

New Records of the Land-hopper, *Talitroides topitotum* (Burt, 1934) (Crustacea, Amphipoda, Talitridae), from Subtropical East Asia

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Abstract *Talitroides topitotum* (Burt 1934), a land-hopper talitrids distributed world wide, is reported from subtropical forests in Okinawa Island, Japan, and Lam Dong Province, Viet Nam. This is the first record of this species from both two countries.

Key words: Amphipoda, Lam Dong, land-hoppers, Okinawa, Japan, Talitridae, *Talitroides topitotum*, Viet Nam.

Introduction

Talitroides topitotum (Burt, 1934) is a land-hopper talitrid species distributed mainly in world sub-tropical regions (Friend and Lam, 1985): in East Asia, from Sri Lanka (Burt, 1934), South India (Carl, 1934) and Hong Kong (Friend and Lam, 1985); in Oceania, from Norfolk Island and New South Wales (Hurley 1955); in Pacific oceanic islands, from Hawaii (Bousfield and Howarth, 1976) and the Marquesas (Stephensen, 1935); in North and Middle America, from California and Louisiana (Shoemaker, 1936) and Mexico (Oaxaca) (Lindeman, 1990); in Atlantic oceanic islands, from Madeira, Azores, and Canary Islands (Dahl, 1967; Stock, 1989; Stock and Abreu, 1992); and from Madagascar, including La Reunion, Comoros Islands (Ruffo, 1958). Friend and Lam (1985) noted that the species occurs also in Brazil. The distributional range of altitude expands from sea coast up to 4300 feet in the mountains (Sri Lanka), and the habitats are confined to humid environment, such as on the margin of water bodies, under decayed leaves or twigs in vegetated area, or sometimes in caves of oceanic islands (Hawaii and Azores). Since the species has also been found in botanical gardens

in Europe (for review see Vader, 1972), the world-wide distribution of this species has been believed to be mediated by human activities (Friend and Lam, 1985). Recently I have got specimens of this species from Okinawa, Japan and Lam Dong, Viet Nam, which give new distributional information in East Asia. In the present paper, this species is described based on the newly obtained material and short comment on the habitats and geographical distribution are given.

Body length is measured from the tip of head to that of telson along straightened dorsal lines. The naming of cuticular structures follows Watling (1989). The specimens examined are deposited in the National Museum of Nature and Science, Tsukuba (NSMT).

Taxonomy

Family Talitridae

Talitroides topitotum (Burt, 1934)

(Figs. 1–4)

Talitrus (*Talitropsis*) *topitotum* Burt, 1934: 184, text-fig. 1, pl. 12, 13; Vader, 1972: 33.

Talitrus decoratus Curl, 1934: 742, figs. 1–6.

Talitrus sylvaticus: Stephensen, 1935 (non Haswell 1880):

19, figs. 1–3; Shoemaker, 1936: 60, figs. 1, 2.

Talitrus (Talitroides) pacificus Hurley, 1955: 155, fig. 3; Ruffo, 1958: 41.

Talitroides pacificus: Bousfield, 1961: 7.

Talitroides topitotum: Bousfield, 1982: 55; Friend and Lam, 1985: 27, figs. 1, 2.

Material examined. One ovigerous female (9.2 mm) (NSMT-Cr 22379), one male (7.0 mm) (NSMT-Cr 22380), one juvenile (4.5 mm) (NSMT-Cr 22381), one ovigerous female, 7 females and 5 juveniles, (NSMT-Cr 22382); upstream of Kamishinkawa, Higashi-mura (formerly Agari-mura), Kunigami-gun, Okinawa, Japan. 24 Feb. 2013; Y. Kusui, A. Miyagi and J. Aoki collect. One female and 12 juveniles, (NSMT-Cr 22383); Kamishinkawa district, Higashi-mura, others as above.

One ovigerous female (8.5 mm) (NSMT-Cr 22384), and one setigerous female (8.5 mm) (NSMT-Cr 22385), 6 ovigerous females, 12 females and 1 unsexed individual, (NSMT-Cr 22386); Bidoup-Nui Ba National Park, Lam Dong Province, Viet Nam; June 2013; Le Hung Anh collect.

