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The Japanese Dialineura (Diptera, Therevidae)*

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Abstract Two species of *Dialineura* Rondani are present in Japan. *D. albata* (Coquillett) is redescribed, and is recorded from Honshu and Kyushu. A new species, *D. shozii* is described; it is also recorded from Honshu and Kyushu.

The genus Dialineura has its centre of distribution in the eastern part of the Palearctic Region. Six species (aurata Zaitzev, gorodkovi Zaitzev, lehri Zaitzev, lyneborgi Zaitzev, mongolica Zaitzev, and nigrofemorata Kröber) are known from East Siberia, Mongolia, or the Far East Territory of the U. S. S. R. One of these (aurata) also occurs in China, wherein affinis Lyneborg and kikowensis Ôuchi are also present. D. gorodkovi of NE Siberia occurs in arctic Canada as well. The Japanese fauna contains albata (Coquillett) and shozii sp. n., herein described. The western part of the Palearctic Region houses only one species, anilis (Linnaeus), which is widespread in Europe, W. Siberia and Kazachstan. The above notes are based on Ôuchi (1943), Lyneborg (1968, 1975), Zaitzev (1971, 1977, 1986), and Irwin and Lyneborg (1981).

The terminology of the male genitalia is largely in accordance with IRWIN and LYNEBORG (1981). The abbreviations used in the figures are as follows: C, cercus; DAP, dorsal apodeme of aedeagus; DP, distiphallus; EAP, ejaculatory apodeme; EP, epandrium; GC, gonocoxite; GS, gonostylus; PA, parameral apodeme; PP, parameral process; SS, substylus; VAP, ventral apodeme; VEPS, ventral epandrial sclerite (=paraproct); VL, ventral lobe.

Genus Dialineura RONDANI

Dialineura Rondani, 1856, Dipt. Ital. Prodr., 1, p. 155. Type species: Musca anilis Linnaeus, 1761 (from "Europe"), by original designation.

^{*} Studies of Diptera Collection in National Institute of Agro-Environmental Sciences, Tsukuba, Ibaraki, Japan. No. 2.

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For detailed diagnosis (including that of male genitalia) of *Dialineura*, see Lyneborg (1968, 1975), Zaitzev (1971), and Irwin and Lyneborg (1981).

The main daignostic characters for *Dialineura* are as follows: 1) antennal segment 1 more or less incrassate, wider than first flagellomere (Figs. 1, 15); 2) frons with pile, and lateral portion of face usually without pile (Figs. 1-2, 15-16); 3) prosternum with long pile; 4) mid coxa with long pile on posterior surface; 5) cell M₃ open (Figs. 7, 21); 6) epandrium elongate and more or less strongly narrowing posteriorly (Figs. 12, 27); 7) paraproctal part of "ventral epandrial sclerite" well sclerotized, about as long as cerci in Japanese species (Figs. 12, 27-28), in other species may be strongly elongate; 8) sternal part of "ventral epandrial sclerite" membranous; 9) hypandrium absent (Figs. 8-9, 22-23); 10) accessory finger-like process (here termed substylus) present on inner side of gonocoxite near insertion of gonostylus (Figs. 8, 22).

The two Japanese species are easily separated by the external characters given below.

In albata, 1) pile on male frons, antennal segment 1, mesonotum, scutellum, etc. much shorter than in shozii; 2) male mesonotum with erect black hairs and recumbent pale pile which is apparently shorter than erect black pile; 3) male abdominal terga 2-6 without black basal band; 4) area above and below apical portion of vein R₁ dark brown (not yellowish brown) and borders along several veins also dark brown in both sexes; 5) female space between antenna and eye 0.9-1.1 times length of antennal segment 1 along outer margin, and female antenna 1.2-1.3 times distance from antenna to anterior ocellus; 6) female mid and hind femora, often also fore femur, yellowish (or reddish) brown; 7) female abdominal terga 1-6 (or 1-7) with large darkened mid-basal spot.

