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Megacrania species in Indonesia (Cheleutoptera: Phasmatidae)

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Abstract

Two new species of *Megacrania* Kaup in Indonesia are described and compared with other related species. There are now three confirmed species in Indonesia.

Key Words

Phasmatidae, stick insects, *Megacrania*, Indonesia

Introduction

The current status of the species in the genus *Megacrania* Kaup, 1871 is somewhat problematical. Hsiung (1991) recognized six species distributed along the western Pacific Ocean from the northeast of Australia to New Guinea, the Solomon Islands, Indonesia, the Philippines, extending to Micronesia and the southern coast of Taiwan. Subsequently, Hsiung & Yang (2000) concluded that the single *Megacrania* species of Australia was in fact *Megacrania batesii*, though its average size was slightly smaller than the type specimen of *M. batesii*.

The distribution of species in Indonesia is not clear. Willemse (1955) first described a species of *Megacrania* from Indonesia as *wegneri*. He gave a detailed morphological description with measurements based on both male and female specimens collected in Obi Is., Moluccas. He also concluded that his new species was related to *Megacrania alpheus* Westwood, 1859.

I have examined Willemse's paratypes and found that they match his description. Willemse further remarked that *M. alpheus* also occurs on Obi, but only along the coast (Kasowari, Wajaloar), whereas *M. wegneri* occurs in the interior of the island. He also listed a number of localities for *M. alpheus* including Key Is. (Dulan).

This study seeks to resolve the following questions: how close is *M. wegneri* to *M. alpheus*? Does *M. alpheus* actually occur on Obi Is., considering that Willemse did not provide any comparative data? How many species of *Megacrania* are there in the Indonesian fauna?

Comparison of Megacrania wegneri (paratype) with related species.— I have compared Willemse's female paratype (Obi Is.) with the female lectotype of *M. alpheus* (Ceylon; mislabelled, see Hsiung, 1991 and Table 1) and found that

M. alpheus was no closer to *M. wegneri* than to other species in this genus.

Hsiung & Yang (2000) compared *M. wegneri* with the Australian species *M. batesii* Kirby, 1896. They found that although the two species had some similarities, the major difference was in the length of the wing, which reached to the posterior margin of the 4th abdominal tergum in *M. wegneri* and the posterior margin of the 2nd abdominal tergum in *M. batesii*. The other difference was in the lateral margins of the mesonotum of *M. batesii* which are less spiny, the first two teeth being larger and sharper, whereas in *M. wegneri*, the lateral margins are strongly spiny with the first two teeth not particularly strong.

I also compared *M. wegneri* with *Megacrania tsudai* Shiraki, 1933 from Taiwan. The major differences are in the length of the wing and the granules of the mesonotum (Table 2).

Megacrania brocki Hsiung, new species

Megacrania alpheus [nec (Westwood, 1859)]: Willemse, 1955. Treubia, 23: 45 [taxonomy, remarks on *M. alpheus* (Westwood)].

Holotype.— *Female* (Fig.1)

Head: oval, slightly porrect, a little longer than broad.

Thorax: pronotal disc slightly shorter than broad, slightly narrowed at anterolateral angles; dorsal surface uneven with strongly defined margins; mesonotum about 2.2 x length of pronotum, surface with numerous elongate and sharp granules quite evenly distributed over anterior three quarters of its length; with two nearly parallel rows of strong triangular spines near the lateral margins, which gradually turn inward posteriorly but without meeting; a median sulcus or keel distinctly present.

Wing: tegmina elongate-ovate, equal in length to mesonotum. Hind wings slightly shorter than other species, 1.8 x as long as the tegmina; reaching 2/3 of the 3rd tergum.

Legs: anterior femora about 1.5 x as long as the mesonotum, with ridge bearing a few spines visible in ventral view, 10 spines on right, 12 on left; tibiae of all legs without spines; first tarsal article of front leg as long as the following three articles together; the first three articles of middle and hind

Table 1. Morphological differences between *M. wegneri* (paratype female) and *M. alpheus* (lectotype female).

