Dorsipes diplocheilae sp. nov. and Dorsipes zeelandicae sp. nov. (Acari: Podapolipidae), subelytral parasites of Diplocheila zeelandica (Redtenbacher) (Coleoptera: Carabidae) in Japan

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Source: Systematic and Applied Acarology, 16(3) : 255-265

Published By: Systematic and Applied Acarology Society

URL: https://doi.org/10.11158/saa.16.3.11

Systematic & Applied Acarology (2011) 16, 255–265. ISSN 1362-1971

Dorsipes diplocheilae sp. nov. and *Dorsipes zeelandicae* sp. nov. (Acari: Podapolipidae), subelytral parasites of *Diplocheila zeelandica* (Redtenbacher) (Coleoptera: Carabidae) in Japan

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Abstract

Two of three new species of Podapolipidae (Acari: Tarsonemoidea) discovered under the elytra of *Diplocheila zeelandica* (Coleoptera: Carabidae) are described under the names *Dorsipes diplocheilae* **sp. nov**. and *D. zeelandicae* **sp. nov**. This is the first record of species in the *dorsipes* group of the genus *Dorsipes* from the genus *Diplocheila*. Adult females of species in the *dorsipes* group share the plesiomorphic character of two pairs of setae on plate EF. The vagina is not broad and the opening is terminal. The male genital capsule is not broader at its base than at its apex. Putative apomorphies for adult females of the *dorsipes* group are: coxal setae *3a* not present, setae v_1 reduced, ambulacra I claws small and tarsi II solenidia omega absent. *Dorsipes diplocheilae* and *D. zeelandicae* are compared with five species from Europe, Asia and western North America in the *dorsipes* group, parasites of carabid beetles in the genus *Carabus.* Revised keys to species of the group *dorsipes* are provided.

Key words: Taxonomy, Podapolipidae, new species, Japan, insect parasites

Introduction

Mites in the family Podapolipidae (Acari: Tarsonemina) are highly specialized ecto- and endoparasites of insects in the orders Blattodea, Orthoptera, and especially Coleoptera. One podapolipid mite species each occurs on insects in the orders Hemiptera and Hymenoptera. Eighty two species of Podapolipidae in four genera occur on fifty one genera of beetles in the family Carabidae. A majority of the 34,175 species of Carabidae (Lorenz 2005) have not been examined thoroughly for podapolipid parasites. Regenfuss (1968) examined nearly 7,000 carabid beetles in 78 genera and found podapolipids on 839 hosts. He described the genus *Dorsipes* and placed seven species of *Dorsipes* from a relatively small area of Central Germany in three groups: *dorsipes*, *inflatus* and *platysmae* (Regenfuss 1968). Eidelberg (1994) noted *Dorsipes* from Ukraine and eastern Russia. Japanese species of *Dorsipes* are: *D. curtonoti* Kurosa and Husband, 2002, *D. limnocarabi* Husband and Kurosa, 2002, *D. yezoensis* Husband and Kurosa, 2002 and the species described herein. The expansion of literature involving *Dorsipes* after 1968 includes the following contributions: Husband and Rack (1991), Eidelberg (1994), Husband (2000), Husband and Dastych (2000), Husband and Kurosa (2002), Kurosa and Husband (2002), Husband and Husband (2005), Husband and Weatherby (2005), Husband and Husband (2007), Hajiqanbar *et al*. (2008) and Husband and Husband (2010). The purposes of this paper are to describe the first record of species in the *dorsipes* group from a host genus other than *Carabus*, the genus *Diplocheila*, compare them with five species in the *dorsipes* group from Japan, Europe and Western North America and present a revised key to species in the *dorsipes* group.

Materials and methods

Fourteen specimens of *Diplocheila zeelandica* (Redtenbacher) (Coleoptera: Carabidae) from Yamagata, Chiba, Ehime, Fukuoka and Okinawa Prefectures, Japan, four specimens of *D. elongata* (Bates) from Chiba and Ibaraki Prefectures, Japan, and three specimens of *D. macromandibularis* (Habu and Tanaka) from Yamagata Prefecture, Japan, were examined for mites by the senior author. Podapolipid mites were discovered on eleven specimens of *D. zeelandica*. Mites were cleared with Keifer's clearing agent (Keifer 1953) and mounted in Andre's fluid (modified Hoyer's medium). Taxonomic research was made on two of the three species involved.

Measurements were taken with the aid of a Zeiss compound phase contrast microscope with an ocular micrometer. All measurements are in micrometers. Setae no longer than the diameter of setal acetabulae are listed as microsetae (m). Setae represented by acetabulae without setal remnants are listed as vestigials (v). Terminology follows Lindquist (1986). Long setae are often bent, obscured, broken or at an angle that makes measurement difficult. Setae are at least as long as indicated.
Abbreviations for institutions cited are: National Museum of Nature and Science, Tokyo, Japan (NSMT), National Museum of Natural History, Washington, D.C., U.S.A. (NMNH), Biozentrum Grindel und Zoologisches Museum, Hamburg, Germany (BGZM), and University of Michigan Museum of Zoology, Ann Arbor, Michigan, U.S.A. (UMMZ).

