

A new genus and two new species
of Microveliinae from Fiji
(Heteroptera: Veliidae)

Новый род и два новых вида Microveliinae с Фиджи
(Heteroptera: Veliidae)

John T. Polhemus¹ & Dan A. Polhemus²
Дж. Т. Полхемус¹, Д.А. Полхемус²

¹ Colorado Entomological Institute, 3115 South York Street, Englewood, Colorado, USA 80113. E-mail: jtpolhemus@msn.com

¹ Экономический институт Колорадо, 3115 ул. Южный Йорк, Инглвуд, Колорадо, США 80113.

² Dept. of Natural Sciences, Bishop Museum, 1525 Bernice St., Honolulu, HI 96817. E-mail: bugman@bishopmuseum.org

² Музей Бишопа, Отдел естественных наук, 1525 ул. Бернис, Гонолулу, HI 96817

KEY WORDS. Heteroptera, Veliidae, Microveliinae, new genus, new species.

КЛЮЧЕВЫЕ СЛОВА. Heteroptera, Veliidae, Microveliinae, новый род, новый вид.

ABSTRACT. The new genus *Fijivelia* **gen.n.** is described from the Fiji Islands to include two new species, *Fijivelia kerzhneri* **sp.n.** from Viti Levu (type species), and *Fijivelia kadavu* **sp.n.** from Kadavu Island. Illustrations are provided of the dorsal and lateral body shapes for females of both species, along with ventral and lateral views of the male terminal abdomen, and photographs of the type locality habitats.

РЕЗЮМЕ. С островов Фиджи описан новый род *Fijivelia* **gen.n.**, с двумя новыми видами, *Fijivelia kerzhneri* **sp.n.** с острова Вити Леву (типовой вид рода) и *Fijivelia kadavu* **sp.n.** с острова Кадаву. Приведены рисунки общего вида самок сбоку и сверху, конца брюшка самцов сбоку и снизу и фотографии биотопов типовой местности.

Introduction

Only one species of Microveliinae has been previously described from the Fiji Islands, *Microvelia pacifica* Kirkaldy [1908], which conforms to the strict definition of the genus *Microvelia* according to the most recent generic revisions of the subfamily [Andersen & Weir, 2001; Polhemus & Polhemus, 2005]. The new genus described here does not fit into any of the genera of Microveliinae treated in the regional studies cited above, or into any other described genus of the subfamily, nearly all of which are represented in the J.T. Polhemus Collection (JTPC).

The terminology used here follows Andersen & Weir [2001] and Polhemus & Polhemus [2005] as far as practical, to facilitate comparison between the taxa described here and those previously described from Australia, New Guinea, and the southwest Pacific region.

All measurements are given in millimeters. CL numbers following certain localities refer to a coding system used by the authors to cross-reference specimens, habitat photographs, and collection metadata.

Most of the material upon which this study is based was collected by the authors, with the notable exception of specimens collected by Alan Gillogly and donated to the J. T. Polhemus Collection (JTPC); these latter will eventually be placed in the U. S. National Museum of Natural History (USNM). Specimens deriving from the Fiji National Insect Collection (FNIC), Suva, as part of the NSF-funded Fiji Arthropod Survey will be returned there, with duplicate exemplars placed in the B. P. Bishop Museum, Honolulu (BPBM), JTPC, and USNM.

