

# Notes on the Japanese Agromyzidae (Diptera), 5. Japanese species of the genus *Cerodontha* Rondani, with the description of five new species

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**Abstract** : The Japanese species of the genus *Cerodontha* are revised. Of the 30 species studied, 5 are new to science, *C. (Icteromyza) ecaudata*, *C. (Poemyza) chonoterminalis* and *togashii*, and *C. (Butomomyza) eminula* and *hakusana*, and 4 species are recorded newly.

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**Key words** : Diptera, Agromyzidae, new species, new records, Japan.

## Introduction

The genus *Cerodontha* Rondani, 1861, in Japan has hitherto consisted of 21 species, to which can now be added five new species and also four unknown species to the fauna. The genus has been divided into seven subgenera: *Icteromyza* Hendel, *Cerodontha* Rond., *Xenophytomyza* Frey, *Poemyza* Hendel, *Phytagromyza* Hendel, *Butomomyza* Nowakowski and *Dizygomyza* Hendel (Nowakowski, 1962, 1967). *Phytagromyza* (only *flavocingulata* Strobl, 1909, is known in the Palaearctic region) is not represented in Japan at present. These subgenera are well differentiated on the external characters as described below. All the species of the genus have the distinct processus longus, which is strongly chitinized, hamate distally or minutely serrated on the ventro-distal side, on the lateral side of the proctiger. The anal process on the dorso-distal apex of the epandrium is present or lacking. The surstylus is provided with the distinct spines in the subgenera *Butomomyza* and *Dizygomyza* as compared with the minute spinulae or setulae in the other subgenera. The phallus and hypandrium show the similarity in general structure among the subgenera.

The larvae of this genus mine the leaf or leaf-sheath of the Juncaceae, Cyperaceae, Poaceae and Iridaceae. The occurrence of three bamboo (Bambuseae) or bamboo-grass leaf-miners, *Cerodontha (Poemyza) bisetiorbita* (Sasakawa, 1955), *sasae* (Sasakawa, 1961) and *togashii* n. sp., in Japan is noticeable for its diversity as compared with that of only two world species, *Agromyza ceylonensis* Spencer, 1961, known on Ceylon, and *Cerodontha (Icteromyza) bambusae* Martinez, 1992, known on Guadeloupe.

## Materials and Methods

The materials were dried specimens collected mainly by myself (MS) in various localities in Japan. The terminology, including abbreviations for certain bristles or setae, follows Sasakawa (1961) excepting the wing vein CuA<sub>1</sub> for M<sub>3+4</sub>.

The holotypes of the new species are deposited in the collection of the Osaka Museum of Natural History (OMNH; Nagai Park, Osaka 516-0034, Japan).

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## Systematics

### Genus *Cerodontha* Rondani Subgenus *Icteromyza* Hendel

*Dizygomyza* (*Icteromyza*) Hendel, 1931: 91.

*Phytobia* (*Icteromyza*), Frick, 1952: 389; Sasakawa, 1961a: 361; Spencer, 1963: 329.

*Cerodontha* (*Icteromyza*), Nowakowski, 1962: 100; Spencer, 1969: 111.

Type-species: *Dizygomyza geniculata* Fallén, 1823.

This subgenus is characterized by the elongated ocellar triangle which extends to the dorsal margin of the yellow lunule. Three species, *C. (I.) duplicata* (Spencer), *ecaudata* n. sp. and *geniculata* (Fallén), occur in Japan.

#### 1. *Cerodontha (Icteromyza) duplicata* (Spencer)

*Phytobia (Icteromyza) duplicata* Spencer, 1961: 84.

*Cerodontha (Icteromyza) duplicata* (Spencer), Spencer, 1965: 26.

*Phytobia (Icteromyza) geniculata* (Fallén), Sasakawa, 1956: 126; 1961a: 381.

The specimens collected on Amami-Oshima Island were not true *geniculata* as suggested by Zlobin (2000). The male genitalia of this species, especially the mesophallus with an acute curvature beyond middle, is specific (Sasakawa, 1961a, fig. 60). This species is widely distributed in the Oriental region.

*Specimens examined.* 1 ♂, Kumogahata, Kyoto, 12 June 1955 (MS); 1 ♂, Kibune, Kyoto, 29 Apr. 1956 (MS).

*Distribution.* Japan (Honshu, Kyushu); India, Nepal, Flores, Indonesia, Thailand, Vietnam, Philippines, China, Papua New Guinea.

