The New World genera of Parathalassiinae (Diptera: Empidoidea: Dolichopodidae s.l.), with new species of *Thalassophorus* and *Eothalassius*

Scott E. Brooks, Jeffrey M. Cumming

Abstract—The parathalassine genera *Thalassophorus* Saigusa, *Eothalassius* Shamshev and Grootaert, and *Chimerothalassius* Shamshev and Grootaert are recorded from the New World for the first time. *Thalassophorus arnaudi* Brooks and Cumming **sp. nov.** is described from specimens collected at coastal localities in British Columbia, Oregon, and California, and represents the second known species in the genus, the type species being *T. spinipennis* Saigusa, known only from Rishiri Island in Hokkaido Prefecture, Japan. Detailed illustrations of the male genitalia of *T. spinipennis* are provided. *Eothalassius borkenti* Cumming and Brooks **sp. nov.** is described from specimens collected along the Pacific coast of Costa Rica, bringing the total number of described species of this former Southeast Asian genus to three, with one probable additional described species in the Mediterranean region. The genus *Chimerothalassius*, which was previously known from a single New Zealand species, is recorded from the island of Dominica, based on a female specimen plus a slide-mounted wing of an undescribed species. A new undescribed parathalassiine genus is also recorded from Chile, based on limited material of two undescribed species. A key to the six genera of Parathalassiinae in the New World, including *Parathalassius* Mik and *Microphorella* Becker, is given, as are some preliminary remarks on the limits and phylogenetic relationships of the parathalassiine genera.

Résumé—On mentionne pour la première fois la présence des genres de Parathalassiinae *Thalassophorus* Saigusa, *Eothalassius* Shamshev et Grootaert et *Chimerothalassius* Shamshev et Grootaert dans le Nouveau Monde. On décrit *Thalassophorus arnaudi* Brooks et Cumming **sp. nov.** à partir de spécimens récoltés dans des localités côtières en Colombie-Britannique, en Oregon et en Californie, laquelle représente la deuxième espèce du genre. L'espèce type, *T. spinipennis* Saigusa, est connu uniquement de l'île Rishiri dans la préfecture d'Hokkaido, au Japon. Les génitalia mâles de *T. spinipennis* sont illustrés en détail. On décrit *Eothalassius borkenti* Cumming et Brooks **sp. nov.** à partir de spécimens récoltés le long de la côte pacifique du Costa Rica. Auparavant restreint au Sud-Est asiatique, ce genre contient maintenant trois espèces, avec probablement une espèce additionnelle dans la région méditerranéenne. Le genre *Chimerothalassius*, auparavant représenté que par une espèce de Nouvelle-Zélande, est ici repertorié de l'île de la Dominique à partir d'un spécimen femelle et d'une aile montée sur lame d'une espèce non décrite. Un nouveau genre de Parathalassiinae est aussi répertorié du Chili, d'après un nombre limité de spécimens de deux espèces non décrites. On présente une clé d'identification des six genres de Parathalassiinae du Nouveau Monde, incluant *Parathalassius* Mik et *Microphorella* Becker, ainsi que quelques remarques préliminaires sur le concept et les relations phylogénétiques des genres de Parathalassiinae.

Introduction

Parathalassiine flies are small (body length 1–3 mm) nonmetallic greyish to dark-coloured dolichopodid flies that are generally found along sea coasts (Fig. 1) and river banks. They

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are distinguished from other dolichopodids by the following combination of features: antenna with single articled arista-like stylus, wing with cell dm usually present and emitting three veins (M_1, M_2, M_4), crossvein bm-m nearly complete but not usually joining M_1, and male terminalia with the left epandrial lamella bearing a ventral process. Seven extant genera are currently recognized in the subfamily Parathalassiinae, with only *Parathalassius* Mik and *Microphorella* Becker having been reported from the New World (Yang *et al.* 2007; Cumming and Sinclair 2009). Here we record three additional genera, *Thalassophorus* Saigusa, *Eothalassius* Shamshev and Grootaert, and *Chimerothalassius* Shamshev and Grootaert, from the region, plus an additional undescribed genus. In this study a new species is described in each of *Thalassophorus* and *Eothalassius* and a key is given to the six genera occurring in the New World.

Study of the Parathalassiinae, as well as the other basal dolichopodid subfamily, Microphorinae, will ultimately increase our understanding of homologies throughout the remainder of the family, allowing for more rigorous phylogenetic analyses of the Dolichopodidae s.s. at the currently confused subfamily/tribe level (see discussion in Sinclair and Cumming 2006). Generic limits within the Parathalassiinae and potential paraphyly of some of the included genera are presently being investigated by us (Cumming and Brooks 2006; Brooks and Cumming 2010). A detailed phylogenetic analysis of the entire subfamily will eventually be required to determine the number of valid genera that should be included. As we progress with our revisionary work on parathalassiines, we are compiling a large matrix of informative characters scored for numerous exemplars throughout the subfamily. This study represents the first of several revisions of New World Parathalassinae.

Material and methods

Specimens examined in this study are deposited in the Biosystematics Laboratory, Kyushu University, Fukuoka, Japan (BLKU), the Natural History Museum, London, United Kingdom (BMNH), the California Academy of Sciences, San Francisco, United States of America (CAS), the Canadian National Collection of Insects, Ottawa, Canada (CNC), the University of Guelph Insect Collection, Guelph, Canada, (DEBU), the Instituto Nacional de Biodiversidad, Santo Domingo de Heredia, Costa Rica (INBC), the United States National Museum of Natural History, Washington, D.C., United States of America (USNM), and the Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany (ZFMK).

Terms used for adult structures primarily follow those of McAlpine (1981) and Cumming and Wood (2009), except for the antenna and wing venation, where the terms of Stuckenberg (1999) and Saigusa (2006), respectively, are used. In the system outlined by Saigusa (2006), the dipteran wing vein A_1 (as used in McAlpine 1981) is homologized with the mecopteran CuP, and consequently CuA_1 (of McAlpine) is termed M_4, whereas CuA_2 is CuA, the anal cell is cell cua, and the anal vein ($A_1 + CuA_2$) is CuP + CuA. The wing-vein homologies as they relate to the Parathalassiinae are shown in Figure 2. Homologies of the male terminalia follow those of Sinclair and Cumming (2006).

Wing length is measured from the basicosta to the wing apex. Male and female terminalia were macerated in 85% lactic acid heated in a microwave oven. Figures of the male genitalia are oriented with the anatomically dorsal parts directed towards the top of the page and the anatomically ventral parts directed towards the bottom of the page, following Sinclair and Cumming (2006, figs. 347–350). In lateral views of the male genitalia, hatched areas delimit aspects of the medial surface of the opposing side that project beyond the limits of the facing side.

Systematics

The previous keys to the genera of Parathalassiinae from the Nearctic Region (Steyskal and Knutson 1981) and Central America (Cumming and Sinclair 2009)

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Fig. 1. Collection localities and habitats of *Thalassophorus* and *Eothalassius*. (A) *Thalassophorus spinipennis* Saigusa resting on intertidal rock on the coast of Rishiri Island, Japan (photograph by Masahiko Satô); (B–E) Collection localities of *Thalassophorus arnaudi* Brooks and Cumming sp. nov.: Ridley Island, British Columbia (B); Nellies Cove, Oregon (C); close-up of rocky substrate at Nellies Cove, Oregon (D); and Enderts Beach, California (E). (F) Collection locality of *Eothalassius borkenti* Cumming and Brooks sp. nov. at Cabo Blanco, Costa Rica, showing rock-shelf shoreline.

include only *Parathalassius* and *Microphorella*. With three additional genera, *Thalassophorus*, *Eothalassius*, and *Chimerothalassius*, now known from the New World, we present here a key to the parathalassiine genera of the entire region. We also include in the key a new undescribed genus that is currently known to us from very limited material of two undescribed species from the rocky coastline of the Valparaiso Region of Chile (specimens are deposited in DEBU).

Genus *Thalassophorus* Saigusa

Thalassophorus Saigusa, 1986: 106.

Type species: *Thalassophorus spinipennis* Saigusa, by original designation.

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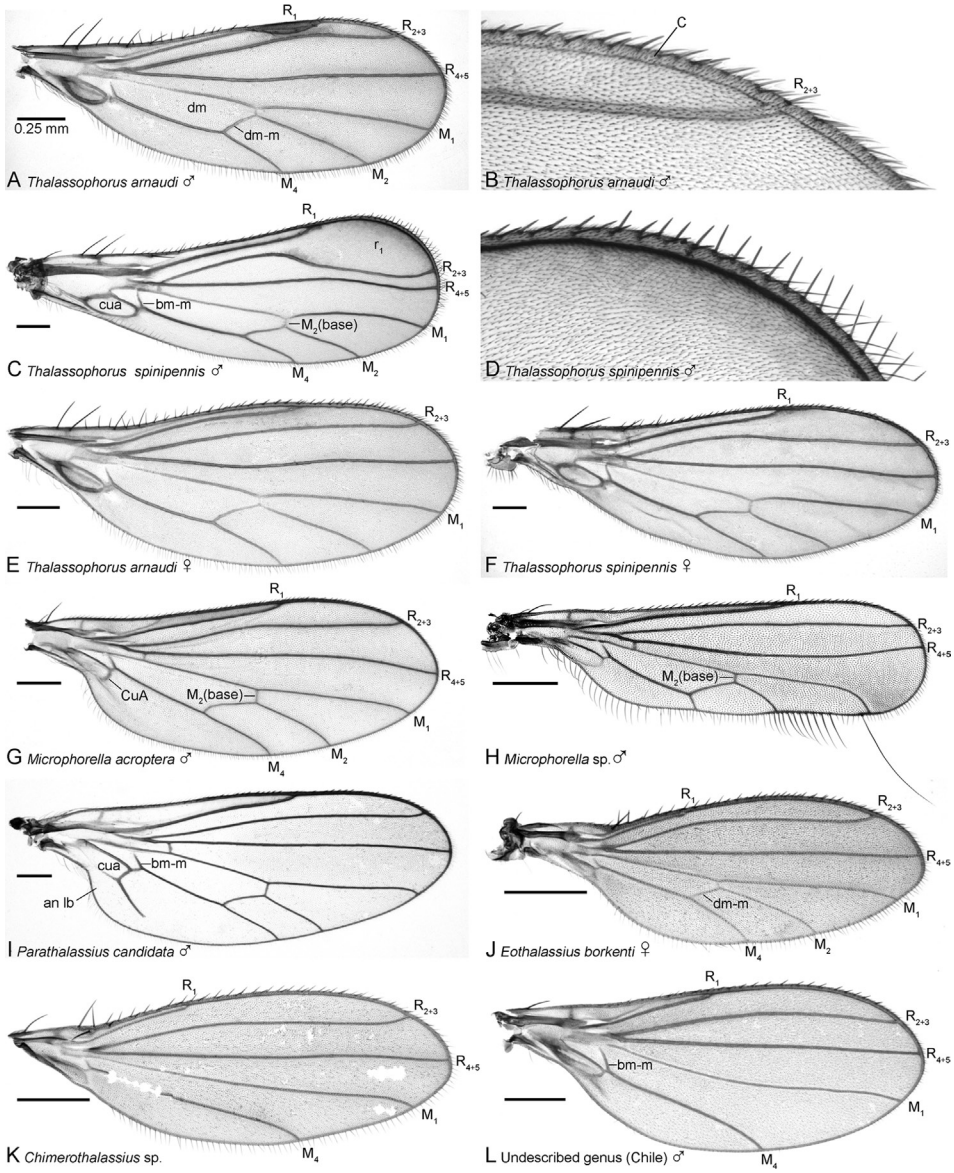
Fig. 2. Wings. (A) *Thalassophorus arnaudi* Brooks and Cumming sp. nov., male; (B) *T. arnaudi* Brooks and Cumming sp. nov., male, close-up of anterodistal portion, showing costal setae; (C) *T. spinipennis* Saigusa, male; (D) *T. spinipennis* Saigusa, male, close-up of anterodistal portion showing costal setae; (E) *T. arnaudi* Brooks and Cumming sp. nov., female; (F) *T. spinipennis* Saigusa, female; (G) *Microphorella acroptera* Melander, male; (H) *Microphorella* sp. (Yukon), male; (I) *Parathalassius candidata* Melander, male; (J) *Eothalassius borkenti* Cumming and Brooks sp. nov., female; (K) *Chimerothalassius* sp. (Dominica), sex unknown; (L) undescribed genus (Chile), male of undescribed species 1 (an lb, anal lobe; bm-m, basal medial crossvein; C, costal vein; cua, anterior cubital (=anal) cell; CuA, anterior branch of cubital vein; dm, discal medial cell; dm-m, discal medial crossvein; M_1, 1st medial vein; M_2, 2nd medial vein; M_4, 4th medial vein; r_1, 1st radial cell; R_1, 1st radial vein; R_{2+3}, 2nd+3rd radial vein; R_{4+5}, 4th+5th radial vein).