Taxonomy

Podapolipidae Ewing 1922

Dorsipes diplocheilae Kurosa and Husband sp. nov. (Figs. 1–2)

Differential diagnosis. Setae *e* (13) of adult female *D. diplocheilae* shorter than the length of setae *e* (24) of *D. yezoensis* and longer than the length of setae *e* (3) of *D. limnocarabi*. Setae *f* (29–35) longer than the length of setae *f* (20–26) of *D. limnocarabi* and shorter than the length of setae *f* (76–100) of *D. yezoensis.* Prodorsal setae v_1 (23–35) longer than setae v_1 of any of the other nineteen species of *Dorsipes* (m-18). Setae *d* and *f* of larval female *D. diplocheilae* (20–29, 22–29) longer than species of *Dorsipes* from the genus *Carabus* (5–15, 7–18). Species in *inflatus* and *platysmae* groups without setae *e.* Setae h_1–h_1 adjacent in larval female *D. diplocheilae* in contrast to separated by 5–20 in related *Dorsipes* with *Carabus* hosts. Tarsi II solenidia ω present in all instars of *D. diplocheilae* but not present in the five related species of *Dorsipes* in the *dorsipes* group with *Carabus* hosts. *D. diplocheilae* and African *Dorsipes tefflii* (*platysmae* group) with genua I, II, III setae of all instars 4-3-3, respectively.

Description

Female (Fig. 1, n=6): *Gnathosoma* length 50–62, width 49–54. Cheliceral stylets length 75–92, pharynx width 13–19, dorsal gnathosomal setae 30–35, ventral gnathosomal setae 15–23, distance between ventral setae 11–21.

Idiosoma. Stigmata evident anterolateral to setae v_1, tracheae narrow throughout. Idiosoma length 310–580, width 237–460 (Table 1). Prodorsal setae v_1 23–35, v_2 v, sc_1 m, sc_2 50–57. Distance between setae v_1 50–57. Plate C, setae c_1 27–37, setae c_2 27–35, plate D setae *d* 30 , foramen *ia* anteromedial to setae *d*, plate EF, lateral setae *e* 5–13, setae *f* 29–35, foramen *im* slightly anterior to setae *e* and *f*; plate H setae h_1 15–17, distance between h_1 setae 46–57. Venter with apodemes conspicuous, coxal setae thin, *1a* 10–11, *2a* 10, *3a* 0–m, *3b* 9–11.