#### 2. *Cerodontha (Icteromyza) ecaudata* sp. nov. (Fig. 1)

*Male.* Head with frons, face and gena dark yellowish brown, occiput and postgena black; parafrontalia darkened on dorsal part above base of lower ors; ocellar triangle black except for yellow anterior apical area; lunule yellow; antenna black; palp yellowish brown. Thorax and abdomen black; mesoscutum mat, slightly dusted with brownish gray. Wing hyaline; veins brown, yellowish at bases; calypter brownish gray, with margin dark brown and fringe brown; halter yellow. Legs black, all knees yellow on distal 1/4 of fore femur, 1/5 of mid and 1/6 of hind femora.

Frons 1.6 times as wide as eye, slightly converging ventrally; parafrontalia slightly projecting above eye margin in profile, bearing two reclinate ors and two inclinate ori; oh reclinate, in a row; lunule higher than semicircle, as high as basal width; eye bare, 1.4 times as high as broad; gena nearly 1/7 of eye height; first antennal flagellomere round, as long as wide, 1.6 times as high as genal height, with pile minute; arista as long as eye height, minutely pubescent.

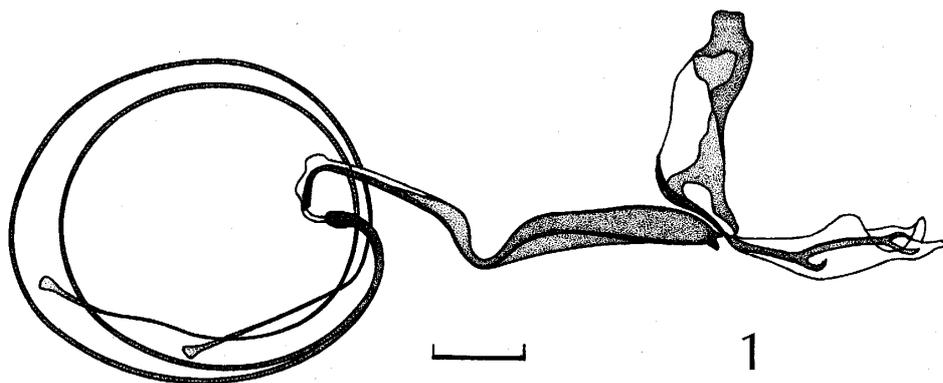


Fig. 1. Phallus of *Cerodontha (Ict.) ecaudata* n. sp. (holotype), lateral view. Scale=0.1 mm.

Mesoscutum with 1+3 dc, four rows of acr, ipa 1/2 of opa, without prsc. Wing 2.8 mm long, costa extending to  $M_1$ , with three sections in ratio of 4 : 1 : 0.8, wing tip situated at apex of  $M_1$ , r-m slightly before middle of discal cell, ultimate section of  $M_1$  about 3.5 times as long as penultimate, ultimate section of  $CuA_1$  approximately equal to penultimate in length.

Epandrium with anal process yellow, 50  $\mu$ m long; cercus 4/5 as high as epandrium; surstylus small, lobate, about 1/2 as wide as epandrium, with 3-4 rows of about 15 short setae. Phallapodeme 1040  $\mu$ m long; hypandrium 550  $\mu$ m long, side piece narrower than phallapodeme; basiphallus+mesophallus 700  $\mu$ m long, the former short, the latter with small curvature at middle, distiphallus with tubules extremely long, coiled, slightly widened on apices. Ejaculatory apodeme 190  $\mu$ m long.

*Female.* Unknown.

*Holotype.* ♂ (OMNT TI 205), Midoroga-ike, Sakyo-ku, Kyoto, 27 Mar. 1959 (MS); genitalia mounted on small glass.

*Distribution.* Japan (Honshu).

*Remarks.* This species is similar to Holarctic *C. (I.) capitata* (Zetterstedt, 1848) in the coloration, wing venation and general structures of the male genitalia, but the frons, face and gena darker, the palp paler, the distiphallic tubules much longer than those of *capitata*. The mesophallus with curvature in this species is quite similar to that of *duplicata* in outline, but the difference in the curved position is clear, that is, in this species it is located at middle, while in *duplicata* at distal 1/3-2/5.

*Etymology.* The specific name, from Latin *e* (out of) and *cauda* (tail), refers to the elongate distiphallus.

