Guangxi Autonomous Region. They represent two families: Phasmatidae and Heteronemiidae. Among them seven species are new to Science: *Baculum maoershanense*, *Baculum flavofasciatum*, *Leptynia xinganensis*, *Sinophasma furcatum*, *Sipyloidea completa*, *Sipyloidea cavata*, *Phraortes corniformis*.

Chen, S.C. & He, Y.H. (1994) Newly recorded genus and a new species of Heteronemiidae (Phasmatodea). *Journal of Beijing Forestry University*, **16**(4): 121-123. [in Chinese].

This paper deals with *Parasipyloidea* Redtenbacher, which is recorded for the first time in China, and one species new to science is described: *Parasipyloidea emeiensis*. The specimen is kept in the Insect Collections of Beijing Agricultural University.

Chen, S.C. & He, Y.H. (1995) Phasmatodea, Phasmatidae and Heteronemiidae. *Insects of Baishanzu Mountain, Eastern China*, 63-68. [in Chinese].

The present paper deals with 7 species of Phasmatodea collected from Mt Baishanzu in Zhejiang Province. Among them 5 new species are described: *Entoria baishanzuensis*, *Micadina zhejiangensis*, *Sinophasma crassum*, *Sipyloidea obvius*, *Phraortes nigricarinatus*. The type specimens are deposited in the collection of Beijing Forestry University.

Chen, S.C. & He, Y.H. (1995) A new species of the genus *Paramyronides* from China (Phasmida Heteronemiidae). *Journal of Beijing Forestry University*, **17**(3): 73-74. [in Chinese].

This paper deals with a new species of the genus *Paramyronides* Redtenbacher from China. Comparison is made between *P. unidentatus* n.sp. and other similar species, and the figures of its features were drafted.

Chen, S.C. & He, Y.H. (1995) A new species of *Trachythorax* from Hainan, China (Phasmida: Heteronemiidae). *Acta Zootaxonomica Sinica*, **20**(2): 197-199. [in Chinese].

The genus *Trachythorax* was established by Redtenbacher in 1908. Heretofore nine species have been recorded in the world, and three species are known in China. They are *T. atosignatus* Brunner from Yunnan, *T. sexpunctatus* Shiraki from Taiwan and *T. longialatus* Cai from Sichuan. In this paper a new species *T. fuscocarinatus* is described from Hainan Province, China. The type specimen is deposited in the Institute of Zoology, Academia Sinica.

Chen, S.C. & He, Y.H. (1996) New species of the genus *Asceles* from Yunnan, China. *Journal of Beijing Forestry University*, **18**(4): 41-42. [in Chinese].

The genus *Asceles* was little known to China. A new species, *Asceles quadriguttatus*, collected from Yunnan Province is described in this paper. This new species is allied to *A. longicauda* (Bi), but differs from it by mesonotum near the longitudinal carina with a row of granulate tubercles; tergum of anal segment with narrow base, about 4 times as long as the 9th abdominal segment and its posterior margin with wider emargination. The type specimen is deposited in the Institute of Zoology, Academia Sinica.

Chen, S.C. & He, Y.H. (1996) Description of the previously unknown male of *Paramyronides unidentatus* (Phasmatodea: Heteronemiidae). *Journal of Beijing Forestry University (English Ed.)*, **5**(1): 98-100.

In the present paper the previously unknown male of *Paramyronides unidentatus* Chen & He is described. The specimens are kept in the Insect Collections of Beijing Agricultural University.

Chen, S.C. & He, Y.H. (1996) Description of two species of males of *Parasipyloidea* and *Trachythorax* (Phasmatodea: Heteronemiidae) unknown before. *Forest Research*, **6**: 664-665. [in Chinese].

In this paper two unknown species of males of *Parasipyloidea aemeiensis* Chen & He and *Trachythorax fuscocarinatus* Chen & He are described. The specimens are kept in the Insect Collection of Beijing Forestry University.

Chen, S.C. & He, Y.H. (1997) Phasmatodea: Phasmatidae and Heteronemiidae. *Insects of the Three Gorge Reservoir area of Yangtze River*, pp. 113-121. [in Chinese].

This present paper is a report of the stick insects collected by the members of Fauna Expedition to Three Gorge Reservoir Area of Yangtze River during 1993-1994. Ten species belonging to two families, five genera are dealt with, in which one genus and six species are new to Science. New genus: *Paraentoria* [type species *P. sichuanensis*]. New species: *Paraentoria sichuanensis*, *Baculum wushanense*, *Baculum xingshanense*, *Baculum bifasciatum*, *Baculum nigrolineatum*, *Micadina conifera*. All the type specimens are kept in the Institute of Zoology, Chinese Academy of Sciences.

Chen, S.C. & He, Y.H. (1997) Two new species of *Baculum* from Sichuan, China (Phasmida: Phasmatidae). *Acta Zootaxonomica Sinica*, **22**(1): 54-55. [in Chinese].

The present paper deals with two new species of Phasmatidae from Sichuan: *Baculum politum* & *Baculum huayingense*.

Chen, S.C. & He, Y.H. (1997) A new genus and new species of Phasmatodea from Yunnan, China (Phasmatodea: Heteronemiidae). *Acta Zootaxonomica Sinica*, **22**(2): 159-161. [in Chinese].

The present paper deals with a new genus, *Dianphasma*, and a new species, *Dianphasma microptera*, of Phasmatodea from Yunnan, China. The type specimen is deposited in the Institute of Zoology, Academia Sinica, Beijing.

Chen, S.C. & He, Y.H. (1997) A new species of *Prosentoria* from Yunan (Phasmatodea: Phasmatidae). *Acta Entomologica Sinica*, **40**(2): 183-184. [in Chinese].

In this paper, *Prosentoria bannaensis* n.sp. is described from a single female collected in Yunnan Province. The type specimen is deposited in the Institute of Zoology, Academia Sinica.

Chen, S.C. & He, Y.H. (1999) Three new species of Phasmatodea from Guangxi, China (Phasmatodea: Phasmatidae and Heteronemiidae). *Journal of the Guangxi Academy of Science*, **15**(2): 34-45. [in Chinese].

This paper deals with three new species, *Baculum xinganense* belonging to Phasmatidae, *Proscelus guangxiensis* and *Asceles caecius* belonging to Heteronemiidae of Phasmatodea from Guangxi, China. Type specimens are deposited in the institute of Zoology, Academia Sinica and Beijing Forestry University respectively.

Chen, S.C. & He, Y.H. (2000) Three new genera and two new species of Heteronemiidae (Phasmatodea) from South China. *Systematic and Faunistic Research on Chinese Insects – Proceedings of 5th National Congress of Insect Taxonomy*. pp. 31-35. [in Chinese].

Three new genera and two new species of Heteronemiidae from South China are described, in this paper. New taxa: *Neososibia* n.gen., with the type species *Neososibia brevispina* n.sp.; *Spiniphasma* n.gen., with the type species *Spiniphasma guangxiense*; *Acaniophasma* n.gen., with the type species *Oxyartes varia* Chen & He, 1992. All the type specimens are kept in the Zhongshan University and China Agricultural University.

Chen, S.C. & He, Y.H. (2000) Three new species of Phasmatodea from Shiwan Dashan, Guangxi (Phasmatodea: Heteronemiidae, Phasmatidae). *Acta Zootaxonomica Sinica*, **25**(4): 395-397. [in Chinese].

The paper deals with three new species of Heteronemiidae and Phasmatidae from Guangxi, China. *Asceles longzhouensis* is allied to *A. brevipennis* Redtenbacher, but differs in head without granules, anterior horn of tegmina obtuse, hindwings light yellow. *Aruanoidea maculata* n.sp. is similar to *A. flaoescens* Chen & Wang, but can be easily distinguished by pronotum, meso- and metapleura covered with granules, body colour and shape of anal segment also different. *Baculum spinicornum* n.sp. resembles *B. chinense* (Brunner), but easily distinguishable from the latter by two spines of head rather long and pointed, the posterior margins of the 2nd-7th sternite with two small elevations respectively. The types are kept in the insect collection of China Agricultural University.

Chen, S.C. & He, Y.H. (2000) Two new species of Phasmatodea (Phasmatodea, Anareolatae) from South China. *Entomotaxonomia*, **22**(1): 17-19. [in Chinese].

This paper deals with two species belonging to Phasmatidae and Heteronemiidae, collected from Jiangxi and Guangxi, China are reported as new to Science. *Paraentoria lushanensis* n.sp. is allied to *P. sichuanensis* Chen & He, it differs from the latter in body covered with sparse setae, lobes on the base of middle femur not divided and with distinct dorsal lobes near base on hind femur and tibia. *Sinophasma atratum* n.sp. is close to *S. largum* Chen & Chen, but the colour pattern of body and legs different, granules on mesonotum concentrated mainly on side of longitudinal carina, subgenital plate with nearly two symmetrical valvulae backward. The type specimens are kept in the Institute of Zoology, Academia Sinica.

Chen, S.C. & He, Y.H. (2001) Phasmatodea: Heteronemiidae and Phasmatidae. In: Wu, H. & Pang, C.W. [Eds.]: *Insects of Tianmu Mountain*. Beijing: Sinica Press. pp. 117-121.

The present paper deals with seven species of phasmids, belonging to five genera of two families, among them one genus is new to Science, collected from Tianmushan National Nature Reserve (30° 22' N, 119° 26' E) in Zhejiang province. *Euphasma* n.gen. has the type species *Micadina henanensis* Bi & Wang, 1998.

Chen, S.C. & He, Y.H. (2001) Two new record genera and new species of Phasmatodea from China (Phasmatodea: Phasmatidae: Heteronemiidae). *Entomological Journal of East China*, **19**(1): 8-10. [in Chinese].

This paper deals with the genera *Acrophylla* Gray and *Parapachymorpha* Brunner of Phasmatodea, which are recorded for the first time from China. Two species *Acrophylla sichuanensis* and *Parapachymorpha tetracantha*, are new to Science. *Acrophylla sichuanensis* n.sp. is very similar to *A. phyllocerca* Redtenbacher, but differs from the latter in: 1) hindwings longer, extending to 3rd abdominal segment; 2) denticle number on the four posterior legs different; 3) posterior margin of anal segment nearly truncate.

Parapachymorpha tetracantha n.sp. is related to *P. spinosa* Brunner, but it can be distinguished from the latter by: 1) meso- and meta-thorax only with sparse spines; 2) each tergite of 6-10 abdominal segments without distinct spines; 3) carinae on the four posterior femora and tibiae covered with obtuse denticles. The type specimens are kept in the Collection of the Entomological Museum, Northwestern Agricultural University, China.

Chen, S.C. & He, Y.H. (2002) Three new species of *Carausius* from Sichuan and Yunnan provinces China (Phasmatodea: Heteronemiidae). *Acta Entomologica Sinica*, **45**(Suppl.): 1-3. [in Chinese].

Three new species of the genus *Carausius* Stål: *C. undatus* n.sp., *C. femoralis* n.sp., *C. lijiangensis* n.sp., are described from southwestern China. The type specimens are deposited in Institute of the Chinese Academy of Sciences and Beijing Forestry University.

Chen, S.C. & He, Y.H. (2004) Phasmatodea: Heteronemiidae. In: Yang X.K. [Ed.]: *Insects of the Great Yarlung Zangbo Canyon of Xizang*. China Science and Technology Publishing House: Beijing, China]. pp. 26-27. [in Chinese].

Two new species of *Sosibia* are described from Medog, Xizang, China: *Sosibia medogensis*, *Sosibia brachyptera*. The types are kept in the Institute of Zoology, the Chinese Academy of Sciences.

Chen, S.C. & He, Y.H. (2004) Phasmatodea: Pseudophasmatidae, Phasmatidae and Heteronemiidae. In: Yang X. K. [Ed.]: *Insects from Mt. Shiwandashan Area of Guangxi*. China Forestry Publishing House: Beijing, China. pp. 46-52.. [in Chinese].

The present paper is a report of the stick insects collected from Mt. Shiwandashan in Guangxi during 1998-2000. Among them 17 species belonging to two families and 11 genera are reported. One new genus *Paraprosceles* (type species *P. microptera* Chen & He) is described. Five new species are described: *Baculum acutum*, *Baculum annuliventris*, *Asceles dilatatus*, *Paramyronides albopunctata*, *Paraprosceles microptera*. Two species are newly recorded for China. Type specimens are in the Institute of Zoology, Chinese Academy of Science, Beijing and Zhongshan University, Guangzhou.

Chen, S.C., He, Y.H. & Chen, Z.Y. (2000) Three new species of Phasmatodea from Guangdong, China (Phasmatodea: Phasmatidae, Heteronemiidae). *Acta Scientiarum Naturalium Universitatis Sunyatseni*, **39**(4): 128-129. [in Chinese].

Three new species of Phasmatidae and Heteronemiidae from Guangdong Province are described: *Baculum lianxianense*, *Marmessoidea viridescens*, & *Paramenexenus congnatus*. All the type specimens are kept in Zhongshan University, Guangzhou.

Chen, S.C., He, Y.H. & Li, Y. (2002) Phasmatodea. . In: Huang, F.S. [Ed.]: *Forest insects in Hainan, China*. Beijing: Sinica Press. pp. 100-116. [in Chinese].

This paper deals with 30 species of phasmids, belonging to 18 genera and five families, collected in the Hainan Province of China. Three genera and 16 species are new to Science, and two genera are new to China. The new genera are: *Nanhuaphasma* Chen, He & Li (type species: *N. hamicercum*) in Pseudophasmatidae, *Qiongphasma* Chen, He & Li (type species: *Q. jianfengense*) in Heteronemiidae, and *Pseudocentema* Chen, He & Li (type species: *P. bispinatum*) in Heteronemiidae. The new species are: *Nanhuaphasma hamicercum* Chen & He, *Dixippus nigriantennatus* Chen & He, *Dixippus hainanensis* Chen & He, *Proscoteles balteatus* Chen & He, *Paramenexenus yangi* Chen & He, *Marmessoidea wuzhishanensis* Chen & He, *Qiongphasma jianfengense* Chen & He, *Pseudocentema bispinatum* Chen & He, *Sosibia hainanensis* Chen & He, *Baculum flavovittatum* Chen & Li,

Baculum giganteum Chen & Li, *Baculum wuzhishanense* Chen & Li, *Baculum nigrifactum* Chen & Li, *Baculum antennatum* Chen & Li, *Baculum viridulum* Chen & Li, *Baculum hainanense* Chen & He. Type specimens are in the insect collection of the Institute of Zoology, the Chinese Academy of Sciences and Beijing Forestry University.

Chen, S.C., He, Y.H. & Xu, F.L. (2006) Heteronemiidae and Phasmatidae. In: Li, Z. Z. & Jin, D. C. [Eds.]: *Insects from Mt. Fanjingshan Landscape*. Guiyang: Guizhou Science and Technology Publishing House. pp 94-102. [in Chinese].

In this paper 16 species of stick insects belonging to the families Phasmatidae and Heteronemiidae collected from Fanjingshan National Nature Reserve in Guizhou Province are reported. Six new species are described: *Sinophasma biacuminatum* Chen & He, *Sinophasma striatum* Chen & He, *Carausius thoracicus* Chen & He, *Parasinophasma fanjingshanense* Chen & He, *Baculum grandis* Chen & He, *Baculum fasciatum* Chen & He. All type specimens are in the Beijing Forestry University.

