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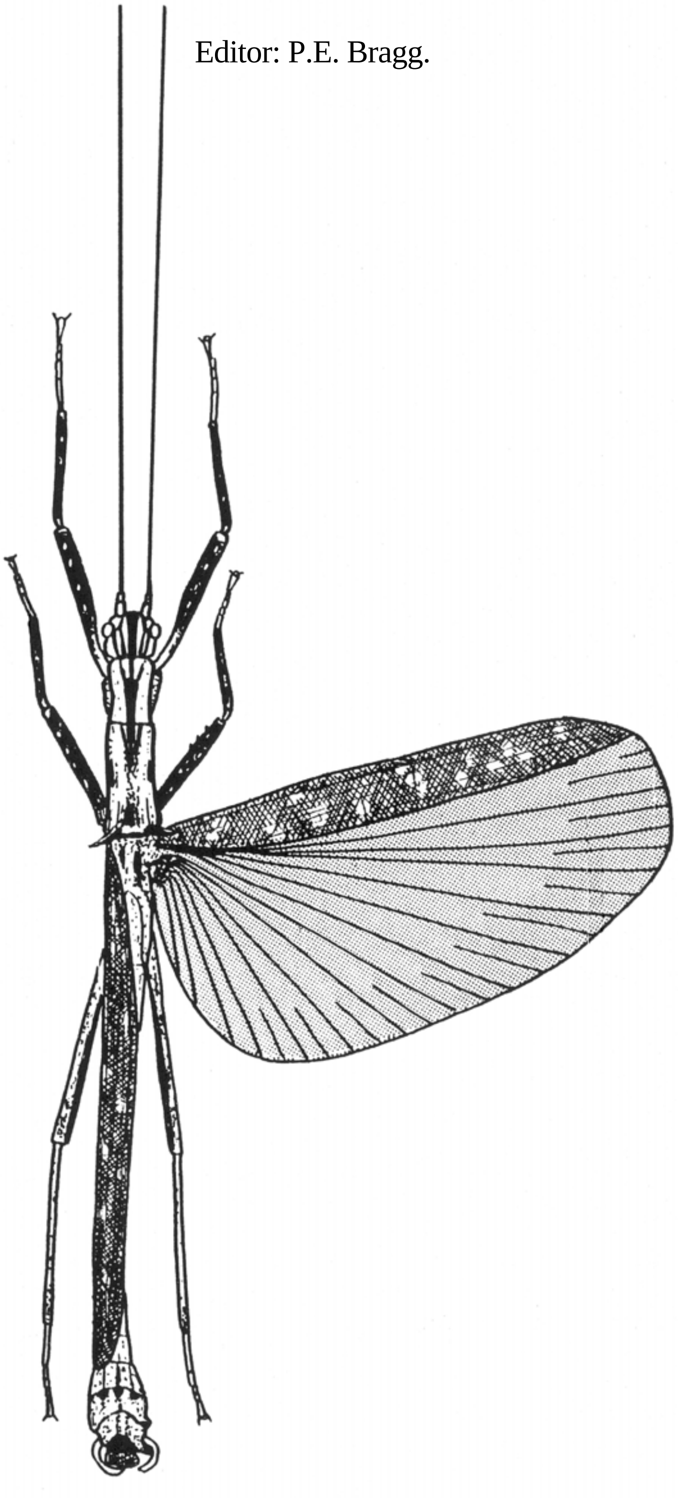

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Contents

Cover illustration: *Presbistus marshallae* Bragg, 2001 drawing by P.E. Bragg.

Aschiphasmatidae, Heteropteryginae and Lonchodinae in the Forestry Research Centre, Sepilok, Sabah

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Abstract
All the specimens of Aschiphasmatidae, Heteropteryginae and Lonchodinae in the collection of the Forest Research Centre, Sepilok, Sabah (FRCS) are recorded. A number of these represent new localities for the species concerned.

Key words
Phasmida, Aschiphasmatidae, Heteropteryginae, Lonchodinae, distribution data, Forestry Research Centre, Sabah, Borneo.

Introduction

In August 2001 the data for all specimens of Aschiphasmatinae, Heteropteryginae and Lonchodinae present in the collection of the Forest Research Centre, Sepilok, Sabah (FRCS) was recorded. A few of these specimens have already been recorded (Bragg, 2001), however, many are new localities for these species.

The collection is composed mainly of material collected shortly after the FRCS was opened, with some subsequent additions and with some older material transferred from elsewhere. There is no policy of continual collection of phasmids. The collection was largely unidentified prior to our visit. We identified material, recorded the data and rearranged the collection.

Species are listed alphabetically within each family or subfamily. Locality data on the specimens varies in format with both English and Malay being used e.g. the abbreviations F.R and H.S. (Hutan Simpan) are both used for Forest Reserve. In cases where both languages have been used for one locality, only the English has been used in the list below. At Sepilok the Arboretum is in the area of the Rainforest Interpretation Centre (R.I.C.). All localities are in Sabah unless otherwise indicated. All dates have been standardised to day.month.year or month.year format with the month in Roman numerals, e.g. Dis 1992 becomes xii.1992. Where specimens are nymphs they are indicated by ♀n for a female nymph, ♂n for a male nymph and n for a nymph for which we did not determine the sex; in two cases we omitted to record the sex of specimens. The collectors name(s) have been standardised where they appear in different forms on labels but are known to us, e.g. all instances of Chan are known to be C.L. Chan and are shown as such on the list below.

Material examined

A) Heteropteryginae

Aretaon asperrimus (Redtenbacher, 1906)
Mile 51, Lungmanis. ♂ F.E. Staff, 15-18.x.1968.
Telupid, Tawai F.R. 2♂♂, 2♀♀, Entomology Staff, 1-13.ix.1994; ♂, ♀, 2n, Entomology Staff, vi-vii.1994.

Dares verrucosus Redtenbacher, 1906
Sepilok Laut. ♀ Entomology Staff, ix.1992; 10♀♀, 12♂♂ Entomology Staff, iii.1994.
Sepilok F.R. ♀, ♂, S. Lantoh, 10.xi.1992.
Sepilok R.I.C. 2♂♂, M.L.T. Bushell, 8.viii.2001.
Ranau, Km 8, Mamut. 2♀♀, 4♂♂, 20.iv.2000.
Telupid, Tawai F.R. ♀ Entomology Staff, vi-vii.1994; ♀ Entomology Staff, 1-13.ix.1994.

Sukau. 3♂♂, C. Prudente, 18.iv.1994.

Datames borneensis sepilokensis Bragg, 1998
Telupid, Tawai Forest Reserve. ♂ Entomology Staff, vi-vii.1994.

Haaniella echinata (Redtenbacher, 1906)
Sepilok Laut. 2♂n, 2♀n, ♂, xii.1992; 3♀n Entomology Staff, iii.1994.
Sepilok. ♀ Jsmail, 22.ii.1972; ♂ ♀n, ♂n, Seow-Choen, C.L. Chan & Arthur Chung; ♀ S. Lantoh, xi.1989; ♀n S. Lantoh, 11.xi.1992.
Sepilok Arboretum. n Matth Allai, 8.iv.1994; ♀ Marcus Gubili, 15.vii.1997.
Ranau, Km 8 Mamut. ♀n, ♂, 20.iv.2000.
Ranau Marakau. ♀n, Entomology Staff, i.1994.
Poring. (sex not recorded) C.L. Chan, 31.vii.1990.
Tawai F.R. ♂, 2♀♀, ♀n, Entomology Staff, 1-13.ix.1994; ♂, ♀, ♀n, Entomology Staff, vi-vii.1994.
Kalumpang, Lahad district. ♀ Ladzim, 22.vii.1970.
Penampang, Sugud. ♂n Momm & John, xi.2000.
No Data. ♂, 2♀♀, ♀n.

Haaniella scabra (Redtenbacher, 1906)
Kinabalu National Park. ♀n, Seow-Choen & C.L. Chan, 16.iv.1993.

Heteropteryx dilatata (Parkinson, 1798)
WEST MALAYSIA, Tapah Hills. ♀ F. Seow-Choen, iv.1995.

B) Aschiphasmatidae
Dajaca filiformis Bragg, 1992
Telupid, Tawai F.R. 2♀♀ Entomology Staff, vi-vii.1994.

Orthomeria alexis (Westwood, 1859)
Ranau, Marakau. ♀, ♂, Entomology Staff, i.1994.

Presbistus appendiculatus Bragg, 2001
Sandakan district, Tanjung Kuang, Kuamet. ♀ Paratype, F.R. Majauim, 28.vii.1967.

Presbistus moharii Bragg, 2001
Lamag. ♀, M.P. Udarby, ix.1967.

C) Lonchodinae
Carausius cristatus Brunner, 1907
Kinabalu National Park, Silau-Silau trail. ♀, C.L. Chan, 13.vii.1990; ♂, C.L. Chan & Poon, 26.ixi1992.

Carausius chani (Hausleithner, 1991)
Mile 14 (Sepilok area). ♂, Mustafa, 10.i.1978.
Sandakan, Kolapis A. ♂ Entomology Staff, 13.vi.1994.

Lonchodes brevipes Gray, 1835
SINGAPORE. ♀, F. Seow-Choen, iv.1994.

SINGAPORE, captive-reared. 2♂♂, F. Seow-Choen, iii.1995.

Lonchodes everetti (Kirby, 1896)
Beramayot F.R. ♀, Robert C. Ong, vi.1996.
Telupid, Tawai F.R. ♀, ♂, Entomology Staff, vi-vii.1994; ♀, ♀n, Entomology Staff, 1-13.ix.1994.

Lonchodes harmani Bragg & Chan, 1993
Kinabalu National Park, Silau-Silau trail. ♂ paratype, ♀ paratype, C.L. Chan, 14.ix.1991.

Lonchodes hosei herberti Bragg, 2001
Sepilok F.R. ♂, ♂n, n, Entomology Staff, iii.1994; 4♂♂, C.L. Chan & Arthur Chung, 16.vi.1994; ♂, C.L. Chan, Arthur Chung & F. Seow-Choen, 16.iv.1994.
Telupid, Tawai F.R. 3♂♂, 2♀n, Entomology Staff, 1-13.ix.1994.
Ranau, Marakam. ♂, ♀n, Entomology Staff, i.1994.
Gunung Lotong, ♂, Entomology Staff, 18.iv.1988.
BRUNEI, Sungai Liang. ♂, F. Seow-Choen & C.L. Chan, v.1994.

Lonchodes imitator (Brunner, 1907)
Telupid, Tawai F.R. ♂, ♀n, n, Entomology Staff, vi-vii.1994; ♀n, Entomology Staff, 1-13.ix.1994.
Sepilok. ♀, Matth Allai, 23.ix.1994.
Sepilok F.R. ♂ Entomology Staff, iii.1994.
Sepilok F.R.C. ♂, M. Anzai, 24.v.1989.
Sepilok Laut. ♂, ♀, Entomology Staff, xii.1992.
Sepilok area. ♂, Entomology Staff, 1.iv.1978.
Sepilok compound. (sex not recorded), 7.viii.1978.
P.P.P. Sepilok. ♂, Matth. Allai, 5.ii.1994
Ranau, Poring. ♀, 10.iv.1978.
Ranau, Mile 59, Hot Spring. ♂, Talib, 17vi.1969.
Ranau, Marakam. 2♂♂, Entomology Staff, i.1994.
Mile 47, Lungmanis. ♂, F.E., 27.viii.1968.
Mile 49, Lungmanis. ♂, F.E., 27.viii.1968.
Tenom, Kallang waterfall. ♀, 2♂♂, C.L. Chan & Poon, 12.ix.1992.
Captive reared from Sabah stock. ♀, F. Seow-Choen, ii.1993.

Lonchodes malleti Bragg, 2001
Mostyn. ♀, captive reared by P.E. Bragg, 2001.

Lonchodes megabeast Bragg, 2001
SARAWAK, Mt Serapi. 2n, Seow-Choen, i.1996.

Lonchodes modestus (Brunner, 1907)
Sepilok Laut. 2♂♂, Entomology Staff, xii.1992; ♂ Entomology Staff, iii.1994.
No Data. ♂n.

Lonchodes thami Bragg, 2001
Telupid, Tawai F.R. ♂ Entomology Staff, vi-vii.1994.

Phenacephorus auriculatus (Brunner, 1907)
Telupid, Tawai F.R. 2♂♂, Entomology Staff, vi-vii.1994.
Ranau, Marakam. ♀, Entomology Staff, vi.1994.

Phenacephorus parahaematomus Bragg, 1995
Telupid, Tawai F.R. 2♂♂, Entomology Staff, vi-vii.1994.

Phenacephorus sepilokensis Bragg, 1994
Sepilok F.R. 3 eggs paratypes, laid by paratype ♀, P.E. Bragg, 1993.
Telupid, Tawai F.R. ♀ Entomology Staff, vi-vii.1994.

Phenacephorus sp. (either *P. cornucervi* or *P. sepilokensis*)
Mile 47, Lungmanis. n, F.E., 24.ii.1967.
Kolapis A. n, M. Anzai, 26.iv.1989.

Prisomera tuberculata Kirby, 1904
Sepilok F.R. ♀n, Entomology Staff, iii.1994.

Importance of the collection

The FRCS collection is the oldest public phasmid collection in Sabah. The bulk of the work at the FRCS, and therefore the emphasis of the collection, is devoted to other orders of insects. Since there is no policy of expanding the phasmid collection, it is relatively small but still contains an interesting selection of species. The majority of specimens are from the local area while other specimens have been added during Forestry Department collecting expeditions to various Forest Reserves.

Acknowledgements

The authors thank Dr Chey Vun Khen and Dr Arthur Y.C. Chung for kindly providing access to the FRCS collection.

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Bragg, P.E. (2001) *Phasmids of Borneo.* Natural History Publications (Borneo), Kota Kinabalu, Sabah.

Asceles margaritatus Redtenbacher, a phasmid from Borneo with two distinct wing lengths

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Abstract
Asceles margaritatus Redtenbacher, 1908 is a very common phasmid in Borneo. The usual form has full length wings but there is a distinct form on Mt Kinabalu, Sabah, which has short wings. Both forms are illustrated and new distribution data is given for the typical form.

Key words
Phasmida, *Asceles margaritatus*, distribution, variable wing length.

Introduction
The phasmid *Asceles margaritatus* Redtenbacher, 1908 usually has fully formed wings. However, there is a short winged form which occurs in Kinabalu National Park, in the area around the Park HQ, this was first recorded by Hausleithner (1991: 222, fig 3, ♂) and was cultured by myself for five generations in the early 1990s as PSG culture 151 (Bragg, 1995). Hausleithner illustrated the male of the micropterous form (1991: fig. 3); Redtenbacher (1908: figs. 25.6a & 25.6b) and I (Bragg, 2001: figs. 215a, 215b) have illustrated the male and female of the macropterous form; Sellick (1993: fig. 1) and I (Bragg, 2001: figs. 215c-e) have illustrated the egg of the macropterous form. Adult males and females of both forms are illustrated here for comparison. Some new localities are listed for this species, based on my own collecting in 2001 and the collection at the Forest Research Centre, Sepilok, Sabah (FRCS). In the following list "n" indicates a nymph for which the sex was not recorded.

New records

A) Macropterous form
SABAH, Tawai Forest Reserve. 8♂♂, 3♀, 4n (FRCS) Entomology Staff, vi-vii.1994; ♂, ♀ (FRCS) Entomology Staff, 1-13.ix.1994.

SABAH, Sepilok Laut. 1♂ (FRCS) Entomology Staff, ix.1992; 6♀♀, 2♂♂, 1n (FRCS) Entomology Staff, xii.1992; 5♂♂, 3♀♀, 3n (FRCS) Entomology Staff, iii.1994.

SABAH, Sepilok. 1♂ (FRCS) Entomology Staff, 26.xi.1977; 1♂ (FRCS) M. Anzai, 17.ii.1991; 1♀ (FRCS) F. Seow-Choen, C.L. Chan & Arthur Chung, 17.vi.1994.

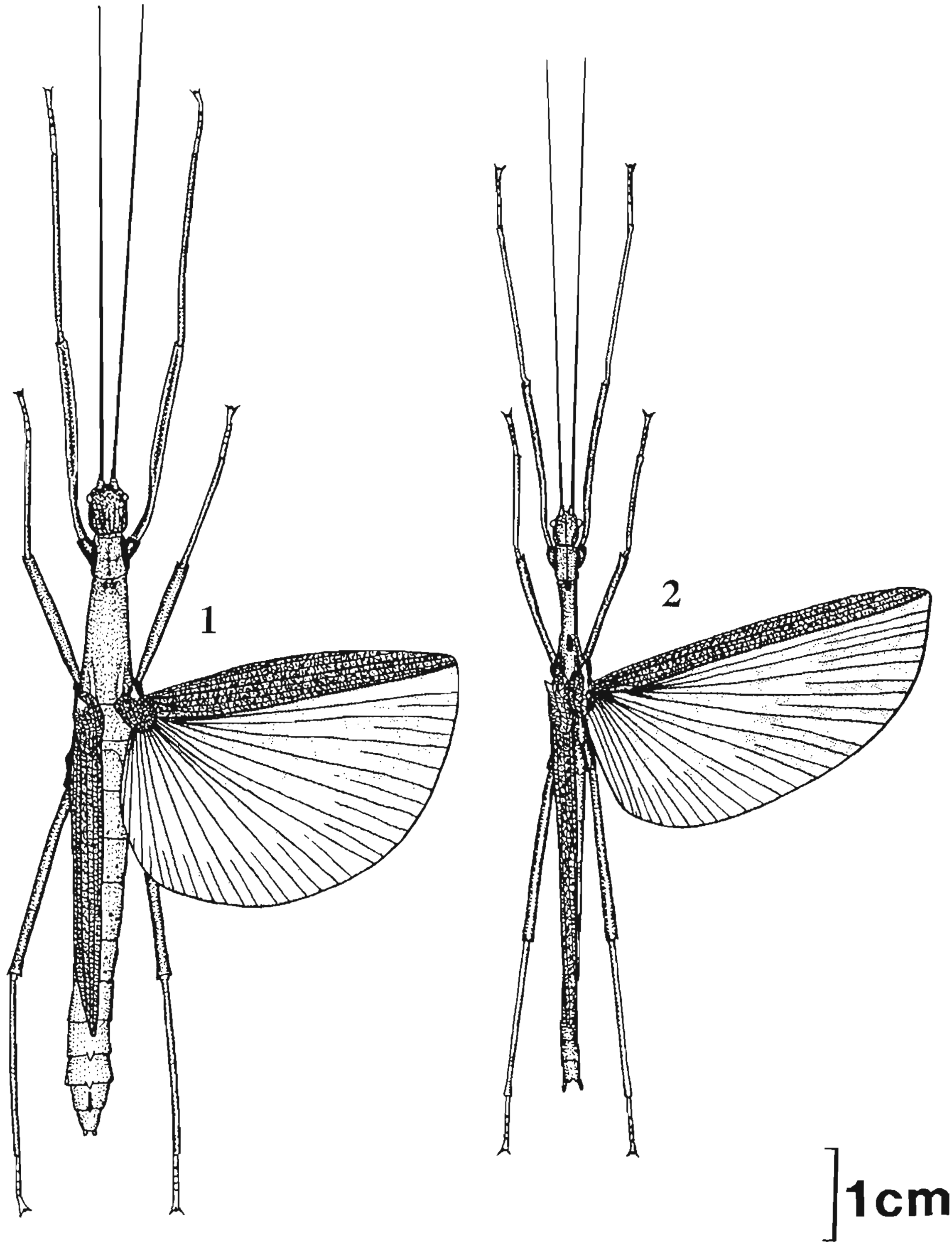
SABAH, Sukau. 1♂, 1n (FRCS) C. Prudent, 18.iv.1994.

SABAH, Ranau, Marakau. 1♂, 1♀, 2n (FRCS) Entomology Staff, i.1994.