### 3. *Cerodontha (Icteromyza) geniculata* (Fallén)

*Agromyza geniculata* Fallén, 1823: 6.

*Dizygomyza (Icteromyza) geniculata* (Fallén), Hendel, 1931: 22.

*Cerodontha (Icteromyza) geniculata*, Nowakowski, 1967: 655.

The yellowish head, black thorax and abdomen, and the black legs with broadly yellow knees in this species are quite similar to those of *duplicata*, but the fringe on the calypter is black (ochreous in *duplicata*), the mesophallus is straight and the distiphallic tubules are divergent apically (cf. Nowakowski, 1973, figs 99 & 108). The larva is known as the leaf-miner of *Eriophorum latifolium* (Cyperaceae) in Europe.

*Specimens examined.* 1 ♂, Senboku New Town, Sakai, Osaka Pref., 20 Oct. 1955 (MS); 1 ♀, Kazuraki-mura, Shiga Pref., 24 July 1955 (MS); 1 ♂, Kibune, Kyoto, 26 Sept. 1993 (MS); 1 ♂, Okumizusaka, Yakuno-cho, Kyoto Pref., 12 July 2002 (MS); 1 ♀, Mt. Bizan, Tokushima, Shikoku, 15 Oct. 1980 (MS).

*Distribution.* Japan (Hokkaido, Honshu, Shikoku -new record); Europe, Russia, Estonia, Ukraine, Tajikistan, Bohemia, Slovak Republic, Syria, Iran, Mongolia, Afghanistan.

### Subgenus *Cerodontha* s. str.

*Cerodontha* Rondani, 1861:10.

Type-species: *Chlorops denticornis* Panzer, 1806.

This subgenus is characterized by the presence of a conspicuous spine or projection at the dorso-apical corner of the first antennal flagellomere and only two (apical) scutellar bristles. The head and legs are largely yellow, differing from the subgenus *Xenophytomyza*. Two species, *C. (C.) denticornis* (Panzer) and *fulvipes* (Meigen) are known to occur in Japan.

### 4. *Cerodontha (C.) denticornis* (Panzer) [Mugi-kiro-hamoguribae]

*Chlorops denticornis* Panzer, 1806: 22.

*Cerodontha denticornis* (Panzer), Hendel, 1920: 169; Isitani, 1938: 106; Sasakawa, 1961a: 387.

This is known as one of the winter cereals (barley, wheat, etc.) pests in Japan and distributed from Hokkaido to Shikoku; the larval host plants belonging 13 genera in the tribes Avéneae, Poeae and Triticeae are known (Spencer, 1990). The characters of male and female genitalia, and larva are described and figured by Sasakawa.

*Specimen examined.* 1 ♀, Mt. Tsurugisan, Tokushima, Awa, Shikoku, 3 June 1957 (MS).

*Distribution.* Japan (Hokkaido, Honshu, Shikoku); Europe, Russia, Turkey, Iran, Afghanistan, Morocco.

### 5. *Cerodontha (C.) fulvipes* (Meigen)

*Agromyza fulvipes* Meigen, 1830: 174.

*Cerodontha fulvipes* (Meigen), Hendel, 1932: 272; Sasakawa, 1961a: 388; Nowakowski, 1973: 57.

This species differs from *denticornis* in the presence of two rows of acr (absent in *denticornis*). The head including the scape and pedicel of antenna is yellow but the vertical angle and parafrontalia between bases of ors and orbit are dark brown, the first antennal flagellomere is black; thorax and abdomen are black. Nowakowski (1973) considered incorrectly that this species identified by myself seemed to be *C. (C.) unguicornis* Hendel (1932), probably from a judgment on Sasakawa's fig. 67 (1961a): head, wing and male genitalia, without the actual examination of the Japanese specimens. Only *Poa trivialis* is recorded as the larval host plant in Poland (Nowakowski, 1967).

*Specimens examined.* 1 ♂ 1 ♀, Mt. Hiko, Fukuoka Pref., Kyushu, 21 May 1957 (MS).

*Distribution.* Japan (Hokkaido, Honshu, Kyushu); Europe.

### Subgenus *Xenophytomyza* Frey

*Cerodontha (Xenophytomyza)* Frey, 1946: 51.

Type-species: *Haplomyza atronitens* Hendel, 1920.

