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Studies on the leaf insects (Phasmida: Phylliidae) of Australia

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Abstract

Studies on the rarely reported Australian leaf insects reveal that *Phyllium* species from northern Queensland, *P. frondosum* Redtenbacher 1906 and *P. siccifolium* (L.), are misidentifications. Consequently, a new species *Phyllium (Phyllium) monteithi* is described and figured, including the egg. *Nanophyllium pygmaeum* Redtenbacher 1906 is confirmed as Australian, although it may be a different species, similar in appearance or related to *Phyllium (Phyllium) frondosum* Redtenbacher. Females are needed to clarify its position. A third Australian species is also reported, *Chitoniscus lobiventris* (Blanchard 1853), based on a single museum record from 1903. Keys are provided to distinguish Australian leaf insects.

Key words

Chitoniscus, *Nanophyllium*, *Phyllium*, leaf insects, walking leaves, Queensland

Introduction

Leaf insects (also known as walking leaves) have always fascinated entomologists. Thirty-seven species have been described in 4 genera, although some existing synonymy (partly because of considerable variation within species) is doubtful. From our examination of museum collections worldwide, it is evident there are several species awaiting formal description.

There has been some confusion over which leaf insects are resident in Australia, with up to 3 species mentioned, albeit doubtfully (Balderson *et al.* 1998, Brock 1999a).

As part of a project on Australian phasmids, the authors have researched literature records and examined material in museum collections. We correct here the misidentification of species and describe a new *Phyllium* (*Phyllium*) species.

Summary of literature mentioning Australian leaf insects.—The following main references cover reports of these insects, all from northern Queensland:

McKeown (1942): two specimens in the vicinity of Cairns.

Key (1970): mention of a *Phyllium* species in the rainforests of northern Queensland.

Key (1974): in his supplement to the 1970 publication, Key reported two *Phyllium* species in the rainforests of north Queenland, identified as "apparently" *P. siccifolium* [including a good figure of the female] and *P. frondosum* Redtenbacher [correctly known as *Phyllium (Phyllium) siccifolium* (L.) and *Phyllium (Phyllium) frondosum* Redtenbacher 1906]. Key added that the latter species may be a synonym of *Phyllium pulchrifolium* Serville 1838. However, this is not the case: *pulchrifolium* is a synonym of *Phyllium (Pulchriphyllium) bioculatum* Gray 1832 (Brock 1999b).

Monteith (1971): discusses the *Phyllium* species figured by Key, linking it closely with an undescribed species from Popondetta, Papua New Guinea. Also, mention is made of a second species from Iron Range National Park.

Monteith (1978): description of the first male of an Australian *Phyllium* species, the species appearing to be *Phyllium siccifolium*.

Vickery (1983): lists the same species as Key (1974); these are also repeated in Balderson *et al.* (1998), although in the latter publication the authors mention that Australian species may be distinct, following my communications on this issue.

Rentz (1988): First reference to *Nanophyllium pygmaeum* Redtenbacher in Australia, with notes on rearing a male [initially with female characteristics; also discussed/illustrated in Rentz (1996)]. The specimen was collected in approximately the same locality where Monteith (1971) collected his nymph.

Brock (1999a): suggests that *Nanophyllium* may be a *Phyllium* species.

Brunet (2000): comments regarding leaf insects that, 'A typical example is the short-antennaed leaf insect (*Phyllium siccifolium*), which is commonly found within sclerophyll forests in eastern Australia.'

No reference was made to Australian species in Klante's revision of *Phyllium* (1976), and only *Nanophyllium pygmaeum* is briefly covered in Grösser (2001), a useful book incorporating all except one described species of leaf insect.