Description of Okinawa material: female (9.2 mm, NSMT-Cr 22379). Eyes (Fig. 1A) medium large. Antenna 1 (Fig. 1A) almost reaching tip of peduncle of antenna 2, flagellum 7 articles and tiny apical one (Fig. 1B, C). Antenna 2 (Fig. 1D, E) peduncle slender, flagellum 21 articles including small apical one. Mandible left lacinia mobilis 4-dentate (Fig. 1F), right lacinia multi-dentate (Fig. 1G). Maxilliped (Fig. 1H) outer plate broad, apically rounded, palp article 2 not lobate medially, with setae cluster on shelf at medial mid-point, article 3 slender, article 4 conical, partly fused to article 3 (Fig. 1I). Other mouth parts as those of common talitrid species.

Gnathopod 1 (Fig. 2A, B), propodus distinctly shorter (ca 60%) than carpus, distally smoothly narrowing, simple. Gnathopod 2 (Fig. 2C), basis slender, ischium elongate, propodus mitten-shaped. Pereopods bi-cuspidactylate. Pereopods 3 and 4 (Fig. 2D, E, F, G), propodus lacking locking robust setae. Pereopod 4 shorter than pereopod 3, basis anterior margin broadened

from mid-point, dactyl base concaved on posterior margin, dactyl nail weakly falciform (Fig. 2H). Pereopods 5–7 (Fig. 3A, C, D) progressively longer posteriorly, propodi with tiny locking robust setae (Fig. 3B), bases of pereopods 5 and 6 oblong oval, that of pereopod 7 expanded. Coxal gills of gnathopod 2 and pereopod 6 large and lobate, distal margins bulbous. Oostegites of gnathopod 2 to pereopod 5 with 4–9 simple-tipped setae on distal margins.

Pleonite side plates (Fig. 4A) lacking marginal pits. Pleopods 1 and 2 (Fig. 4B, C), peduncle outer margin plumose-setose, with 2 retinacula; outer ramus as long as peduncle, inner ramus about 65% (pleopod 1) and 50% (pleopod 2) of inner ramus. Pleopod 3 (Fig. 4D) strongly reduced, peduncle about 70% of that of pleopod 1, with a small robust seta sub-apically; inner ramus reduced to knob-like protrusion, outer ramus flap-shaped, with 3 plumose setae. Uropod 1 (Fig. 4F), distolateral robust seta of peduncle apically sinuate, with subapical accessory blade and tiny seta (Fig. 4G); outer ramus marginally bare. Uropod 2 (Fig. 4F), peduncle with 3 strong distolateral robust setae, outer ramus marginally bare. Uropod 3 (Fig. 4H) peduncle with 2 robust setae, ramus small, with short and elongate setae. Telson (Fig. 4J) apically notched, with 4 lateral and 1 apical robust seta per lobe.

Description of Okinawa material: Male (7.0 mm, NSMT-Cr 22380). Same the female as given above except the sexual characters (presence of genital papillae, lacking of oostegites), size-depending characters (antenna 1 flagellum with 7 articles, antenna 2 flagellum with 19 articles, telson with 3 lateral and 1 apical robust seta per lobe).

Remarks. Two females from Viet Nam (ovigerous, 8.5 mm, NSMT-Cr 22384 and setigerous, 8.5 mm, NSMT-Cr 22385) show no significant differences from the above descriptions, except they display 3 robust setae on the peduncle of uropod 3 (Fig. 4I). Dactyl nail of pereopod 4 smoothly tapering. Pleopod 3 shows slightly more reduced outer ramus (Fig. 4D) than that of Okinawa material. When consider wide variation