Chen, S.C. & Li, Y. (1999) The eggs of genus *Baculum* in China. *Journal of Beijing Forestry University*, **21**(6): 52-57. [in Chinese].

The eggs of twelve species of the genus *Baculum* from China were studied, described, keyed and illustrated with 26 figures.

Chen, S.C. & Li, Y. (1999) Two new species of *Baculum* from Mt. Jigong, Henan (Phasmatodea: Phasmatidae). In: Shen, X.C. & Deng, G.F. [Eds.]: *Insects of the Jigong Mountains Regions, China*. Agricultural Sciencetech Press: Beijing, China. pp. 7-10. [in Chinese].

Two new species of *Baculum* from Mt. Jigong in Henan Province are reported as new to Science. *Baculum jigongshanense* is described from nine females and one male. *Baculum vivinum* is described from one female. The type specimens are in the collection of Beijing Forestry University.

Chen, S.C. & Ran, J.C. (2002) Phylliidae, Heteronemiidae and Phasmatidae. In: Li, Z. & Jin, D. [Eds.]: *Insects from Maolan Landscape*. Guizhou Science and Technology Publishing House: Guiyang: China. pp. 123-128. [in Chinese].

This paper deals with 16 species and eight genera of Phasmatodea collected from Guizhou Maolan Nature Reserve. Three new species are described: *Neososibia guizhouensis*, *Baculum liboensis*, & *Baculum maolanense*. The type specimens are in the collection of Beijing Forestry University and Maolan Nature Reserve.

Chen, S.C. & Shang, Z.H. (1999) Four new species of genus *Baculum* from Mt. Funiu, Henan (Phasmatodea: Phasmatinae). In: Shen, X. & Pei, H. [Eds.]: *Insects of the Mountains Funiu and Dabie Regions, China*. Agricultural Sciencetech Press: Beijing, China. pp. 9-13. [in Chinese].

This paper deals with four new species of the genus *Baculum* from Henan Province. The new species are: *Baculum femoratum*, *B. brevicercatum*, *B. interdentatum*, and *B. xixiaense*. The type specimens are in the collection of Beijing Forestry University.

Chen, S.C., Shang, Z.H., & Pei, H.C. (2000) Two new species of walking stick (Phasmatodea: Phasmatidae) from Xizang and Yunnan, China. *Entotaxonomia*, **22**(2): 98-100. [in Chinese].

This paper describes two new species of the family Phasmatidae from Xizang and Yunnan, China. *Baculum nyalamense* n.sp. is similar to *B. obnoxium* (Brunner), but differs

from the latter by the large-sized, hind femora longer, and the shape of anal segment and operculum are also different. *Paraclitumnus bannaensis* n.sp. is closely related to *P. apicatis* (Chen & He), but differs from the latter in the head rather elongated and flat, four posterior femora with 6-7 small teeth on the apical portion of inferior median carina. apico-lateral lobes of anal segment sharp, the size and shape of supraanal plate and cerci are also different. The types are kept in the Institute of Zoology, Academia Sinica.

Chen, S.C. & Wang, J.J. (1998) A new species of *Aruanoidea* Brunner attacking forest from Guangxi (Phasmatoidea: Heteronemiidae). *Journal of Guangxi Academy of Sciences*, **14**(1): 1-2. [in Chinese].

In the present paper a new species of *Aruanoidea* Brunner, collected from Guangxi, is described. The type specimens of *Aruanoidea flavescens* n.sp. are kept in the insect collection of Beijing Forestry University.

Chen, S.C. & Wang, J.J. (1998) A new species and a new record species of the genus *Asceles* (Phasmatoidea: Heteronemiidae). *Journal of Guangxi Academy of Sciences*, **14**(2): 15-16. [in Chinese].

The present paper deals with two species of the genus *Asceles*. *Asceles clavatus* is new to science and *A. bispinus* is new to China. The new species is described and figured. The type specimen is deposited in the insect collection of Beijing Forestry University.

Chen, S.C. & Wang, H.J. (2005) Phasmatoidea, Phasmatidae and Heteronemiidae. *Insect Fauna of Middle West Qinling and South Mountains of Gansu Province*. pp. 95-101. [in Chinese].

This paper is a report on the stick insects collected by the Comprehensive Scientific Expedition to the southern Gansu forest area and Qinling Mountains Region, the Chinese Academy of Sciences during 1998-1999. Eleven species are dealt with, belonging to two families and two genera. Four new species of *Baculum* are described: *B. kangxianense*, *B. gansuense*, *B. wenxianense*, and *B. spinulosum*.

Chen, S.C. & Yin, J. (1995) Description of a new species of the genus *Baculum* from Yunnan, China (Phasmatoidea, Phasmatidae). *Forest Research*, **8**: 10-11. [in Chinese].

This paper deals with a new species of *Baculum* from the Yunnan Province of China. The type specimen of *Baculum luopingense* n.sp. is deposited in the insect collection of Beijing Forestry University.

Chen, S.C. & Yin, J. (1996) A new species of the Family Phasmatidae from Yunnan Province. *Journal of Beijing Forestry University*, **18**(1): 59-60. [in Chinese].

This paper deals with a new species of the genus *Baculum* of the family Phasmatidae collected from Yunnan Province, China. *Baculum nigrodentatum* n.sp. is allied to *B. apicalis* Chen & He, but differs in: (1) anal segment elongate and its posterior margin emarginate deeply; (2) supra-anal plate lanceolate; (3) ovipositor exceeding the tip of the operculum. The type specimens are deposited in the insect collection of Beijing Forestry University.

Cliquennois, N. (2007) Aperçu général de la diversité des phasmes de Madagascar (Insecta, Phasmatoidea). [Overall preview of the diversity of stick insects of Madagascar (Insecta, Phasmatoidea)]. *Le bulletin d'Arthropoda*, **32**: 3-16. [in French].

The stick insects of Madagascar are poorly known, having been neglected during nearly a century. They belong to four groups: Achriopterini, best known and less diversified taxon, Anisacanthidae and Antongiliinae, groups of which members show a wide range of

variation in body morphology and that include the vast majority of Madagascan species, and Damasippoididae, with few, rather scarcely seen species. Monandropterini often mentioned for Madagascar have their distribution probably limited to Mascarenes. Madagascar is also home to three naturalized alien species.

Cliquennois, N. (2007) “*Vivant, était vert avec des antennes rouges*”: extinction de *Xenomaches incommodus*, Phasme endémique de l’île Rodrigues (Phasmatodea). *Bulletin de la Société entomologique de France*, **112**(3): 375-376. [in French]

“*Green, with red antennae, when alive*”: extinction of *Xenomaches incommodus*, endemic phasmid of Rodrigues island (Phasmatodea). *Xenomaches incommodus* (Butler, 1876), endemic phasmid of Rodrigues island, is most probably an extinct species.

Cliquennois, N. (2007) Plantes nourricières des phasmes des Mascareignes: Maurice, Réunion, Rodrigues (Phasmatodea). *Bulletin de la Société entomologique de France*, **112**(3): 397-405. [in French]

Food plants of Mascarenes stick insects: Mauritius, Réunion, Rodrigues (Phasmatodea). Mascarenes archipelago has a total of twelve stick insects species, of which one is exotic and one is extinct. They feed on about seventy listed plants. The number of plants eaten per stick insects species varies from one to 37. The overexploitation of one palm tree in Réunion endangers the very existence of one species of phasmid. A similar scenario has already led to the extinction of the only indigenous species recorded in Rodrigues.

Conle, O., Hennemann, F.H. & Fontana, P. (2007) Studies on neotropical Phasmatodea V: Notes on certain species of *Pseudosermyle* Caudell, 1903, with the descriptions of three new species from Mexico (Phasmatodea: Diapheromeridae: Diapheromerinae: Diapheromerini). *Zootaxa*, **1496**: 31–51.

Six species of *Pseudosermyle* Caudell, 1903 occurring in Mexico are discussed. Three new species from Mexico are described and illustrated, all of which are closely related to *Pseudosermyle phalangiphora* (Rehn, 1907): *P. chorreadero* **n.sp.** from both sexes, *P. procera* **n.sp.** and *P. claviger* **n.sp.** from the males only. The males of *P. inconguens* (Brunner v. Wattenwyl, 1907) and *P. tolteca* (Saussure, 1859) are re-described and illustrated. Detailed descriptions and illustrations are furthermore provided for both sexes and the eggs of *P. phalangiphora* (Rehn, 1907).

Taxonomic problems caused by misidentifications and wrong synonymies of previous authors concerning to these six species are clarified. A lectotype is designated for *Pseudosermyle inconguens* (Brunner v. Wattenwyl, 1907). *Ocnophila crudis* Brunner v. Wattenwyl, 1907 and *Dyme depressa* Brunner v. Wattenwyl, 1907 are shown to be junior synonyms of *P. phalangiphora* Rehn, 1907.

Hennemann, F. (2007) Species report No. 11: *Dyme bifrons* Stål, 1875 uit Peru (Panguana). *Phasma*, **17**(67): 4-6. [in Dutch].

In addition to *Dyme mamillata* Brunner von Wattenwyl, 1907 (Species report No. 1, *Phasma* 16(61)) a second Peruvian species of the genus *Dyme* Brunner von Wattenwyl, 1907 was recently brought into culture: *Dyme bifrons* Stål, 1875. It is characterised by the blue bases of the fore legs of females and colourful males. The females show strong intraspecific variation of the coloration and armature of the head. Information is provided on the classification, culture history and origin of the present culture-stock, breeding and alternative food plants. Brief descriptions and illustrations are presented of the adults, nymphs and eggs.

Hennemann, F.H. & Conle, O.V. (2007) Studies on Philippine Lonchodinae, with the descriptions of two new genera and eleven new species (Phasmatodea: Phasmatidae: Lonchodinae). *Mitteilungen der München Entomologische Gesellschaft*, **97(Supp.)**: 3-88.

The subfamily Lonchodinae is a large but still rather poorly studied group of Old World Phasmatodea. The collections of the authors include numerous species of Lonchodinae from the Philippine Islands of Samar, Mindoro, Panay, Babuyan and Luzon, some of which are here studied in detail. Two new genera and eleven new species are described. Keys to the genera and a checklist of Philippine Lonchodinae are presented which lists 28 described species in nine distinct genera.

The genus *Mithrenes* Stål, 1877 is re-described and distinguished from related genera. Two new species are described based on both sexes and the eggs: *Mithrenes mindorensis* **sp.n.** from Mindoro and *Mithrenes panayensis* **sp.n.** from Panay. A lectotype is designated for *Mithrenes asperulus* Stål, 1877. The paralectotype of *Lonchodes systropedon* Westwood, 1859 is conspecific with *Mithrenes whiteheadi* (Kirby, 1896) and *Lonchodes nodulosus* Brunner, 1907 is the opposite sex and a junior synonym as is *Dixippus bilobatus* Brunner, 1907 (**syn.n.**). A lectotype is designated for *Dixippus bilobatus* Brunner and descriptions are provided for both sexes. Keys are presented to distinguish between the four described species in the genus.

The new species *Lonchodes philippinicus* **sp.n.** from Panay is described and illustrated based on both sexes and the eggs. As currently treated, the genus *Lonchodes* Gray, 1835 is shown to be polyphyletic. A critical discussion of the genus is presented, which briefly summarizes the generic units or specific groups recognized within the genus. Species subsequently attributed to *Lonchodes* Gray are here transferred to the genera *Lonchodiodes* **gen.n.**, *Mnesilochus* Stål, 1877 and *Hermagoras* Stål, 1875. A list of species which belong in *Lonchodes* (sensu strictu) is provided.

The new genus *Lonchodiodes* **gen.n.** (type-species: *Lonchodiodes samarensis* **sp.n.**) and five new species are described and illustrated. Four species are known from both sexes and the eggs: *Lonchodiodes atrovirens* **sp.n.** and *Lonchodiodes grandis* **sp. n.** from Panay, *Lonchodiodes samarensis* **sp.n.** from Samar and *Lonchodiodes babuyanensis* **sp.n.** from the Babuyan Islands. *Lonchodiodes eurycanthoides* **sp. n.** from Mindoro is described from the male and female alone. Three species are transferred from *Lonchodes* Gray, 1835 to *Lonchodiodes* **gen.n.**: *Lonchodes putingmantsa* Zompro, 2003 **comb.n.**, *Lonchodes tagalicus* Stål, 1877 **comb.n.** and *Lonchodes trollius* Westwood, 1859 **comb.n.** The female and egg of *L. trollius* (Westwood, 1859) are described and illustrated for the first time and a re-description is provided of the male. Keys are presented to distinguish between the eight known species in the genus.

A list of species is presented for *Periphetes* Stål, 1877. One new species, *Periphetes quezonicus* **sp.n.**, is described from Luzon based on the female and male. A detailed description and illustrations of the egg of *Periphetes forcipatus* (Bates, 1865) from Sulawesi are provided. *Dixippus furcatus* Brunner, 1907 and *Periphetes duivenbodei elongatus* Günther, 1938 from Sulawesi and *Periphetes sangirensis* Dohrn, 1910 from Sangihe Island shown to be junior synonyms of *P. forcipatus* (Bates) (**syn.n.**). Lectotypes are designated for *Lonchodes analis* Brunner, 1907 and *Lonchodes forcipatus* Bates, 1865.

The new genus *Matutumetes* **gen.n.** is described for two new species from Mindanao, both of which are known from the male and female: *M. amoenus* **sp.n.** and *M. mindanaensis* **sp.n.** This new genus is well characterized by the strikingly prominent praeopercular organ of females. The eggs of *Matutumetes* **gen.n.** remain unknown.

Mnesilochus Stål, 1877 is re-established (**stat. rev.**), re-described and distinguished from related genera. A list is presented of the 13 species currently included, 11 of which are here transferred from either *Lonchodes* Gray, 1835 (*sensu lato*) or *Phenacephorus* Brunner, 1907. The female and egg of *Mnesilochus headulus* Stål, 1877 are described and illustrated for the first time and a re-description is provided of the male. *Prisomera tuberculatum* Brunner, 1907 is synonymised with *Mnesilochus mindanaense* (Brunner, 1907) **syn.n.** *Prisomera modestissimum*

Brunner, 1907 was synonymised with *Mnesilochus modestus* (Brunner, 1907) in error and is shown to be a synonym of *Paraprisomera coronata* (Brunner, 1907) **syn.n.**. The type-locality "S.O. Borneo" is shown to be wrong, the specimens most certainly originating from Sri Lanka. *Lonchodes jenswilhelmjanzeni* Zompro, 2007 is transferred to *Mnesilochus jenswilhelmjanzeni* (Zompro, 2007) **comb.n.**

A review is presented of the genus *Manduria* Stål, 1877, along with a re-description and brief notes on its systematic position. A key is provided to distinguish the females. The female paralectotype of *Lonchodes systropedon* Westwood, 1859 in BMNH is shown to be a specimen of *M. bilobatus* (Brunner, 1907). Holotypes of most new taxa are deposited in the State Zoological Collection Munich, Germany (ZSMC), paratypes in various public and private collections.