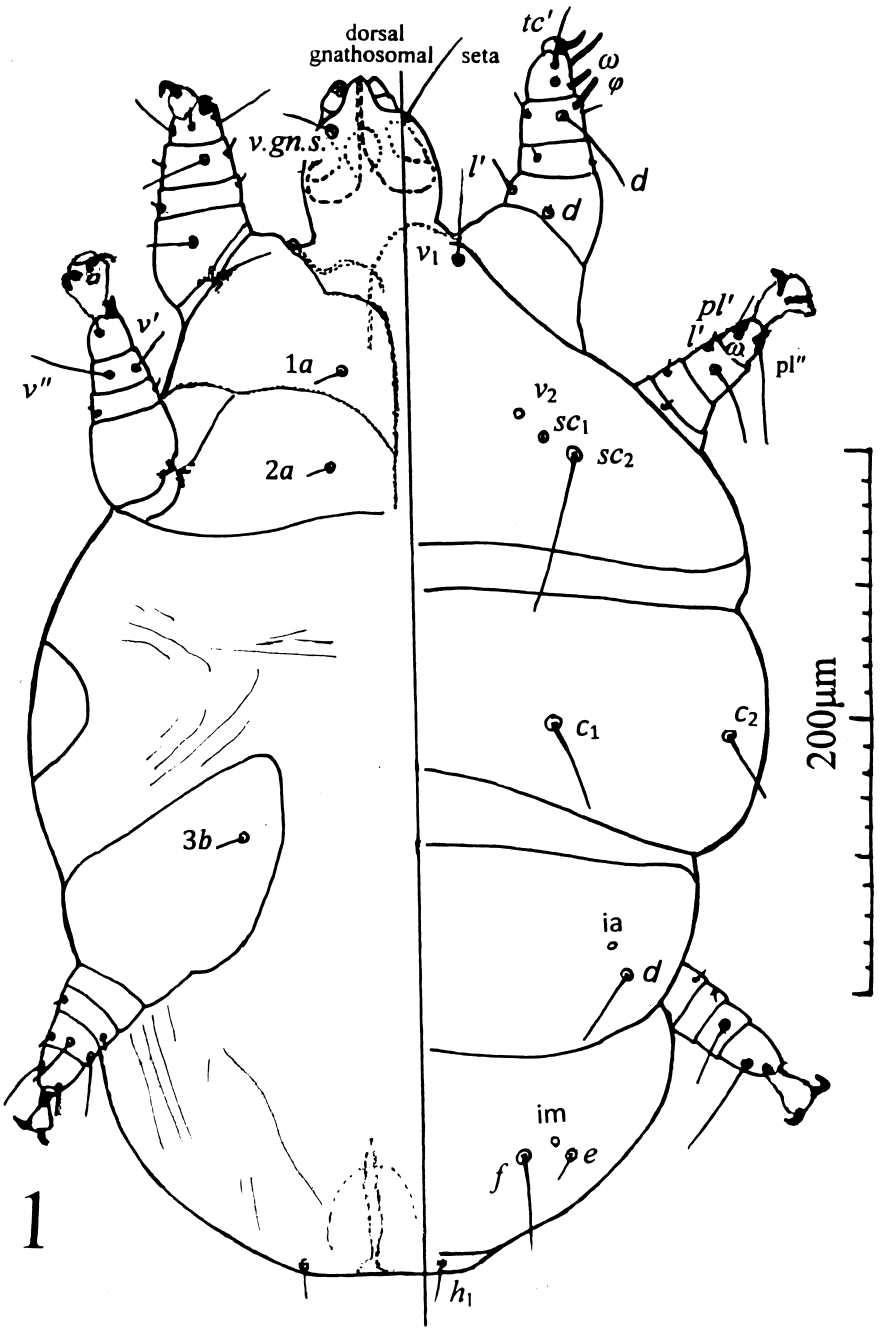

FIGURE 1. *Dorsipes diplocheilae* Kurosa and Husband, sp. nov., adult female.

Legs. Setation for femur, genu, tibia, tarsus I, II, III 3-4-7- 9, 1-3-4-6, 1-3-4-5, respectively. Tarsus I setae *ft′* microsetae and solenidia included in setal count. Ambulacrum I with a prominent claw (14–15), ambulacra II, III each with two prominent claws (14–15). Femur I setae *v″* 17–21, tibia I solenidion φ 11–12, setae *k* 6–7, tarsus I solenidion *ω* 7–10. Femur II setae *d* 4–5, tibia II setae *v″* 25–30, tarsus II solenidion *ω* 7–8, setae *pl″* 35–50. Tibia III setae *d* 25–27. Tarsus III setae *pl′* 20–25, *pl″* 40–50.

Larval female (Fig. 2, n=7): *Gnathosoma* length 40–45, width 35–40. Cheliceral stylet length 50–53. Pharynx width 8–10, dorsal gnathosomal setae 42–60, ventral setae 15–24, distance between ventral setae 14–18.

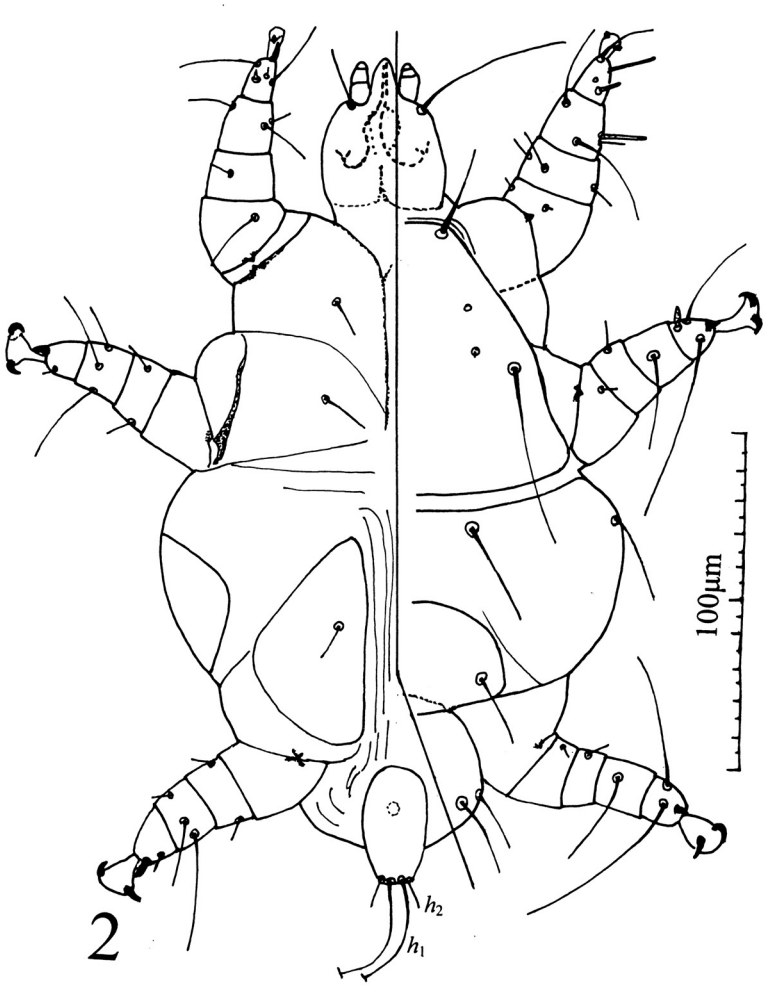

FIGURE 2. *Dorsipes diplocheilae* Kurosa and Husband, sp. nov., larval female.

