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A study of the members of the tribe Phasmatini Gray, 1835, that occur within the boundaries of Wallacea (Phasmatodea: Phasmatidae: Phasmatinae: "Lanceocercata")

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Abstract

The tribe Phasmatini Gray, 1835 predominantly includes very striking stick insects of remarkable size, most of which are characteristic for their large and often colourful wings. The tribe represents roughly half of the Giant Stick Insects of Wallacea, a subregion in Eastern Indonesia comprising thousands of islands that are separated by deep water straits from the continental islands to the west (Sundaland: Borneo, Java and Sumatra) and East (New Guinea). Within Wallacea the Phasmatini are represented by four genera, namely *Anchiale* Stål, 1875, *Eurycnema* Audinet-Serville, 1838, *Paracyphocrania* Redtenbacher, 1908 and *Phasma* Lichtenstein, 1796. Currently eight distinct species are known to occur in the Wallacea. Two of these are newly described in the present paper , this is *Anchiale buruense* **sp. n.** and *Paracyphocrania major* **sp. n.**.

Keys are provided for the distinction of the Phasmatini taxa of Wallacea and information on the overall distribution of the four genera is presented, which reveals a derivation of the tribe from the Australian region. The tribe Phasmatini itself is briefly characterized and discussed. Brief characterizations of the four genera are provided along with complete lists of the species currently contained.

Anchiale Stål, 1875 is represented in the Wallacea by two species. *A. maculata* (Olivier, 1792) is widely distributed throughout Wallacea except for Sulawesi and shows considerable intraspecific variability. Both sexes and the eggs are illustrated and the eggs formally described for the first time. The synonymies of *A. maculata* are clarified. *A. stolli* Sharp, 1898 and *A. confusa* Sharp, 1898 from New Britain and the Solomon Islands are shown to be errorneous synonyms of *A. maculata* and are here re-established as valid species (**stat. rev.**). *A. caesarea* Redtenbacher, 1908 is removed from the genus *Acrophylla* Gray, 1835 and transferred to *Anchiale* (**comb. n.**). The new species *A. buruense* **sp. n.** from the island of Buru (Maluku Islands) is described and illustrated based on both sexes and the egg.

Eurycnema Audinet-Serville, 1838 has two species within the boundaries of Wallacea. *E. nigrospinosa* Redtenbacher, 1908 is only known from the Kei Islands in the southeastern portion of Wallacea and otherwise found on New Guinea. Both sexes and the eggs are illustrated. *E. versirubra* Audinet-Serville, 1838 is found on some of the Lesser Sunda Islands and otherwise distributed throughout Java, Sumatra and SE-Borneo. The records from Java, Sumatra and southeast Borneo are estimated to be artificial. Females of this species are dimorph and occur in two distinct colour morphs, which differ by the distinct colouration of the undersides of the tegmina and alae. *E. versirubra* colour morph *versirubra* has two forms, the insects either being bright green or dull yellow with the ventral surfaces of the tegmina and alae bright red. *E. versirubra* colour morph *versifasciata*, has the ventral surfaces of the tegmina and alae yellow, the insects themselves being pale bluish green to turquoise in colour. Only the bright green form appears to be natural with the other colour-forms caused

by parthenogenetic reproduction in captivity. Both sexes, the eggs and the two aforementioned colour-morphs are illustrated.

Paracyphocrania Redtenbacher, 1908 contains two known species and is endemic to Sulawesi and the nearby island of Peleng. The new species *Paracyphocrania major* **sp. n.** from Peleng is described and illustrated based on the female and egg. The male remains as yet unknown. The previously unknown male of *P. lativentris* Redtenbacher, 1908 is described for the first time. Both sexes and the eggs are illustrated. *Vasilissa tecticollis* Redtenbacher, 1908 is shown to have been misinterpreted previously, here removed from *Paracyphocrania* and shown to be a synonym of the Australian *Tropidoderus rhodomus* McCoy, 1882 (**syn. n.**). Hence, the type-locality of *V. tecticollis* originally given as "Philippines" is definitely wrong, which proves the tribe Phasmatini is not represented in the Philippines at all.

Phasma Lichtenstein, 1796 is represented in Wallacea with two distinct species and has one further species on New Guinea. A key is provided to distinguish between the three known species of *Phasma*. *Ph. gigas* (Linnaeus, 1758) is widely distributed throughout Wallacea and found on almost all major islands, although the historic records from Sulawesi deserve evaluation. *Ph. gigas* is most certainly not present on New Guinea, with all New Guinean records actually referring to *Ph. reinwardtii* (de Haan, 1842). *Ph. gigas* exhibits remarkable intraspecific variability in the colouration and certain morphological features of the insects, with several of these variations appearing to be peculiar to certain localities and islands. The range of variation as well as both sexes and the eggs are illustrated. *Papuanoidea straleni* Werner, 1930 from New Guinea has erroneously been synonymised with *Ph. gigas* and is here shown to be a synonym of *Ph. reinwardtii* (de Haan, 1842) (**syn. n.**). The second Wallacean representative of the genus, *Ph. marosense* Hennemann, 1998, is endemic to Sulawesi. The previously unknown male is described for the first time and both sexes and the eggs are illustrated.

Holotypes of the two newly described species, *Anchiale buruense* **sp. n.** and *Paracyphocrania major* **sp. n.**, are deposited in the State Zoological Collections Munich, Germany (ZSMC).

Key words: Phasmatodea, Phasmatidae, Phasmatine (sensu stricto), Lanceocercata, Phasmatini, *Anchiale*, *Eurycnema*, *Paracyphocrania*, *Phasma*, Wallacea, keys, descriptions, descriptions, new species, new synonyms, new combination, eggs, distribution, biogeography

Introduction

Many of the largest and most spectacular extant insects of the world belong to the order Phasmatodea. Those occuring in the Wallacea, a subregion in Eastern Indonesia between Sundaland (Java, Sumatra and Borneo) in the west and New Guinea in the east, are largely represented by members of the tribe Phasmatini Gray, 1835, which are remarkable for their mostly impressive size and large, often colourful wings. Although these Giant Stick Insects are amongst the most well known insects not only of this particular subregion, the systematics and distributional patterns of species are often still poorly understood.

The present paper deals with the genera and species of the tribe Phasmatini, that occur within the boundaries of Wallacea and clarifies the identities of these taxa, their synonymies and discusses the often remarkable intraspecific variation and distributional pattern throughout this geologically complex subregion. The distributions of the species covered are highly interesting and may help understanding the faunistic influences in the Wallacea, generally showing an Australian derivation for the Phasmatini, which have considerably more numerous members in the Papuan region and Australia. While five of the eight currently known species are endemic to certain islands or restricted to a fairly small number of nearby islands, the two other species are widely spread throughout almost entire Wallacea.

Two new species are described from the islands of Buru (Maluku Islands) and Peleng east of Sulawesi. Furthermore, the previously unknown males and previously unknown eggs of two species are described and illustrated, along with identification keys and illustrations of all eight known species. Particular reference is made to the intraspecific variability of the two widely distributed species, namely *Anchiale maculata* (Olivier, 1792) and *Phasma gigas* (Linnaeus, 1758), and some previously established synonymies are corrected.

Biogeography

Wallacea is a group of several thousand islands of various sizes, which cover a total land area of roughly 338.500 km2 located between Sundaland in the west, the Philippines in the north as well as New Guinea and Australia in the east and southeast. Recent studies have revealed that also the Philippines need to be considered as part of the