

A New Land-hopper Genus, *Mizuhorchestia*, from Japan (Crustacea, Amphipoda, Talitridae)

Hiroshi Morino

Department of Zoology, National Museum of Nature and Science,
4–1–1 Amakubo, Tsukuba, Ibaraki 305–0005, Japan
Email: morino631@gmail.com

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Abstract *Mizuhorchestia urospina* gen. et sp. nov. is described from terrestrial habitats in Japan. It is characterized by elongate antenna 1, 4-dentate left mandible, maxilliped palp article 2 lacking mediodistal lobe, strongly subchelate gnathopod 1 in both sexes, cuspidactylate pereopods, moderately reduced pleopods, and weakly armed outer ramus of uropod 1. These features distinguish the new genus from allied genera: *Agilestia* Friend, 1982, *Orchestiella* Friend, 1987, *Paciforchestia* Bousfield, 1982, *Neorchestia* Friend, 1987, and *Waemataua* Duncan, 1994.

Key words: Amphipoda, land-hoppers, *Mizuhorchestia urospina*, new genus, new species, Talitridae, Japan.

Introduction

The Talitridae is an amphipod family that inhabits supralittoral to terrestrial habitats, including salt-marshes, mangrove swamps and coastal to high mountain forests, of warm temperate to subtropical regions. Some members are found at marginal zones of inland lakes and still some have colonized freshwater streams (Friend and Richardson, 1986). Serejo and Lowry (2008) counted about 250 species in this family, which are currently allocated to 64 genera.

For Japanese talitrid fauna, Morino (1999) recognized 19 species within six genera, among which seven terrestrial species and some genera awaiting formal description. Quite recently two terrestrial species, not treated in Morino (1999), have been recorded from Okinawa, southern Japan; *Minamitalitrus zoltani* White, Lowry and Morino, 2013 from a cave in Daito Island (White *et al.*, 2013) and *Talitroides topitotum* (Burt, 1934) from forests of Okinawa Island (Morino, 2013).

Generic concept of the Talitridae had long posed difficulty in utility (Lowry and Bopiah,

2012). This situation has been broken through with a series of work by Bousfield (1982, 1984), where he advocated numerical treatment based on “reliable and significant characters from all body regions.” This “whole body” methodology has received general acceptance, *e.g.*, in Friend (1987), Morino and Miyamoto (1988), and Lowry and Bopiah (2012). The trend of regional endemism of talitrid diversity it has revealed made traditional genera split into smaller ones and led to discoveries of new genera from unexplored regions. Thus among 64 genera now recognized, 80% (52) have been described since 1982.

In the present and the succeeding studies on the Japanese Talitridae, generic characters adopted are mainly comparable to Bousfield (1982, 1984) and Lowry and Bopiah (2012). At the same time, it is assumed that the diversity of gnathopod 1 reflects aspects of phyletic and ecological diversities of these animals, so that taxonomical weight is assigned to it. Miyamoto and Morino (1999, 2004), in the study of Taiwanese Talitridae, have suggested a taxonomical potential of fine structures and arrangements of setae

in mouth parts and gnathopods, which is followed by Cheng *et al.*, (2011) by using SEM analysis. The present study adopts light microscopy level characters, leaving SEM level analyses to future studies.

The present paper deals with a new genus and a new species from terrestrial habitats from Japan.

Methods

The specimens were dissected under a stereomicroscope, then appendages and bodies were depicted under a light microscope using a drawing-tube. The illustrated appendages were fixed on slide mounts with Hoyer's medium or kept in small tubes. The body length measured from the tip of head to the tip of telson along straightened dorsal margin.

The ecological and geographical distribution for species is given after the descriptions. The ecological distribution is described based on the following habitat types: supralittoral zones, salt marshes, coastal (including back shore) grasslands, coastal forests, inland grasslands, inland forests, and inland water margins (*cf.* Miyamoto, 1984; Tsubokura *et al.*, 1998). For description of geographical distributions, major geographical features of Japan are briefly mentioned here (Fig. 1). The Japan Archipelago is composed of four main islands (Hokkaido, Honshu, Shikoku and Kyushu) and many islands with small archipelagos. Kyushu is connected in the south to Taiwan via Nansei Archipelago; Honshu, conveniently divided into north-east, central and south-west parts, is linked to the Mariana Archipelago through Izu (Oshima, Miyake, Hachijo Islands) and Ogasawara Archipelagos (Mukojima, Chichijima, Hahajima Islands). Nansei Archipelago consists of the following smaller archipelagos: Osumi (Tanegashima, Yakushima Islands), Tokara (not illustrated here), Amami (Amami-oshima, Tokunoshima Islands), Okinawa (Okinawa Island), Miyakao (Miyako Island), and Yaeyama Archipelagos (Ishigaki, Iriomote Islands). About 360km west of Okinawa,

uplifted atolls the Daito Islands stand.

Zoogeographically the Japan Archipelago is situated on the boundary between the Palaearctic and Orinental regions (Lincoln *et al.*, 1998), the boundary between them running across Nansei Archipelago.

Taxonomy

Family Talitridae

Mizuhorchestia gen. nov.