Systematic Part

Fijivelia Polhemus & Polhemus **gen.n.**

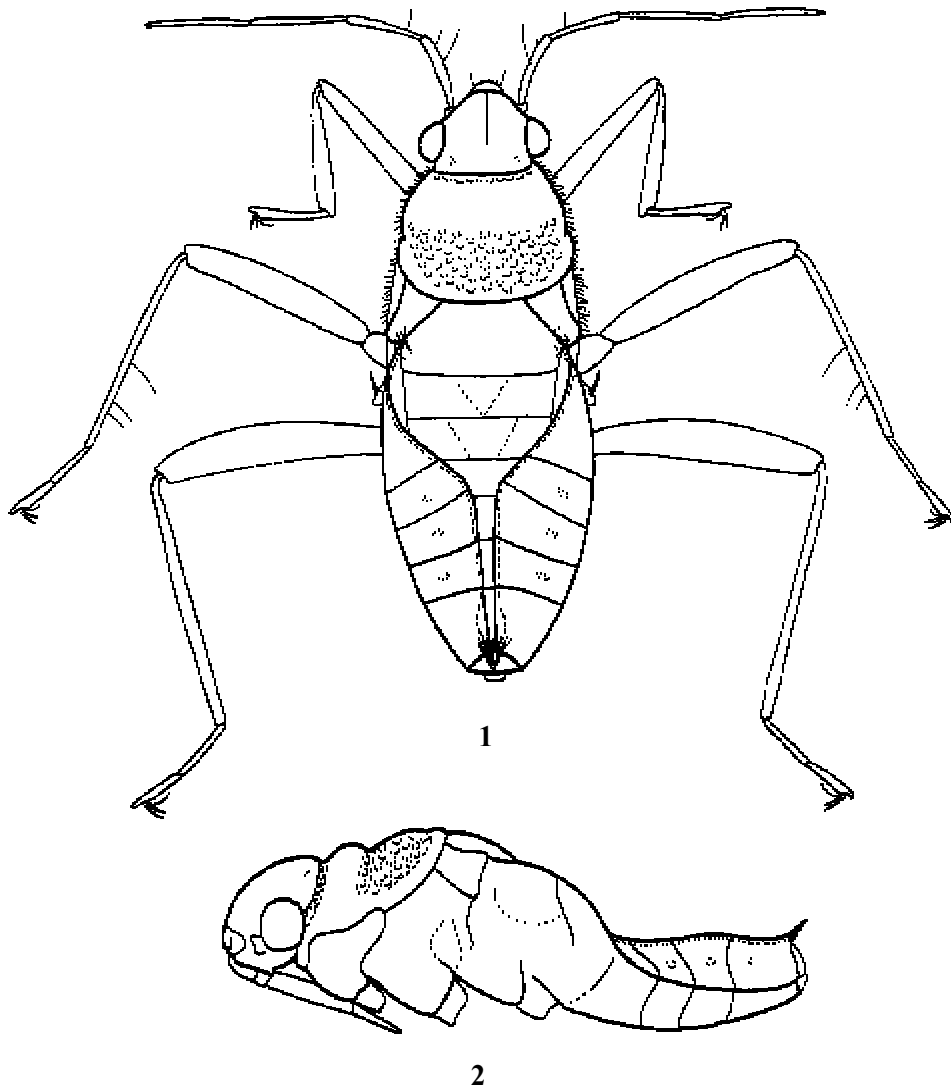
Figs 1–10.

Type-species: *Fijivelia kerzhneri* Polhemus & Polhemus **sp.n.**

DESCRIPTION. Size. Apterous form, length of males 2.05–2.71 mm, females 2.08–2.94 mm; general body characteristics and size not sexually dimorphic, males narrower than females. Macropterous form unknown.

Color. Ground color orange brown, with blackish brown markings often overlain with bluish pruinose; head mostly orange brown; pronotum anteriorly with a broad orange brown transverse stripe behind vertex of head; connexiva mostly orange brown; abdominal tergites II–III, often VI–VII, marked with bluish pruinose; venter mostly black.

Structural characters. Apterous forms with body shape narrow-elongate (Figs 1, 3). Eyes globose, exerted but not beyond anterolateral pronotal angles, separated by more than twice the width of an eye, appressed to anterior pronotal margin, with moderate length ocular setae. Head declivant anteriorly, posterior margin sloping caudo-dorsally, extend-



Figs 1-2. *Fijivelia kerzhneri*, sp.n.: 1 — female, dorsal view; 2 — female, lateral view of body.
 Рис. 1-2 *Fijivelia kerzhneri*, sp.n.: 1 — самка, сверху; 2 — самка, сбоку.

ing behind eyes (Figs 1-4), with usual three pairs of facial trichobothria plus numerous short setae; vertex with prominent median sulcus, black glabrous pseudocellar spots; gular region short, plainly visible, rostral cavity closed posteriorly. Rostrum reaching to middle of mesosternum, segment I short, enclosed in rostral cavity, segment IV about twice the length of I, almost four times longer than II, segment III more than 7 times as long as II. Antennae slender, segments III and IV very long, fourth segment not fusiform, total length about 0.6 x body length.