In shozii, 1) pile on male frons, antennal segment 1, mesonotum, scutellum, etc. long; 2) male mesonotum with erect black hairs and erect pale to pale brown or golden pile, which is nearly as long as black pile; 3) male abdominal terga 2-6 each with black basal band which is produced in middle; 4) area above and below apical portion of vein R₁ yellowish brown, and wing membrane in both sexes without darkened portions; 5) female space between antenna and eye 0.5-0.6 times length of antennal segment 1 along outer margin and female antenna 1.5-1.7 times distance from antenna to anterior ocellus; 6) female femora (excepting apices) dark brown to black (as in 3); 7) female abdominal terga 2-7 shining and with pale or brown gray pollinose borders.

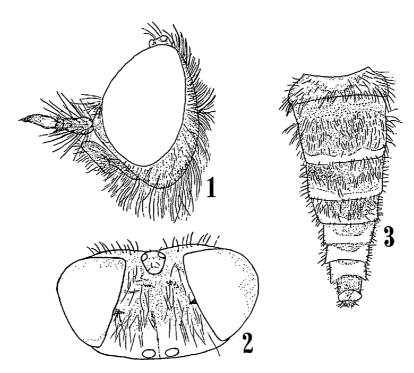
Dialineura albata (COQUILLETT)

[Japanese name: Yamato-tsurugi-abu]

(Figs. 1-14)

Psilocephala albata Coquillett, 1898, Proc. U.S. natn. Mus., 21: 317. Type area: Japan.

Male. Similar to shozii except as follows: Head (Figs. 1, 4-6): Apical portion

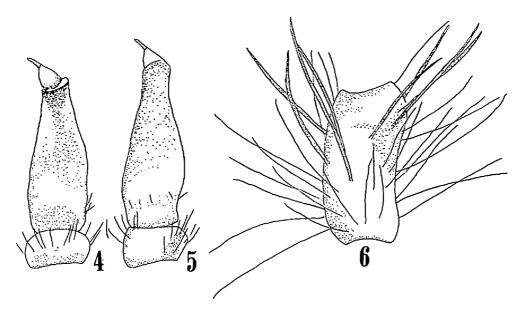


Figs. 1-3. Dialineura albata; 1, male head, lateral view; 2, female head, direct frontal view (distance between antenna and anterior ocellus is kept horizontal); 3, female abdomen, dorsal view.

of palpus pale (or yellowish) brown; hairs on (1) frons, (2) upper occiput just behind eye, and (3) antennal segment 1 distinctly shorter than in *shozii* and those on (2) weaker and fewer in number; hairs on occiput not golden; half width of head 1.0–1.1 times width of frons just above antenna and 0.8–0.9 times (almost the same as in *shozii*) width of face at lowest portion from a direct frontal view; space between antennae 0.2–0.3 times width of ocellar triangle; space between antenna and eye 0.2–0.3 times (almost the same as in *shozii*) width of frons just above antenna and 0.6–0.7 times length of antennal segment 1 along outer margin; ocellar triangle 1.0–1.2 times as long as wide; antenna 1.0–1.2 times as long as distance from antenna to anterior ocellus; relative lengths of antennal segments 1, 2, 3 and style (along outer surface) 100: 22 (16–27): 96 (82–107): 28 (24–31), and their relative widths (except that of style) (from the side) 56 (50–69): 41 (37–47): 39 (35–44); data based on 10 specimens.

Thorax: Mesonotum with three broad darker stripes; the median stripe is separated by a median vitta, and each lateral stripe is interrupted at the suture (this may be the same in *shozii*); hairs on mesonotum and scutellum distinctly shorter than in *shozii*; mesonotum with erect black pile and recumbent pale pile, the latter being apparently shorter than the former; hairs on scutellum and upper posterior part of mesopleuron not golden.

Wing (Fig. 7): Area above and below apical portion of vein R₁ dark brown



Figs. 4-6. Male antenna of *Dialineura albata*; 4-5, segments 2, 3 and style, outer and inner views; 6, segment 1, outer view.