Key's attempts at identifying 2 species at first seem wide of the mark. However, *Phyllium (Phyllium) monteithi* n. sp. has a close affinity with *P.* (*P.*) *siccifolium*, particularly females. Key may have seen a female of *P.* (*P.*) *frondosum* (from Papua New Guinea, known only from females so far) or a *frondosum*-like species. This theory helps confirm my view that *Nanophyllium pygmaeum* is the male of a *frondosum*-like species, taking into account similarity in leg shape. Support for this link is strengthened by examination of a probable pair of leaf insects from Pantai, Nabire, Irian Jaya (P.D. Brock collection). The male is very similar to *N. pygmaeum*, except it has bold white patches on its hindwings and longer antennae. Another male from Utakwa River, Irian Jaya, ix. 1912 – iii. 1913, leg. A.F.R. Wollaston (BMNH), however, has only a hint of a white patch on the hindwings. Whilst a possible new species, this material may represent no more than a form or subspecies of *pygmaeum*; further specimens are needed to evaluate this. It is not certain that the single damaged female represents this species, although from our

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studies of leaf insect shape, it is considered very likely. Another clue is Monteith (1971), where Fig. 2 shows the large, broad forefemur of a female nymph from Iron Range, north Queensland, Australia, which resembles that of a *Phyllium* (*Phyllium*) species with more broadened forelegs than *P.* (*P.*) *siccifolium*. By contrast, Zompro and Grösser (in press) propose that *Nanophyllium* belong to a new tribe, largely based on hindwing color (brown in *Nanophyllium*, transparent in other Phylliidae). Discovery of an undoubted female of *Nanophyllium* is needed to clarify the position.

The type locality of *N. pygmaeum* is Katau, Papua New Guinea (which is near northeastern Australia). Although there are minor differences between specimens from Australia and Papua New Guinea/Irian Jaya, without further evidence, on balance these are insufficient to warrant separate species status.

In an effort to expand our knowledge of leaf insects, a survey was initiated from the Australian Insect Farm (www.insectfarm.com.au) in February 2001, also using publications of the Entomological Society of Queensland, Land for Wildlife (North Queensland) and Kuranda, Envirocare, North Queensland. A similar approach proved useful in obtaining new information from the public when Pat Matyot (Matyot, pers. comm. 1988) asked for sighting of leaf insects (*Phyllium* (*Pulchriphyllium*) *bioculatum* Gray 1832) in the Seychelles.

In Queensland, three leads were received from Cairns and Kuranda, both areas where this insect has been seen previously. Unfortunately, visits revealed no live leaf insects. Andrew Horn (Kuranda) reported that green and brown mottled leaf insects had been seen on several occasions, dislodged to the ground, usually after a cyclone or severe storm. They were beneath *Cryptocarya mackinnoniana*, also the likely foodplant of leaf insects located in a garden in Cairns. Allen Walford-Huggins (pers. comm.) found a female leaf insect on the road after a cyclone at Lake Placid, Cairns.

Eggs of *Phyllium* (*Phyllium*) *monteithi* n. sp. were obtained from a female found at Roln Forest, Gadgarra State Forest, 2 November 1964. These have been closely compared with *Phyllium* (*Phyllium*) *siccifolium* from South-East Asia and *Phyllium* (*Phyllium*) *zomproi* Grösser 2001 from New Guinea; *zomproi* is considered to be the closest relative.

Abbreviations for Depositories

AMSA	Australian Museum, Sydney, Australia
ANIC	Australian National Insect Collection, Canberra, Australia
BMNH	Natural History Museum, London, United Kingdom
CMUZ	University Museum of Zoology, Cambridge, UK
MCSN	Museo Civico di Storia Naturale "Giacomo Doria", Genova, Italy
MNHN	Museum d'Histoire Naturelle, Paris, France
NHMW	Naturhistorisches Museum, Wien, Austria
QDPC	Queensland Department of Primary Industries, Indooroopilly, Australia
QMBA	Queensland Museum, Brisbane, Australia
UQIC	University of Queensland, Saint Lucia, Australia

Key to the known species of Australian leaf insects

The mesonotum in front of the forewings is distinctly transverse in *Chitoniscus* Stål, but almost quadrate in *Phyllium* (*Phyllium*) Illiger. *Nanophyllium* Redtenbacher are only known from a few males with brown or brown and white hindwings (these transparent in other known Phylliidae).

