

***Gibbothorax* gen.n., with four new species of apterous Carventinae (Heteroptera: Aradidae) from Fiji**

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Abstract

The fauna of Aradidae or flat bugs of the Fiji Islands is still insufficiently explored and studied. To date, eight genera and 22 species have been recorded. Most of them are macropterous, but *Nesiaptera* USINGER & MATSUDA, 1959 (Carventinae) with four species is apterous, *Zimmermania brachyptera* USINGER, 1948 (Carventinae) brachypterous, and *Phanocoris lobatus* USINGER & MATSUDA, 1959 (Mezirinae) micropterous. Since Kormilev's studies, further apterous specimens belonging to the subfamily Carventinae have come to light, which cannot be placed in any extant genus of Aradidae. For these, the new genus *Gibbothorax* gen.n. is proposed and four new species are described and illustrated: *G. raivuki* sp.n. from Taveuni, *G. kambuya* sp.n. from Kadavu, and *G. degei* sp.n. (type species) and *G. ligadua* sp.n. from Viti Levu.

Key words. Hemiptera, Heteroptera, Aradidae, Carventinae, new genus, new species, Fiji.

Zusammenfassung

Die Aradidenfauna der Fidschi-Inselgruppe ist erst lückenhaft erforscht. Bisher sind 22 Aradidenarten aus acht Gattungen von Fiji beschrieben, von denen die meisten makropter sind, jedoch mit Ausnahme von *Nesiaptera* USINGER & MATSUDA, 1959 (Carventinae) mit vier apteren Arten, der brachypteren Art *Zimmermania brachyptera* USINGER, 1948 (Carventinae) und der mikropteren Art *Phanocoris lobatus* USINGER & MATSUDA, 1959 (Mezirinae). Seit den Studien Kormilevs wurden weitere Exemplare aus der Unterfamilie Carventinae bekannt, die zu keiner der beschriebenen Aradidengattungen gehören. Für sie wird die neue Gattung *Gibbothorax* gen.n. errichtet und vier neue Arten werden nachstehend beschrieben und abgebildet: *G. raivuki* sp.n. von Taveuni, *G. kambuya* sp.n. von Kadavu sowie *G. degei* sp.n. (Typusart) und *G. ligadua* sp.n. von Viti Levu.

Introduction

The archipelago of Fiji represents an independent South Pacific country and consists of 330 islands of which 110 are inhabited. Only 10% of the country's territory (about 19.400 km²) is land. The largest islands are Viti Levu, Vanua Levu, Taveuni, and Kadavu. They are of volcanic origin, mountainous, with the highest elevation (Mount Tomanivi, Viti Levu) at 1,324 m a.s.l., and in great parts still covered by tropical moist or dry forests.

The aradid fauna of Fiji is not yet thoroughly studied, although the following taxa have so far been described from these islands (KIRKALDY 1908, USINGER 1948, USINGER & MATSUDA 1959, KORMILEV 1966, 1967, 1968, 1969, 1971, MONTEITH 1982, KORMILEV & FROESCHNER 1987).

Subfamily Calisiinae:

- Calisius excelsus* KORMILEV, 1967
- Calisius magdalenae* KORMILEV, 1966
- Calisius pacificus* KIRKALDY, 1908
- Calisius pallidus* KORMILEV, 1967
- Calisius zimmermani* KORMILEV, 1967

Subfamily Carventinae:

- Camerarius intermedius* KORMILEV, 1969
- Carventus minusculus* KORMILEV, 1969
- Carventus ovatus* KORMILEV, 1966
- Carventus robustus* KORMILEV, 1966
- Nesiaptera denticulata* (KORMILEV, 1968)
- Nesiaptera gibbosa* (KORMILEV, 1968)
- Nesiaptera ovata* (KORMILEV, 1968)
- Nesiaptera rotundata* (KORMILEV, 1968)
- Nesiaptera tuberculata* (KORMILEV, 1968)
- Zimmermania brachyptera* USINGER, 1948

Subfamily Mezirinae:

- Arbanatus elongatus* (KORMILEV, 1967)
- Arbanatus fungicola* (KIRKALDY, 1908)
- Arbanatus leai* (KORMILEV, 1967)
- Arbanatus longiceps* (KORMILEV, 1967)
- Arbanatus longirostris* KORMILEV, 1971
- Phanocoris lobatus* USINGER & MATSUDA, 1959
- Ctenoneurus fijiensis* KORMILEV, 1971

Specimens collected in 1989 on the main island, Viti Levu, by the first author, and two specimens from Taveuni and Kadavu Islands later donated to him, were now studied and recognised as unknown taxa. As they cannot be placed into one of the previously described genera of Carventinae, a new genus and four new species are proposed, which are described and illustrated herein.