[New Japanese name: Mizuho-tobimushi zoku]

Type species. *Mizuhorchestia urospina* sp. nov.

Diagnosis. Body size medium, eyes medium. Antenna 1, peduncle reaching beyond end of peduncular article 4 of antenna 2; peduncle longer than flagellum, article 3 longer than articles 1 and 2 each. Antenna 2 in male not incrassate, flagellum longer than peduncle. Mandible, left lacinia 4-dentate. Maxilliped palp articles 2 and 3 broad, not mediodistally lobate, article 4 distinct, reduced, apically positioned on article 3.

Gnathopod 1 strongly subchelate in both sexes; in male, merus-propodus with pellucid lobe, carpus and propodus with broad based pellucid lobes, propodus lateral surface with a row of elongate setae; in female, carpus with pellucid lobe. Gnathopod 2 in male, propodus powerfully subchelate; in female, basis slender, propodus mitten-shaped. Pereopods 3–7, propodus locking robust setae lacking or weakly developed, dactyli cuspidactylate (bi-cuspsate). Coxa of pereopod 4 wider than deep. Coxa of pereopod 6, posterior lobe smoothly curved. Pereopods 6 and 7 in male not incrassate. Coxal gills of pereopods 2 and 6 large (especially in pereopod 6), lobate at middle, attenuated distally. Oostegites distally simple-setose.

Pleopods, peduncles marginally bare or weakly robust-setose; rami moderately reduced. Uropod 1, peduncle distolateral robust seta longer than subdistal one; inner ramus with dorso-marginal robust setae; outer ramus with 1 (or 2)



Fig. 1. Map of the Japan Archipelago and the adjacent areas (smaller islands are not illustrated). Oshima, Miyake, and Hachijo Islands compose Izu Archipelago; Mukojima, Chichijima and Hahajima Islands compose Ogasawara Archipelago. Tanegashima and Yakushima Islands compose Osumi Archipelago; Amami-oshima and Tokunoshima Islands compose Amami Archipelago; Okinawa and adjacent islands compose Okinawa Archipelago; Ishigaki and Iriomote compose Yaeyama Archipelago. Osumi to Yaeyama Archipelagos compose Nansei Archipelago.

robust setae marginally. Uropod 3, peduncle narrowing distally; ramus short. Telson lobe with a lateral and apical robust setae (2–3 per lobe).

Remarks. The present new genus is allied to

land-hopper genera from Australian region (*Agilestia* Friend, 1982, *Orchestiella* Friend, 1987, *Neorchestia* Friend, 1987, and *Waemataua* Duncan, 1994), and also to *Protorchestia* Bous-

field, 1982, a beach-flea genus known from the southern hemisphere, in sharing the following characters: 1) antenna 1 reaching beyond tip of peduncular articles 4 of antenna 2, 2) gnathopod 1 strongly subchelate in both sexes, 3) carpus and propodus of male gnathopod 1 with pellucid lobes, and 4) maxilliped palp article 2 lacking medial lobe and palp article 4 distinct. However, *Agilestia* and *Orchestiella* are separable from the new genus in having developed pleopod rami, simple coxal gills and sexually dimorphic uropods 1 and 2. *Neorchestia* and *Protorchestia* are distinguished from *Mizuhorchestia* gen. nov. in having 5-dentate lacinia mobilis of mandible, and simplidactylate pereopods 3–7. *Waematau* contains species with varied characters, from which the new genus differs in marginally robust-setose outer ramus of uropod 1.

The present new genus also shows similarity to a North Pacific beach-flea genus *Paciforchestia* Bousfield, 1982, in elongate antenna 1, strongly subchelate gnathopod 1, and reduced pleopods. However, mediodistally lobate article 2 of maxilliped palp, 5-dentate lacinia in left mandible, and deep peduncle of uropod 3 of the latter is distinctive from *Mizuhorchestia*.

Etymology. The generic name is cited from an old name for Japan, “Mizuho no kuni” in an ancient chronicle, meaning the country of fresh rice crop.

***Mizuhorchestia urospina* sp. nov.**

[Japanese name: Toge-okatobimushi]

(Figs. 2–3)

“*Nipponorchestia*” sp. 1 Miyamoto, 1982: 94.

“*Parorchestia*” sp. 4 Morino, 1999: 640 (fig. 2), 644.

Type material. Holotype (NSMT-Cr 22843), male 10.0 mm, Dewa Shrine (*Cryptomeria*, 400 m alt.), Mt. Haguro, Tsuruoka, YAMAGATA; 8 Sept. 1974; Morino, H. collect. Allotype (NSMT-Cr 22844), female 9.0 mm, same data as holotype. Paratypes: female 11.5 mm (NSMT-Cr 22848), female 11.0 mm, (NSMT-Cr 22849), Research Forests (Ehime University) (*Cryptome-*

ria forests, 700 m alt.), Komenono, EHIME; 3 Oct. 1976; Morino, H. collect. Female 9.6 mm (NSMT-Cr 22852), male 9.7 mm (NSMT-Cr 22853), Research Forests (Kochi University) (*Cryptomeria* forest, 500 m alt.), Kamiananai, Tosayamada, KOCHI; 5 Oct. 1976; Morino, H. collect.