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Key to New World genera of the subfamily Parathalassiinae

1. Wing cell dm present, with veins M_2 and dm-m (Figs. 2A, 2C, 2E–2J) 2
— Wing cell dm absent, without veins M_2 and dm-m (Figs. 2K, 2L) 5

2. CuA rounded, cell cua convex apically to entirely ovoid; anal lobe not developed (Figs. 2A, 2C, 2E–2H, 2J); scutellum with 1 pair of strong bristles 3
— CuA straight, cell cua truncate apically; anal lobe partially developed (Fig. 2I); scutellum with 2–3 pairs of strong bristles ..... *Parathalassius* Mik

3. Gena well-developed and projected below eye; palpus triangular, tapered to pointed tip (Fig. 3A); basal portion of costa with 2 strong spine-like bristles near crossvein h and 2 weaker spine-like bristles level with base of R_{2+3} (Figs. 2A, 2C, 2E, 2F); female cercus terminating as a slender cuticular projection (Figs. 5D, 5E) ..... *Thalassophorus* Saigusa
— Gena weakly developed, scarcely projected below eye; palpus broadly or narrowly rounded apically, not triangular (cf. Fig. 3B); basal portion of costa with at most one spine-like bristle (Figs. 2G, 2H, 2J); female cercus terminating with a long seta (Figs. 11A, 11C) or as a blunt point (Fig. 11D) 4

4. R_1 reaching costa before middle of wing (or before base of M_2) (Fig. 2J); arista-like stylus lengthened, at least 5 times length of postpedicel (Fig. 3C); palpus prominent, broadly rounded apically (cf. Fig. 3B); male terminalia with right epandrial lamella partially fused with hypandrium (Figs. 8B, 9B, 10B); female terminalia with acanthophorite setae (Figs. 11A, 11C, tg 10) ..... *Eothalassius* Shamshev and Grootaert
— R_1 reaching costa beyond middle of wing (or beyond base of M_2) (Figs. 2G, 2H); arista-like stylus not lengthened, at most 2 times length of postpedicel (cf. Figs. 3A, 3B); palpus small, narrowly rounded apically; male terminalia with right epandrial lamella not fused with hypandrium (cf. Figs. 4C, 6B); female terminalia with acanthophorite spines (Fig. 11D, tg 10) ..... *Microphorella* Becker

5. Gena scarcely projected below eye; mouthparts directed ventrally (cf. Fig. 3A) with broad fleshy labellum; palpus elongate and narrow, with long ventral setae; fore coxa with strong basal seta, anterior surface without field of short stout spine-like setae; female terminalia with acanthophorite setae (cf. Figs. 11A, 11C, tg 10) ..... *Chimerothalassius* Shamshev and Grootaert
— Gena distinctly projected below eye (Fig. 3B); mouthparts directed posteriorly with narrowed labellum (Fig. 3B); palpus broad, without long ventral setae (Fig. 3B); fore coxa without strong basal seta, anterior surface with field of short stout spine-like setae; female terminalia with acanthophorite spines (cf. Fig. 11D, tg 10) ..... undescribed genus (Chile)

Included species

The genus currently includes *Thalassophorus spinipennis* Saigusa and *Thalassophorus arnaudi* Brooks and Cumming **sp. nov.**

Diagnosis

Thalassophorus is distinguished from other parathalassiine genera by the following characters: head (Fig. 3A) with gena well-developed and projected below eye, mouthparts directed ventrally with fleshy labellum, epipharyngeal carina lengthened and projecting vertically into head, palpus large triangular and tapered to pointed tip; thorax with prosternum fused to proepisternum forming precoxal bridge, scutellum with 1 pair of strong dorsally directed bristles near apex; wing (Figs. 2A, 2C, 2E, 2F) with costa bearing double row of short spine-like setae along anterior margin, basal portion of costa bearing 4 dorsally inclined spine-like bristles (2 strong bristles above

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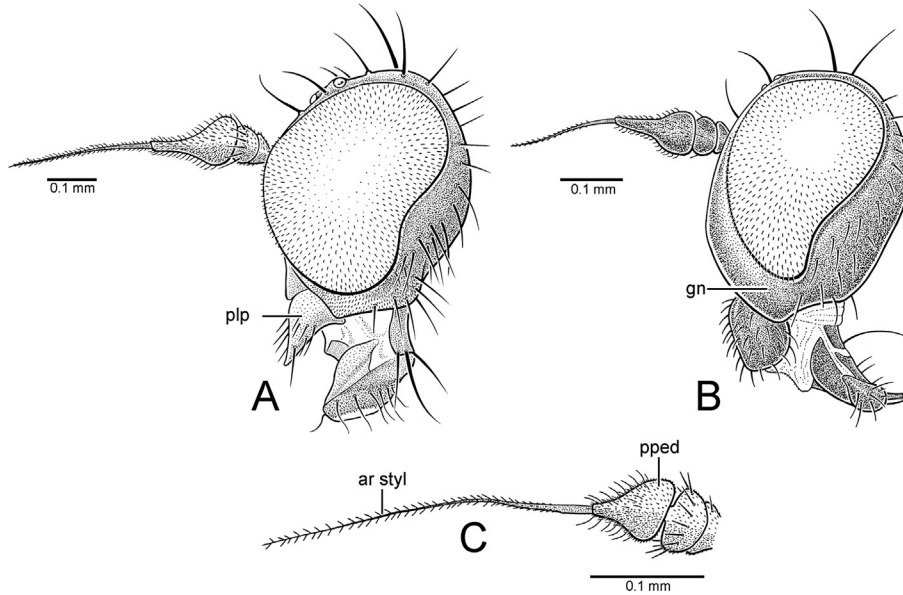
Fig. 3. Heads and antennae. (A) *Thalassophorus arnaudi* Brooks and Cumming sp. nov., lateral view of male head; (B) undescribed genus (Chile), lateral view of male head of undescribed species 1; (C) *Eothalassius borkenti* Cumming and Brooks sp. nov., lateral view of male antenna (ar styl, arista-like stylus; gn, gena; plp, palpus; pped, postpedicel).



crossvein h and 2 weaker bristles above base of R_{2+3}), R_1 reaching costa beyond middle of wing (or beyond base of M_2), crossvein bm-m complete (*T. spinipennis*) or incomplete (*T. arnaudi*), cell dm present with veins M_2 and dm-m, CuA rounded, cell cua ovoid, anal lobe not developed; male abdominal sternite 5 with large ventral prolongation (Fig. 4A); hypopygium (Figs. 4B, 4C, 6A, 6B) with right and left epandrial lamellae apparently separated from hypandrium, left epandrial lamella with weakly articulated ventral process, asymmetrical medial hypandrial process arising from posterior end with left side truncate and right side rounded in posterior view, postgonites cradling base of phallus with left and right lobes protruding from between dorsal and ventral surstylar lobes, phallus with basal flange, apex bifurcate, phallic plate present, hypoproct projected as undivided medial lobe bearing apical setae, cerci narrow and nearly symmetrical (Figs. 5C, 6C); female abdomen with apical segments retracted into segment 6 (*T. spinipennis*) or partially retracted into segment 5 (*T. arnaudi*), tergite and sternite 6 with row of well-developed posteromarginal setae, terminalia with tergite 10 bearing acanthophorite setae, cercus terminating as a slender cuticular projection (Figs. 5D, 5E).

Distribution

Thalassophorus is currently known from seacoasts of Rishiri Island, Hokkaido Prefecture, Japan (*T. spinipennis*; Fig. 7A), and western North America from British Columbia south to northern California (*T. arnaudi*; Fig. 7B).

Remarks

Males of both species of *Thalassophorus* possess a large broad ventral prolongation of male abdominal sternite 5 (Fig. 4A). We have observed a very similar modification of sternite 5 in a southern European species of *Microphorella* that appears to be conspecific with *Microphorella curtipes* (Becker) (but see Shamshev and Grootaert 2004, table 1). Pregenitalic modifications of sternite 5 (and

