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## ODINIIDAE OF JAPAN, WITH DESCRIPTIONS OF A NEW SPECIES AND A NEW SUBSPECIES \*

(Diptera)

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The Oдиниidae is one of the most poorly represented families of the acalyprate Diptera and has hitherto been unreported from Japan.

In 1950, the writer received for identification specimens of an interesting species belonging to this family from Mr. N. KOYAMA, of the Shinshu University, Ueda, Nagano Prefecture. This species has been identified as *Odinia boletina* ZETTERSTEDT. In this paper, besides the above species, the writer presents descriptions of a new species and a new subspecies of the family which were found in the collection of the Division of Entomology, National Institute of Agricultural Sciences, Tokyo, Japan.

On this occasion, the writer wishes to express his sincere thanks to Mr. N. KOYAMA for his friendship in offering such valuable material. Acknowledgements are also due to Dr. C. W. SABROSKY and Dr. P. W. OMAN of the Division of Insect Identification, Bureau of Entomology and Plant Quarantine, United States Department of Agriculture, for their kind help in completing the present paper.

### *Odinia boletina* ZETTERSTEDT

*Mitichia boletina* ZETT., Dipt. Scand. VII, p. 2721 (1848); SCHINER, F. A. II, p. 298 (1864).

*Odinia boletina* HENDEL, Wien. Ent. Zeit. 22, p. 252 (1903); BECKER, Kat. pal. Dipt. 4, p. 240 (1905); HENDEL, Wien. Ent. Zeit. 30, p. 33 (1911); HERING, "Die Tierwelt Deutsch." 6, Agromyzidae, p. 160 (1927); SÉGUY, Faune France 28, p. 628 (1934); HENNIG, "Die Fliegen" Lief. 122, Oдиниidae, p. 7 (1938).

\* Contribution from the Division of Entomology, National Institute of Agricultural Sciences.

Male. Head densely grey pollinose; front flat; frontalia yellowish dark grey, more or less clear yellow along anterior margin, appearing almost bare but covered with sparsely scattered hairs; parafrontalia and margins of the ocellar triangle whitish grey pollinose; a small black spot at base of each fronto-orbital and vertical bristle; compound eye metallic green in living specimen with a distinct transverse reddish stripe across the middle; lunule whitish grey pollinose, median portion with a faint dark longitudinal vitta; face and cheek silvery white pollinose, only posterior haired portion of cheek dark grey pollinose; clypeus (Prälabrum) and palpi dull yellow, tip of palpus somewhat brownish; basal and second segments of antenna black, anterior dorsal margin of second antennal segment yellowish; third antennal segment clear yellow, with a black fan-shaped marking on each side just before base of arista; arista black, basal one fourth yellow, with long pubescence.

Thorax bluish grey pollinose; no distinct markings on dorsum except a rather pale black spot at base of each dorsocentral bristle. Four to six rows of acrostical bristles—inner pair arranged regularly,

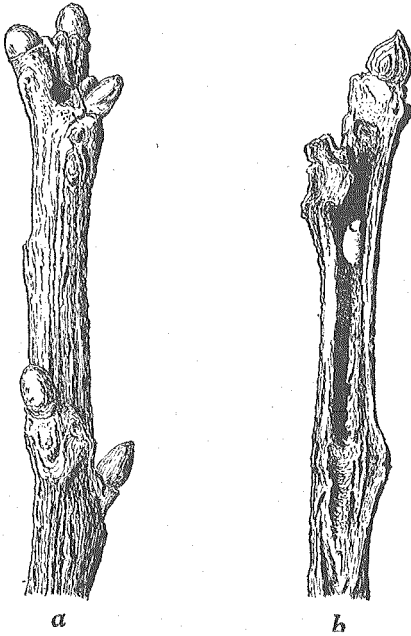


Fig. 1. a: A walnut twig infested by a Gelechiid larva, showing an exit hole near the tip, in which the pupa of *Odinia boletina* ZETT. is lodging. b: Longitudinal section of the same twig, showing the burrow excavated by a Gelechiid larva and a pupa of *Odinia boletina* ZETT. attached on its inner wall.

