

PHASMIDA FROM BAKO NATIONAL PARK

by

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Summary

Eight species of Phasmid collected in the Bako National Park are discussed. Two new synonyms and a homonym are given, an existing synonym is corrected, and the lectotype of *Lonchodes amaurops* is designated. Illustrations of several species and some eggs are included. The genus *Dajaca* is reviewed and a new species is described and illustrated.

Key Words

Acacus, *Dajaca*, *Epidares*, *Datames*, *Haaniella*, *Hoploclonia*, *Lonchodes*, New species, *Dajaca filiformis*, Synonym, Homonym, Lectotype, Eggs, Bako National Park, Sarawak.

Introduction

In December 1987 a few Phasmids were collected in Bako National Park, the results of this have been briefly reported elsewhere (Bragg 1988). During August 1989 a small collection of Phasmids was made at Bako National Park by myself and Mr. Patrick van der Stigchel from the Netherlands. The aim of both collecting trips was to take specimens back to the UK and the Netherlands and attempt to rear them in captivity. In all ten species were collected.

This paper gives details of the eight species collected by myself. In most cases the specimens have been compared with type material, the following codens are used in the text:

NHM	Natural History Museum, London.
OXUM	Oxford University Museum, Oxford.
NHMW	Naturhistorisches Museum Wien, Austria.

A summary of the species collected is given in Table 1, the classification used is that used by Bradley & Galil (1977). Several previously undescribed eggs are described, using the standard terminology (Clark 1976). The plants used for captive rearing in the UK are referred to by their common names in the text; the scientific names are listed in Table 6.

Material collected by Mr. van der Stigchel included most of the listed species, with the notable exception of *Dajaca filiformis*. Mr. van der Stigchel also collected two other species of the subfamily Necroschiinae but I have not had the opportunity to examine these specimens.

Specimens were collected at night, using head torches to search vegetation along several of the Park trails.

RESULTS

Heteropteryglnae

Epidares nolimetangere (de Haan) 1842. (Fig. 1)

Phasma (*Acanthoderus*) *nolimetangere* de Haan, 1842: 135, pl. 14.6 & 14.7.

Acanthoderus nolimetangere (de Haan); Westwood, 1859: 50.

Tisamenus nolimetangere (de Haan); Kirby, 1904: 399.

Dares nolimetangere (de Haan); Redtenbacher, 1906: 54.

Dares nolimetangere (de Haan); Günther, 1935a: 2.

Daris nolimetangere (de Haan); Günther, 1943: 150. [misspelling]

Dares nolimetangere (de Haan); Herbert, 1990: 24–25.

Epidares nolimetangere (de Haan); Bragg, 1991e: 265–267.

1987: 2 ♂♂, 5 ♀♀.

1989: 3 ♂♂, 2 ♀♀.

It has recently come to my attention that Bradley & Galil (1977) listed *Epidares* Redtenbacher as a genus, elevating it from the status of a sub-genus which as used by Redtenbacher. No explanation for this elevation was offered by Bradley & Galil so there is a possibility that it was unintentional; there are numerous errors in their paper. However there is no doubt that *Epidares nolimetangere* is quite different from the species of *Dares* with which I am familiar, so it is conceivable that this elevation was intended; I therefore consider it to be a valid genus.

The egg of this species is dark brown and covered in fine hairs which are hooked at the end. The eggs have a length of 3.9mm, height 3.0mm and width 2.6mm. In captivity they are usually found on the ground although occasionally eggs are found on leaves or caught on the sides of the cage.

This species has been found to be very common at two other sites, Mt. Serapi and Kampung Bengoh, both in the First Division of Sarawak. It is usually found within 1m of the ground, on a variety of low growing plants. Specimens from Bako were all of the usual coloration for this species although males from Mt. Serapi have a lot of green on the thorax. This species has proved easy to rear in the U.K., feeding on bramble, dog rose, oak, firethorn, elder and hawthorn. Details of how to rear this species have been given elsewhere (Herbert 1990).

Datames oileus (Westwood) 1859.

Acanthoderus oileus Westwood, 1859: 53, pl. 26.4.

Acanthoderus gravidus Bates, 1865: 343. [Synonymised by Günther, 1934: 76.]

Acanthoderus mouhoti Bates, 1865: 342. [Synonymised by Günther, 1934: 76.]

Datames oileus (Westwood); Stål, 1875: 93.

Datames aequalis Rehn, 1904: 89. [Synonymised by Günther, 1934: 76.]

Datames oileus (Westwood); Kirby, 1904: 400.

Datames mitratus Redtenbacher, 1906: 50. [Synonymised by Günther, 1934: 76.]

Datames cylindripes Redtenbacher, 1906: 51. [Synonymised by Günther, 1934: 76.]

Datames arietinus Redtenbacher, 1906: 51. [Synonymised by Günther, 1934: 76.]

Datames oileus (Westwood); Redtenbacher, 1906: 52.

Dares fulmeki Werner, 1934: 1. [Synonymised by Günther, 1934: 76.]

Datames oileus (Westwood); Günther, 1934: 76.

1989: 1 ♀.

This was found on vegetation, 20cm above the ground. This species also occurs on Mt. Serapi and in the area around Kampung Bengoh. On Mt. Serapi it was observed feeding on leaves of a low growing monocotyledon. Attempts to rear this species have been unsuccessful as specimens refused the food offered in the U.K. Only one egg was collected, this hatched but refused to feed. The eggs are similar in general form to those of *Epidares nolimetangere* but smaller. The following measurements are taken from an egg which lacks the operculum: length 3.1mm, height 3.1mm and width 2.7mm.

***Haaniella saussurei* Kirby 1904.** (Fig. 2)

Heteropteryx grayi var. Saussure, 1870: 310.

Haaniella saussurei n.n. Kirby, 1904: 397.

Heteropteryx saussurei n.sp. Redtenbacher, 1906: 171. **New Homonym & Objective Synonym.**

Haaniella echinata (Redtenbacher); Rehn, 1938: 368.