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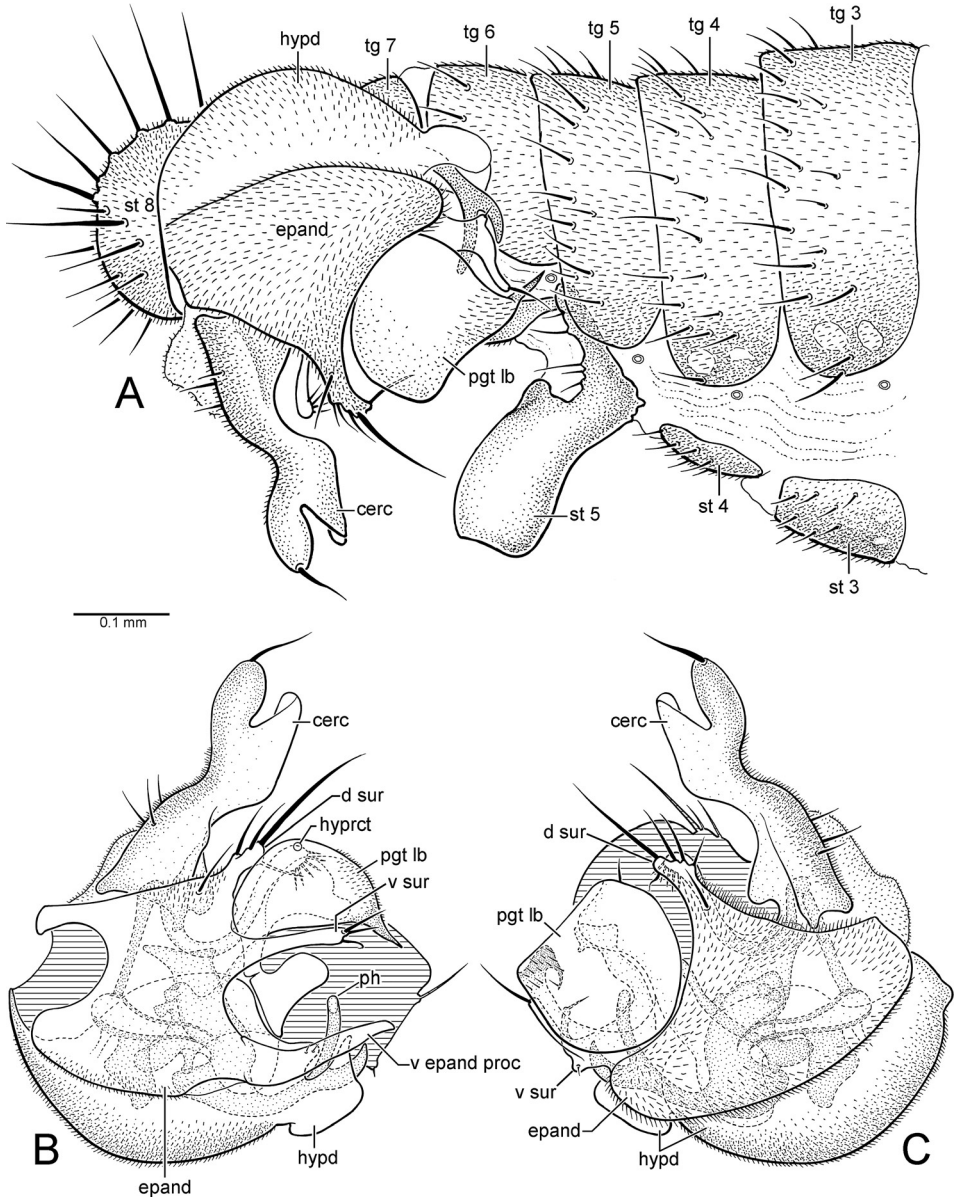
Fig. 4. *Thalassophorus arnaudi* Brooks and Cumming sp. nov., male. (A) Posterior portion of abdomen, right lateral view; (B) hypopygium, left lateral view; (C) hypopygium, right lateral view (cerc, cercus; d sur, dorsal lobe of surstylus; epand, epandrium; hypd, hypandrium; hyprct, hypoproct; pgt lb, postgonite lobe; ph, phallus; st, sternite; tg, tergite; v epand proc, ventral epandrial process; v sur, ventral lobe of surstylus).



sternite 6) have also been recorded in some species of *Microphorella* from Southeast Asia and New Guinea (Shamshev and Grootaert 2004).

Species of *Thalassophorus* are restricted to rocky or stony marine shores, where adults occur on wet stones and rocks in the intertidal zone (Figs. 1A–1E). Immature stages are presently unknown.

Thalassophorus arnaudi Brooks and Cumming sp. nov.

(Figs. 1B–1E, 2A, 2B, 2E, 3A, 4, 5, 7B)

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Fig. 5. *Thalassophorus arnaudi* Brooks and Cumming sp. nov. (A) Right postgonite lobe of male hypopygium, dorsal view; (B) left postgonite lobe of male hypopygium, dorsal view; (C) male cerci, dorsal view; (D) female terminalia, dorsal view; (E) female terminalia, left lateral view (cerc, cercus; spm pmp, sperm pump; spmth, spermatheca; st, sternite; tg, tergite).

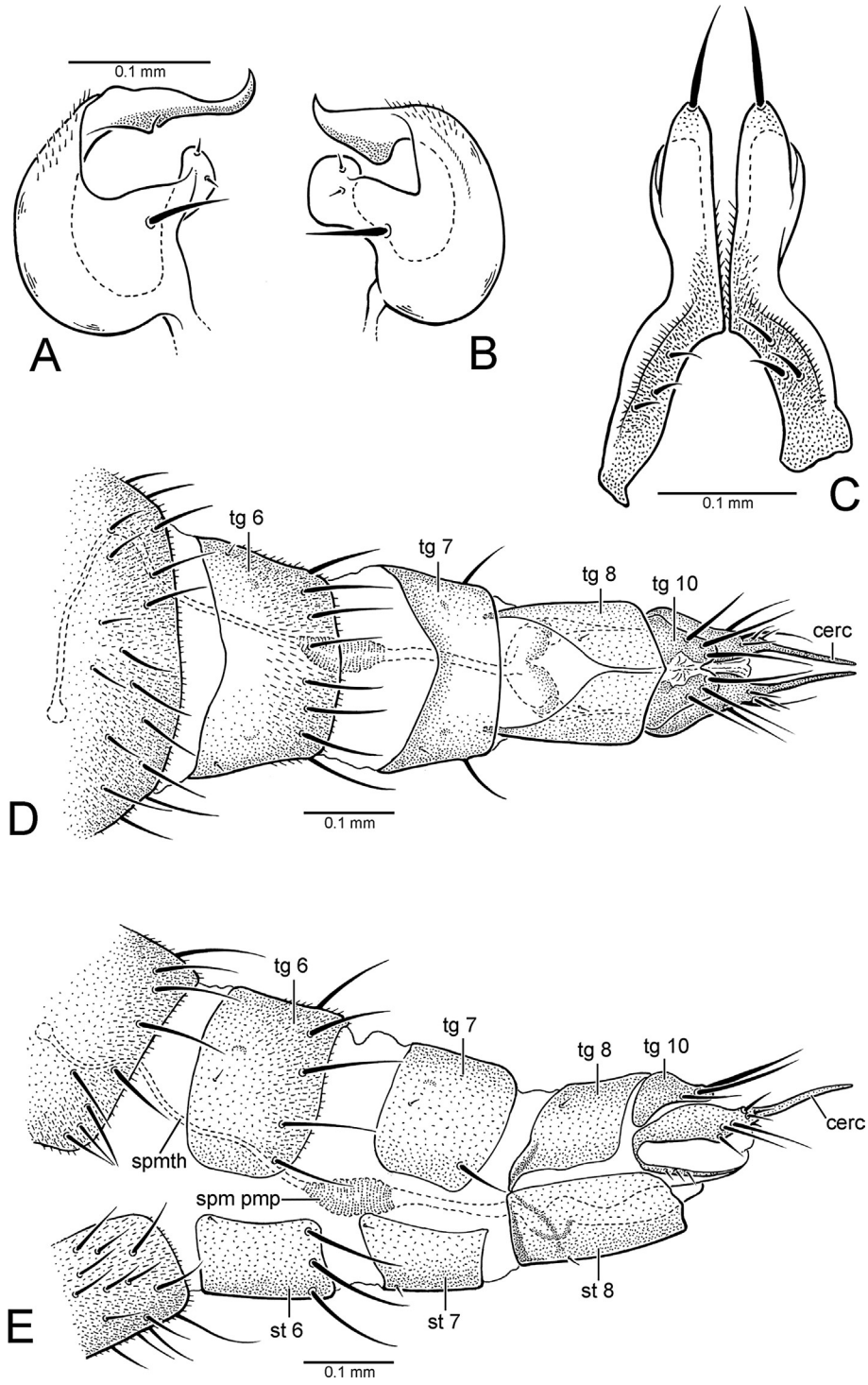

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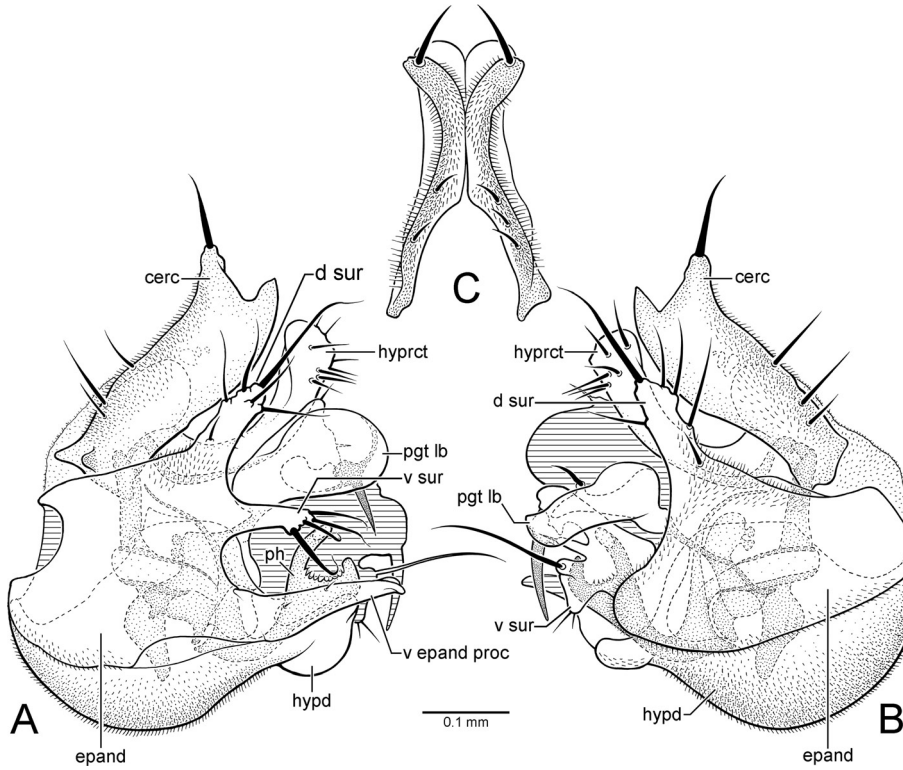
Fig. 6. *Thalassophorus spinipennis* Saigusa, male paratype. (A) Hypopygium, left lateral view; (B) hypopygium, right lateral view; (C) cerci, dorsal view (cerc, cercus; d sur, dorsal lobe of surstylus; epand, epandrium; hypd, hypandrium; hyprct, hypoproct; pgt lb, postgonite lobe; ph, phallus; v epand proc, ventral epandrial process; v sur, ventral lobe of surstylus).



Type material

Holotype ♂ labelled: "CAN: BC: Prince Rupert/ Ridley Island, N54°14.13′/ W130°19.80′, 16.viii.2008/ shore/beach with rocks, logs/ & boulders S.E. Brooks"; "HOLOTYPE/ *Thalassophorus arnaudi*/ Brooks & Cumming" [red label] (CNC).

Paratypes: CANADA: British Columbia: 2 ♂♂, 5 ♀♀, same data as holotype; 1 ♂, 1 ♀, same data except, 15.viii.2008; 6 ♀♀, same data except 17.viii.2008; 1 ♂, 2 ♀♀, same data except 17.viii.2008, J.M. Cumming; 1 ♀, Prince Rupert, Ridley Island, 7.viii.1996, P.H. Arnaud, Jr., M.M. Arnaud, beach of rocks, boulders, and logs (USNM); **UNITED STATES OF AMERICA: Oregon:** 11 ♂♂, 9 ♀♀, Curry Co., Port Orford, Nellies Cove, 42°44′16″N, 124°30′28″W, 30.v.2009, rocky seashore, S.E. Brooks (CNC); 7 ♂♂, 4 ♀♀, same data except J.M. Cumming (CNC); **California:** 23 ♂♂, 14 ♀♀, Del Norte Co., Crescent City, Enderts Beach, 41°41′59″N, 124°08′31″W, 1.vi.2009, ex. seashore rocks, S.E. Brooks (CNC); 1 ♀, same data (USNM); 1 ♀, same data (CAS); 1 ♂, 1 ♀, same data (BMNH); 1 ♂, same data (ZFMK); 1 ♂, 1 ♀, same data (BLKU); 7 ♂♂, 1♀, same data except J.M. Cumming (CNC); 1 ♀, same data (USNM); 1 ♂, same data (CAS); 1 ♀, same data (ZFMK); 1 ♀, same data except, 3.vi.2009, tidal rocks, B.J. Sinclair (CNC).