Pronotum very slightly raised medially, without median carina; collar weakly raised, set off by a demarcating line of coarse foveae; anterior and posterior lobes set off by a transverse row of deep foveae, evanescent medially; entire dorsum densely set with moderate length decumbent golden setae; posterior lobe with numerous large dark foveae, humeri not prominent, almost straight posteriorly, not modified, covering mesonotum and most of metanotum. Thoracic venter not diagnostic, with weakly formed tubercles on either side of mesosternal midline on posterior margin opposing an unmod-

ified metasternum. Metasternal scent gland opening (omphalium) in male marked by a tubercle, in female not visible; scent channels prominent, curving slightly anterad to base of metacetabulae, marked there by tuft of long slender setae. Wing pads not visible.

Abdomen narrow, with a row of small glabrous foveae in deep suture demarcating tergites I and II; without longitudinal carinae on tergites; tergites III-VI subequal in length, II longer, I longest. Abdominal sternites set off from laterosternites by hair-free glabrous oval and round lacunae; male ventrites V-VI with median longitudinal sulcus, ventrite VII with median depression flanked by ventrally directed tufts of setae.

Legs long, hind legs longer than others; posterior femur of males and females as stout or stouter than anterior femur; anterior femur set beneath with short to long light setae, unmodified in males; anterior tibia of male with an apically curved, J-shaped grasping comb of minute black setae occupying 1/4 to 2/5 of tibial length (Fig. 8); middle and hind femora set ventrally with short slender setae; all tarsi of

moderate length (Figs 1, 7), claws short, slender; both up- and down curving arolia short, slender.

Male ventrite VII modified, genital segments small, ventrite VIII not modified; pygophore unmodified; parameres small, slender, symmetrical, hidden; proctiger not modified; tergite IX rounded, not protruding. Female with tergite VIII basally on same plane as VII, angled ventrad, truncate posteriorly; proctiger forming an anal plate or lid, convex, bent ventrad, concealing gonocoxae and genital opening; anal cone not visible.

ETYMOLOGY. The generic name *Fijivelia* is derived from Fiji, the islands of origin, and *Velia*, the nominate genus of the family. Gender feminine.

COMPARATIVE NOTES. *Fijivelia* keys to *Microvelia* in both Andersen and Weir [2001] and in Polhemus and Polhemus [2005], but clearly does not belong there because the female abdominal tergites VII–VIII are deflected ventrally forming an anal plate. *Fijivelia* differs from all other microveliinae genera by the following combination of characters: head posteriorly prolonged behind the eyes; glabrous areas present on the female meso- and metapleura to facilitate phoresy; female connexiva convergent over tergite IV, modified posteriorly; male fore tibia with a prominent grasping comb recurved distally, formed by a row of tiny pegs, in the shape of a shepherd's crook (seen also in *Tarsovelia* Polhemus and Polhemus). *Fijivelia* also seems to be unique among Microveliinae in possessing large deep glabrous pseudocellar spots on the vertex of the head.

Fijivelia kerzhneri Polhemus & Polhemus **sp.n.**

Figs 1–2, 9–10, 12.

MATERIAL. Holotype, apterous ♀, Fiji, Viti Levu, Tavua Distr., 2 mi. (3.2 km.) E. Nadarivatu, 12-XII-1970, A.Gillogly (USNM). Paratypes as follows, all apterous: Fiji, Viti Levu, Tavua Distr., 3 ♂, 2 ♀, same data as holotype (JTPC, USNM); Tavua Distr., 4 ♂, 5 ♀, Governor's Pool, on slopes of Mt. Lomalagi, nr. Nadarivatu, 790 m., 17°33'43"S, 177°57'49"E, water temp. 19° C., 10 August 2005, 12:00–13:30 hrs., CL 7436, D.A. Polhemus, J.T. Polhemus (FNIC, JTPC, BPBM); Suva Distr., 11 ♂, 3 ♀, headwaters of Veisari River, W. of Suva, first streamlet on road to Waivudawa, 260 m., 18°04'27"S, 178°21'50"E, water temp. 24° C., 23 January 2005, CL 7356, D. A. Polhemus (FNIC, JTPC, USNM).

DESCRIPTION. Size. Apterous male, length 2.05–2.38 mm ($x = 2.25$, $n = 6$); width 0.72–0.83 mm ($x = 0.76$, $n = 6$). Apterous female, length 2.08–2.66 mm ($x = 2.40$, $n = 6$); width 0.72–0.83 mm, ($x = 0.80$, $n = 6$).