Haaniella echidna Rehn, 1938: 369, pl. 14.l. **New Synonym**

Haaniella echinata echidna Günther, 1944: 70.

Haaniella echinata saussurei Günther, 1944: 70.

1987: 1 ♂ nymph, 3 ♀♀ nymphs; reared to adults.

1989: 1 ♂, 2 ♀♀ nymphs.

Redtenbacher named Saussure's variation as a species, unaware that Kirby had already done so. Redtenbacher used the generic name *Heteropteryx* Gray (1835: 32) although he should have used *Haaniella* which Kirby had established for *Heteropteryx* de Haan (1842: 108); this has been pointed out by both Dohrn

(1910: 401) and Karny (1923: 234). *Heteropteryx saussurei*, when transferred to *Haaniella*, is therefore a secondary homonym of *Haaniella saussurei* Kirby. However a replacement name is not needed as the two names refer to the same species; *H. saussurei* (Redtenbacher) is an objective synonym. Subsequent authors all seem to have been unaware of this situation.

Examination of the eggs of *H. echinata* and *H. saussurei* have shown these to be two distinct species. The eggs of *H. echinata* are oval in shape (Harman 1987) while those of *H. saussurei* are lemon shaped (Fig. 2). The difference is so remarkable that it is clear that Rehn was incorrect when he decided that *H. saussurei* is a synonym of *H. echinata*.

In addition I have established by captive breeding that *H. echidna* is in fact the male of *H. saussurei* (**New Synonym**). Although I have not been able to examine the type specimens of these species, my material agrees with Günther's key (1944) and the male agrees with the description and illustration in Rehn's paper (1938).

This species was found from ground level up to 2 m above the ground. Table 2 gives the variation in the measurements of the specimens collected at Bako. Mating in this species involves the production of spermatophores (Bragg 1991a). The eggs are brown in colour with a smooth surface. The length is typically 13.5 mm, height 6.5 mm and width 6.5 mm. Eggs are laid 5 mm below ground level and in unheated conditions in the U.K. they take 15–18 months to hatch; growth from first instar to adult takes about 15 months.

Both adults and nymphs feed on oak, ivy, dog rose, pyracantha and bramble. The newly hatched nymphs have white tips to the antennae, this is not the case with the adults.

***Hoploclonia gecko* (Westwood) 1859.** (Figs. 3 and 4)

Acanthoderus gecko Westwood, 1859: 52, pl. 26.6 & 26.7. Syntypes 3♂♂, 3♀♀, Borneo (OXUM) [examined], ♀, Borneo (NHM) [examined].

Hoploclonia gecko (Westwood); Stål, 1875: 92.

Hoploclonia gecko (Westwood); Kirby, 1904: 399.

Hoploclonia gecko (Westwood); Redtenbacher, 1906: 46, pl. 1.10.

Hoploclonia gecko (Westwood); Rehn & Rehn, 1938: 466.

Hoploclonia gecko (Westwood); Bragg, 1991d: 13–15.

1987: 1 ♂, 1 ♀.

1989: 4 ♂♂, 5 ♀♀.

This species was found on the ground or within 30 cm of ground level. In the U.K. it feeds on bramble, dog rose, oak, hawthorn, ivy, eucalyptus and firethorn. A breeding culture has been established and the conditions for rearing have been described (Bragg, 1991d). I have also found this species on Mt. Serapi.

The egg (Fig. 3) is laid a few millimetres below ground level in damp soil. They are greyish brown in colour and the surface has numerous spicules which are longer at the opercular end. A typical egg length is 4.2mm, height 3.0mm and width 2.6mm. The opercular angle is difficult to measure due to the egg being so short relative to its height and width, however it is in the region of -10° .

Lonchodinae

Lonchodes amaurops Westwood 1859. (Figs. 5–8)

Lonchodes amaurops Westwood, 1859: 43, pl. 24.10. **Lectotype** ♀, Sarawak, Borneo (OXUM) here designated [examine], **Paralectotype** ♀ nymph, Borneo (NHM) [examined].

Sthenoboëa amaurops (Westwood); Kirby, 1904: 323.

Prisomera amaurops (Westwood); Brunner, 1907: 288.

Lonchodes amaurops (Westwood); Günther, 1932: 381.

Lonchodes amaurops (Westwood); Bragg, 1991b: 21–24.

Lonchodes amaurops (Westwood); Bragg, 1991c: 13–17.

Lonchodes pterodactylus Gray, 1835: 19. [Synonymised by Günther 1932: 382.] [Erroneous Synonym].

Lonchodes dispar (Bates); 1865: 337. HOLOTYPE ♂ Borneo, (OXUM) [examined] **New Synonym.**

Staelonchodes dispar (Bates); Kirby, 1904: 318.

1987: 3 ♂♂ nymphs, 2 ♀♀ nymphs, reared to adult.

These were found on bushes, within 2m of the ground. This species is exceptionally easy to rear in captivity (Bragg, 1991b, 1991c), feeding on a variety of plants including hawthorn, firethorn, dog rose, raspberry, privet, bramble, elderberry and ivy. Adults will feed on the young leaves of oak but will not feed on mature leaves of this plant. This suggests that this species could possibly be important in limiting the regrowth of areas where vegetation has been cleared and could become a crop pest in certain circumstances.

Westwood described only the female of this species from "Sarawak, Borneo" in 1859. The species was described from two specimens, an adult female which is now in the OXUM and a nymph which is in the NHM. It is the OXUM specimen which was illustrated by Westwood and, as this is an adult specimen, I select this as the lectotype.

In 1865 Bates described a male with the name *Lonchodes dispar*, however he omitted to mention the spine which is present on the hind margin of the fifth abdominal segment (Fig. 7). This omission led to Günther (Günther 1932: 382) incorrectly giving *L. dispar* as a synonym of *L. pterodactylus* Gray. *L. amaurops*

is characterized by the presence of the abdominal spine in both sexes. Captive breeding and examination of the type specimens has confirmed this synonymy. This species was omitted from the monograph by Brunner & Redtenbacher (Brunner von Wattenwyl 1907; Redtenbacher 1906, 1908).