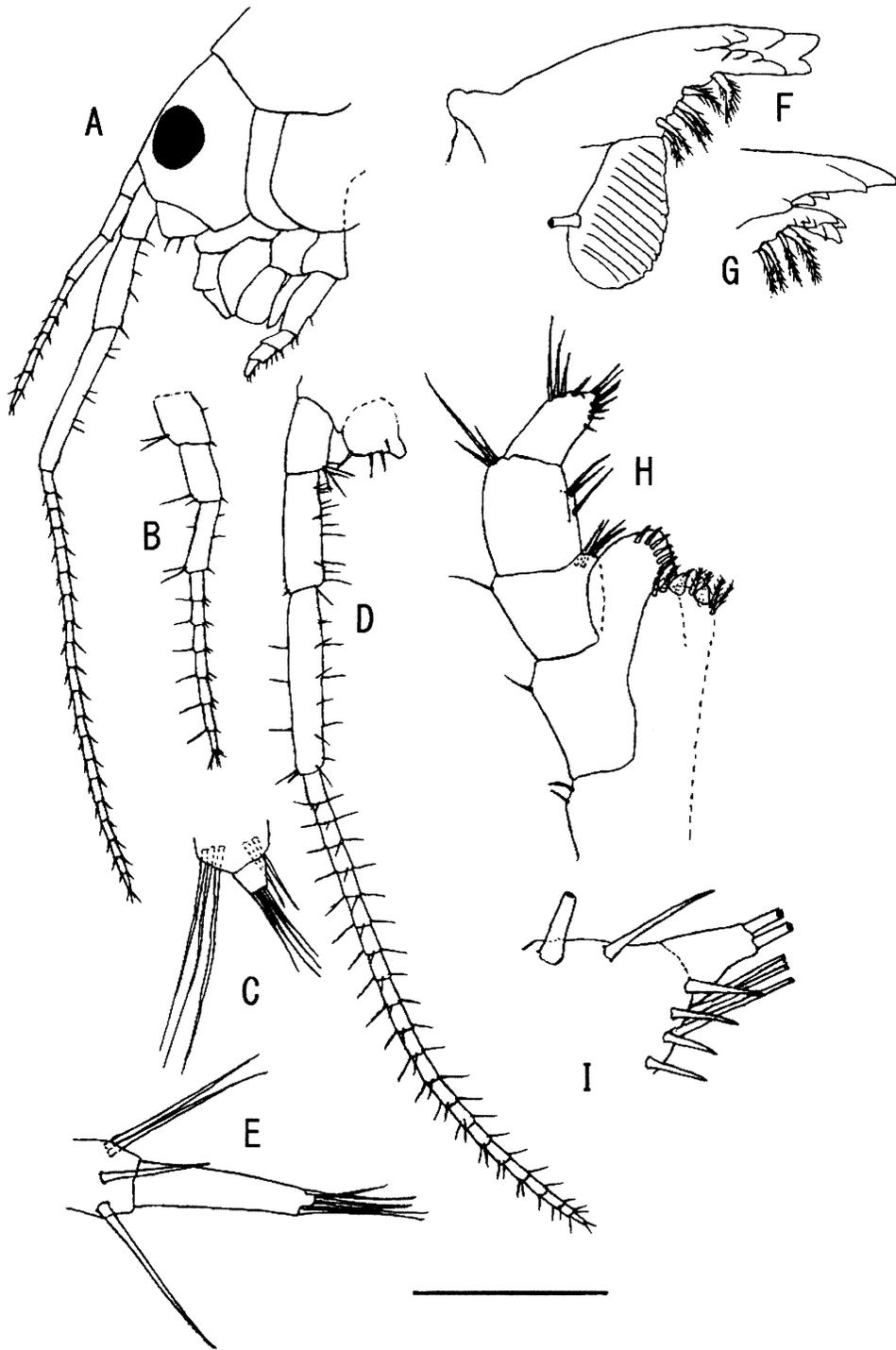


Fig. 1. *Talitroides topitotum* (Burt, 1934), ovigerous female, 9.2 mm (NSMT-Cr 22379), Higashi-mura, Okinawa, Japan. — A, Head part; B, antenna 1; C, terminal article of flagellum of antenna 1; D, antenna 2; E, terminal article of flagellum of antenna 2; F, left mandible; G, incisor and lacinia mobilis of right mandible; H, maxilliped; I, distal articles of maxillipedal palp. Scale: A, 1.14 mm; B and D, 0.95 mm; C and E, 94 μ m; F–H, 0.24 mm; I, 61 μ m.