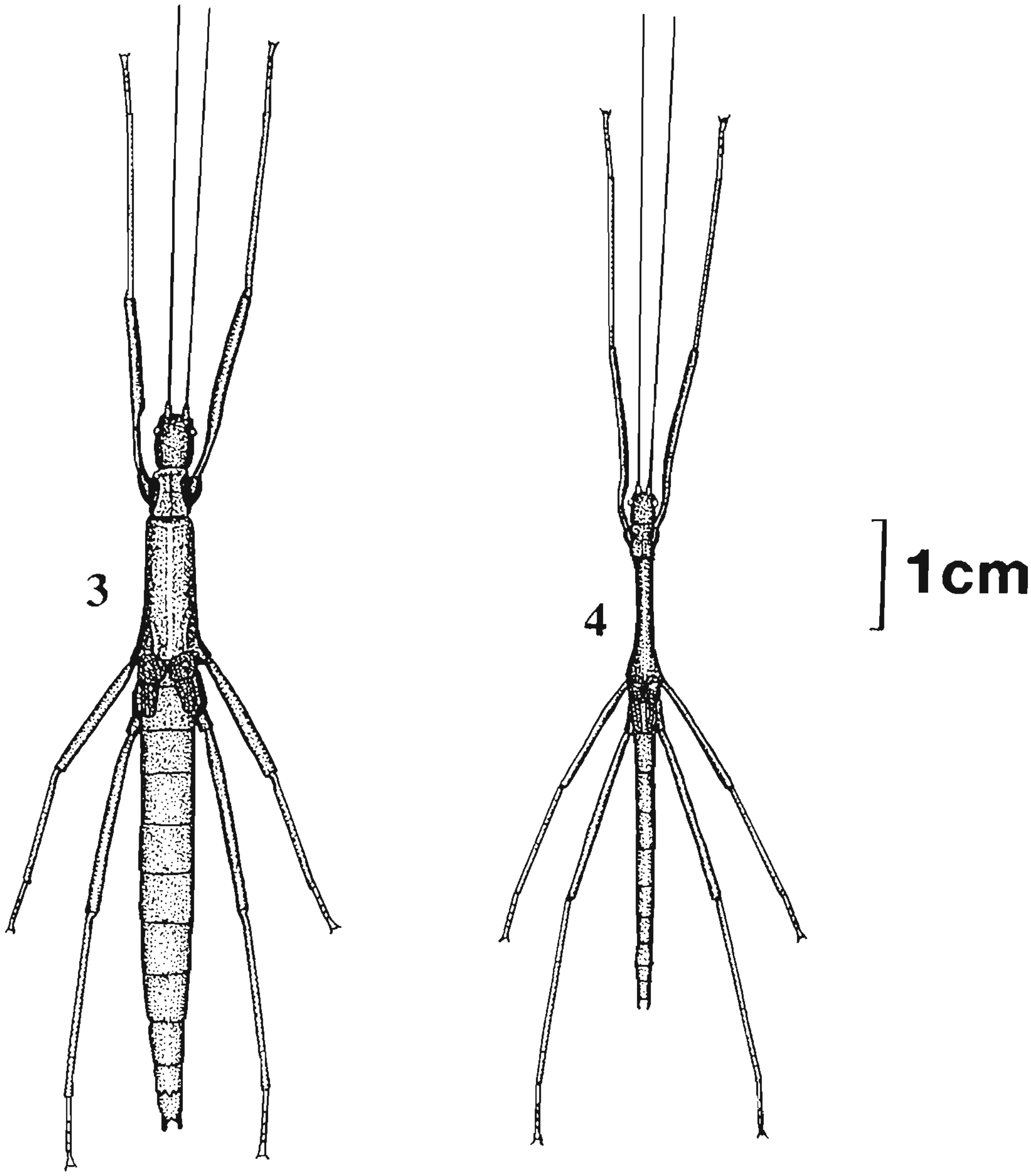
SABAH, near Babaggon, N005 54' 22" E116 10' 16", altitude 96m. 1♀ (PEB-3076), 1♂ (PEB-3077) P.E. Bragg, 30.vii.2001; 1♂ (PEB-3078) P.E. Bragg, 13.viii.2001.

B) Micropterous form
SABAH, Kinabalu National Park, Silau-Silau trail. 1♀, 1♂ (FRCS) C.L. Chan & Poon, 26.ix.1992.

Other specimens
During my visit to Sabah with Mark Bushell in July and August 2001, numerous specimens of this species were found at Sepilok, Babaggon and at Kinabalu National Park. However, I did not collect any specimens from localities from which I had previously (Bragg, 2001) recorded this species. Mark Bushell recorded the numbers of specimens seen while we were collecting and also collected a number to attempt to rear them.



Figures 1 & 2. *Asceles margaritatus*, macropterous form. 1. Female, 2. male.



Figures 3-4. *Asceles margaritatus*, micropterous form. **3.** Female, **4.** male.

Acknowledgements

I thank Dr Chey Vun Khen and Dr Arthur Y.C. Chung for kindly providing access to the FRCS collection.

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Hausleithner, B. (1991) Eine Phasmidenausbeut aus dem Gebiet des Mount Kinabalu, Borneo (Phasmatodea). *Nachrichten des Entomologischen Vereins Apollo, Frankfurt*, N.F. 11(4): 217-236.

Redtenbacher, J. (1908) *Die Insektenfamilie der Phasmiden.* Volume 3. Leipzig.

Sellick, J. (1993) The leaf-piercing eggs of *Asceles*. *Phasmid Studies*, 2(2): 54-55.

A new species of *Phanocles* Stål, 1875, from Costa Rica (Phasmatodea: Diapheromeridae: Diapheromerinae: Diapheromerini)

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With drawings of adults by Jacques Potvin.

Abstract
A new species of Phasmatodea, *Phanocles costaricensis* n.sp., from Costa Rica as well as its eggs are described and illustrated. It is closely related to the type-species *Phanocles burkartii* (Saussure, 1868), but differs in its smaller size, being comparatively slender, the smaller dilations of the seventh abdominal tergite and in lacking the large lobes on the head and extremities.

Key words
Phasmida, Phasmatodea, *Phanocles costaricensis* n.sp., Costa Rica, PSG 47.

Introduction

During the 1990s a large stick-insect from Costa Rica used to be bred by several enthusiasts in Europe and was included on the Phasmid Study Group culture list as "PSG 47 *Bacteria* sp.". After closer examination of two specimens kindly given to the author by A.J.E. Harman, the species turned out to be undescribed, belonging to the genus *Phanocles* Stål, 1875 (type species *Bacteria burkartii* Saussure, 1868, by subsequent designation of Kirby, 1904: 353) described from Mexico. The male of this new species is the first to be known from the genus.

The original culture dates from 1982 but apparently died out within a few years. New culture-stock was collected by A.J.E. Harman and M. Salton near Monteverde in Costa Rica at an altitude of about 1000m on 14th August 1989. A report on keeping and breeding this species has been published by Gale (1992). The drawings of the male and female in this paper are of the paratypes in the author's collection.

Abbreviations used:

BMNH:	British Museum of Natural History, London, England.
NHMW:	Naturhistorisches Museum Vienna, Austria.
ANSP:	Academy of Natural Sciences of Philadelphia, USA.
OXUM:	Oxford University Museum, Oxford, England.
INBC:	Instituto Nacional de Biodiversidad, Costa Rica.
PB:	Private collection of Paul D. Brock, Slough, Berks, England.
FH:	Private collection of Frank H. Hennemann, Freinsheim, Germany.
OZ:	Private collection of Oliver Zompro, Kiel, Germany.
PEB:	Private collection of P.E. Bragg, Awsworth, Notts, England.
AJEH:	Private collection of Allan J.E. Harman, Hockley, Essex, England.

Phanocles costaricensis n.sp.

Bacteria sp., Gale, 1992: 5, figs: 1 (egg), ♀ & ♂ (page 6, figs not numbered); Potvin, 1995: figs 118 (♂) & 119 (♀).
Phanocles n.sp., Zompro, 2001: 197.

Material

Holotype: ♂ (BMNH) Bred England, Essex, Hockley, 18.vi.1992, male *Bacteria* sp. PSG 47.
Paratypes (3♂♂, 11♀♀, 6 eggs): ♀ (INBC) Costa Rica, Puntarenas Prov., Monteverde, 14.viii.1989, M. Salton & A.J.E. Harman, female *Bacteria* sp.; 2♀♀ (ASNP; BMNH) Costa Rica, Puntarenas Province, Monteverde, 16.viii.1989, A.J.E. Harman. [ex.] A.

Harman & M. Salton coll.; ♀ (OXUM) Costa Rica, Puntarenas Province, Monteverde, 16.viii.1989, [ex.] A. Harman & M. Salton coll.; ♀ (AJEH) Bred England, Essex, Hockley, 14.ii.1991, A. Harman & M. Salton coll.; ♀ (PB) Bred England, Essex, Hockley, 10.xi.1992, [ex.] A. Harman & M. Salton coll.; ♀ (BMNH) Bred England, Essex, Hockley, 11.xi.1992, [ex.] A. Harman & M. Salton coll.; ♂ (AJEH) Bred England, Essex, Hockley, 14.xi.1990, A.J.E. Harman, A. Harman & M. Salton coll.; ♀ (NHMW) Bred England, Essex, Hockley, 10.x.1994, [ex.] A. Harman & M. Salton coll.; ♂ (FH 0472-1) Bred England, Essex, Hockley, 1992, *Bacteria* sp. PSG 47, A.J.E. Harman; ♀ (FH 0472-2) Bred England, Essex, Hockley, 1991, A.J.E. Harman, Originally Costa Rica, 1989; 4 eggs (FH 0472-E): ex Zucht. W. Potvin (Belgien), 1992; ♀ (OZ) Bred England, Essex, Hockley, 14.x.1992, A.J.E. Harman, [ex.] A. Harman & M. Salton coll.; ♂ (PEB-413), ♀ (PEB-412), 2 eggs (PEB-414) Captive bred by P.E. Bragg, 1990. Original stock collected by Allan Harman, 1989.

Diagnosis

Typical for *Phanocles* Stål, 1875, and closely related to the type-species *Phanocles burkartii* (Saussure, 1868), but differing in smaller size, comparatively slender body, the smaller dilation of abdominal tergite VII and the lack of large lobes on the head and extremities.

Description of male (Figs. 1 & 3)

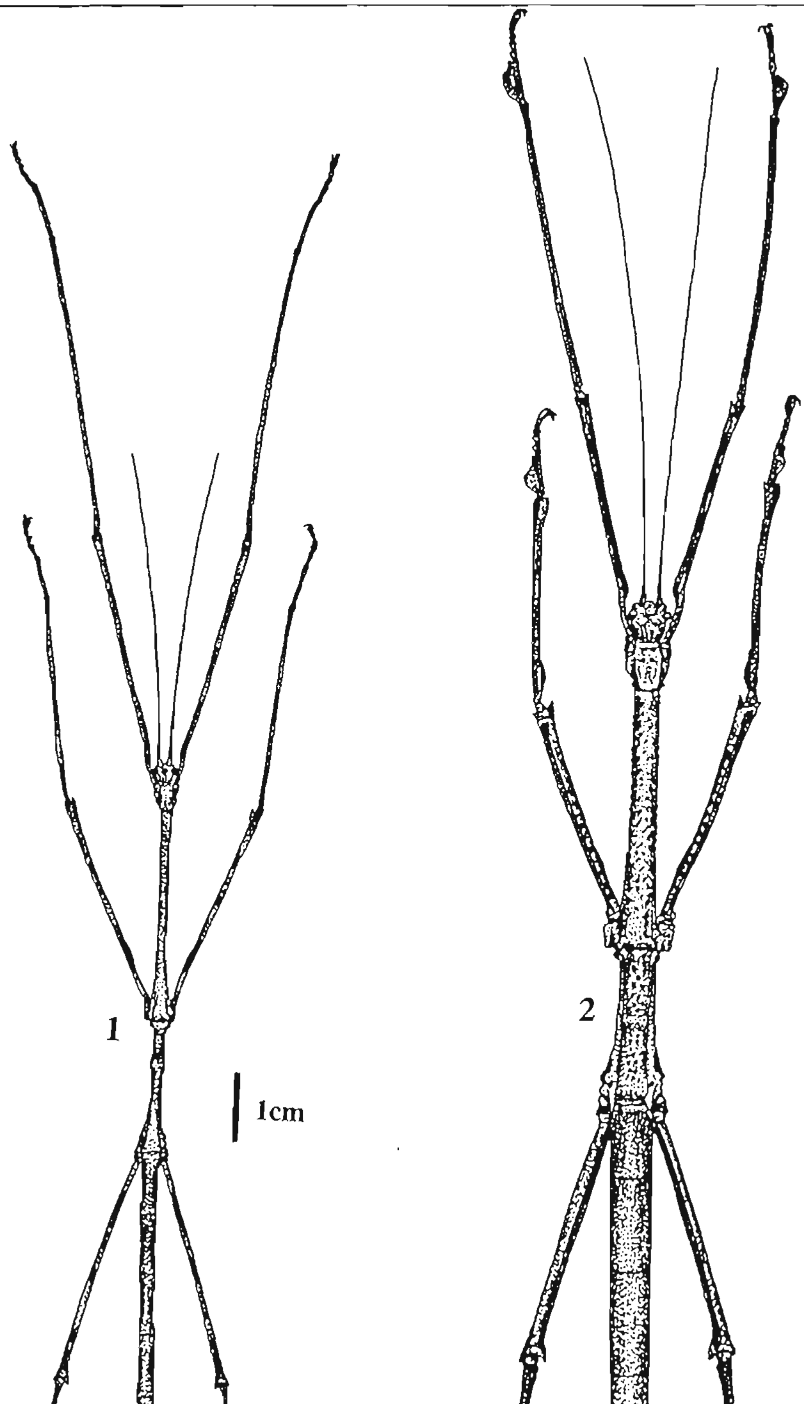
Medium sized for the genus, very slender, smooth, not glossy, dark brown. Mesothorax and mesosternum slightly greenish. Mesofemora apically with broad yellow and black band. Meso- and metatibiae annulated in lighter brown.

Head almost spherical, slightly longer than broad, with two granules between eyes. Eyes projecting hemispherically, with a triangular, black impression between them and with an almost oval, smooth and lighter coloured area at their anterior margin. Back of head with black median line and four dark brown lateral lines on straw coloured background. Antennae reaching posterior of abdominal tergite V. Scapus dorsoventrally depressed, rounded quadrangular, with two elongated furrows ventrally. Pedicellus almost cylindrical, more than two thirds of its width and more than one third of the length of the scapus. Following segments elongated, annulated, indistinctly separated from each other.

Pronotum as long as head, but more slender, lateral margins slightly narrowed in median section. Anterior strongly marginated, followed by a row of three deep depressions. Posterior not marginated. Median line very fine, transverse depression quite shallow. Mesonotum long, slender, parallel-sided, except for slight dilation at mesocoxae. Metanotum very short, only half the length of the median segment, both smooth and parallel-sided.

Abdominal segments darker than thorax, smooth. II shorter than median segment. Length of segments increasing up to V. VI as long as II, VII shorter than VI and only half the length of V. VIII and IX equal in length. Anal segment about two thirds the length of IX. The three terminal segments combined as long as V. Posterior of tergite VIII with a regular dilation. Anterior of IX as broad as VIII, strongly narrowing, the posterior half parallel-sided and of same width as V, strongly laterally depressed. Anal segment convex, pointing downwards, posterior third with median carina. Cerci not projecting beyond posterior margin of anal segment, almost straight, pointing downwards. Vomer with prominent median-furrow on ventral surface. Lamina subgenitalis cup-like, posteromedian with triangular tip and posteriorly depressed and margined thorn in centre.

Profemora basally curved, triangular in cross-section, carinae marginated, with fine black hairs. Cross-section of protibiae quadrate, bristled. Probasitarsus slightly longer than remaining segments combined, with a flat bristled dorsal carina. Second tarsal segment as



Figures 1 & 2. *Phanocles costaricensis* n.sp. **1.** Male (paratype); **2.** Female (paratype).

long as the following two combined; fourth half the length of third; all marginated and bristled; last segment as long as second. Mesofemora trapezoidal in cross-section, posterior surface slightly thickened apically, bristled; apical half annulated, yellow at apical end with the swollen area black and followed by a smooth yellow band; distal half greyish brown. Mesotibiae quadrate in cross-section, all carinae bristled. Mesobasitarsus as long as the remaining segments combined, structured like the protarsus. Hind legs as mid legs but with the swollen area of femora less prominent.

Measurements are given in table 1.

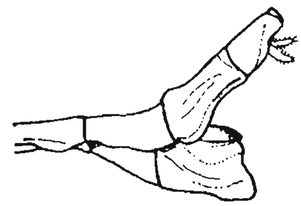


Figure 3. Male, terminal segments, lateral view.

Table 1. *Phanocles costaricensis* n.sp., measurements in millimetres

	Holotype ♂	Paratype ♂♂	Paratype ♀♀ (wild caught)	Paratype ♀♀ (wild caught)
Body	111.8	115.5-118.5	174.0-203.2	158.3-190.0
Body (incl. operculum)	-	-	176.0-211.0	160.5-192.0
Antennae	93.0	> 82.0	90.0	> 73.0
Head	3.5	3.8	7.1-8.8	6.1-7.5
Pronotum	3.6	3.7-4.0	6.7-7.0	6.1-7.1
Mesonotum	28.5	29.0-30.0	37.8-43.6	36.3-43.5
Metanotum	7.0	6.0-7.5	11.4-13.7	10.5-12.0
Median segment	10.4	12.0-11.7	11.7-12.9	11.0-12.1
Profemora	35.4	37.3-37.6	37.0-41.7	37.2-40.0
Mesofemora	27.3	30.4-31.1	29.4-35.0	28.5-38.8
Metafemora	32.8	35-6-35.8	35.0-39.7	32.4-38.6
Protibiae	42.3	45.0-45.9	40.2-43.1	40.8-45.4
Mesotibiae	30.8	32.5-32.8	30.0-33.8	31.0-34.2
Metatibiae	37.2	38.1-39.8	37.0-42.0	36.1-43.0

Description of female (Figs. 2 & 4)

Large, more massive than male, but generally slender insect. Colour uniformly brown, however specimens range from mid-brown to grey when alive. Measurements in table 1.

Head almost spherical, slightly longer than broad, with two stout tubercles behind eyes, similar to the male. Paler area at anterior margin of eyes. Antennae as in male, but only reaching to posterior of abdominal tergite II.

Pronotum as long as head, lateral margins slightly convex. Transverse depression deep.

Anterior half of pronotum with two small tubercles directly next to median line, posterior half with a row of small granules on both sides of median line. Mesonotum as broad as pronotum, covered with several tubercles of different sizes, posterior slightly broadened, the posterior margin strongly raised. Mesosternum tuberculate. Metanotum clearly shorter than median segment, armed as mesonotum.

Median segment with less prominent tubercles than metanotum, as long as abdominal segment II. Remaining abdominal segments smooth. III longer than II, IV the widest and longer than III. V longer than IV. Tergite VII with small lateral lobe ending in a pointed tooth posteriorly. Segment VII as long as II. Sternite VII with a posteromedian praeopercular-organ which can only be seen as two small granules on both sides of the median line. Tergites VIII to X more slender than VII, all of same width; VIII to X combined as long as V. Tergite VIII almost as long as the remaining combined. Tergite IX slightly longer than anal segment, the latter with a faint median carina. Operculum keeled, projecting beyond posterior margin of anal segment by length of tergite IX and X combined; slightly narrower at posterior margin of tergite VIII getting much broader at IX, lateral margins curved upwards. Fila ovipositorius (inferior valvulae) projecting beyond anal segment by the length of tergite IX. Cerci short, not reaching to apex of anal segment.

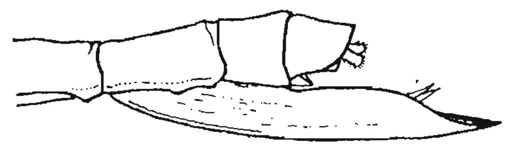
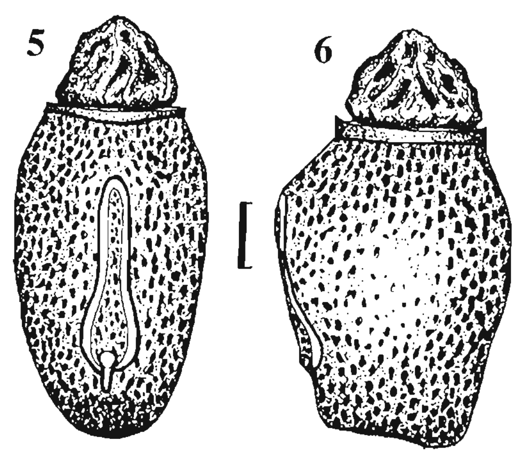


Figure 4. Female, terminal segments, lateral view.

Profemora basally curved, triangular in cross-section, broadly carinated, bristled. Protibiae as in male, but the carinae more prominent. Probasitarsus as long as remaining segments excluding claw, with a high rounded triangular dorsal carina. Second segment as long as the following two combined, third twice as long as fourth. Fifth as long as second and third combined. Mesofemora trapezoidal in cross-section, furrowed dorsally, posteroventral carina slightly dilated and swollen in apical third. Ventral carinae of mesotibia apically rounded. Mesobasitarsus as long as the following three segments combined, the segments as in protarsus. Hind legs as mid legs, but the elevated ventral carinae of tibia less prominent.



Figures 5 & 6. Egg. **5.** Dorsal view; **6.** Lateral view. (scale line = 1mm).

Description of egg (Figs. 5 & 6)

Capsule grey, lateral area brown; dorsally and ventrally strongly convex, and slightly depressed at the polar end. Whole surface strongly punctate. Micropylar plate elongate, two thirds as long as capsule, slightly projecting, with white margin; inner area as punctate as capsule. Micropylar cup dark brown. Operculum almost round, flat. Capitulum large, orange and strongly domed with several irregular depressions. Measurements: Length (including capitulum) 4.4mm; capsule length 3.5mm; width 1.5mm; height 2.4mm.