Character	<i>M. wegneri</i> (Obi Is.)	<i>M. alpheus</i> (Ceylon, mislabelled)
Pronotum	Slightly longer than broad	Slightly shorter than broad
Mesonotum	2.4 x length of pronotum; surface with numerous (> 50) long and sharp granules; with two nearly parallel rows of sharp and elongate spines near lateral margins	2.2 x length of pronotum; surface with 40-45 large and distinct granules sparsely distributed; with two nearly parallel rows of distinct, small spines near the lateral margins
Tegmina	Elongate ovate, 1.1 x as long as the mesonotum	Ovate, shorter than mesonotum
Hind wing	Long, about 2.1 x as long as the tegmina, reaching the posterior margin of the 4 th abdominal tergum	Short, about 1.6 x as long as the tegmina, reaching the middle of 2 nd abdominal tergum
Abdomen	62 mm in length, about 3.6 x as long as the mesonotum	74 mm in length, about 4.6 x as long as the mesonotum
Anal segment	Posterior margin of anal segment nearly rounded	Posterior margin of anal segment nearly rounded, slightly concave in central area
Subgenital plate	18 mm in length; slightly longer than mesonotum, not attaining extremities of cerci; center of ventral surface with a longitudinal ridge	21 mm in length, about 1.3 x length of mesonotum; surpassing extremities of cerci

Table 2. Morphological differences between *M. wegneri* (paratype female) and *M. tsudai* (paratype female).

Characters	<i>M. wegneri</i> (Obi Is.)	<i>M. tsudai</i> (Kuraru, Taiwan)
Lateral margin of mesonotum	Spiny	Less spiny
Granules on mesonotum	Distinct and sharp	Less distinct and sharp
Hind wing	Long, reaching to posterior margin of 4 th abdominal tergum	Slightly surpassing apical margin of 3 rd abdominal tergum
Anal segment	Posterior margin without split	Central area of the posterior margin with a very tiny split
Subgenital plate	Slightly longer than mesonotum, not attaining extremities of cerci	Nearly as long as mesonotum, not attaining extremities of cerci

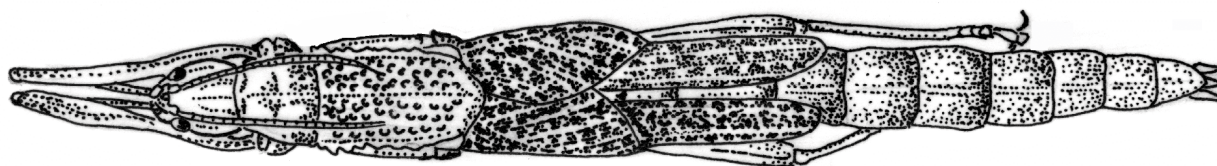


Fig. 1. Holotype, female *Megacrania brocki* Hsiung (Key-Inseln).

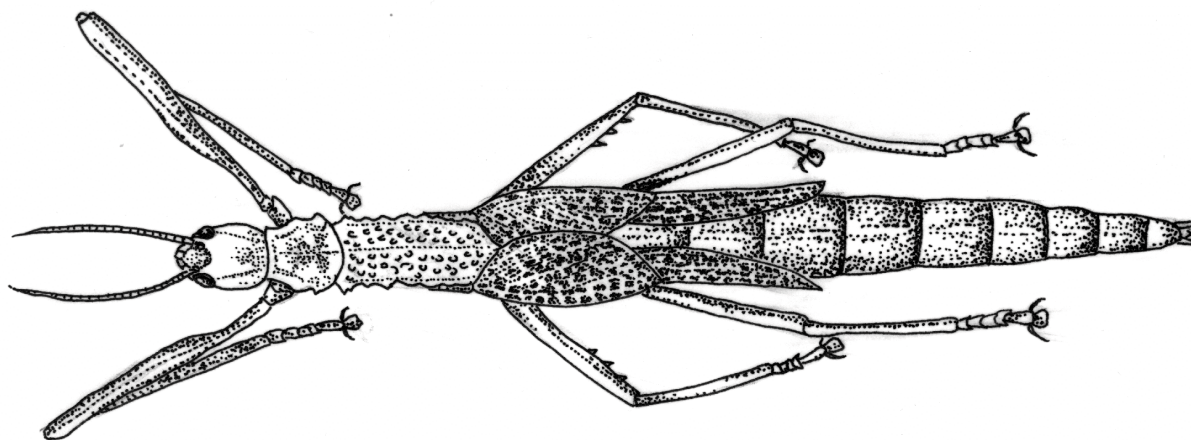


Fig. 2. Holotype, female *Megacrania rentzi* Hsiung (Tandjijong, S.D. Borneo).

legs of equal length, fourth smaller, fifth elongate, its apex expanded.