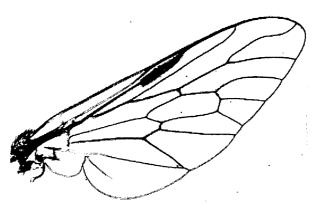
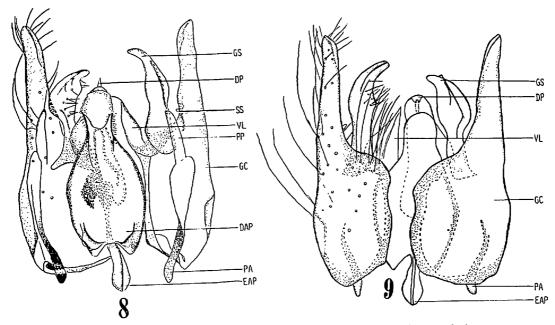


Fig. 7. Male wing of Dialineura albata.

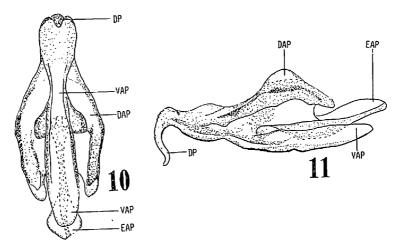
(not yellowish brown); several veins also bordered with dark brown; knob of halter dark brown to black, stem except base pale brown or yellowish brown.

Legs: White erect pile on coxae and femora shorter than in *shozii*, and that on hind femur appears to be confined to dorso-proximal part; relative lengths of segments (excluding coxa and trochanter) of fore leg 203 (189–219): 230 (208–253): 100: 45 (40-50): 38 (35-39): 24 (21-26): 35 (34-38), of mid leg 219 (200–241): 259 (236–281): 118 (108-125): 56 (50-59): 39 (38-41): 23 (18-25): 34 (32-38), of hind leg 295 (278–331): 352 (338–382): 142 (132–150): 66 (59–74): 45 (39–49): 25 (24–27): 34 (31–37), and in hind leg from the side, relative widths of femur, tibia, and tarsal segments 1-3, 41 (38–45): 25 (23–28): 18 (16–22): 15 (13–18): 13 (11–15); (N=10).

Abdomen: Terga 2-6 wholly white gray tomentose and without black basal



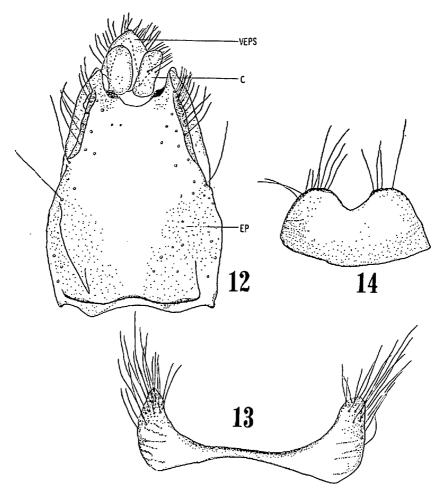
Figs. 8-9. Male genitalia of Dialineura albata, dorsal and ventral views.



Figs. 10-11. Aedeagus of *Dialineura albata*, ventral and lateral views (based on 2nd specimen).

bands; erect pile on abdomen distinctly shorter than in shozii; hairs on gonocoxites wholly or chiefly pale brown or yellowish brown.

Genitalia (Figs. 8–14): Substylus on inner side of gonocoxite weak; gonostylus with outer extension rounded; distiphallus comparatively wide at base and with spinules at sides; dorsal apodeme with a pair of large longitudinal ridges; ventral apodeme longer than dorsal apodeme, and its proximal half hardly narrower than the distal half. Specimens dissected: 2 33, Tarumizu, Kagoshima Pref., 31. iii. 1977, A. NAGATOMI.



Figs. 12-14. Male genitalia of *Dialineura albata*; 12, dorsal view; 13, tergum 8, dorsal view (not flattened out); 14, sternum 8, ventral view.

Length: Body 7.9-9.7 mm; wing 6.1-7.4 mm; fore basitarsus 0.8-1.0 mm.