Hennemann, F.H. & Conle, O.V. (2007) Studies on neotropical Phasmatodea VII. Descriptions of a new genus and four new species of Diapheromerinae from Peru and Bolivia (Phasmatodea: "Anareolatae": Diapheromeridae). *Mitteilungen der München Entomologische Gesellschaft*, **97(Supp.)**: 89-112.

The new genus *Lobolibethra* **gen.n.** is established in the tribe Diapheromerini, with *Lobolibethra panguana* **sp.n.** designated as the type-species. Three new species are described: *L. boliviana* **sp.n.** from the Chapare Province of Bolivia and *L. mutica* **sp.n.** from North Peru from the females only, the type-species *L. panguana* **sp. n.** from East Peru from is described from both sexes and the eggs. *Libethra peruana* Caudell, 1918 is a junior synonym of *Ocnophila mainerii* Giglio-tos, 1910 (**syn.n.**). *Ocnophila ignava* (Westwood, 1859) from Brazil and *Rugosolibethra ramale* (Giglio-Tos, 1898) from South Ecuador are transferred to *Lobolibethra* **gen.n.**

A new species of the genus *Ocnophiloidea* Zompro, 2001 (tribe Ocnophilini), *O. dillerorum* **sp. n.**, is described from the Huanuco Province of East Peru. This new species is known from both sexes and the egg. Holotypes of new taxa are deposited in MUSM and ZSMC, paratypes in the two mentioned institutions and the authors' collections. All type specimens are dried and pinned.

Hennemann, F.H., Conle, O.V. & Delfosse, E. (2007) Studies on Neotropical Phasmatodea VI, The genus *Cranidium* Westwood, 1843 (Phasmatodea, Phasmatidae, Cladomorphinae). *Bulletin de /a Societe entomologique de France*, **112(3)**: 357-368.

The genus *Cranidium* Westwood, 1843 [type-species: *Diapherodes (Cranidium) serricollis* Westwood, 1843 = *D. gibbosa* Burmeister, 1838] is re-described. *Bacteria clavigera* Redtenbacher, 1908, is shown to represent the male of *Cranidium gibbosum*, new synonym; lectotypes are designated for these two taxa. Detailed descriptions and illustrations of both sexes and the eggs as well as a complete synonymic list are provided for *C. gibbosum*, which is the only species included in the genus. The synonymy of *D. (C) serricollis* with *C. gibbosum* is attributed to Charpentier (1845), not Kirby (1904). Detailed information is provided on the biology, natural habitats, food plants and culturing of *C. gibbosum*. A brief review of the tribe Cranidiini is provided.

Hennemann, F.H., Conle, O.V. & Zhang, W.W. (2008) Catalogue of the Stick and Leaf-insects (Phasmatodea) of China, with a faunistic analysis, review of recent ecological and biological studies and bibliography (Insecta: Orthoptera: Phasmatodea). *Zootaxa*, **1735**: 1-77.

A complete taxonomic catalogue of the Stick and Leaf-insects (Phasmatodea) recorded or described from the mainland China (excluding Taiwan) is presented. 241 valid species are listed, which are currently attributed to 50 genera, 5 families and 7 subfamilies. Genera and species are listed alphabetically. All available type-data is provided based mainly on literary sources for

species described by Chinese workers from 1986 to 2006, including documented depository of type specimens.

The catalogue therefore also provides complete lists of the type-material of Phasmatodea housed in the following Chinese institutions: Administration of Baishuijiang Natural Reserve (ABNR), Beijing Forestry University, Beijing (BFU), China Agricultural University, Beijing (CAU), Geological Museum of China, Beijing (GMC), Inca Science Ltd., Chongqing (INCA), Institute of Zoology, Chinese Academy of Sciences, Beijing (IZCAS), Department of Biology, Nankai University, Tianjin (NKU), Northwest Sci-Tech University of Agriculture and Forestry, Shaanxi (NWAU), Institute of Zoology, Shaanxi Normal University, Xi'an (SNU), Institute of Entomology, Sun Yat-sen University (ICRI), Shanghai Institute of Entomology, Academia Sinica, Shanghai (SIES), Tianjin Natural History Museum, Tianjin (TMNH), Zhejiang Museum of Natural History, Hangzhou (ZMNH). The known distribution of each species, by means of provinces is provided as well. 14 species are shown to have been recorded from China in error, several of these based on misidentifications. The "Phasmatodea-like" fossil taxa described from the Late Jurassic Yixian Formation of North Hebei and West Liaoning are listed in a separate section. Two new generic synonyms are recognized: *Arthminotus* Bi, 1995 synonymised with *Lopaphus* Westwood, 1859 (**n.syn.**) and *Dianphasma* Chen & He, 1997 synonymised with *Parasosibia* Redtenbacher, 1908 (**n.syn.**). The genus *Linocerus* Gray, 1835 (Type-species: *Linocerus gracilis* Gray, 1835) was erroneously synonymised with the mediterranean *Bacillus* St. Fargeau & Audinet-Serville, 1825 and is here re-established in Phasmatidae: Pachymorphinae: Gratidiini (**rev. stat.**). Relationship to *Clonaria* Stål, 1875 (= *Gratidia* Stål, 1875, = *Paraclonaria* Brunner v. Wattenwyl, 1893), *Sceptrophasma* Brock & Seow-Choen, 2000 and *Macellina* Uvarov, 1940 is obvious.

21 species are transferred to other genera (**new combinations**): *Asceles dilatatus* Chen & He, 2004 and *Asceles quadriguttatus* Chen & He, 1996 to *Pachyscia* Redtenbacher, 1908, *Arthminotus sinensis* Bi, 1995 to *Lopaphus* Westwood, 1859, *Baculum dolichocercatum* Bi & Wang, 1998 and *Baculum politum* Chen & He, 1997 to *Medauroidea* Zompro, 1999, *Dixippus hainanensis* Chen & He, 2002, *Dixippus huapingensis* Bi & Li, 1991, *Dixippus nigroantennatus* Chen & He, 2002, *Dixippus parvus* Chen & He, 2002 and *Entoria bobaiensis* Chen, 1986 to *Lonchodes* Gray, 1835, *Sipyloidea obivius* Chen & He, 1995 to *Sinophasma* Günther, 1940, *Paramyronides biconiferus* Bi, 1993, *Paramyronides leishanensis* Bi, 1992, *Lonchodes chinensis* Brunner v. Wattenwyl, 1907, *Lonchodes confucius* Westwood, 1859 and *Phasgania glabra* Günther, 1940 to *Phraortes* Stål, 1875, *Gratidia bituberculata* Redtenbacher, 1889 and *Leptynia xinganensis* Chen & He, 1993 to *Sceptrophasma* Brock & Seow-Choen, 2002, *Prosentoria bannaensis* Chen & He, 1997 to *Paraentoria* Chen & He, 1997, and *Mantis squeueston* Olivier, 1792 to *Phanocloidea* Zompro, 2002. *Acrophylla sichuanensis* Chen & He, 2001 remains of unknown generic assignment, but is shown to be not a member of the Australian genus *Acrophylla* Gray, 1835. Furthermore, as *Baculum* Saussure, 1861 is a neotropical genus and most Old World species previously attributed to this genus are now listed in *Ramulus* Saussure, 1861, all Chinese species described in *Baculum* Saussure are consequently transferred to *Ramulus* Saussure. Other changes of specific placements are based on published literature and concern the following three synonymies not recognized by Chinese workers: *Abrosoma* Redtenbacher, 1906 (= *Proseles* Uvarov, 1940), *Necroscia* Audinet-Serville, 1838 (= *Aruanoidea* Redtenbacher, 1908), *Lopaphus* Westwood, 1859 (= *Paramyronides* Redtenbacher, 1908). *Megalophasma* Bi, 1995 is transferred from Necrosciinae to Lonchodinae.

Four lectotypes are designated and three new specific synonyms revealed. A lectotype is designated for *Rhamphophasma modestus* Brunner von Wattenwyl, 1893, the type-species of *Rhamphophasma* Brunner von Wattenwyl, 1893, in order to fix this genus and species. The male paralectotype is shown to be a male of *Parapachymorpha nigra* Brunner von Wattenwyl, 1893, the type-species of *Parapachymorpha* Brunner von Wattenwyl, 1893. *Clitumnus porrectus* Brunner von Wattenwyl, 1907 is synonymised with *Bacillus ? artemis* Westwood, 1859 and a lectotype designated for the former (**n.syn.**). A lectotype is designated for *Oxyartes lamellatus*

Kirby, 1904 in order to fix this taxon and confirm the synonymy established by Dohrn, 1910 (= *Oxyartes honestus* Redtenbacher, 1908, = *Oxyartes spinosissimus* Carl, 1913). *Paracentema stephanus* Redtenbacher, 1908 is shown to have been erroneously synonymised with *Neohirasea japonica* (de Haan, 1842) and here synonymised with *Neohirasea maerens* (Brunner von Wattenwyl, 1907) (**n. syn.**). In order to fix this new synonymy a lectotype is designated for *Paracentema stephanus* Redtenbacher, 1908.

Finally, a biogeographic analysis of the Chinese phasmid fauna is presented. This includes brief background information on the topography and biogeography of China along with maps showing the seven zoogeographical subregions currently recognized as well as the 4 municipalities, 23 provinces, 5 autonomous regions and 2 special administrative regions of China. A summary of the taxonomic compilation of the fauna is provided and its relationships with neighbouring regions, of both the Palaearctic and Oriental realms, are discussed. A study is presented on the distribution of the taxa and species densities of each province / autonomous region. Recent ecological studies are summarized and list of the host plants of 42 different species attached. The pest status of certain species which have become of serious importance for agriculture in China is briefly summarized based on literary sources.

Henry, G.M. (2008) Stridulatie bij het Wandelend blad. *Phasma*, **18**(68): 22-23. [in Dutch].

A translation of Henry, G.M. (1922) Stridulation in the leaf insect. *Spolia Zeylanica*, **12**: 217-220. Stridulation appears to be little known among the Phasmidae. It is not mentioned in the Cambridge Natural History Museum account of this insect, and therefore the following account of a sound-producing organ in certain species of leaf-insects may be of interest.

Leeuwen, R. van (2007) Species report No. 13: *Eurycantha insularis* (Lucas). *Phasma*, **17**(67): 18. [in Dutch].

Eurycantha insularis is a nice species that has been in culture for a long time. It has previously been referred to as *Eurycantha coriacea* Redtenbacher.

Li, B.H. (1993) Phasmida. In: Fan, D. [Ed.]: *Forest insects in Shandong China*. China Forestry Publishing House: Beijing, China, pp. 20-22. [in Chinese]

Records five species of Phasmida: *Baculum* sp., *Paraclitumnus robinus* Cai, *Phraortes confucius* (Westwood), *Staelonchodes borealis* Cai, *Macella souchongia* (Westwood).

Liu S. & Cai, B. (1992) Phasmatodea: Phasmatidae and Heteronemidae. *Insects of the Hengduan Mountains Region*, **1**: 59-64. [in Chinese].

A report of the stick-insects collected by the Comprehensive Scientific Expedition to the Hengduan Mountains Region, Academia Sinica, during 1981-1983. Six: species are dealt with, belonging to 2 families, 3 genera, in which 5 species are new to Science. The new species are: *Baculum fusco-thoracicum*, *Baculum lineatum*, *Cnipsus apteris*, *Ramulus lanceus*, *Ramulus scalpratus*. All the type specimens are deposited in the Institute of Zoology, Academia Sinica.

Rabaey, K. (2007) Species report No. 12: *Extatosoma tiaratum* (Macleay, 1826) PSG 9. *Phasma*, **17**(67): 7-9. [in Dutch].

Because of its striking appearance, the Australian *Extatosoma tiaratum tiaratum* has become one of the most popular stick-insects bred in captivity. It is in established culture since 1960 and was originally introduced from North Queensland, Australia. As it is in culture for a long time already, it is necessary to introduce 'new blood'. In 2000 a new stock was imported from the Brisbane area and is hoped to strengthen the old European cultures. Descriptions of the adults, nymphs and eggs as well as brief information on the biology and breeding of *E. tiaratum tiaratum* are provided.

Rabaey, K. (2008) Species report No. 14: *Hemiplasta falcata* (Redtenbacher, 1908) (nieuw in cultuur). *Phasma*, **18**(68): 5-6. [in Dutch].

This species from Sulawesi has been collected by Daniel Dupont in 2007 on the Peleng Island. Arnaud and Christophe Bauduin brought them into culture. The female of this species was described by Redtenbacher in 1908 and later by Frank Hennemann. The male is described for the first time. Male, female and egg are illustrated with colour photographs.

Simoens, R. & Rabaey, K. (2008) Onze siertuin-voedselplantentuin. Deel 1: wintertijd. *Phasma*, **18**(68): 24-26. [in Dutch].

This article describes foodplants during wintertime, based on the authors' garden. Not only the value as food for phasmids is important, also the ornamental value is promoted. This article is the first of a series of four, representing the four seasons. Includes colour photographs of nine foodplants.

Tamayo Lorenzo, J. (2007) *Phenacephorus latifemur*: una nueva especie de la tribu Lonchodini de la isla de Borneo (Phasmatodea, Diapheromeridae, Lonchodinae). *Boletín Sociedad Entomológica Aragonesa*, **41**: 95–99. [in Spanish].

Phenacephorus latifemur, a new species of the tribe Lonchodini from the island of Borneo (Phasmatodea, Diapheromeridae, Lonchodinae). *Phenacephorus latifemur*, **sp.n.**, a stick insect from the island of Borneo (Malaysia), is described. The new species belongs to the group of *Phenacephorus cornucervi* (Brunner, 1907), characterized by the length of the mid femora, which are shorter than the combined length of the metanotum and median segment in females, and not longer than the same combined length in males. A key separating the new taxon from the most closely related species is included, as well as some comments on its biology.

Tamayo Lorenzo, J. (2008) *Phenacephorus latifemur*: een nieuwe soort uit Borneo van de tribus Lonchodini (Phasmatodea: Diapheromeridae: Lonchodinae). *Phasma*, **18**(68): 13-17. [in Dutch]

A Dutch translation of Tamayo Lorenzo, J. (2007) – see abstract above.

Zhou, W.B. (1997) A new species of the genus *Baculum* from China (Phasmida: Phasmatidae). *Wuyi Science Journal*, **13**: 6-7. [in Chinese].

The paper deals with a new species of the genus *Baculum* Saussure, collected from Tiantaistian, Zhejiang province, China. The type specimen of *Baculum tiantaiensis* **n.sp.** is deposited in Zhejiang Museum of Natural History.

Erratum

In the biography of Klaus Günther (Bragg, P.E. & Zompro, O. (2007) Biographies of Phasmatologists – 6. Klaus Günther. *Phasmid Studies*, **16**(2): 25-33), the authors referred to Hildegard Kaufhold as Günther's second wife (on page 25, second and fourth paragraphs). She was his first wife. The authors are grateful to Michael Schmitt for drawing their attention to this error.

Further information about Günther, including several photographs, is available at: http://www.zfmk.de/web/Forschung/Abteilungen/Entomologie/Coleoptera/Projekte/Wissenschaftsgeschichte/Klaus_Gnther/index.de.html

Biographies of Phasmatologists – 9. Morgan Hebard.