Material and methods

The material upon which this study is based on, is deposited in the aradid collection of the first author at the Tiroler Landesmuseum, Innsbruck, Austria (CEHI) which later will be transferred to the Bavarian State Collection of Zoology in Munich, Germany.

The specimens from Viti Levu were collected from a decaying tree trunk infested by fungi in a moist rainforest.

Apterous aradid specimens are usually covered by incrustations and debris obscuring the body structures. Therefore, they were softened for about 30 minutes in hot water where few drops of formic acid were added; the incrustation was removed with a pin and a fine brush and the cleaned specimen remounted for examination.

Measurements were taken with a micrometre eyepiece and are given in millimetres.

When citing the text on the labels of a pin attached to the specimens, / separates the lines and // different labels. Photos were taken with an Olympus OM-5 camera, and Helicon Focus 8, along with Adobe Photoshop CS6 software utilized for image composition.

Abbreviations used: deltg = dorsal external laterotergite (connexivum), vlst = ventral laterosternite, mtg = mediotergite, ptg = paratergite.

Taxonomy

Carventinae USINGER, 1950

***Gibbothorax* gen.n.** (Figs 1–12)

Type species. *Gibbothorax degei* sp.n.

Description. Apterous, size 4–5 mm. Thorax strongly bulging and elevated on thorax and tergal plate. Body reddish brown; legs and antennae yellowish. Surface coarsely punctured, the elevated parts beset with yellowish setae with curved apices which are longer and denser on antennae and legs.

Head wider than long. Genae as long as clypeus, not contiguous in front, reaching about half of antennal segment I; antenniferous lobes with blunt apices. Antennae moderately longer than width of head; segment I longest and club shaped; II and III shortest, cylindrical of nearly same length; IV longer than both preceding segments. Eyes protruding, substylate. Postocular lobes converging posteriorly. Rostrum arising from an open atrium well behind apex of clypeus, as long as head; rostral groove deep with carinate borders.

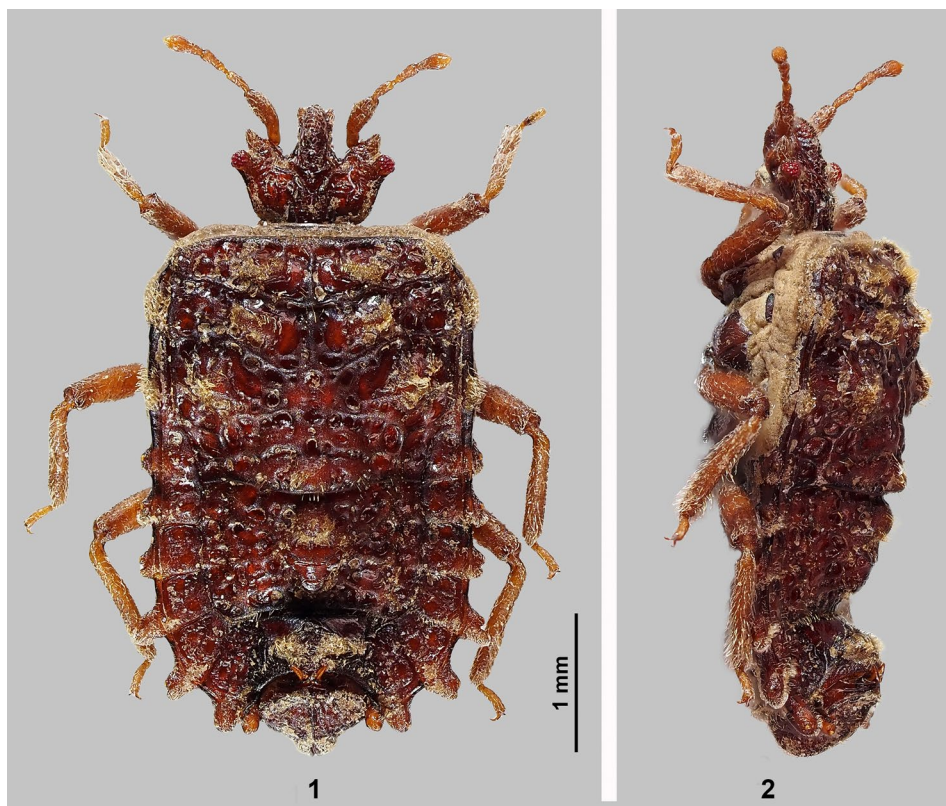
Thorax. Pro-, meso- and metanotum, and mtg I and II fused into a strongly elevated sclerite; this structure is separated anteriorly from prosternum and laterally from triangularly produced deltg I+II by a suture; pro- and mesonotum strongly transverse, their posterior margins sinuate and carinate defining their limits, each with two protuberances beset with yellowish setae; mesonotum consisting of two oval callosities topped by yellowish setae, fused to mtg I+II. – Legs unarmed, with dense pilosity; claws with thin parempodia.