The males of this species occur in two distinct colour forms; one I term the *dispar* form is identical to the type specimen of *L. dispar*, the other, which I refer to as the *viridis* form is mainly green in colour. All the males collected from Bako and on Mt. Santubong are of the *dispar* form, specimens from Kampung Bengoh and Mt. Serapi are of the *viridis* form (Bragg, 1991b, 1991c).

The female of this species is polymorphic, showing variation in the wart like protuberance and spine on the fifth abdominal segment, and in the size of the tubercles on the mesothorax (Fig. 8.). Specimens from elsewhere also show variation in the back of the mesothorax and end of the abdomen. Table 3 gives the range of measurements obtained from almost 100 captive reared specimens bred from individuals caught at Bako. The size of captive bred specimens is consistent with specimens caught at Bako and elsewhere.

Of the two female specimens collected at Bako, only one survived to reproduce. She laid a total of 282 eggs, at a mean rate of 4.51 per 24 hours at 15–25°C. The hatch rate of the eggs is high, and survival of nymphs is almost 100%.

The eggs (Fig. 6.) exhibit variation in shape, colour and surface sculpturing. The base colour varies from dark brown to grey. The surface is covered in many thin dark ridges. These can be so numerous that the surface appears pitted with tiny holes rather than covered in ridges. The egg is 3.5mm long, 2.5mm in height and 2mm in width. The micropylar plate forms a cream coloured stripe along the dorsal side. The operculum is almost flat and has a very distinct orange capitulum. The opposite end is rounded and has a blunt ended projection which varies in length. Some eggs appear much fatter than others, mainly because they have a long projection but the same total length. Often the projection appears pale brown in colour due to the absence of the dark ridges.

Lonchodes jejunos (Brunner) 1907.

Dixippus jejunos Brunner 1907: 278. Syntypes ♂♂ and ♀♀ Borneo (NHMW) [examined].

Phasma (Lonchodes) uniforme Westwood, 1848: 79, pl. 39 fig. 3. [Synonymised by Günther, 1935b: 125].

Lonchodes jejunos (Brunner); Hausleithner, 1989: 105, fig. 2e–f.

1989: 3 ♀♀ nymphs.

Günther (1935b: 125) synonymised *L. jejunos*, *L. validor* (Brunner) and *L. uniformis* (Westwood). These species are certainly very closely related, however, as Hausleithner (1989) has shown, the eggs are quite distinct and I consider the synonymy doubtful, and that they should be treated as distinct species at present.

I originally identified this species as *L. uniformis*, on the basis of a specimen in the NHM. I have subsequently examined the type specimen of *L. uniformis* at the OXUM; I found that the species which I collected at Bako is not *L. uniformis*. Examination of the type specimens have confirmed the identity of this species. Re-examination of the specimens at the NHM, has shown that the only female from Sarawak was wrongly identified, it is in fact a specimen of *L. jejunos*. There are also four males which appear to be *L. jejunos*, two are labelled "Sarawak" and two have no data attached. Five males labelled "*Prisomera uniforme*" at OXUM also appear to be *L. jejunos*; all five are marked "Kuching".

The eggs of this species also agree with those of *L. jejunos* which have been illustrated by Hausleithner (1989: fig. 2e–f). While at OXUM I examined some eggs collected by Shelford; these are clearly eggs of *L. jejunos* although Shelford had marked them as *L. uniformis*. Shelford's description of the eggs of *L. uniformis* (Shelford 1916) must therefore relate to *L. jejunos*.

Three specimens were found along the path in front of the Park Head Quarters. There is also a photograph, which appears to be this species, on display in the Visitors' Centre. This species is common at Kampung Bengoh and also occurs in Kuching and on Mt. Serapi.

This species has bred in captivity, feeding on dog rose, bramble and eucalyptus. I have found this to be another species which produces spermatophores (Bragg 1991a).

Necroscilinae

Acacus sarawacus (Westwood) 1859. (Fig. 9)

Bacteria sarawaca Westwood, 1859: 31, pl. 25.1 & 25.2. Syntypes 2 ♀, 1 ♂ Sarawak (OXUM) [examined], ♂ Sarawak (NHM) [examined].

Staelonchodes sarawaca (Westwood); Kirby, 1904: 317.

Acacus sarawacus (Westwood); Brunner, 1907: 252.

Acacus sarawacus (Westwood); Günther, 1938: 127.

Bacteria sinkiebensis Wood-Mason, 1877: 343. [Synonymised by Günther, 1938: 127].

Acacus sarawacus (Westwood); Günther, 1943: 153.

Acacus sarawaca (Westwood); Hausleithner, 1991: 221.

1987: 1 ♂.

1989: 4 ♂♂ 3 ♀♀.

These were found feeding on bushes from 0.5m to 3m above the ground. It is the only species which was found on the higher parts of Jalan Lintang.

The eggs are roughly cylindrical, coming to a blunt point at the end opposite to the operculum (Fig. 9). The operculum has a number of raised projections on it and is surrounded by a ring of hair-like structures; the opercular angle

is +23°. A typical egg is 5.7mm in length, with a width of 1.6mm and a height of 1.7mm. The egg is a uniform mid-brown in colour and the surface is heavily sculptured with numerous raised ridges. The eggs of this species appear to be suited for burying in soil and in captive conditions most of the eggs were deposited in a small tray of damp Vermiculite; some of the eggs were deposited on the floor of the cage.

I have had some success rearing this species from specimens obtained from Mt. Serapi, Sarawak and from Sabah. The adults and nymphs feed on bramble, pyracantha and rose.

The type specimens of *Bacteria sarawaca* are of course from Sarawak, although no specific locality is recorded. The type specimens of *Bacteria sinkiebensis* are from an island off the north east coast of Sumatra. This species appears to be widely distributed and common in north Borneo. In addition to Bako I have found it on Mt. Serapi, Mt. Santubong, at Kampung Bengoh, Simunjan, and at Sri Aman in Sarawak, at Kuala Belalong in Brunei, and on Mt. Kinabalu in Sabah.