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Abstract

Morgan Hebard (1887-1946) came from a very wealthy American family and was able to devote his life to the study of Orthoptera. He built up a huge collection of orthopteroid insects at the Academy of Natural Sciences of Philadelphia. He described over 800 new species of orthopteroids; this included 44 new species, and ten new genera of phasmids. His life and phasmid work is outlined.

Key words

Phasmida, Phasmatologist, Morgan Hebard, Biography, Academy of Natural Sciences of Philadelphia.

Morgan Hebard (1887-1946)

Morgan Hebard was born on 23rd February 1887 in Cleveland, Ohio, USA. His forename came from his maternal grandfather, David Morgan, a Welshman who emigrated to the USA as a young man and made his fortune in the iron and steel industry. His father, Charles Samuel Hebard, came from a wealthy, well-connected American family and had a Congressman as a grandfather; the family fortune was grounded in the lumber trade.

His early interest in entomology was Lepidoptera, an interest that developed as he encountered different species in various parts of the country. The family had their main home in Philadelphia, but also had a winter home in Georgia, and a summer home in Michigan; in addition they spent several weeks per year in Florida. He was privately tutored until the age of 17 when he went to Asheville School in North Carolina, followed by Yale University from where he graduated in 1910.

He first met James Abram Garfield Rehn in 1903 when he was identifying some of his Lepidoptera at Philadelphia Museum; at the time Rehn was a student working on Orthoptera in the museum. Encouraged by Rehn, Hebard developed an interest in Orthoptera (including cockroaches, mantids, and phasmids) and Dermaptera and they wrote their first joint paper on Orthoptera that they found in Georgia and Florida (Rehn & Hebard, 1905).

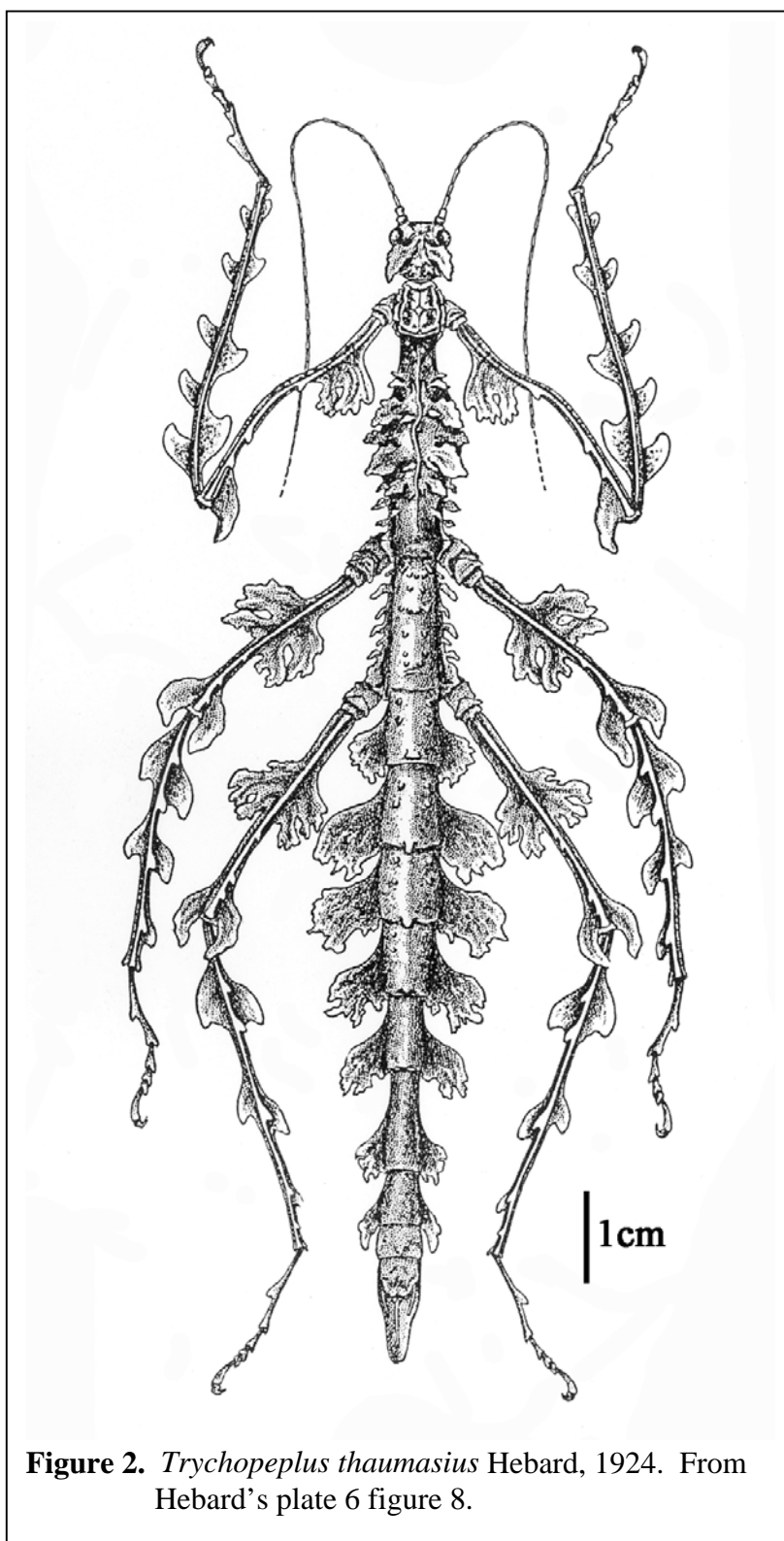
After graduating from Yale, Hebard worked in the banking industry for a year; thereafter he devoted his time to entomology. Hebard and Rehn had a long-term aim of producing a monograph of North American Orthoptera. To this end Hebard financed fifteen years of field trips lasting from six weeks to three months for himself and Rehn, they amassed over 100,000 specimens of Orthoptera. In addition they made trips to Jamaica, Panama and Colombia; Hebard also visited Cuba and the Bahamas, and in his University vacations he had twice visited Europe. From the outset Hebard was developing the Hebard Collection, which was maintained in the Philadelphia Museum and was formally transferred to the museum in 1945. To supplement his own collecting Hebard purchased collections of material from many parts of the world, particularly Central and South America, and one particularly large collection from the Philippines.

At Yale Hebard was in the shotgun team, and was also said to be a good shot with both rifle and revolver. In 1913 Hebard married Margaret Claxton and they had two sons and a daughter. In the First World War he became a lieutenant in the Signal Corps and later



Figure 1. Morgan Hebard.

transferred to Military Intelligence, all his time in the army was served in the USA. In his 40s Hebard developed severe arthritis that restricted his movement and limited his entomological work. He was Curator of Insects at the Academy of Natural Sciences of Philadelphia for several years but did not accept any payment for the post.



Hebard wrote 197 papers on Orthoptera and Dermaptera, either on his own or with Rehn. The publications listed at the end of this biography are restricted to papers that deal

with phasmids or are specifically mentioned for other reasons; some publications that only record known species from a new area have been omitted.

Hebard was particularly interested in cockroaches, but also did work on other orthopteroids from many parts of the world. The Hebard Collection of Orthoptera grew to about 250,000 specimens by the time he formally transferred it to the Academy of Natural Sciences of Philadelphia in 1945. It filled 2400 cabinet drawers and included over 3000 type specimens of species he had either described, or purchased from other collections, or exchanged.

Morgan Hebard died at the age of 59 in Philadelphia from a heart attack on 28th December 1946. An extensive obituary was published by his friend and colleague J.A.G. Rehn (1948).

Genera and species named after Hebard

Morgan Hebard was involved in the descriptions of about 800 species of orthopteroids, so it is not surprising that 40 orthopteroid species have been named after him; but only one is a phasmid. The following list gives an idea of the scope of these names.

Phasmid: *Ilocano hebaridi* Rehn & Rehn, 1938.

Mantids: Three species, and two genera: *Hebardia* Werner, 1921 & *Hebaridiella* Werner, 1924.

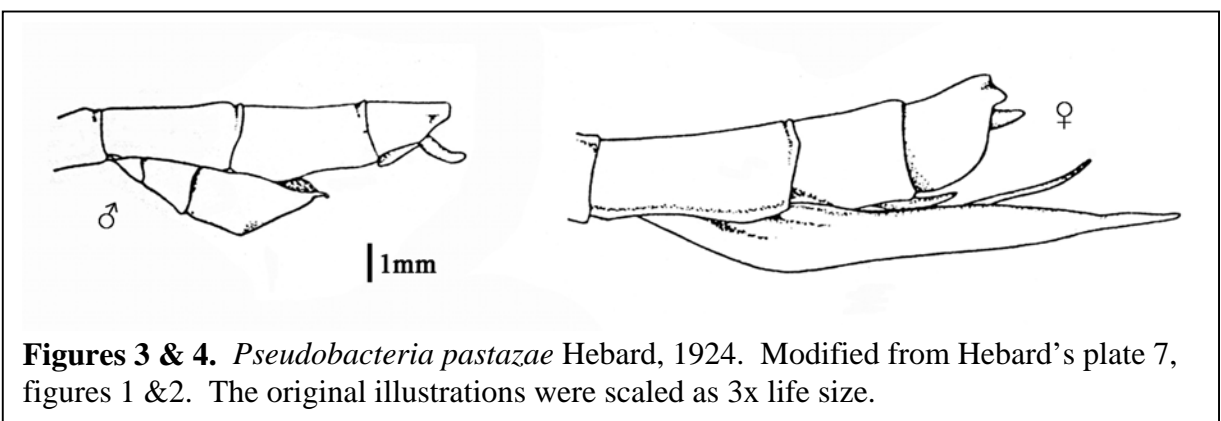
Cockroaches: Eight species, and four genera: *Hebardina* Bei-Bienko, 1938, *Hebardula* Uvarov, 1939, *Euhebardula* Princis, 1953 (a replacement name for *Hebardula* Princis, 1950).

Orthoptera: 28 species, three genera: *Hebardacris* Rehn, 1952, *Hebardiniella* Chopard, 1932, (emendation of *Hebardinella* Chopard, 1932), *Hebarditettix* Günther, 1938.

Phasmid work

Hebard described 44 new species on his own and nine as co-author with J.A.G. Rehn. He described six new genera on his own and four as co-author with Rehn. Although he worked on Orthoptera from many parts of the world, all his new species of phasmids are from North, Central, or South America.

In his first paper to deal with phasmids Hebard was highly critical of Brunner (1907) & Redtenbacher's (1906 & 1908) work: "It is indeed deplorable that, with so many species before them, these authors have made virtually no effort to study and discuss these problems in a scholarly and scientific manner" (Hebard, 1919: 158); "As a whole, we can definitely state that the *Insektenfamilie der Phasmiden* is the greatest retrograde step made in recent years, away from true scientific study of the order Orthoptera" (Hebard, 1919: 159). He later remarks "It did not seem possible that so pretentious a work, could actually be so carelessly executed, superficial and unsatisfactory" (Hebard, 1919: 162).



Figures 3 & 4. *Pseudobacteria pastazae* Hebard, 1924. Modified from Hebard's plate 7, figures 1 & 2. The original illustrations were scaled as 3x life size.

Hebard also criticises the scarcity of illustrations in Brunner & Redtenbacher's monograph. All but two of the new species described by Hebard were illustrated (the exceptions: *Dyme carrikeri* Hebard, 1919 and *Anisomorpha monstrosa* Hebard, 1932). However, many of Hebard's illustrations consist of only one view of the apex of the abdomen; as such, they are useful for distinguishing species, but only when one has already decided to which genus the specimen belongs. For *Isogoras chocoensis* Hebard, 1921 the only illustration is a single fore-wing (fig 5). His illustrations were usually printed with the size indicated in the caption e.g. "life size", or "3x" etc. (figs 3 & 4), or occasionally "much enlarged" (fig 7). Where I have reproduced examples of his illustrations in this paper I have added scale lines to those for which he gave a precise magnification.

Hebard's work is a significant and valuable contribution to our knowledge of New World phasmids.

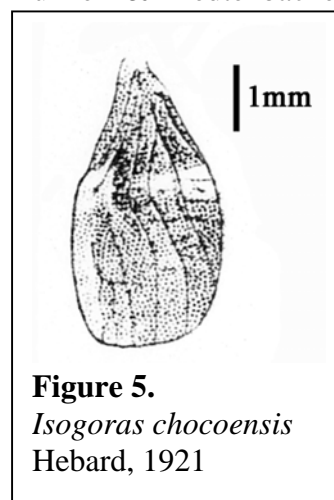


Figure 5.
Isogoras chocoensis
Hebard, 1921

Lists of genera, species and subspecies described by Hebard

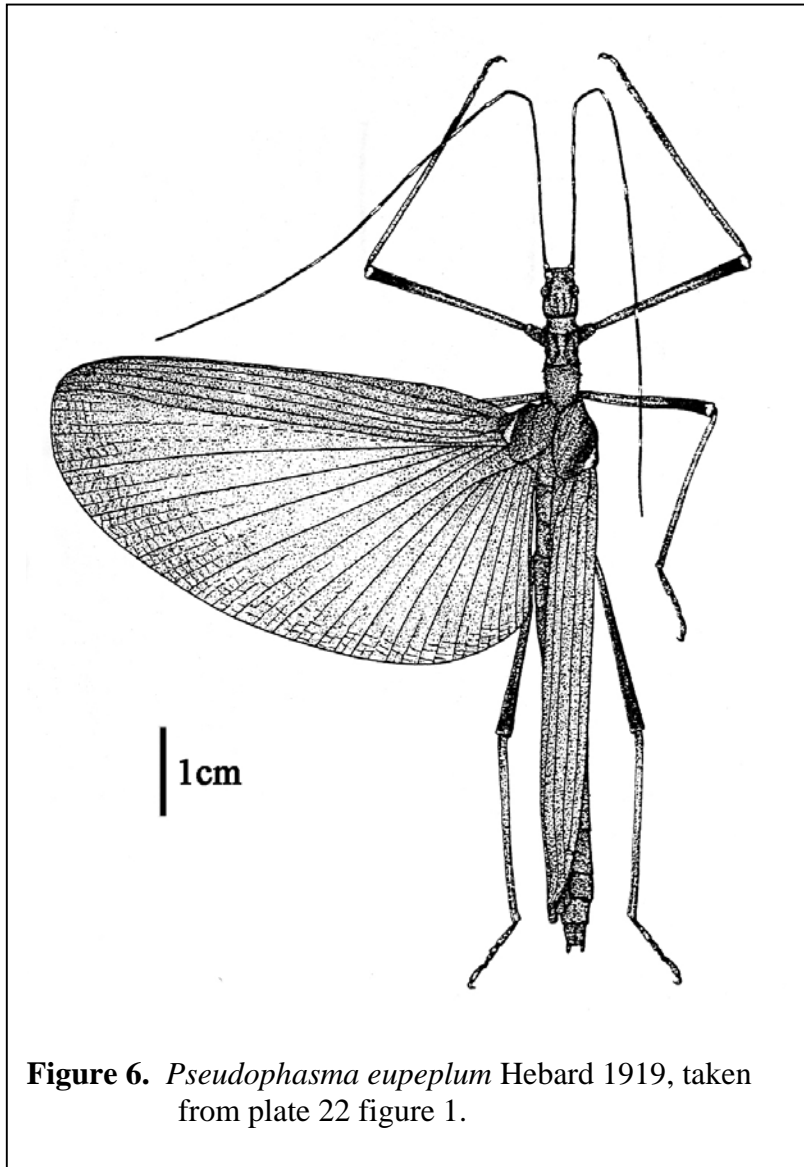
New genera (in alphabetical order)

- Acanthometriotes*Hebard, 1924: 139.
- Aploploides*.....Rehn & Hebard, 1938: 49.
- Brachyelena*Hebard, 1933a: 31.
- Ceratites*Rehn & Hebard, 1909: 126.
- Holcoides*Hebard, 1919: 148.
- Libethroidea*Hebard, 1919: 170.
- Litosemyle*Hebard, 1919: 171.
- Manomera*Rehn & Hebard, 1907: 283.
- Pseudoceroys*Hebard, 1922b: 354.
- Rhabdoceratites*Rehn & Hebard, 1912a: 232.