Females (Figs 2, 7)

Abdomen very tapered, segments not lobed laterally. Body length 75 to 76mm. . . . . *Phyllium* (*Phyllium*) *monteithi* sp. n.
Outer margin of abdominal segments 6 to 8 lobed laterally. Body length 60 to 62 mm . . . . *Chitoniscus lobiventris* (Blanchard 1853)

Note – the female of *Nanophyllium pygmaeum* Redtenbacher 1906 is unknown. However, it almost certainly has forelegs with a large external lobe, and a much broader abdomen, compared with the above mentioned species.

Males (Figs 1, 4)

Forewings long and slender, hindwings transparent. All femora with typical slender leaf-like expansions. Abdomen broad, leaf-like. Body length 61 to 62 mm . . . . . *Phyllium (Phyllium) monteithi* sp. n.
Forewings short, hindwings dark brown. All femora with exaggerated lobes. Abdomen narrow, tapered sharply towards tip. Body length 28 to 30 mm . . . . . *Nanophyllium pygmaeum* Redtenbacher 1906

Although not yet found in Australia, the male of *Chitoniscus lobiventris* (35 to 38mm) has lobed abdominal segments 6-8, which readily distinguish it from the male of *N. pygmaeum*. In addition, *C. lobiventris* has transparent hindwings, which are brown in *N. pygmeaum*.

***Phyllium (Phyllium) monteithi* sp. n.**
Figs 1-3

Holotype.— **Male** (Fig. 1) Robust greenish yellow smooth insect with a fairly broad leaf-like abdomen. Fore and hindwings long. Body length 62 mm.
Head: Smooth, only slightly longer than broad. Eyes large, brown. Antennae hairy; brown with 20 segments; longer than fore legs. First segments short, then much longer, final four shorter.
Thorax: Pronotum shorter, more slender than head; conspicuous median depression; a few tubercles present laterally, including bold tubercles beneath coxae. Mesonotum smooth, a little shorter than pronotum; broadening towards hind part of segment as typical in *Phyllium* males (only slightly transverse). Metanotum much longer than mesonotum, broadening to abdomen.
Abdomen: Smooth, long, leaf-like; much wider than thorax, broadening gradually to middle of 4th segment, then tapered from 7th to anal segment; segments of similar length. Cerci broad, tapered at tip. Subgenital plate tapered to sharply pointed tip, not reaching end of anal segment.
Wings: Forewings elongate, leaf-like, pale greenish. Hindwings long, almost reaching end of abdomen. Pre-anal part of hindwings translucent, as are hindwings.
Legs: Leaf-like. Inner margin of fore femora broadened, with 4 dentations. Mid and hind femora more slender than fore, typical in *Phyllium* (*Phyllium*), with several small dentations. Foretibiae leaf-like, lobed.

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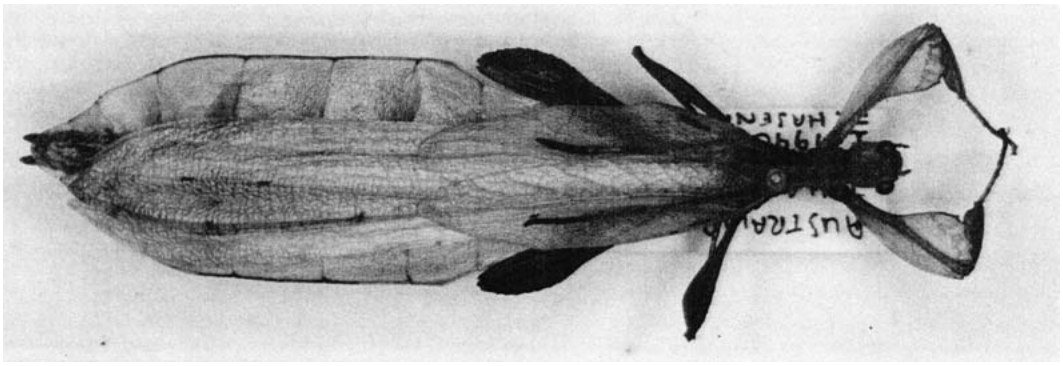


Fig. 1. *Phyllium (Phyllium) monteithi* holotype male.