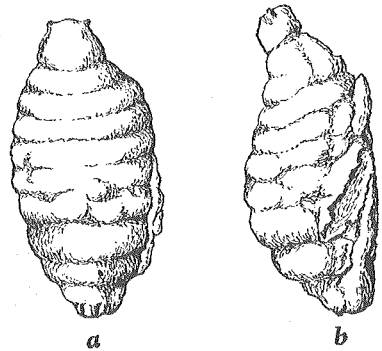


Fig. 2. Pupa of *Odinia boletina* ZETT. a: Dorsal view. b: Lateral view.

diverging posteriorly and continuing to distinct prescutellar acrostical bristles; outer pair begins with two rows in anterior part and arranging in disorder posteriorly, being not exceeded four rows at most, and discontinued near the fourth dorsocentral bristle. Scutellum bare on disk, with four strong marginal scutellar bristles, dark grey pollinose and apical margin distinctly yellowish. Pleura pale grey pollinose, with the following two brown transverse stripes: one from posterior base of anterior stigma nearly to base of haltere, and the other one, which is much darker in colour than the former, along upper margin of sternopleura. Sternopleura dark grey pollinose, with three distinct long bristles

along posterior half of its upper margin, among which the anterior one is most long and strong; sparsely haired on anterior lower portion and with a row of more distinct hairs along posterior margin of this haired area.

Abdomen grey pollinose; tergite of each segment sparsely haired, with a row of rather long hairs along its posterior margin and a small blackish brown spot on each insertion of these hairs; a pair of large dark brown median spots on each dorsum of third to fifth segments; a pair of dark brown markings on lateral sides of third segment or on both third and fourth segments varying with individuals; basal segment (1+2 tergites) dark brown, subshining, with hind margin broadly yellowish.

Legs yellow; bases of fore and middle coxae more or less brownish; hind coxa almost entirely dark brown; fore and middle femora except their apices faintly infuscated; hind femora short and thickened abnormally, almost entirely dark brown except yellow apex; tibiae each with blackish brown subapical and subbasal annuli and middle tibia with a small dark spot at base on dorsal surface; apical segments of all tarsi brown. Wing venation as in the figure presented by HENNIG (1938, p. 7). However, clouds on two cross veins, break of costa, median portion of  $r_1$  and basal junction of  $r_{2+3}$  and  $r_{4+5}$  are rather intense blackish brown, and basal junction of  $r_1$ , apices of  $r_{2+3}$  and  $r_{4+5}$  are also faintly clouded; calypter white, fringed with white hairs; halteres white, basal portion pale yellow.

Female. Ground colour and colour of markings of legs much paler than those of male; hind femora normal, not thickened as in male; lateral markings on both sides of third and fourth abdominal segments faint or lacking in general.

Body length: 2.5–2.9 mm.

Specimens examined: 2♂♂, 3♀♀ (April 20–30, 1950), 1♀ (April 19, 1951), 1♂ (April 20, 1951), 2♂♂ (May 13, 1951), 1♀ (May 20, 1951). All the specimens were collected in the pupal stage by Mr. N. KOYAMA of the Shinshu University in 1950 and 1951 at Ueda City, Nagano Prefecture, Japan and reared by himself (in 1950) and the writer (in 1951).

Distribution: Europe, Africa, North America and Japan.

The above description was written on the basis of the Japanese specimens which were sent to the writer for identification by Mr. KOYAMA. They were all reared out of the burrows on tips of the walnut twigs (*Juglans regia* L.) excavated by the larvae of a certain species belonging to the family Gelechiidae<sup>1), 2)</sup> (Lepidoptera). The pupae of the fly, about 2.7–3.2 mm. in length and covered with white waxy substance, were found attached on the inner walls of these burrows. The habits of the larva have hitherto been unknown, but judging from the place where pupation occurred, it appears that the habits of the fly should be quite similar to those of *Odinia maculata* MEIGEN.