This subgenus is provided with only the apical scutellar bristles as in *Cerodontha* s. str., but is recognizable by the blunt projection and absence of spine at the dorso-apical corner of the first antennal flagellomere, and the entirely black thorax and legs. Only one species, *C. (X.) bisetosa* Zlobin, is known to occur in Japan. Although Spencer (1990) gives the general resemblance to the species of *Cerodontha* s. str. on the basis of phallic character, the phallus in the species of *Xenophytomyza* is peculiar as follows: the distiphallus is distinctly separated from the mesophallus; the narrow sclerite is situated on the ventral side between the mesophallus and distiphallus.

### 6. *Cerodontha (Xenophytomyza) bisetosa* Zlobin

*Cerodontha (Xenophytomyza) bisetosa* Zlobin, 1994: 142.

*Cerodontha (Xenophytomyza) biseta* (Hendel), Sasakawa, 1961a: 388.

This small, black species, with the wing length 1.6-2.0 mm, is characterized by the brown inner margin of parafrontalia and gena (1/4-1/5 of eye height), the long ultimate section of CuA<sub>1</sub> (1.7-1.8 times as long as penultimate), the triangular surstylus, the weakly swollen and sclerotized distal end of the distiphallus, and the narrow ejaculatory apodeme (60-65 µm in greatest width, 110-125 µm in length).

*Specimens examined.* 1 ♂, Kibune, Kyoto, 24 Apr. 1958 (MS); 1 ♂, Mt. Ushio-zan, Kyoto, 3 May 1958 (MS); 1 ♀, Momoyama, Kyoto, 8 June 1960 (MS); 1 ♂ 1 ♀, Oono Exp. Forest of Kyoto Pref. Univ., Kyoto Pref., 1-2 June 1971 (MS); 1 ♂, Sonobe, Kyoto Pref., 17 May 1980 (Y. Yoshiyasu); 2 ♂, Kibune, Kyoto, 24 May 1982 (MS); 2 ♂ 1 ♀, Mt. Taiko-yama, Tango, Kyoto Pref., 27-28 May 1982 (MS); 2 ♂, Hodani, Hirakata, Osaka Pref., 18 June 1989 (MS); 1 ♂, Shimakage, Kunda, Kyoto Pref., 20 May 1993 (MS); 2 ♂, Mt. Wakasugi-yama, Fukuoka, Kyushu, 24 May 1957 (MS).

*Distribution.* Japan (Honshu, Kyushu); Russia (Primorskiy Kray).

### Subgenus *Poemyza* Hendel

*Dizygomyza (Poemyza)* Hendel, 1931: 35.

*Cerodontha (Poemyza)*, Nowakowski, 1962: 102.

Type-species: *Agromyza pygmaea* Meigen, 1830.

*Poemyza* differs from other subgenera in the presence of high and narrow lunule, and from the subgenera *Cerodontha* and *Xenophytomyza* in having the round first antennal flagellomere and four (basal and apical)

scutellar bristles.

This is the dominant subgenus which consists of ten species in Japan. Three species, *C. (P.) bisetiorbita* (Sasakawa), *sasae* (Sasakawa) and *togashii* n. sp. are the leaf-miners of the bamboo or bamboo-grass (Bambuseae). *C. (P.) phragmitidis* Nowakowski on *Phragmites* (Arundineae) and *sasakawai* Zlobin on *Setaria* (Paniceae) are also monophagous, while *lateralis* (Macquart) is oligophagous, limited to the Triticeae; *incisa* (Meigen) and *pygmaea* (Meigen) are polyphagous (Aveneae, Poaeae, Triticeae, etc.).