Abdomen: elongate; about 3.6 x as long as mesonotum; segments I-VI wider than the remaining ones; posterior margin of anal segment nearly round, a distinct split at its center; cerci broad, lamellate, apices rounded; subgenital plate 19.5 mm, slightly longer than mesonotum, its margins gradually narrowing apically, not attaining extremities of the cerci, center of ventral surface with longitudinal ridge.

Coloration.— General color pale green.

Measurements.— (Holotype) lengths (mm). Body 111.5; pronotum 8; mesonotum 18; tegmen 18; hindwing 33; front femur 27; median femur 16; hind femur 18.5; front tibia 24; median tibia 14.5; hind tibia 15.5.

Type material.— Holotype ♀, Key-Inseln, 1912, P. Kibler leg. 81 ♀♀ paratypes, bearing the same labels as the holotype. 2 ♀♀ (1 nymph), Isl. Obi, Kasowari - Lodii (nymph without Lodii), one collected 19-8, 1953, the nymph collected 20-8, 1958 (both with C. Willemse's identification label as *Megacrania alpheus*). The holotype and paratypes are deposited in the Staatliches Museum für Naturkunde Stuttgart, Germany.

The paratypes agree with the description of the holotype. Four specimens have very similar morphological characters

to the holotype, but their localities are not clear. Therefore they were not listed as paratypes (three specimens collected in Bongu, one in Pelew Ins.). The one collected in Pelew Ins. might be from Palau Ins. However, it needs further proof and study.

Measurements.— (Paratypes). Lengths (mm). Body 104.5 - 128.5; pronotum 8-9; mesonotum 17-20; tegmen 16.5-21; hindwing, 30-36.5; front femur 25-29; median femur 15-17; hind femur 15.5-19; front tibia 22-27.5; median tibia 12.5-15; hind tibia 15-17.5.

Distribution.— Known only from S. Moluccas.

Etymology.— This new species is named after Paul Brock for his help in this project and his contributions to phasmatid study.

This new species has been compared with *M. wegneri*, *M. alpheus*, *M. batesii*, and *M. tsudai*. Their differences are listed in tables 3-7.

Megacrania rentzi Hsiung, new species

Holotype.— Female (Fig. 2)

Head: oval, slightly porrect, longer than broad.

Thorax: pronotal disc as long as wide; mesonotal lobes much longer than broad, about 2.5 x the length of pronotum, its surface with about 60 elongate granules evenly distrib-

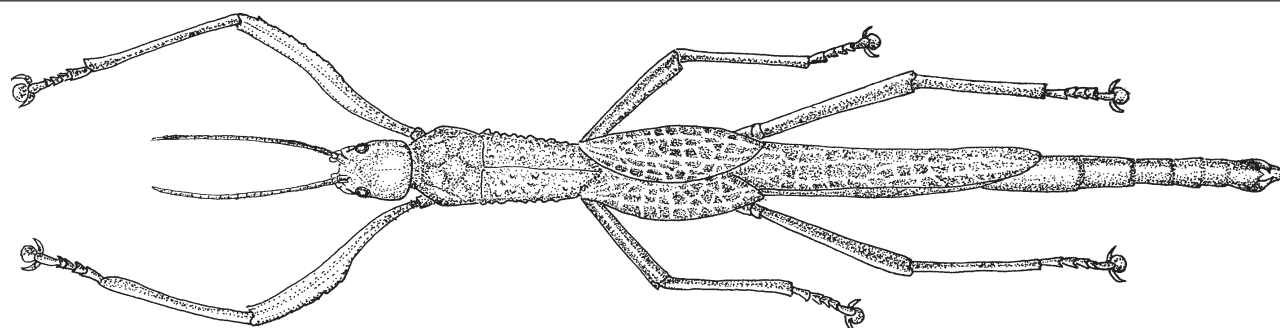


Fig. 3. Allotype, male *Megacrancia rentzi* Hsiung (Borneo).

uted on the anterior 80% of surface, some granules connected to each other in the central region; the lateral margin of mesonotum not spiny with very dull teeth.

Wing: tegmina elongate ovate, slightly longer than mesonotum; hind wings of moderate size, about 2 x as long as the tegmina, surpassing the posterior margin of the 2nd abdominal tergum.