Of all specimens before the writer, the structurally important characters, i.e. minute hairs on frontalia, height of cheek, arrangement of acrostical bristles, proportion of wing veins, body length, etc., apparently agree with those of *O. boletina* ZETT., but the colouration or colour of markings of several parts of the body, i.e. cheek, third antennal

1) Determined by Prof. Dr. S. ISSHIKI of the Naniwa University.

2) A walnut borer reported by Mr. S. TOMISAWA in 1924 (Report of the Government Forest. Exp. Stat. No. 44, pp. 61–72) seems to agree with the present Gelechiid species, even though the taxonomic position of the borer was not discussed in his paper.

segment, palpus, clouds on both cross veins, etc., seems to be different from the common form in Europe and rather resembles that of *O. maculata* MEIG. After careful examinations through the literature, the writer has come to the conclusion that the colours of these parts are comparatively variable and less stable than other structural characters used to define the species, and that the Japanese specimens should be identified as *O. boletina* ZETT. HENNIG (1938) stated the following opinion: "Eine Möglichkeit bestünde noch darin, dass es sich bei *boletina* um eine ökologische form (Rasse?) von *maculata* handelt. ....". The results obtained in the present study may not be sufficient to prove his assumption, but suggest the desirability of additional investigations of this interesting problem.

### *Schildomyia yushimai* sp. n.

Male and female. Frontalia dark brown, distinctly yellow in anterior portion and rather blackish posteriorly at both sides of ocellar triangle; faintly grey pollinose near vertex and around ocellar triangle; anterior margin of frontalia with a row of proclinate

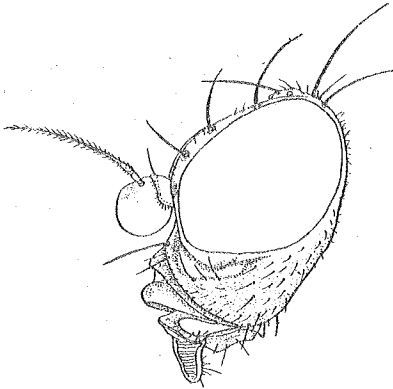


Fig. 3. *Schildomyia yushimai* sp. n.  
Lateral view of the head.

minute hairs and median portion of frontalia with sparsely scattered minute hairs; ocellar triangle brown; a large anchor-shaped brown marking on vertex, transverse extensions of the marking reaching to each base of outer vertical bristles and median stripe equivalent to the halve of anchor extending forward to anterior ocellus, passing through posterior ocelli; occiput dark grey; parafrontalia densely grey pollinose, a brown spot at base of each fronto-orbital bristle and a brown marking between antennal base and eye; orbital hairs arranged not in a row, but somewhat in disorder; lunule bare, grey pollinose with a median dark marking; cheek groove well defined, narrow and crescent-shaped, brownish yellow, circumferential part of cheek grey pollinose; two or three bristles well above lower margin of cheek, directed dorso-cephalad; anterior and median upper portions of cheek groove each with a brown marking; face largely dark brown, anterior margin yellowish brown, median portion faintly grey pollinose, antennal grooves rather blackish brown; third antennal segment yellow, with a faint brown marking before base of arista; second and basal segments yellowish brown; arista dark brown, yellow at base, with long pubescence; maximum length of hairs on arista slightly longer than the widest part of arista; clypeus (Prälabrum) developed conspicuously and strongly protruded anteriorly, dark brown; palpi yellow, brownish at base, flat and spatulate.