Female. Similar to shozii except as follows: Head (Fig. 2): Apical portion of palpus pale (or yellowish) brown as in 3; black spot at eye margin of frons small or often practically absent; tomentum on lower frons and antenna may be pale (or white) gray; width of frons just above antenna 1.7-1.9 times width of frons at anterior ocellus, which is 2.3-2.8 times width of ocellar triangle; half width of head 0.8-0.9 times (almost the same as in shozii) width of frons just above antenna and 0.8 times (almost the same as in shozii) width of face at lowest portion from a direct frontal view, which is 1.7-1.8 times (in shozii, 1.4-1.7 times) distance from antenna to anterior ocellus; space between antennae 0.2-0.4 times (in shozii, 0.3-0.7 times) width of ocellar triangle; space between antenna and eye 0.9-1.1 times length of antennal segment 1 along outer margin; antenna 1.2-1.3 times as long as distance from antenna to anterior ocellus; relative lengths of antennal segments 1, 2, 3 and style are 100: 24 (19-25): 98 (93-107): 30 (27-34), and their relative widths (except

that of style) (from the side) are 54 (50-57): 44 (40-50): 50 (43-57); palpus 0.7-0.8 times (almost the same as in *shozii*) as long as distance from antenna to ventral base of proboscis; data based on 6 specimens.

Thorax: Tomentum on mesonotum and scutellum, as well as on pleura, pale gray.

Wing: As in male.

Legs: Mid and hind femora, often also fore femur, yellowish (or reddish) brown; white erect pile on fore and mid femora present (this may be the same in *shozii*); relative lengths of segments of fore leg 184 (173–195): 213 (193–229): 100: 43 (40–46): 34 (29–38): 21 (18–23): 30 (27–33), of mid leg 211 (193–233): 252 (233–271): 118 (100–131): 58 (51–66): 39 (33–41): 21 (18–23): 29 (27–31), of hind leg 276 (263–292): 346 (323–390): 138 (124–149): 64 (58–72): 43 (39–49): 24 (22–28): 29 (27–33), and in hind leg from the side, relative widths of femur, tibia, and tarsal segments 1–3, 38 (32–43): 24 (22–26): 18 (15–21): 15 (13–16): 13 (11–15); (N=7).

Abdomen (Fig. 3): Dark brown to black, and white gray tomentose, but terga 1-6 (or 1-7) each with a large darkened mid-basal spot which may be variable in extent and often not well defined; sides of terga 4-7 (or 5-7) also darkened; pile on abdomen wholly pale and that on sides of terga 1-2 and on sternum 2 longer than on rest of abdomen.

Length: Body 9.1-10.7 mm; wing 7.0-8.2 mm; fore basitarsus 0.9-1.1 mm. *Distribution*. Japan (Honshu and Kyushu).

Specimens examined (30 & 7, 7 \circ 9). [Honshu] (10 & 7, 4 \circ 9). Fukushima Pref. (2 \circ 9): 2 \circ 9, Akai-yaji, Inawashiro, 14. vi. 1974, K. Kanmiya. Nara Pref. (1 &): 1 &, Tenri, Nara, 12. vi. 1963, I. Miyagi. Hyôgo Pref. (9 & 7, 2 \circ 9): 8 & 7, 2 \circ 9, Sasayama, Tamba, 26. iv. 1956, A. Nagatomi; 1 &, Hyônosen, Tajima, 26. v. 1953, T. Okutani. [Kyushu] (20 & 7, 3 \circ 9). Fukuoka Pref. (1 &): 1 &, Shikamura, 5. v. 1946, T. Shirozu. Kagoshima Pref. (19 & 7, 3 \circ 9): 7 & 7, 3 \circ 9, Ôsumi-ôgawara, 22. iv. 1962, A. Nagatomi; 12 & 7, Tarumizu, 31. iii. 1977, A. Nagatomi.

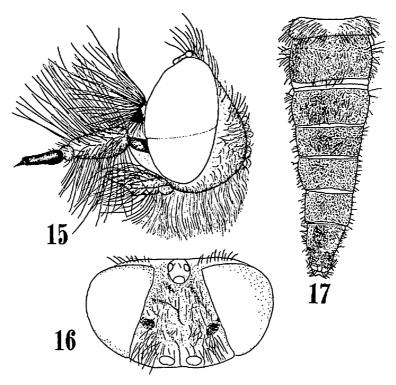
Dialineura shozii sp. n.

[Japanese name: Shozi-tsurugi-abu]

(Figs. 15-31)

Dialineura shozii is closely related to D. lehri ZAITZEV, 1977 from Primorye. Both shozii and lehri may represent rather plesiomorphic species of Dialineura, as the paraproct is small, a parameral process is present, a substylus is present, the dorsal apodeme of aedeagus is without ridges, and the distiphallus has no spicules or denticles. Synapomorphic characters for shozii and lehri could be the triangular extension of the gonostylus, the medially directed apex of the parameral process, and the very enlarged first antennal segment.