Legs: anterior femora 1.7 x the length of mesonotum; the femora with a few spines visible in ventral view. 11 spines on left femora and 9 on the right; the middle femora each with 3 spines; the hind femora with 4 spines on left and 7 on the right. Tibiae of all legs without spines; first tarsal article of front leg as long as the following three articles together; the first three tarsal articles of middle and hind legs of equal length, the fourth smaller and the fifth elongate with apex expanded.

Abdomen: elongate, about 3.5 x as long as mesonotum; segment II-IV slightly wider than remainder which are gradually narrowed towards abdomen extremity. Posterior margin of anal segment nearly square. Cerci long, surpassing apex of operculum; subgenital plate not attaining extremities of cerci.

Coloration.— General color light brown, head and thorax darker.

Measurement (mm).— Length of body 132; median length of pronotum 11.5; median length of mesonotum 21; length of tegmen, 24; length of hind wing 40; length of femora: front 34.5, middle 21 and hind 26; length of tibiae: front 31, middle 20 and hind 23.

Allotype.— **Male** (Fig. 3). Agrees generally with holotype, but smaller and differing as follows: about 70 granules on surface of mesonotum, lateral margin of mesonotum more spiny; hind wings reach to middle of the 4th abdominal segment; coloration testaceous; all femora with a few spines visible in ventral view; fore with 3 spines on left and 2 on right; the middle with 3 on right and none on left (leg regenerated); the hind with 4 on either side.

Measurement (mm).— Length of body 80.5; median length of pronotum 6; median length of mesonotum; 12.5 length of tegmen 15; length of hind wing 40; length of femur: front

24, middle 13, hind 16; length of tibiae: front 20.5, middle 11.5, hind 14.5.

Type material.— Holotype ♀, bearing three labels:

1. Tandjong. S.D. Borneo, Fr. Suck leg. Ded 31. XII. 1895; 2. Z.M.H. Hamburg; 3. *M. alpheus*. Allotype ♂, bearing three labels: 1. Borneo; 2. Staat Museum für Tierkunde Dresden; 3. *alpheus*. The holotype is deposited in the Universität Hamburg, Zoologisches Institut und Zoologisches Museum and the allotype is in the Staatliches Museum für Tierkunde.

Distribution.— Known only from Borneo.

Etymology.— This species is named after David Rentz in recognition of his support and encouragement in the present research.

This new species is compared with other related species (Table 7 - 12).

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Table 3. Morphological differences between *M. wegneri* (paratype female) and *M. brocki* (holotype female).

Characters	<i>M. wegneri</i> (Obi Is.)	<i>M. brocki</i> (Key-Inseln)
Body	Slim	Robust
Numbers of granules on mesonotum	70	60
Mesonotum	Lateral margins spiny, first few teeth not expanded	Not very spiny, first 3 teeth closely connected and expanded
Hind wing	Reaching posterior margin of 4 th abdominal tergum	Reaching center of 3 rd abdominal tergum
Anal segment	Posterior margin without split in central area	Posterior margin with a tiny split in central area

Table 4. Major morphological differences between *M. brocki* (holotype female) and *M. alpheus* (lectotype female).

Characters	<i>M. brocki</i> (Key-Inseln)	<i>M. alpheus</i> (Ceylon, mislabelled)
Hind wing	Long	Short
Mesonotum	Granules narrow and prominent, lateral margins spiny, first 3 teeth closely connected and expanded	Granules less distinct, the lateral margin less spiny. First two teeth slightly expanded.
Anal segment	Posterior margin nearly rounded with a tiny split	Posterior margin without split.
Subgenital plate	Not attaining extremities of cerci	Attaining extremities of cerci.
Color	Pale green	Brown

Table 5. Major morphological differences between *M. brocki* (Key-Inseln) and lectotype of *M. batesi*.

Character	<i>M. brocki</i> (Key-Inseln)	<i>M. batesii</i> (Saloman Is)
Body length	111.5 mm	132 mm
Mesonotum	Number of granules 80	Number of granules 60
Hind wing	Reaching middle region of 3 rd abdominal tergum	Short, reaching middle region of 2 nd abdominal tergum
Anal segment	Posterior margin with tiny split	Posterior margin without split

Table 6. Morphological differences between *M. brocki* and *M. batesii* (specimen from Bismarck Is., New Pammer)

Character	<i>M. brocki</i> (Key-Inseln)	<i>M. batesii</i> (Bismark Is.)
Body	More robust	More elongate
Mesonotum	Lateral margin spiny; first three spines on each margin slightly expanded	First or first and second spines on each margin larger than the following spines

Table 7. Morphological differences between *M. brocki* and *M. tsudai* (Taiwan).