Additional materials examined. Materials are compiled by localities (prefectural regions).

AKITA: 2 males, 3 females (NSMT-Cr 22855); Oga Peninsula; 27 Aug. 1979; Inoue, H. collect. 4 males, 4 females (NSMT-Cr 22856); Oga; 12 Aug. 1979; Kato collect.

YAMAGATA: 5 males, 11 females, 5 juveniles (NSMT-Cr 22845); Dewa Shrine (*Cryptomeria*, 400 m alt.), Mt. Haguro, Tsuruoka; 8 Sept. 1974; Morino, H. collect. 4 males, 3 females (NSMT-Cr 22857); Naso-taki, Mt. Gassan; 24 Sept. 1979; Kato collect. 2 juveniles (NSMT-Cr 22924); Hayama mountain track (*Cryptomeria*, 450 m alt.), Murayama; 31 Jul. 1989; Tamura, H. *et al.* collect. 2 males, 1 female, 1 juvenile (NSMT-Cr 22920); Natagiri tunnel (*Quercus crispula*, *Acer* sp., *Magnolia ovobata*; 500 m alt.), Mogami; 31 Jul. 1989; Tamura, H. and Katsumata, H. collect.

MIYAGI: 4 males, 2 females, 18 juveniles (NSMT-Cr 22923); Utsuno (*Acer* sp., *Magnolia ovobata*; 250 m alt.), Kami-cho; 31 Jul. 1989; Hagino, Y. *et al.* collect.

FUKUI: 2 males, 1 female, 6 juveniles (NSMT-Cr 22870); Mikata; 12 Aug. 1975; Maekawa, T. collect. 4 males, 15 females (NSMT-Cr 22903); Shimoarai, Katsuyama; 21 Jul. 1980; Miyamoto, H. collect. 13 males, 7 females, 2 juveniles (NSMT-Cr 22904); Hakusan Shrine (220 m alt.), Shimo-ikari; 22 Aug. 1974; Miyamoto, H. collect. 3 males, 13 females, 5 juveniles (NSMT-Cr 22905); Maruoka, Sakai; 7 Mar. 1981; Miyamoto, H. collect. 1 male, 5 females, 1 juvenile (NSMT-Cr 22916); Komegawaki, Mikuni; 16 May 1981; Miyamoto, H. collect.

KYOTO: 1 female (NSMT-Cr 22837); Ochiai-bashi, Ashu, Research Forest (Kyoto University) (*Cryptomeria* forests); 16 Sept. 1971; Morino, H.