### Key to Japanese species

1. Frontalia or parafrontalia partially yellow..... 2  
Frons uniformly dark brown to black..... 4
2. Notopleuron entirely and postpronotal lobe (humerus) partially yellow..... 10. *lateralis* (Meigen)  
Notopleuron and postpronotal lobe brown..... 3
3. Antennal scape and pedicel orange-yellow, femora yellow on distal 1/3-1/2..... 15. *sasakawai* Zlobin  
Antenna black, scape brownish; all knees narrowly yellow..... 14. *sasae* (Sasakawa)
4. All knees yellow..... 5  
Only fore knee yellow..... 7
5. Large species with wing length more than 2.5 mm; acr in 6-8 rows..... 11. *phragmitidis* Nowakowski  
Small species with wing length 1.6-2.0 mm; acr in 4-6 rows..... 6
6. Acr in 4 rows; distiphallallic tubules distinctly swollen in form of funnel at end..... 8. *chonoterminalis* n. sp.  
Acr in 6 row; distiphallallic tubules slightly swollen at end..... 16. *thunebergi* Nowakowski
7. Fringe of calypter white to yellow..... 9. *incisa* (Meigen)  
Fringe of calypter brown to black..... 8
8. Oh in 2 rows..... 7. *bisetiorbita* (Sasakawa)  
Oh in a row..... 9
9. Ultimate section of CuA<sub>1</sub> 1.5 times as long as penultimate; distiphallus short, globular..... 17. *togashii* n. sp.  
Ultimate section of CuA<sub>1</sub> 2-3 times as long as penultimate; distiphallus tubulous..... 10
10. Distiphallus with tubules twice as long as basal broadened tube; ejaculatory apodeme with blade well expanded  
..... 12. *pygmaea* (Meigen)  
Distiphallus with tubules thrice as long as basal broadened tube; ejaculatory apodeme slightly expanded  
..... 13. *pygmella* (Hendel)

#### 7. *Cerodontha (Poemyza) bisetiorbita* (Sasakawa) comb. n. [Nezasa-hamoguribae]

*Phytobia (Poemyza) bisetiorbita* Sasakawa, 1955: 64; 1961a: 370.

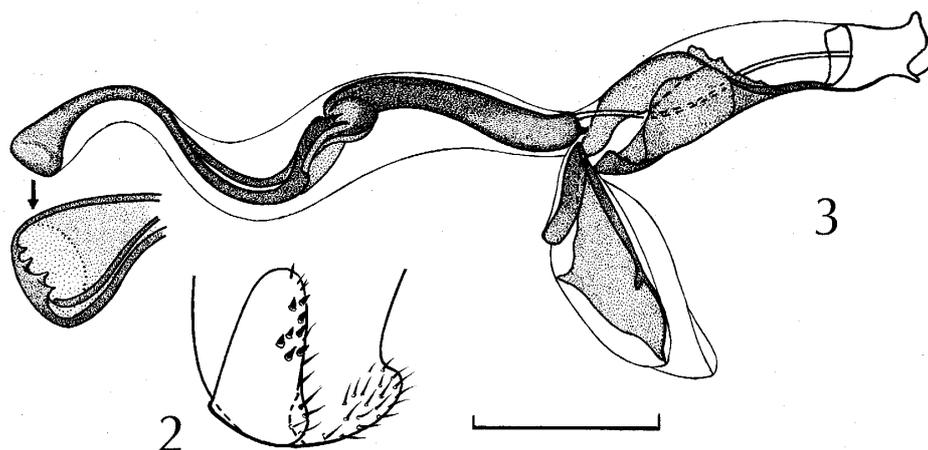
This species is immediately distinguishable by the presence of two rows of oh and eight rows of acr (10 rows before transverse suture), and the ultimate section of CuA<sub>1</sub> to the penultimate ratio as 1.3-1.7 : 1. The phallus is characteristic in the presence of dense hairs on the basiphallallic membrane, the situation of the paraphallus just above base of the mesophallus, and the short length of the mesophallus and distiphallus. The larva makes a whitish-green linear mine on the leaf of *Pleioblastus variegatus* var. *viridis* (Bambuseae).

*Specimens examined.* 1 ♂6 ♀, Momoyama Imperial Tomb Garden, Kyoto, 8 June 1960 (MS); 2 ♂3 ♀, Mt. Taiko-yama, Tango, Kyoto Pref., 25 May 1982 (MS); 1 ♂, Yakuno-cho, Kyoto Pref., 29 Apr. 2003 (MS).

*Distribution.* Japan (Hokkaido, Honshu, Kyushu); Formosa.

#### 8. *Cerodontha (Poemyza) chonoterminalis* sp. nov. (Figs 2-3)

*Male.* Black; head with dorsal part laterad of ocellar triangle, inner margin of parafrontalia, basal part of lunule, parafacialia and gena slightly brown-tinged; scape and pedicel of antenna dark brown; thorax sparsely gray-dusted, mesoscutum slightly shining when viewed from behind, with lateral side brown-tinged; mesopleural suture and wing base yellow; abdomen shiny, brownish black. Wing hyaline, veins yellow at bases; calypter yellow, with fringe whitish. Legs with coxae and femora brownish black but the latter distinctly yellow on distal 1/4, fore tibia brownish



Figs 2-3. Male genitalia of *Cerodontha* (Poe.) *chonoterminalis* n. sp. (paratype). 2, surstylus; 3, phallus, lateral view. Scale=0.1 mm.

yellow, mid and hind tibiae pale brown, all tarsi yellowish but darker on hind tarsus.