Character	<i>M. brocki</i> (Key-Inseln)	<i>M. tsudai</i> (Kuraru, Taiwan)
Body	More robust	Slim
Mesonotum	With distinct granules, especially in the central region	Granules not as distinct as in <i>M. brocki</i>
Wing	Hind wings short, 11.8 x as long as tegmina, reaching up to 2/3 length of 3 rd abdominal tergum	Hind wings of moderate size, about 2.0 x as long as the tegmina, reaching a little beyond the hind margin of the 3 rd abdominal tergum
Leg	Anterior femora 1.5 x as long as the mesonotum	Anterior femora 0.3 x length of mesonotum
Anal segment	Posterior margin of anal segment nearly round, a distinct split at its center	Central area of posterior margin with a very tiny split
Subgenital plate	Slightly longer than mesonotum	Nearly as long as mesonotum

Table 8. Morphological differences between *M. rentzi* (holotype female) and *M. wegneri* (paratype female).

Character	<i>M. rentzi</i> (Tandjiong, S.D. Borneo)	<i>M. wegneri</i> (Obi Is.)
Pronotum	Pronotal disc as long as wide	Slightly longer than broad
Mesonotum	Surface with 60 elongate granules, its lateral margin not spiny with very dull teeth	Surface with 50 long and sharp granules, its lateral margin strongly spiny
Wing	Hind wing surpassing the posterior margin of the 2 nd abdominal tergum	Hind wing reaching the posterior margin of the 4 th abdominal tergum
Abdomen	3.5 x as long as the mesonotum	4.6 x as long as the mesonotum
Anal segment	Posterior margin of anal segment nearly square	Posterior margin of anal segment nearly rounded, slightly convave in central area

Table 9. Morphological differences between *M. rentzi* (holotype female) and *M. tsudai* (paratype female).

Character	<i>M. rentzi</i> (Tandjiong, S.D. Borneo)	<i>M. tsudai</i> (Kuraru, Taiwan)
Pronotum	Pronotal disc as long as wide	Pronotal disc shorter than broad
Mesonotum	Surface with 60 elongate granules evenly distributed on anterior 80% of surface	With 78 granules distributed on the anterior 75% of surface
Tegmina	Elongate ovate, slightly longer than mesonotum	About equal in length to the mesonotum
Hind wing	Surpassing the posterior margin of the 2 nd abdominal tergum	Reaching a little beyond the hind margin of the 3 rd abdominal tergum
Anal segment	Posterior margin of anal segment nearly square	Nearly rounded
Color	General color light brown	Pale green

Table 10. Morphological differences between *M. rentzi* (holotype female) and *M. brocki* (holotype female).

Character	<i>M. rentzi</i> (Tandjiong, S.D. Borneo)	<i>M. brocki</i> (Key-Inseln)
Pronotum	Pronotal disc as long as wide	Pronotal disc slightly shorter than broad
Mesonotum	2.5 x the length of pronotum, the lateral margins not too spiny with dull teeth	2.3 x the length of pronotum, the lateral margin strongly spiny
Tegmina	Slightly longer than mesonotum	Equal in length to the mesonotum
Leg	Anterior femora 1.9 x the length of mesonotum	Anterior femora about 1.5 x as long as the mesonotum
Anal segment	Posterior margin of anal segment nearly square	Posterior margin of anal segment nearly round
Color	Light brown	Pale green

Table 11. Morphological differences between *M. rentzi* (holotype female) and *M. batesi* (lectotype female).

Character	<i>M. rentzi</i> (Tandjong, S.D. Borneo)	<i>M. batesii</i> (Solomon Is.)
Mesonotum	Surface with 60 elongate granules, evenly distributed, margin less spiny	80 granules evenly distributed, margin quite spiny
Tegmina	Elongate ovate, slightly longer than mesonotum	Ovate short than mesonotum
Hind wing	Surpassing the posterior margin of the 2 nd abdominal tergum	Reaching to posterior margin of the 2 nd abdominal tergum
Coloration	General color light brown	Green
Anal segment	Posterior margin of anal segment nearly square	Posterior margin of anal segment nearly round

Table 12. Morphological differences between *M. rentzi* (holotype female) and *M. alpheus* (lectotype female).