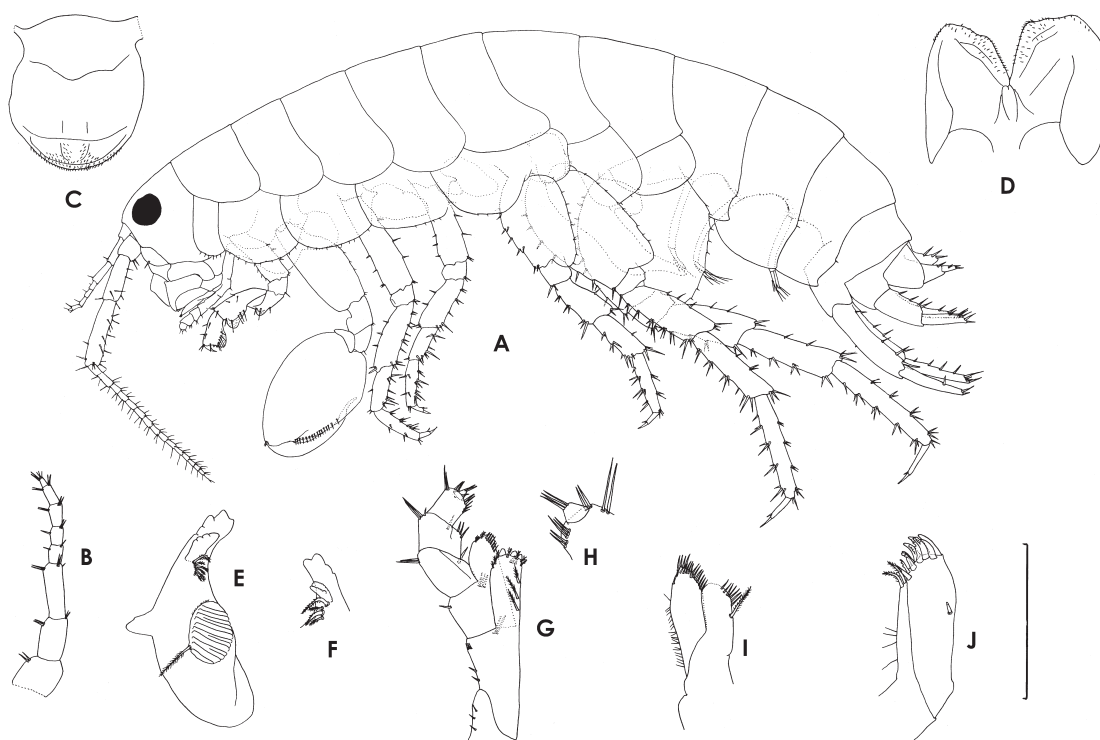


Fig. 2. *Mizuhorchestia urospina* gen. et sp. nov. Male, 10.0mm (holotype: NSMT-Cr 22843). Mt. Haguro, Yamagata, Japan. — A, habitus, lateral view (after Morino, 1999); B, antenna 1; C, upper lip; D, lower lip; E, left mandible; F, distal part of right mandible; G, maxilliped; H, palp article 4 of maxilliped (enlarged); I, maxilla 2; J, maxilla 1. Scale: A, 1.85 mm; B, 0.94 mm; C–J, 0.48 mm.

collect. 3 males, 2 females (NSMT-Cr 22847); Ashu (*Fagus crenata*, *Quercus crispula*); Sept. 1975; Tsukamoto, J. collect. 3 males, 4 females, 1 juvenile (NSMT-Cr 22838); Jajima Island (near hill top woods), Maizuru; 19 Nov. 1972; Morino, H. collect. 3 males, 4 females, 4 juveniles (NSMT-Cr 22839); Jajima Island (near-shore woods), Maizuru; 19 Nov. 1972; Morino, H. collect. 2 males, 4 females, 2 juveniles (NSMT-Cr 22842); A hill behind Miyazu Junior High School (*Cryptomeria*), Miyazu; 21 Aug. 1973; Morino, H. collect.

HYOGO: 4 males, 11 females, 2 juveniles (NSMT-Cr 22840); Gembudo, Kinosaki; 16 Apr. 1973; Morino, H. collect. 5 males, 14 females, 1 juvenile (MST-Cr 22841); Daishiyama (*Cryptomeria*, midslope), Kinosaki; 16 Apr. 1973; Morino, H. collect. 1 male, 2 females, 25 juveniles (NSMT-Cr 22865); The Nature Park (sec-

ondary, evergreen broad-leaved forests), Ikuno; 12 May 1981; Tanaka, Sh. collect. 17 males, 10 females, 38 juveniles (NSMT-Cr 22925); Igumi (coastal forests), Hamasaka; 12 May 1990; Ishii, K. collect. 26 males, 39 females, 101 juveniles (NSMT-Cr 22926); Igumi (secondary forests), Hamasaka; 12 May 1990; Ishii, K. collect.

TOTTORI: 2 females, 7 juveniles (NSMT-Cr 22928); Daisen (*Fagus crenata* forests, 900–1000 m alt.); 14 May 1990; Ishii, K. collect.

OKAYAMA: 7 females, 1 juvenile (NSMT-Cr 22899); Hinase; 23 Sept. 1978; Miyamoto, H. collect. 2 males, 8 females (NSMT-Cr 22900); Nishi-awakura; 23 Sept. 1978; Miyamoto, H. collect.

SHIMANE: 4 males, 8 females (NSMT-Cr 22901); Nishinoshima, Oki Island; 4 Aug 1978; Miyamoto, H. collect. 1 male, 9 females, 6 juveniles (NSMT-Cr 22902); Daisen (800 m alt.); 18