Color. Apterous male: ground color orange brown marked with bright bluish pruinose; head, anterior pronotum, connexiva, abdominal tergites orange brown; tergites II–III with pruinose wedges laterally, tergite VI and often tergite VII with pruinose triangles medially; pleural regions mostly blackish, lighter caudad; venter mostly blackish. Head with lower part above eyes sometimes darkened. Pronotum orange brown; posterior lobe thickly set with contrasting black foveae. Wing pads absent. Abdomen mostly orange brown, tergites darker laterally and between tergites; connexiva broadly orange brown, darker on dorsal margin. Legs leucine to orange brown.

Structural characters. Apterous male: head of moderate length, declivant anteriorly; length 0.43, width 0.54; width of eye/interocular space, 0.13/0.29. Pronotum long, posterior margin evenly curving, not angulate, humeri obscure, sides almost parallel; length (midline): width, 0.51 : 0.76.

Abdominal venter bearing short, fine, pale setae; ventrites V–VI deeply sulcate longitudinally (Fig. 9); ventrite VII excavated anteromedially, concave, curving to posterior

thickened carina, flanked caudally on each side by a tuft of long brownish setae (Figs 9, 10); first genital segment (segment VIII), proctiger unmodified.

Legs clothed with numerous short, appressed, pale setae, intermixed on ventral surface of fore femur with longer, erect, pale, setae; posterior femora as stout as anterior femora; all legs unarmed, lacking setal tufts or other modifications. Antennal segment I with 2, segment II with 1 long erect dark setae; segments II–III set with numerous moderate length recumbent setae; all segments with short recumbent setae.

Antennal formula I : II : III : IV; 0.36 : 0.27 : 0.43 : 0.58.

Proportions of legs as follows: Femur, tibia, tarsal 1, tarsal 2 of fore leg, 0.68 : 0.54 : 0.29 : 0.0; of middle leg, 0.93 : 0.90 : 0.25 : 0.25; of hind leg, 1.04 : 1.19 : 0.21 : 0.25. Grasping comb about 0.40x length of fore tibia.

Paramere small, triangular, hidden; proctiger not modified.

Apterous female: Similar to male in general structure (except connexiva) and coloration, but larger, abdominal tergites VI–VII without pruinose markings. Lateral margins of pronotum, metanotum and first abdominal segment thickly set with stiff dark erect setae. Connexiva vertical basally, abruptly incurved over tergite III, appressed over tergites IV–VI and dorsal margins parallel but separated (Fig. 1); dorsal margin of connexival segment VII flattened, hair free, terminating caudally in a tuft of stiff black erect setae; abdominal venter unmodified.

ETYMOLOGY. The patronymic *kerzhneri* honors Izya Kerzhner for his enormous positive influence on the study of Heteroptera, and his cheerful assistance to many other workers worldwide.

COMPARATIVE NOTES. Easily recognized by the strongly depressed female abdomen (Fig. 2) and the small but deep concavity on the male ventral abdomen (Fig. 9). For additional diagnostic comments see discussion under *F. kadavu* **sp.n.** below.

BIOLOGICAL NOTES. This species appears to prefer wet bedrock exposures along the margins of sheltered stream pools in upland settings (Fig. 12). For instance, the specimens from the upper Veisari River locality were taken by splashing a heavily shaded bedrock wall along the margin of a small, shaded plunge pool at the base of a small cascade descending over rounded stream boulders.