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The author thanks A.J.E. Harman (Essex) for donation of the specimens, J. Potvin (Belgium) for permission to use his nice drawings of the types, O. Zompro (Max-Planck-Institut für Limnologie, Plön, Germany) for helpful discussions about the identity of the new species, Judith Marshall (BMNH) for arranging the loan of the specimens.

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Reviews and Abstracts.

Phasmid Abstracts

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

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

Akay, T., Baessler, U., Gerharz, P. & Bueschges, A. (2001) The role of sensory signals from the insect coxa-trochanteral joint in controlling motor activity of the femur-tibia joint. *Journal of Neurophysiology*, 85(2) 594-604.

Interjoint coordination in multi-jointed limbs is essential for the generation of functional locomotor patterns. Here we have focused on the role that sensory signals from the coxa-trochanteral (CT) joint play in patterning motoneuronal activity of the femur-tibia (FT) joint in the stick insect middle leg. This question is of interest because when the locomotor system is active, movement signals from the FT joint are known to contribute to patterning of activity of the central rhythm-generating networks governing the CT joint. We investigated the influence of femoral levation and depression on the activity of tibial motoneurons. When the locomotor system was active, levation of the femur often induced a decrease or inactivation of tibial extensor activity while flexor motoneurons were activated. Depression of the femur had no systematic influence on tibial motoneurons. Ablation experiments revealed that this interjoint influence was not mediated by signals from movement and/or position sensitive receptors at the CT joint, i.e., trochanteral hairplate, rhombal hairplate, or internal levator receptor organ. Instead the influence was initiated by sensory signals from a field of campaniform sensillae, situated on the proximal femur (fCS). Selective stimulation of these fCS produced barrages of inhibitory postsynaptic potentials (IPSPs) in tibial extensor motoneurons and activated tibial flexor motoneurons. During pharmacologically activated rhythmic activity of the otherwise isolated mesothoracic ganglion (pilocarpine, 5×10^{-4} M), deafferented except for the CT joint, levation of the femur as well had an inhibitory influence on tibial extensor motoneurons. However, the influence of femoral levation on the rhythm generated was rather labile and only sometimes a reset of the rhythm was induced. In none of the preparations could entrainment of rhythmicity by femoral movement be achieved, suggesting that sensory signals from the CT joint only weakly affect central rhythm-generating networks of the FT joint. Finally, we analyzed the role of sensory signals from the fCS during walking by recording motoneuronal activity in the single middle leg preparation with fCS intact and after their removal. These experiments showed that fCS activity plays an important role in generating tibial motoneuron activity during the stance phase of walking.

Andreetti, A. & Osella, G. (2001) Blattaria, Mantodea, Orthoptera, Phasmatodea, Dermaptera, dei Monti della Laga: Faunistica, ecologia e zoogeografia (Artropoda, Insecta). *Memorie del Museo Civico di Storia Naturale di Verona* (2 Serie) *Sezione Scienze della Vita,* (14): 3-93. [in Italian]

The results of our research on the Orthopteroidea Insects (Blattodea, Mantodea, Orthoptera, Dermaptera and Phasmida) of the Laga Mts., Mt. Prato and Montagna dei Fiori Massif (Central Apennines, Italy) are analyzed and discussed and include 67 taxa in total.

This number was obtained from field research over a three year period (1996/1998) and the literature data. For each examined taxon the following notes are reported: literature data, list of the examined specimens (Laga Mts., Mt. Prato and Montagna dei Fiori Massif as well as the available unpublished data for the Central Apennines), the Italian and general chorology together with biological, chorological and zoogeographical notes. Sixty-two species were found in the Laga Mts., 30 in Mt. Prato and 29 in Montagna dei Fiori Massif. The most interesting analyzed species from both a faunistical and zoogeographical point of view are: *Barbitistes yersini* Brunner which has just been listed as part of the Apennine fauna therefore its Apennine distribution and ecology are explained; *Polysarcus denticauda* (Charpentier), up till now listed as a Central European taxon, in the Central Apennines it is known exclusively from the Reatini Mt. and the Gran Sasso massif, a small colony has also been found in the Laga Mts.; *Meconema meridionale* Costa, *M. thalassinum* (De Geer) and *Cyrtaspis scutata* (Charpentier), these rare (due to their ecology) mediterranean arboreal species have been found in several localities of the interior Central Apennines; *Eupholidoptera danconai* La Greca has been collected on the Montagna dei Fiori Massif and is the first finding in the Central Apennines of this very rare taxon envisaged as being endemic to the Southern Apennines; *Ephippiger melisi* Baccetti and *E. ruffoi* Galvagni, new findings of these uncommon Central Apennine endemic species are listed; *Podisma emiliae* Ramme, endemic to the Northern Apennines, new for the Central Apennines (Mt. Prato); *Podisma goidanichi* Baccetti, an endemic species to the Gran Sasso (Prati di Tivo and Mt. San Franco) is regarded for the first time as being common and widely distributed in all high pastures of the Laga Mts; *Euthystira brachyptera* (Ocskay), a new species for the Apennines, up till now listed in Italy only in the Alps and Calabria, two small colonies have been found in the Laga Mts. (Capricchia - Sacro Cuore and Monte Gorzano - Stazzo del Gorzano); *Glyptobothrus apricarius* (Herrich-Schaefer), the Laga Mts are the most southern occurrence of this Eurosibirian species, the taxon is exceptionally rare in the Apennines. A comparative analysis of the most interesting ecological peculiarities of the orthopteran fauna of the Laga Mts. with other Central Apennine massifs is given together with a Canonical Variates Analysis and comments on living in pastures at high altitudes.

Auerswald, L., Birguel, N., Gade, G., Kreienkamp, H.J. & Richter, D. (2001) Structural, functional, and evolutionary characterization of novel members of the allatostatin receptor family from insects. *Biochemical and Biophysical Research Communications,* 282(4): 904-909.

By using degenerate primers based on known mammalian somatostatin receptors and the recently identified *Drosophila* allatostatin receptors (AlstR), we have cloned a novel receptor for the neuropeptide, allatostatin, from the cockroach *Periplaneta americana*. The receptor exhibits about 60% amino acid identity in the transmembrane regions when compared to the two known AlstRs from *Drosophila melanogaster*. In addition, two cDNA fragments were obtained from the stick insect *Carausius morosus*, one of which is similar to *Drosophila* AlstR, whereas the other is more similar to mammalian somatostatin receptors. Functional expression in *Xenopus* oocytes shows that the *Periplaneta*-AlstR exhibits high affinity to endogenous cockroach allatostatin peptides. Studies with synthetic peptides demonstrate that agonistic activity is mediated by the conserved C-terminal pentapeptide YXFGL-amide; in this sequence, amidation of the C-terminus is obligatory to maintain affinity. Thus, our studies provide a molecular basis for understanding the widespread biological activities of the allatostatin peptides.

Bullini, L. & Nascetti, G. (2002) Soortvorming door hybridisatie in wandelende takken en andere insecten. *Phasma*, 12(45): 3-10. [in Dutch]

Translation, by K. D'Hulster, of the section relating to phasmids from "Speciation by hybridization in phasmids and other insects". This was originally published in 1990 in *Canadian Journal of Zoology*, 68: 1747-1760.

Cecchettini, A., Falleni, A., Gremigni, V., Locci, M.T., Masetti, M., Bradley, J.T. & Giorgi, F. (2001) Yolk utilization in stick insects entails the release of vitellin polypeptides into the perivitelline fluid. *European Journal of Cell Biology*, 80(7): 458-465.

This study investigates the developmental fate of vitellin (Vt) polypeptides generated by limited proteolysis in an insect embryo. To this end, a number of polyclonal (pAb) and monoclonal antibodies (mAb) were raised against the yolk sac and the perivitelline fluid of late embryos of the stick insect *Carausius morosus*. Two dimensional immuno gel electrophoresis and Western blotting demonstrate that polypeptides resulting from Vt processing are present both in the yolk sac and the perivitelline fluid. At the confocal microscope, different labelling patterns were detected in the ooplasm. depending on the stage of development attained by the embryo. At early developmental stages, label is associated with large unsegmented portions of the fluid ooplasm. During embryonic development, the fluid ooplasm is gradually transformed into yolk granules by intervention of vitellophages. Prior to dorsal closure, the yolk sac is separated from the perivitelline fluid by interposition of serosa cells (the so called serosa membrane). Several mAbs raised against the perivitelline fluid react specifically with this membrane suggesting that the release of Vt polypeptides from the yolk sac occurs by intracellular transit through the serosa cells. By immunocytochemistry, gold label appears associated with the cell surface and a number of vacuoles of the serosa membrane. These data are interpreted as suggesting that Vt polypeptides resulting from limited proteolysis in stick insect embryos are not exhaustively degraded within the yolk sac, but are instead transferred transcytotically to the perivitelline fluid through the serosa membrane.

Cermak, M. & Hasenpusch, J.W. (2000) Distribution, biology and conservation status of the peppermint stick insect, *Megacrania batesii* (Kirby) (Phasmatodea: Phasmatidae), in Queensland. *Memoirs of the Queensland Museum*, 46(1): 101-106.

Megacrania batesii was studied in the Wet Tropics region of north Queensland. Its natural history and distribution is reviewed and supplemented by observations in the field and in captivity. Surveys found a substantial, sexually-reproducing population at Cape Tribulation in a range of habitats. Three parthenogenetic populations south of Cairns are confined to small patches of habitat adjacent to beaches. The reliance of *M. batesii* on *Pandanus* was confirmed and the range of *Pandanus* species eaten was expanded. The species is under no immediate threat but fits the IUCN criteria for Vulnerable on the basis that its population occurs over an area of less than $100km^2$ and could be further threatened if any one subpopulation is extirpated.

Duerr, V. (2001) Stereotypic leg searching movements in the stick insect: Kinematic analysis, behavioural context and simulation. *Journal of Experimental Biology*, 204(9): 1589-1604.

Insects are capable of efficient locomotion in a spatially complex environment, such as walking on a forest floor or climbing in a bush. One behavioural mechanism underlying such adaptability is the searching movement that occurs after loss of ground contact. Here, the kinematic sequence of leg searching movements of the stick insect *Carausius morosus* is analyzed. Searching movements are shown to be stereotypic rhythmic movement sequences consisting of several loops. The typical loop structure allows the mean tarsus trajectory to be calculated using a feature-based averaging procedure. Thus, it is possible to describe the common underlying structure of this movement pattern. Phase relationships between joint angles, analyzed for searching front legs, indicate a central role for the thorax-coxa joint in searching movements. Accordingly, the stereotyped loop structure of searching differs between front-, middle-and hindlegs, with leg-specific patterns being caused by differing protraction/retraction movements in the thorax-coxa joint. A simple artificial neural network that had originally been devised to generate simple swing movements allows two essential features of empirical searching trajectories to be simulated: (i) cyclic movements and (ii) the smooth transition into a search trajectory as a non-terminated swing movement. It is possible to generate several loops of a middle-leg search, but the precise size and shape of the loops fall short of a real-life approximation. Incorporation of front-leg retraction or hind-leg protraction during searching will also require an extension to the current model. Finally, front-leg searching occurs simultaneously with antennal movements. Also, because leg searching movements are a local behaviour, the legs remaining on the ground continue their stance phase, causing a forward shift of the body, including the searching leg. As a result of this shift, the centre of the searched space is close to the anterior extreme position of the tarsus during walking, representing the location of most likely ground contact according to past experience. Therefore, the behavioural relevance of searching movements arises from the combined actions of several limbs.

Duerr, V., Koenig, Y. & Kittmann, R. (2001) The antennal motor system of the stick insect *Carausius morosus*: Anatomy and antennal movement pattern during walking. *Journal of Comparative Physiology A Sensory Neural and Behavioral Physiology*, 187(2): 131-144.

The stick insect *Carausius morosus* continuously moves its antennae during locomotion. Active antennal movements may reflect employment of antennae as tactile probes. Therefore, this study treats two basic aspects of the antennal motor system: First, the anatomy of antennal joints, muscles, nerves and motoneurons is described and discussed in comparison with other species. Second, the typical movement pattern of the antennae is analyzed, and its spatio-temporal coordination with leg movements described. Each antenna is moved by two single-axis hinge joints. The proximal head-scape joint is controlled by two levator muscles and a three-partite depressor muscle. The distal scape-pedicel joint is controlled by an antagonistic abductor/adductor pair. Three nerves innervate the antennal musculature, containing axons of 14-17 motoneurons, including one common inhibitor. During walking, the pattern of antennal movement is rhythmic and spatio-temporally coupled with leg movements. The antennal abduction/adduction cycle leads the protraction/retraction cycle of the ipsilateral front leg with a stable phase shift. During one abduction/adduction cycle there are typically two levation/depression cycles, however, with less strict temporal coupling than the horizontal component. Predictions of antennal contacts with square obstacles to occur before leg contacts match behavioural performance, indicating a potential role of active antennal movements in obstacle detection.

Fischer, H., Schmidt, J., Haas, R. & Bueschges, A. (2001) Pattern generation for walking and searching movements of a stick insect leg. I. Coordination of motor activity. *Journal of Neurophysiology*, 85(1): 341-353.

During walking, the six legs of a stick insect can be coordinated in different temporal sequences or gaits. Leg coordination in each gait is controlled and stabilized by coordinating mechanisms that affect the action of the segmental neuronal networks for walking pattern generation. At present, the motor program for single walking legs in the absence of movement-related coordinating intersegmental influences from the other legs is not known. This knowledge is a prerequisite for the investigation of the segmental neuronal mechanisms that control the movements of a leg and to study the effects of intersegmental coordinating input. A stick insect single middle leg walking preparation has been established that is able to actively perform walking movements on a treadband. The walking pattern showed a clear division into stance and swing phases and, in the absence of ground contact, the leg performed searching movements. We describe the activity patterns of the leg muscles and motoneurons supplying the coxa-trochanteral joint, the femur-tibial joint, and the tarsal leg joints of the middle leg during both walking and searching movements. Furthermore we describe the temporal coordination between them. During walking movements, the coupling between the leg joints was phase-constant; in contrast during searching movements, the coupling between the leg joints was dependent on cycle period. The motor pattern of the single leg generated during walking exhibits similarities with the motor pattern generated during a tripod gait in an intact animal. The generation of walking movements also drives the activity of thoraco-coxal motoneurons of the deafferented and de-efferented thoraco-coxal leg joint in a phase-locked manner, with protractor motoneurons being active during swing and retractor motoneurons being active during stance. These results show that for the single middle leg, a basic walking motor pattern is generated sharing similarities with the tripod gait and that the influence of the motor pattern generated in the distal leg joints is sufficient for driving the activity of coxal motoneurons so an overall motor pattern resembling forward walking is generated.

Geens, V. (2001) Hoe een takkenkooi maken in 5 minuten? *Phasma*, 11(44): 89-90. [in Dutch].

The author explains how to build a phasmid cage in five minutes, with very cheap material. She uses a five litre plastic bottle and transforms it into a practical cage. It is very useful for small species and for nymphs of larger species. It can also be used as a temporary cage while waiting for a better one to be built.

Huang, Y.S.F. & Brock, P.D. (2001) A new species of *Phasmotaenia* Navas (Phasmida: Phasmatidae) from Taiwan. *Journal of Orthoptera Research*, 10(1): 9-14.

Phasmotaenia lanyuhensis n.sp. is described from four female and three male specimens collected in Lanyuh Island (south-east Taiwan). This species is characterized from others in the genus by its shorter hind wings, and shorter length of operculum. A key to females of the genus is provided; males have not previously been recorded. Adults and eggs are described and figured.

Lelong, P. & Langlois, F. (2001) Contribution a la connaissance des Phasmatodea de la Guadeloupe. *Bulletin de la Societe Entomologique de France*, 106(3): 241-258. [in French]

Two faunistic inventories allowed us to update the knowledge of Phasmatodea of Guadeloupe. Ten species are presented, with identification keys for adults and eggs. The distribution of these species is also discussed.

Leps, J., Novotny, V. & Basset, Y. (2001) Habitat and successional status of plants in relation to the communities of their leaf-chewing herbivores in Papua New Guinea. *Journal of Ecology*, 89(2): 186-199.

The spatial distribution of 30 woody species (15 species each of Euphorbiaceae and Moraceae) and their associated leaf-chewing communities (Orthoptera, Phasmatodea, Coleoptera and Lepidoptera) were studied in coastal, riverine and rain forest habitats. A successional series, from abandoned gardens to primary forest, was examined. Host plant records for more than 27,000 insects, all verified by feeding experiments, and spatial distribution of almost 900 plant specimens were evaluated.

Phylogenetic (taxonomic) relatedness of host plants explained 56% of the variability in the composition of their herbivore communities, while the ecological (distribution) similarity of plants explained only 4%.

The successional optimum of plant species was not an important determinant of the composition of their herbivore communities.

Neither plant successional optimum nor plant palatability to a generalist herbivore were correlated with the number of species, abundance or host specificity of its herbivores, nor was there a correlation between a plant's palatability to a generalist herbivore and its successional optimum.

Herbivore communities became dominated increasingly by a few abundant species in later stages of succession.

On average, Ficus species had lower palatability and supported more species of herbivores than species of Euphorbiaceae. The abundance of herbivores and their dominance index were not significantly different between the two plant families.

These results contradict several previous studies of successional trends in temperate regions. Many tropical successions, however, start with pioneer trees, rather than with annual herbs, and may present a permanent and predictable habitat for insects even at the earliest stages, with no advantage for polyphagous species. Numerous pioneer trees in the tropics possess anti-herbivore defences, resulting in their low palatability to generalists, increased host specificity of herbivores, and often idiosyncratic composition of herbivore communities. Even plant traits such as species richness of their herbivores or palatability may have a phylogenetic component which should not be ignored.

Marescalchi, O. & Scali, V. (2001) New DAPI and FISH findings on egg maturation processes in related hybridogenetic and parthenogenetic *Bacillus* hybrids (Insecta, Phasmatodea). *Molecular Reproduction and Development*, 60(2): 270-276.

Bacillus stick insects have proved adequate for studying a wide array of reproductive modes: sexual, parthenogenetic, hybridogenetic, androgenetic. Hybridogenetic strains (*B. rossius-grandii*) were thought to discard the paternal "*grandii*" haploset during first meiotic division and keep the "*rossius*" hemiclone, whereas the clonal *B. whitei* (=*rossius/grandii*) would maintain its hybrid structure by fusing back two nonsister nuclei-each derived from previously segregated heterospecific complements-by the end of the 2nd meiotic division. New investigations on laid eggs and ovariole squashes, either DAPI stained or FISH labelled, revealed that in hybridogens the "*grandii*" set is excluded from the germ line prior to meiosis and that a DNA extra-synthesis should occur to produce hemiclonal eggs after two cytologically normal meiotic divisions. On the other hand, in *B. whitei* eggs no genome segregation appears to occur and an intrameiotic DNA extra-synthesis must take place to produce 2n tetrachromatidic oocytes I; these divide twice and give unreduced clonal eggs. The new findings bring hybridogenetic oogenesis of Bacillus to be coincident with that of the known hemiclonal organisms and point to an independent onset of *B. whitei* from hemiclonal strains. In addition, *B. whitei* gains a closer resemblance to *B. lynceorum* owing to the sharing of a cytologically identical egg maturation mechanism, of the same maternal ancestor and of peculiar chromosomal features. It is here suggested that *B. lynceorum* originated from the incorporation of an "atticus" genome into a *B. whitei* egg, according to a pathway of repeated hybridization often occurred with other polyploid hybrids.

Potvin, W. (2001) Wandelende takken plukken in West-Maleisië, juli 2001. *Phasma*, 11(44): 98-118. [in Dutch].

The author tells about his successful collecting trip to Singapore and West Malaysia on which he was accompanied by a friend from the Dutch/Belgian group Phasma. They collected a total of 582 phasmids from 43 different species from many different locations, collecting for about three hours each evening. Some evenings were fantastic, on other occasions they did not even find a single nymph. They carefully noted the collecting data of each specimen and some species were found in previously unrecorded localities.

Potvin, W. (2001) Uitwendige bouw van wandelende takken en bladeren. *Phasma*, 11(44): 120-125. [in Dutch].

The author explains the external anatomy of phasmids. The most frequently used terms are illustrated and explained, the more specialised (taxonomic) terms are omitted. The aim of this article is to help readers understand certain texts about phasmids, in which words like thorax, femur, median segment etc. are often used.

Potvin, W. (2002) Invoeren van wandelende takken. *Phasma*, 12(45): 2. [in Dutch].

The author tells about importing stick insects from the tropics. Phasmid species (except one) are not protected by law and can be freely captured and imported. However, it can be hard to get a new species home alive and to find the suitable conditions to breed it.

[*Phasmid Studies* Editor's note: While it may be true that only one species is protected by international law, some countries do have export restrictions which cover all animals including stick insects (e.g. Australia). Therefore you may not be breaking the law by bringing the animal into your home country, but you could be breaking local laws by taking it out of its original country. Some countries also have import restrictions, e.g. Australia and USA, so an import permit would be needed.]