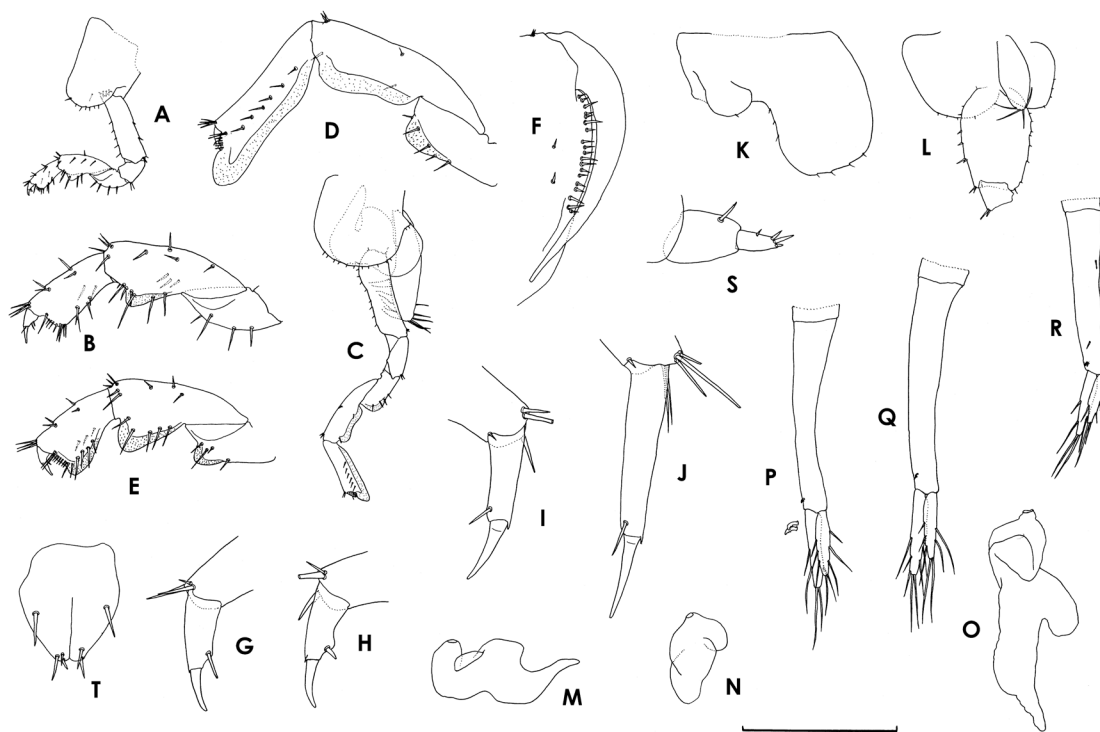


Fig. 3. *Mizuorchestia urospina* gen. et sp. nov. Male, 10.0 mm (holotype: NSMT-Cr 22843); female, 9.0 mm (allotype: NSMT-Cr 22844). Mt. Haguro, Yamagata, Japan. — A, gnathopod 1; B, distal articles of gnathopod 1; C, gnathopod 2; D, distal articles of gnathopod 2; E, distal articles of gnathopod 1; F, dactylus of gnathopod 2; G–J, dactyli of pereopods 3–5, 7; K, coxa of pereopod 6; L, oostegite of pereopod 5; M–O, coxal gills of pereopods 2, 3, 6; P, pleopod 1 and retinacula (enlarged); Q–R, pleopods 2–3; S, uropod 3; T, telson. A–D, L, female; others, male. Scale: A, C, M–O, 1.43 mm; B, D, S–T, 0.56 mm; E–F, 0.71 mm; G–J, 0.28 mm; K–L, 1.09 mm; P–R, 0.63 mm.

Aug. 1978; Miyamoto, H. collect. 1 female (NSMT-Cr 22910); Hiyoshi Shrine (woods), Izumo; 3 Nov. 1982; Nunomura, N. collect. 2 juveniles (NSMT-Cr 22911); Maji (coastal forests), Nima-cho; 3 Nov. 1983; Nunomura, N. collect. 39 males, 31 females, 51 juveniles (NSMT-Cr 22927); Hinomisaki (*Castanopsis cuspidate* var. *sieboldii* forests); 15 May 1990; Ishii, K. collect.

YAMAGUCHI: 1 male (NSMT-Cr 22873); Shiroyama (primary, evergreen forests; 10 m alt.), Iwakuni; 28 Aug. 1981; Maeda, M. collect. 4 males, 7 females (NSMT-Cr 22895); Nishiki (*Cryptomeria* forests), Kuga-gun; 31 Jul. 1978; Miyamoto, H. collect. 2 males, 3 females, 1 juvenile (NSMT-Cr 22896); Kitsune-jima (near Myojin Pond), Hagi; 1 Aug. 1978; Miyamoto, H. col-

lect. 2 males, 5 females, 14 juveniles (NSMT-Cr 22897); Kawanishi, Iwakuni; 31 Jul. 1978; Miyamoto, H. collect. 4 males, 8 females, 1 juvenile (NSMT-Cr 22898); Omijima; 1 Aug. 1981; Miyamoto, H. collect.

TOKUSHIMA: 4 females (NSMT-Cr 22846); Mt. Ishidate (1000 m alt.); 25 Mar. 1975; Minato, H. collect. 5 juveniles (NSMT-Cr 22874); Osaka-goe (*Pinus* and evergreen, broad-leaved forests; 240 m alt.), Naruto; 4 Oct. 1981; Tanaka, Sh. collect. 1 male, 1 female, 14 juveniles (NSMT-Cr 22875); Kawakami (primary, evergreen-broad leaved forests; 480 m alt.), Koyadaira; 4 Oct. 1981; Tanaka, Sh. collect. 2 females, 1 juvenile (NSMT-Cr 22876); Mt. Tsurugi (1340 m alt.), Koyadaira; 14 Oct. 1981; Tanaka, Sh. collect. 12 juveniles (NSMT-Cr 22877); Yoze (secondary,

evergreen- and deciduous broad leaved forests), Orono, Kamiyama; 4 Oct. 1981; Tanaka, Sh. collect. 1 female (NSMT-Cr 22912); Agawa, Kamiyama, Myozai-gun; 8 Aug. 1983; Kikuchi, Y. collect.