Pseudophasmatinae

GENUS *Dajaca*

KEY TO THE SPECIES OF *Dajaca*

1. Antennae rounded & bead like. Front edge of pronotum straight.
..... *D. monilicornis* Redtenbacher.
2. Antennae uniform thickness. Front edge of pronotum indented.
..... *D. filiformis* **New Species.**

The genus *Dajaca* was established by Brunner (Brunner von Wattenwyl 1893: 99). It is the only genus of the subfamily Pseudophasmatinae to occur in Borneo (Bradley & Galil 1977: 200). The general appearance of the males, females and eggs are similar to some members of the Aschiphasmatinae (eg. *Dinophasma* spp.) and the placement of this genus may need revision. When Brunner described the genus he did so without giving a species description. To date only one species has been described; *Dajaca monilicornis* Redtenbacher (Redtenbacher 1906). As *D. monilicornis* was the only described species at that time it is the type species of *Dajaca* in accordance with Article 69a (vii) of the International Code of Zoological Nomenclature.

Brunner gave the following brief description of the genus:

1. Species wingless. Subgenital plate of female is elongated.
2. Feet short. Front tarsus, first joint not longer than the second tarsal joint. (Antennae with a thick basal joint and necklace shaped).

It is clear from the reference to the necklace-like antennae at the end of Brunner's description that *D. monilicornis* is the species on which he based his genus. As the male is winged but Brunner described the genus as wingless, I assume that he had only a female available at that time.

The new species described below clearly belongs in the same genus as *D. monilicornis*, yet it does not possess the necklace-like antennae (although some of the antennal segments are globular). However Brunner placed the reference to the antennae in brackets, which suggests that he did not necessarily consider this to be a characteristic of the genus.

When Redtenbacher gave a more detailed description of the genus he included the reference to the necklace-like antennae. In view of the new species below it is clear that the reference to the necklace-like antennae should have been part of the species description, not the generic description. Apart from this characteristic Redtenbacher's description of the genus appears to be accurate.

Redtenbacher's female specimen of *D. monilicornis* has lost its original colour, although I have not examined the male it is clear from the description that this too has lost much of its colour. This is possibly due to them being exposed to strong sunlight or alcohol. I have found that ethanol destroys the green coloration of this species. To clarify the species I give below a modified version of Redtenbacher's description of *D. monilicornis*.

The movement of both species in this genus is remarkable because it is a scuttling movement, reminiscent of a cockroach, rather than the usual walk of most Phasmids.

***Dajaca monilicornis* Redtenbacher** 1908: 162, syntypes ♀ Borneo (NHMW) [examined], ♂ Borneo (Budapest Museum).

Head, body and legs bright green. Dorsal surface of head, pronotum, abdominal segments 7–10 light brown, abdominal segment 7 of female may appear white. Ventral surface of head and thorax black. Ventral surface of abdomen light brown. Femora compressed, with a pointed carina on the outside. Upper & outer surfaces of femora green, inside & lower surfaces light brown. Tibiae brown with occasional black patches, middle tibiae with green patches.

Eyes bright red. Wings of male dark, frontal area brown with a green margin at the front. Antennae composed of thick spherical segments at the head end, becoming filamentous towards the end. Antennal segments 3 to 7 thickly covered in dark hair (Fig. 10).

There are adult specimens of this species in the Sarawak Museum, the NHM, Cambridge University Museum and I have collected specimens on Mt. Serapi in Sarawak. Mr. C.L. Chan of Kota Kinabalu, Sabah has collected this species in Sabah (personal communication). To judge by its frequency in museum collections, *D. monilicornis* is quite common. There are specimens of both sexes in each of the collections listed above. Günther (1943) reports one male and three females found at Mahakam, Sarawak by Dr. Nieuwenhuis in 1894. This species appears to be monophagous, in August 1991 more than thirty specimens were seen on one tree. Every leaf on the tree appeared to have been partly eaten and I estimate that 40% of the foliage had been eaten; no specimens were found on any other trees.

It is obvious from Redtenbacher's illustration of the female that the measurement given for the metanotum is in fact that of the metanotum and median segment combined. It also appears from examination of the specimen that the female

is not adult. The measurements given in Table 4 are from six females and five males collected from Mt. Serapi.

***Dajaca filliformis* New Species** (Fig. 11)

1989: 1 ♀, Holotype.

This was found resting on the upper surface of a leaf 30cm above the ground. The unidentified plant was at the side of one of the marked trails in the park, at an altitude between 50m and 100m.

Measurements are given in Table 5. The following description is based on both the preserved specimen and a colour photograph of the holotype when live. The specimen died during the return to the U.K. and some decomposition had occurred before it could be preserved. It was preserved by evisceration and stuffing with cotton wool in the usual manner (Bragg 1990). Due to the rapid decomposition which had occurred before preservation the specimen is in poor condition and stuffing appears to have increased the distance between the head and pronotum (see Fig. 11).

The body is light brown, the dorsal surface of the 7th abdominal segment is white in the living insect and the front of the mesothorax is white, heavily mottled with brown.

The head is rounded and dorso-ventrally flattened with a wrinkled surface; there are no ocelli. The antennae have 47 segments although only 28 are easily seen. In the live specimen the antennae consist of alternate light and dark brown bands. The basal segment is dorso-ventrally flattened and the 4th & 5th segments are exceptionally short and approximately spherical.

The upper surface of the thorax and median segment are heavily wrinkled. The pronotum is indented at the front margin and has a small depression at the centre. The mesothorax is narrow at the front, widening towards the rear. Body light brown with underside of thorax black in the preserved specimen. The underside of the abdomen is darkened in the preserved specimen. The 9th & 10th abdominal segments are granulose. The cerci are dark brown, cylindrical and slightly incurving with blunt ends.

All femora are compressed, more or less triangular, with a single slightly rounded dorsal carina and two fairly distinct ventral carinae.

Fore femora with perhaps one minute tooth on the anterior ventral carinae, near the joint with the tibia. There are numerous small hairs on ventral surface.