Idiosoma. Length 180–340, width 135–250 (Table 1). Prodorsal plate setae v_1 26–28, v_2 v, sc_1 m, sc_2 50–60, v_1–v_1 distance 27–32. Plate C, setae c_1 20–30, c_2 21–30. Plate D, setae *d* 20–29, plate EF setae *e* 10–17, setae *f* 22–29. Plate H, setae h_1 70–80, h_2 10–12, h_1–h_1 setae adjacent. Venter with apodemes 1, 2 moderately developed, extending to sternal apodeme medially. Coxal setae *1a* 10–11, *2a* 13–15, *3a* absent-m, *3b* 10–11. Legs. Setation as in adult female. Ambulacra I each with two small claws (3–5), ambulacra II, III each with two larger claws (7–12). Femur I setae *v″* 20–25, tibia I solenidion φ 10–14, setae *k* 5–7, tarsus I solenidion *ω* 6–10, setae *ft′* absent-vestigial. Femora II, III setae *d* 5–7, 6–9. Tarsi II, III setae *pl′* 25–35 and 33–50, and *pl″* 47–53 and 48–60, respectively.

Egg (n=1): Length 220, width 145.

Male unknown.

Host. All the specimens examined were found on the hind wings (mostly basal portion), metanotum or abdominal dorsum under the elytra of *Diplocheila* (*Isorembus*) *zeelandica* (Redtenbacher, 1867) (Coleoptera: Carabidae: Licinini) collected in four localities of Japan.

Type material: Holotype, adult female (Kurosa No. 4889-1), from *Diplocheila zeelandica* (Redtenbacher) (Coleoptera: Carabidae), Funaura, Iriomote Is., Okinawa Prefecture, Japan, 24 April 1979, Y. Kurosa leg., deposited in the National Museum of Nature and Science, Tokyo, Japan (NSMT). Paratypes, four adult females and five larval females with the same data as the holotype; one adult female, one egg, Mt. Tomisan, Minami-Bôsô-shi, Chiba Pref., Japan, 5 March 1978, T. Okumura leg.; one larval female, Oda-chô, Ehime Pref., Japan, 23 July 1957, E. Yamamoto leg.; one larval female, Sonai, Iriomote Is., Okinawa Pref., Japan, 27 April 1979, Y. Kurosa leg. One adult female paratype and one larval female paratype are deposited in each of the following museums: NMNH, UMMZ and BGZM. The remaining paratypes are deposited in NSMT.

Etymology. The specific name *diplocheilae* refers to the generic name of the host beetle, *Diplocheila zeelandica*.

Dorsipes zeelandicae Kurosa and Husband sp. nov. (Figs. 3–5)

Differential diagnosis. Setae *e* (5) of adult female *D. zeelandicae* shorter than the length of setae *e* (13– 24) of *D. yezoensis* and *D. diplocheilae* and longer than length of setae *e* (3) of *D. limnocarabi*. Setae *f* (48–65) longer than the length of setae *f* (20–35) of *D. limnocarabi* and *D. diplocheilae*, shorter than the length of setae *f* (76–100) of *D. yezoensis.* Prodorsal setae v_1 (22–37) longer than setae v_1 of any of the other nineteen species of *Dorsipes* (m-18) except *D. diplocheilae* (23–35). Setae *d* and *f* of larval female *D. zeelandicae* (25–27) shorter than setae *d* and *f* of *D. diplocheilae* (29–35) and longer than all other species of *Dorsipes* (5–15, 7–18). Species in *inflatus* and *platysmae* groups without setae *e*. Setae h_1–h_1 adjacent in larval female *D. zeelandicae* as in *D. diplocheilae* and in contrast to separated by 5–20 in related *Dorsipes*. Tarsi II solenidia ω present in all instars of *D. zeelandicae* and *D. diplocheilae* but not present in the five related species of *Dorsipes* in the *dorsipes* group. *D. zeelandicae*, *D.diplocheilae* and African *Dorsipes tefflii* (*platysmae* group) with genua I, II, III setae of all instars 4-3-3, respectively.

Description

Female (Fig. 3, n=5): *Gnathosoma* length 52–70, width 55–68. Cheliceral stylets length 84–100, pharynx width 12–15, dorsal gnathosomal setae 30–35, ventral gnathosomal setae 11–20, distance between ventral setae 20.

Idiosoma. Stigmata evident anterolateral to setae v_1, tracheae narrow throughout. Idiosoma length 332–430, width 240–318 (Table 1). Prodorsal setae v_1 22–37, v_2 v, sc_1 m, sc_2 89–89. Distance between setae v_1 60. Plate C, setae c_1 58–68, setae c_2 37–72, plate D setae *d* 50–65, plate EF lateral setae *e* 5, setae *f* 48–65; plate H setae h_1 14–17, distance between h_1 setae 51–57. Venter with apodemes 2 not extending to sternal apodeme, coxal setae thin, *1a*, 10–15, *2a* 10–14, *3a* absent, *3b* 8–10.

Legs. Setation for femur, genu, tibia, tarsus I, II, III 3-4-7-9, 1-3-4-6, 1-3-4-5, respectively. Tarsus I setae *ft′* microsetae and solenidia included in setal count. Ambulacrum I with a prominent claw (14–20), ambulacra II, III each with two prominent claws (13–20). Femur I setae *v″* 20–30, tibia I solenidion φ 10–11, setae *k* 5–8, tarsus I solenidion ω 8–10. Femur II, III setae *d* 4–5 and 3–5, tibia II setae *v″* 27–34, tarsus II solenidion ω 8–10, setae *pl″* 25–48. Tibia III setae *d* 20–35. Tarsus III setae *pl′* 17–22, *pl″* 45–50.