Frons 1.7-2 times as wide as eye; parafrontalia gradually broadening ventrally, in ventromost part about 1.5 times as wide as dorsal width, ventral part between lower ors and lower ori slightly projecting above eye in profile, bearing two ors and two(-3) ori, distance between lower ors and lower ori as long as that between upper and lower ors; oh rather long, in a row; lunule higher than broad or frontal length between its dorsal margin and anterior ocellus; eye bare, 1.3-1.5 times as high as wide; gena 1/7-1/8 of eye height; first antennal flagellomere small, as long as wide, round apically, with pile whitish and as long as basal thickness of arista; arista as long as eye height, minutely pubescent.

Mesoscutum with 0+3 dc (first postsutural dc about twice as long as acr; rarely one short additional bristle before that), four dense rows of acr. Wing: Costa extending to apex of  $M_1$  which is situated at wing tip, with three sections in proportion of 2.6-3 : 1 : 0.7; r-m before middle of discal cell; ultimate section of  $M_1$  4.5-5 times as long as penultimate; ultimate section of  $CuA_1$  nearly 1.5 times as long as penultimate (14 : 10).

Epandrium with anal process 30  $\mu$ m long, 1.5 times as long as basal width; surstylus (Fig. 2) incurved, with 15-18 spinules and setulae along margin. Hypandrium slightly shorter than 1/2 of phallapodeme (650-680  $\mu$ m). Phallus (Fig. 3) nearly 1.5 times as long as hypandrium; distiphallus loosely S-shaped, with distal tubules parallel and well-swollen in form of funnel at each end; hypophallus almost as long as basiphallus; ejaculatory apodeme 140-150  $\mu$ m long, 165-180  $\mu$ m in greatest width.

Body length 1.6 (holotype)-1.8 mm, wing length 1.7 (holotype)-2.0 mm.

*Female*. Unknown.

*Holotype*. ♂ (OMNH TI 206), Mt. Kudoji-yama, Hirosaki, Aomori Pref., emerg. 19 Oct. 1972 (MS), host plant unknown. *Paratypes*. 2 ♂, same data as holotype except for emerg. date 18-19 Oct.; 1 ♂, Sonobe, Kyoto Pref., 17 May 1981 (Y. Yoshiyasu); 1 ♂, Yufuin-cho, Ooita Pref., Kyushu, 5 Aug. 1998 (A. Fujimori).

*Distribution*. Japan (Honshu, Kyushu).

*Puparium*. Brown, 3 mm in length; posterior spiracle with 5-6 bulbs, of which ventromost bulb slightly projected ventrally.

*Remarks*. This species is easily recognized by the pale fore tibia and all tarsi from all the known species of *atra*-group (Nowakowski, 1973). It is somewhat similar to *C. (P.) phragmitidis* in having the yellow knees of all legs, the distinct anal process on the epandrium, and the funnel-shaped apices of the distiphallic tubules, but it is smaller and is provided with the sparser row of acr (in *phragmitidis* the wing length is 2.5-3.3 mm and acr arranged in 6-8 rows). The large funnel-shaped apex of distiphallic tubule in this species is more similar to that of European *C. (P.) pygmina* (Hendel, 1931; Nowakowski, 1973, fig. 128P) than that of *phragmitidis* (Nowakowski, 1973, fig. 122P), but *pygmina* has not the yellow knees on the mid and hind legs, and also the anal process on the epandrium.

*Etymology*. The specific name, formed from Greek *chonos* (crucible) and *termonos* (end), refers to the

funnel-shaped end of distiphallus.

**9. *Cerodontha (Poemyza) incisa (Meigen)*** [Okazaki-hamoguribae]

*Agromyza incisa* Meigen, 1830: 182.

*Cerodontha (Poemyza) incisa* (Meigen), Nowakowski, 1962: 112; 1973: 116; Sasakawa, 1993: 342.

*Oscinis okazakii* Matsumura, 1916: 444.

*Phytobia (Poemyza) okazakii* (Matsumura), Sasakawa, 1961a: 372.