The middle femora are armed with 3–4 outwardly curving small teeth on the anterior ventral carinae, becoming progressively larger away from the body. The ventral surfaces of the femora are covered with long hairs, the rest of the femora are mainly hairless, with only a few small hairs on the anterior face.

The rear femora are armed with 5 minute teeth on the anterior ventral carinae and 3–4 minute teeth on the posterior ventral carinae. The ventral surfaces are covered in small hairs; the anterior carinae in long hairs. The anterior faces

of the rear femora are hairless; posterior faces have a few small hairs.

All tibiae have numerous long and short hairs, these are longer on the fore tibiae. The middle rear tibiae are rounded, with only a single carina on the ventral surface.

The tarsi appear to be the same colour as the body in the living specimen but have become very dark in the preserved specimen.

General Comments

These results suggest that the Phasmid population of Bako National Park is not very varied or very large. However very little time was spent looking for Phasmids and only a small area was searched. Primary Forest is a difficult habitat to search for Phasmids as most species are probably in the canopy layer. The dry areas on the higher parts of Jalan Lintang were clearly not suited to Phasmids, there was no sign of leaf damage and only a few minutes were spent looking in this area. The protected status of the Park ensures that some of the predators (Monkeys, Birds) are present in larger numbers than elsewhere, this must have a detrimental effect on the Phasmid population.

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Family	Sub Family	Species
Bacillidae	Heteropteryginae	<i>Epidares nòlimetangere</i> (de Haan)
Bacillidae	Heteropteryginae	<i>Datames oileus</i> (Westwood)
Bacillidae	Heteropteryginae	<i>Haaniella saussurei</i> Kirby
Bacillidae	Heteropteryginae	<i>Hoploclonia gecko</i> (Westwood)
Heteronemiidae	Lonchodinae	<i>Lonchodes amaurops</i> Westwood
Heteronemiidae	Lonchodinae	<i>Lonchodes jejusus</i> (Brunner)
Heteronemiidae	Necrosciinae	<i>Acacus sarawacus</i> (Westwood)
Pseudophasmatidae	Pseudophasmatinae	<i>Dajaca filiformis</i> New Species

Table 1. Summary of species collected.

Sizes (mm) of <i>Haaniella saussurei</i>			
	Adult ♂	Adult ♀	1st Instar
Body length	88 – 89	127 – 134	31
Antenna	66 – 76	68 – 72	16
Fore femora	22 – 23	25 – ?*	6
Mid femora	18 – 19	20 – 21	5
Hind femora	26 – 28	31 – 33	8

Table 2. Sizes of *Haaniella saussurei*.

*Both front legs of the largest female have been regenerated.

Sizes (mm) of <i>Lonchodes amaurops</i>			
	Adult ♂	Adult ♀	1st Instar
Body length	76 – 92	92 – 111	16
Antenna	59 – 65	37 – 44	7
Fore Leg	51 – 57	45 – 50	9
Mid Leg	33 – 36	31 – 34	8
Hind Leg	44 – 48	41 – 46	9

Table 3. Sizes of *Lonchodes amaurops*.

<i>Dajaca monilicornis</i>		
Lengths (mm)	Male	Female
Head & Body length	41 – 43.5	66 – 75
Antennae	21 – 22	34 – 46
Abdomen	25.5 – 27	38 – 48
Mesonotum	5.5	8 – 10
Metanotum & Median segment	5.5	8 – 9
Fore femora	4.5 – 5	7 – 7.5
Mid femora	4	5.5 – 6
Hind femora	7 – 7.5	9.5 – 10
Wings	18 – 19	–

Table 4. Sizes of *Dajaca monilicornis*.

Sizes (mm) of female <i>Dajaca filiformis</i>			
Head	5		
Antenna	29.5		
Pronotum	5		
Mesonotum	8		
Metanotum	2.5		
Leg measurements	Fore	mid	hind
Femur	6.5	5	10
Tibia	4	4	7
Tarsus	4	3.5	6

Table 5. Measurements of *Dajaca filiformis*.

Common name	Scientific name	Family
Bramble	<i>Rubus fruticosus</i>	Rosaceae
Dog Rose	<i>Rosa canina</i>	Rosaceae
Elder	<i>Sambucus nigra</i>	Caprifoliaceae
Eucalyptus	<i>Eucalyptus gunnii</i>	Myrtaceae
Flowering currant	<i>Ribes</i> sp.	Grossulariaceae
Hawthorn	<i>Crataegus monogyna</i>	Rosaceae
Ivy	<i>Hedera helix</i>	Araliaceae
Oak	<i>Quercus</i> sp.	Fagaceae
Privet	<i>Ligustrum ovalifolium</i>	Oleaceae
Firethorn	<i>Pyracantha</i> sp.	Rosaceae
Raspberry	<i>Rubus idaeus</i>	Rosaceae

Table 6. The scientific names of food plants used in captive rearing.



Fig. 1a. Male of *Epidares nolimetangere*.

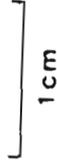


Fig. 1b. Female of *Epidares nolimetangere*.

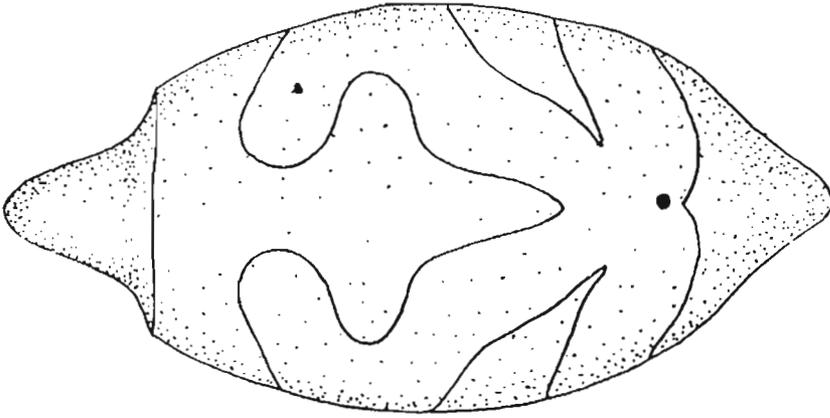


Fig. 2. Egg of *Haaniella saussurei*.