Diagnosis

Males of *T. arnaudi* are distinguished from those of *T. spinipennis* by the following features: costa with swelling at end of R_1 (Fig. 2A) (absent in *T. spinipennis*; Fig. 2C); cell r_1 narrow beyond R_1, ending well before wing apex (Fig. 2A) (expanded and extending to wing apex in *T. spinipennis*;

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Fig. 7. Known distribution of *Thalassophorus* Saigusa. (A) *Thalassophorus spinipennis* Saigusa; (B) *T. arnaudi* Brooks and Cumming sp. nov.

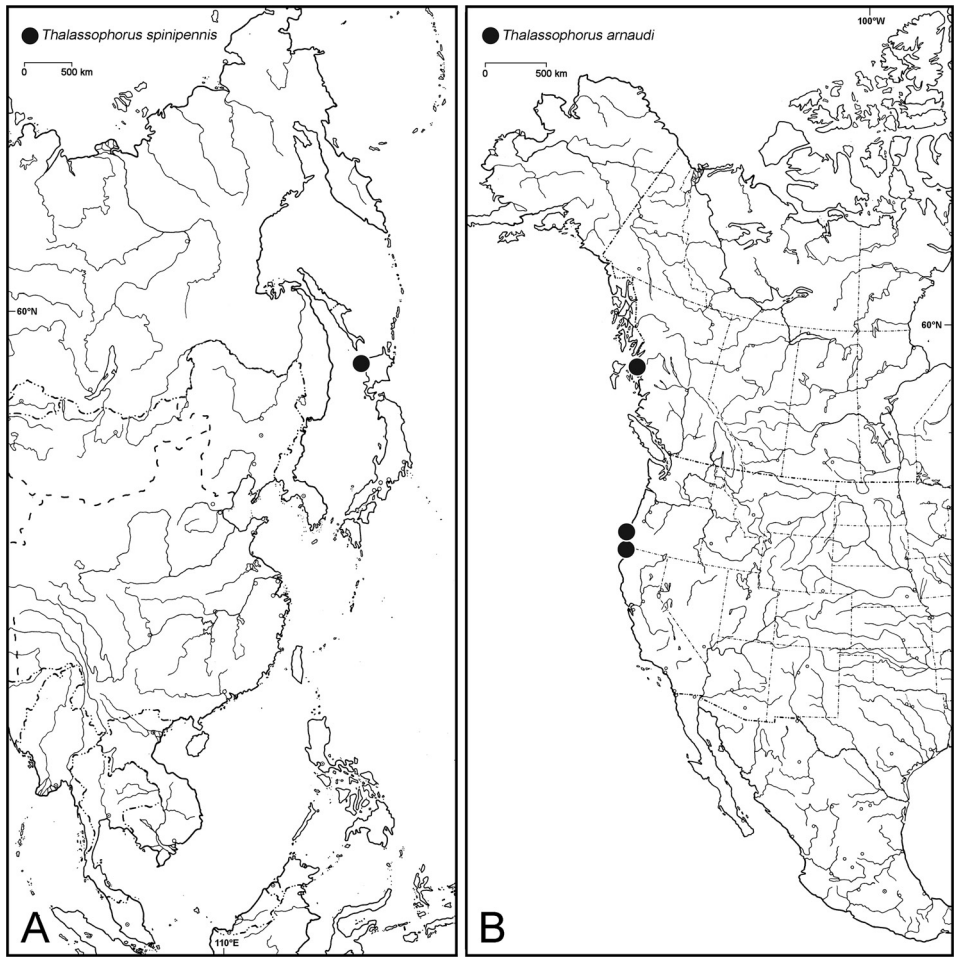

Fig. 2C); apical costal section between R_1 and M_1 lacking erect spine-like setae (Fig. 2B) (setae present in *T. spinipennis*; Fig. 2D); R_{2+3} and R_{4+5} widely separated in apical part of wing (Fig. 2A) (closely approximated in *T. spinipennis*; Fig. 2C); bm-m incomplete (Figs. 2A, 2E) (complete in *T. spinipennis*; Figs. 2C, 2F); right postgonite lobe broad (Fig. 4C) (narrow in *T. spinipennis*; Fig. 6B); phallus with non-serrated claw-like process (Figs. 4B, 4C) (process serrated and fin-like in *T. spinipennis*; Figs. 6A, 6B); cerci with apices straight in dorsal view (Fig. 5C) (divergent in *T. spinipennis*; Fig. 6C); cercus constricted at middle in lateral view (Figs. 4A–4C) (not constricted in *T. spinipennis*; Figs. 6A, 6B). Females of *T. arnaudi* and *T. spinipennis* are distinguished by the following features: costal section between R_1 and R_{2+3} about 2 times length of costal section between R_{2+3} and R_{4+5} (Fig. 2E) (about 3.5 times length in *T. spinipennis*; Fig. 2F); R_{2+3} and M_1 divergent (Fig. 2E) (subparallel in *T. spinipennis*; Fig. 2F); abdominal tergite 8 narrowly divided medially (Fig. 5D) (broadly divided in *T. spinipennis*).

Description

Male: Body length 1.6–2.3 mm, wing length 2.1–2.3 mm. Dark brown ground colour, with greyish blue-green and rusty brown

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pruinosity, legs slightly paler. **Head** (Fig. 3A): Dark brown ground colour with dense greyish blue-green pruinosity, dorsally with faint rusty tinge. Broader than thorax in dorsal view; ovoid in lateral view, with lower margin truncate; about 1.3 times broader than high in anterior view. Neck inserted high on head. Ocellar triangle conspicuous. Occiput weakly concave on upper median part. Eyes dichoptic, entirely covered with ommatrichia, medial edge with weak emargination near antenna, ommatidia smaller anterodorsally. Frons greyish blue-green with faint rusty tinge, broadly widening above. Face greyish blue-green, narrowest at middle, with width less than diameter of anterior ocellus. Clypeus greyish blue-green, not separated from face, projecting and somewhat beak-like in lateral view when mouthparts exerted (flattened when mouthparts retracted), widening below, apical margin weakly pointed. Bristles of head well-differentiated; dorsal bristles strong and black: pair of inclinate fronto-orbitals well-separated from base of antenna, pair of lateroclinate anterior ocellars, 2–3 pairs of tiny proclinate posterior ocellars, pair of inclinate postocellars, 2–4 pairs of lateroclinate verticals (verticals variable in number and arrangement); postocular setae short and uniserial dorsally becoming longer and scattered below, uppermost postoculars dark, remainder pale; postgena with pale setae along edge of mouth opening. Antenna entirely dark brown, inserted above middle of head in profile; scape short, funnel-shaped; pedicel subequal in length to scape, spheroidal with subapical circlet of setulae; postpedicel about 1.8–2.1 times longer than wide, drop-shaped, clothed in moderately long fine hairs; stylus about 1.7 times length of postpedicel, with short hairs. Palpus dark brown, clothed with minute pile, apical half with several weak setae on outer surface. Epipharyngeal carina lengthened, extended to clypeal ridge, keel-shaped in lateral view; epipharyngeal blades narrow; labellum with 6 geminately sclerotized pseudotracheae. Gena strongly projected below eye. **Thorax**: Dark brown ground colour with dense greyish blue-green pruinosity, with rusty brown tinge in dorsal view. Mesoscutum moderately arched, prescutellar depression apparent. Proepisternum with small setula. Antepronotum narrow with 2 pale setulae per side. Postpronotal lobe distinct with 1–2 small setulae. Mesonotum shield-shaped in dorsal view, longer than wide, bristles well-differentiated and black. Acrostichal setae absent, pair of setulae on extreme anterior margin of mesoscutum; anterior mesoscutum with transverse row or group of 3–4 setulae per side anterolateral to 1st dorsocentral bristle; 5–6 dorsocentral bristles (2nd dorsocentral strongest, 1st, 3rd, and 4th sometimes reduced, 1–2 additional setulae sometimes present), 1 strong presutural supra-alar bristle, 1–3 postsutural supra-alar bristles, 2 notopleural bristles, and 1 post-alar bristle per side. Scutellum broadly subtriangular. Mesopleuron bare. Halter with light-brown stalk, knob pale brownish white. **Legs**: Dark brown, coxae and femora with blue-green tinged pruinosity (weaker on femora), femora and tibiae paler at knees, tarsi somewhat lighter on ventral surface; legs (except anterior surface of mid-femur) devoid of well-developed bristles, mostly covered with fine black setae, except for coxae, trochanters, and ventral surface of femora with pale setation; tarsomere 5 with apex broadly pointed in dorsal view; claws enlarged. *Foreleg*: Coxa with pale setae on anterior surface; femur somewhat thickened basally, slightly longer than tibia, basal third with field of short pale hairs ventrally; tibia slender; tarsus slightly longer than tibia; basitarsus as long as tarsomeres 2–4 combined, without spinose anterior tubercle at base; tarsomeres 2–4 decreasing in length apically; tarsomere 5 subequal in length to tarsomere 3. *Midleg*: Coxa with pale setae on anterior surface along lateral and apical margins; femur slender, slightly longer than tibia, basal third with field of short pale hairs ventrally, apical 2/3 with anterior row of 9–10 prominent bristles; tibia slender; tarsus slightly longer than tibia; basitarsus as long as tarsomeres 2–4 combined; tarsomeres 2–4 decreasing in length apically; tarsomere 5 slightly longer than tarsomere 4. *Hindleg*: Coxa with 3–4 pale setae on outer surface; femur slender, slightly longer than tibia, ventral margin with series of short pale setae becoming stronger and darker apically; tibia