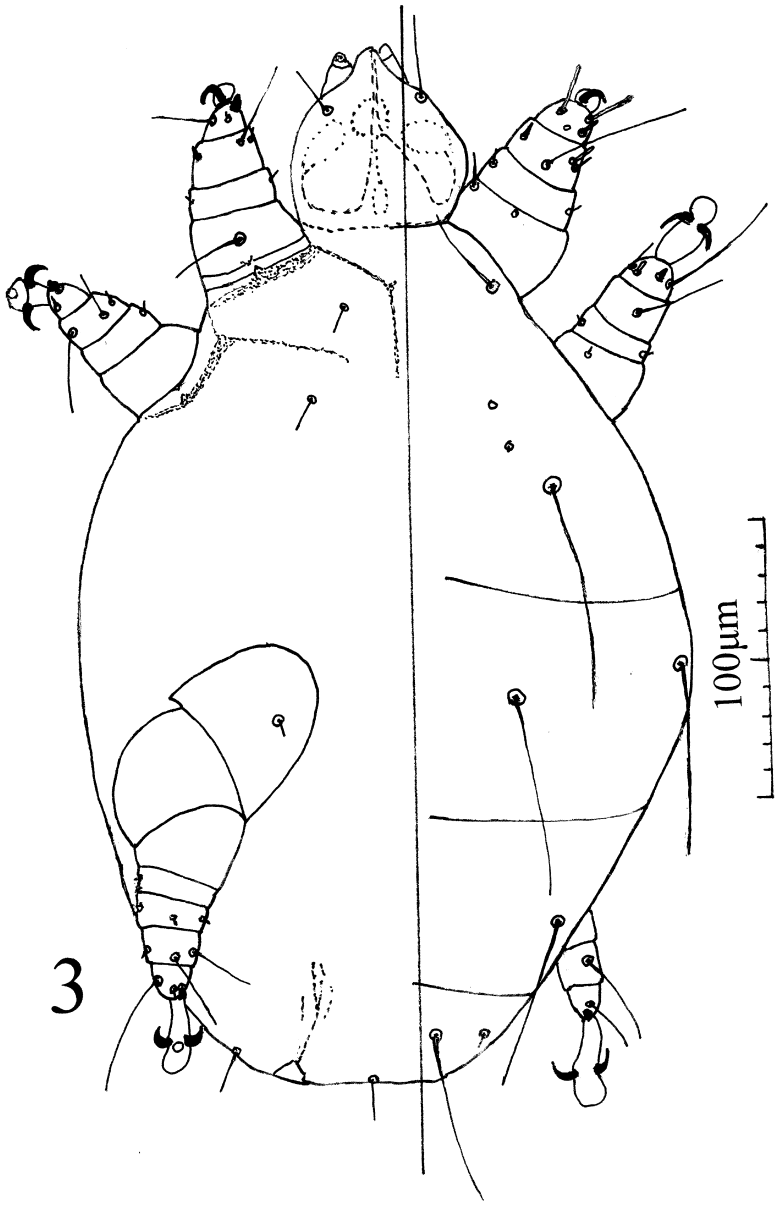

FIGURE 3. *Dorsipes zeelandicae* Kurosa and Husband, sp. nov., adult female.

Male (Fig. 4, n=1): Gnathosoma length 33, width 35. Cheliceral stylet length 18, pharynx width 7. Dorsal gnathosomal length 24, ventral gnathosomal length 10, distance between ventral gnathosomal setae 17.

Idiosoma. Length 195, width 137 (Table 1). Prodorsal plate setae v_1, v_2 and sc_1 m, sc_2 60, distance between setae v_1 42. Aedeagus middorsal between fused plates C, D and EF, length 20, maximum width 19. Venter with apodemes I and II moderately developed, apodemes II not extending to sternal apodeme. Coxal setae *1a* 6, *2a* 10, *3a* 0, *3b* 8.

Legs. Setation as in female. Ambulacrum I with a single small claw (5), ambulacra II, III each with two strong claws (15). Tibia I solenidion φ 10, seta *k* 4, tarsus I solenidion ω 10. Femur II setae

d m, tibia II setae *v″* 23, tarsus II solenidion *ω* 10, setae *pl″* 36. Femur III setae *v′* m, tibia III setae *l′* spinelike 3, *v″* 25. Tarsus III setae *pl″* 40. Legs IV femur and genu without setae, Tibia IV setae *v″* m, tarsus IV setae *tc′* claw-like 6, *u′* 5, *pv′* 3 and *pv″* 3.