Thorax grey pollinose; a brown median stripe on which inner two rows of acrostical bristles are inserted and width of the stripe broadened posteriorly; a large brown spot at base of each dorsocentral bristle and inner sides of the posterior pair contiguous with broadened median stripe; an oblique brown vitta from upper margin of humeral callus to

notopleura; lateral portion of transverse suture, a portion on which supra-alar bristle is inserted, a portion on which intra-alar bristle is inserted and posterior portion of postalar callus each with a brown vitta or marking. Fore to six rows of acrostical bristles; inner two rows arranged regularly, diverging posteriorly and continuing to pre-scutellar bristles; outer rows arranged in disorder posteriorly, but not exceeding four rows at most. Scutellum grey pollinose; a pair of large brown median markings on which several short hairs are inserted; two pairs of marginal bristles, apical pair about twice longer than subbasal pair; a dark brown marking at base of each apical bristle and in some specimens, inner sides of markings almost contiguous with each other at apex of scutellum. Pleura grey pollinose with following stripes: a brown vitta along upper margin of mesopleura from lower portion of humeral callus to anterior base of wing, a broad brown vitta from base of anterior stigma to upper portion of pteropleura crossing median portion of mesopleura; a dark grey vitta along upper margin of sternopleura. Mesopleura bare. Sternopleura with three strong bristles on posterior half of its upper margin; with two or three long hairs along posterior margin of lower triangular portion and a sparsely haired longitudinal area on median portion.

Abdomen blackish brown, slightly polished basally; faint yellowish grey pollinose on apical two segments; hind margin of each tergite narrowly pale brown and both sides of each tergite largely whitish grey pollinose near hind margin; uniformly scattered short hairs on disk and a row of longer bristles on hind margin of each tergite.

Legs yellowish brown; coxae dark brown; apices of femora yellow; tibiae yellowish, each with two faint brown annuli; tarsi yellow, apical segment and metatarsus of each tarsus more or less brownish. Of two male specimens before the writer, coxae and femora rather blackish brown, tibiae and tarsi yellowish dark brown especially in fore legs. In general, legs of the male are darker in colour than those of the female.

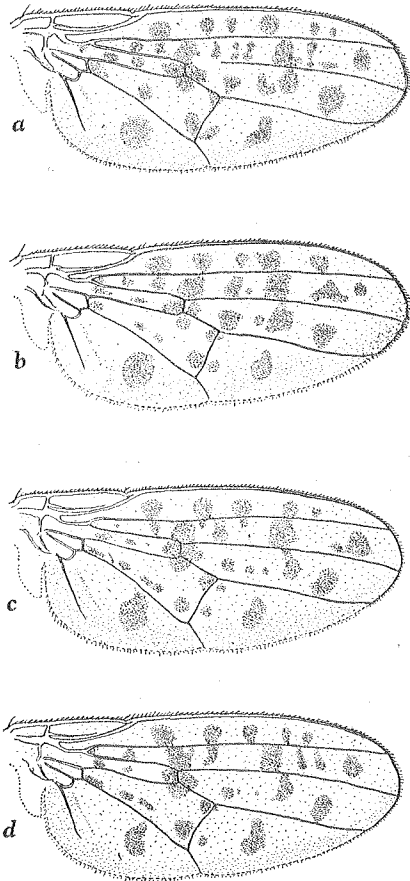


Fig. 4. *Schildomyia yushimai* sp. n.  
Showing variations in wing markings.  
a: Left wing of the holotype ( $\delta$ ). b: Right wing of the holotype. c: Left wing of the allotype ( $\text{♀}$ ). d: Right wing of the allotype.

and femora rather blackish brown, tibiae and tarsi yellowish dark brown especially in fore legs. In general, legs of the male are darker in colour than those of the female.

Wing tinged with slight brown, iridescent, marked with many dark brown spots and dot these markings are variable in number, shape and size, and differ not only with each individual but even with right or left wing of an individual as shown in figure 4: (a, b, c, d, outer cross vein a little longer than the distance from inner cross vein and about twice of the distance from apex of fifth vein; calypter whitish, fringed with pale yellow hair; halteres pale yellow.

Body length: 2.8—3.1 mm.