Rabaey, K. (2002) *Entoria victoria*, een wandelende tak van Hong Kong. *Phasma*, 12(45): 13-14. [in Dutch].

Entoria victoria is a stick insect from Hong Kong with a name that sounds like music. The author received the eggs from Sean Cheng living in Hong Kong and she had the luck to bring them into culture in Belgium. It seems an easy species which accepts bramble, rose and oak in captivity.

Rabaey, K. & Simoens, R. (2001) *Pandanus*, een voedselplant voor de *Megacrania* soorten. *Phasma*, 11(44): 127-128. [in Dutch].

The authors report on the *Pandanus* palm as the only suitable foodplant for stick insects of the genus *Megacrania*. They briefly describe a few species of *Pandanus* which can be kept as household plants. One needs a good quantity of *Pandanus* to breed *Megacrania* species since they eat a lot.

Schmidt, J., Fischer, H. & Bueschges, A. (2001) Pattern generation for walking and searching movements of a stick insect leg. II. Control of motoneuronal activity. *Journal of Neurophysiology*, 85(1): 354-361.

In the stick insect, *Cuniculina impigra*, intracellular recordings from mesothoracic motoneurons that control flexion and extension of the tibia and depression and levation of the trochantero-femur were made while the leg performed walking-like movements on a treadband or stereotyped rhythmic searching movements. We were interested in how synaptic input and intrinsic properties contribute to form the activity pattern of motoneurons during rhythmic leg movements without sensory feedback from other legs. During searching and walking, motoneurons expressed a rhythmic bursting pattern that was formed by a depolarizing input followed by a hyperpolarizing input in the inter-burst interval. This basic pattern was similar in all fast, semi-fast, and slow motoneurons that were recorded. Hyperpolarizations were in synchrony with activity in the antagonistic motoneurons. De- and hyperpolarizations were associated with a decrease in input resistance. All motoneurons showed spike frequency adaptation when depolarized by current injection to a membrane potential similar to that observed during walking. In the hyperpolarizing phase of fast flexor motoneurons, the initial maximum hyperpolarization was followed by a sag in potential toward more depolarized values. Consistent with this observation, only fast flexor motoneurons developed a depolarizing sag potential when hyperpolarized by injection of constant negative current.

Schmitz, J., Dean, J., Kindermann, T., Schumm, M. & Cruse, H. (2001) A biologically inspired controller for hexapod walking: Simple solutions by exploiting physical properties. *Biological Bulletin (Woods Hole)*, 200(2): 195-200.

The locomotor system of slowly walking insects is well suited for coping with highly irregular terrain and therefore might represent a paragon for an artificial six-legged walking machine. Our investigations of the stick insect *Carausius morosus* indicate that these animals gain their adaptivity and flexibility mainly from the extremely decentralized organization of the control system that generates the leg movements. Neither the movement of a single leg nor the coordination of all six legs (i.e., the gait) appears to be centrally pre-programmed. Thus, instead of using a single, central controller with global knowledge, each leg appears to possess its own controller with only procedural knowledge for the generation of the leg's movement. This is possible because exploiting the physical properties avoids the need for complete information on the geometry of the system that would be a prerequisite for explicitly solving the problems. Hence, production of the gait is an emergent property of the whole system, in which each of the six single-leg controllers obeys a few simple and local rules in processing state-dependent information about its neighbours.

Simoens, R. (2002) Determinatie van *Hoploclonia*. *Phasma*, 12(45): 11-12. [in Dutch].

The author gives a brief description of the care of *Hoploclonia* species and a determination key, based on the recent book by Phil Bragg (*Phasmids of Borneo*, Natural History Publications (Borneo), Kota Kinabalu. ISBN 983-812-027-8).

Taddei, A.R., Gambellini, G., Fausto, A.M., Baldacci, A. & Mazzini, M. (2000) Immunolocalization of different tubulin epitopes in the spermatozoon of *Bacillus rossius* (Insecta, Phasmatodea). *Journal of Submicroscopic Cytology and Pathology*, 32(4): 635-643.

The existence of distinct tubulins in microtubules forming the sperm axoneme has been demonstrated in various species, whereas little is known about the distribution of tubulin variants in insect spermatozoa. In the present study, a panel of specific antibodies has been used to investigate the presence and localization of tubulin isotypes and post-translationally modified tubulins in the spermatozoon of the stick insect *Bacillus rossius*. Indirect immunofluorescence and immunogold staining showed differences in labelling in the mature sperm and that the tubulin epitopes localized differentially in the axoneme. In particular, the tyrosinated alpha-tubulin mainly occurs on doublets. These results provide an insight into the molecular composition of the microtubules forming the sperm axoneme of *B. rossius* and suggest that the structural specificity could reflect distinct functional roles within axonemal microtubules.

Tilgner, E.H., Camilo, G.R. & Moxey, C.F. (2000) A new species of *Lamponius* (Phasmida: Phasmatidae) from Puerto Rico. *Journal of Orthoptera Research*, 9: 37-39.

The phasmid *Lamponius nebulosus* is described and information is provided about host plants, defensive behaviour, and distribution.

Zompro, O. (2001) Redescription and new synonymies of *Heteronemia* Gray, 1835 (Insecta: Phasmatodea) transferred to the suborder Areolatae. *Studies on Neotropical Fauna and Environment*, 36(3): 221-225.

Re-examination of the holotype of the stick insect species *Heteronemia mexicana* Gray, 1835, the type species of the genus *Heteronemia* Gray, 1835, has revealed this species to actually represent the suborder Areolatae. This discovery results in a number of dramatic nomenclatural alterations. As the family Heteronemiidae is based on *Heteronemia*, all of its more than 160 constituent genera but *Heteronemia* must be reallocated, being members of the suborder Anareolatae. The Diapheromeridae Kirby, 1904, n.stat., being the next oldest available name, is thus allocated full family rank to encompass them. The following new synonyms have been established: generic synonyms of *Heteronemia* Gray, 1835 are *Bacunculus* Burmeister, 1838, *Bactridium* Saussure, 1868, *Bacillidium* Uvarov, 1939, and *Donusa* Stål, 1875. Synonyms of *Heteronemia mexicana* Gray, 1835 are *Prisomera phyllopus*, Gray, 1835, *Bacunculus spatulatus* Burmeister, 1838, *Bactridium coulonianum* Saussure, 1868, *Donusa prolixa* Stål, 1875, *Bacteria foliacea* Blanchard, 1851, and *Donusa glabriuscula* Redtenbacher, 1906. Synonyms of *Heteronemia chilensis* (Westwood, 1859) are *Bacteria cornuta* Philippi, 1863, *Bacteria collaris* Philippi, 1863, and possibly *Bacunculus blanchardi* Camousseight, 1988. *Heteronemia* is rediagnosed, becoming the only genus in the family Heteronemiidae and comprising but two valid species, *mexicana* and *chilensis*, both from Chile. Hence the holotype of *mexicana*, claimed to derive from Mexico, was apparently mislabelled. A lectotype is designated for *Bacunculus spatulatus* Burmeister, 1838.

Zompro, O. (2001) The type-material of the insect order Phamatodea, described by Johann Jacob Kaup. *Senckenbergiana biologica*, 81(1/2): 133-145.

The type material of 23 taxa of the insect order Phasmatodea described by Johann Jakob Kaup and housed in the Hessisches Landesmuseum, Darmstadt, Germany (HLDH), and Senckenberg-Museum, Frankfurt am Main, Germany (SMF) is listed. If possible, teh actual taxonomic position of each taxon is provided. Lectotypes are designated for *Clonistria cacica* Kaup, 1871, *Ceroys capreolus* Kaup, 1871, *Lonchodes duivenbodei* Kaup, 1871, *Acanthoderous hystrix* Kaup, 1871, *Pachymorpha novaeguineae* Kaup, 1871, *Acanthoderous occipitalis* Kaup, 1871, *Eurycantha rosenbergii* Kaup, 1871, *Ophicrania straticollis* Kaup, 1871, and *Necroscia vipera* Kaup, 1871. *Ceroys capreolus* Kaup, 1871 is found to be a new synonym of *Sermyle mexicana* (Saussure, 1859), *Lonchodes duivenbodei* Kaup, 1871, a new synonym of *Periphetes forcipatus* (Bates, 1865). *Bacteria cacica* Kaup, 1871, is transferred to *Clonistria* Stål, 1875, *Haplopus grayi* Kaup, 1871 to *Diapherodes* Gray, 1835, *Cladoxerus insignis* Kaup & von Heyden, 1871 to *Hermarchus* Stål, 1875.

Zompro, O. & Adis, J. (2001) A new species of Phasmatodea of the genus *Echetlus* Stål. *Revista de Agricultura*, 76(2): 291-297.

A new species of Phasmatodea, *Echetlus evoneobertii* Zompro & Adis, is described from southern Brazil, where it is likely to have been introduced. This species is destructive to *Eucalyptus urophylla* S.T. Blake (Myrtaceae) which was imported from Australia. *Ernodes sumatranus* Redtenbacher, 1908 is designated as type species for *Ernodes* Redtenbacher, 1908 which is restituted as a valid genus. *Bacunculus tener* Brunner, 1907 is a new synonym of the type species *Echetlus peristhenes* (Westwood, 1859). With that *Echetlus* includes the following species: *Parasipyloidea cercata* Redtenbacher, 1908, *Bacillus peridromes* Westwood, 1859, *Anophelepis periphanes* Westwood, 1859, *Bacillus peristhenes* Westwood, 1859, and *Echetlus evoneobertii* Zompro & Adis, 2001.

The identity of *Lonchodes geniculosus* (Westwood, 1848) – a mistaken Lonchodinae from Malaysia and the description of the female (Phasmatodea: Phasmatidae: Lonchodinae)

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Abstract

Lonchodes geniculosus (Westwood, 1848) was previously only known from the male holotype and has since been incorrectly referred to as a synonym of *Lonchodes geniculatus* Gray, 1835. Comparison of both species proved *Lonchodes geniculosus* (Westwood) to be a valid taxon. A redescription of the male, a description of the newly discovered female and illustrations of both sexes are provided. The systematic position and differentiation of *Lonchodes geniculosus* (Westwood) from other species of *Lonchodes* Gray, 1835 are briefly discussed. A synonymic list for *Lonchodes geniculatus* Gray, 1835 as well as measurements and illustrations of both sexes are provided.

Key words

Phasmida, Phasmatodea, Lonchodinae, *Lonchodes geniculosus*, Malaysia, Myanmar, descriptions, erroneous synonym.

Introduction

There is still much confusion within the taxonomy of the large subfamily Lonchodinae. The males of *Lonchodes* Gray, 1835 and closely related genera prove especially difficult to identify or distinguish. Consequently there are still numerous undescribed synonyms or species which have been erroneously synonymized by previous authors and prove to represent valid taxa. In several cases breeding of the species has been the key for matching the sexes, and as a larger variety of species from this subfamily have been reared in Europe the systematics of this group have improved.

Westwood (1848 : 80) originally described and illustrated (pl. 39 : 4) *Phasma (Bacteria) geniculosum* from a single male collected on Pulau Pinang. Recognizing the species belonged to the genus *Lonchodes* Gray, 1835 (Type-species: *Lonchodes brevipes* Gray, 1835 : 19), Westwood (1859 : 37) synonymized *Lonchodes geniculosus* with *Lonchodes geniculatus* Gray, 1835 after noting the likely synonymy in his original description. Since then, *Lonchodes geniculosus* (Westwood, 1848) has been erroneously referred to as a synonym of *Lonchodes geniculatus* Gray, 1835 by all later authors (Brunner von Wattenwyl, 1907, Brock 1995 & 1999). Kirby (1904a: 372) established his new genus *Staelonchodes* on *L. geniculatus* Gray, 1835, but he did not describe the genus and could not have examined the type specimen in MVMA. By transferring *L. geniculatus* back into *Lonchodes* Gray, 1835 Brock (1995: 86) synonymised the two genera; this still requires confirmation since close examination and comparison shows several characters of the insects and eggs which may confirm the validity of Kirby's *Staelonchodes*. If Brock's identification of *L. geniculatus* is correct, *Staelonchodes* Kirby may have to be reinstated with several of the species currently included in *Lonchodes* being transferred. In his dreadful revision of the genus *Lonchodes* Gray, Günther (1932) does not list either *geniculatus* or *geniculosus*.

Comparison of males and females of an unidentified *Lonchodes* in the author's collection with the holotype of *Lonchodes geniculosus* (Westwood) in OXUM proved these to be the same species. Further research showed the female to be as yet undescribed. Subsequent comparison of these with specimens of *Lonchodes geniculatus* Gray, obtained from local dealers in Peninsular Malaysia and Thailand, and collected by Francis Seow-Choen in Singapore, clearly showed them to represent two distinct species.

Consequently *Lonchodes geniculosus* (Westwood, 1848) is a valid species, which was so far only known from the male sex. Apart from its synonymy and identity being discussed, this paper provides a redescription of the male, a first description of the female as well as illustrations of both sexes. For an easier distinction of the two taxa notes as well as measurements and illustrations for *Lonchodes geniculatus* Gray are also provided.

Searching in other museum and pivate collections only revealed one further male in NHMW which was provisionally identified as "*Lonchodes* sp." and six specimens in the collection of O. Conle (Fischen, Germany) which were obtained from the same source as the specimens in the author's collection.

Abbreviations used:

MVMA: Museum of Victoria, Abbotsford, Victoria, Australia.
NHMW: Naturhistorisches Museum Vienna, Austria.
OXUM: Oxford University Museum, Oxford, England.
FH: Private collection of Frank H. Hennemann, Freinsheim, Germany.
OC: Private collection of Oskar V. Conle, Fischen, Germany.

Lonchodes geniculosus (Westwood, 1848)

Phasma (*Bacteria*) *geniculosum* Westwood, 1848 : 80, pl. 39 : 4. Holotype, ♂: Malacca, Prince of Wales Isl., S. Cantor (OXUM, No. 562).

[*Lonchodes geniculatus*, Westwood, 1859 : 37, synonymized with *Lonchodes geniculatus* Gray, 1835 - **erroneous synonym**]

[**not** *Lonchodes geniculatus*, Brunner von Wattenwyl, 1907 : 258, erroneous reference to *L. geniculosus* (Westwood) as a synonym of *L. geniculatus* Gray]

[**not** *Lonchodes geniculatus*, Brock, 1995 : 86, erroneous reference to *L. geniculosus* (Westwood) as a synonym of *L. geniculatus* Gray]

[**not** *Lonchodes geniculatus*, Brock, 1999 : 170, erroneous reference to *L. geniculosus* (Westwood) as a synonym of *L. geniculatus* Gray]

Material

3♂♂, 3♀♀, Myanmar, Tenasserim, via Lehmann, vi.1995 (FH 0267-1 to 6); 1♂, Penang, Coll. Br. v. W. (NHMW, No. 545); 3♂♂, 2♀♀, 1♀ nymph, Myanmar, Tenasserim, via Lehmann, vi.1995 (OC).

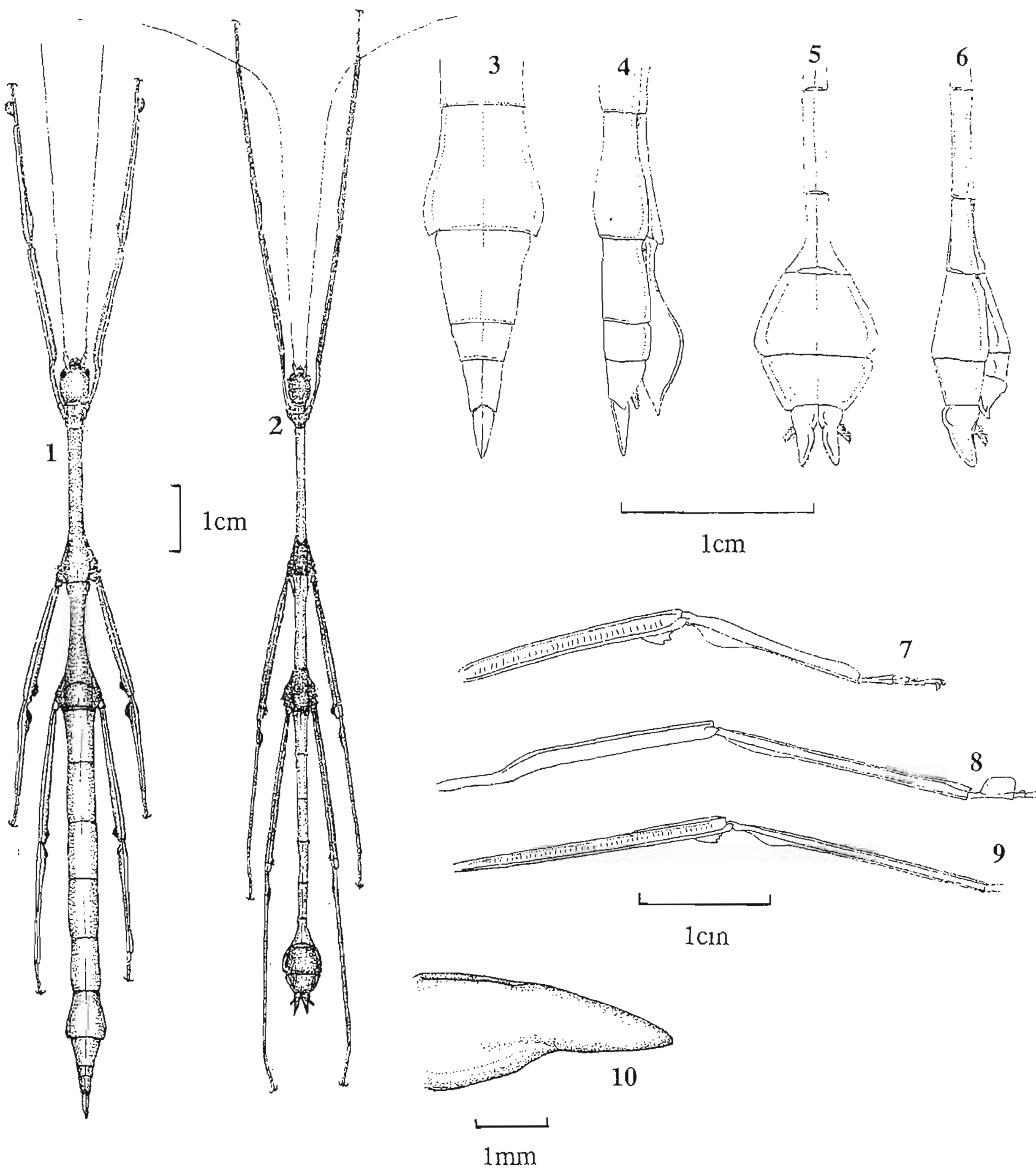
Diagnosis

Closely related to the type species *Lonchodes brevipes* Gray, 1835 from Peninsular Malaysia and Sumatra and *Lonchodes margaritatus* (Brunner von Wattenwyl, 1907) from Thailand and Vietnam but easily distinguished from both species by the lancett-like supraanal plate of females, greenish brown body colouration of both sexes and broadened terminal abdominal segments of males. Additionally it differs from the first by: more slender body; greenish instead of uniformly brown body colouration and more elongate and less prominently lobed legs of both sexes. From the second it additionally differs by: the more elongate body and legs of both sexes; strongly medially constricted metathorax and laterally dilated and swollen abdominal tergite VII of females.

The lancett-like supraanal plate of females shows relation to the bornean *Lonchodes everetti* (Kirby, 1896). The broadened terminal abdominal tergites of the male resembles *Lonchodes skapanus* Brock, 1999 from Peninsular Malaysia.

Description of female (Figs. 1, 3, 4, 7, 8)

Medium-sized (body length 116.0-118.5mm), relatively slender species (average body width 4.0mm), typical for the genus and with an elongate, lancett-shaped supraanal plate. Head and thorax evenly granulose; abdominal tergites evenly granulose at anterior, becoming sparingly and much more indistinctly granulose towards the posterior; sternites very unevenly



Figures 1-10 *Lonchodes geniculosus* (Westwood, 1848).

1. Female, dorsal view.
2. Male, dorsal view.
3. Apex of female's abdomen, dorsal view.
4. Apex of female's abdomen, lateral view.
5. Apex of male's abdomen, dorsal view.
6. Apex of male's abdomen, lateral view.
7. Left mid leg of female.
8. Right front leg of female.
9. Left mid leg of male.
10. Lateral view of anal segment of male.

granulose. All carinae of femora and tibiae, very minutely granulose. Head and body uniformly mid green dorsally; lateral and ventral surfaces orange brown. Legs green, with apical end of femora brownish. Antennae black, but becoming brownish towards bases. Tergites II-VII occasionally with a bold white longitudinal lateral line.