EHIME: 4 males, 2 females, 1 juvenile (NSMT-Cr 22850); Komenono Research Forest (Ehime University) (*Cryptomeria* forests, 700 m alt.); 3 Oct. 1976; Morino, H. collect. 2 males, 2 females, 1 juvenile (NSMT-Cr 22871); Yoshida, near Hokketsu Cave, Kitauwa-gun; date not known; Nishikawa, Y. collect. 1 male, 5 juveniles (NSMT-Cr 22878); Mt. Tatsukawa (secondary, evergreen, broad-leaved forests; 180 m alt.), Niihama; 3 Oct. 1981; Tanaka, Sh. collect. 2 males, 3 juveniles (NSMT-Cr 22879); Nakamura (evergreen, broad-leaved forests; 240 m alt.), Tamagawa; 3 Oct. 1981; Tanaka, Sh. collect. 3 females, 9 juveniles (NSMT-Cr 22888); Shimonagasawa (secondary, evergreen, broad-leaved forests; 240 m alt.), Nakayama; 5 Oct. 1981; Tanaka, Sh. collect. 1 female, 5 juveniles (NSMT-Cr 22889); Misaka-toge (primary, deciduous, broad-leaved forests; 650 m alt.), Matsuyama; 3 Oct. 1981; Tanaka, Sh. collect. 1 female, 6 juveniles (NSMT-Cr 22890); Gotanda-kawamai (secondary, evergreen, broad-leaved forests; 70 m alt.), Yawatahama; 5 Oct. 1981; Tanaka, Sh. collect. 7 males, 6 females, 20 juveniles (NSMT-Cr 22915); Iwaya Temple, Mikawa; 26 May 1985; Tanaka Sh. collect. 1 male, 2 females (NSMT-Cr 22929); Namakusa-dani, Odamiyama, Uchiko; 1 May 1994; Yamamoto, E. collect. 1 male, 7 females, 8 juveniles (NSMT-Cr 22930); Namakusa-dani, Odamiyama, Uchiko; 21 Jul. 1994; Yamamoto, E. collect. 1 male, 3 juveniles (NSMT-Cr 22931); Namakusa-dani, Odamiyama, Uchiko; 18 Oct. 1994; Yamamoto, E. collect. 3 juveniles (NSMT-Cr 22932); Keikoku, Odamiyama, Uchiko; 4 May 1994; Yamamoto, E. collect. 3 males, 5 females, 1 juvenile (NSMT-Cr 22933); Masagoya, Odamiyama, Uchiko; 2 May 1994; Yamamoto, E. collect. 1 male, 4 females (NSMT-Cr 22934); Masagoya, Odamiyama, Uchiko; 21 Jun. 1994; Yamamoto, E. collect. 2 males, 3 females, 1 juvenile (NSMT-

Cr 22935); Masagoya, Odamiyama, Uchiko; 22 Jul. 1994; Yamamoto, E. collect.

KOCHI: 3 females, 1 juvenile (NSMT-Cr 22851); A hill near Shigeto JR Station; 4 Oct. 1976; Morino, H. collect. 4 males, 1 females, 3 juveniles (NSMT-Cr 22854); Kami-ananai Research Forest (Kochi University) (*Cryptomeria* forests, 500 m alt.); 5 Oct. 1976; Morino, H. collect. 1 male, 3 females (NSMT-Cr 22872); Izumi, Niyodo, Takaoka-gun; 20 Mar. 1976; Nishikawa, Y. collect.

KAGAWA: 1 male (NSMT-Cr 22922); Kanka-kei, Shodoshima Island; 13 May 1984; Shiba, M. collect.

FUKUOKA: 5 males, 18 juveniles (NSMT-Cr 22880); Uehara (secondary, evergreen, broad-leaved forests; 100 m alt.), Fukuoka; 28 Jul. 1981; Tanaka, Sh. collect. 1 female, 18 juveniles (NSMT-Cr 22881); Tsurugasaka (secondary, evergreen, broad-leaved forests; 80 m alt.), Iihara, Maebaru; 28 Jul. 1981; Tanaka, Sh. collect. 5 juveniles (NSMT-Cr 22885); Ryuzenkyo (primary, evergreen, broad-leaved forests; 180 m alt.), An-nyuji Temple, Nogata; 17 Aug. 1981; Tanaka, Sh. collect. 3 juveniles (NSMT-Cr 22886); Kuwabara (secondary, evergreen, broad-leaved forests; 60 m alt.), Moto-oka, Fukuoka; 13 Jul. 1981; Tanaka, Sh. collect. 2 females, 2 juveniles (NSMT-Cr 22887); Sakurai Shrine (secondary, broad-leaved forests; 500 m alt.), Sakurai, Sima; 13 Jul. 1981; Tanaka, Sh. collect. 1 female, 8 juveniles (NSMT-Cr 22868); Uenokyo Valley, Akaike; 1 Aug. 1981; Tanaka, Sh. collect. 4 males, 1 female, 7 juveniles (NSMT-Cr 22864); Fukae-matsusue (secondary, evergreen, broad-leaved forests), Nijyo-cho; 21 Jun. 1981; Tanaka, Sh. collect. 11 juveniles (NSMT-Cr 22869); Fukui-tachihara, Nijyo-cho; 22 Jul. 1981; Tanaka, Sh. collect.