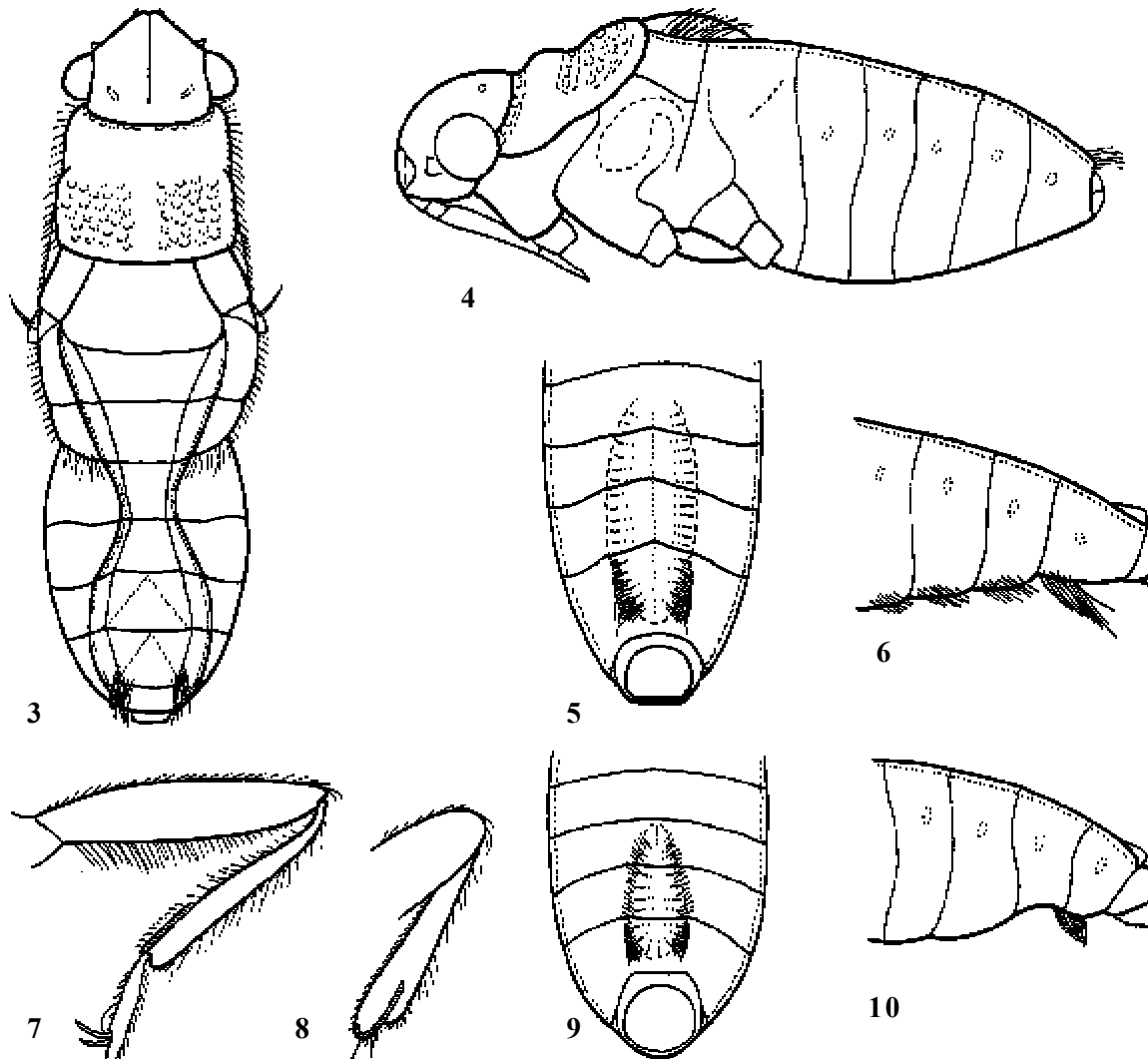
DISTRIBUTION. Apparently endemic to Viti Levu, the largest and oldest of the Fijian islands.

Fijivelia kadavu Polhemus & Polhemus **sp.n.**

Figs 3–8, 11

MATERIAL. Holotype, apterous ♀, Fiji, Kadavu, Vunisea Dist., Vodavoda Creek from road crossing to water supply intake, 4 km. NE of Vunisea, 80–100 m., 19°00'51"S, 178°10'49"E, water temp. 22° C., 18.VIII.2005, 14:00–16:00 hrs., CL 7449, D.A. Polhemus, J.T. Polhemus (FNIC). Paratypes as follows, all apterous: Fiji, Kadavu, Vunisea Distr., 31 ♂, 28 ♀, same data as holotype (FNIC, JTPC, BPBM, USNM); Vunisea Distr., 2 ♀, upper Waikana Creek and tribs., 5 km. SW of Vunisea on road to Tavuki, 135 m., 19°04'08"S, 178°08'17"E, water temp. 22° C., 17.VIII.2005, 15:30–16:30 hrs., CL 7446, D.A. Polhemus, J.T. Polhemus (USNM) (FNIC); Vunisea Distr., 4 ♂, 3 ♀, Tirigaloa Creek at waterfall, 3 km. S. of Ravitaki, 15–40 m., 19°07'56"S, 178°07'02"E, water temp. 22.5° C., 18.VIII.2005, 10:00–11:30 hrs., CL 7447, D.A. Polhemus, J.T. Polhemus (FNIC, USNM).