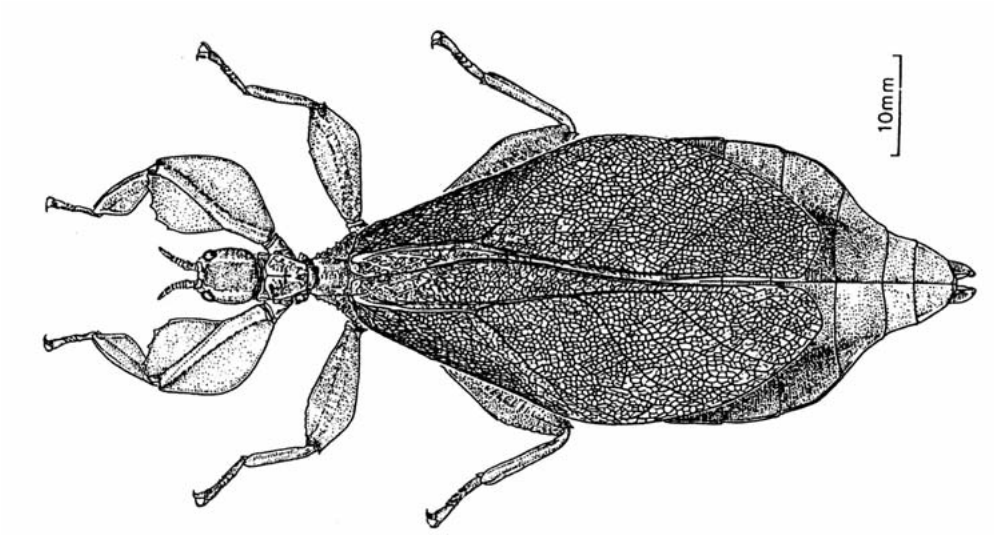


Fig. 2. *Phyllium (Phyllium) monteithi* paratype female (after Monteith 1971, also figured in Key 1974).