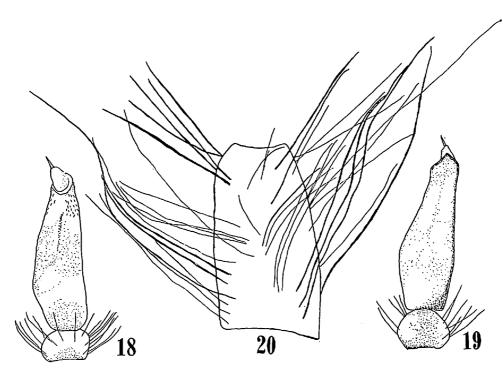
In male lehri, the abdominal terga are entirely silvery white pollinose (in male



Figs. 15-17. Dialineura shozii; 15, male head, lateral view; 16, female head, direct frontal view (=distance between antenna and anterior ocellus is kept horizontal); 17, female abdomen, dorsal view.

shozii, each of abdominal terga 2-6 has a black basal band produced at middle), and the apex of parameral process is pointed (in shozii, it is rounded).

Male. Head (Figs. 15, 18-20): Dark brown to black, and white gray pollinose; frons and antennal segment 1 with long black hairs which are often intermixed with pale or light brown hairs; upper occiput just behind eye margin with a transverse row of long black hairs directed forward; (1) ocellar triangle, (2) vertex, (3) occiput above neck (except cerebrale), and (4) antennal segment 2 with black hairs which are stout on (3) and short on (4); occiput, cheek, palpus and proboscis with white pile which may become golden on occiput; eyes very narrowly separated or contiguous for a distance which is roughly as long as ocellar triangle; half width of head 1.1-1.3 times distance from antenna to anterior ocellus, 0.8-0.9 times width of frons just above antenna, and 0.8 times width of face at lowest portion from a direct frontal view, which is 1.4-1.5 times distance from antenna to anterior ocellus; space between antennae 0.3-0.6 times width of ocellar triangle; space between antenna and eye 0.2 times width of frons just above antenna and 0.4-0.5 times length of antennal segment 1 along outer margin; ocellar triangle 0.9-1.0 times as long as wide; distance from antenna to ventral base of proboscis 0.9-1.1 times distance from antenna to anterior ocellus; antenna 1.3-1.5 times as long as distance from antenna to anterior ocellus; relative lengths of antennal segments 1, 2, 3, and



Figs. 18-20. Male antenna of *Dialineura shozii*; 18-19, segments 2, 3 and style, outer and inner views; 20, segment 3, outer view.

style (along outer surface) 100: 16 (14–19): 62 (54–71): 17 (14–19) and their relative widths (except that of style) (from the side) 49 (43–57): 25 (22–29): 25 (22–29); palpus 0.7–0.8 times as long as distance from antenna to ventral base of proboscis; proboscis measured along ventral surface 1.0–1.15 times as long as distance from antenna to ventral base of proboscis; data based on 8 specimens.

Thorax: Dark brown to black, and white gray pollinose; mesonotum with a pair of narrow white gray pollinose vittae, with long erect black hairs and with erect, pale to pale brown or golden pile which is nearly as long as black hairs; pleura (except ptero-, hypo-, and posterior part of sterno- and of the metapleura) and scutellum with very long pale pile which often becomes golden on scutellum and upper posterior part of mesopleura; the number of black bristles are as follows: npl, 3 (rarely 4); sa, 2; pa, 1; dc, 1-2; sc, 2.

Wing (Fig. 21): Membrane is faintly brown fumose, but stigma (area above and below apical portion of vein R_1) is yellowish brown being long and narrow; veins dark brown, but partly yellowish brown; halter yellowish brown, but base of stem and of knob darkened.