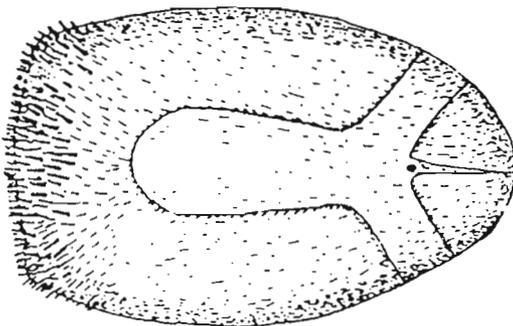
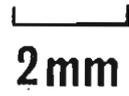


Fig. 3. Egg of *Hoploclonia gecko*.



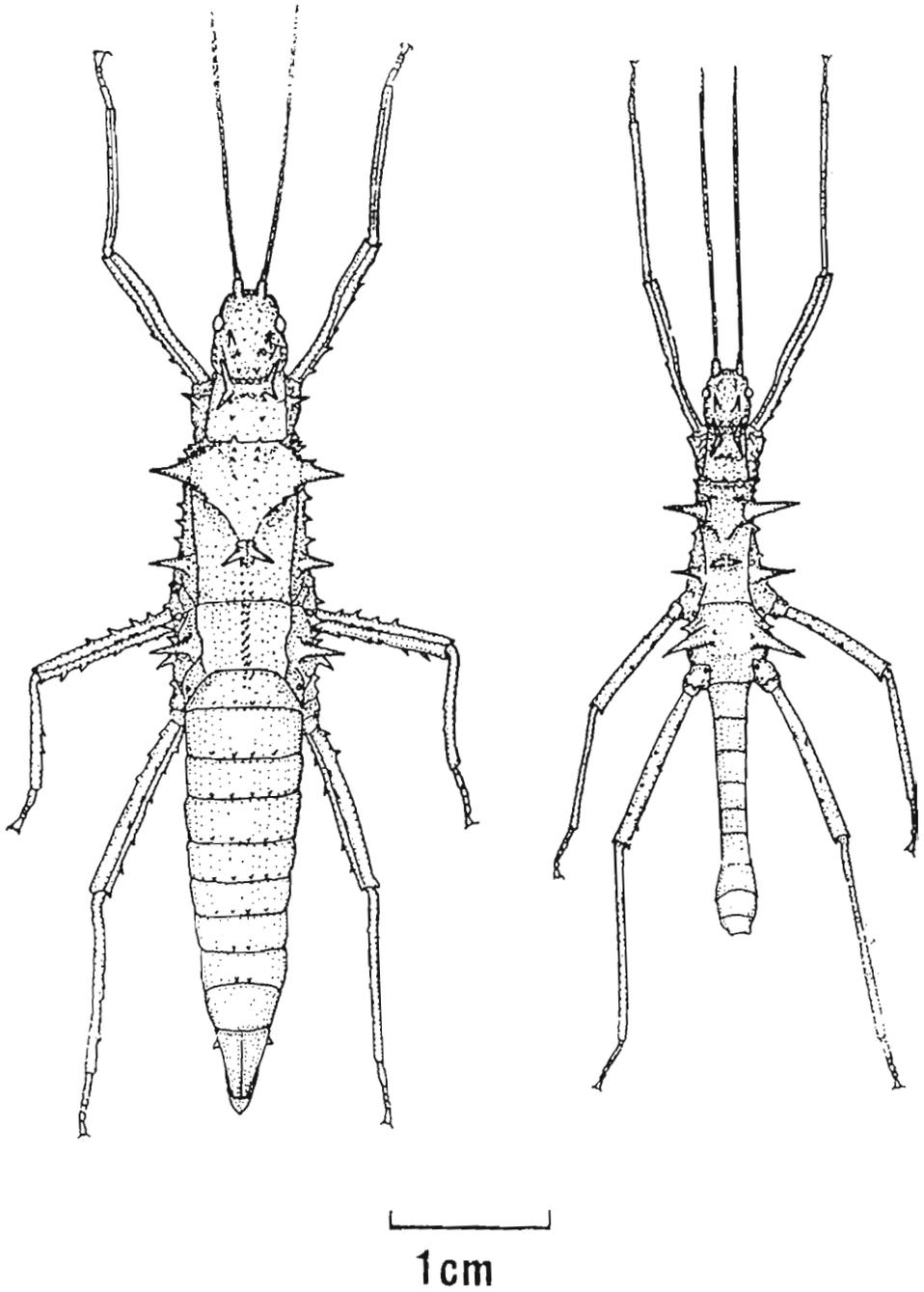


Fig. 4. Male and female *Hoploclonia gecko*.