Abdomen. Deltg II–VII with distinct protuberances along posterior half bearing the dorsally exposed spiracles II–VII on anterior face; fused triangularly produced deltg I+II reaching pronotum. Tergal plate elevated along midline, highest on mtg III, then sloping laterally and posteriorly. Tergite VII in male raised medially for the reception of the posteriorly conical pygophore, which is not dissected for the study of parameres; ptg VIII slender with apical spiracle VIII.

Venter. Ventral surface of thoracic sterna covered by a velvet-like, yellowish layer; fused pro-, meso- and metasternum and median parts of sternites II–VII smooth and mat at middle. Lateral parts of sternites with distinct apodemal impressions; posterolateral angles of vlst II–VII laterally expanded, increasing in size posteriad, bearing the spiracles which are visible from above.

Etymology. The genus name refers to the unusually inflated body structure, from “gibbus” (Latin) for inflated, arched, and “thorax” (Latin) for breast.

Distribution. As all four species originate from the Fiji Islands, it can be assumed that they represent endemic taxa.



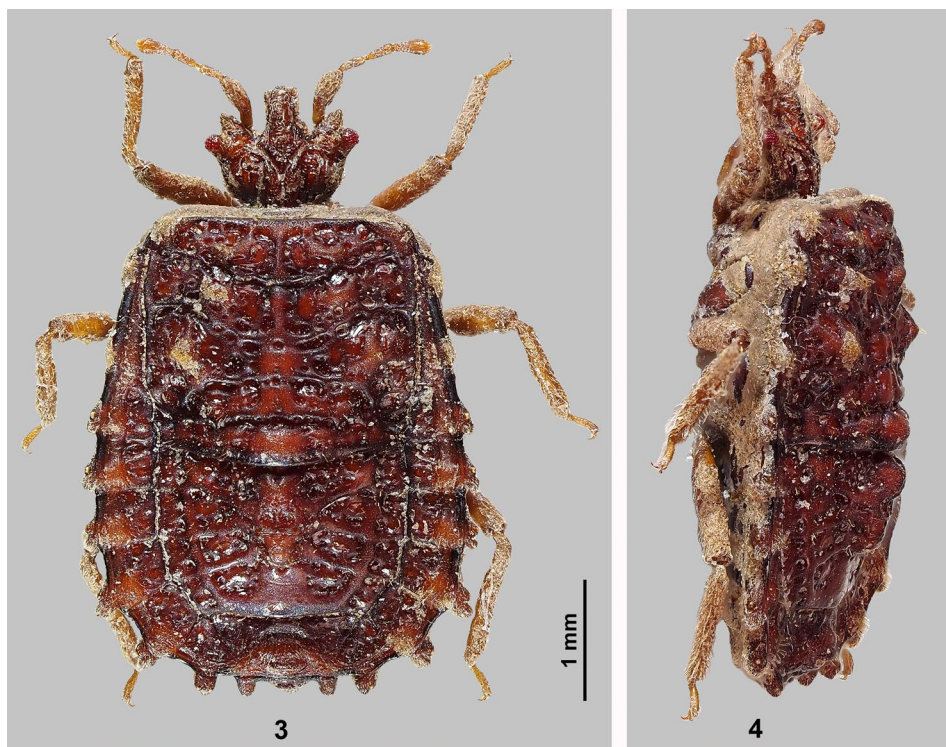
Figs 1–2. *Gibbothorax degei* sp.n. (1) Holotype ♂, dorsal; (2) sublateral. © A. Eckelt.