SAGA: 8 males, 7 females, 2 juveniles (NSMT-Cr 22858); Minamiyama, Hamatama; 23 Jun. 1981; Tanaka, Sh. collect. 13 males, 17 females, 10 juveniles (NSMT-Cr 22859); Arakawa (primary, evergreen, broad-leaved forests), Nanayama; 23 Jun. 1981; Tanaka, Sh. collect. 2 females (NSMT-Cr 22860); Hinokuchi (second-

ary, evergreen, broad-leaved forests), Mitsuze; 3 Jul. 1981; Tanaka, Sh. collect. 2 males, 9 juveniles (NSMT-Cr 22861); Nagino (secondary, evergreen, broad-leaved forests), Mitsuze; 3 Jul. 1981; Tanaka, Sh. collect. 2 males, 3 females, 3 juveniles (NSMT-Cr 22862); Oshiraki (secondary, evergreen, broad-leaved forests), Nanayama; 23 Jun. 1981; Tanaka, Sh. collect. 2 females, 1 juvenile (NSMT-Cr 22863); Karigawa (primary, evergreen, broad-leaved forests), Shiraki; 23 Jun. 1981; Tanaka, Sh. collect. 4 males, 2 females, 15 juveniles (NSMT-Cr 22866); Shimoyamase, Hamatama; 22 Jul. 1981; Tanaka, Sh. collect. 2 males, 2 females, 3 juveniles (NSMT-Cr 22867); Sugiyama, Fuji-cho; 6 Jul. 1981; Tanaka, Sh. collect. 4 juveniles (NSMT-Cr 22882); Seto (secondary, evergreen, broad-leaved forests; 340 m alt.), Higashi-yamada, Hamatama; 22 Jul. 1981; Tanaka, Sh. collect. 2 males, 4 juveniles (NSMT-Cr 22891); Near Ikisa Dam (primary, evergreen, broad-leaved forests; 150 m alt.), Ouchi; 22 Aug. 1981; Tanaka, Sh. collect. 1 male, 1 female, 2 juveniles (NSMT-Cr 22892); Furumichi (secondary, evergreen, broad-leaved forests; 260 m alt.), Yamato-cho; 6 Jul. 1981; Tanaka, Sh. collect. 4 males, 1 female, 14 juveniles (NSMT-Cr 22893); Shimoda (secondary, evergreen, broad-leaved forests, 380 m alt.), Kyuragi; 6 Jul. 1981; Tanaka, Sh. collect. 2 males, 1 female (NSMT-Cr 22894); Sakai-toge (secondary, evergreen, broad-leaved forests; 360 m alt.), Ikenohata, Sefuri; 3 Jul. 1981; Tanaka, Sh. collect.

KUMAMOTO: 1 juvenile (NSMT-Cr 22884); Kikuchi-keikoku valley (primary, evergreen, broad-leaved forests; 500 m alt.), Kikuchi; 6 Aug. 1981; Tanaka, Sh. collect.

NAGASAKI: 2 females, 8 juveniles (NSMT-Cr 22883); Orihashi (evergreen, broad-leaved forests; 160 m alt.), Shimabara; 23 Aug. 1981; Tanaka, Sh. collect. 1 male, 8 females, 2 juveniles (NSMT-Cr 22914); Ankokuji temple, Iki Island; 1 Aug. 1983; Miyamoto, H. collect. 1 female (NSMT-Cr 22921); Ogiyama, Narao, Nakadori Island (Goto archipelago); 8 Jul. 1988; Nunomura, N. collect.

OITA: 1 male (NSMT-Cr 22913); Kameyama,

Beppu; 24 Sept. 1983; Nunomura, N. collect. 6 juveniles (NSMT-Cr 22917); Motomiya-magaibutsu (*Lithocarpus edulis*, 80 m alt.), Tai, Bungo-takada; 21 Oct. 1987; Nakamura, O. collect. 7 juveniles (NSMT-Cr 22918); Base of Mt. Tawara (*Pinus densiflora*, *Acer* sp.; 300 m alt.), Yamaga, Hayami-gun; 21 Oct. 1987; Nakamura, O. collect. 1 male, 2 females, 4 juveniles (NSMT-Cr 22919); Hirano (*Castanea crenata*, *Quercus acutissima*; 180 m alt.), Kumano-magaibutsu, Bungo-takada; 21 Oct. 1987; Nakamura, O. collect.

MIYAZAKI: 3 males, 11 females, 7 juveniles (NSMT-Cr 22906); Research Forest (Kyushu University) (*Cryptomeria* forests), Okawachi; 29 Sept. 1982; Morino, H. collect. 2 males, 8 females, 2 juveniles (NSMT-Cr 22907); Hachiman Shrine, Okawachi; 30 Sept. 1982; Morino, H. collect. 3 females, 6 juveniles (NSMT-Cr 22908); Research Forest (Miyazaki University), Tano; 4 Oct. 1982; Morino, H. collect. 5 males, 5 females, 5 juveniles (NSMT-Cr 22909); Research Forest (Miyazaki University), Tano; 2 Oct. 1982; Morino, H. collect.

Description (generic characters not repeated) of male (Holotype). Antenna 1 (Fig. 2A–B), peduncular article 3 longest, subequal to articles 1 and 2 combined; flagellum with 5 articles. Antenna 2 (Fig. 2A), peduncular article 5 subequal to articles 3 and 4 combined; flagellum with 16 articles.