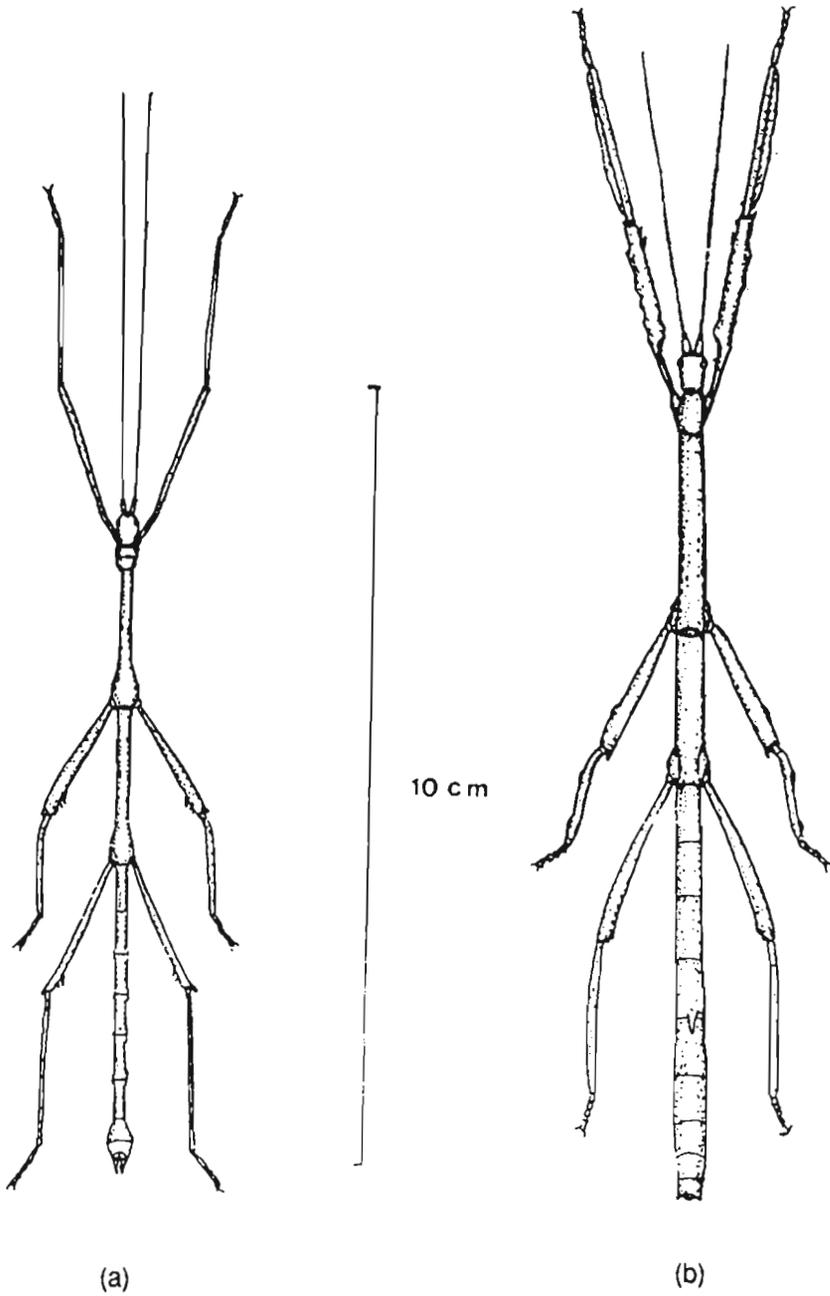


Fig. 5a. Male *Lonchodes amauiops*.

Fig. 5b. Female of *Lonchodes amauiops*.

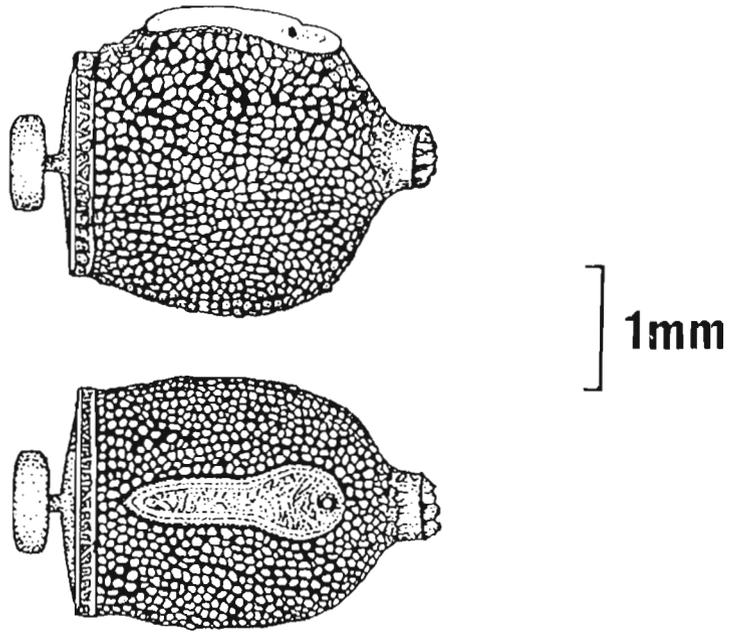


Fig. 6. Egg of *Lonchodes amaurops*.

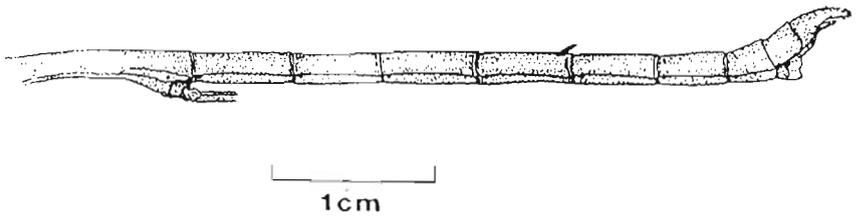
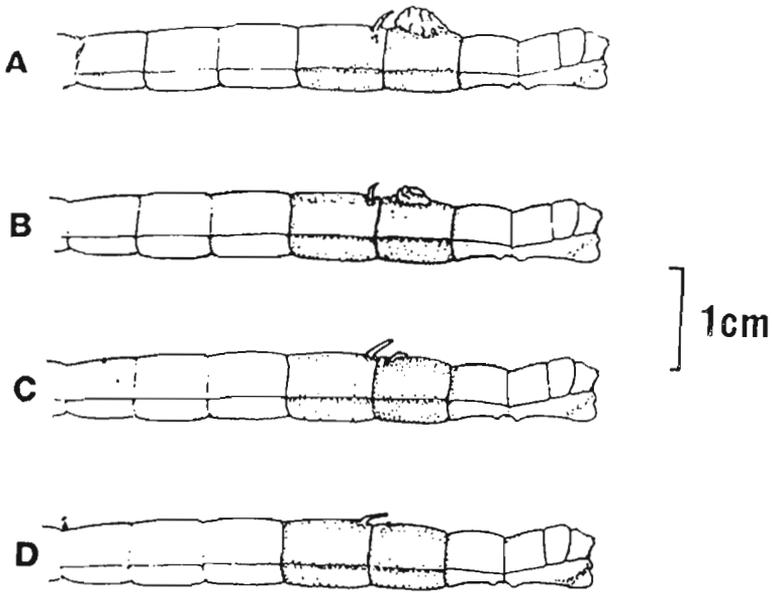
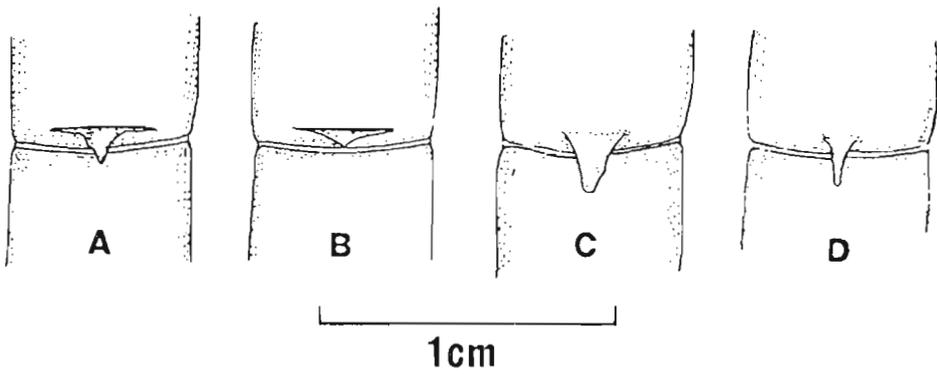