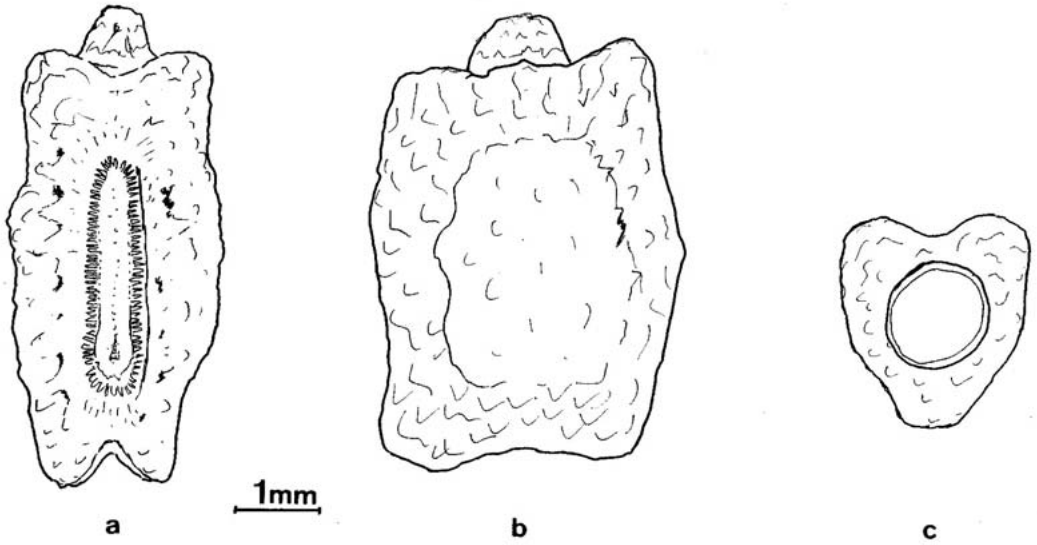


Fig. 3. *Phyllium (Phyllium) monteithi* egg views a) dorsal b) lateral c) from top, with operculum removed.

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Table 1. Measurements (mm).

	Male (holotype)	Female (Paratypes)
Body length	62	75 to 76
Head	3.5	5.5 to 6
Antennae	26	4
Pronotum	3	4.5
Mesonotum	2.5	3.8
Metanotum	5	7
Median segment	2	2
Forewings	25	48 to 49
Hindwings	50	N/A
Forefemora	11	14
Midfemora	9	12.5
Hindfemora	10.5	15.5
Foretibiae	6	7
Midtibiae	5.5	7
Hindtibiae	8	11.5
Cerci	1	2.5

Male paratypes body lengths range 61 to 62 mm (n = 5) other measurements approximately as holotype male.

Paratype.— **Males**: (5 specimens). Same as holotype except for minor size and color variation, being mainly leaf-green.

Paratype.— **Females** (Fig. 2): (4 specimens). Broad body with long coriaceous forewings. Body length 75 to 76 mm.
Head: Smooth, only slightly longer than broad. Eyes small. Antennae short, with 10 segments.
Thorax: As in male, but much broader.
Abdomen: As in male, but much broader, 8th segment more sharply tapered. Cerci broad, tapered at tip. Operculum tapered to sharply pointed tip, not reaching end of anal segment.
Wings: Fore wings long, leaf-like, almost reaching end of 7th abdominal segment.
Legs: As in male.
Egg (Fig 3a-c): Various shades of light brown. Capitulum conical, with ridges. Capsule uneven, with numerous ridges and a series of several central pits. Capsule length 5 mm, height 3.7 mm, width 2.5 mm. Micropylar plate long (length 2.7 mm) fairly broad, slightly broadened at base. Outer margin with numerous short processes.

The abdomen of *monteithi* in both sexes is rather broader than *zomproi*. Similarly, the legs of *monteithi* are noticeably broader, particularly the fore legs. The general appearance of the eggs of the above-mentioned species indicates an affinity with the uneven shape of *monteithi* and the less conspicuous micropylar plate, easily distinguishing it from *zomproi*. The eggs of both species differ considerably from those of the Asian type species *P.* (*P.*) *siccifolium*, whose capsule is largely covered by pinnae (Brock 1999b).

Holotype.— ♂, Australia: Mt. Lewis, near Julatten, north Queensland, i.1990, J. Hasenpusch (QMBA).



Fig. 4. *Nanophyllium* sp. male – Mt. Tozer, near Iron Range National Park, north-east Queensland (David Rentz). Previously identified as *pygmaeum*, but may prove to be undescribed.

Paratypes.— ♂, Australia: Windsor Tableland, NE Mt Carbine, north Queensland, 3.xii.1986, A. & M. Walford-Huggins (QMBA); ♂, Australia: Mt. Windsor Tableland, north Queensland, 27.xii.1976, A. Walford-Huggins (UQIC); ♂, Australia: Kuranda, north Queensland, 3.iii.1983, R. Straatman (ANIC). [labelled *Phyllium siccifolium*]; ♂, Australia: Mt. Lewis, nr end of road w. of Mossman, north Queensland, 28.xii.1989, M.S. & B.J. Moulds (AMSA); ♂, Australia: Kuranda, Black Mountain Road, north Queensland, 20.xii.1987, attracted to light, J. Hasenpusch (J Hasenpusch coll.); ♀, Australia: Innisfail, north Queensland, 1935, H. Smith (QMBA); ♀, Australia: Atherton Tableland, north Queensland, 17.v.1965, S. Elder (QDPC); ♀, Australia: Cairns district, north Queensland (UQIC); ♀, Australia: Gadgarra State Forest, nr Lake Tinaroo, north Queensland, 2.xi.1964 [and 8 eggs, some damaged] (QDPC).