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slender, weakly bowed, slightly enlarged apically, with dorsal setae prominent and somewhat erect; tarsus subequal in length to tibia; basitarsus as long as tarsomeres 2–3 combined, without spinose posteroventral tubercle at base; tarsomeres 2–4 decreasing in length apically; tarsomere 5 slightly longer than tarsomere 4. **Wing** (Figs. 2A, 2B): Hyaline, about 3 times longer than wide, veins dark brown. Pterostigma absent, membrane entirely covered with minute microtrichia, alula absent. Costa circumambient, with swelling present at end of R_1. Extreme anterior base of costa with row of 4 setae, anterior margin bearing 2 rows of short spine-like setae (in addition to 4 dorsally inclined spine-like bristles), posterior margin with setae finer and longer. Costal section between crossvein h and R_1 with setae prominent and widely spaced. Costal section between R_1 and M_1 lacking erect spine-like setae (Fig. 2B, cf. Fig. 2D). All longitudinal veins complete, reaching wing margin, Sc faint apically. R_1 reaching wing margin at costal swelling. Cell r_1 narrow, not expanded beyond R_1, ending well before wing apex. R_{2+3} and R_{4+5} widely spaced and parallel in apical part of wing. R_{4+5} straight. R_{4+5} and M_1 widely spaced and divergent in apical part of wing. M_1, M_2, and M_4 nearly straight beyond cell dm. Base of Rs originating opposite humeral crossvein. Short r-m crossvein present (sometimes indistinct) in basal fourth of wing at base of R_{4+5}. Crossvein bm-m incomplete. Cell dm extending to middle of wing. Cells br, bm, and cua in basal fourth of wing. Cell br slender, subequal in length to bm and cua, sometimes indistinct. Cells bm and cua broader than br. Cell cua closed, with ventral margin darkened and thick. Anal vein (CuP + CuA) absent. Calypter with fine pale setae. **Abdomen** (Fig. 4A): Dark brown ground colour with blue-green tinged pruinosity. Abdominal muscle plaques present. Tergites 1–6 with short posteromarginal setae; sternites 2–4 with scattered marginal setulae; sternite 5 with single row of posteromarginal setulae lateral to ventral prolongation, otherwise bare; segments 6 and 7 with few setulae, mainly bare. Segments 1–4 symmetrical, with simple tergites and sternites; segments 5–7 narrowed, somewhat more heavily sclerotized and laterally compressed to form cavity on right side for hypopygium. Sternites 6–7 simple, not contorted, lacking pregenitalic processes. Sternite 8 ovoid, setose, tergite 8 forming narrow sclerotized band. *Hypopygium* (Figs. 4A–4C): Dark brown, projecting apical components paler. Lateroflexed to right; inverted, with posterior end directed anteriorly; small and compact, about 1/3 length of abdomen; asymmetrical; foramen unformed. Epandrium divided into left and right lamellae. Left epandrial lamella (Fig. 4B) trifurcate in lateral view with rounded basal emargination, partially overlapping left side of hypandrium, ventral portion fused with hypandrium but epandrial margin distinct; ventral epandrial process (Fig. 4B) digitiform, weakly tapering apically, bearing 2 short, closely approximated setulae before middle. Left surstylus (Fig. 4B) bilobed, dorsal and ventral lobes separated by deep U-shaped cleft through which left postgonite lobe protrudes. Dorsal lobe of left surstylus shorter than ventral lobe, with several long apical setae and 1 lateral seta at base. Ventral lobe of left surstylus digitiform, length about 2 times that of dorsal lobe, apex with several long medially directed setae. Right epandrial lamella (Figs. 4A, 4C) broadly flask-shaped in lateral view, partially overlapping right side of hypandrium, not fused with hypandrium, lacking ventral process. Right surstylus (Fig. 4C) bilobed, dorsal and ventral lobes separated by broad shallow cleft through which right postgonite lobe protrudes. Dorsal lobe of right surstylus subequal in length to ventral lobe, with several long apical setae and 1 lateral seta at base. Ventral lobe of right surstylus complex, trifurcate, mostly hidden in lateral view by right postgonite lobe. Hypandrium (Figs. 4B, 4C) bowl-shaped, subequal in length to epandrium. Postgonite with internal portion arch-shaped in dorsal/ventral view with short anterolateral apodemes; left postgonite lobe (Figs. 4B, 5B) broad, dome-like, concave medially, with pointed, medially directed apical projection and thumb-like medial projection bearing 1 strong seta basally and 2 setulae near expanded apex, with auxiliary flap-like lobe situated below ventral lobe of surstylus;

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right postgonite lobe (Figs. 4A, 4C, 5A) similar to left lobe but larger, with apical margin truncate, pointed apical projection elongate, auxiliary lobe indistinct. Phallus with apical portion Y-shaped, with nonserrated claw-like process (Figs. 4B, 4C). Ejaculatory apodeme (Figs. 4B, 4C) keel-like, laterally flattened. Hypoproct (Figs. 4B, 4C) about half cercus length, slender with weak apical setae. Cercus (Figs. 4A–4C) constricted at middle in lateral view, apex straight in dorsal view (Fig. 5C) and bearing strong apical seta.

Female: Body length 1.8–2.6 mm, wing length 2.4–2.7 mm. Similar to male except face slightly wider; costa lacking swelling at end of R_1. Terminalia (Figs. 5D, 5E) with tergite 8 narrowly divided medially (Fig. 5D), narrowly fused with sternite 8 anterolaterally; tergite 10 medially divided, with three long acanthophorite setae on each side; cercus elongate, with several setae anterior to slender cuticular apical projection; spermatheca an unsclerotized unpigmented tube with sperm pump at base.

Distribution

Unlike its Palaearctic congener *T. spinipennis*, which is presently known only from Rishiri Island, Japan (Fig. 7A), *T. arnaudi* appears to be more widely distributed in the Nearctic Region and occurs along the west coast from seashore localities in British Columbia, Oregon, and California (Figs. 1B–1E, 7B).

Remarks

The habitat of *T. arnaudi* ranges from primarily rocky shorelines comprised of boulders mixed with cobble and gravel (Figs. 1B–1D) to more sandy beaches with regular cobble-gravel deposits and emergent boulders (Fig. 1E). Adults were collected by sweeping over bare intertidal rocks.

Etymology

This new species is named in honour of dipterist and renowned collector Dr. Paul H. Arnaud, Jr., of the California Academy of Sciences. Paul and his wife, Madeline, collected the first known specimen from Ridley Island, British Columbia, in 1996.

Genus *Eothalassius* Shamshev and Grootaert

Eothalassius Shamshev and Grootaert, 2005: 108.

Type species: *Eothalassius platypalpus* Shamshev and Grootaert, by original designation.

Included species

The genus currently includes *Eothalassius platypalpus* Shamshev and Grootaert, *Eothalassius gracilis* Shamshev and Grootaert, and *Eothalassius borkenti* Cumming and Brooks **sp. nov.** *Microphorella merzi* Gatt also appears to belong to *Eothalassius* (Shamshev and Grootaert 2005, p. 117) (see Remarks below).

Diagnosis

Eothalassius is distinguished from other parathalassiine genera by the following characters: head with face narrow ventrally, gena scarcely projected below eye, antenna with arista-like stylus lengthened (at least 5 times length of postpedicel) (Fig. 3C), mouthparts directed ventrally with fleshy labellum, epipharyngeal carina lengthened and projecting vertically into head, palpus broad (particularly in males) with apex slightly pointed to widely rounded apically; thorax with prosternum fused to proepisternum forming precoxal bridge, scutellum with 1 pair of strong bristles near apex; wing (Fig. 2J) with costa bearing double row of short spine-like setae along anterior margin, R_1 short reaching costa before middle of wing (or before base of M_2), crossvein bm-m incomplete, cell dm present or if absent without vein dm-m, CuA rounded, cell cua convex apically, anal lobe not developed; male terminalia (Fig. 10) with epandrium partially fused with hypandrium, left epandrial lamella with apparently nonarticulated ventral process, postgonites cradling base of phallus with left and right lobes

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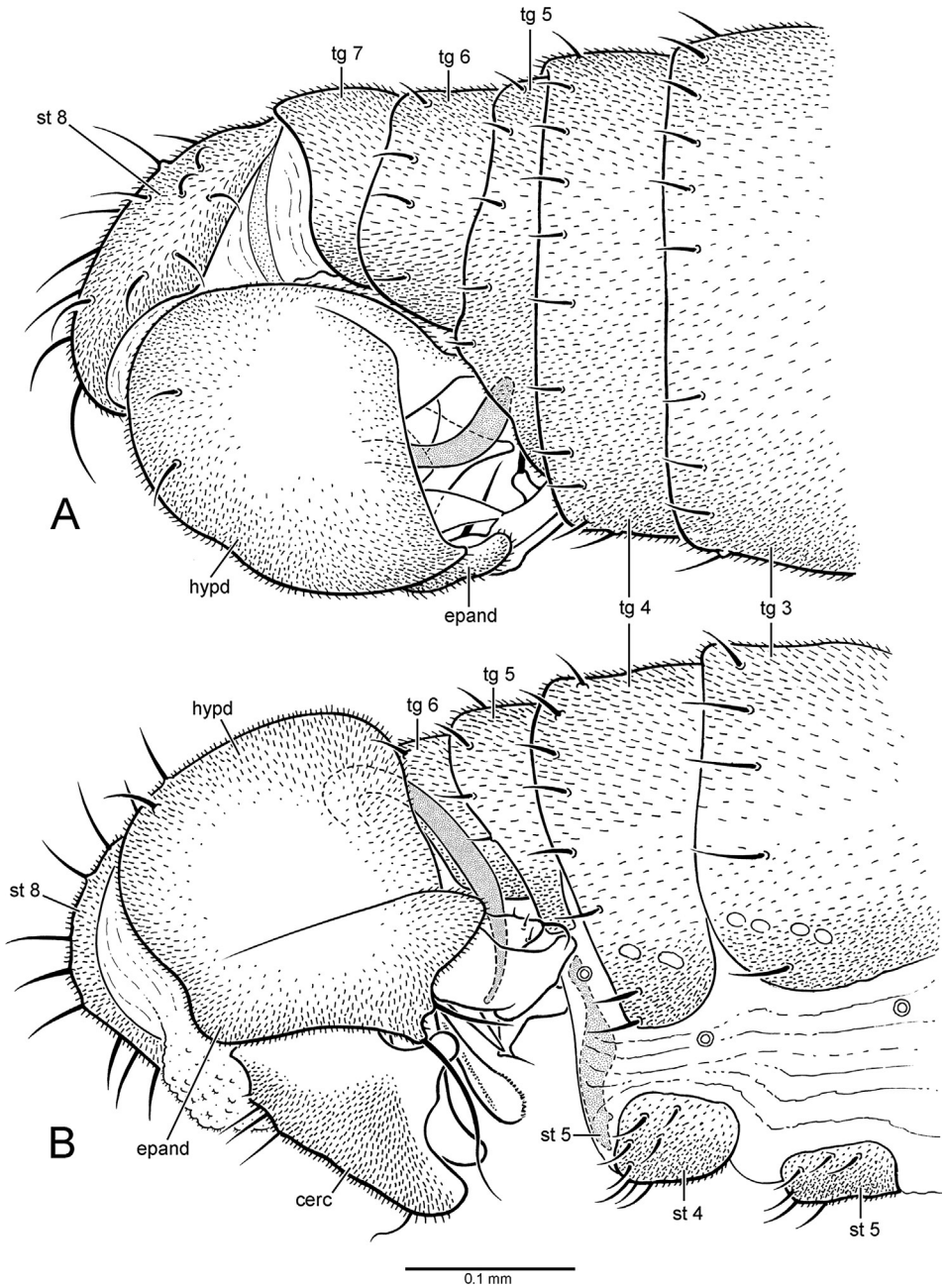
Fig. 8. *Eothalassius borkenti* Cumming and Brooks sp. nov., male. (A) Posterior portion of abdomen, dorsal view; (B) posterior portion of abdomen, right lateral view (cerc, cercus; epand, epandrium; hypd, hypandrium; st, sternite; tg, tergite).



protruding from between dorsal and ventral surstylar lobes, hypoproct projected as pair of non-setose asymmetrical lobes, cerci broad and asymmetrical (Figs. 9B, 10C); female abdomen with apical segments retracted into segment 6, terminalia with tergite 10 bearing acanthophorite setae, cercus slender and terminating with long seta (Figs. 11A, 11C).