HEAD: About 1.5x longer than wide, globose, vertex rounded and convex with a short and indistinct W-shaped impression between bases of antennae. Eyes very small, oval, convex dark reddish brown and unevenly projecting from head capsule. Antennae reaching posterior margin of median segment, antennomeres increasing in length towards middle and strongly shortened towards apices. Scapus almost 2.5x longer than wide, dorsoventrally compressed, slightly laterally dilqated, oval seen from dorsal. Pedicellus about ¼ the length of scapus, cylindrical.

THORAX: Pronotum shorter than the head,1.3x longer than wide, almost rectangular, posterior margin slightly rounded. Anterior margin slightly raised and median transverse depression, distinct, lighter green and reaching lateral margins of segment. Mesonotum long, parallel-sided, slightly widening and flattened at posterior margin. Mesopleurae widening and projecting over mesonotum just before the leg joint, increasing the body width to almost 1.5x the width of mesonotum. Mesosternum simple. Metanotum about 2/3 the length of mesonotum, widened at anterior and posterior margin and strongly consricted at the middle. Metasternum simple.

ABDOMEN: Median segment about 1.3x broader than long, distinctly shorter than metanotum, posterior margin broader than anterior margin. Segments II-VI almost of equal length and width, parallel-sided, about 2x longer than wide. II slightly widening towards anterior margin. Tergites with a fine median line, sternites smooth with slightly raised lateral margins. Posterior margin of sternite VII slightly swollen. Tergit VII slightly shorter than previous, distinctly swollen and widening towards posterior margin; lateral margins forming a very shallow, rounded lobe. VIII shorter than VII, anterior margin distincty broader than posterior margin, about 1.5x longer than wide and with a very fine median carina. IX less than half the length of previous, broader than long, convex. Anal segment, with a fine median carina, tapering towards posterior margin which has a deep concave incision; angles pointed and triangular. Supraanal plate more or less equal in length to anal segment, tapered towards apice and strongly keeled. Cerci very small, pale brown, cylindrical with pointed apices and minutely setose. Operculum reaching posterior margin of anal segment, keeled, slightly convex in posterior half.

LEGS: Mid legs reaching over posterior margin of tergite III, hind legs projecting over tergite VI; mesofemora reaching posterior of median segment. Femora quadrate in cross.section. Profemora slightly laterally compressed, posterodorsal carina lower and more indistinct, than anterodorsal carina; basally compressed and curved. Ventromedian carina of protibiae raised into a flat ledge, which is lightly rounded at base. Dorsal carina raised and diverging apically, forming an impressed, triangular area. Probasitarsus as long as remaining segments combined, except claw, dorsal carina raised into a prominent almost semicircular lobe. Meso and metafemora slightly swollen, becoming broader towards apices and indistinctly downcurving.Ventral carinae apically raised into two slightly converging, toothed lobes. Medioventral carina very indistinct and flat. Ventral carinae of meso and metatibiae very unevenly widened just behind base and at apice. Medioventral carina strongly raised and forming a rounded lobe basally (more distinct on mesotibiae). Meso- and metabasitarsus slightly longer than following three segments combined.

Measurements of specimens in the author's collection are given in table 1.

Description of male (Figs. 2, 5, 6, 9, 10)
Medium-sized (body length 99.0-100.5mm), very slender and colourful species, typical for the genus and with distinctly broadened abdominal tergites VII-IX. Head, thorax and legs densely; abdominal tergites granulose at anterior, becoming very sparingly and indistinct towards the posterior; sternites very indistincly granulose. Head, pronotum and posterior section of mesothorax and metathorax as well as median segment dark blueish green. Remaining parts of body pale olive tending to get darker on abdomen, segments VIII-X dark brown. Tergite II with a small white anterolateral spot. Legs glossy greyish green with black carinae; knees bright red. Antennae entirely reddish black.

HEAD: Generally as in female but eyes relatively larger and more prominently projecting from head capsule. Antennae as in female but reaching to posterior margin of abdominal tergite IV.

THORAX: Pronotum shorter and narrower than head, slighly medially constricted but generally as in female. Mesothorax cylindrical, very elongate and slightly widening at the posterior. Mesopleurae posteriorly widened, projecting over mesonotum and widening the body width to about 1.5x the width of mesonotum. Metathorax about ¾ the length of mesothorax, widened at anterior and posterior margin.

ABDOMEN: Median segment distinctly shorter than metanotum, rectangular about 1.5x longer than wide. Segments II-VI of almost equal length, slightly medially constricted, 3.5x longer than wide. Tergites with a faint median carina. VII ¾ the length of VI and strongly widening in posterior half. VIII almost 3x broader than II-VI, strongly swollen , posterior margin broader than anterior margin. IX narrowing towards posterior margin, anterior margin as broad as VIII. Anal segment laterally compressed, divided longitudinally, formed two slightly dowencurving, roughly triangular lobes; dorsal carina with a median impression. Interior surfaces armed with numerous minute black teeth. Cerci small, cylindrical, incurving. Subgenital plate very slightly projecting over posterior margin of tergite IX, slightly convex and posteriorly carinated and posteromedially notched.

LEGS: All very long and slender; mid legs reaching posterior margin of tergite V; hind legs projecting over apex of abdomen; mesofemora reaching to middle of tergite II. Profemora basally compressed and curved, posterodorsal carina reduced and lower than anterodorsal carina. Protibiae simple. Probasitarsus almost 2x longer than remaining segments combined. Meso- and metafemora slightly swollen and quadrate in cross-section. Ventral carinae apically with a triangular tooth, followed by 1-2 smaller teeth on common base. Medioventral carina of meso- and metatibia slightly rounded near base. Meso- and metabasitarsus slightly longer than combined length of remaining segments.

Measurements of specimens in the authors collection are given in table 1.

Comments
The locality "Myanmar, Tenasserim" of the specimens in the collections of FH and OC is questionable as this is a highland area in contrast to to the type locality of *Lonchodes geniculosus* (Westwood), Pulau Penang, which is a small and flat island few kilometres of the northwest coast of Peninsular Malaysia close to the Thailand border. Much of the material from this source and labelled "Myanmar"seems to be from other regions respectively. As an example, two males of *Lonchodes rubrifemur* (Brunner von Wattenwyl, 1907) with the data "Myanmar, Tenasserim" could be obtained, although the type locality given by Brunner von Wattenwyl (1907) is Borneo.

Comparison of the Myanmar specimens with the holotype of *L. geniculosus* (Westwood) in OXUM however leaves no doubt in these being conspecific. Males show a very typical colouration and shape of anal segment which readily distinguishes it from other closely related taxa. The females are readily distinguished from all other representatives of the genus in this region, by the elongate supraanal plate and typical shape of thorax, terminal abdominal segments and lobes of the legs. The shape of the supraanal plate shows relation to the bornean *Lonchodes everetti* (Kirby, 1896).

None of the examined females had an egg in its ovipositor and, since none was in the egg-laying stage when collected, the eggs are still unknown.

Measurements	*L. geniculosus*		*L. geniculatus*	
(mm)	♂♂	♀♀	♂♂	♀♀
Body	99.0-100.5	116.0-122.5	84.5-105.0	96.5-126.0
Head	3.8	5.7-6.5	3.6-4.1	5.0-5.8
Pronotum	3.0	3.9-4.3	3.0-3.8	4.0-5.0
Mesonotum	24.0-24.5	22.5-24.6	23.0-27.0	22.5-29.5
Metanotum	16.0-16.8	15.8-16.5	12.3-15.2	12.7-16.1
Median segment	2.7	3.6-3.9	3.4-4.2	3.6-4.7
Profemora	27.0-28.2	22.5-26.6	21.8-26.0	19.0-25.0
Mesofemora	20.9-23.0	18.4-20.1	15.8-18.2	14.2-19.0
Metafemora	24.0-26.8	21.0-23.2	18.0-22.5	16.1-19.8
Protibiae	27.0-30.5	21.0-24.5	23.1-28.0	19.0-25.0
Mesotibiae	19.6-21.8	14.8-17.0	12.6-14.3	10.0-13.8
Metatibiae	26.1-29.2	17.4-21.6	19.1-22.2	16.0-19.7
Antennae	75.0	50.0-51.8	55.0-64.0	36.0-46.0

Table 1: Measurements of *Lonchodes geniculosus* (Westwood, 1848) and *Lonchodes geniculatus* Gray, 1835 (only from specimens in collection of FH).

Lonchodes geniculatus Gray, 1835

Lonchodes geniculatus Gray, 1835: 19. Holotype, ♂, India Orientali (MVMA - not traced, see Bragg, 2001: 436) Westwood, 1859: 37; Brunner von Wattenwyl, 1907: 258 ;Seow-Choen, Brock & Seow-En, 1994: 12; Brock, 1995: 86; Seow-Choen, 1997: 63, figs. 37 (♂), 38-39 (♀), 40 (egg); Brock, 1999: 35 & 170, figs. 16 (♂), 17a-f (♀), 17g (egg); Seow-Choen, 2000: 10, pl. 10 (♂ & ♀).

Staelonchodes geniculatus, Kirby, 1904a: 372; Kirby, 1904b: 317.

Prisomera thoracicum Brunner von Wattenwyl, 1907: 289. Holotype, ♀: Malakka, Perak, Jachau (NHMW, No. 561) (synonymized by Seow-Choen, Brock & Seow-En, 1994 : 12) [note: Günther, 1932 : 376 incorrectly synonymized *P. thoracicum* with *Lonchodes hosei* Kirby, 1896]; Brock, 1998: 62.

[**not** *Phasma* (*Bacteria*) *geniculosum* Westwood, 1848, **erroneous synonym** by Westwood, 1859: 37]

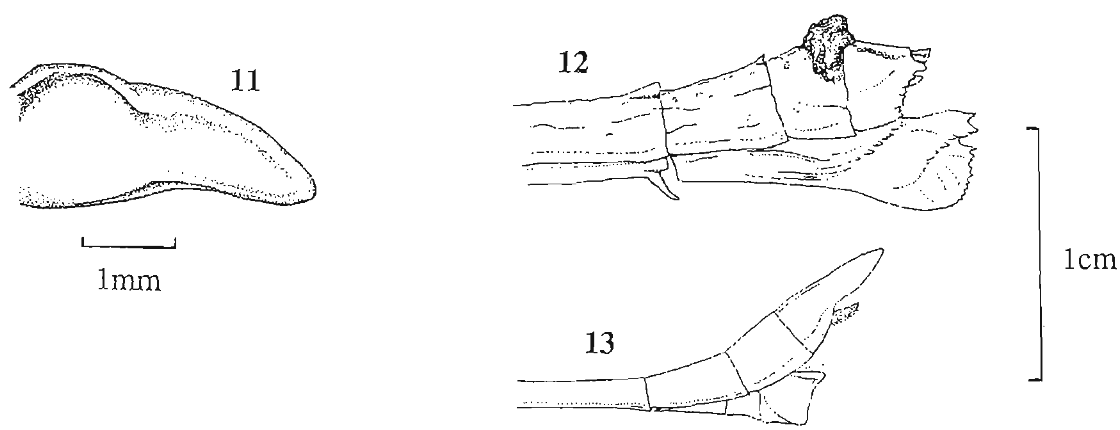
[**not** *Lonchodes geniculatus* Stål, 1875: 64, from "Insulae Philippinae, coll. Brunner" - presumably relating to *Lonchodes mindanaense* (Brunner, 1907) - Misidentification.]

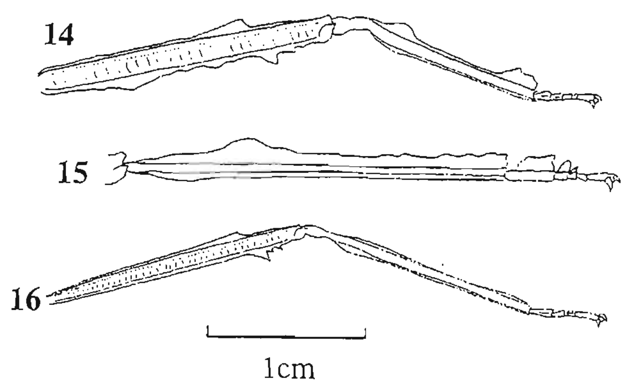
Material

1 ♀, West Malaysia, Pulau Penang, leg. M.K.P. Yeh v.1993 (FH 0147-1); 1♀, 28 eggs, ex Zucht: F. Seow-Choen, vii.1994 (FH 0147-2, E & ED); 2♀♀, Singapore, Island Club Road, leg. F. Seow-Choen, vii.1995 (FH 0147-3 & 4); 2♂♂: Singapore, Island Club Road, leg. F. Seow-Choen, iv-v.1993 (FH 0147-5 & 6); 2♂♂, 4♀♀, S-Thailand, Phuket, leg. Stobbe iii.1998 (FH 0147-7 to 12).

Comments

The species is widely distributed within Peninsular Malaysia, but also frequently found in Singapore and in the Phuket area in Southern Thailand. Stål (1875: 64) recorded it from the Philippines in error. Brock (1999: 35) provided brief descriptions of both sexes and the eggs and gave a listing of native foodplants. The females of this species show a wide range of intraspecific variation, which is partly illustrated and described by Brock (1999, figs. 17a-f) and Seow-Choen (2000, pl. 10).





Figures 11-16 *Lonchodes geniculatus* Gray, 1835

11. Lateral view of anal segment of male.
12. Apex of female's abdomen, lateral view
13. Apex of male's abdomen, lateral view
14. Left mid leg of female (FH 0147-1).
15. Right fore tibia of female.
16. Left mid leg of male.

Specimens in the author's collection from Southern Thailand are remarkably shorter than specimens from Peninsular Malaysia and Singapore, but do not differ in any other features except smaller size. Size ranges: Thailand: males 84.5-86.0mm, females 96.5-108.0mm; Peninsular Malaysia & Singapore: males 103.0-105.0mm, females 114.5-126.0mm.

Rather than *L. geniculosus* (Westwood, 1848), it is closely related to the two Bornean species *Lonchodes amaurops* Westwood, 1859 and *Lonchodes harmani* Bragg & Chan, 1993, which are remarkably similar in body sculpturing and shape of genitalia and mid legs.

Measurements of males and females in the author's collection are given in table 1. The male and female are illustrated in figures 9-14.

Acknowledgements

The author is grateful to Dr. U. Aspöck (NHMW) and Dr. G. McGavin (OXUM) for access to the collections and to O. Conle (Fischen, Germany) for providing data of the specimens in his collection. Special thanks are also due to Francis Seow-Choen (Singapore) for assistance during night collecting in Singapore and for the donation of specimens from his collection.

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Catalogue of type-material of the insect order Phasmatodea deposited in the Museum für Tierkunde, Dresden, Germany

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Abstract
This catalogue lists the type-material of the insect-order Phasmatodea housed in the Museum für Tierkunde in Dresden (SMTD), Germany. It contains types of 87 species. The collection is especially strong in material from China, the Philippines, and New Guinea. The collection contains types of Bragg, Brunner von Wattenwyl, Fritzsche, Günther, Redtenbacher, and Zompro.

Key words
Phasmida, Phasmatodea, Museum für Tierkunde Dresden, type-material, catalogue.

Introduction

This catalogue lists the type material of the insect order Phasmatodea housed in the Staatliches Museum für Tierkunde in Dresden, Germany.

The collection is housed in 29 wooden drawers with glass-top in the measurements 60cm x 46cm x 6cm. It contains types of 87 species, which have been described by Phil Bragg, Karl Brunner von Wattenwyl, Ingo Fritzsche, Klaus Günther, Josef Redtenbacher and Oliver Zompro. Furthermore, Paul D. Brock, Oskar Conle, Detlef Grösser and Frank Hennemann have worked in the collection. An important part of the material was described by Klaus Günther, who was head of the Department of Entomology from 1934 to 1946. Günther published several papers on Phasmatodea, mainly based on material of the NHRS, RMNH, SMTD, ZMHB and ZMUH. Urich (1975) published an obituary on Günther. He mentions (1975: 352) a letter from Günther addressed to Urich from 18.x.1974, in which Günther states that he did not return material he had on loan from several museums. This is one reason why a considerable number of type-specimens recorded for other museums have been traced in boxes apart from the main collection during the preparations for the moving of the Museum in 1999.

Methods

Every single specimen of Phasmatodea in the collection of the Museum für Tierkunde was examined. The type specimens have been compared with the original description and remaining specimens of the type series, which have been examined on various trips to European museums by the author in 1997, 1998 and 2001. The results of the research in these museums have already been published in catalogues of these collections, or are currently in press (Brock, 1998; Zompro, 2000; in press a, b; Zompro & Brock, in press).

In several cases eggs have been removed by the author from the ovipositor or the abdomen of type specimens. The material was needed for the author's phylogenetical studies in the order and are, if taken from a type specimen, also type material. They are listed with the specimen they are taken from in the catalogue.

Brunner von Wattenwyl and Redtenbacher (1906-08) often list the location of material described by them as "Coll. m." refering to Brunner von Wattenwyl's collection, which is now integrated in the NHMW-collection. This is the only material Redtenbacher has actually seen, otherwise he worked from Brunner's notes only.

The material is listed in alphabetical order of the species names.

The following format is used:
species author, year and publication data [*Original genus*]
[Number of type specimens, type locality and storage of specimens as mentioned in the

original description.]
SMTD [SMTD drawer number] List of specimens with sexes and quantity of specimens and citation of label data.
Data of labels of type-specimens.
Comments on additional type specimens housed in other collections.
[Current name combination, if confirmed by the author.]

List of abbreviations used:
AT: Allotype.
HT: Holotype.
LT: Lectotype.
PT: Paratype.
PLT: Paralectotype.
ST: Syntype.

Museum-codons used:

ANIC	Australian National Insect Collection, Canberra, Australia.
ANSP	Academy of Natural Sciences, Philadelphia, USA.
BMNH	The Natural History Museum, London, England.
CUMZ	University Museum of Zoology Insect Collection, Cambridge, England.
DCMD	Derby City Museum, Derby, England.
DEIC	Deutsches Entomologisches Institut, Eberswalde, Germany.
FMSM	Federal Malayan State Museum, Kuala Lumpur, Malaysia.
HNHM	Hungarian National History Museum, Budapest, Hungary. [This collection was lost in a fire in 1956].
INPC	Indian Agricultural Research Institute, New Dehli, India.
ISNB	Institut Royal des Sciences Naturelles, Brusseles, Belgium.
MBBJ	Museum Zoologicum Bogoriense, Bogor, Java, Indonesia.
MCSN	Museo Civico di Storia Naturale "Giacomo Doria", Genua, Italy.
MHNG	Museum d'histoire naturelle, Geneva, Switzerland.
MIZT	Universita di Torino, Torino, Italy.
MNHN	Museum d'Histoire naturelle, Paris, France.
MNMS	Museo Nacional de Ciencias Naturales, Madrid, Spain.
NHMB	Naturhistorisches Museum, Basel, Switzerland.
NHME	Natural History Museum, Maastricht, Netherlands.
NHMN	Nottingham Natural History Museum, Wollaton Hall, Nottingham, England.
NHMW	Naturhistorisches Museum, Vienna, Austria.
NHRS	Naturhistorika Riksmuseet, Stockholm, Sweden.
OXUM	Hope Entomological Collections, University Museum, Oxford, England.
RMNH	Nationaal Natuurhistorische Museum, Leiden, Netherlands.
SMFD	Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt a. M., Germany.
SMNS	Staatliches Museum für Naturkunde, Stuttgart, Germany.
SMSM	Sarawak Museum, Kuching, Sarawak, Malaysia.
SMTD	Museum für Tierkunde, Dresden, Germany.
UMBB	Übersee-Museum, Bremen, Germany.
UPLB	University of the Philippines Los Baños, Museum of Natural History, Los Baños, Philippines.
ZMAN	Zoologisch Museum, Universiteit van Amsterdam, Amsterdam, Netherlands.
ZMAS	Zoological Museum, Academy of Science, St. Petersburg, Russia.
ZMFK	Zoologisches Forschungsinstitut und Museum "Alexander Koenig", Bonn, Germany.
ZMHB	Zoologisches Museum der Humboldt-Universität, Berlin, Germany.
ZMUH	Zoologisches Museum der Universität Hamburg, Germany.
ZMUK	Zoologisches Museum der Christian-Albrechts-Universität, Kiel, Germany.
ZMPA	Polish Academy of Sciences, Warszawa, Poland.
ZSMC	Zoologische Staatssammlung, München, Germany.