Distribution.— Several records from various parts of a 140 km stretch in northeastern Queensland between Mossman and Innisfail, including rainforest localities up to 40 km inland. Photographs have been taken of a female seen in Cairns Botanical Gardens (discussion with Peter Shanahan, 1997). Another male was found in Kuranda by Jack Hasenpusch, but was not preserved.

Etymology.— Named after Geoff Monteith, curator of insects at Queensland Museum, Brisbane, who has a great passion for Australian insects.

Foodplants.— Possibly including *Cryptocarya mackinnoniana* (Lauraceae), following observations by members of the public.

Behavior.— Males emit an unpleasant-smelling fluid from their mouthparts when handled, a common form of defensive reaction in phasmids.

***Nanophyllium pygmaeum* Redtenbacher 1906**
Fig. 4

Holotype ♂, New Guinea: Katau, 1876, D'Albertis (MCSN) [examined].

Katau or Binaturi River is in the Gulf of Papua region of New Guinea, close to the northeast Australian coast.

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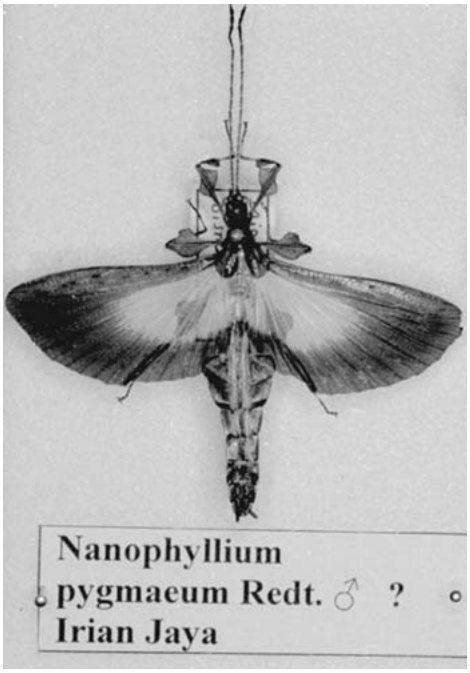


Fig. 5. *Nanophyllium* sp. male - Nabire, Irian Jaya

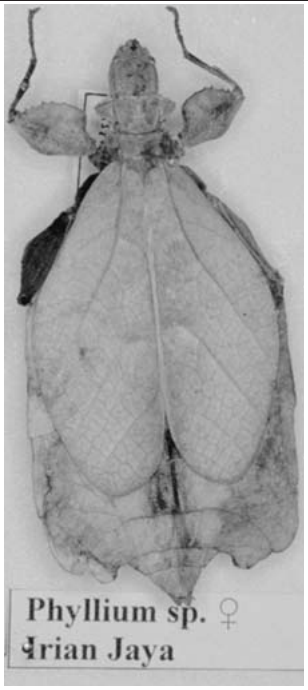


Fig. 6. *Nanophyllium* sp. ? female - Nabire, Irian Jaya.

Non-type material examined.— Possibly this species: ♂, Australia: 3 km ENE Mt Tozer, nr Iron Range National Park, northeast Queensland, 28.vi.1986, reared from young nymph, died 19.i.1987 (ANIC) [30mm] (shown in Fig. 4); possibly this species: ♀, nymph, Australia: Iron Range National Park, northeast Queensland, vi.1971, G. Monteith (QMBA).