*Cerodontha (Poemyza) hammi* Spencer, 1971: 157.

This species is distinctive, having the yellowish white fringe on the calypter, six rows (4 rows behind the third dc) of acr, the ultimate section of CuA<sub>1</sub> to the penultimate ratio 1.7-2.3 : 1, and the narrowly sclerotized distiphallic tubules with small funnel-shaped apices. Male and female genitalia and larval characters: See Sasakawa, 1961a, fig. 51. The favorite host plant appears to be *Agropyron tsukusiense* var. *transiens* (Triticeae) and *Triticum aestivum* as one of the wheat pests in Japan, and many hosts, 28 genera such as *Calamagrostis*, *Dactylis*, *Festuca*, etc. are known in Europe.

*Specimens examined.* 2♂1♀, Saikyo Univ. Farm, Shimogamo, Kyoto, 29 May 1953 & emerg. 13 June 1988, from unidentified grass (MS); 1♀, Katsura, Kyoto, emerg. 2 July 1953, on *Phragmites australis* (MS); 5♂2♀, Kibune, Kyoto, 9 & 25 Apr. 1954 (MS); 1♂, Hatano, Kanagawa Pref., 12 Apr. 1955 (MS); 2♂4♀, Tonosho, Is. Shodo-shima, 28 July 1959 (MS); 1♀, Kohtani, Matsudo-shi, Chiba Pref., emerg. 9 Apr. 1983, from puparium on *Bromus inermis* (Bromeae) (K. Okazaki); 2♀, Sugi-kitamachi, Hirakata, Osaka pref., 18 June & 10 Sept. 1989 (MS); 1♂, Kamigamo, Kyoyo, emerg. 6 June 1991, from puparium on *Agropyron* sp. (T. Imura); 2♂1♀, Kurondo-ike Park, Osaka Pref., 26 July 1993 & 2 May 1994 (MS); 1♂, Sapporo, Hokkaido, 22 June 1981 (I. Miyagi); 2♂, Kurume, Fukuoka Pref., Kyushu, emerg. 11 May 1999, from puparia on *Agropyron tsukusiense* var. *transiens* (K. Kanmiya).

*Distribution.* Japan; Holarctic, Pakistan.

**10. *Cerodontha (Poemyza) lateralis (Macquart)*** [Mugi-kiberi-hamoguribae]

*Agromyza lateralis* Macquart, 1835: 609.

*Dizygomyza (Poemyza) lateralis* (Macquart), Hendel, 1931: 40.

*Phytobia (Poemyza) lateralis*, Frick, 1953: 70; Sasakawa, 1955: 65; 1961a: 371.

*Cerodontha (Poemyza) lateralis*, Nowakowski, 1962: 123; 1973: 109.

This species was firstly reported by Isitani (1938, as *Dizygomyza* sp.) as one of the wheat pests in Tokyo. The frons is yellow but brownish ventrally, the mesoscutum is gray-dusted black but yellow on the lateral side, differing distinctly from the known Japanese species of this subgenus. Male and female genitalia: See Sasakawa, 1961a, fig. 50. The larva forms a linear mine, broadened more blotch-likely before the pupation in the mine, on the leaf of the Triticeae.

*Distribution.* Japan; Europe, Russia, China, Afghanistan.

**11. *Cerodontha (Poemyza) phragmitidis* Nowakowski**

*Cerodontha (Poemyza) phragmitidis* Nowakowski, 1967: 647; 1973: 95.

This large, black species with the wing length 2.5-3.3 mm has the high lunule (higher than frontal length between anterior ocellus and dorsal margin of lunule), conspicuously narrowing at midpoint by the dark brown, distinctly broadened parafrofrontalia, 0+4-5 dc (anterior two short, about twice as long as acr, the third dc thrice of acr), the orange-yellow fringe on the calypter, the yellow knees of all legs, and the funnel-shaped distal ends of the distiphallic tubules. The specimens agree with the original description.

*Specimens examined.* 3♂2♀, Makino, Yodogawa Riverside, Hirakata, Osaka Pref., emerg. 15 June 1992, from puparia on *Phragmites australis* (MS).

*Distribution.* Japan (new record); Europe, Russia, Czech Republic..

### 12. *Cerodontha (Poemyza) pygmaea* (Meigen)

*Agromyza pygmaea* Meigen, 1830: 183.

*Dizygomyza pygmaea* (Meigen), Hendel, 1920: 135.