New species described by Hebard alone

Hebard, 1919

- apolinari* (*Bacteria*) 161, pl. 19.10, 19.11.
- atrata* (*Anisomorpha*)145, pl. 20.6.
- carrikeri* (*Acanthoclona*) 143, pl. 20.4 & 20.5.
- carrikeri* (*Dyme*) 174.
- colombiae* (*Bostra*) 159, pl. 22.5 & 22.6.
- cortex* (*Planudes*) 155, pl. 22.2, 22.3 & 22.4.
- eupeplum* (*Pseudophasma*)152, pl. 22.1.
- forceps* (*Holcoides*) 148, pl. 21.2, 21.3 & 21.4.
- insalubris* (*Libethra*)166, pl. 23.3.
- inusitata* (*Libethroidea*) 170, pl. 23.7 & 23.8.
- ocanae* (*Litosemyle*) 172, pl. 23.9 & 23.10.
- robustum* (*Pseudophasma*)151, pl. 21.6.
- spinicollis* (*Libethra*) 164, pl. 23.1 & 23.2.
- strangulata* (*Acanthoclona*) .. 141, pl. 20.1, 20.2 & 20.
- taeniatum* (*Pseudophasma*)150, pl. 21.5.
- viridis* (*Stratocles*)146, pl. 21.1.



Hebard, 1920

chumash (*Timema*) 130, figs 2.

Hebard, 1921

chocoensis (*Isagoras*) 164, pl. 9.27.

Hebard, 1922a

erythropleura (*Diapheromera*) 192, pl. 7.12-14

Hebard, 1922b

annulicornis (*Brizoides*) 348, pl. 14.1 & 14.2.

ariadne (*Prisopus*) 352, pl. 14.3-8.

harroweri (*Pseudoceroys*) 355, pl. 15.1& 15.2.

panamae (*Libethra*) 356, pl. 14.9 & 15.3-4.

Hebard, 1924

- annulicornis* (Dyme) 145, pl. 6.6 & 6.7.
camposi (Libethra) 143, pl. 6.3-5.
crassus (Acanthometriotes) 139, pl. 5.17.
esmeraldas (Pseudophasma) 136, pl. 5.15 & 5.15.
infumata (Holca) 135, pl. 5.13.
pastazae (Pseudobacteria) 150, pl. 7.1-3.
spicatus (Paraprisopus) 141, pl. 6.1.
thumasius (Trychopeplus) 148, pl. 6.8 & 6.9.

Hebard, 1932

- monstrosa* (Anisomorpha) 214.
oaxacae (Heteronemia) 217, pl. 17.1-3.

Hebard, 1933a

- apolinari* (Isagoras) 37, pl. 2.10-11.
chopardi (Isagoras) 37, pl. 2.13.
ecuadoricus (Isagoras) 37, pl. 2.12.
flavidum (Pseudophasma) 33, pl. 2.9.
hirsuta (Brachyelena) 32, pl. 2.8.
metae (Libethra) 39, pl. 3.3.
straminea (Libethra) 38, pl. 3.2.

Hebard, 1933b

- magnifica* (Dyme) 123, pl. 6.7 & 6.8.

Hebard, 1934

- torquata* (Diapheromera) 281, pl. 20.1-3.
hesperus (Parabacillus) 286, pl. 20.5-6.

Hebard, 1937

- ritensis* (Timema) 349, pl. 21.1.
velii eucnemis (Diapheromera) [ssp.] ... 350, pl. 22.1-2.

Rehn & Hebard, 1909

- covilleae* (Diapheromera) 126, fig. 5.
tenuis (Pseudosermyle) 121, figs. 2-4.

Rehn & Hebard, 1914

- brachypyga* (Manomera) 385, fig. 2 & 4.

Rehn & Hebard, 1938

- stenocephalum* (Aploploides) 49, pl. 4.18-21.
annulipes (Clonistria) 47, pl. 3.12 & 3.13.
bicoloripes (Clonistria) 43, pl. 3.7, 3.8 & 3.9.
latebricola (Clonistria) 42, pl. 3.5 & 3.6.
monticola (Clonistria) 45, pl. 3.10 & 3.11.
dominicæ (Lamponius) 38, pl. 3.3 & 3.4.

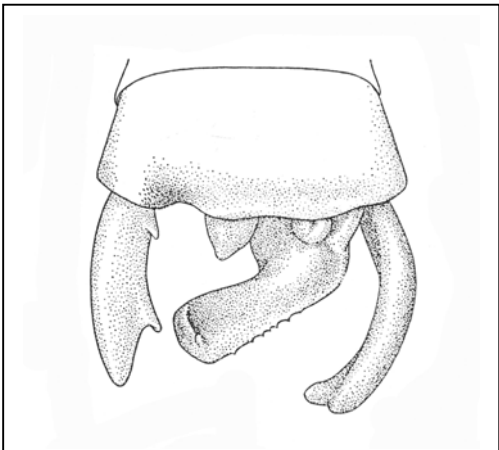


Figure 7.
Timema ritensis Hebard, 1937
 plate 21 figure1 – scale given by
 Hebard as “much enlarged”.

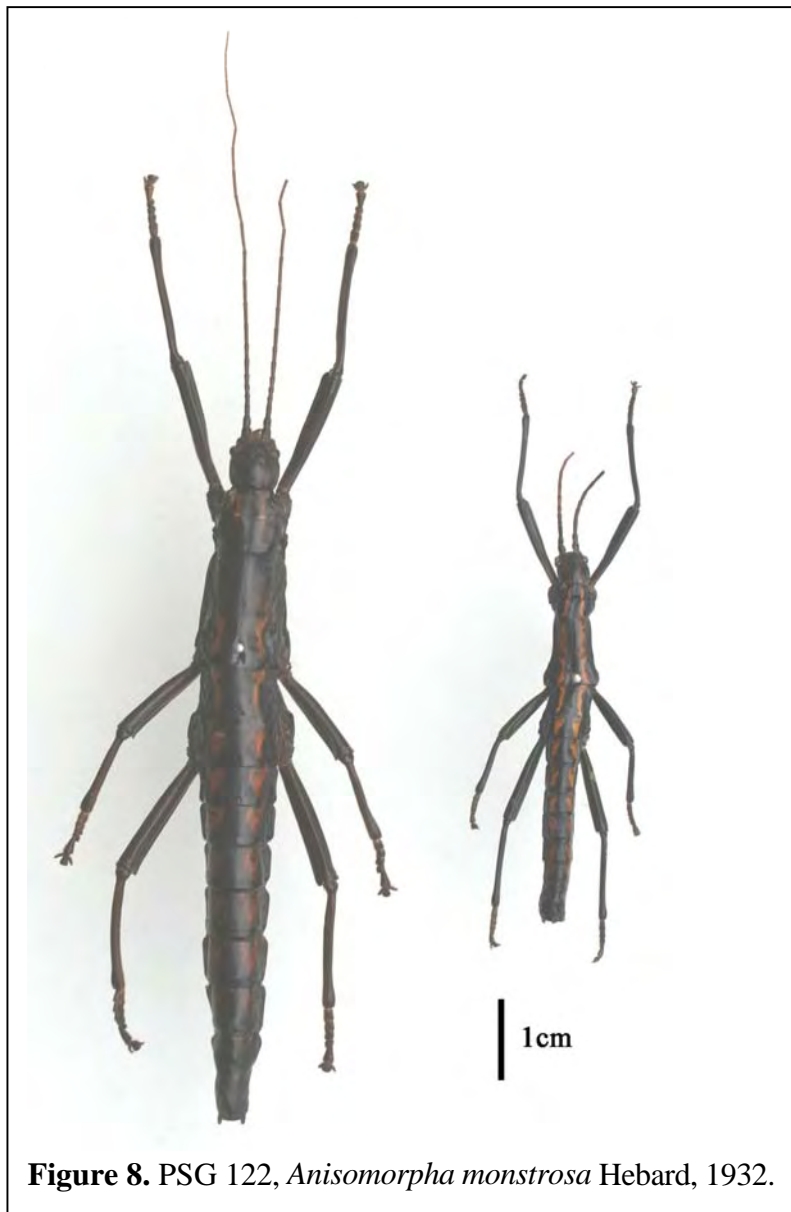


Figure 8. PSG 122, *Anisomorpha monstrosa* Hebard, 1932.

Species in culture

Two species described by Hebard are listed on the Phasmid Study Group's culture list. One of these, PSG 98 *Parabacillus hesperus* Hebard, 1934 has not been in culture for many years; it may never have been in culture: in the early days of the PSG species were allocated a number when they were being maintained in captivity, before it was known if they would breed successfully. The other culture is PSG 122, *Anisomorpha monstrosa* Hebard, 1932; this is a junior synonym of *Anisomorpha paromalus* (Westwood, 1859) but it was being reared under Hebard's name for several years before the synonym was recognised.

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A spectacular new species of *Ophicrania* Kaup, 1871, from Mindanao, Philippines (Phasmatodea, Phasmatidae, Platycraninae).

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Abstract

A new species of *Ophicrania* Kaup, *Ophicrania sagittarius* n. sp. from Mindanao Philippines as well as its eggs are described and illustrated for the first time together with notes on the food plant and habitat. The species differs from all other species in the genus by the striking colour and the absence of wings.

Key words

Ophicrania sagittarius n. sp., Platycraninae, Philippines, Mindanao, Mount Apo, Pandanus.

Introduction

Species belonging to the tribe of the Platycranini are only rarely found, this is mainly due to their arboreal way of life and the close relation with their food plant where they blend in perfectly. Recently a revision of the genus *Megacrania* Kaup, 1871 was published (Hsiung, 2007), a revision at species level of the genus *Ophicrania* is desperately required as well. The last time a new *Ophicrania* species was described, was by Brock in 1999 and like many other *Ophicrania* species, it is only known from one sex. The last description based on both sexes was by Günther in 1937 but Günther misplaced this species, as well as *Ophicrania meridionalis* Günther, 1932. The correct names should be *Graeffea leverii* (Günther, 1937) **comb. n.** and *Graeffea meridionalis* (Günther, 1932) **comb. n.**

The first *Ophicrania* egg was described as early as 1871 by Kaup, the founder of ootaxonomy. Kaup stated: “Dieses Ei ist das sonderbarste, welches ich kenne, und, trägt mich mein Schlufs nicht das alle Eier von einem und demselben Genus sich in der allgemeinen Form ähnlich sehen müssen” [This egg is the most peculiar egg that I know, and, unless I am very much mistaken, eggs belonging to a same genus have to look alike in shape]. Indeed, as Kaup stated, all *Ophicrania* eggs look alike and can be distinguished by the clear median line from *Megacrania* Kaup, 1871 (Sellick, 1997).

Including this new species, 19 species of *Ophicrania* are known at present. Nine species occur in the Philippines.

Checklist of Philippine species belonging to *Ophicrania*

Below an alphabetical list of *Ophicrania* species so far recorded from the Philippine Islands is presented. The known distribution given is based on literature sources (Bruner, 1915; Otte & Brock, 2005) and collection of the authors. Many species are only known from one locality and many of the localities aren't detailed. Most of the time only the island or just Philippines is mentioned on the labels.

1. *Ophicrania brunni* (Redtenbacher, 1908: 378) [Arrhidaeus]
[Samar: Palapa]
2. *Ophicrania nigricornis* (Stål, 1877: 41) [Arrhidaeus]
[Philippine Islands]*
3. *Ophicrania nigroplagiatus* (Redtenbacher, 1908: 376) [Arrhidaeus]
[Luzon]
4. *Ophicrania nigrotaeniatus* (Redtenbacher, 1908: 377) [Arrhidaeus]
[Luzon: Valle de Bulusan]
5. *Ophicrania palinurus* (Westwood, 1859: 135 pl. 2: 6) [Necroscia]
[Luzon: Quezon National Park]
6. *Ophicrania sagittarius* sp. n.
[Mindanao: Mount Apo, Tampakan]

7. *Ophicrania stygius* (Westwood, 1859: 192 pl. 2: 3) [Necroschia]
= *Ophicrania stali* (Kirby, 1896: 741) [Arrhidaeus]
[Albay, N.E. Luzon]
8. *Ophicrania vittipennis* (Stål, 1875: 85) [Arrhidaeus]
[Luzon]
9. *Ophicrania viridinervis* (Stål, 1875: 85, pl. 17: 2) [Arrhidaeus]
[Luzon: Sierra Madre]

* Bragg (2001) also recorded this species from Sabah and Sarawak, but the material was badly damaged so there are doubts whether this is really the same species.

Abbreviations used :

BMNH: British Museum of Natural History, London, England.

IRSNB: Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium.

JB: private collection Joachim Bresseel, Meise, Belgium.

MB: private collection Mark Bushell, Wiltshire, England.

MG: private collection Marco Gottardo, Ferrara, Italy.

HT: holotype.

PT: paratype.

SMI: Sagittarius mines inc.

Ophicrania sagittarius n. sp.

Material

HT, ♂ : Philippines, Mindanao, Mount Apo, Lake Agko, 16.III.2008, ex coll. JB (IRSNB)

PT [2 ♂♂, 1 ♀, 1 egg]: ♀ Philippines, Mindanao, Mount Apo, Lake Agko, 16.III.2008, ex coll. JB (IRSNB); ♂ Philippines, Mindanao, Mount Apo, Lake Agko, 16.III.2008, ex coll. JB (BMNH); 1 egg Philippines, Mindanao, Mount Apo, Lake Agko, III.2008, ex collection MB (IRSNB); ♂ Philippines, Mindanao Island, Mt. Apo, 1300 m, 27.III-10.IV.2006, leg. R. Cabale, collection MG



Figure 1. Male holotype mating with female paratype.

Diagnosis

Atypical *Ophicrania* species because it lacks wings in which it differs from the type species *Ophicrania striaticollis* Kaup, 1871 as well as by its smaller size and striking colours.

The most closely related species appears to be *Ophicrania apterus* (Redtenbacher, 1908) from Papua New Guinea. Only the female is known of this species. Although its name suggests the total lack of wings, it still possesses small scale-like tegmina. All the types of *O. apterus* (Redtenbacher, 1908) are lost, but the authors examined a specimen out of the collection of Frank H. Hennemann. *O. apterus* is differently coloured: a white dorsal longitudinal line

reaching from head till the end of the abdomen.