Comparative notes. There is no Carventinae taxon known with similar habitus and cuticular structure. The apterous genus *Nesiaptera* differs by an egg-shaped habitus and a flat, not strongly inflated thorax. *Zimmermania brachyptera* differs at once by its elongate slender habitus, long antennae, a flat dorsal surface, and the macropterous or brachypterous alary state.

Gibbothorax gen.n. superficially resembles *Phanocoris lobatus* USINGER & MATSUDA, 1959, a micropterous species described from Fiji, sharing the deeply punctured body surface. However, the latter belongs to the subfamily Mezirinae and differs from *Gibbothorax* gen.n., e.g., by other thoracic structures and spiracles II–VII not laterally exposed and visible from above.

Key to the species of *Gibbothorax* gen.n.

- 1 Median part of metanotum and mtg I each with two conical tubercles. Taveuni (♂).
..... ***G. raivuki* sp.n.**
- Median part of metanotum and mtg I each without two conical tubercles. 2
- 2 Median part of metanotum, mtg I and mtg II fused to smooth transverse ridges separated by deep depressions. Kadavu (♀). ***G. kambuya* sp.n.**



Figs 3–4. *Gibbothorax degei* sp.n. (3) Paratype ♀, dorsal; (4) sublateral. © A. Eckelt.

- Median part of metanotum, mtg I and mtg II not fused to smooth transverse ridges. 3
- 3 Mtg II distinctly elevated at middle, anterior border of pronotum straight. Viti Levu (♂, ♀). *G. degei* sp.n.
- Mtg II without a median elevation at middle, anterior border of pronotum convex. Viti Levu (♂). *G. ligadua* sp.n.

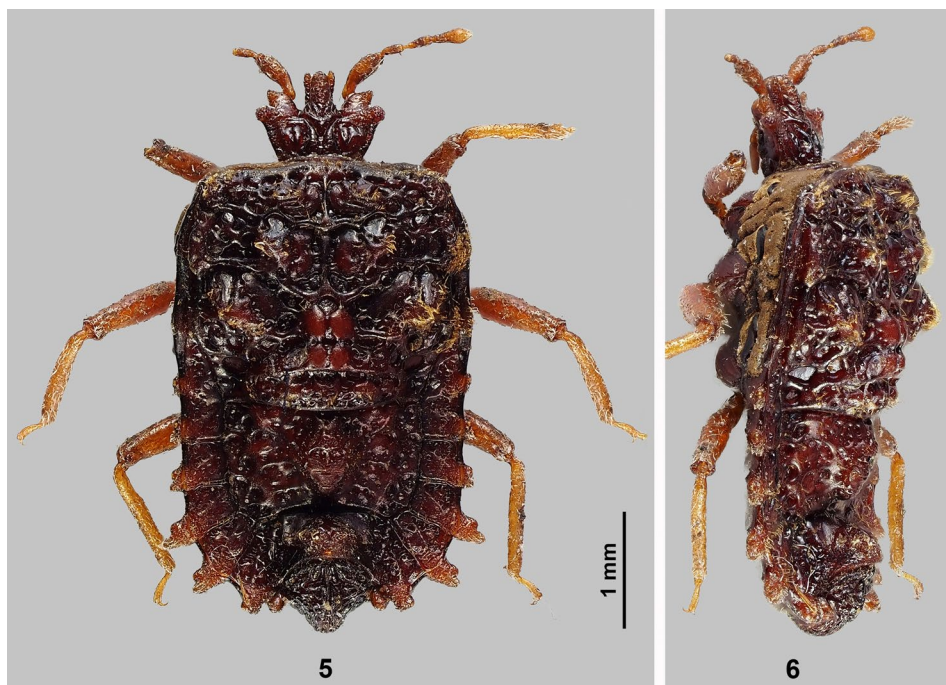
***Gibbothorax degei* sp.n. (Figs 1–4)**

Material examined. Holotype (♂): Fiji / Viti Levu, Rainforest / 16-23 XII 89 E.Heiss // (CEHI); Paratype (♀), with same data as holotype. Type labels are attached accordingly.

Diagnosis. Distinguished from the congeners by the characters given in the key.

Description of male. Apterous, body with subparallel lateral margins, truncate anteriorly. Colouration unicolourous reddish-brown; yellowish are antennae and legs and setae on thoracic and abdominal elevated structures and lateral projections of abdomen; a velvet-like cover on lateral parts of venter, partly visible from above, ochraceous.