Upper lip (Fig. 2C) lacking spines. Mandible (Fig. 2E–F), incisor 5-dentate, left lacinia 4-dentate. Maxilliped (Fig. 2G–H), palp articles 2 lacking mediodistal lobe, medial setae confined to mediodistal corner, article 3 rectangular, article 4 conical. Other mouth parts (Fig. 2D, I–J) same as those of other talitrid species.

Gnathopod 1 (Figs. 2A, 3E), merus with pellucid lobe, carpus ca 1.6 times as long as propodus, pellucid lobe large, triangular in shape, propodus with row of 4 setae on lateral surface, palmar margin vertical, exceeding dactylus. Gnathopod 2 (Figs. 2A, 3F), propodus enlarged, palmar margin smooth, subequal to posterior margin in length, dactylus attenuated apically. Pereopods 3

and 4 (Figs. 2A, 3G–H), propodus locking spine lacking, pereopod 4 slightly shorter than pereopod 3, dactylus weakly pinched. Pereopods 5–7 (Figs. 2A, 3I–J) getting progressively longer posteriorly, propodus locking spines minute, dactyli of pereopods 6 and 7 slender. Coxal gills of pereopods 2 and 6 (Fig. 3M, O) large (especially of pereopod 6), lobed at middle, distally strongly attenuated. Other gills (Fig. 3N for pereopod 3) small, convoluted.

Pleonite side plates (Fig. 2A), posterodistal corner bluntly acuminate, with single setule on

posterior margin, lacking marginal pits. Pleopods peduncle slender, with 2 retinacula; rami *ca.* 0.4 times as long as peduncle. Pleopod 1 (Fig. 3P), peduncle marginally bare; rami with a few marginal and 1–2 apical setae. Pleopod 2 (Fig. 3Q) slightly longer than pleopod 1. Pleopod 3 (Fig. 3R) shortest, peduncle with a few surface robust setae.

Uropod 1 (Fig. 2A), peduncle distolateral robust seta longer than subdistal one; outer ramus with 1 marginal robust seta, inner ramus with 4 robust setae on dorsal margin. Uropod 2



Fig. 4. Distribution of *Mizuhorchestia urospina* gen. et sp. nov. ★: from Miyamoto 1982

(Fig. 2A), rami subequal in length, marginally with robust setae. Uropod 3 (Fig. 3S), peduncle slightly tapering distally, with dorsal robust seta; ramus shorter than peduncle, with marginal and a few apical robust setae. Telson (Fig. 3T) longer than wide, apically notched, each lobe with a lateral and 2–3 apical robust setae.

Female (Allotype; sexual characters). Gnathopod 1 (Fig. 3A–B), merus and propodus lacking pellucid lobe, carpus with small pellucid lobe, propodus lateral surface with 2 submarginal robust setae, palmar margin vertical, slightly exceeding dactylus. Gnathopod 2 (Fig. 3C–D), basis-propodus slender, merus with dome-shaped pellucid lobe, carpus and propodus with flat-shaped pellucid lobes. Brood plates of pereopod 2 (Fig. 3C) with 12, of pereopod 5 (Fig. 3L) with 4 simple-tipped setae.

Etymology. The species name refers to robust-setose outer ramus of uropod 1.

Distribution. The present species is collected from under litters or moist soils of coastal, inland and mountain forests in Honshu, Shikoku and Kyushu (Fig. 4). The highest altitude so far recorded is 1340m in Mt. Tsurugi, and vegetation of inhabited forests ranges from coniferous (especially in *Cryptomeria* wood) to broad-leaved deciduous trees. It occurs also in a few islands in Japan Sea. In Honshu, the species exhibits disjunct distributional pattern, occurring in southeast parts abundantly and in several spots of northern parts.

Remarks. The number of the marginal robust seta on outer ramus of uropod 1 exhibits variation, some bearing 2 setae. The present new species shows common traits with the following south-east Asian land-hoppers: "*Parorchestia*" *kinabaluensis* Shoemaker, 1935 from North Borneo and "*Parorchestia*" *luzonensis* Baker, 1915 from the Philippines. However, mediodistally lobate palp article 2 in maxilliped, strongly reduced pleopod 3, and marginally bare outer ramus of uropod 1 in "*P.*" *kinabaluensis*, and developed pleopods and elongate flagellum of antenna 2 in "*P.*" *luzonensis* separate each species from *M. urospina*.

The morphological features of the present species: slender appendages, distinct article 4 of maxilliped, large coxal gills, reduced pleopods, indicate that it had adapted to truly terrestrial habitats. The peculiar disjunct distribution may suggest the once continuous distribution in Honshu. This pattern would be involved with some climatic factors and/or brought on by interspecific actions with other talitrid members. The patterns of air-temperature, precipitations, habitat and vegetational types in Honshu change clinally, and not correspond to this pattern of distribution. Thus interspecific factor seems likely. The morphological similarities of this species to Australian terrestrial genera, as mentioned elsewhere, is apparently due to convergent evolution, since no allied forms have been recorded so far from the southern small archipelagos of Japan. It is highly possible that the species evolved in the main islands of Japan and adapted to forest habitats from the local ancestral forms.

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