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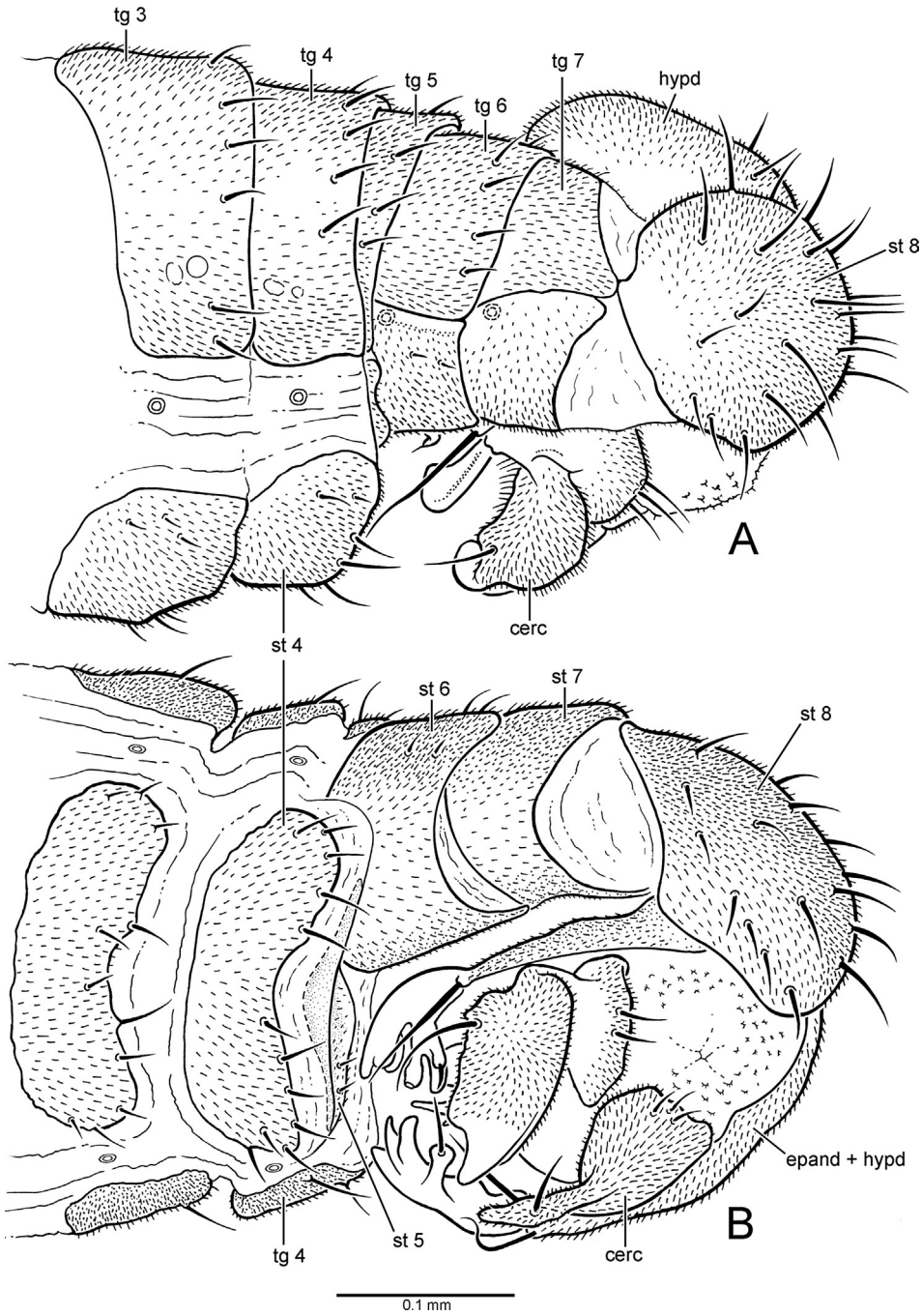
Fig. 9. *Eothalassius borkenti* Cumming and Brooks sp. nov., male. (A) Posterior portion of abdomen, left lateral view; (B) posterior portion of abdomen, ventral view (cerc, cercus; epand, epandrium; hypd, hypandrium; st, sternite; tg, tergite).



Distribution

Eothalassius is known from the coasts of Southeast Asia and Papua New Guinea (*E. gracilis*, *E. platypalpus*) (Shamshev and Grootaert 2005) (Fig. 12A) and the Pacific side of Costa Rica (*E. borkenti*) (Fig. 12B). *Microphorella merzi*, which is probably congeneric with *Eothalassius*, is known from the

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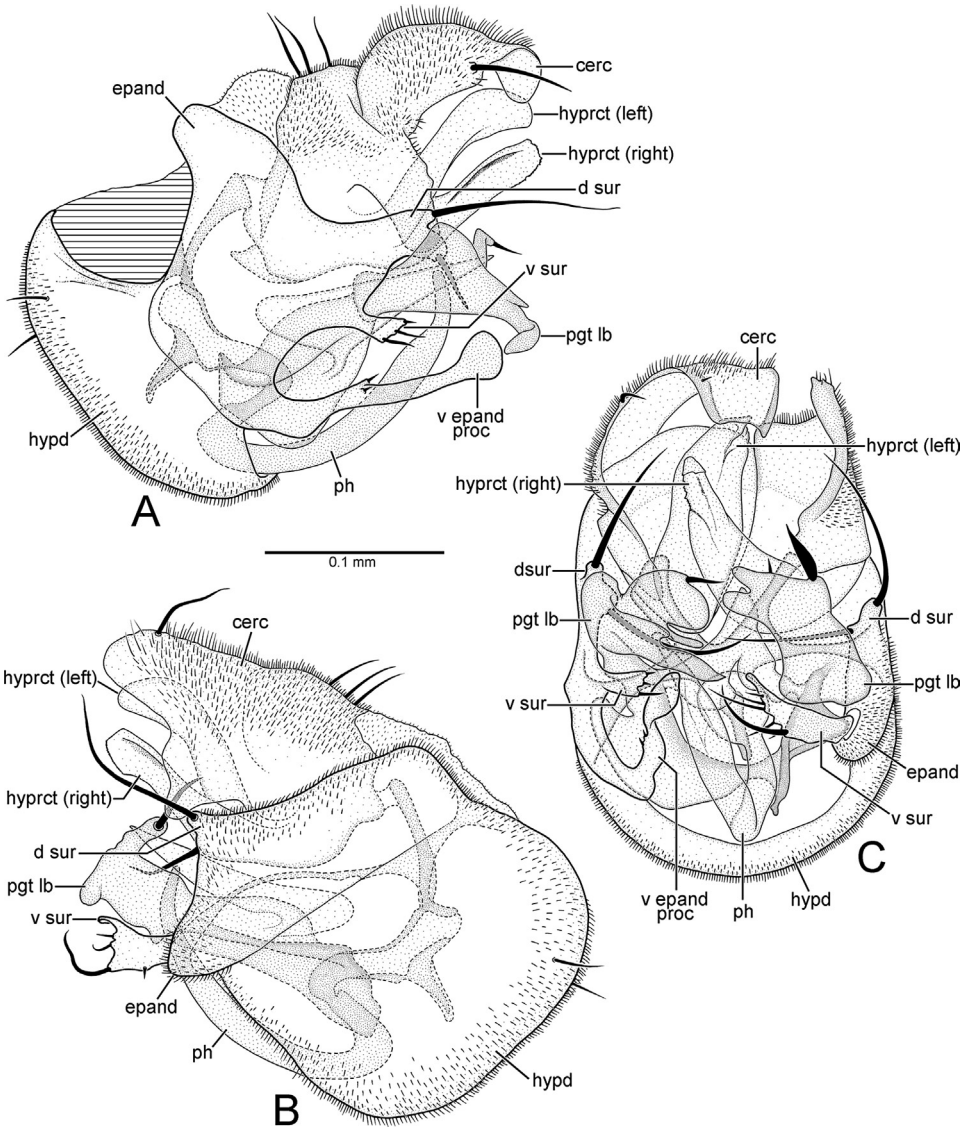
Fig. 10. *Eothalassius borkenti* Cumming and Brooks sp. nov., male. (A) Hypopygium, left lateral view; (B) hypopygium, right lateral view; (C) hypopygium, posterior view (cerc, cercus; d sur, dorsal lobe of surstylus; epand, epandrium; hypd, hypandrium; hyprct, hypoproct; pgt lb, postgonite lobe; ph, phallus; v epand proc, ventral epandrial process; v sur, ventral lobe of surstylus).



Mediterranean coast of Turkey, Cyprus, and Malta (Gatt 2003) (Fig. 12C).

Remarks

As reported by Gatt (2003), *M. merzi* has the hypopygium with the epandrium and hypandrium partially fused, the female terminalia with acanthophorite setae and a slender cercus terminating in a long apical seta, a head with a narrow ventral face and an enlarged male palpus. On the basis of these characters and the lack of cell dm with crossvein dm-m absent (similar to *E. platypalpus*), it is likely that *M. merzi* belongs to *Eothalassius* as suggested by Shamshev and Grootaert (2005, p. 117), although the antennal stylus is not as lengthened as in other species of the

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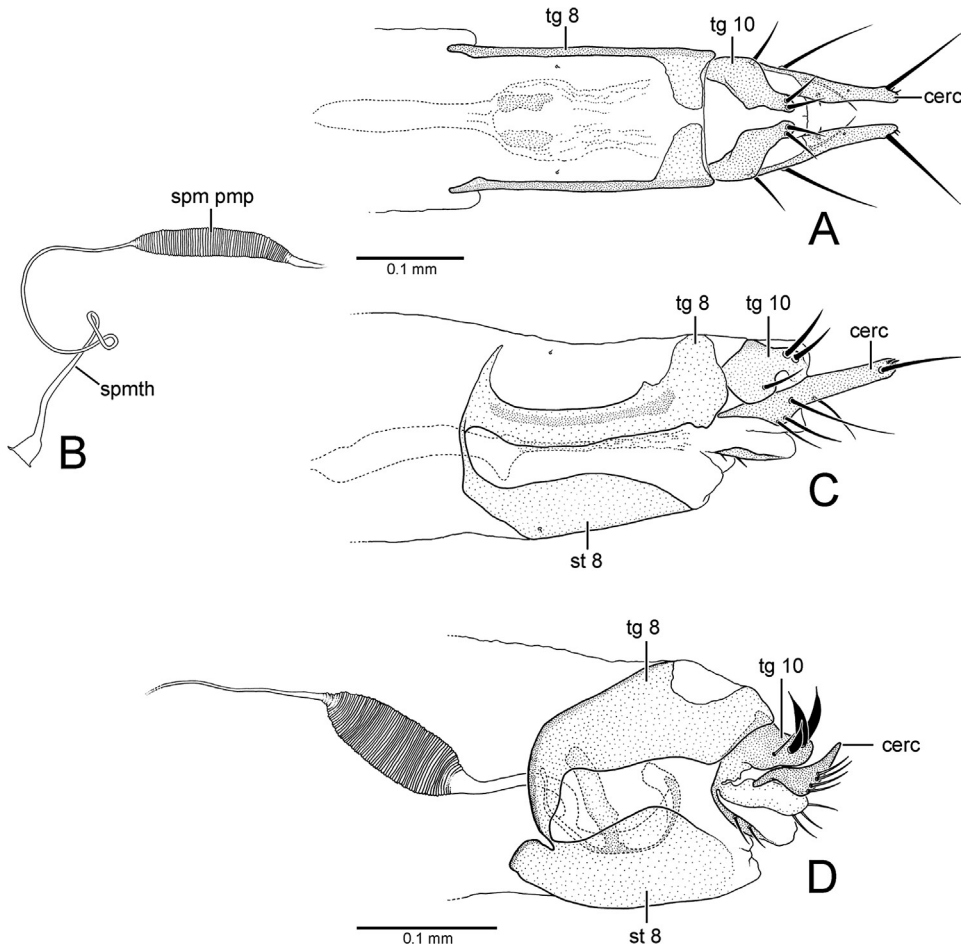
Fig. 11. Female terminalia. (A) *Eothalassius borkenti* Cumming and Brooks sp. nov., dorsal view; (B) *E. borkenti* Cumming and Brooks sp. nov., spermatheca; (C) *E. borkenti* Cumming and Brooks sp. nov., left lateral view; (D) *Microphorella* sp. (Yukon), left lateral view (cerc, cercus; spm pmp, sperm pump; spmth, spermatheca; st, sternite; tg, tergite).



genus. However, formal assignment of this species within *Eothalassius* as a new combination should await a detailed examination of this species.