DESCRIPTION. Size. Apterous male, length 2.48–2.71 mm ($x = 2.57$, $n = 6$); width 0.72–0.83 mm ($x = 0.76$, $n = 6$). Apterous female, length 2.77–2.94 mm ($x = 2.89$, $n = 6$); width 0.83–0.89 mm, ($x = 0.85$, $n = 6$).



Figs 3–10. *Fijivelia* spp.: 3–8 — *F. kadavu* sp.n.; 9–10 — *F. kerzhneri* sp.n. 3 — female, dorsal view; 4 — female, lateral view of body; 5, 9 — male, ventral view of terminal abdomen; 6, 10 — male, left lateral view of terminal abdomen; 7 — male foreleg, ventral view; 8 — male foreleg, oblique view of tibia showing shape of grasping comb.

Рис. 3–10. *Fijivelia* spp.: *Fijivelia kadavu* sp.n. 9–10 — *F. kerzhneri* sp.n.; 3 — самка, сверху; 4 — самка, сбоку; 5, 9 — конец брюшка самца, снизу; 6, 10 — конец брюшка самца, слева; 7 — передняя нога самца, снизу; 8 — передняя нога самца, показана форма хватательного гребня.

Color. Apterous male: ground color orange brown marked with bright bluish pruinose, head, anterior pronotum, connexiva, abdominal tergites orange brown, tergites II–III with pruinose wedges laterally, tergite VI and often tergite VII with pruinose triangles medially; pleural regions mostly blackish, extreme caudal end lighter; venter mostly blackish. Head with lower part above eyes sometimes darkened. Pronotum orange brown; posterior lobe tinged with brown, thickly set with contrasting black foveae. Wing pads absent. Abdomen mostly orange brown, tergites darker laterally and between tergites; connexiva broadly orange brown, darker on dorsal margin. Legs leucine to orange brown, tinged with darker brown distally.

Structural characters. Apterous male: head of moderate length, declivant anteriorly; length 0.43, width 0.54; width of eye/interocular space, 0.09/0.36. Pronotum long, posterior margin evenly curving, not angulate, humeri obscure, sides almost parallel; length (midline): width, 0.54 : 0.79.

Abdominal venter bearing short, fine, pale setae; ventrites V–VI shallowly sulcate longitudinally (Fig. 5); ventrite VII shallowly excavated anteromedially, sloping posteriorly to slightly raised posterior margin, flanked caudally on each side by a tuft of long pale setae (Fig. 6); first genital segment (segment VIII), proctiger unmodified.

Legs clothed with numerous short, appressed, pale setae, intermixed on ventral surface of all femora with longer erect pale setae, longest on anterior femur, shortest on posterior femur; posterior femora as stout as anterior femora; all legs unarmed, lacking setal tufts or other modifications. Antennal segment I with 2, segment II with 1 long erect dark setae; segments II–III set with numerous long recumbent setae, with length about twice the width of segment; all segments with short recumbent setae.

Antennal formula I : II : III : IV, 0.32 : 0.32 : 0.43 : 0.51.

Proportions of legs as follows: Femur, tibia, tarsal 1, tarsal 2 of fore leg, 0.76 : 0.54 : 0.27 : 0.0; of middle leg, 0.97



Fig. 11. Vodavoda Creek, Kadavu Is., Fiji, type locality for *Fijivelia kadavu* sp.n. The type series was taken from shaded pools in bedrock above the cascade.

Рис. 11. Бухта Водавода, остров Кадаву, Фиджи — типовая местность *Fijivelia kadavu* sp.n. Типовая серия была собрана над водопадом, на образованных в коренной породе затененных прудах.

: 0.86 : 0.18 : 0.25; of hind leg, 1.04 : 1.15 : 0.18 : 0.25. Grasping comb about 0.25–0.27x length of fore tibia.