Catalogue of type-material

abnormis Redtenbacher, 1908: 548 [*Sipyloidea*]
[♂♀. Neu-Guinea (Coll. m., Mus. Dresden); Huon-Golf (Mus. Budapest).]
SMTD [not traced]
Further type-material in NHMW and ZMUH. HNHM-material was lost in fire in 1956.
acheloa Günther, 1940a: 496 fig. 19 [*Libethra*]
[♀, Rio Tacana.]
SMTD [27] HT: ♀, Tacana, Brasilien, Waehner leg., Y. preto, S. Waehner leg.; 1939 1
[*Rugosolibethra acheloa* (Günther, 1940)]
aculeata Günther, 1936: 336 fig. 13 [*Pericentropsis*]
[♀, Doormanpad, 1410m, X.1920]
SMTD [25] HT: ♀, N. N. Guinea, W. C. v. Heurn, Prauwenbi V., Doormanpad 1920 October, 1410 m.
[*Pericentropsis aculeata* Günther, 1936]
acutangulus Brunner v. Wattenwyl, 1907: 300 pl. 13: 7 a, b [*Eupromachus*].
[♀. Kaiser Wilhelmsland in N. Guinea (Coll. m., Mus. Dresden, Mus. Budapest.]
SMTD [21] ST: ♀, Neu-Guinea, 711; 2 ♀ nymphs, K. Wilhelmsland, Bongu.
Further type-material in ANSP and NHMW. HNHM-material was lost in fire in 1956.
[*Eupromachus acutangulus* Brunner v. Wattenwyl, 1907]
armadillo Redtenbacher, 1906: 44 pl. 1: 8 [*Tisamenus*]
[♀. Philippinen (Mus. Dresden).]
SMTD [7] LT, designated by Zompro, 2001e: 50: ♀, 1 egg ex ovipositor, PLT: ♀, Philippinen, Schadenberg 694.
Further ♂ with same data.
[*Tisamenus armadillo* Redtenbacher, 1906]
armatus Redtenbacher, 1906: 139 [*Metriotes*]
[♂♀. Antioquia, Columbien (Coll. m.); Brasilien (Mus. Dresden).]
SMTD [2] ST: ♀, Brasil.
Further type-material in NHMW.
arrogans Brunner v. Wattenwyl, 1907: 207 pl. 9: 1a-c [*Prosentoria*]
[♂♀. Kina Balu in ins. Borneo (Coll. m., Mus. Acad. Petropol.).]
SMTD [12] ST: ♂, Nord-Borneo; 1911 2; *Prosentoria arrogans* ♂♀ Brunn; *arrogans* Brunn.; ♀, Nord-Borneo; 1911 2.
Further type-material in NHMW, ZMAS and ZMUH.
[*Prosentoria arrogans* Brunner v. Wattenwyl, 1907]
australe Günther, 1933c: 155 fig. 1-4 [*Phasmotaenionema*]
[HT: ♀, Buma (Malaita), Salomonen, E. Paravicini leg. V.1929, im Naturh. Museum, Basel; PT: 2♀♀, Kira-Kira, (S. Cristoval), I.1929, im Naturh. Museum, Basel; ♀, Guadalcanar, X.1928, im Naturh. Museum, Basel;, ♀, Kira-Kira (S. Cristoval), Salomonen, I.1929, E. Paravicini leg, im Zool. Mus. Berlin.]
SMTD [9] PT: ♀, 1 egg, Kieta, Bougainville; 193.; 1937 9; *australis* K. Gthr.
Further type-material in NHMB and ZMHB.
bicorne Redtenbacher, 1906: 126 [*Euphasma*]
[♂♀. Südamerika, Columbien (Coll. m., Mus. Berlin, Mus. Dresden).]
SMTD [4] ST: ♂, ♀, Amer. mer.
Further type-material in NHMW and ZMHB.

borneensis borneensis Bragg, 1998: 70 [*Datames*]
[♂♀. Material. - Sarawak: Mt Serapi, 120 m: ♀, holotype (BMNH, PEB-176), 26.vii.1991. Paratypes: Brunei: Teraja, waterfall trail: ♂ (PEB-2137), 03.xi.1994. - Sarawak: Locality not recorded: ♂ (NHMW, PEB-2423), xi.1994; 3 ♀ (OXUM, PEB-2532; NHMW, PEB-2533; NHMN, PEB-2589), 2♂♂ (SMTD, PEB-2534; OXUM, PEB-2590) 1994. Mt Serapi, 100 m: ♂ (BMNH, PEB-1587), 05.viii.1992. Mt Serapi, 150 m: ♀ (PEB-488), 12.viii.1989. Mt Serapi, 240 m: ♀ nymph (PEB-178), 13.viii.1990; ♂ (BMNH, PEB-181), 26.vii.1991; c5 (PEB-182), 13.viii.1990, ♂ nymph (BMNH, PEB-183), 26.vii.1991; ♂ (BPBM, PEB-489), 13.viii.1990. Matang: ♀ (SMSM-12), viii.1899; Mt Santubong, 100 m: ♀ nymph (BMNH, PEB-1862), very pale specimen when collected, almost white, 31.vii.1992. Kpg Bengoh: ♂ (BMNH, PEB-177), 31.vii.1989. Kpg Bengoh, Gunung Sebakam: ♀ (RMNH, PEB-180), egg (RMNH, PEB-490), removed from body of PEB-180, egg (BMNH, PEB-1408), 29.vii.1989. Kpg Bengoh, Gunung Sunana: ♀ (PEB184), (BMNH, PEB-185), 30.vii.1989. 20 km upstream of Kapit: ♂ nymph (BMNH, PEB-179), 07.viii.1990. Bau, near Wind Cave: 4 ♀ (ZMHB, PEB-1557; MCSN, PEB-1558; NHRS, PEB-1559; BMNH, PEB-1836), ♂ nymph (BMNH, PEB-1722), eggs (PEB-1950; PEB-1560), 08.viii.1992; 1st instar nymph (PEB-1922), captive reared 1993; 3 ♂ (PEB-2138; NHMN, PEB-2139; RMNH, PEB-2140), 06.xi.1994. Bau: ♂ (SMSM-524), P.E. Bragg, 08.viii.1992. Lambir Hills NP: ♂ nymph (PEB-1623), 18.viii.1992. Niah NP: 2♂♂ (DCMD, PEB-1636; BMNH, PEB-1637), 17.viii.1992, ♂ (PEB-2135), 27.x.1994; ♂ (BMNH, PEB-2136), 28.x.1994.— No data: ♀ (SMSM-14).]
SMTD [7] PT: ♂, Sarawak, P. E. Bragg 1994, Accession Number: PEB-2534.
Further type material in BMNH, Coll. P. E. Bragg, DCMD, MCSN, NHMW, NHRS, OXUM, RMNH, SMSM, ZMHB.
[*Datames borneensis borneensis* Bragg, 1998]
brevipenne Günther, 1940b: 244 fig. e, l, g [*Sinophasma*]
[2♂♂, ♀, Kiangsi, Kiukiang, Mt. Kuling, Lindström, Mus. Stockholm und Dresden]
SMTD [20] ST: ♂, Kiu-Kiang, Mt. Kuling, China, Lindström; 1939 20
Further type-material in NHRS.
[*Sinophasma brevipenne* Günther, 1940]
brevitarsis Redtenbacher, 1908: 485 [*Diardia*]
[♂. Milne Bay, Huon-Golf, Neu-Guinea (Coll. m., Mus. Dresden).]
SMTD: Not traced.
Further type-material in NHMW.
calopteryx Günther, 1944: 78 fig. 5 [*Kalokorinnis*]
[♀, Nordborneo, J. Waterstradt leg., Naturkundemuseum Stettin (HT); ♀, Central-Borneo, Quellgebiet des Koetei-Flußes; Museum für Tierkunde, Dresden; ♂, Selangor, Bukit Kutu, 1100m, 13.3.1931, H. Pendlebury leg., Fed. Mal. St. Mus., Kuala Lumpur]
SMTD: Not traced.
Further type-material in FMSM and ZMPA
[*Kalokorinnis calopteryx* Günther, 1944]
carinatus Redtenbacher, 1908: 364 [*Dimorphodes*]
[♀. Bongo, Neu-Guinea (Mus. Berlin, Mus. Amsterdam, Mus. Dresden).]
SMTD [21] ST: ♀, K. Wilhelmsland, Bongu.
Further type-material in ZMAN and ZMHB.
carli Günther, 1937a: 83 fig. 1, 2 [*Heterocopus*]
[♂, 120m, ♀, 900m: Torricelli-Gebirge]
SMTD [22] ST ♀, 1 egg ex ovipositor: Kais. Wilhelmsland, Torricelli-Gebirge, Dr. Schlaginhaufen. 1910 1, 900m; ST ♂, Kais. Wilhelmsland, Torricelli-Gebirge, Dr.

Schlaginhaufen. 1910 1, 120m.
[*Pachymorpha (?) carli* (Günther, 1937)]
coenosa Redtenbacher, 1908: 344 pl. 16: 1, 2 [*Eurycantha*]
[♂♀. Neu-Guinea (Coll. m., Mus. Dresden, Mus. Genua, Hofmus. Wien, Mus. Berlin).]
SMTD [23] ST: ♀, 441
Further type-material in MCSN, NHMW, ZMHB.
difficilis Günther, 1940b: 237 [*Micadina*]
[2♂♂, Fukien, Kwangtseh, 15. und 18.VII.1937, J. Klapperich leg, Mus. Bonn und Dresden]
SMTD [20] ST ♂, Kwangtseh-Fukien, J. Klapperich O., 18.7.1937; 1929 11
Further type-material in ZMFK.
[*Micadina difficilis* Günther, 1940]
doederleini Günther, 1929: 684 pl. 3: 1, 2 [*Graeffea*]
[HT: ♂, AT: ♀, Schraderberg (2100m), 22.-31.V.1913; PT: 67♂♂, 15♀♀, Schraderberg (2100m), 22.-31.V.1913]
SMTD [8] PT: ♂, D. N. Guinea 350 Schraderberg 5.-13.VI.13, Kais. Augustafluß Exp., Bürgers S. G.; ♀, D. N. Guinea 350 Schraderberg 2100 m, 22.-31.V.13, Kais. Augustafluß Exp., Bürgers S. G.
Further type-material in DEIC, ZMHB and Coll. Zompro, affiliated with ZMUK.
[*Graeffea doederleini* Günther, 1929]
duivenbodei elongatus Günther, 1938b: 58, 75 [*Periphetes*]
[Zentralcelebes: ♀, Palopa, ♀, Posso-See, Mus. Basel.]
SMTD [25] ST: ♀, Palopa, Celebes; *Periphetes spec.* (*duivenbodei* Kaup?) K. Günther det.
1 further ♀ in NHMB.
echinata Günther, 1936: 335 fig. 12 [*Trapezaspis*]
[♂, Prauwenbivak, XI. XII.1920]
SMTD [21] HT: ♂, N. N. Guinea, W. C. v. Heurn, Prouwenbiv, XI-XII.1920
echinatus Redtenbacher, 1908: 505 [*Neocles*]
[♂♀. Dapitan, Mindanao (Mus. Dresden).]
SMTD [19] ST: ♀, Dapitan, Mindanao 832. ST: ♂, Dapitan, Mindanao 831.
elongata Zompro & Eusebio, 2000a: 61 figs. 1-4 [*Phasmotaenia*]
[19♀♀, 4 nymphs. Holotype: ♀, 1 egg ex abdomen, Baguio City, 8.IX.64, J. F. Cruz [UPLBMNHC No. PHA 00235]. Paratypes: ♀, 1 egg ex ovipositor, Baguio City, 19.IV.1967, J. Ancheta [OZ 275-1, ex UPLBMNHC]; 2♀♀, Bagio, Luzon [SMTD]; ♀, Philippinen, Bagio, leg. Huenderts, 4.VII.1967 [Private collection F. H. Hennemann 370-1, ex coll. Departise]; ♀, Philippinen, Luzon, Manila [ZMUH]; ♀, 1 egg ex abdomen, Baguio, 16.V.98, I. L. Lit Jr. [UPLBMNHC No. PHA 00307]; 3♀♀, Baguio City, 14.III.67, Alcachupas, N. [UPLBMNHC No. PHA 00284, 00285, 00286]; 2♀♀, Baguio City, 19.IV.1967, J. Ancheta [UPLBMNHC No. PHA 00231, 00232]; ♀, Batingil, Dumaguete, Negros Oriental, 22.II.1932, T. A. Araneta [UPLBMNHC No. PHA 00226]; ♀, Col. No. 382, Loc. Baguio, Date 7-12-84, Coll. Royumol [UPLBMNHC No. PHA 00227]; ♀, Baguio City, 8.IX.67, J. C. F. Cruz [UPLBMNHC No. PHA 00228]; ♀, Philippines, La Trinidad, Benguet, 26. June. 1974, L. P. Molitas [UPLBMNHC No. PHA 00229]; ♀, Loc.: Mansion, Baguio City, Date: 12-8-85 [UPLBMNHC No. PHA 00230]; ♀, Forestry, FI, 3.IX.67, Alcachupas [UPLBMNHC No. PHA 00135]; ♀ 5-instar nymph, Host: Pine tree, Baguio, 16.V.98, I. L. Lit Jr. [UPLBMNHC No. PHA 00306]; ♀ 5-instar nymph, Philippines, La Trinidad, Benguet, 26. June. 1974, L. P. Molitas [UPLBMNHC No. PHA 00234]; ♀ 4-instar nymph, Baguio, Pr. D. Lobo, Liberty, I. A. Perez [UPLBMNHC No. PHA 00142]; ♀ 4-instar nymph, Baguio City, Oct. 14.1983, C. W. [UPLBMNHC No. PHA 00143]; ♀, no data [UPLBMNHC No. PHA 00316].].

SMTD [12] PT: 2 ♀, Bagio, Luzon.
Further type-material in UPLB (HT), Coll. Hennemann, Coll. Zompro, affiliated with ZMUK and ZMUH.
[*Phasmotaenia elongata* Zompro & Eusebio, 2000]
emmrichi Zompro, 1998: 157 fig. 9 [*Leosthenes*]
[Holotypus: ♀, (Neuguinea) Kais. Wilhelmsland, Torricelli Gebirge, Dr. Schlaginhaufen 1910/1 (SMTD).]
SMTD [11] HT: ♀, Kais. Wilhelmsland, Torricelli Gebirge, Dr. Schlaginhaufen 1910 1.
[*Leosthenes emmrichi* Zompro, 1998]
errans Günther, 1938a: 140 [*Orthonecroscia*]
[2♂♂, 2♀♀, Borneo 6♂♂, ♀, "California, Humboldt Bay", Indian Museum; ♂, ♀, Java, Naturkunde-Museum, Stettin]
SMTD [17] ST: ♂, Ind. Mus. Borneo, 144; ♀, Ind. Mus. Borneo, 144; 1937 2; ♂, Ind. Mus. Humboldt Bay, 140.
In ZMPA ♂ from Java, ♂, ♀ from Borneo, further material presumably in Calcutta.
exiguus alienigena Günther, 1938b: 73 fig. 12 [*Menexenus*]
[2♂♂, Nordostcelebes, Minahassa, Gg. Lokon und Tomohon, Mus. Basel und Dresden.]
SMTD [25] ST: ♂, Tomohon, Celebes, Sar.
One further ST ♂ in NHMB.
exiguus exiguus Günther, 1938b: 72 fig. 13 [*Menexenus*]
[2♂♂, 2♀♀, ♀ larva: Nordcelebes, Matinang-Gebirge, Südseite, 1000m, Mus. Basel und Dresden.]
SMTD [25] ST: ♂, ♀, Sarasin, VIII.1894, Matinang-Kette, 1000 m, Südseite, Nord-Celebes.
Further type-material in NHMB.
extraordinarius Günther, 1936: 326, fig. 1 [*Neopromachus*]
[♀, Albatros Bivak, Mamberamo, V.1926]
SMTD [21] HT: ♀, N. N. Guinea, Exp. 1926, W. Docters v. Leeuwen, Mamberamo, Alb.-Bivak, Datum V.
[*Neopromachus extraordinarius* Günther, 1936]
flavipennis Redtenbacher, 1906: 112 [*Brizoides*]
[♂. Brasilia (Mus. Dresden).]
SMTD [4] HT: ♂, Brasil
flavolimbata Redtenbacher, 1906: 97 [*Autolyca flavo-limbata*]
[♂♀. Ecuador, Cocha (2700m), Troje prope Huaca (Coll. m., Giglio-Tos); Pasto (Mus. Dresden).]
SMTD [2] PLT: ♂, no data.
Further type-material in MIZT, MCSN, NHMW. LT in MCSN selected by Brock, 1998: 29.
One PLT in NHMW is labelled: Ecuador, Cocha, "Mus. Dresden".
fritzschei Zompro, 2000a: 53 fig. 9-21 [*Gratidia*]
[Holotypus (♂): Nakhon Ratchasima, Amphoe Pak Chong, Thanon Thannarat km 7, 300m, 101°24'50" E 14°36'50" N, 18.X.1997;
Paratypen: Nakhon Ratchasima, 4 km N Pak Chong, 450m, 11.X.1997: ♂, ♀ ; Nakhon Ratchasima, 6km SW Pak Chong, Ban Dai Ma Station, 350-375m: 5♂♂, 3♀♀: 03.IX.1998; ♂, ♂ 1-4: 05.IX.1998; ♂: 08.I.1998; 2♂♂: 11.IX.1998; ♂, ♀: 12.IX.1998; ♂: 13.IX.1998; 2♂♂, 2♀♀: 17.-18.IX.1998; ♂, 3♀♀: 18.XI.1997; ♀: 26.XI.1997; ♂, 2♀♀: 28.IX.1998; ♀: 29.VIII.1998; 2♂♂, ♀: 30.VIII.1998; Nakhon Ratchasima, Amphoe Pak Chong, Thanon Thannarat km 0, 310m, 101°24'50" E 14°36'50" N, 25.XII.1997: ♂; Nakhon Ratchasima, Amphoe Pak Chong, Thanon Thannarat km 6, 325m, 101°21' E 14°32' N, 10.I.1998: 17♂♂; 16.I.1998: 5 ♀; 21.XI.1997: 4♂♂, 3♀♀; km 7, 300m, 101°24'50" E 14°36'50" N,

02.X.1997: 7♂♂, 7♀♀, 2♀♀ L-4, ♀ L-5; 06.I.1998: 2♂♂, ♂ L-4, 3♀♀, 4♀♀ L-4, 3♀♀ L-5; 11.IX.1997: ♂, ♂ L-4; 18.X.1997: 2♂♂; 25.XII.1997: 8♂♂, ♀ ; auf *Acalypha wilkesiana* Muell., 17.XII.1997, 5♂♂, 3♀♀; Nakhon Ratchasima, Ban Pak Mo, quarry S Khao Chan, 350m, 101°28' E 14°33'50'' N, 09.X.1997: 10♂♂, 10♀♀, ♀ L-4, ♀ L-5; Nakhon Ratchasima, Khao Yai, Heo Suwat, 700m, 09.X.1997: ♂; Nakhon Ratchasima, Khao Yai, Khao Narok, Spirit house, ca. 700m, 06.X.1997: ♂; Nakhon Ratchasima, S Khao Luk Chang, 400-475m, 101°21' E 14°31'50'' N, 01.X.1998: ♂; 06.X.1997: 2♂♂, ♀ ; Nakhon Ratchasima, S Khao Mai Pok, 900-1000m, 101°19' E 14°31' N, 19.-25.X.1997: ♂; Zucht O. Zompro, F-1 der aufgeführten Tiere: 2♂♂, 2♀♀. Der Holotypus und der Großteil der Paratypen in der Sammlung O. Zompro (Nr. 358-1 - 150), Paratypen auch in den folgenden Sammlungen: I. Fritzsche (2♂♀), F. Hennemann (3 ♂♀), Staatliches Museum für Naturkunde, Dresden (♂♀), Zoologisches Museum der Humboldt-Universität, Berlin (♂♀), Deutsches Entomologisches Institut, Eberswalde (♂♀), Muséum d'histoire naturelle, Genf (♂♀), Übersee-Museum, Bremen (3 ♂♀), Senckenberg-Museum, Frankfurt (♂♀), Zoologisches Museum, Hamburg (♂♀), Museo Civico di Storia Naturale "Giacomo Doria", Genua (♂♀), Naturhistorisches Museum Wien (♂♀).]

SMTD [26] PT: ♂, Thailand, Nakhon Ratchasima, Amphoe Pak Chong, Thanon Thannarat km 6, 325m, 101°21' E 14°32' N, 21.XI.1997, leg. I.Fritzsche; 352-52 Coll. O.Zompro; ♀, Thailand, Nakhon Ratchasima, Ban Pak Mo, quarry S Khao Chan, 350m, 101°28' E 14°33'50'' N, 09.X.1997, leg. I.Fritzsche, 358-38 Coll. O.Zompro.

Further type-material in Coll. Zompro, affiliated with ZMUK (HT), BMNH, Coll. Bragg, CUMZ, DEIC, Coll. Fritzsche, Coll. Hennemann, MCSN, MHNG, MNHN, NHMW, OXUM, SMFD, UMBB, ZMHB and ZMUH.

[*Gratidia fritzschei* Zompro, 2000]

frontalis Redtenbacher, 1908: 559 [*Necroscia*]

[♂♀. Amboina (Coll. m., Hofmus. Wien, Mus. Berlin); Java (Mus. Dresden).]

SMTD [18] ST: ♀, no data; ♀, Java, Schierb.