Types: Holotype (♂), Allotype (♀), and Paratypes (3 ♂♂, 1 ♀), Nagaoka-mura: Nagano Prefecture, (July 25, 1949) K. YUSHIMA leg. The type specimens are preserved in the Division of Entomology, National Institute of Agricultural Sciences, Nishigahara: Tokyo.

This species is related structurally to *Schildomyia punctifrons* MALLOCH (1926 from Costa Rica, but differs distinctly in having characteristic markings on wing. The characters induced the present species to the genus *Schildomyia* almost correspond with the generic characters proposed by MALLOCH (Proceedings U. S. National Museum Vol. 68, Art. 21, p. 26, 1926), but the writer found slight differences in the following points: (1) MALLOCH described as "frontal lunule sparsely haired", but the present species has no hairs on lunule and has only grey pruinescence with a dark marking on its media portion. (2) He also stated that "an upwardly and forwardly directed bristle well above margin of cheek, not on margin as in *Odinia*", but the present species has two or three such bristles. (3) Furthermore, in the present species, the clypeus (Prälabrum) is developed conspicuously and strongly protruded anteriorly, while MALLOCH did not mention such a character. In spite of careful examination, the writer could not find any other conclusive differences contrasting with the characters of the genus *Schildomyia*, and it seems to the writer that the above mentioned differences have not sufficient value to establish distinct genus. Therefore, the writer holds the opinion that the present species should fall within the genus *Schildomyia* and those characters proposed by MALLOCH should be supplemented as follows: "frontal lunule sparsely haired or bare"; "one to three upwardly and forwardly directed bristles well above margin of cheek, not on margin as in *Odinia*"; clypeus strongly protruded or not so".

### ***Traginops orientalis naganensis* subsp. n.**

Male. Anterior half of frontalia clear yellow, very sparsely haired, with a row of proclinate minute hairs along its anterior margin; protuberance on upper portion of front very strong and conspicuous as in *Traginops orientalis* DE MEIJERE; greater part of the swelling black, anterior portion triangularly whitish pollinose and posterior media portion yellowish grey pollinose; hind portion of frontalia between swelling and parafrontalia black and this black area extending to or just before base of inner vertical bristle; parafrontalia whitish yellow pollinose; a black spot at insertion of each fronto-orbital bristle and a dark brown spot between antennal base and eye; distance between two upper fronto-orbital bristles about one and half times distance between lower and second upper fronto-orbital bristles; vertex grey pollinose, with a large violin-shaped brown marking on middle and a pair of divergent postocellar bristles inserted on posterior part of this marking; in one specimen, lateral extensions of the marking almost connected with each brown spot at insertion of inner vertical bristle; occiput grey pollinose

with two brown stripes extending dorsad from dark coloured central portion. Antennae yellow; third segment clear yellow, with a faint brown marking before base of arista; first and second segments somewhat deep yellow; arista black, yellowish at base. Lunule brownish grey pollinose with a dark grey median marking; face brownish grey pollinose, median portion largely dark grey; cheek groove yellow, with a brown marking along its

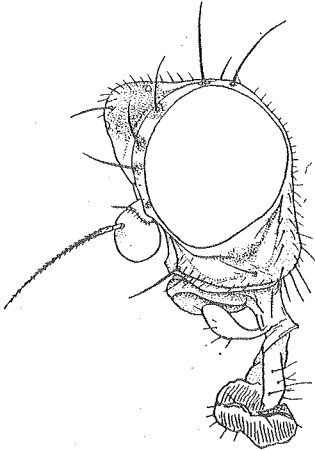


Fig. 5. *Traginops orientalis naganensis* subsp. n. Lateral view of the head.

upper hind margin; surrounding parts of cheek grey pollinose; a part of orbit below compound eye distinctly broadened in the middle; a distinct bristle on middle of lower portion of cheek, directed dorso-cephalad; clypeus (Prälabrum) well developed and strongly protruded, largely dark brown except a yellow median portion; palpi pale yellow, more or less brownish at base, and spatulate.