Head wider than long (1.20 : 0.85). Clypeus subparallel; genae not exceeding apex. Eyes small, granular and somewhat stylate, directed laterally and upward. Postocular lobes sinuately converging posteriorly to a constricted ring-like collar; vertex raised medially; antennae 1.18 times as long as width of head.



Figs 5–6. *Gibbothorax raivuki* sp.n. (5) Holotype ♂, dorsal; (6) sublateral. © A. Eckelt.

Thorax. Pronotum truncate anteriorly, surface deeply punctured as whole body, with two slight elevations beset with yellowish tuft of setae; posterior border carinate and convex. Metanotum with two setigerous, oblique elevations, depressed at middle, posterior border as pronotum. Metanotum with two larger and more prominent setigerous elevations, posteriorly fused to mtg I+II, mtg II posteriorly raised at middle with a tuft of setae.

Abdomen. Tergal plate elevated along midline sloping posteriorly; deltg II–VII with triangular lateral expansions bearing the dorsally visible spiracles II–VII; tergite VII medially raised and beset with setae.

Measurements of holotype: Length 4.60; ratio length / width of body 1.80; ratio width of pronotum / width of head 2.00; width of abdomen across tergite IV 2.50, of tergite V 2.55; length of antennae 1.42.

Description of female. Basically as male, however of larger size and more rounded lateral margins of abdomen. Measurements. Length 5.00; ratio length / width of body 1.54; width of abdomen across tergite IV 3.25, of tergite V 3.10; length of antennae 2.30.

Etymology. The epithet refers to Degei, the supreme Fijian god and god of snakes, noun in apposition.

Distribution. So far only recorded from the largest and main island Viti Levu.



Fig. 7. *Gibbothorax raivuki* sp.n. (7) Holotype ♂, ventral.
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***Gibbothorax raivuki* sp.n. (Figs 5–7)**

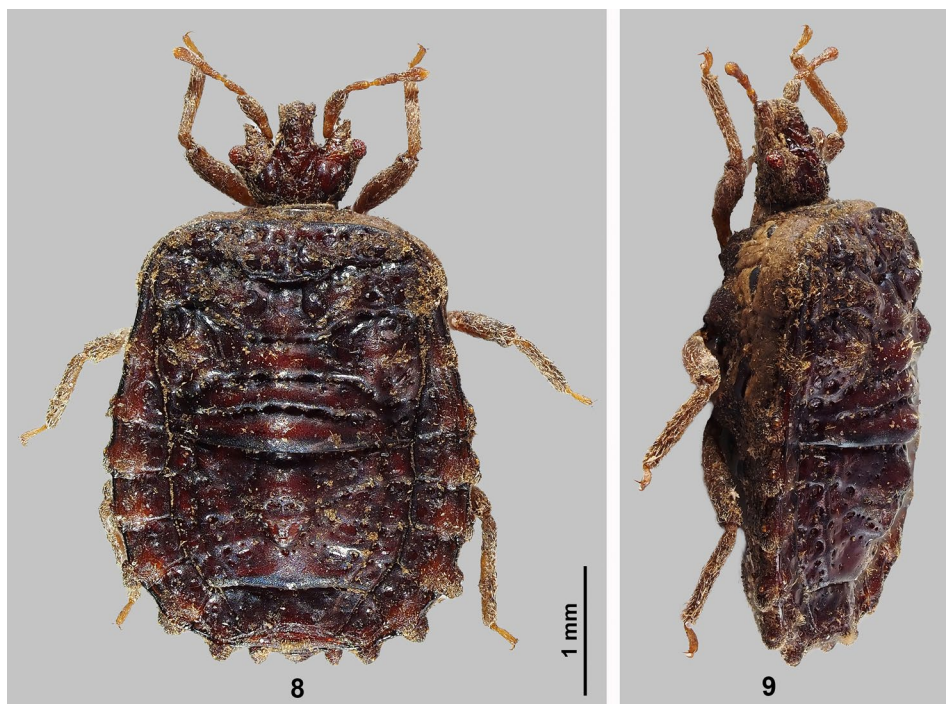
Material examined. Holotype (♂): Fiji / Taveuni, under bark / VI 1993 G. Bruno // (CEHI). The holotype label is attached accordingly.

Diagnosis. Recognized and differing from the congeners by the four distinct conical tubercles placed at middle of fused metanotum and mtg I.