Fig. 7. A typical abdominal spine of the males of *Lonchodes amaurops*.



A — D: Side views of spine and wart formations of females.



A — D: Corresponding dorsal views of spines (wart omitted).

Fig. 8. Variation in the females of *Lonchodes amaurops*.

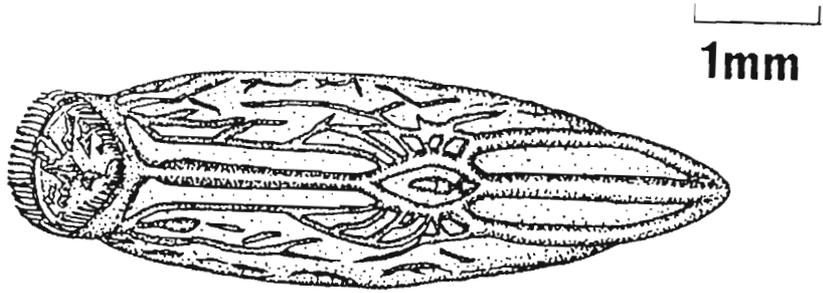


Fig. 9. Egg of *Acacus sarawacus*.

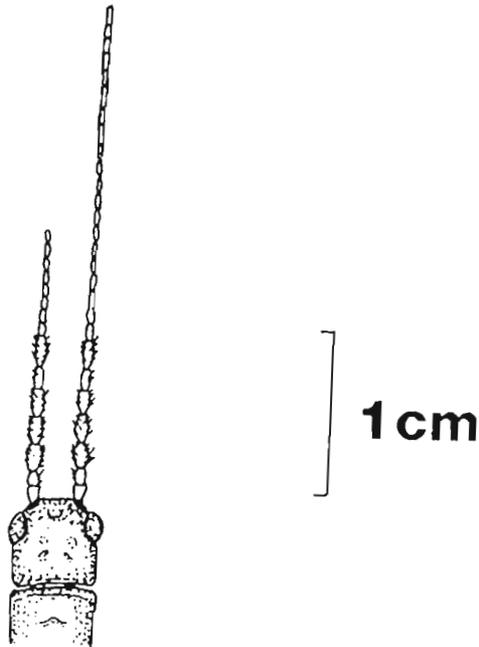


Fig. 10. Head of *Dajaca monilicornis*.

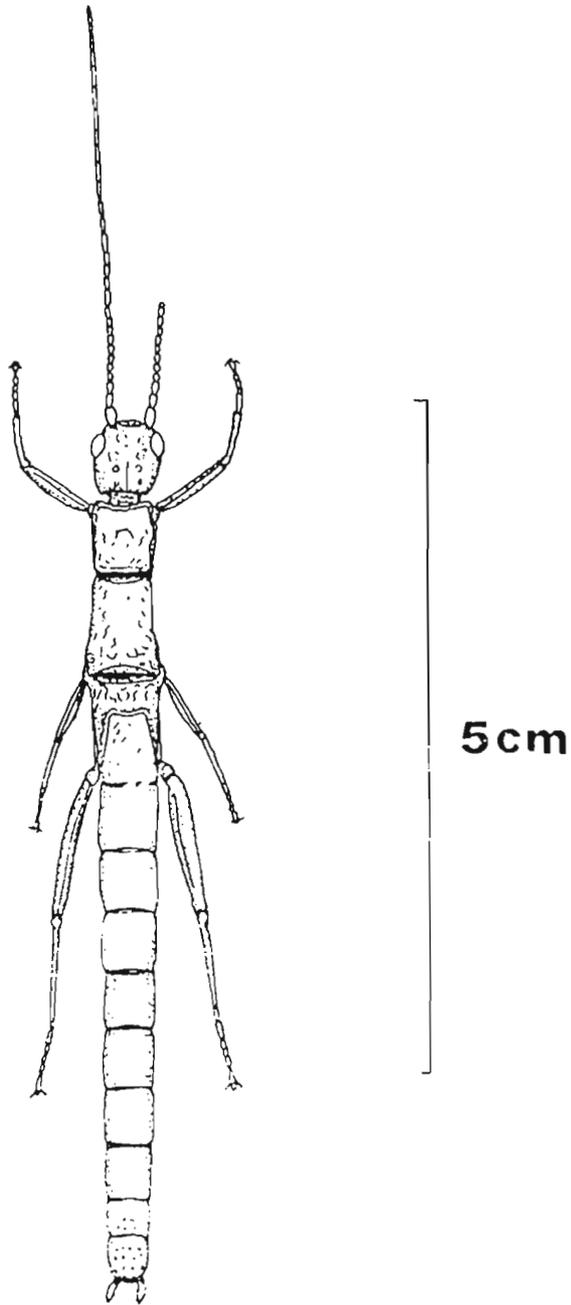


Fig. 11. *Dajaca filiformis*. New Species.