Character	<i>M. rentzi</i> (Tandjong, S.D. Borneo)	<i>M. alpheus</i> (Ceylon, mislabelled)
Pronotum	Pronotal disc as long as wide	Pronotal disc slightly shorter than broad
Mesonotum	2.5 x length of pronotum, surface with 60 elongate granules	2.2 x length of pronotum, surface with 45 large and distinct sparsely distributed granules
Tegmina	Elongate ovate, slightly longer than mesonotum	Ovate, shorter than mesonotum
Abdomen	Elongate, 3.5 x as long as mesonotum	4.6 x as long as the mesonotum
Anal segment	Posterior margin of anal segment nearly square	Posterior margin of anal segment nearly rounded, slightly concave in central area
Subgenital plate	Not surpassing extremities of cerci	Surpassing extremities of cerci

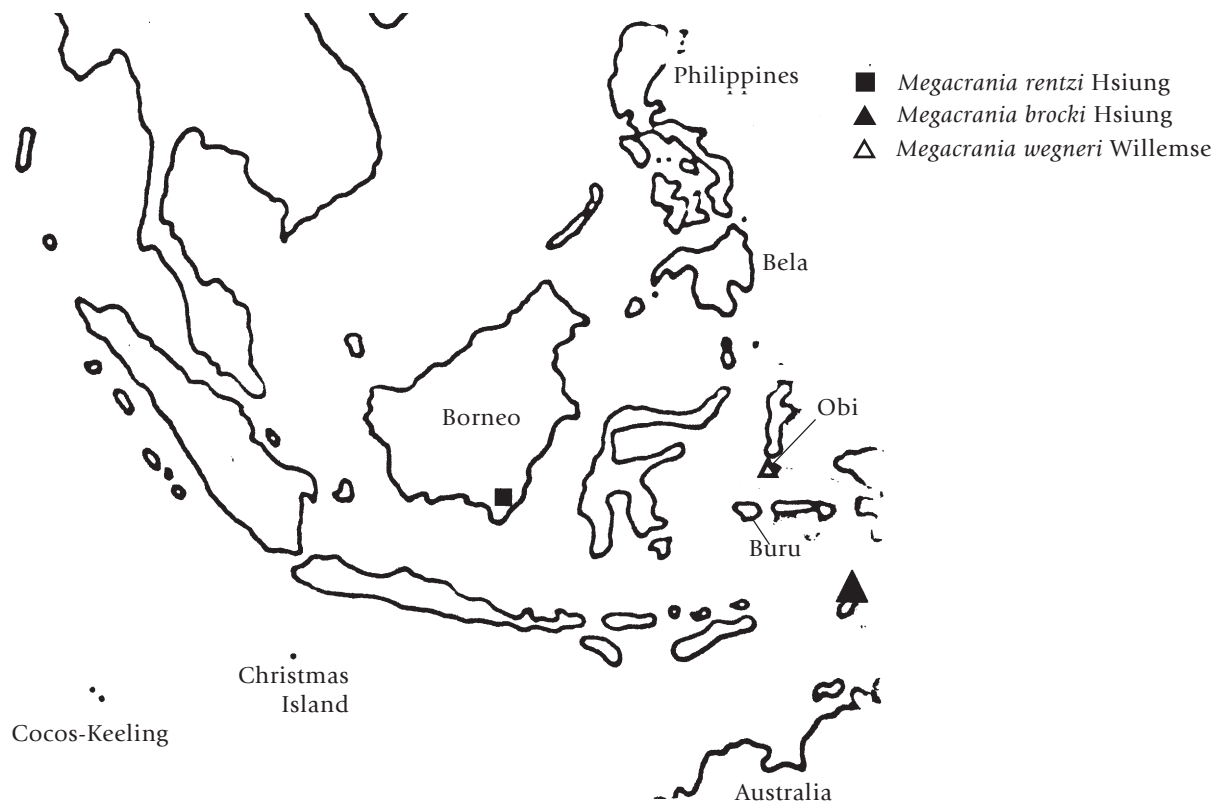


Fig. 4. Geographic distribution of *Megacrania brocki*, *M. wegneri*, and *M. rentzi*.