Further type-material in NHMW, ZMHB.

glaber Günther, 1938a: 135 [*Asceles*]

[3♂♂, Nieder Birma, Tavoy; ♂, "Neu-Guinea, Andai"; 2♀♀, Nieder Birma, Tavoy; 2♀♀, Perak]

SMTD [18] ST: ♂, Ind. Mus., Tavoy, L. Burma, 118; ♀, Syntypus: Ind. Mus., Perak, Malay Pen.

Further type-material possibly in INPC Dehli. Several requests were not answered.

glaber Redtenbacher, 1908: 366 [*Dimorphodes*]

[♀. Neu-Guinea (Mus. Dresden).]

SMTD [21] HT: ♀, A. B. Meyer, Neu-Guinea, 1873 andei

glabra Günther, 1940b: 246 [*Phasgania*]

[♂, Peking, Stötzner-Expedition, Mus. Dresden]

SMTD [20] HT: ♀, Peking, Exp. Stötzner

granulosus Redtenbacher, 1908: 483 [*Lamachus*]

[♀. Dapitan, Mindanao (Mus. Dresden, Coll. m.).]

SMTD [20] ST: 2 ♀, Dapitan, Mindanao, 826

Further type-material in NHMW.

[*Orxines granulosus* (Redtenbacher, 1908)]

grisescens Redtenbacher, 1906: 137 [*Perliodes*]

[♂♀. Brasilien (Mus. Dresden); Surinam (Hofmus. Wien; Chiriqui, Panama (Mus. Ak. Petersburg).]

SMTD [2] ST: 2♂, ♀, Brasil

Further type-material in NHMW, ZMAS.
groesseri Zompro, 1998: 159 fig. 6-8 [*Phyllium*]
[Holotypus: ♀, Arch. Salomons, Buin, I. Bougainville (SMTD); In der CSIRO-Collection in Canberra/Australien ein Männchen (Paratypus) Salomon Islands, Konga Village, Buin Area, Bougainville, 21.III.1961.]
SMTD [6] HT: ♀, Buin, I. Bougainville, Arch. Salomons.
Further ♂ paratype in ANIC.
[*Phyllium groesseri* Zompro, 1998]
haematacanthus Redtenbacher, 1906: 54 [*Dares hämatacanthus*]
[♂. Britisch Nord-Borneo (Mus. Hamburg); Neu-Guinea (Mus. Berlin).]
SMTD [7] LT, designated by Zompro, 2001: 53: ♂, British Nord Borneo (Padas Fluss), H. Fruhstorfer misit / Museum 15.6.1891.
[*Hoploclonia haematacantha* (Redtenbacher, 1906)]
Redtenbacher records the SMTD specimen for ZMUH. The second ♂ from "Neu-Guinea" is present in ZMHB.
helleri Brunner v. Wattenwyl, 1907: 256 [*Diangelus*]
[♂. Dapitan in ins. Philippinis (Mus. Dresden).]
SMTD [24] HT: ♂, Dapitan, Mindanao.
[*Diangelus helleri* Brunner v. Wattenwyl, 1907]
hoenei Günther, 1940b: 243 fig. d, m [*Sinophasma*]
[♂, ♀, Chekiang, West-Tien-Mu-Shan, 1600m, Höne, 1932, Mus. Dresden]
SMTD [20] ST: ♂, ♀, West Tien Mu Shan, 1600 m, Provinz Lifa Kiang, China, Hön. leg, 1932.
[*Sinophasma hoenei* Günther, 1940]
horrida Brunner v. Wattenwyl, 1907: 249 [*Stheneboea*]
[♀. Celebes (Mus. Dresd.).]
SMTD [25] HT: ♀, A. B. Meyer, Celebes 1871, 321.
horridus luwuensis Günther, 1938b: 68, fig. 8, 9 [*Menexenus*]
[♂ larva, 3♀♀ Zentralcelebes, Luwu, Flachland, Boran-Djeladja, 28.I.-1.II.1895; ♂, Luwu, Flach- und Hügelland bis 500m, Mus. Basel und Dresden.]
SMTD [25] ST: ♀, Sarasin, 28.I.-1.II. 1895, Luwu, Flachland Boran Djehadja, Centr. Cel., 1939 14.
Further type-material in NHMB.
inchoata Brunner v. Wattenwyl, 1907: 309 [*Libethra*]
[♀. Bogota (Coll. m., Mus. Dresd.).]
SMTD [27] ST: ♀, Bogota, Kirsch.
Further type-material in NHMW.
injucundus Günther, 1937a: 93 [*Neopromachus*]
[24♂♂ und 18♀♀, Torricelli-Gebirge, 120-780m]
SMTD [21] ST: ♂, 5 ♀, 4 ♀n5, Kais. Wilhelmsland Toricelli Gebirge Dr. Schlaginhaufen; 1910 10.
Further 2♂♂, ♀ in DEIC.
[*Neopromachus injucundus* Günther, 1937]
insularis talaudensis Günther, 1934: 82 [*Leprocaulus*]
[2♂♂, 23♀♀, Salibaboe (Liroeng, Talaud-Inseln)]
SMTD [24] ST: ♀, ST: ♂, 2♀♀, Talaud Liroeng Salibaboe, Erie V. 1926; Cotypus *Leprocaulus insularis talaudiensis* K. Gthr.; 1933 5.
Further type-material in MBBJ, RMNH and ZMHB.
[*Leprocaulinus insularis talaudensis* Günther, 1934]

involuta Günther, 1940b: 238, fig. a, h [*Micadina*]
[2♂♂, Fukien, Kwangtseh, 21. und 25.VII.1937, J. Klapperich leg., Mus. Bonn und Dresden]
SMTD [20] ST: ♂, Kwangtseh-Fukien, J. Klapperich O., 21.7.1937, 1939 11
Further type-material in ZMFK.
[*Micadina involuta* Günther, 1940]
iuxtavelatus Günther, 1937a: 88, pl. 1: 2 [*Neopromachus*]
[♂, Torricelli Gebirge, 780m; ♂, Zoutbron, VI. VII.1910, Van Kampen leg.]
SMTD [21] ST: ♂, Kais. Wilhelmsland, Torricelli-Gebirge, Dr. Schlaginhaufen.
Further type-material in RMNH.
[*Neopromachus iuxtavelatus* Günther, 1937]
jacobsoni Günther, 1944: 73, fig. 3, 4 [*Haaniella*]
[♂, Simalur, Sinabang, III.1913, E. Jacobson leg. (HT); ♀, Simalur, Sinabang, 28.IV.1916, S. A. J. Voorthuys leg (AT), beide im Rijksmuseum van Naturl. Historie, Leiden; ♂, Peloe Babi (= Simalur), II. 1908, S.P. Buitendyk leg., Museum für Tierkunde, Dresden.]
SMTD [7] PT: ♂, S. P. Buitendyk, Peloe Babi, Sumatra, II.1908.
Further type-material in RMNH.
klapperichi Günther, 1940b: 240 fig. b, f, k, n [*Sinophasma*]
[3♂♂, ♀, Fukien, Kwangtseh, 25.VII. und 19.VIII.1937, J. Klapperich leg., Mus. Bonn und Dresden]
SMTD [20] ST: ♂, Kwangtsch-Fukien, J. Klapperich O., 25.7.1937, 1939 11
Further type-material in ZMFK.
[*Sinophasma klapperichi* Günther, 1940]
laetus Günther, 1936: 331, fig. 9 [*Neopromachus*]
[2♀♀, Holländ. Nord-Neuguinea, 1910, Museen Dresden und Buitenzorg.]
SMTD [21] ST: ♀, Neu-Guinea, 1910, O. K., Hollandia.
Further type-material in MBBJ.
[*Neopromachus laetus* Günther, 1936]
leveri Günther, 1937b: 5, fig. 3 a, b [*Ophicrania*]
[2♂♂, Kolambangara, Lady Lever, 29.III.1935 (no. 4299), Savo Reko, 23.II.1934 (no. 816), ♀, Reko, 23.II.1934 (no. 816), 3♀♀, Savo, 165m, 24.VI.1935 (no. 4731); 2♀♀, Ostsavo, 17.VII.1935, auf Cocosblättern (no. 4977), ♀, Savo, auf *Cocos nucifera*, 30.X.1933, ♀, Ostvanikoro, V. VI.1933; (1 ♀, Savo, Naturhist. Mus. Basel.)]
SMTD [8] ST: ♂, Salomon-Ins., Kolambangara, Lady Lever, I. R. A. Lever leg, 4299; ♂, ♀, Salomon-Ins., Savo Reko, H. I. Pasden leg., 816; 3♀♀, Salomon.Ins., Savo 500 ft., I. R. A. Lever leg., 1939 18, 4731; 2♀♀, Salomon.Ins., East Savo, I. R. A. Lever leg., 1939 18, 4977; ♀, Salomon Islands, Savo Is., *Cocos nucifera*, 30.X., 1939 H. T. Pagden; ♀, May - Jun. '33, Salomon Is., East of Vanikoro, d. I. R. A. Lever.
1 ST ♀ in NHMB. The ♂ from Kolambangara could not be traced.
[*Ophicrania leveri* Günther, 1937]
lobatipes Brunner v. Wattenwyl, 1907: 295 [*Promachus*]
[♂♀. Colonia germanica in N. Guinea (Coll. m., Mus. Berol., Budap., Dresd.).]
SMTD [21] ST: 8 ♂, ♀, 5 nymphs, K. Wilhelmsland, Bongu; ♀, Syntypus: Neu-Guinea, 757.
Further type-material in NHMW and ZMHB. HNHM-material lost in fire in 1956.
[*Neopromachus lobatipes* (Brunner v. Wattenwyl, 1907)]
marginale Redtenbacher, 1906: 115 [*Paraphasma*]
[♂♀. Brasilien, Santos, Minas Geraës, Rio de Janeiro, Goyaz (Coll. m., Mus. Dresden, Mus. Paris, Mus. Ak. St. Petersburg, Mus. Hamburg, Mus. Stuttgart, Mus. Budapest); Paraguay

(Mus. Hamburg, Coll. Boliv., Mus. Genua, Mus. Budapest).]
SMTD [4] PLT: ♂, Iraby, R. Gr. do Sul; 1936 2
[*Paraphasma marginale* Redtenbacher, 1906]
Further type-material in HNHM, MCSN, MNMS, MNHN, SMNS, ZMAS, ZMUH. LT in MCSN selected by Brock, 1998: 41.
mindanaense Brunner v. Wattenwyl, 1907: 286. [*Prisomera*]
[♂♀. Mindanao (Mus. Dresd.).]
SMTD [24] LT, designated by Bragg 1996: 44: ♀, PLT, ♂, Dapitan, Mindanao.
mirabile Günther, 1940b: 242, fig. c, j [*Sinophasma*]
[2♂♂, ♀, Fukien, Kuatun, 2300m, 16., 23. und 17.VII.1938, J. Klapperich leg., Mus. Bonn und Dresden]
SMTD [20] ST: ♂, Kuatun (2300m), 27,40 n. Br., 117, 406 L., J. Klapperich, 23.7.1938 (Fukien)
Further type-material in ZMFK.
[*Sinophasma mirabile* Günther, 1940]
mirabilis Redtenbacher, 1908: 483 [*Lamachus*]
[♂. Java (Mus. Dresden).]
SMTD: Not traced.
mjöbergi Günther, 1935b: 23, fig. 7a, b [*Orthonecroscia*]
[10♂♂, ♀, Mt. Tibang; 4♂♂, ♀, Pajau River; ferner ♂, Mt. Tibang, ♂, Pajau River, im Zool. Mus. Berlin.]
SMTD [17] ST: ♂, Mt. Tibang, 1700m, Borneo, Mjöberg, 1939 20; ♀, Pajau River, Borneo, Mjöberg, 1939 20.
Further type-material in NHRS and ZMHB.
muticus Brunner v. W., 1907: 294 [*Promachus*]
[♂♀. Nova Guinea, Bongu (Mus. Dresd.), Tamara in Berlinhafen (Mus. Budap., Coll. m.), Friedrich-Wihelmshafen (Mus. Berol.).]
SMTD [21] ST: 2♂♂, ♀, K. Wilhelmsland, Bongu.
Further type material in NHMW and ZMHB. HNHM-material lost in fire in 1956
[*Neopromachus muticus* (Brunner v. W., 1907)]
nodosum Günther, 1938b: 79, fig. 16, 17 [*Prisomera*]
[♂, ♂ larva, Nordcelebes, Bone-Tal, 8. und 14.I.1894, 200 und 700m, Mus. Basel und Dresden.]
SMTD [24] ST: ♂ nymph: Sarasin, 14.I.1894, Bone-Tal, ca. 700 m, Nord Cel., further one unreadable handwritten label.
Further type-material in NHMB.
notata Redtenbacher, 1908: 514 [*Marmessoidea*]
[♂. Batavia (Mus. Dresden).]
SMTD [17] HT: ♂, Batavia 498
obsoletus Redtenbacher, 1908: 499 [*Asceles*]
[♂. Philippinen (Mus. Dresden).]
SMTD: Not traced.
pachynotus bicolor Günther, 1937a: 90 pl. 1: 3 [*Neopromachus*]
[9♂♂, Torricelli-Gebirge, 700-900m]
SMTD [21] ST: 2♂♂, Kais. Wilhelmsland, Torricelligebirge, Dr. Schlaginhaufen, 1910 1
[*Neopromachus pachynotus bicolor* Günther, 1937]
Further type material in MHNG. Günther records 9♂♂ ST, of which only four have been traced so far.

paradoxus Günther, 1942: 323 fig. 15 [*Ommatopseudes*]
[♂, Museum van Natuurlijke Historie in Leiden; Sumatra]
SMTD [11] HT: ♂, Edw. Jacobson, Sungai Kumbang, Sum. 9. 1915.
[*Ommatopseudes paradoxus* Günther, 1942]
parva Günther, 1944: 73 fig. 21 [*Haaniella*]
[2♂♂, Nordost-Sumatra, Kwalu, Dr. Volz leg., Mus. Hamburg und Dresden]
SMTD [7] ST ♂, Nordost-Sumatra, Kwalu, Dr. Volz leg.
The second ♂ could not be traced in ZMUH.
poeciloptera Günther, 1940a: 500 [*Phantasca*]
[♂, Südostcolombia, Rio Tacana, Waehner leg., Mus. Dresden; ♂, Brasilien, ob. Amazonas, Fonteboa, Mus. Stettin]
SMTD [not traced]
Further ♂ in ZMPA.
praestantior Brunner v. Wattenwyl, 1907: 271 [*Carausius*]
[♀. Nova Guinea (Mus. Dresdens.), Ins. Roon (Mus. Hamb.), Ins. Key (Coll. m.).]
SMTD [24] ST: ♀, ST: A. B. Meyer, Neu Guinea 1873, Dore; ♀, ST: A. B. Meyer, Neu Guinea 1873, Mum.
Further type-material in NHMW and ZMUH.
pseudosipylus laevis Günther, 1936: 341 [*Sipyloidea*]
[2♂♂, ♀, Rouffaer Rivier, ca. 175m, VIII.1926]
SMTD [17] ST: 2♂♂, ♀, N. N. Guinea, Exp. 1926, W. Docters v. Leeuwen, Rouffel-River, ±175 m, Datum VIII.
pterobrimus Günther, 1934a: 284, fig. 1 [*Miroceramia*]
[♂, Ost-Ceram, I.-II., 1910]
SMTD [7] HT: ♂, O.-Ceram, Januar - Februar 1910.
rammei Günther, 1936: 26 [*Nescicroa*]
[HT: ♂, AT: ♀, PT: ♂, 3♀♀, Latimoujong-Gebirge, Uru, 800m, VIII.1930]
SMTD [18] PT: ♀, Celebes, Latimodjong-Geb., Oeroe 800 m, Heinrich 8.1930, 1939 13.
Further type-material in ZMHB.
robusta Günther, 1936: 343 fig. 17 [*Sipyloidea*]
[♀, Albatros Bivak, Mamberamo, VIII.1926]
SMTD [17] HT: ♂, N. N. Guinea Exp. 1926, W. Docters v. Leeuwen, Mamberamo, Alb.-Bivak, Datum VII.
rubrus Zompro, 1998: 162, fig. 4-5 [*Breviphetes*]
[Holotypus: ♂, (Neuguinea) Kaiser Wilhelmsland, Torricelli-Gebirge, 1910 (SMTD).]
SMTD [25] HT: ♂, Kais. Wilhelmsland, Torricelli-Gebirge, Dr. Schlaginhaufen.
[*Breviphetes rubrus* Zompro, 1998]
sanguinata Redtenbacher, 1908: 560 [*Necroscia*]
[♂. Kaiser-Wilhelmsland, Neu-Guinea (Mus. Dresden).]
SMTD [18] ST: ♂, 2♂♂, K. Wilhelmsland, Bongu.
sarasinorum Günther, 1938b: 70, fig. 10, 11 [*Menexenus*]
[♂, 2♀♀, "Celebes", Mus. Basel und Dresden.]
SMTD [25] ST: ♀, Sarasin, Celebes.
Further type-material in NHMB.
satyr Redtenbacher, 1908: 420 [*Bacteria*]
[♀. Brasilien (Mus. Dresden, Mus. Brüssel).]
SMTD [28] ST: ♀, Brasil.
Further 1 ST ♀ in ISNB.
[*Phanocloidea satyr* (Redtenbacher, 1908)]

scalprifera Günther, 1935a: 139 fig. 5a, b [*Cylindomena*]
[♀, Westjava, 1919]
SMTD [20] HT: ♀, West-Java, 1919.
[*Cylindomena scalprifera* Günther, 1935]
schlaginhaufeni Günther, 1937a: 91 fig. 4-7 [*Neopromachus*]
[♀, Torricelli-Gebirge, 780m]
SMTD [21] HT: ♀, Kais. Wilhelmsland, Torricelligebirge, Dr. Schlaginhaufen, 1910 1.
[*Neopromachus schlaginhaufeni* Günther, 1937]
semoni Brunner v. W., 1907: 294 [*Promachus*]
[♂♀. N. Guinea (Coll. m., Mus. Budap., Mus. Berol., Mus. Dresd.).]
SMTD [21] ST: ♀, K. Wilhelmsland, Bongu.
Further type-material in NHMW and ZMHB. HNHM-material lost in fire in 1956.
serripes Redtenbacher, 1908: 364 pl. 16 fig. 14, 15 [*Dimorphodes*]
[♂♀. Neu-Guinea (Coll. m., Mus. Budapest, Mus. Berlin, Coll. Staudinger, Mus. Genua); Borneo (Mus. Dresden ? (Mus. Amsterdam).]
SMTD [22] ST: ♂, K. Wilhelms-Land Bongu; ♂; *serripes* Redt.; 2 ♀, K. Wilhelms-Land Bongu; ♀ n5, K. Wilhelms-Land Bongu; 1 nymph, Neu Guinea 761.
Further type-material in HNHM, MCSN, NHMW and ZMAN.
[*Dimorphodes serripes* Redtenbacher, 1908]
spinithorax Zompro, 2001: 52 figs. 7-12 [*Microphyllium*]
[Holotype: ♂, Luzon, St. Thomas (coll. Staatliches Museum für Tierkunde, Dresden); paratypes: ♀ L-5, ♀ L-4, data as holotype (coll. Staatliches Museum für Tierkunde, Dresden).]
SMTD [6] HT: ♂, PT: ♀ n5, ♀ n4, Luzon, St. Thomas.
[*Microphyllium spinithorax* Zompro, 2001]
tacanae Günther, 1940a: 494 [*Isagoras*]
[♂, Rio Tacana]
SMTD [3] HT: ♂, Y preto, S. Waehner leg., Tacana, Brasilien, Waehner leg., 1939 1.
tenmalainus Günther, 1938a: 127 [*Menexenus*]
[♂, 2♀♀, Südindien, Tenmalai, Courtallam, H. S. Rao leg., 28.X.1926; ♂, Südindien, Courtallam, 16.XI.1921]
SMTD [25] ST: ♀, Courtallam, S. Grzdia, H. S. Rao 28.X.26.
Further type-material possibly in INPC. Several requests were not answered.
truncata Redtenbacher, 1908: 522 [*Aruanoidea*]
[♂. Dapitan, Mindanao (Mus. Dresden).]
SMTD [18] HT: ♂, Dapitan, Mindanao 833.
viridis Zompro, 1998: 163 fig. 10 [*Breviphetes*]
[Holotypus: ♂, (Neuguinea) Kaiser Wilhelmsland, Torricelli-Gebirge, 1910, Dr. Schlaginhaufen (MHNG). - Allotypus: ♀, Daten wie Holotypus (SMTD).]
SMTD [25] AT: ♀, Kais. Wilhelmsland, Torricelli-Gebirge, Dr. Schlaginhaufen.
The HT ♂ in MHNG.
[*Breviphetes viridis* Zompro, 1998]
waehneri Günther, 1940a: 495 fig. 18 [*Bacteria*]
[♀, Manaos; ♀, Ostecuador, Aguamo, Haensch leg, Mus. Stettin]
SMTD [29] ST ♀, Manaos, 1939.
Further ♀ in ZMPA.
[*Phanocles waehneri* (Günther, 1940)]

willemsei Günther, 1935a: 125 fig. 2-4 [*Parapygirhynchus*]
[4♂♂, 9♀♀, Perú, 1924]
SMTD [27] ST: 2♂♂, ♀, Peru, 1924, 1935 2; 2♀♀, Peru, 1935 2.
An additional female seems to be part of the type-series also, it has the same number-label (1935 2), even so is not mentioned by Günther. Further type-material in NHME.
[*Ocnophila willemsei* (Günther, 1935)]
zomproi Fritzsche & Gitsaga, 2000: 11-14, 2 figs. [*Parapachymorpha*]
[Holotyp ♂: Thailand, Nakhon Ratchasima, S Khao Mai Pok, 900-100m, 101°19'E 14°31'N, 19.-25.X.1997, leg. I. Fritzsche (Coll. O. Zompro); Paratypen: 68♂♂, 57♀♀ 2♀♀ Nymphs: 9♂♂, 3♀♀, 2 Nymphen, Daten wie Holotyp (Coll. O. Zompro); ♂, ♀, Daten wie Holotyp (Coll. I. Fritzsche); 2♂♂, Daten wie Holotyp (Coll. F. Hennemann); ♂, Daten wie Holotyp (Coll. DEIC), Eberswalde; 5♂♂, 3♀♀, Nachzuchten des vorhergehenden Materials V.1998 (Coll. O. Zompro); 8♂♂, 8♀♀, Nachzuchten des vorhergehenden Materials I.1999, jeweils ein Paar in folgenden Sammlungen: ZMHB, ZMUH, ZSMC, ISNB, SMTD, MCSN, NHMW, MHNG: 32♂♂, 32♀♀, Nachzuchten des vorhergehenden Materials I.1999 (Coll. O. Zompro). 10♂♂, 10♀♀, Nachzuchten des vorhergehenden Materials I.1999 (Coll. I. Fritzsche)]
SMTD [25] PT: ♂, ♀, Zucht O. Zompro I.1999.
Further type-material in Coll. Zompro, affiliated with ZMUK (HT), Coll. Bragg, DEI, Coll. Fritzsche, Coll. Hennemann, ISNB, MCSN, MHNG, NHMW.