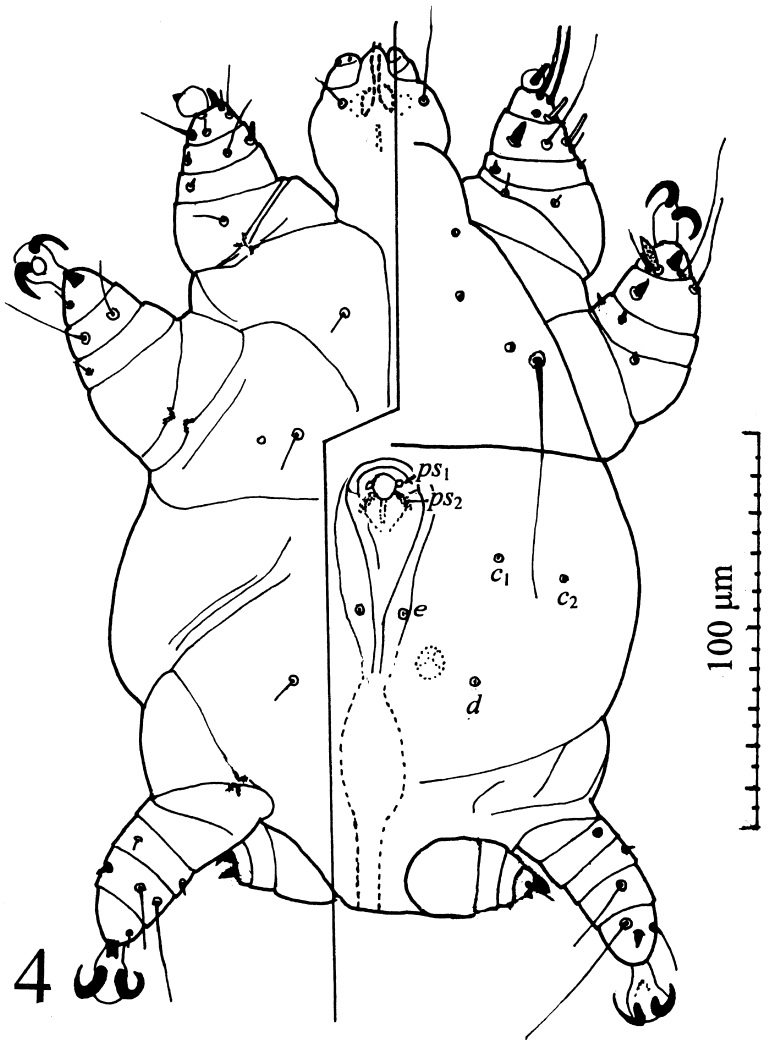

FIGURE 4. *Dorsipes zeelandicae* Kurosa and Husband, sp. nov., male.

Larval female (Fig. 5, n=1): *Gnathosoma* length 48, width 45. Cheliceral stylet length 61. Pharynx width 8, dorsal gnathosomal setae 44, ventral setae 11, distance between ventral setae 15.

Idiosoma. Length 190, width 132 (Table 1). Prodorsal plate setae v_1 26, v_2 0, sc_1 m, sc_2 79, v_1–v_1 distance 34. Plate C, setae c_1 24, c_2 22. Plate D, setae *d* 25, plate EF setae *e* 7, setae *f* 27. Plate H, setae h_1 70, h_2 7, h_1–h_1 setae adjacent. Venter with apodemes 1, 2 moderately developed, extending to sternal apodeme medially. Coxal setae *1a* 9, *2a* 13, *3a* 0, *3b* 8.

Legs. Setation as in adult female. Ambulacra I each with two small claws (4), ambulacra II, III each with two larger claws (15). Femur I setae *v″* 20, tibia I solenidion φ 10, setae *k* 6, tarsus I solenidion *ω* 9, setae *ft′* 0. Femora II, III setae *d* 7, 6. Tarsi II, III setae *pl′* 30 and 33, and *pl″* 44 and 47, respectively.