Legs: Dark brown to black, but tibia and basitarsus except apices, and apex of femur yellowish brown; often fore basitarsus and mid and hind femora almost wholly dark brown to black; coxae and femora white gray tomentose; coxae with long erect white pile and femora with recumbent white pile which becomes longer

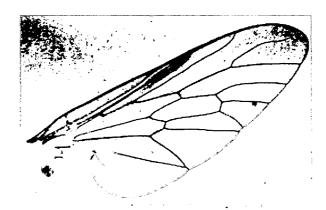


Fig. 21. Male wing of Dialineura shozii.

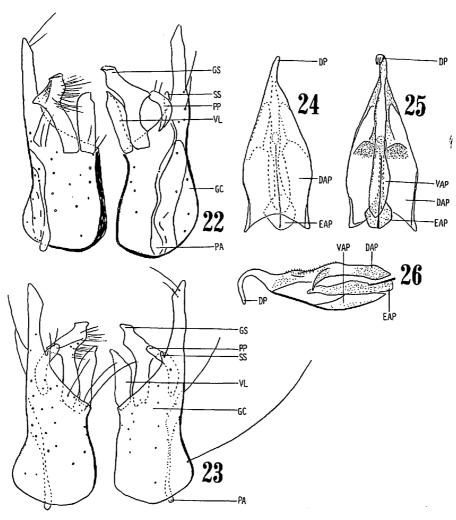
and erect on posterior surface of fore-, ventral surface of mid-, and basal part of hind femur; fore and mid coxae each with 2-3, black bristles at apex; hind coxae with 1 anterodorsal black bristle at middle and with a group of black, ventral bristles at apex; hind femur with a row of 6-10, black antero-ventral bristles; relative lengths of segments (excluding coxa and trochanter) of fore leg 182 (169-200): 209 (200-229): 100: 43 (38-46): 34 (29-37): 21 (18-23): 28 (24-31), of mid leg 196 (182-214): 236 (225-260): 121 (110-126): 55 (51-58): 37 (31-40): 19 (16-20): 26 (24-30), of hind leg 274 (260-309): 340 (325-374): 141 (138-144): 67 (64-70): 42 (38-45): 21 (18-23): 28 (26-31) and in hind leg from the side, relative widths of femur, tibia, and tarsal segments 1-3, 33 (28-38): 21 (20-23): 16 (15-18): 13 (11-14): 12 (10-13); (N=8).

Abdomen: Dark brown to black, and white gray pollinose; each of terga 2-6 may have a black basal band produced at middle and these bands are gradually smaller posteriorly; abdomen above and below clothed with long erect white pile which becomes partly recumbent on dorsum; hairs on gonocoxites black; sternum 1 and anterior part of sternum 2 bare.

Genitalia (Figs. 22-31): Substylus on inner side of gonocoxite well developed and easily recognized; apex of parameral process rounded and directed medially; gonostylus with a hook-like outer extensions; dorsal apodeme in dorsal view with sub-parallel sides, distiphallus gradually tapering posteriorly and without spinules; dorsal apodeme without longitudinal ridges; ventral apodeme not extending beyond antero-lateral corners of dorsal apodeme; in ventral apodeme, the proximal half is narrower than the distal half. Specimen dissected: 1 3, Kuroiso, Tochigi Pref., 11. v. 1965, E. KATAYAMA.

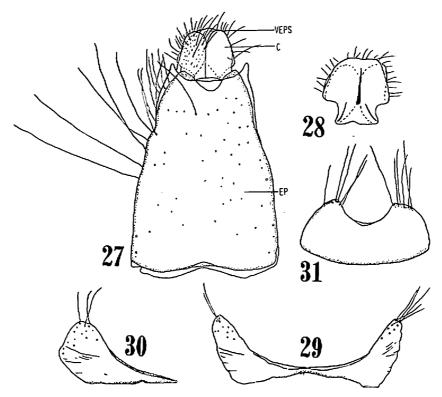
Length: Body 7.3-9.7 mm; wing 6.5-7.9 mm; fore basitarsus 0.9-1.1 mm.