As mentioned in the literature summary above, more material is needed to confirm whether or not the Australian species is *N. pygmaeum*.

Other specimens from Irian Jaya mentioned above have been excluded from measurements in the keys, because there is doubt that they belong to this species. However, the male and probable female from Nabire, Irian Jaya (P. D. Brock collection) are illustrated (Figs 5-6) and will feature in a further paper covering some leaf insects of Papua New Guinea and Irian Jaya (Brock, in progress).

Foodplants.— Host plant unidentified. In captivity accepted *Pyracantha* sp. (*Rosaceae*) (Rentz 1988).

***Chitoniscus lobiventris* (Blanchard 1853)**
Fig. 7

Holotype.— ♂, Fiji: Viti, Lebouka (MNHN) [examined].

Non-type material examined.— [from countries other than Fiji] ♀ Australia: Cairns, Queensland, viii.1903, Perkins (CMUZ) (shown in Fig. 7); ♀ Solomon Islands: Kolombangara, 28.ii.1983, M. Bigger (BMNH) [det. as *Chitoniscus* sp., nr *lobiventris*, J.A. Marshall, 1986]; ♂, Solomon Islands: Kolombangara, 20.x.1983, M. Bigger (BMNH) [det. as *Chitoniscus* sp., nr *lobiventris*, J.A. Marshall, 1986].

Whilst this single record from Australia is from 1903, R.C.L. Perkins donated a significant collection to CMUZ (including other Australian species) and the curator would be surprised if Perkins had made a mistake with the locality (Foster, pers. comm.). As with some other *Chitoniscus* species, distribution is widespread.

Conclusion

Although the relatively few records indicate that leaf insects are uncommon in Australia, they have been recorded from very widespread localities (Fig. 8), indicating that at least *P. monteithi* is well established in remote rainforest locations. Many Australian phasmids are only known from a handful of records, even some species well known as culture stocks.

One of the main taxonomic problems in the Phasmida is that variation can be extreme and this is particularly true of the leaf insects. Without examination of eggs and/or rearing a series of specimens, it is sometimes difficult to realize the extent of variation within individual species.

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Literature cited

Audinet-Serville J.G. 1838. Histoire Naturelles des Insectes. Orthoptères. Librarie Encyclopédique de Roret, Paris.

Balderson J., Rentz D.C.F., Roach A.M.E. 1998. Phasmatodea, pp. 347-376, 451-456. In: Houston W.W.K., Wells A. (Eds) Zoological Catalogue of Australia. Vol 23. Archaeognatha, Zygentoma, Blattodea, Isoptera, Mantodea, Dermaptera, Phasmatodea, Embioptera, Zoraptera. CSIRO, Melbourne, Australia.

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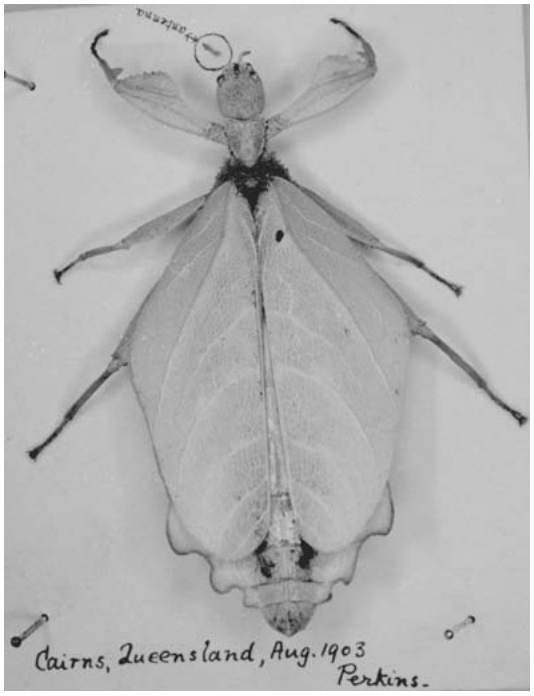


Fig. 7. *Chitoniscus lobiventris* female – Cairns

Fig. 8. Distribution map showing Australian leaf insects.