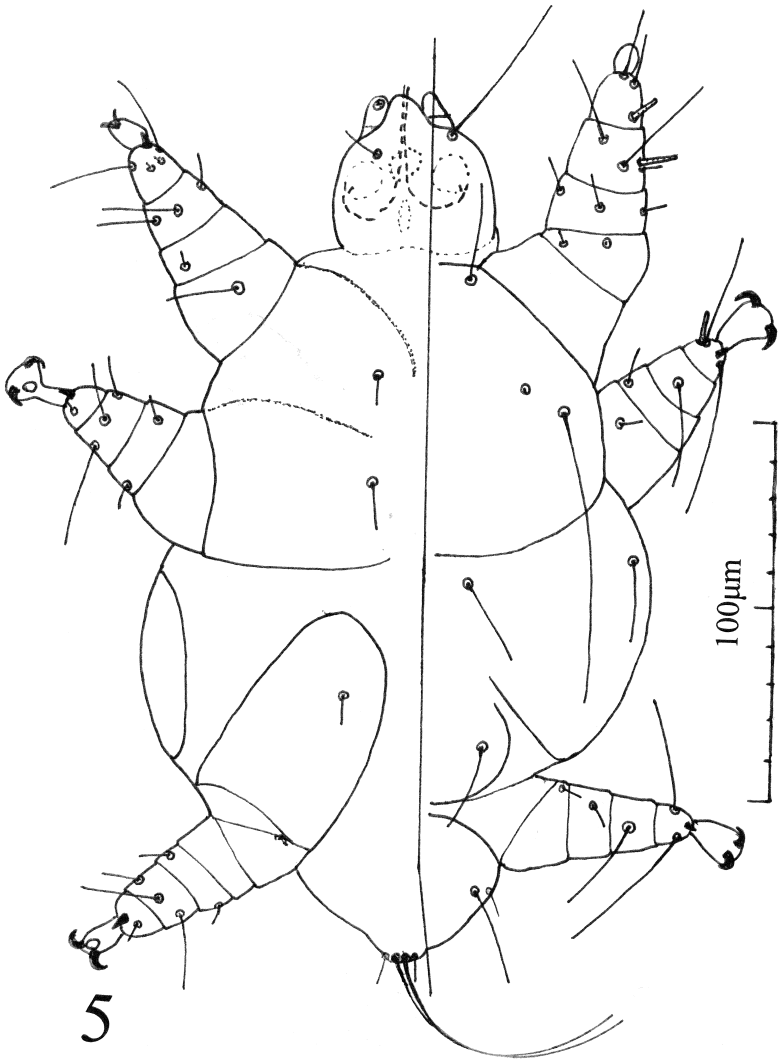

FIGURE 5. *Dorsipes zeelandicae* Kurosa and Husband, sp. nov., larval female.

Host. All of the mites from the host specimens examined were found on the basal portion of hind wings or abdominal dorsum under the elytra of two specimens of *Diplocheila* (*Isorembus*) *zeelandica* (Redtenbacher, 1867) (Coleoptera: Carabidae: Licinini) collected in two localities in Japan. In no case were *Dorsipes diplocheilae* and *D. zeelandicae* found in coexistence on a single host beetle.

Type material: Holotype, adult female (Kurosa No. 21740-2), from *Diplocheila zeelandica* (Redtenbacher) (Coleoptera: Carabidae), Yoshii-machi, Fukuoka Prefecture, Japan, 3 August 1957, N. Gyôtoku, leg., deposited in the National Museum of Nature and Science, Tokyo, Japan (NSMT). Paratypes, four adult females, one male and one larval female with the same data as the holotype; two adult females, Mt. Tomisan, Minami-Bôsô-shi, Chiba Pref., Japan, 31 December 1973, T. Okumura, leg. One adult female paratype is deposited in each of the following museums: NMNH, BGZM and UMMZ. The remaining paratypes are deposited in NSMT.

Etymology. The specific name *zeelandicae* refers to the specific name of the host beetle, *Diplocheila zeelandica.*

TABLE 1. Comparison of selected maximum measurements for species of the *dorsipes* group of the genus *Dorsipes*: *D. diplocheilae* (*Ddi*), *D. zeelandicae* (*Dz*), *D. dorsipes* (*Ddo*), *D. carabi* (*Dc*), *D. limnocarabi* (*Dl*), *D. yezoensis* (*Dy*), *D. balli* (*Db*). All measurements are in micrometers.

Character	*Ddi*	*Dz*	*Ddo*	*Dc*	*Dl*	*Dy*	*Db*
ADULT FEMALES							
Idiosoma length	580	430	638	380	495	565	685
Idiosoma width	460	318	415	270	330	380	552
Gnathosoma width	54	68	82	79	68	76	110
Cheliceral stylets	92	100	80	62	88	68	95
Idiosomal setae							
v_1	35	37	5	3	10	5	m
c_1	37	68	80	28	26	90	35
c_2	25	72	50	26	16	70	40
d	30	65	57	25	14	78	25
e	13	5	17	18	6	24	14
f	35	65	80	25	26	100	29
Genu II setae *l′*	5	5	0	0	0	0	0
Genu III setae *l′*	5	5	0	0	0	0	0
Femur II setae *d*	5	5	5	3	m	8	5
Femur III setae *d*	5	5	7	4	m	7	5
Tarsus II solenidion *ω*	10	10	0	0	0	0	0
Tarsus III setae *pl″*	50	50	120	56	112	140	80
LARVAL FEMALES							
Idiosoma length	340	190	298	-	242	288	360
Idiosoma width	250	132	210	-	158	186	315
Cheliceral stylets	53	61	66	-	63	55	88
Dorsal gnathosomal setae	50	44	34	-	29	39	45
Idiosomal setae							
v_1	28	26	m	-	7	2	3
c_2	30	22	13	-	6	25	12
d	29	25	14	-	8	15	11
e	17	7	13	-	4	7	7
f	29	27	17	-	15	15	18
Genu II setae *l′*	11	8	0	-	0	0	0
Genu III setae *l′*	10	7	0	-	0	0	0
Femur II setae *d*	7	7	5	-	m	6	3
Femur III setae *d*	9	6	5	-	m	4	3
Tarsus II solenidion *ω*	9	8	0	-	0	0	0
Tarsus III setae *pl″*	53	47	113	-	67	120	95
Distance h_1-h_1	0	0	20	-	5	18	9
MALES							
Idiosoma length	-	195	192	-	190	230	172
Idiosoma width	-	137	173	-	165	170	167
Cheliceral stylets	-	18	25	-	32	22	23
Dorsal gnathosomal setae	-	24	8	-	13	10	m
Ventral gnathosomal setae	-	10	9	-	8	5	7
Idiosomal setae sc_2	-	60	49	-	100	47	5
Femur II, III setae *d*	-	m	m	-	m	m	m
Tarsus II solenidion *ω*	-	10	0	-	0	0	0
Tibia II setae *v″*	-	23	30	-	42	32	16
Tarsus III setae *pl″*	-	40	45	-	85	75	25
Aedeagus width	-	19	31	-	26	35	40