Description of male. One of the relatively large species of the genus. Paired setigerous elevations increasing in size from pro-, to meso- and metanotum; apices beset with yellowish setae. Other characters as described for the genus.

Head wider than long (1.10 : 0.85). Clypeus and adjacent genae parallel-sided; head structure and substylate eyes similar to *degei* sp.n.; antennae 1.18 times as long as width of head.

Thorax and abdomen. Anterior border of pronotum truncate, slightly convex at middle; other body structures as given for the genus.



Figs 8–9. *Gibbothorax kambuya* sp.n. (8) Holotype ♀, dorsal; (9) sublateral. © A. Eckelt.

Measurements. Length 4.60; ratio length / width of body 1.73; ratio width of pronotum / width of head 2.32; width of abdomen across tergite IV 2.50, of tergite V 2.65; length of antennae 1.30.

Etymology. This epithet refers to Raivuki, the Fijian goddess of the seasons, noun in apposition.

Distribution. So far only recorded from the third largest island Tavenui.

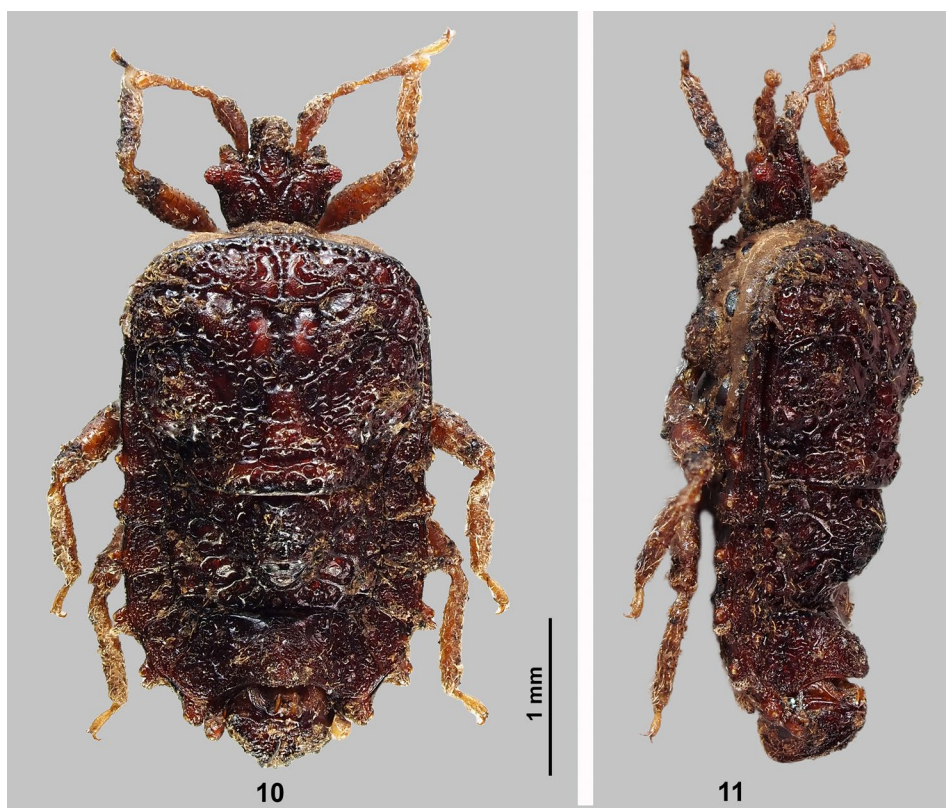
***Gibbothorax kambuya* sp.n. (Figs 8, 9)**

Material examined. Holotype (♀): Fiji / Kadavu, under bark / VI 1993 G.Bruno // (CEHI). The holotype label is attached accordingly.

Diagnosis. This species differs from the congeners by the piceous colour, by the generally less punctate surface, and the smooth transverse median ridges of metanotum, mtg I and mtg II.

Description of female. One of the smallest species of the genus. Body structures as described for the genus, not repeated. Comparison of figures better shows the specific differences as indicated in the key.

Head wider than long (1.10 : 0.80); antennae 1.28 times as long as width of head.



Figs 10–11. *Gibbothorax ligadua* sp.n. (10) Holotype ♂, dorsal; (11) sublateral. © A. Eckelt.