Shamshev and Grootaert (2005) indicate that the type series of *E. gracilis* was collected from the littoral and supralittoral zones of sandy coastal beaches, whereas *E. platypalpus* was collected along creeks exiting onto sandy coastal beaches. *Microphorella merzi* was also collected on sandy coastal beaches (Gatt 2003). *Eothalassius borkenti* appears to favour rocky seashores (Fig. 1F). Immature stages are presently unknown.

Eothalassius borkenti Cumming and Brooks sp. nov.

(Figs. 1F, 2J, 3C, 8, 9, 10, 11A–11C, 12B)

Type material

Holotype ♂ labelled: "CR: Herradura/ 16.XII.1993/ A. Borkent/ CD 1709"; "ex. tidal rocks/ at low tide"; "HOLOTYPE/ *Eothalassius borkenti*/ Cumming and Brooks" [red label] (CNC). **Paratypes: COSTA RICA:** 1 ♂, 1 ♀, same data as holotype (CNC); 1 ♀, 1 partial specimen (sex unknown), same data except, 25.x.1993, CD 1629, ex. tidal

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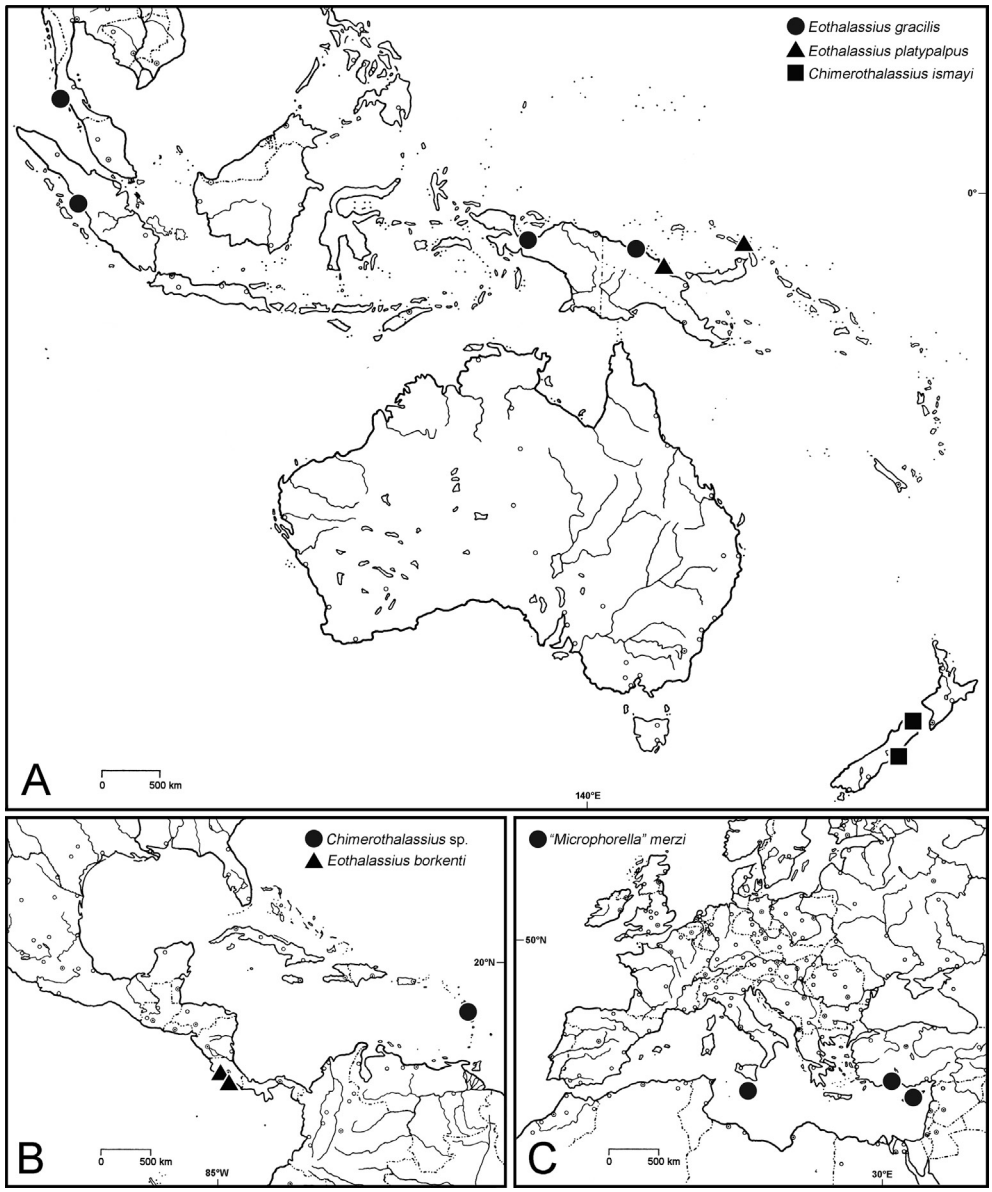
Fig. 12. Known distributions of *Eothalassius* Shamshev and Grootaert and *Chimerothalassius* Shamshev and Grootaert. (A) *Eothalassius gracilis* Shamshev and Grootaert, *E. platypalpus* Shamshev and Grootaert, and *C. ismayi* Shamshev and Grootaert; (B) *Chimerothalassius* sp. from Dominica and *E. borkenti* Cumming and Brooks sp. nov.; (C) "*Microphorella*" *merzi* Gatt.



pools (CNC); 1 ♂, Manuel Antonio National Pk., 17.xi.1993, A. Borkent, CD 1670, sweeping intertidal zone near entrance of park (flowing freshwater stream nearby) (INBC); 1 ♀, Cabo Blanco, 19.i.1994, A. Borkent, CD 1734, tidal rocks (CNC); 1 ♀, Puntarenas, 2 km S Cabuya, 10.xi.2000, A. Borkent CD 5098*, swp tidal rocks (CNC); 1 ♀, same data (INBC); 1 ♂, Puntarenas, Corcovado National Pk., San Pedrillo, 1–50 m, 8°37′15N, 83°44′6E, 14.viii.2001, M. Buck, rocky seashore sweeping, debu00176474 (DEBU); 1 ♀, same data except debu00176399 (DEBU); 1 partial specimen (sex unknown), same data except

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debu00176410 (DEBU); 3 ♀♀, same data except 11.viii.2001, S.A. Marshall, beach sweep, debu00187966, debu00187988, debu00187989 (DEBU); 1 ♀, Osa Peninsula, Corcovado National Pk., nr. San Pedrillo Ranger Stn, 8°37′N, 83°44′E, 12–15.viii.2001, J.M. Cumming, intertidal zone (CNC).

Diagnosis

The only species of *Eothalassius* known from the New World, *E. borkenti* is most easily distinguished from other congeners (*i.e.*, *E. platypalpus*, *E. gracilis*, and *M. merzi*) by the presence of relatively long setae on the basal portion of the costa, including a single erect spine-like costal bristle near the base of R_{2+3} (Fig. 2J). *Eothalassius borkenti* has the wing with cell dm (and crossvein dm-m) present, unlike *E. platypalpus* and *M. merzi* but not *E. gracilis*. In addition, males of *E. borkenti* have the hypopygium characterized by large broad asymmetrical cerci and distinctively shaped asymmetrical hypoproct lobes (Figs. 10A–10C), and females have each acanthophorite of the terminalia narrowed anteriorly (Figs. 11A, 11C, tg 10).

Description

Male: Body length 1.2–1.3 mm, wing length 1.1–1.2 mm. Dark brown ground colour with greyish green and rusty brown pruinosity, legs slightly paler. **Head**: Dark brown ground colour with greyish green pruinosity. Broader than thorax in dorsal view; ovoid in lateral view; about 1.3 times broader than high in anterior view. Neck inserted high on head. Ocellar triangle conspicuous. Occiput weakly concave on upper median part. Eyes dichoptic, entirely covered with ommatrichia, medial edge with very weak emargination near antenna, ommatidia smaller anterodorsally. Frons greyish green, broadly widening above. Face narrowest at middle, width less than diameter of anterior ocellus. Clypeus greyish, small, not separated from face. Bristles of head well-differentiated; strong and dark brown: pair of reclinate fronto-orbitals above antennal base, pair of lateroclinate anterior ocellars, 2 pairs of tiny proclinate posterior ocellars, pair of inclinate postocellars, 2 pairs of lateroclinate verticals; postocular setae short and uniserial, pale; postgena with pale setae along edge of mouth opening. Antenna (Fig. 3C) brown, inserted near middle of head in profile; scape short, funnel-shaped; pedicel slightly longer than scape, spheroidal with subapical circlet of setulae; postpedicel about as long as wide, drop-shaped, clothed in moderately long fine hairs; stylus at least 5 times length of postpedicel, with short hairs. Palpus brown, clothed with minute pile and several weak setae on outer surface; nearly as wide as long, broadly rounded to nearly truncate apically. Epipharyngeal carina lengthened, extended to and overlapped by clypeal ridge; epipharyngeal blades narrow; labellum apparently with 6 inconspicuous geminately sclerotized pseudotracheae. Gena narrow. **Thorax**: Dark brown ground colour with dense greyish green pruinosity, with rusty brown tinge in dorsal view. Mesoscutum moderately arched, prescutellar depression barely apparent. Proepisternum and anteprontum without small setulae. Postpronotal lobe distinct with 1 small setula. Mesonotum shield-shaped in dorsal view, longer than wide, bristles well-differentiated. Acrostichal setae absent; 4 dorsocentral bristles (1st weakest, 3rd sometimes absent), 1 presutural supra-alar bristle (close to upper notopleural bristle), 1 postsutural supra-alar bristle, 2 notopleural bristles (upper notopleural close to presutural supra-alar bristle), and 1 small post-alar bristle per side. Scutellum broadly subtriangular; scutellar bristles usually directed dorsally. Mesopleuron bare. Halter with light-brown stalk, knob pale brownish white. **Legs**: Brown, tibiae and tarsi slightly darker; legs (except anterior surface of mid-femur) devoid of well-developed bristles, mostly covered with fine pale-brown setae; tarsomere 5 with broad apical process in dorsal view. *Foreleg*: Coxa with pale setae on anterior surface; femur somewhat thickened basally, slightly longer than tibia; tibia slender; tarsus slightly longer than tibia; basitarsus as long as tarsomeres 2–4 combined, without spinose anterior tubercle at base; tarsomeres 2–4 decreasing in length apically; tarsomere 5 subequal in length to tarsomere 3. *Midleg*: Coxa with few pale apical setae; femur