Discussion

Regenfuss (1968) described the genus *Dorsipes* and placed seven species into three groups: *dorsipes*, *inflatus* and *platysmae*. With the addition of 12 species since 1968 and reexamination of characters of the original seven species, some of the eight apo- and plesiomorphic characters chosen by Regenfuss are no longer valid for all species in the three groups. Kurosa and Husband (2002) redescribed *D. inflatus* and *D. notopus* and noted that male *D. inflatus* and *D. notopus* have tarsus I solenidia ω and tibiae I solenidion φ. Femur III setae are not present in most species in the *inflatus* group (one exception) and are also not present in four of the seven species in the *platysmae* group. Setae *e* (setae lumbales externae) are consistently present in species in the *dorsipes* group and absent in all species of the *inflatus* and *platysmae* groups (Regenfuss 1968). Ambulacral claw I is "very small" (3–6) in all species in the *platysmae* group (Regenfuss 1968). Coxal setae *3a* (setae presternales internae) are not present in all species in the *inflatus* group and *D. dorsipes* and *D. carabi*, in the *dorsipes* group (Regenfuss 1968). Setae *3a* are present in *D. limocarabi* Husband and Kurosa 2002, *D. balli* Husband and Husband 2010 and in *D. diplocheilae* herein of the *dorsipes* group. The presence of tarsus II solenidia ω in *D. diplocheilae* and *D. zeelandicae* is in contrast to the pattern of no tarsus II solenidia in the *inflatus* group and *dorsipes* groups as described by Regenfuss (1968).

The most consistent characters for females of species in the *dorsipes* group are: presence of setae *e* on plate EF, elongate setae *f* (20–100) in contrast to shorter setae *f* (7–18) for all *Dorsipes* except *D. tefflii* Husband from Africa, presence of femora II, III setae, long setae c_1 (20–90) and *d* (25–78) (one exception) in contrast to setae c_1 short (6–19), except *D. tefflii* and *D. nigeri* in the *platysmae* group. Adult females of *D. diplocheilae* and *D. zeelandicae* have longer setae v_1 (23–37) in contrast to shorter setae v_1 (m-18) for all other female *Dorsipes.* Female *D. diplocheilae* have shorter setae c_1, c_2, *d* and *f* setae (27–37, mean value 31) and longer setae *e* (mean value 9.3) in contrast to lengths of setae c_1, c_2, *d* and *f* (37–72, mean value 57.2) and shorter setae *e* (5) in female *D. zeelandicae.* Larval females mimic adult females in respect to lengths of setae *e*.

Key to groups of the genus *Dorsipes*, adult females

1. Plate EF with setae *f* (7–18, except *D. tefflii*, 30), setae *e* absent. 2
- Plate EF with setae *f* (15–100) and *e* (3–24), hosts *Carabus* and *Diplocheila*. . . . . *dorsipes* group
2. Tarsus II solenidion ω absent, host genus *Amara* . . . . . *inflatus* group
- With tarsus II solenidion ω, host genera; *Agonum, Cyclotrachelus, Poecilus, Pterostichus, Tefflus* . . . . . *platysmae* group

Key to species in the *dorsipes* group, adult females

1. Prodorsal setae v_1 (22–37), as long as width of base of tarsus I (16–25), tarsus II solenidion ω present (9), host *Diplocheila* 2
- Prodorsal setae v_1 (m-10) shorter than width of base of tarsus I (15–28), tarsus II solenidion ω absent, host *Carabus* 3
2. Setae c_1 and *d* 50–72, setae *e* shorter (5). . . . . *Dorsipes zeelandicae* **sp. nov.**
- Setae c_1 and *d* 27–37, setae *e* longer (5–13) . . . . . *Dorsipes diplocheilae* **sp. nov.**
3. Setae v_1 shorter (m-3) 4
- Setae v_1 longer (5–10) 5
4. Cheliceral stylets (60–62) shorter than width of gnathosoma (79) . . . . . *Dorsipes carabi*
- Cheliceral stylets (77–96) nearly equal to width of gnathosoma (72–110). . . . . *Dorsipes balli*

5. Setae c_1 and *d* (45–70) longer than ventral gnathosomal setae (27–38) 6
- Setae c_1 and *d* (7–16) shorter than ventral gnathosomal setae (28–37) . . . *Dorsipes limnocarabi*
6. Cheliceral stylets (73–80) equal to or longer than width of gnathosoma (75–82), claw I larger (25) . . . . . *Dorsipes dorsipes*
- Cheliceral stylets (65–68) shorter than width of gnathosoma (72–76), claw I not as large (17) . . . . . *Dorsipes yezoensis*

Acknowledgments

We are grateful to the late Messrs. Takashi Okumura and Naomi Gyôtoku, Dr. Yoshiro Kurosa, Saku Medical Center, Nagano Prefecture, Japan and Mr. Eiji Yamamoto, Uchiko-chô, Ehime Prefecture for material used in this work.

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Accepted by Owen Seeman: 20 Jul 2011; published 14 Oct. 2011