Measurements. Length 4.30; ratio length / width of body 1.43; ratio width of pronotum / width of head 2.33; width of abdomen across tergite IV 3.00, of tergite V 2.65; length of antennae 1.30.

Etymology. This epithet refers to Kambuya, the Fijian god of weather, noun in apposition.

Distribution. So far only recorded from the fourth largest island of Kadavu.

***Gibbothorax ligadua* sp.n. (Figs 10, 11)**

Material examined. Holotype (♂): Fiji / Viti Levu, Rainforest / 16-23 XII 89 E.Heiss // (CEHI). The holotype label is attached accordingly.

Diagnosis. Resembles *G. degei* sp.n. but differs by smaller size, smaller head, narrow body and convex, not truncate anterior pronotum, and by the characters given in the key.

Description of male. Basic structures of body as given in the generic description. Dorsal surface with deep irregular punctures separated by thin carinae. The paired elevations on pro-, meso- and metanotum are hardly developed.

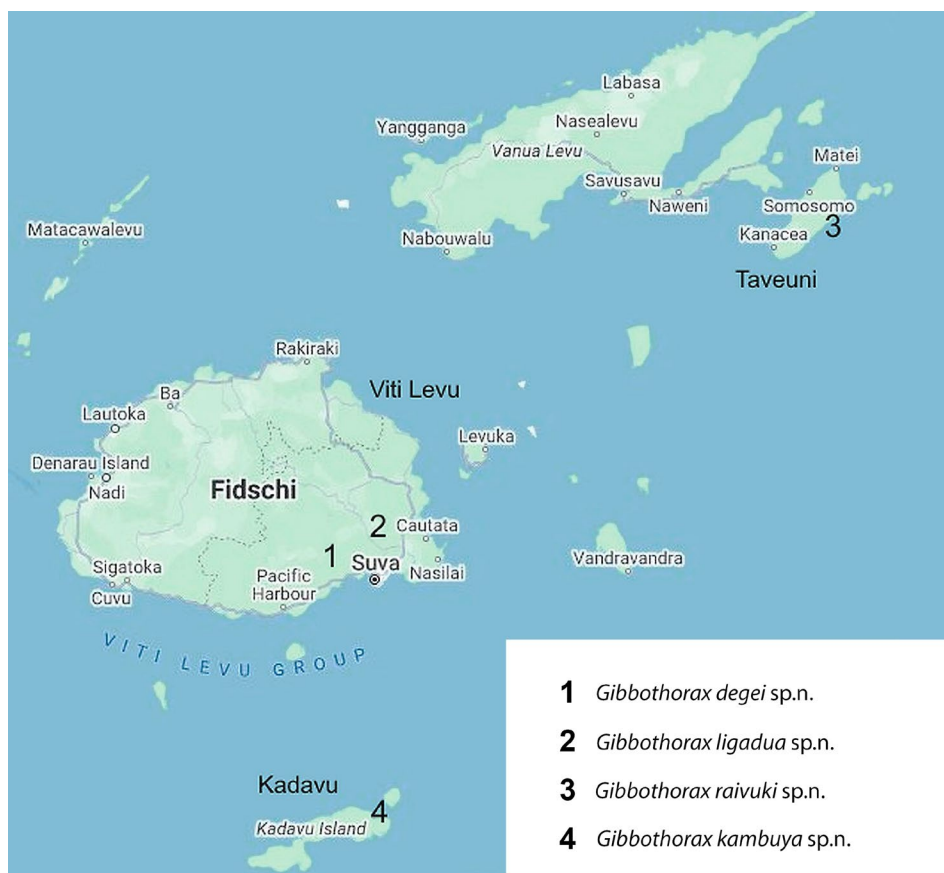


Fig. 12: Distribution map of *Gibbothorax* species on Fiji Islands. Original map by Pacific Ocean free blank map.

Head wider than long (0.85 : 0.65) but distinctly narrower than *G. degei* sp.n. Eyes not stylate and laterally produced. Antenna 1.23 times as long as width of head.

Thorax and abdomen. Structures as given for the genus; mtg II without posterior elevation.

Measurements. Length 4.00; ratio length / width of body 1.90; ratio width of pronotum / width of head 2.23; width of abdomen across tergite IV 2.10, tergite V 2.05; length of antennae 1.05.

E t y m o l o g y. This epithet refers to Ligadua, the Fijian god of music, noun in apposition.

D i s t r i b u t i o n. So far only recorded from the largest and main island Viti Levu.

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