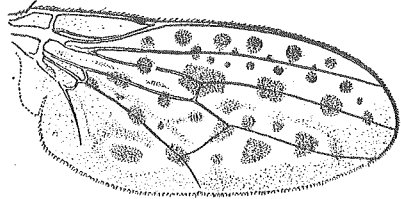


Fig. 6. Wing of *Traginops orientalis naganensis* subsp. n.

Thorax yellowish grey pollinose, with many brown spots or dots on dorsum; a brown median stripe, composed originally of the coalescence of a spot at base of each acrostical bristle, on which two rows of acrostical bristles are inserted; a large round brown marking at posterior end of this median stripe on which a pair of distinct prescutellar acrostical bristles are inserted; a brown spot at base of each dorsocentral bristle except posterior pair, which have very small black spots at base; dorsum covered with many scattered hairs and many of which have a brown spot at each insertion; an oblique brown vitta along upper margin of humeral callus; a brown marking on posterior portion of postalar callus; several brown spots on both lateral sides of dorsum between humeral callus and postalar callus; scutellum more or less bluish grey pollinose, with a pair of brown median markings on which several hairs are inserted; a pair each of apical and basal scutellar bristles, base of each bristle and basal angles on both sides marked with a brown spot. Pleura yellowish grey pollinose on upper half and rather bluish grey pollinose on sternopleura; a brown stripe from lower margin of humeral callus to lower base of wing; a brownish black stripe along upper margin of sternopleura. Sternopleura bearing three strong bristles on posterior half of upper margin, with two or three short hairs between them; with several long hairs on lower triangular portion and sparsely haired longitudinal area on median portion.

Abdomen dark brown, slightly polished; hind margin of each tergite narrowly yellowish brown; a faint grey median stripes; sides of each tergite grey pollinose and covered with dark brown spots, on each spot a lateral macroseta inserted; terminalia yellowish brown.

All coxae and fore femora blackish brown; middle and hind femora dark brown; tip of each femur yellow; dorsal surface of middle femora more or less yellowish; tibiae yellow, with dark brown subapical and subbasal annuli; tarsi brownish yellow. Wing whitish hyaline, with many dark brown spots on entire surface and pale dark border along its posterior margin. Wing venation as in the type-form, *Traginops orientalis* DE MEIJERE (1911), while the markings on wing are rather related to *T. irrorata* COQUILLET (1900) according to the figures presented by COQUILLET (1900) and CURRAN (1934), but slightly differ in details as shown in the figure 6.

Body length: 4 mm.

Types: Holotype (♂), and Paratype (♂), Nagaoka-mura, Nagano Prefecture, Japan, (July 25, 1949) K. YUSHIMA leg. The type specimens are preserved in the National Institute of Agricultural Sciences, Nishigahara, Tokyo.

The present specimens apparently belong to the genus *Traginops* COQUILLET (1900) according to the original description and the generic characters thoroughly reinvestigated by HENDEL (1909). Regarding the specific characters, they are all related closely to the type-form of *T. orientalis* DE MEIJERE which has been recorded from Java and China, but differ from it in the colour or markings of front, third antennal segment, vertex, cheek, transverse stripes on thorax, pleura, leg and wing. Therefore, the writer considers that the Japanese specimens should be treated as a subspecies. So far as the result of investigations through the literature, the writer is somewhat doubtful whether or not *T. irrorata* COQUILLET (North America) and *T. orientalis* DE MEIJERE are distinct species. The principal differences between these two species appear to be in the markings of wing and other parts of the body, which are characters apparently variable in colour, shape and size or in number, while the fundamental arrangements of these markings are showing a similar tendency in both species. However, in the present state of study, the writer holds the opinion that even though *T. irrorata* and *T. orientalis* may represent but a single species, the specimens studied from Japan should without doubt be considered as belonging to the *T. orientalis* DE MEIJERE complex.