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slender, slightly longer than tibia, apical 1/2 with anterior row of 5–6 prominent bristles; tibia slender; tarsus slightly longer than tibia; basitarsus as long as tarsomeres 2–4 combined; tarsomeres 2–4 decreasing in length apically; tarsomere 5 twice as long as tarsomere 4. *Hindleg*: Coxa with few pale apical setae; femur slender, slightly longer than tibia, weakly bowed; tibia slender, slightly enlarged apically; tarsus subequal in length to tibia; basitarsus nearly as long as tarsomeres 2–3 combined, without spinose posteroventral tubercle at base; tarsomeres 2–4 decreasing in length apically; tarsomere 5 slightly longer than tarsomere 4. **Wing** (Fig. 2J): Hyaline, about 3 times longer than wide, veins light brown. Pterostigma absent, membrane entirely covered with minute microtrichia, alula absent. Costa circumambient, with single erect spine-like costal bristle near base of R_{2+3}. Anterior costal margin with double row of spine-like setae longer, more prominent, and widely spaced towards base. Posterior margin of costa with setae finer and longer. All longitudinal veins complete, reaching wing margin, Sc faint apically. R_1 reaching wing margin before middle of wing. R_{2+3}, R_{4+5}, and M_1 equally spaced, nearly parallel in middle of wing and divergent in apical part of wing. M_1, M_2, and M_4 slightly curved beyond cell dm. Base of Rs originating opposite humeral crossvein. Short r-m crossvein indistinct in basal fourth of wing at base of R_{4+5}. Crossvein bm-m incomplete. Cell dm present, extending to middle of wing, with vein dm-m. Cells br, bm, and cua in basal fifth of wing. Cell br indistinct. Cells bm and cua subequal in length and width, both slightly broader than br. Cell cua closed, with distal margin nearly abutting costa. Anal vein (CuP + CuA) absent. Calypter with fine setae. **Abdomen** (Figs. 8, 9): Brown ground colour with rusty brown pruinosity. Abdominal muscle plaques present. Tergites 1–6 with short posteromarginal setae; sternites 2–4 with scattered setulae; sternites 5–6 with 2 setulae; tergite 7 bare; sternite 7 bare. Segments 1–4 symmetrical with simple tergites and sternites; at least segments 6–7 narrowed and laterally compressed to form cavity on right side for hypopygium. Sternites 6–7 simple, not contorted, lacking pregenitalic processes. Sternite 8 quadrate, with several setae posteriorly, tergite 8 atrophied. *Hypopygium* (Figs. 8, 9, 10): Lateroflexed to right; inverted with posterior end directed anteriorly; small, less than half length of abdomen; asymmetrical; foramen unformed. Epandrium divided into left and right lamellae. Left epandrial lamella partially overlapping left side of hypandrium, trifurcate in lateral view (Fig. 10A); ventral epandrial process present (Figs. 10A, 10C), apparently non-articulated at base, bearing 2 short setulae near midpoint, with spatulate apex. Left surstylus (Figs. 10A, 10C) bilobed, dorsal and ventral lobes separated by broad cleft through which left postgonite lobe protrudes. Dorsal lobe of left surstylus with 2 small apical processes bearing a long bristle. Ventral lobe of left surstylus blunt, with 3 short apical setae. Right epandrial lamella (Figs. 8B, 10B) broadly subrectangular in lateral view, partially fused with hypandrium, lacking ventral process. Right surstylus (Figs. 10B, 10C) bilobed, dorsal and ventral lobes separated by shallow cleft through which right postgonite lobe protrudes. Dorsal lobe of right surstylus short, bearing 2 long apical bristles. Ventral lobe of right surstylus flap-like, articulated at base, bearing 1 long curved ventral bristle and several apical setae. Hypandrium short and deep in lateral view (Figs. 8B, 10A, 10B), without medial process arising from posterior end (Figs. 8A, 10C). Postgonite with internal portion arch-shaped in dorsal/ventral view with short anterolateral apodemes, projecting dorsomedially as pointed process; left postgonite lobe (Figs. 9B, 10A, 10C) multilobate, with rounded dorsal projection bearing 1 strong seta above slender medial projection and pointed elongate ventral projection; right postgonite lobe (Figs. 9B, 10B, 10C) similar to left lobe but flap-like and shallowly trifurcate along medial margin, with thick strong seta plus short seta on dorsal margin. Phallus tubular, J-shaped in lateral view, bent upwards (Figs. 10A–10C). Ejaculatory apodeme short, rod-like. Hypoproct projected as pair of overlapping asymmetrical lobes; left lobe broad with flange-like apex, right lobe digitiform with blunt apex (Fig. 10C). Cerci broad, asymmetrical (Figs.

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8B, 9A, 9B, 10), left cercus partially divided into basal and apical components.

Female: Body length 1.2–1.5 mm, wing length 1.1–1.3 mm. Similar to male. Terminalia (Figs. 11A–11C) with tergite 8 medially divided, slender anteriorly, narrowly fused with sternite 8 anterolaterally; tergite 10 medially divided and narrowed anteriorly, with three acanthophorite setae on each side; cercus slender, terminating in long apical seta; spermatheca an unsclerotized unpigmented tube with sperm pump at base.

Distribution

Eothalassius borkenti occurs along the Pacific coast of Costa Rica (Figs. 1F, 12B).

Remarks

Eothalassius borkenti was referred to as an undescribed species of *Microphorella* in Cumming and Sinclair (2009, p. 668). This species was collected on rocky seashores (Fig. 1F).

Etymology

This species is named in honour of Dr. Art Borkent of Salmon Arm, British Columbia, who collected the first known specimens of the type series.

Genus *Chimerothalassius* Shamshev and Grootaert

Chimerothalassius Shamshev and Grootaert, 2002: 131.

Type species: *Chimerothalassius ismayi* Shamshev and Grootaert, by original designation.

Included species

The genus currently includes *Chimerothalassius ismayi* Shamshev and Grootaert and *Chimerothalassius* sp. (Dominica).

Diagnosis

Chimerothalassius is distinguished from other parathalassiine genera by the following characters: head with gena scarcely projected below eye, mouthparts directed ventrally with fleshy labellum, palpus elongate and narrow with long ventral setae; thorax with prosternum fused to proepisternum forming precoxal bridge, scutellum with 1 pair of strong dorsally directed bristles near apex; legs with fore coxa bearing strong basal seta, fore femur with 2 rows of ventral setae, tarsomere 5 of each leg with apical finger-like process; wing (Fig. 2K) with costa bearing double row of short spine-like setae along anterior margin, R_1 short reaching costa before middle of wing, crossvein bm-m complete, cell dm absent without veins M_2 and dm-m, CuA rounded, cell cua convex apically, anal lobe not developed; male terminalia (known only for *C. ismayi*) with right and left epandrial lamellae apparently separated from hypandrium, left epandrial lamella with apparently non-articulated ventral process, postgonites cradling base of phallus with left and right lobes protruding from between dorsal and ventral surstylar lobes, cerci short and nearly symmetrical; female abdomen with apical segments retracted into segment 5, terminalia with tergite 10 bearing acanthophorite setae, cercus narrowly rounded apically.

Distribution

Chimerothalassius is known from coastal localities on the Caribbean island of Dominica (*Chimerothalassius* sp.) (Fig. 12B) and South Island, New Zealand (*C. ismayi*) (Fig. 12A). Figure 12A includes the type locality of *C. ismayi* from South Birdlings Flat listed in Shamshev and Grootaert (2002), as well as additional new localities from Cable Bay (female specimen deposited in USNM) and Port Levy on Banks Peninsula (male specimen deposited in DEBU).

Remarks

Shamshev and Grootaert (2002) indicated that the type series of *C. ismayi* was swept from a stony beach at South Birdlings Flat. The Port Levy specimen of *C. ismayi* was collected with a pan trap set along a sea

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streambed. Label data indicate that one of the two specimens of *Chimerothalassius* sp. from Dominica (Layou River mouth) was collected along the seashore. Immature stages are presently unknown.

Chimerothalassius sp.

(Figs. 2K, 12B)

Material examined

DOMINICA: 1 ♀, Layou River mouth, 9.i.1965, W.W. Wirth, seashore, Bredin-Archbold, Smithsonian Biological Survey, Dominica (USNM); 1 partial specimen (slide-mounted wing), Rodney's Rock, 5.ii.1964, H. Robinson (USNM).

Diagnosis

Chimerothalassius sp. is distinguished from *C. ismayi* by the body being brown rather than grey; the basal portion of the costa bearing group of 3–4 spine-like bristles near the base of R_{2+3} (Fig. 2K) (absent in *C. ismayi*); the costa with a prominent double row of spine-like setae along the anterior margin (less prominent in *C. ismayi*); a longer arista-like stylus, about 4 times longer than the postpedicel (as opposed to 2 times longer in *C. ismayi*); and the anepisternum without a dorsal row of 4 short setae (present in *C. ismayi*). The male is unknown.

Distribution

At present, *Chimerothalassius* sp. is known only from coastal localities on the Caribbean island of Dominica (Fig. 12B).

Remarks

With the exception of the slightly damaged slide-mounted wing (Fig. 2K), the remainder of the specimen from Rodney's Rock has apparently been lost or inadvertently destroyed. The wing of the Rodney's Rock specimen is nearly identical with that of the female specimen from the mouth of the Layou River (approximately 2 km north of Rodney's Rock), and is presumably conspecific. Additional specimens, including males, will need to be collected before this new species can be described.

Discussion

Phylogenetic relationships of the parathalassiine genera are at present unclear. The South African genera *Plesiothalassius* Ulrich and *Amphithalassius* Ulrich appear to be the most generalized extant representatives of the subfamily (Ulrich 1991) and are probably the stem or sister group to the other extant genera (Cumming and Brooks 2006; Brooks and Cumming 2010). Excluding these two genera, the Holarctic genus *Parathalassius* may be the sister group to the remaining genera, based primarily on wing shape and venation (Cumming and Brooks 2002). Problems persist with the definition of *Microphorella*, a widely distributed genus that appears to be paraphyletic with respect to at least *Thalassophorus* and *Eothalassius* (Cumming and Brooks 2006). If *Thalassophorus* and *Eothalassius* are retained at the generic level, then subdividing *Microphorella* into several additional genera may be required. The relationships of *Chimerothalassius* and the undescribed genus from Chile are also presently unclear, although together they might be the sister lineage to the previously mentioned *Microphorella* group (Brooks and Cumming 2010).

A detailed phylogenetic analysis of the entire Parathalassiinae is needed to resolve relationships, as well as to determine the number and ranking of generic groups within the subfamily. This will hopefully help explain some of the interesting zoogeographic patterns that appear to be emerging in the Parathalassiinae, with a possibly basal South African component, a number of Southern Hemisphere taxa with additional New World connections, and less restricted generic geographic distributions than previously documented.

Given the small body size of the Parathalassiinae and their frequent association with inadequately sampled coastal marine habitats, distributional patterns of these flies are

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undoubtedly poorly known. However, the two known species of *Thalassophorus* appear to represent a standard Asio-Nearctic Tertiary disjunct distribution, which is well known in the Empidoidea (see Sinclair and Saigusa 2002; Sinclair *et al.* 2012). The widespread Old World – New World connections now found within *Eothalassius* and *Chimerothalassius* may represent even older relict distributional patterns known in groups such as ditomyid fungus gnats (see Cranston 2005), or may be the result of more recent anemochore dispersal through oceanic drift (see Kirk-Spriggs and McGregor 2008). Increased sampling of small agile Diptera from intertidal, estuarine, and other seashore habitats throughout the world will certainly uncover numerous additional parathalassiine taxa that when described and analyzed phylogenetically will increase our evolutionary understanding of this extremely interesting basal lineage of Dolichopodidae.

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