Paramere small, triangular, hidden; proctiger not modified.

Apterous female. Similar to male in general structure (except connexiva) and coloration, but larger, abdominal tergites II–III mostly pruinose, abdominal tergites VI–VIII with distinct medial pruinose triangles. Lateral margins of pronotum, mesonotum, metanotum and sides of first three abdominal segments below connexiva thickly set with stiff dark erect setae. Connexiva almost vertical (Figs 3, 4), sinuate, incurved to tergite IV, then curving outward to tergite VII (Fig. 3); dorsal margin of connexival segment VII not flattened nor hair free, without compact caudal tuft of setae, instead with a caudal brush of randomly directed setae; abdominal venter unmodified.

ETYMOLOGY. The name *kadavu* is a noun in apposition, named for the Fijian island of origin, Kadavu (pronounced in English “kan-davu”).

COMPARATIVE NOTES. *Fijivelia kadavu* sp.n. is easily separated from *F. kerzhneri* sp.n., the only other known species of the genus, by female characters, particularly the form of the connexiva, which are vertical along abdominal tergites IV–VII in *F. kadavu* sp.n. (Figs 3, 4), but infolded over abdominal tergites IV–VII in *F. kerzhneri* sp.n. (Figs 1, 2); in addition, the central portions of the connexival margins of *F. kadavu* sp.n. are deflected inward, giving the abdomen an “hourglass” shape when viewed from above (Fig. 3). Additional differences in the females of these

species include the presence of bright blue pruinosity on tergites VI–VII in *F. kadavu* sp.n., which are absent in *F. kerzhneri* sp.n., and the presence of a flattened hair free region dorsally on connexival segment VII in *F. kerzhneri* sp.n., which is also absent in *F. kadavu* sp.n.. In addition, *F. kadavu* sp.n. is somewhat larger, and the males have a longer but shallower ventromedial abdominal sulcus, and a smaller concavity on sternite VII than seen in *F. kerzhneri* sp.n. (compare Figs 5 and 9).

BIOLOGICAL NOTES. Taken from the quiet edges of shaded pools along rainforest streams. At the Vodavoda Creek type locality (Fig. 11) this species was extremely abundant on still pools amid boulders away from the main stream channel, while along upper Waikana Creek only a few individuals were taken, all being found in dark recesses beneath undercut, vegetated banks.

DISTRIBUTION. Apparently endemic to Kadavu, the most southerly of the large Fijian islands.

ACKNOWLEDGMENTS. We wish to thank David Olson and Moala Tokota’a for logistical assistance and field support on Viti Levu and Kadavu, and Alan Gillogly for the donation of specimens long ago. This project was supported by grant DEB 0425970 from the National Science Foundation, Washington, DC, and the Schlinger Foundation; and by the Smithsonian Institution’s Drake Fund. In addition, JTP completed this research as an adjunct faculty member in the Bioagricultural Sciences Department at Colorado State University. We thank all of the above organizations for



their continuing support of research involving the systematics and biogeography of aquatic Heteroptera. This represents contribution No. 2006-001 to the NSF-Fiji Arthropod Survey.

References

- Andersen N.M. & Weir T.A. 2001. New genera of Veliidae (Hemiptera: Heteroptera) from Australia, with notes on the generic classification of the subfamily Microveliinae // *Invertebrate Taxonomy*. Vol.15. P.217–258.
- Kirkaldy G.W. 1908. A catalogue of the Hemiptera of Fiji // *Proc. Linn. Soc. New South Wales*. Vol.33. P.345–391.
- Polhemus D.A. & Polhemus J.T. 2005. Two new genera and thirty new species of Microveliinae (Heteroptera: Veliidae) from the East Papua Composite Terrane, far eastern New Guinea // *Tijdschr. Entomol.* Vol.147. P.113–189.

Fig. 12. Headwater streamlet tributary to the upper Veisari River, Viti Levu Is., Fiji, type locality for *Fijivelia kerzhneri* sp.n. The type series was taken from shaded bedrock faces bordering small pools.

Рис. 12. Приток в верховье реки Верхняя Веисари, остров Вити Леву, Фиджи — типовая местность *Fijivelia kerzhneri* sp.n. Типовая серия была собрана в тени, на поверхности коренной породы у кромки небольших прудов.