Blanchard C.E. 1853. In: Gode and Baudry (Eds) Voyage au Pole Sud et dans l'Oceanie. Zoologie 4: 35-360, pl. 1: 9.

Brock P.D. 1999a. The Amazing World of Stick and Leaf-Insects. The Amateur Entomologists' Society, Orpington. The Amateur Entomologist Vol. 26.

Brock P.D. 1999b. Stick and Leaf Insects of Peninsular Malaysia and Singapore. Malaysian Nature Society, Kuala Lumpur.

Brunet B. 2000. Australian Insects: A Natural History. Reed New Holland, Sydney.

Gray G.R. 1832. In Griffiths E. (Ed.) The Animal Kingdom, arranged in conformity with its organisation by the Baron Cuvier. Insecta Vol. 2, Whittaker, Treacher and Co, London.

Gray G.R. 1835. Synopsis of the Species of Insects Belonging to the Family of Phasmidae. Longman, Rees, Orme, Brown, Green & Longman.

Grösser D. 2001. Wandelnde Blätter. Ein Katalog aller bisher beschreibenen Phylliinae-Arten und deren Eier mit drei Neubeschreibungen. Edition Chimaira, Frankfurt.

Key K.H.L. 1970. Phasmatodea (Stick-insects) pp 394-404. In: The Insects of Australia. CSIRO. Melbourne University Press, Melbourne.

Key K.H.L. 1974. Phasmatodea (Stick-insects), pp 48-49. In: The Insects of Australia, Supplement 1974. CSIRO Division of Entomology. Melbourne University Press, Melbourne.

Kirby W.F. 1904. A Synonymic Catalogue of Orthoptera. Vol. 1, Orthoptera Euplexoptera, Cursoria, et Gressoria (Forficulidae, Hemimeridae, Blattidae, Mantidae, Phasmidae). Longman, London.

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Klante H. 1976. Die Wandelnden Blätter. Eine taxonomische Revision der Gattung *Phyllium* III. (Insecta Orthoptera, Phasmoptera. Zoolog. Beiträge 22: 49-79.

McKeown K.C. 1940. Australian Insects. VIII. Orthoptera: 3. Stick and Leaf Insects. Australian Museum Magazine 7: 125-130.

Monteith G.B. 1971. Leaf Insects from Australia. The Entomological Society of Queensland News Bulletin 78 (August 1971): 14-15, figs. 1-3.

Monteith G.B. 1978. The first male leaf insects from Australia. The Entomological Society of Queensland News Bulletin 5: 138-139.

Redtenbacher J. 1906. Die Insektenfamilie der Phasmiden I. In Brunner von Wattenwyl K., Redtenbacher J. 1906-1908). pp. 1-180, 6 pls. Verlag Engelmann, Leipzig.

Rentz D.C.F. 1988. *Nanophyllium pygmaeum* Redtenbacher (Phasmatodea: Phylliidae: Phylliinae), a leaf insect recently recognised in Australia. Australian Entomology Magazine: 15: 3-5.

Rentz D.C.F 1996. Grasshopper Country: the Abundant Orthopteroid Insects of Australia. University of NSW Press, Sydney.

Vickery V.R. 1983. Catalogue of Australian Stick Insects (Phasmida, Phasmatodea, Phasmatoptera, or Cheleutoptera). CSIRO Australian Division of Entomology Technical Paper. No. 20:1-19.

Westwood J.O. 1859. Catalogue of Orthopterous Insects in the Collection of the British Museum. Part 1, Phasmidae. British Museum, London.

Zompro O., Größer D. (in process). A generic revision of the insect order Phasmatodea: The genera of the areolate stick insect family Phylliidae (Walking Leaves) (Insecta: Orthoptera). Spixiana.

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