The most closely related Philippine species is *Ophicrania nigricornis* (Stål, 1877). The female has developed tegmina, but the alae are not visible. The male is fully winged. Heads and bodies of both sexes are coloured orange and black.

Furthermore this is the first *Ophicrania* species described that occurs with certainty on the island of Mindanao and with both sexes completely wingless.

Etymology

This species is named after the Sagittarius Mines, Inc. (SMI) for their efforts to study and breed stick insects in their field trials (Tampakan, Mindanao, Philippines) and create environmental and biodiversity awareness within the community.

Description

All colouration taken from photographs of live specimens.

Male (figs. 1-5 & 11)

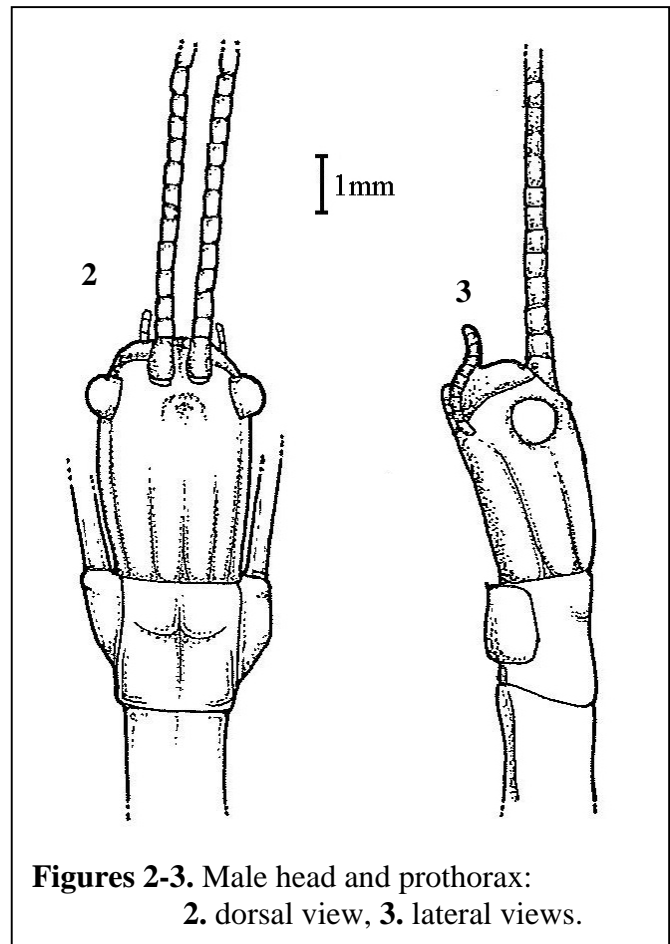
Whole body with a shiny appearance and wingless. Measurements see table 1.

Head: Much longer than wide, uniformly deep blue-green, with a raised oval area between the eyes. Mouthparts orange. Antennae orange and consisting of 20 segments. Scapus flattened, pedicellus short and almost spherical. Following segments slightly setose. Third segment as long as scapus and pedicellus combined. Segment IV as long as third, then gradually becoming longer until segment XIII, segment XIV-XVII again shorter. Last segment again longer with a darker end.

Thorax: Completely shiny orange and smooth. Prothorax shorter than head, pronotum with a median transverse groove. Mesothorax longer than head and prothorax combined. Cylindrical in cross section, smallest diameter in the centre. Metathorax short with a lateral raised area which reaches the metacoxae.

Legs: Greenish- blue with a setose ventral area, carinae indistinct.

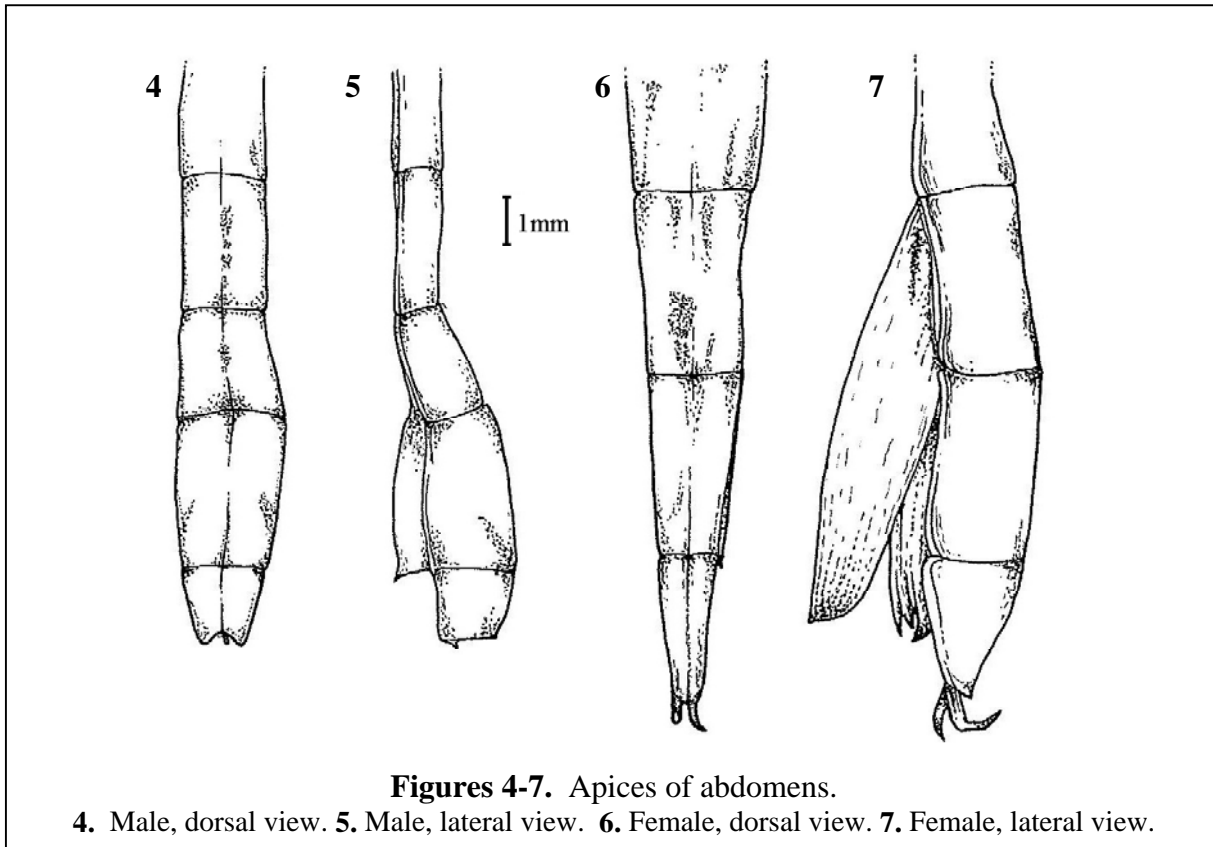
Profemora curved and compressed basally. Ventral part bearing two small spines; one apically and one subapically. Mesofemora as profemora, but shorter and ventral spines more distinct. Metafemora with three spines, the first one not as distinct as the two following. Tibia compressed laterally and with a spine at the apex. Tarsomeres greenish- blue with orange colouration at apexes, pretarsus dark orange. Probasitarsus very long, longer than all tarsomeres combined. Third tarsomere about two thirds as long as second. Fourth tarsomere very short. Fifth tarsomere widened latero- apical. Meso- & metaprobasisitarsus about as long as following tarsomeres. Basisitarsi and all tarsomeres with a very small spine at the apex.



Figures 2-3. Male head and prothorax:
2. dorsal view, 3. lateral views.

Claws curved, arolia large reaching the end of the claws.

Abdomen: Same colouration as thorax. Median segment smooth and separated from thorax by a transverse depression at the end of the metanotum and by lateral ridges. Segment II about one third longer than median segment. Segment II-VI more or less from the same length. Segment VII a bit shorter than preceding segments. Segment VIII – X with a distinct ridge dorso- medially. Segment VIII half as long as segment VII, segment IX slightly longer than VIII and segment X shorter again with apically a short division postero- medially. Cerci short, slightly exceeding the last segment. Poculum rounded with a carina ventro- medially.



Female (figs. 1, 6-10)

Differently coloured and broader body than in male, the specimen has lost much of its original colouration during preservation. Measurements see table 1.

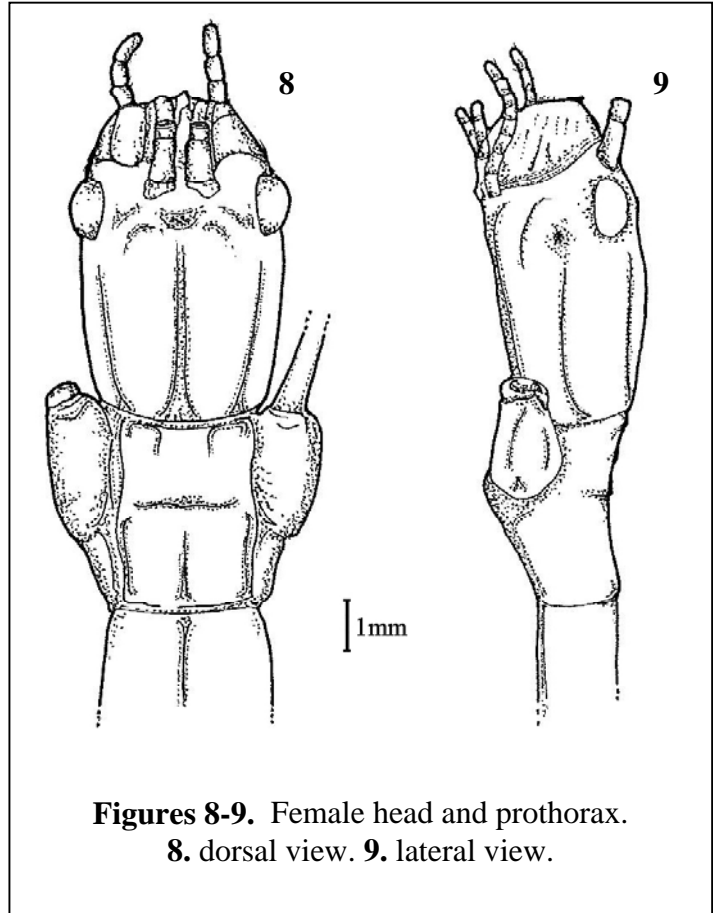
Head: Typically for the subfamily very large, colour deep blue-green with black cheeks. Anterior half of head a slightly darker green-blue. Mouth-parts orange. Eyes orange with a raised oval area between the eyes and a depression posterior and anterior of this area. Vertex possessing three longitudinal depressions. One median depression reaching from the raised oval area between the eyes till the start of the pronotum. Two other depressions, each starting at the posterior side of the eye and ending at the sides of the pronotum. The cheeks possess a pseudoforamen under the posterior side of the eye, just above the lateral black markings. Antennae broken but examined before damage. Antennae orange, a bit longer than head and prothorax combined, consisting of scapus, pedicellus and 19 following segments. Scapus flattened, pedicellus short and almost spherical. Following segments slightly setose. First segment about as long as scapus. Segment II & III decreasing length, segments IV-VII increasing again in length. After segment VII gradually reducing in size till segment XVIII,

last segment as long as segment XVII & XVIII combined.

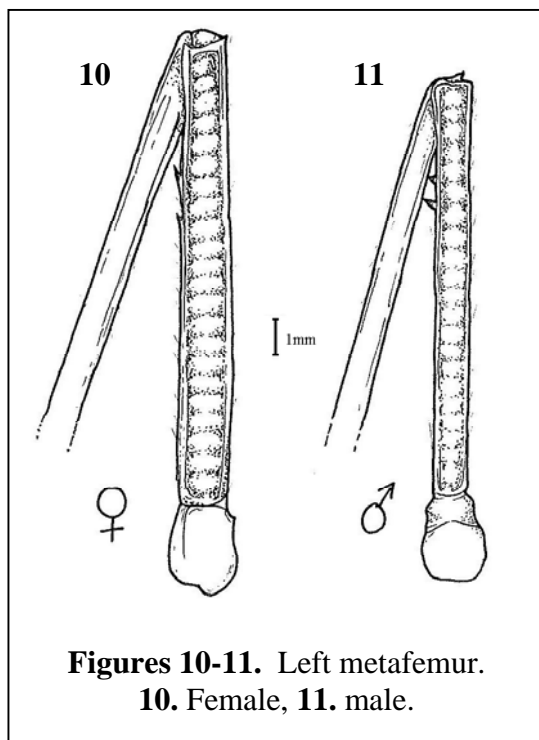
Thorax: Dorsal surface of thorax blue-green with orange longitudinal markings on metanotum. Edges of all dorsal segments orange. Ventral surface uniform orange. Prothorax shorter than head, pronotum with a median transverse and longitudinal groove forming a cross. Mesothorax smooth and about four thirds the length of the head and prothorax combined. Cylindrical in cross section, smallest diameter in the centre. Metanotum about as long as pronotum with a lateral raised area that reaches the metacoxae.

Legs: Greenish-blue with small scattered patches of blue-black and with a setose ventral area, carinae unlike male distinct but unarmed. Apexes of all leg segments with small area of orange colouration. Only one foreleg present. Profemur compressed and curved basally, almost triangular in cross-section, bearing one small spine subapically. Mesofemora shorter, bearing three successive spines subapically. Metafemora reaching the end of abdominal segment V, bearing four successive spines subapically. Tibia all unarmed. Probasitarsus very long, longer than all tarsomeres combined. Basitarsi and all tarsomeres with a very small spine at the apex. Tarsomeres gradually reducing in size. Claws curved, arolia large reaching the end of the claws.

Abdomen: Deep blue-green with orange-brown mark on dorsal surface of abdominal segment VIII. Edges of all dorsal segments with orange edges. Ventral surface of abdomen uniform orange with connecting tissue between dorsal and ventral plates a slightly darker orange. Median segment a bit longer than metanotum. Separated from the thorax by a transverse depression at the end of the metanotum and by lateral ridges. Segment II about one third longer than median segment. Segment II-VII more or less from the same length. Segment VIII slightly shorter than segment VII and segment IX slightly longer than segment VII. Segment X with a dorsomedial ring and rounded posteriorly. Cerci orange and about as long as last segment. Operculum not passing last segment, with a black pit on both sides anteriorly. Praeopercular organ indistinct.



Figures 8-9. Female head and prothorax.
8. dorsal view. 9. lateral view.



Figures 10-11. Left metafemur.
10. Female, 11. male.