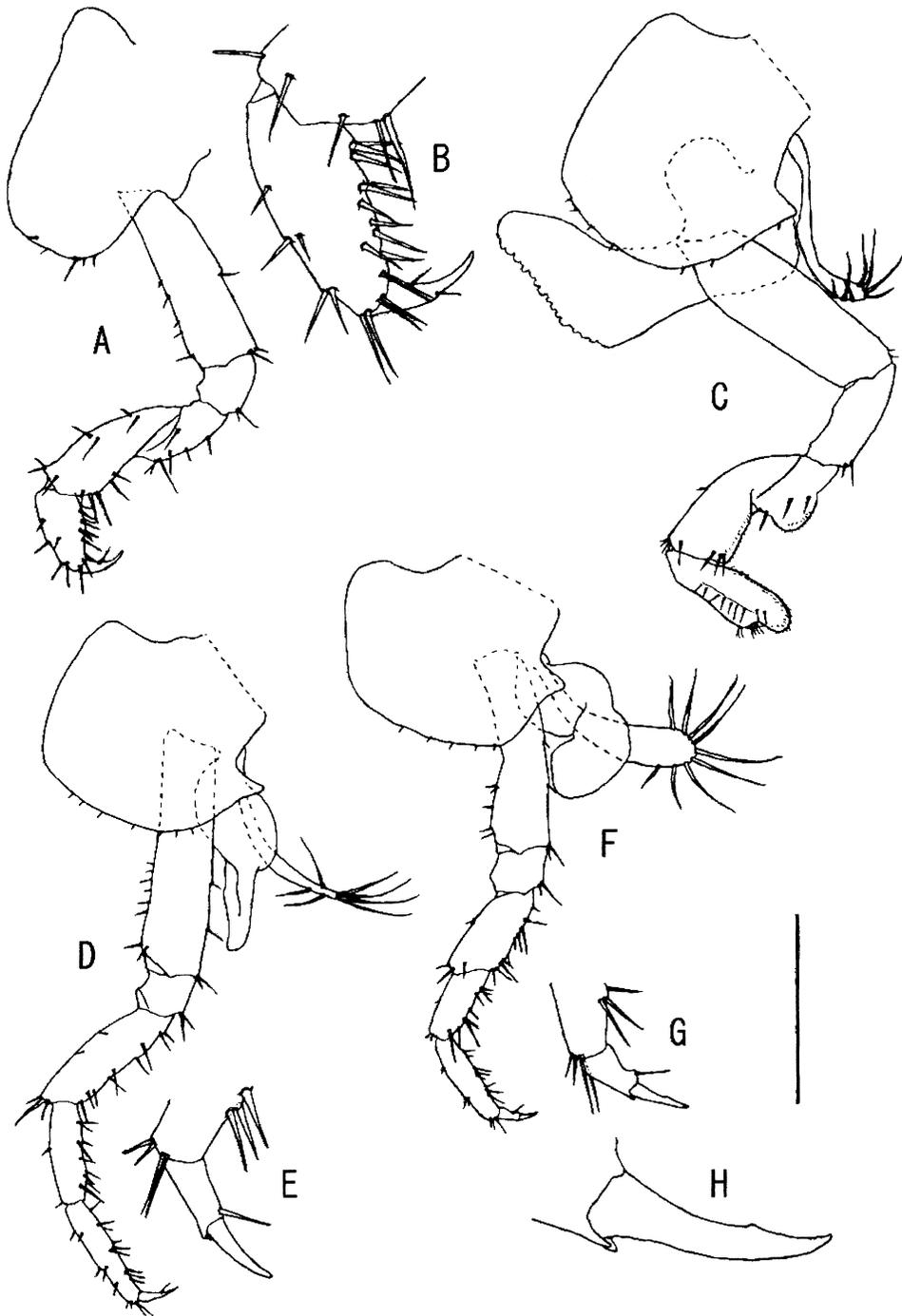


Fig. 2. *Talitroides topitotum* (Burt, 1934), ovigerous female, 9.2 mm (NSMT-Cr 22379), Higashi-mura, Okinawa, Japan. — A, gnathopod 1; B, propodus and dactylus of gnathopod 1; C, gnathopod 2; D, pereopod 3; E, dactylus of pereopod 3; F, pereopod 4; G, dactylus of pereopod 4; H, nail of dactylus of pereopod 4. Scale: A and C, 0.71 mm; B, 0.28 mm; D and F, 0.85 mm; E and G, 0.33 mm; H, 85 μ m.