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Notes on the PSG species belonging to the tribe Anisomorphini sensu Bradley & Galil, 1977, with a list and key to the genera (Phasmatodea: Pseudophasmatidae: Pseudophasmatinae)

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Abstract
The neotropical tribe Anisomorphini sensu Bradley & Galil, 1997 have always been a taxonomically problematic group. The authors published a revision of the tribe (Conle & Hennemann, 2002), which affects the systematic position or scientific name of some cultured species. The following paper provides a list of all genera belonging to Anisomorphini as well as determination keys to the males and females. Special reference is made to the identity of species included on the PSG culture-list, with the valid names being listed, along with information on each culture's history and origin.

Key words
Phasmida, Phasmatodea, Pseudophasmatidae, Pseudophasmatinae, Anisomorphini, genera, type-species, key, PSG species, identity.

Introduction

As arranged by Bradley & Galil (1977), the neotropical tribe Anisomorphini has always been a taxonomically problematic group. Since Redtenbacher´s (1906) treatment of the genera and species belonging to this group, no further studies of revisional nature have been made, and most species described subsequently were simply included in either *Anisomorpha* Gray, 1835 or *Autolyca* Stål, 1875 which have both consequently become polyphyletic genera.

Therefore a revision of the tribe at species-level seemed necessary and, since starting to visit numerous European museums in the early 1990s in order to photograph their type specimens, the authors began extensive research on the group. The recent publication of this revision (Conle & Hennemann, 2002) brought about numerous taxonomic changes, some of which concern species included on the PSG culture-list. The following paper summarizes those taxonomic changes which affect PSG species and lists the current valid names, along with information on each culture's history and origin. Additionally a list of all genera belonging to the Anisomorphini as well as determination keys for the males and females are included.

The current paper is meant as a first step for identification of taxa belonging to this tribe on generic level. It is especially hoped that it will to be of use for PSG-members and other people importing livestock of Anisomorphini from their holidays or expeditions.

Genera of Anisomorphini

Alloeophasma Redtenbacher, 1906: 126. Type-species: *Anophelepis poeyi* Saussure, 1868: 67, by subsequent designation of Conle & Hennemann, 2002: 17.

Anisomorpha Gray, 1835: 13 & 18. Type-species: *Phasma buprestoides* Stoll, 1813: 68, by subsequent designation of Kirby, 1904: 401.

Atratomorpha Conle & Hennemann, 2002: 30. Type-species: *Anisomorpha atrata* Hebard, 1919: 145, by original designation.

Autolyca Stål, 1875: 56 & 95. Type-species: *Autolyca pallidicornis* Stål, 1875: 95, by subsequent designation of Kirby, 1904: 402.

Columbiophasma Conle & Hennemann, 2002: 41. Type-species: *Bacteria quindensis* Goudot, 1843: 5, by original designation.

Decidia Stål, 1875: 96. Type-species: *Phasma soranus* Westwood, 1859: 127, pl. 17: 3, by subsequent designation of Kirby, 1904: 403.

Malacomorpha Rehn, 1906: 113. Type-species: *Malacomorpha androsensis* Rehn, 1906: 22, by monotypy.

Monticomorpha Conle & Hennemann, 2002: 53. Type-species: *Autolyca flavolimbata* Redtenbacher, 1906: by original designation.

Neophasma Redtenbacher, 1906: 124. Type-species: *Neophasma subapterum* Redtenbacher, 1906: 125, by subsequent designation of Zompro, 2000: 93.

Paranisomorpha Redtenbacher, 1906: 90. Type-species: *Paranisomorpha insignis* Redtenbacher, 1906: 90, by monotypy.

Peruphasma Conle & Hennemann, 2002: 91. Type-species: *Autolyca pentlandi* Redtenbacher, 1906: 95, by original designation.

Pseudolcyphides Karny, 1923: 234. Type-species: *Phasma spinicolle* Burmeister, 1838: 585, by original designation.

Key to the genera of Anisomorphini

Females

1. Caribbean Islands. 2
- Southern USA, Central and South America. 4
2. Tergites smooth. 3
- Tergites with posteromedial tubercle; body granulated. . . . . *Malacomorpha*
3. Mesonotum smooth; at least 2x as long as pronotum. . . . . *Alloeophasma*
- Mesonotum spined; at best 1.5x as long as pronotum. . . . . *Pseudolcyphides*
4. Profemora distinctly curved and depressed basally 5
- Profemora more or less straight, not depressed basally 6
5. Operculum short, at best reaching half of anal segment; basitarsus indistinctly longer than second segment; Southern USA and Central America. . . . . *Anisomorpha*
- Operculum long, apically pointed and reaching posterior margin of anal segment; basitarsus at least 2x as long as second segment; South America. . . . . *Neophasma*
6. Medium-sized to large, slender insects; Central America and Northern Columbia. 7
- Small to very small, stout or compact insects; South America. 9
7. Antennal segments cylindrical and parallel-sided. 8
- Antennal segments knob-like thickened apically . . . . *Paranisomorpha*
8. Profemora longer than head, pro- and mesonotum combined; basitarsus 3x as long as second tarsomere; alate. . . . . *Decidia*
- Profemora shorter than head, pro- and mesonotum combined; basitarsus at best 2x as long as second tarsomere; apterous. . . . . *Autolyca*
9. Tergites II-VII smooth. 10
- Tergites II-VII with posteromedial tubercle. 11
10. Very small, compact insects; legs short, edges rounded; body smooth, glossy. . . . . *Monticomorpha*
- Medium sized insects; legs elongate, distinctly carinated; body densely setose. . . . . *Peruphasma*
11. Mesonotum with prominent spines; body smooth and glossy. . . . . . . *Atratomorpha*
- Mesonotum without distinct spines; body granulose. . . . . *Columbiophasma*

Males

[The male of *Decidia* Stål, 1875 is not yet known].

1. Caribbean Islands. 2
- Southern USA, Central and South America. 4
2. Tergites smooth. 3

- Tergites with posteromedial tubercle; body granulated. . . . . *Malacomorpha*
3. Mesonotum smooth; at least 2x as long as pronotum. . . . . *Alloeophasma*
- Mesonotum spined; at best 1.5x as long as pronotum. . . . . *Pseudolcyphides*
4. Profemora distinctly curved and depressed basally 5
- Profemora more or less straight, not depressed basally 6
5. Subgenital plate small, not convex; basitarsus indistinctly longer than second tarsomere; Southern USA and Central America. . . . . *Anisomorpha*
- Subgenital plate strongly convex, cup-like; basitarsus at least 2x as long as second tarsomere; South America. . . . . *Neophasma*
6. Tergite IX with forceps-like, posterolateral lobes, Central America. 7
- Tergite IX without lateral lobes; South America. 8
7. Antennal segments cylindrical, parallel-sided; body smooth and glossy. . . *Autolyca*
- Antennal segments knob like, thickened apically; body granulose. . .*Paranisomorpha*
8. Anal segment simple, without lateral spine. 9
- Anal segment with distinct, finger-like lateral spine. . . . . *Columbiophasma*
9. Tergites II-VII smooth; mesonotum smooth. 10
- Tergites II-VII with posteromedial tubercle; mesonotum with distinct spines. . . . . *Atratomorpha*
10. Very small, compact insects; legs short, edges rounded; body smooth, glossy. . . . . *Monticomorpha*
- Medium sized; legs elongate distinctly carinated; body densely setose. . *Peruphasma*

Comments and identities of species included on the PSG culture-list

PSG 12: *Anisomorpha buprestoides* (Stoll, 1813)

This species is very variable in size and coloration and seems to have developed numerous varieties which may perhaps be regarded as geographical races. There are mainly two colour-forms, one clearly black and white striped, and relatively larger, from Florida and a smaller brownish colour-form in which the stripes are less distinct or almost absent from regions north of Florida. Although quite common in some places, *A buprestoides* is restricted to Key West, Florida and Georgia. Other records are usually misidentifications of the very similar *Anisomorpha ferruginea* (Palisot de Beauvois, 1821), which may however be distinguished from *A. buprestoides* by its smaller size, stouter body, less distinct stripes on the body and lacking the black lateral band on the anal segment.

This species seems to have been imported to Europe several times since the 1970s and has subsequently been successfully reared by many breeders. The original culture stock PSG 12 originated from Florida, however there is no information available on when or by whom the origin insects or eggs were collected. The original PSG 12 represented the large, black and white striped variety of *A. buprestoides* while later imports included the smaller, brownish variations from Georgia.

Although some stock readily feed on bramble (*Rubus* spp.) others seem to feed exclusively on privet (*Ligustrum* spp.) or rhododendron (*Rhododendron* spp.).

PSG 50: *Peruphasma sp.* ?

This Peruvian species was apparently never in culture but included on the PSG species-list as "*Paranisomorpha* sp. PSG 50". According to its locality it most probably represented a member of *Peruphasma* Conle & Hennemann, 2002 instead of *Paranisomorpha* Redtenbacher, 1906 which is restricted to Central America.

PSG 122: *Anisomorpha paromalus* Westwood, 1859
= *Anisomorpha monstrosa* Hebard, 1932: 214. [synonymised by Conle & Hennemann, 2002: 28].
The culture stock of this attractive black and orange species was collected in Belize (formerly known as British Honduras) in the early 1990s and referred to as "*Anisomorpha* sp." or a dark variety of *A. buprestoides* (Stoll, 1813). It was originally reared by M. Lazenby & F. Holloway and subsequently identified as *Anisomorpha monstrosa* Hebard, 1932 by Brock (1995: 6).

Comparison of cultured specimens of PSG 122 with the types of *Anisomorpha paromalus* Westwood, 1859 in the British Museum of Natural History, London proved these two taxa to be synonymous (Hennemann & Conle, 2002). As Westwood´s name is the older one, Hebard´s name is a junior synonym, with *A. paromalus* being the valid name for PSG 122.

The type locality of *A. monstrosa* Hebard is Mexico, Merida, Yucatan, which is very close to Belize where the culture stock was collected. *A. paromalus* Westwood was described from Venezuela, a locality which is presumably wrong.

PSG 191: *Neophasma borellii* (Giglio-Tos, 1897)
The original eggs of this culture stock were laid between 3rd and 8th January 1997 by a female collected in Paraguay, Dept. Paraguari, Sapucay and sent to Frank Hennemann by a local supplier. The stock was parthenogenetic and seems to have died out after a few generations. Insects were feeding exclusively on privet (*Ligustrum* spp.).

PSG 198: *Anisomorpha ferruginea* (Palisot de Beauvois, 1821)
This species is widely distributed in the USA including Texas, Louisiana, Mississippi, Tennessee, Oklahoma, Kentucky, Georgia, South- and North Carolina and parts of Georgia, it is however absent in Florida. Specimens are often misidentified as *A. buprestoides* (Stoll) which is restricted to Florida and Georgia and distinguished by its larger size, more distinctly striped and elongate body and distinct black lateral band of the anal segment.

Due to its wide geographic distribution it has developed several varieties which may rank as geographic races or subspecies. Culture stock seems to have been imported to Europe two times, the first originated from Mississippi. The stock feeds on bramble (*Rubus* spp.) and privet (*Ligustrum* spp.).

PSG 213: *Malacomorpha jamaicana* (Redtenbacher, 1906)
This species is commonly found in Jamaica, from where the present stock was brought into culture by Tony James. It is extremely productive and easy to rear, feeding on bramble (*Rubus* spp.) and privet (*Ligustrum* spp.). Although apterous, a single female of the type series in NHMW possesses rudimentary tegmina and alae.

PSG 220: *Malacomorpha cyllarus* (Westwood, 1859)
This species is very similar and closely allied to *M. jamaicana* (Redtenbacher, 1906), but differs at first sight by the existence of tegmina and alae and the slightly paler body colour. The present stock was also brought to Europe by Tony James who collected it in Jamaica. It seems to feed exclusively on privet (*Ligustrum* spp.).

Correction to Conle & Hennemann, 2002, plate VII, fig. 73 and p. 109

The photo of the male holotype of *Neophasma vittata* (Toledo-Piza, 1939) in the Escola Superior de Agricultura "Luis de Queiroz", Sao-Paulo, Brazil was kindly provided by O.

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Instructions on how to order this revision follow the references.

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How to order the revision of Anisomorphini

Conle, Oskar V. & Frank H. Hennemann (2002): Revision neotropischer Phasmatodea: Die Tribus Anisomorphini sensu Bradley & Galil 1977. (Insecta, Phasmatodea, Pseudophasmatidae). *Spixiana*, Supplement No. 28, 141 pages, 19 plates. ISBN 3-89937-001-5

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Reviews and Abstracts.

Book Reviews

Arthropods in Baltic Amber by Jens-Wilhelm Janzen (2002). Published by Ampyx-Verlag, Halle (Saale). ISBN 3-932795-14-8. Hardback, size 233mm x 217mm, 168 pages, over 400 figures, including more than 300 colour prints. In English and German. Price excluding postage: about 50 Euros. **Reviewed by Oliver Zompro.**

Jens-Wilhelm Janzen is an enthusiastic collector of fossils and insects and is famous for his publications on Hymenoptera in Baltic amber. He has worked with Arthropods in Baltic amber for many years, and this knowledge is collected in this attractive book. Janzen is a professional teacher, and his experiences in teaching are mirrored in the information and arrangement of this beautiful book.

The book is subdivided into four chapters.

The first one contains easy to use illustrated keys to the orders of insects, myriapods, crustaceans and arachnids which have been found in Baltic amber

The second chapter lists the most important characteristics of each order and includes a note about the frequency in Baltic amber. A representative of each order is figured in a detailed illustration.

The third chapter is the largest in the book, containing more than 300 brilliant colour photos featuring samples of more than 200 Arthropod families. Representatives of several families, especially of Hymenoptera, beetles and flies, are figured from Baltic amber for the first time.

The fourth chapter includes a glossary, in which the scientific terms are explained. These are followed by information about further literature and links in the internet. The last part is an index including all taxa included.

The aim of this book, a presentation of the variety of Arthropods in Baltic amber, is fully attained. It really impresses by its clear arrangement, the exact drawings, and especially the large number of brilliant colour photos in which several rarities are figured for the first time. The numerous cross-references make it easy to find further information in other chapters.

Latest results of research are included in this book, also descriptions which are still in press or which have been published only weeks before. The clear information and arrangement make the book most recommendable for students and especially collectors of Baltic amber inclusions, and it is a good support for the specialist because of the large variety of illustrations. In view of the scope, the price of about 50 Euros appears fully justified.

In conclusion, "Arthropods in Baltic Amber" should be present in the library of everybody interested in Arthropods.

Phasmid Abstracts

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

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

Zompro, O. (2001) Redescription and new synonymies of *Heteronemia* Gray, 1835 (Insecta: Phasmatodea) transferred to the suborder Areolatae. *Studies on Neotropical Fauna and Environment*, 36(3): 221-225.

Re-examination of the holotype of the stick insect species *Heteronemia mexicana* GRAY, 1835, the type species of the genus *Heteronemia* Gray, 1835, has revealed this species to actually represent the suborder Areolatae. This discovery results in a number of dramatic nomenclatural alterations. As the family Heteronemiidae is based on *Heteronemia*, all of its more than 160 constituent genera but *Heteronemia* must be reallocated, being indeed members of the suborder Anareolatae. The Diapheromeridae Kirby, 1904, n.stat., being the next oldest available name, is thus allotted full family rank to encompass them. The following new synonymy has been established: Synonyms of *Heteronemia* Gray, 1835 are *Bacunculus* Burmeister, 1838, *Bactridium* Saussure, 1868, *Bacillidium* Uvarov, 1939, and Donusa Stål, 1875. Synonyms of *Heteronemia mexicana* Gray, 1835, are *Prisomera phyllopus* Gray, 1835, *Bacunculus spatulatus* Burmeister, 1838, *Bactridium coulonianum* Saussure, 1868, *Donusa prolixa* Stål, 1875, *Bacteria foliacea* Blanchard, 1851, and *Donusa glabriuscula* Redtenbacher, 1906. Synonyms of *Heteronemia chilensis* (Westwood, 1859) are *Bacteria cornuta* Philippi, 1863, *Bacteria collaris* Philippi, 1863, and possibly *Bacunculus blanchardi* Camousseight, 1988. *Heteronemia* is rediagnosed, becoming the only genus in the family Heteronemiidae and comprising but two valid species, *mexicana* and *chilensis*, both from Chile. Hence the holotype of *mexicana*, claimed to derive from Mexico, was apparently mislabelled. A lectotype is designated for *Bacunculus spatulatus* Burmeister, 1838.

Zompro, O. (2001) The type-material of the insect order Phamatodea, described by Johann Jacob Kaup. *Senckenbergiana biologica*, 81(1/2): 133-145.

The type-material of 23 taxa of the insect order Phasmatodea described by Johann Jakob Kaup and housed in the Hessisches Landesmuseum, Darmstadt, Germany [HLDH], and Senckenberg-Museum, Franfurt am Main, Germany [SMF] is listed. If possible, the actual taxonomic position of each taxon is provided. Lectotypes are designated for *Clonistria cacica* Kaup 1871, *Ceroys capreolus* Kaup 1871, *Lonchodes duivenbodei* Kaup 1871, *Acanthoderus hystrix* Kaup 1871, *Pachymorpha novaeguineae* Kaup 1871, *Acanthoderus occipitalis* Kaup 1871, *Ophicrania striaticollis* Kaup 1871, and *Necroscia vipera* Kaup 1871. *Ceroys capreolus* Kaup 1871, is found to be a new synonym of *Sermyle mexicana* (Saussure 1859), *Lonchodes duivenbodei* Kaup 1871, a new synonym of *Periphetes forcipatus* (Bates 1865). *Bacteria cacica* Kaup 1871, is transferred to *Clonistria* Stål 1875, *Haplopus grayi* Kaup 1871, to *Diapherodes* Gray 1835, *Cladoxerus insignis* Kaup & von Heyden 1871, to *Hermarchus* Stål 1875.

Zompro, O. & Adis, J. (2001) A new species of Phasmatodea of the genus *Echetlus* Stål. *Revista de Agricultura*, 76(2): 291-297.

A new species of Phasmatodea, *Echetlus evoneobertii* Zompro & Adis n. sp., is described from Southern Brazil, where it is likely to have been introduced. This species is destructive to *Eucalyptus urophylla* Blake (Myrtaceae) which was imported from Australia. *Ernodes sumatranus* Redtenbacher, 1908, is designated as type-species for *Ernodes* Redtenbacher, 1908, which is restituted as valid genus. *Bacunculus tener* Brunner v. W., 1907, is a new synonym of the type-species *Echetlus peristhenes* (Westwood, 1859). With that *Echetlus* includes the following species: *Parasipyloidea cercata* Redtenbacher, 1908, *Bacillus peridromes* Westwood, 1859, *Anophelepis periphanes* Westwood, 1859, *Bacillus peristhenes* Westwood, 1859.

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