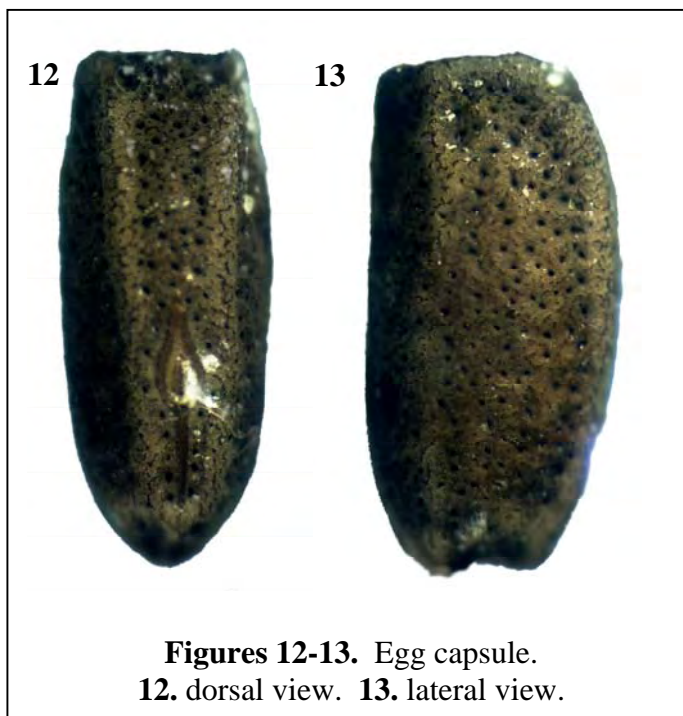
<i>Ophicrania sagittarius</i>	HT, ♂ (IRSNB)	PT, ♂ (BMNH & MG)	PT, ♀ (IRSNB)
Body:	52.9	41.2 – 51.8	69.8
Head:	4.4	4.4 – 4.5	7.1
Pronotum:	3.0	2.8 – 2.9	3.8
Mesonotum:	11.2	10.4 – 10.6	14.2
Metanotum:	2.8	2.7 – 3.0	3.5
Median segment:	2.8	2.6 – 2.9	4.2
Profemora:	19.7	18.4 – 19.0	23.6
Mesofemora:	11.2	10.0 – 10.9	13.3
Metafemora:	15.2	14.3 – 14.9	17.0
Protibiae:	20.4	18.8 – 19.2	25.3
Mesotibia	11.0	10.3 -10.5	13.5
Metatibia	15.1	14.0 -15.2	17.0
Antennae:	16*	17.8 – 18.3	/

Table 1: measurements of *Ophicrania sagittarius* sp. n. [mm]. *few segments missing.

Eggs (fig. 12-13)

Description: Capitulum missing but conical like as in other *Ophicrania* species. Capsule also typical for the genus, laterally compressed and pitted all over the surface. Posterior part of ventral and dorsal side elevated, forming a ‘split’ polar area with an impression in the centre from lateral perspective. General colouration of capsule greyish to brown.

Micropylar plate small and shaped in the form of a raindrop, with in its centre a slightly elevated area. Micropylar cup present and slightly elevated. Micropylar plate coloured like capsule, except for the outer margin, the median line and the central region which are reddish brown.



Figures 12-13. Egg capsule.
12. dorsal view. **13.** lateral view.

Measurements (without capitulum): width 2mm; height: 2,1mm; length: 4,6mm.

Comments

The type specimens were found at Lake Agko Campsite, Mt. Apo, Mindanao, although they have also been found in Tampakan during field trials (pers. comm. B. Mabanta). The area is highland secondary rainforest with a large amount of biodiversity. When initially handled the insects produced a milky fluid from defensive glands located in the front corners of the prothorax. The scent of this fluid was reminiscent of peppermint, very similar to a number of *Megacrania* spp. The insects were in plain view on the upper surface of the leaves. The

combination of their bright colour with the defensive fluid produced, would suggest that this is a very effective deterrent against potential predators.

This species was found high up on pandan trees (*Pandanus* sp.; Pandanaceae); because of the considerable damage to these trees, it is probably their only foodplant. It is the first record of a species not belonging to the genus *Megacrania* that is found to feed on *Pandanus*. Recently, damage to pandan plants due to stick insects was reported from Panay island: unfortunately the specimens collected in Panay were lost, but a specimen from Bohol was identified “most probably” as *Megacrania batesii* Kirby, 1896 (Lit & Eusebio, 2008). Although according to Hsiung (2007) *Megacrania alpheus* (Westwood, 1859) is also present in the Philippines and the type locality (Ceylon) is probably in error.

Acknowledgements

Special thanks go out to Benjie Mabanta (Manila, Philippines) for making research on the Philippine Phasmatodea possible. Thanks to Ellen Caluwé (Londerzeel, Belgium) for accompanying and assisting the authors. Marco Gottardo (Ferrara, Italy) is thanked for providing measurements and data of his specimen. Thanks are due to Efren O. Sarmiento (Tampakan, Philippines), Claire Dacanay (Tampakan, Philippines), Jose Sebua (General Santos, Philippines) and Sagittarius Mines Inc. (SMI) for their help in Mindanao. Dr. Phil E. Bragg (Nottinghamshire, England) and Frank H. Hennemann (Kaiserslautern, Germany) are thanked for providing necessary literature, comments and data.

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Reviews and Abstracts.

Phasmid Abstracts

The following abstracts briefly summarise articles that have recently appeared in other publications, or articles published since 1992 that have only recently come to the attention of the editor. 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.

Note on *Phasma* numbers 69 & 70. Numbers 69 and 70 of *Phasma* were both marked “nummer 69” and both were dated “juni 2008”. Volume 70 was published in August 2008 and had a photograph of *Phenacephorus sepilokensis* on the cover. In the abstracts below 70 is used for the second issue that was numbered 69.

Bote, H. (2008) Die Stabschrecke *Pharnacia ponderosa* Stål, 1877 – Haltung und Zucht. *Arthropoda*, **16**(2) 12-13. [in German]

Discusses rearing and breeding *Pharnacia ponderosa* Stål. The male, female, egg, and spermatophore are illustrated.

Bragg, P.E. (2008) The first description of the male and egg of *Syringodes rubicundus* (de Haan, 1842) (Phasmida: Diapheromeridae: Necrosiinae). *Zoologische Mededelingen Leiden*, **82**(24): 255-260.

The female of *Syringodes rubicundus* (de Haan, 1842) from Borneo is redescribed, and the egg and male are described and illustrated for the first time.

Bragg, P.E. & Zompro, O. (2008) Biografie van phasmatologen: Klaus Günther. *Phasma*, **18**(69) 14-19. [in Dutch].

Klaus Günther (1907–1975) was a prolific phasmid taxonomist. His life and phasmid work is outlined. He described 24 new genera and 146 new species or subspecies of Phasmida and illustrated most of those species. His arrangement of the families, subfamilies and tribes of phasmids (1953) remained almost unchanged for 50 years. [This is a Dutch translation of Bragg P.E. & Zompro, O. (2007) Biographies of Phasmatologists - 6. Klaus Günther. *Phasmid Studies*, **16**(2): 25-33.]

Brock, P.D., Hennemann, F.H. & Morgan, B. (2008) *Acanthomenexenus* Brock & Hennemann, a new genus of stick insect, following discovery of the stunning male of *Menexenus polyacanthus* from Sangihe (Phasmida: Diapheromeridae: Lonchodinae). *Le bulletin d'Arthropoda*, **36**: 3-15.

Variation in the female of *Menexenus polyacanthus* Dohrn, 1910 (Diapheromeridae: Lonchodinae) from Sangihe is commented on, and the egg and spectacular male are described and illustrated for the first time. This has resulted in transfer to a new genus *Acanthomenexenus*, where it is proposed that several former *Menexenus* species from Sulawesi belong.

Buckley, T.R., Attanayake, D. & Bradler, S. (2008) Extreme convergence in stick insect evolution: phylogenetic placement of the Lord Howe Island tree lobster. *Proceedings of the Royal Society, B.*, **1552**: 1-8.

The 'tree lobsters' are an enigmatic group of robust, ground-dwelling stick insects (order Phasmatodea) from the subfamily Eurycanthinae, distributed in New Guinea, New Caledonia and associated islands. Its most famous member is the Lord Howe Island stick insect *Dryococelus australis* (Montrouzier), which was believed to have become extinct but was rediscovered in 2001 and is considered to be one of the rarest insects in the world. To resolve the evolutionary position of *Dryococelus*, we constructed a phylogeny from approximately 2.4 kb of mitochondrial and nuclear sequence data from representatives of all major phasmatodean lineages. Our data placed *Dryococelus* and the New Caledonian tree lobsters outside the New Guinean Eurycanthinae as members of an unrelated Australasian stick insect clade, the Lanceocercata. These results suggest a convergent origin of the 'tree lobster' body form. Our reanalysis of tree lobster characters provides additional support for our hypothesis of convergent evolution. We conclude that the phenotypic traits leading to the traditional classification are convergent adaptations to ground-living behaviour. Our molecular dating analyses indicate an ancient divergence (more than 22 Myr ago) between *Dryococelus* and its Australian relatives. Hence, *Dryococelus* represents a long-standing separate evolutionary lineage within the stick insects and must be regarded as a key taxon to protect with respect to phasmatodean diversity.

Cliquennois, N. (2008) Révision des Anisacanthidae, famille endémique de phasmes de Madagascar (Phasmatodea : Bacilloidea). *Annales de la Société entomologique de France*, (N.S.), **44**(1): 59-85. [in French].

Review of Anisacanthidae, stick insects family endemic to Madagascar (Phasmatodea: Bacilloidea). The Malagasy family Anisacanthidae is subdivided into three groups: Anisacanthinae, Leiophasmatinae **n.subfam.** and Xerantherinae **n.subfam.** The Anisacanthinae include *Anisacantha* Redtenbacher 1906, *Paranisacantha* **n.gen.**, *Parectatosoma* Wood-Mason 1879, *Somacantha* **n.gen.** The Leiophasmatinae include *Leiophasma* Uvarov 1940 and probably *Amphiphasma* **n.gen.** The Xerantherinae include *Archantherix* **n.gen.**, *Cenantherix* **n. gen.**, *Parorobia* Chopard 1952 and *Xerantherix* Brancsik 1893. *Pseudoleosthenes* Redtenbacher 1906 is transferred to the family Damasippoididae.

Conle, O.V. Hennemann, F.H. & Perez-Gelabert, D.E. (2008) Studies on neotropical Phasmatodea II: Revision of the genus *Malacomorpha* Rehn, 1906, with the descriptions of seven new species (Phasmatodea: Pseudophasmatidae: Pseudophasmatinae). *Zootaxa*, **1748**: 1-64.

The genus *Malacomorpha* Rehn, 1906 is revised at the species-level, based upon examination of all necessary type-material and extensive material housed in ANSP, CMNH and USNM mainly collected on nine expeditions to the Dominican Republic, including collections at 280 sites distributed throughout the country. A re-description of the genus and detailed descriptions of all 13 known species are provided. Seven new species are described and illustrated: *Malacomorpha bastardoae* **n. sp.**, *M. macaya* **n. sp.**, *M. hispaniola* **n. sp.**, *M. minima* **n. sp.**, *M. multipunctata* **n. sp.** & *M. obscura* **n. sp.** from Hispaniola and *M. sanchezi* **n. sp.** from Puerto Rico. The eggs of *M. bastardoae* **n. sp.**, *M. cyllarus* (Westwood, 1859), *M. jamaicana* (Redtenbacher, 1906), *M. multipunctata* **n. sp.**, *M. obscura* **n. sp.**, *M. sanchezi* **n. sp.**, and *M. spinicollis* (Burmeister, 1838) are described and illustrated, those of the four latter species for the first time. According to the original description and distribution *Phasma graveolens* King, 1867 is obviously a synonym of *M. cyllarus* (Westwood, 1859), and not a

synonym of *Anismorpha buprestoides* (Stoll, 1813) as stated by previous authors (**n. syn.**). A lectotype is designated for *Phasma spinicollis* Burmeister, 1838.

The newly described species, *M. longipennis* (Redtenbacher, 1906) and *M. hispaniola* **n. sp.** in particular, prove the genera *Pseudolcyphides* Karny, 1923 (Type-species: *Phasma spinicollis* Burmeister, 1838) and *Alloeophasma* Redtenbacher, 1906 (Type-species: *Anophelepis poeyi* Saussure, 1868) to be synonyms of *Malacomorpha* Rehn, 1906 (**n. syn.**). Consequently, the type species of both genera are here transferred to *Malacomorpha* Rehn, 1906 (**n. comb.**). The genus now contains apterous, brachypterous and pterous species restricted to the Greater Antilles and Bahamas.

Eilmus, S. (2008) Bemerkungen zur Regeneration eines Beines anstelle einer Antenne bei Phasmiden. *Arthropoda*, **16**(1): 83.

A brief review of antennae regeneration in phasmids.

Eusebio O.L., Lit , I.L. & Vorkel, I. (2004) First description of the male of *Phasmotaenia elongata* Zompro & Eusebio (Phasmatoidea: Phasmatidae) with notes on its host plants and a revised key to the species of *Phasmotaenia* Navas. *Philippine Agricultural Scientist*, **87**(2): 191-195.

The stick and leaf insects are interesting arthropods especially in the tropics but they are not well known in the Philippines. They are classified under the order Phasmatoidea and include some pest species. Stick and leaf insects are large to very large chewing insects and are known to many as “masters of camouflage” because of their remarkable resemblance to sticks or leaves. A recently discovered species, *Phasmotaenia elongata* Zompro and Eusebio, was described based on adult females, nymphs and eggs collected from pine trees in Benguet. No male was available at the time it was described as new to science.

Accurate descriptions of all forms and stages of stick insects are important in identifying individuals in the field and in museum collections. They allow us to differentiate males from females, which is vital in studying how the organism reproduces and behaves sexually. These aspects of stick insect biology are, in turn, essential in further researches, whether for pest management, in case of potential pests, or for biodiversity conservation, especially for species that are found only in the Philippines or those that are endangered.

More recently, a male from Benguet province, the type locality of *P. elongata*, was collected on agohe, *Casuarina equisetifolia* L. The male of *P. elongata* differs from that of *P. lanyuhensis* Huang & Brock, a species from Taiwan, in having longer antennae, shorter appendages found at the tip of the abdomen and a smaller body size. The definition of the genus *Phasmotaenia* is modified to accommodate new information from the Philippine species, and a taxonomic key to its known species is provided to facilitate their identification.

Fritzsche, I. (2008) Zur Entdeckung von *Malacomorpha guamuhayaense* Zompro & Fritzsche, 2008. *Arthropoda*, **16**(1): 38. [in German].

An account of the discovery of *Malacomorpha guamuhayaense* Zompro & Fritzsche, 2008.

Ghiselli, F., Milani, L., Scali, V., & Passamonti, M. (2007) The *Leptynia hispanica* species complex (Insecta Phasmida): polyploidy, parthenogenesis, hybridization and more. *Molecular Ecology*, **16**(20) 4256-4268.

The *Leptynia hispanica* stick insect species complex includes bisexuals, triploid and tetraploid parthenogenetic populations, suggesting that polyploidy has played a central role in the evolution of this complex. An analysis of karyotype, mitochondrial DNA (cox2) and nuclear DNA (ef1-alpha) markers was carried out to clarify phylogenetic relationships and

microevolutionary/phylogeographical patterns of the *L. hispanica* complex. Our analyses suggested a subdivision of bisexual populations into four groups, tentatively proposed as incipient species. Moreover, triploids and tetraploids showed two independent origins, the latter being more ancient than the former. From *ef1*-alpha analysis, triploids showed hybrid constitution, while the hybrid constitution of tetraploids is likely, but more data are needed. We suggest that *L. hispanica* is a case of 'geographical parthenogenesis' with parthenogenetic strains colonizing large peripheral ranges, and bisexuals confined to glacial refuge areas. Moreover, the age, wide distribution and competitive advantage of polyploids over diploids, demonstrate their significance in the evolution of the *L. hispanica* species complex.