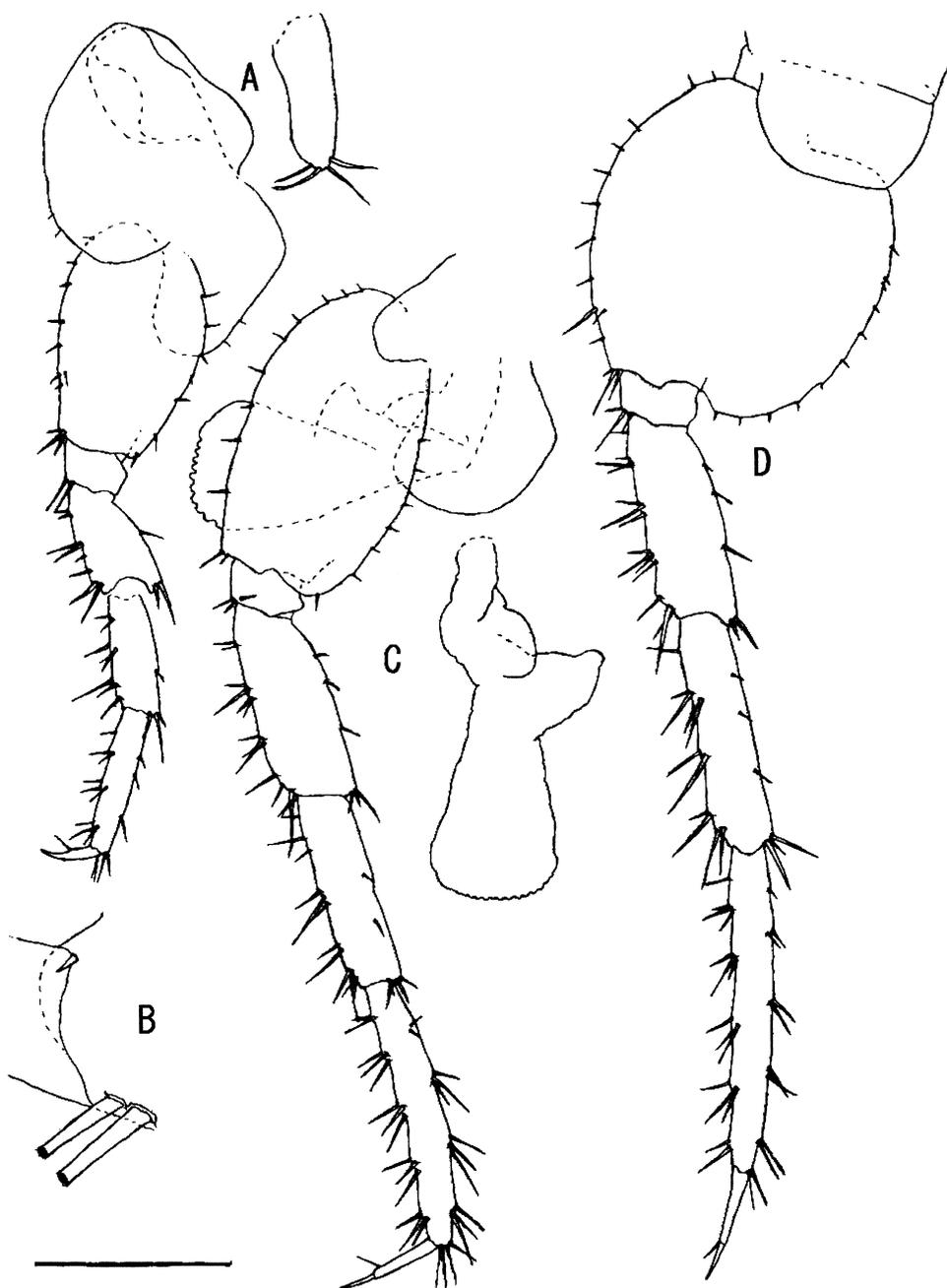


Fig. 3. *Talitroides topitotum* (Burt, 1934), ovigerous female, 9.2 mm (NSMT-Cr 22379), Higashi-mura, Okinawa, Japan. — A, pereopod 5 and oostegite; B, locking robust seta on propodus of pereopod 5; C, pereopod 6 and coxal gill; D, pereopod 7. Scale: A, C and D, 0.85 mm; B, 85 μ m.

of this character (see reference in synonym list), it would possibly be an individual variation rather than geographical one. No male is found in the Viet Nam material.

Talitroides topitotum is peculiar within the Talitridae in having the combination of the following characters: elongate antenna 1, simple gnathopod 1 (both sexes), mitten-shaped gnatho-