Female. Similar to male except as follows: Head (Fig. 16): Tomentum on frons, ocellar triangle, vertex, upper occiput, and antenna brown gray; frons with a blackened spot just below middle at each eye margin; hairs on frons, ocellar triangle, vertex, and antennal segment 1 much shorter than in 3; black stout hairs



Figs. 22–26. Male genitalia of *Dialineura shozii*; 22–23, dorsal and ventral views (aedeagus is omitted); 24–26, dorsal, ventral and lateral views.

on occiput above neck numerous in number; width of frons just above antenna 2.0-2.2 times width of frons at anterior ocellus, which is 1.9-2.4 times width of ocellar triangle; half width of head 1.3-1.5 times distance from antenna to anterior ocellus, 0.9-1.0 times (almost as in 3) width of frons just above antenna, and 0.9 times (almost as in 3) width of face at lowest portion from a direct frontal view, which is 1.4-1.7 times (almost as in 3) distance from antenna to anterior ocellus; space between antenna and eye 0.3 times width of frons just above antenna and 0.5-0.6 times length of antennal segment 1 along outer margin; distance from antenna to ventral base of proboscis 1.1-1.3 times distance from antenna to anterior ocellus; antenna 1.5-1.7 times as long as distance from antenna to anterior ocellus; relative lengths of antennal segments 1, 2, 3, and style (along outer surface) 100: 16(11-19): 60(46-80): 19(17-21), and their relative widths (except that of style) (from the side) 44(39-48): 29(25-32): 31(27-33); palpus 0.8-0.85 times and proboscis (measured



Figs. 27-31. Male genitalia of *Dialineura shozii*; 27, dorsal view; 28, paraproct, ventral view; 29, tergum 8, dorsal view (not flattened out); 30, lateral part of tergum 8 (which is kept rather horizontal), dorsal view; 31, sternum 8, ventral view.

along ventral surface) 0.9-1.2 times as long as distance from antenna to ventral base of proboscis respectively (almost as in 3).

Thorax: Tomentum on mesonotum and scutellum brown gray; pair of narrow vittae on mesonotum brown gray; hairs on thorax much shorter than in δ ; in mesonotum brown pile recumbent and apparently shorter than black erect hairs.

Wing: As in male.

Legs: Often tarsomere 2 (or 2-3) at base yellowish brown (this may be so in \circlearrowleft); white erect hairs on coxa shorter than in \circlearrowleft and those on femur practically absent; femora with white recumbent pile which may be intermixed with short black hairs; relative lengths of segments of fore leg 174 (165-186): 203 (192-214): 100: 41 (39-43): 31 (27-34): 17 (16-20): 25 (22-27), of mid leg 194 (184-207): 236 (220-257): 122 (116-126): 52 (49-57): 33 (31-37): 17 (13-20): 24 (22-27), of hind leg 265 (259-279): 324 (304-343): 135 (129-139): 61 (59-64): 37 (36-39): 20 (18-24): 25 (23-29) and in hind leg from the side, relative widths of femur, tibia, and tarsal segments 1-3, 35 (33-40): 23 (20-26): 17 (14-19): 13 (10-15): 11 (9-12); (N=7).

Abdomen (Fig. 17): Dorsum shining, but terga 2-7 with pale (or brown) gray tomentose posterior borders which are very often narrowly yellowish brown in colour, variable in extent with individual, and sometimes absent on terga 4-7;

posterior borders of sterna 2-6 narrowly pale (or yellowish) brown; tergum 1 and sides of terga 2-3 (or 2-4) white gray tomentose; hairs on abdomen much shorter than in 3; terga 1-4 with pale brown recumbent pile which becomes white and erect on sides (pile on sides of tergum 4 often black); sterna 2-3 with pale erect pile; sterna 4-8 and terga 5-8 with short erect black pile which is often chiefly pale on sternum 4 and tergum 5.

Length: Body 8.9-11.0 mm; wing 7.0-8.2 mm; fore basitarsus 1.0-1.3 mm. Distribution. Japan (Honshu and Kyushu).

Holotype: 3, Sugadaira (1,000 m), Honshu, 24. vii. 1971, V. S. v. d. Goot & J. A. W. Lucas.

The holotype is in the Zoological Museum (Copenhagen) and the paratypes are in Kagoshima University (Kagoshima) and the National Institute of Agro-Environmental Sciences (Tsukuba, Ibaraki Pref.).

This species is dedicated to Mr. Shozi Kato (of Nagoya City), who inspired one of us (Nagatomi) with insect collecting as a childhood friend.

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