Größer, D. (2008) First description of a new species of *Chitoniscus* Stål, 1875 since 100 years (Phasmatoidea: Phylliidae). *Arthropoda*, **16**(1): 32.

A new species of *Chitoniscus* Stål, 1875 (Insecta: Phasmatoidea: Phylliidae) and its egg are described and figured from Sarramea, New Caledonia, for the first time: *Chitoniscus sarramaeansis* Größer, n.sp.

Größer, D. (2008) Erstnachzucht einer *Chitoniscus*-Art: *Chitoniscus sarramaeansis* Größer, 2008. *Arthropoda*, **16**(1): 33-35. [in German]

Describes the rearing of *Chitoniscus sarramaeansis* Größer, 2008.

Größer, D. (2008) Interessante Arten der Wandelnden Blätter aus Borneo (Phasmatoidea). *Arthropoda*, **16**(2): 86. [in German]

Comments on some *Phyllium* spp. from Borneo.

Hennemann, F.H. & Conle, O.V. (2009) Studies on the genus *Phasmotaenia* Navás, 1907, with the descriptions of five new species from the Solomon Islands, a revised key to the species and notes on its geographic distribution (Phasmatoidea: "Anareolatae": Phasmatidae s. l.: Stephanacridini). *Zootaxa*, **2011**: 1–46.

The genus *Phasmotaenia* Navás, 1907 (type-species: *Taeniosoma sanchezi* Bolívar, 1897) is currently known only from the Philippine Islands and Taiwan, but here shown to extend eastwards as far as to the Solomon Islands, Northern New Guinea and even Fiji. A taxonomic review of the genus, and updated keys to the species are presented.

The type-species of *Phasmotaenia* Navás, 1907, *P. sanchezi* (Bolívar, 1897) from Luzon, Philippines is shown to have been misinterpreted by previous authors. This has resulted in the description of the here revealed junior synonym *Phasmotaenia elongata* Zompro & Eusebio, 2000 (n.syn.). A survey of the intraspecific variation of *P. sanchezi* (Bolívar, 1897) is provided along with illustrations of the holotype. *Phasmotaenia australe* (Günther, 1933) from the Solomon Islands is removed from synonymy with *Phasmotaenia godeffroyi* (Redtenbacher, 1908). From Micronesia and shown to be a distinct and valid species. Both species are transferred to *Phasmotaenia* Navás, 1907. Examination of the paratypes of *P. australe* (Günther, 1933) has revealed these to represent two different species distinct from the holotype, one of which is described as new herein (*P. guentheri* n.sp.). The male of *P. australe* is described and illustrated for the first time, and re-descriptions are presented of the female and egg along with notes on its considerable intraspecific variability. *Stephanacris laeviceps* Hennemann & Conle, 2006 from New Guinea (Mt. Doorman) and *Hermarchus inermis* Redtenbacher, 1908 from Fiji are transferred to *Phasmotaenia* Navás, 1907. A lectotype is designated for *Hermarchus inermis* Redtenbacher, 1908.

Five new species from the Solomon Islands are described and illustrated: *P. bukaense* n.sp. (Buka Id.), *P. guentheri* n.sp. (Makira Id.), *P. salomonense* n.sp. (Bougainville Id. & Santa Isabel Id.), *P. spinosa* n.sp. (Malaita Id.) and *P. virgea* n.sp. (New Georgia Id.). While

the females and eggs of all five species are recognized, the males of *P. guentheri* n.sp., *P. bukaense* n.sp. and *P. salomonense* n.sp. remain as yet undescribed.

The genus now contains eleven described species and the geographic distribution is shown to extend from Lanyuh Island southeast of Taiwan and the Philippines over Micronesia, New Guinea and the Solomon Islands as far as Fiji in the east. This interesting distributional pattern is briefly discussed under the aspect of biogeography and taking the geology of the concerned regions into account. A modified and extended description of the genus *Phasmotaenia* Navás, 1907 and differentiation from related genera is provided along with updated keys to the eleven species currently known. Two further so far unnamed species from the Philippines (Luzon) and the Solomon Islands (Guadalcanal) are recognized but not formally described.

Hsiung, C.C. (2001) *Megacrania* species in Indonesia (Cheleutoptera: Phasmatodea). *Journal of Orthoptera Research* **10**(2): 293-301.

Two new species of *Megacrania* Kaup are described and compared with other related species. There are now three confirmed species in Indonesia. *Megacrania brocki* Hsiung from Key and Obi Islands, and *M. rentzi* Hsiung from Tandjong, Borneo are compared with *M. wegneri* Willemse from Obi, *M. alpheus* Bates (mislabelled as 'Ceylon'), *M. batesii* Kirby from Bismark Is. and *M. tsudai* Shiraki from Taiwan.

Hsiung, C.C. (2003) Two new species of *Megacrania* Kaup (Cheleutoptera: Phasmatodea) from the Admiralty Islands. *Journal of Orthoptera Research* **12**: 31-35.

Six specimens collected in the Admiralty Islands are described as two new species; four specimens are named *M. vickeri* Hsiung, the other two as *M. artus* Hsiung. They are compared with the most closely related species of *Megacrania*, *alpheus*, *batesii* and *rentzi*.

Hsiung, C.C. & Yang, J.T. (2000) Systematic study of *Megacrania* species of Australia (Cheleutoptera: Phasmatodea). *Journal of Orthoptera Research* **9**: 71-75.

The single *Megacrania* species of Australia is described and compared with *M. tsudai* Shiraki, *M. wegneri* Willemse and the lectotype of *M. batesii* Kirby, with the conclusion that it is *M. batesii*.

Hsiung, C.C. (2007) Revision of the genus *Megacrania* Kaup (Cheleutoptera: Phasmatidae). *Journal of Orthoptera Research*, **16**(2) 207-221.

The genus *Megacrania* Kaup is revised. Types or paratypes of all species were examined. Two new species, *Megacrania obscuris* and *Megacrania spina*, are described and illustrated. A key is given to the species.

Junker, R.R., Itioka, T., Bragg, P.E. & Blüthgen, N. (2008) Feeding Preferences of Phasmids (Insecta: Phasmida) in a Bornean Dipterocarp Forest. *The Raffles Bulletin of Zoology*, **56**(2): 445-452.

Stick and leaf insects (Phasmida) from 19 species (53 individuals) were collected in a lowland dipterocarp forest (Lambir Hills, Sarawak, Malaysia). Dual-choice tests were conducted to examine whether phasmids discriminate between young and old leaves of seven plant species. A second set of tests examined the preferences of phasmids for leaves from *Dryobalanops lanceolata* (Dipterocarpaceae) saplings versus leaves from the upper canopy of the same tree species. *Haaniella echinata* and other flightless species (Heteropterygidae and Lonchodinae) fed on nearly all plant species offered and showed significant preferences for old leaves in three plant species. In contrast, flying phasmids (Aschiphasmatinae and Necrosciinae) rejected leaves from most plants and did not show consistent leaf age choices.

H. echinata and flightless phasmids preferred canopy leaves from *D. lanceolata* over leaves from saplings, regardless of leaf age. Our results are consistent with the hypothesis that young leaves of some plant species are better defended against generalist herbivores than old leaves and that saplings are better defended than adult trees. Since upper canopy leaves were highly palatable to understorey phasmids, factors other than chemical defences must contribute to the low abundance of phasmids in forest canopies.

Klug, R. & Klass, K.D. (2007) The potential value of the mid-abdominal musculature and nervous system in the reconstruction of interordinal relationships in lower neoptera. *Arthropod Systematics and Phylogeny*, **65**(1): 73–100.

The mid-abdominal musculature and its innervation are compared for several lower neopteran "orders"; data on Embioptera and Mantophasmatodea are presented for the first time. For the sclerotisations, the musculature, and the nervous system of the mid-abdomen general descriptions are given, and general aspects of homologisation in these elements are explained; for the lateral muscles the distinction of three groups innervated by the T-, B-, or C-nerves is confirmed. Differences in the musculature and nervous system of the lower neopteran lineages are discussed and evaluated with regard to their phylogenetic implications. Conditions in Ephemeroptera, Megaloptera, and Zygentoma are partly included in the discussion. Several characters were found to be informative on interordinal relationships. Plecoptera have features probably plesiomorphic at the neopteran level: the origin of nerve A in front of the ganglion and the innervation of intrasegmental lateral muscles by nerve A; this may support the monophyly of a taxon comprising all other Neoptera. The hyperneural muscle found in many Dictyoptera also appears as a uniquely plesiomorphic structure (at the pterygotan level). The co-occurrence of two specific lateral muscles supplied by nerve B as well as certain subdivisions in the lateral muscles may support a clade Phasmatodea + Embioptera. We also point to character systems that appear informative on the internal phylogeny of order-level taxa, such as the relationships between nerves T and M in Plecoptera, the ventral musculature in Ensifera, the dorsal musculature in Dermaptera, and details of the hyperneural muscle in Dictyoptera. Besides the very low number of taxa studied so far, major problems still persistent in the use of mid-abdominal characters for phylogenetic work are (1) the insufficient knowledge on topographic homologies for the lateral cuticular areas of the mid-abdomen; (2) lacking knowledge on the neuronal structural level of the mid-abdominal nervous system; (3) difficulties in the homologisation of muscles and nerves between Pterygota and the apterygote Archaeognatha and Zygentoma, which are partly due to the presence of a system of non-cuticular tendons in the latter and limit outgroup comparison for Pterygota.

Köhn, J. (2008) Eine Mißbildung bei der Gespenstschrecke *Extatosoma tiaratum* (MacLeay, 1827), *Arthropoda*, **16**(1): 82.

Notes and photographs of an *Extatosoma tiaratum* which lost an antenna and regenerated it as a foot.

Lit, I.O. & Eusebio, O.L. (2008) First description of the male of *Sungaya inexpectata* Zompro, 1996 (Phasmatodea: Heteroptergidae: Obrimini). *Arthropoda*, **16**(2) 40-42.

The adult male of the stick insect *Sungaya inexpectatu* Zompro, 1996 is described for the first time. This is based on a collection of several individuals from the Province of Bataan (new locality record). This monotypic genus is so far known to be endemic to the Philippines, with the original material of the type species, *inexpectata* collected from Sungay, Tagaytay City, Cavite Province. These two places are both on the western side of Luzon Island. The discovery of this species in the Lamao Forest Reserve, an area being

considered for eco-tourism, provides an insight that there may be more endemic species in that area and that future eco-tourism activities, if unavoidable, should place special considerations to ensure the survival and protection of species such as *S. inexpectata*.

Marske, K.A., Ivie, M.A. & Hilton, G.M. (2007) Effects of volcanic ash on the forest canopy insects of Montserrat, West Indies. *Environmental Entomology*, **36**(4): 817-825.

The impact of ash deposition levels on canopy arthropods was studied on the West Indian island of Montserrat, the site of an ongoing volcanic eruption since 1995. Many of the island's natural habitats have been buried by volcanic debris, and remaining forests regularly receive volcanic ash deposition. To test the effect of ash on canopy arthropods, four study sites were sampled over a 15-mo period. Arthropod samples were obtained using canopy fogging, and ash samples were taken from leaf surfaces. Volcanic ash has had a significant negative impact on canopy arthropod populations, but the decline is not shared equally by all taxa present, and total population variation is within the variance attributed to other abiotic and biotic factors. The affected populations do not differ greatly from those of the neighbouring island of St. Kitts, which has not been subject to recent volcanic activity. This indicates that observed effects on Montserrat's arthropod fauna have a short-term acute response to recent ash deposition rather than a chronic depression caused by repeated exposure to ash over the last decade.

Murányi, D. (2007) *Peruphasma marmoratum*, a remarkable new species of high montane Phasmatodea (Pseudophasmatidae: Pseudophasmatinae) from the Venezuelan Andes. *Zootaxa* **1398**: 57–67.

A remarkable new species of high montane Phasmatodea (Pseudophasmatidae: Pseudophasmatinae), *Peruphasma marmoratum* **sp.n.** from the Venezuelan Andes is described and illustrated from both sexes. The species of *Peruphasma* Conle & Hennemann, 2002, which were excluded by Zompro (2004) are confirmed as belonging to the genus. The new species differs from all other members of the genus by the presence of tubercles on the mesonotum. Affinities, ecological and distributional notes, and notes on other Anisomorhini from Venezuela are presented.

Simoens, R. & Rabaey, K. (2008) Onze siertuin-voedselplantentuin. Deel 2: Lente in de tuin! *Phasma*, **18**(69): 10-13. [in Dutch].

Foodplants in springtime. After a cold winter and a "winter-diet" for our phasmids finally spring came. The "winter-foodplants" get new growth but also "summer-plants" are re-growing and are getting ready to serve as foodplant and variation. Again, we try to take care of the ornamental value. Also certain weeds can be of use and as phasmid breeders we also see the ornamental value of those plants.

Simoens, R. & Rabaey, K. (2008) Aschiphasmatini of Diamanttakjes. *Phasma*, **18**(69): 20-22. [in Dutch].

Although giving common names to phasmids is not advisable because of confusion, the authors want to call all Aschiphasmatini "Diamond sticks". Two reasons are explained: their tiny shiny appearance and it's a nice name to make them more popular amongst phasmid breeders. For the moment five different species are kept in captivity but there is not much enthusiasm for these less known species. This article is a plea to breed Aschiphasmatini with breeding information.

Simoens, R. & Rabaey, K. (2008) Onze siertuin-voedselplantentuin. Deel 3: Zomer. *Phasma*, **18**(70): 5-6. [in Dutch]

Summertime offers a broad variety of foodplants. A lot of ornamental plants can be offered now so that winter foodplants can grow. We offer a "summer diet" with high quality value, although it is not known that phasmids care about the quality. Summertime is perfect; we may not forget the spiders and their cocoons of course. We think further ahead, wintertime is far away but it is now the time to prepare, especially collecting acorns to provide oak in winter. As we described in the previous *Phasma*-newsletters a lot of possible foodplants, we will now highlight the ornamental part.

Strybosch, J. (2008) Species report 17: PSG 118 *Aretaon asperrimus* (Redtenbacher, 1906). *Phasma*, **18**(70): 7-8. [in Dutch]

Aretaon asperrimus is a nice looking species and easy to breed in captivity. Originally the species was named *Obrimus asperrimus* Redtenbacher, 1906 and the first females were found at Mount Kinabalu (Sabah). Rehn & Rehn, 1938 changed the name to *Aretaon asperrimus*. They were found on several places: Tawau, Poring, Inanam, Ulu Moyog but also on the island of Palawan Philippines. This report is handy for breeders who are interested in culturing this species.

Zompro, O. (2008) Zur Entdeckung von *Sungaya inexpectata* Zompro, 1996. *Arthropoda*, **16**(2): 41. [in German].

An account of the discovery of *Sungaya inexpectata* Zompro, 1996 in the Philippines in 1995.

Zompro, O. & Fritzsche, I. (2008) A new phasmid from Cuba *Malacomorpha guamuhayaense* n.sp. (Phasmatodea: Pseudophasmatidae). *Arthropoda*, **16**(1): 36-37.

Malacomorpha guamuhayaense Zompro & Fritzsche, n.sp. (Phasmatodea: Pseudophasmatidae: Anisomorphini), is described from Cuba .