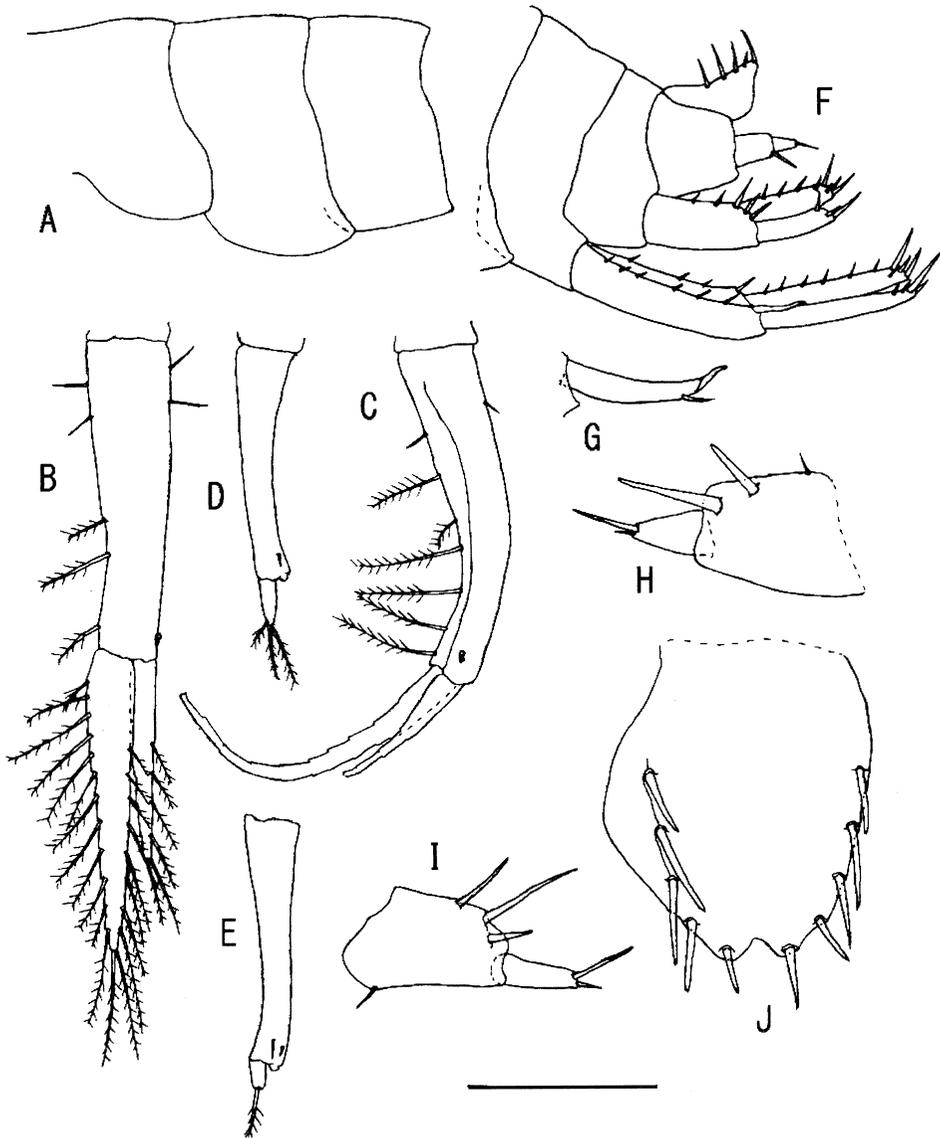


Fig. 4. *Talitroides topitotum* (Burt, 1934). — A, pleonites; B, pleopod 1; C, pleopod 2 (plumose setae on rami omitted); D and E, pleopod 3; F, urosomites; G, distolateral robust seta of uropod 1 peduncle; H and I, uropod 3; J, telson. E and I: ovigerous female, 8.5 mm (NSMT-Cr 22384), Nui Ba, Lam Dong province, Viet Nam; others: ovigerous female 9.2 mm (NSMT-Cr 22379), Higashi-mura, Okinawa, Japan. Scale: A, 1.14 mm; B-E, 0.33 mm; F, 0.95 mm; G-J, 0.28 mm.

pod 2 (both sexes), lobate and bulbous distal margin on coxal gills of pereopods 2 and 6, distolateral robust seta of uropod 1 peduncle apically sinuated and equipped with blade and seta, among others. The present material shows no significant difference from those of the United States described and illustrated by Shoemaker

(1936), those of Marquesas Islands by Stephensen (1935) and of Hong Kong by Friend and Lam (1985). Those authors have not mentioned the weakly-falciform dactyl nail of pereopod 4 as described above in Okinawa material, and reduced locking robust setae on propodus of pereopods. It is worth noting that the congeneric



Fig. 5. Upper picture: Giang Ly stream, Bidoup-Nui Ba Park, Lam Dong Province, Viet Nam; lower picture: fish ponds, Bidoup-Nui Ba Park, Lam Dong Province, Viet Nam (photos by Dr Hung Anh).

species *T. alluaudi* displays strongly developed falciform nail of pereopods 3–5 and reduced locking robust setae on the propodi (Ortal and Morino, 1993).

Habitat and distribution. The samples of soil animals from Okinawa forwarded to me in the present study were composed of five lots, three of them are from Kamishinkawa district, one from upstream of Kamisinkawa, and one from Takae district, all in Higashi-mura. Among them three lots contained *Talitroides topitotum*. The common environmental features of these three lots are that the talitrid species has been secured from semi- or primary natural forests, and not from secondary forests of subtropical evergreen broad-leaved trees, and topographically situated near valley bottoms, not along ridges nor slopes of mountains. It is apparent that these locations keep relatively high humidity.

The survey of land amphipods thus far conducted in Rhykyu Archipelagoes revealed several species (Morino, 1999), but no *Talitroides* species until this study. Thus it is highly probable that this species has restricted distributional range in Okinawa Island.

In Viet Nam, the present material was collected from Giang Ly stream (Fig. 5 upper picture: 12°10.343'N, 108°41.826'E) and artificial ponds for fish-culture (Fig. 5 lower picture: 12°11.121'N, 108°41.114'E), in Bidoup-Nui Ba National Park, with altitude of 4742 feet. According to the collector, Dr Anh, *T. topitotum* usually lives on the marginal wet soil, under soil, sand and stones of the stream, and edges of the ponds, and sometimes is found swimming in water. Since they are found from the localities with human activities, it is possible that the populations have been introduced anthropogenically. At the same time, the spot-like distribution at high altitude (4,300 feet at Sri Lanka, and 4,742 feet from Viet Nam) might also be caused by animal agencies, e.g., migrating birds. Population phylogenetic studies on representative populations of this species, in parallel with the analysis of historical documents of human colonization and botanical plantations, might give support to the assumed role of human

agencies in the dispersion and distribution, especially in the subtropical islands regions.

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