*Dizygomyza (Poemyza) pygmaea* (Meigen), Hendel, 1931: 46.

*Cerodontha (Poemyza) pygmaea*, Nowakowski, 1962: 112; Spencer, 1969: 133.

This species closely resembles *incisa* in general appearance, including the structures of male genitalia (cf. Nowakowski, 1973, fig. 141), but the fringe on the calypter is dark brown. The specimens agree with the original description. The larval favorite hosts are known as *Brachypodium*, *Dactylis* and *Deschampsia* in Europe (Spencer, 1990).

*Specimens examined.* 2 ♂1 ♀, Kibune, Kyoto, 27 May 1980 (MS).

*Distribution.* Japan (new record); Holarctic.

### 13. *Cerodontha (Poemyza) pygmella* (Hendel)

*Dizygomyza (Poemyza) pygmella* Hendel, 1931: 48.

*Phytobia (Poemyza) pygmella* (Hendel), Sasakawa: 1961b: 124.

*Cerodontha (Poemyza) pygmella*, Spencer, 1969: 134; Iwasaki, 2000: 145.

This species was described on the basis of the broader frons and parafrontalia, denser rows of acr and larger discal cell, differing from those of *pygmaea*. Spencer (1969) noted that the broader frons is not valid as a specific character after his examination of numerous European specimens. I have also observed the Japanese material of *pygmaea* with the broader frons (twice as wide as eye, as in *pygmella* as described by Hendel), the denser rows of acr (eight rows as in *pygmella*), and the shorter ultimate section of CuA<sub>1</sub> (twice as long as penultimate as in *pygmella*). It is said that there are considerable variations in the ratios of the frons to eye and the ultimate to penultimate sections of CuA<sub>1</sub>, and the number of the acr-rows in both *pygmella* and *pygmaea*. Although *pygmella* was synonymized with *pygmaea* by Spencer (1969), I wish to treat *pygmella* as distinct herewith, because of the differences between both species in the characters of male genitalia, especially in the phallus, are distinct (genitalia of *pygmella*: Iwasaki, 2000, figs 11-13 and *pygmaea*: Nowakowski, 1973, fig. 141).

*Distribution.* Kamchatka, Kuriles.

### 14. *Cerodontha (Poemyza) sasae* (Sasakawa) comb. n.

*Phytobia (Poemyza) sasae* Sasakawa, 1961a: 374.

This species is recognizable by the pale head and the wing venation, differing from those of European *C. (P.) morula* Hendel (1920). The larva forms a linear mine on the leaf of *Sasa paniculata* in Hokkaido.

*Distribution.* Japan.

### 15. *Cerodontha (Poemyza) sasakawai* Zlobin

*Cerodontha (Poemyza) sasakawai* Zlobin, 1984: 52.

*Phytobia (Poemyza) setariae* Spencer, Sasakawa, 1961a: 376.

This species belongs to the *muscina*-group with the pale knees, but is easily distinguishable by the pale antenna (scape and pedicel orange-yellow, first flagellomere yellowish to dark brown), the short ultimate section of CuA<sub>1</sub> (ultimate: penultimate ratio as 0.9-1 : 1), and the long distiphallus (about thrice as long as mesophallus, curving once just after junction with mesophallus and not forming S-shape).

Following characters are added to Sasakawa's description (1961a) on the terminalia: the epandrium is provided with two spines at the postero-ventral corner; the phallapodeme is 600-700 µm long, the phallus is 450-600 µm long; the ejaculatory apodeme is 120-150 µm long and 60-100 µm broad. Larval characters and mining habit: See Sasakawa, 1961a, p. 377.

*Specimens examined.* 2 ♀, Higashi-Hiraga, Matsudo, Chiba Pref., emerg. 9 May 1982 & 21 Oct. 1982, larvae coll. 15 Oct. 1981, on *Setaria viridis* var. *minor* (K. Okazaki); 1 ♂, Iwakura, Kyoto, 2 May 1987 (MS); 6 ♂1 ♀, Uji-Riverside, Kyoto Pref., 30 July 1987 (MS); 1 ♂1 ♀, Shizuhara, Kyoto, emerg. 17 Oct. 1991, from larvae on *Setaria*

*viridis* (T. Imura); 1 ♂, Mt. Kudoji-yama, Hirosaki, Aomori Pref., 27 Sept. 1992 (MS); 5 ♂, Iwakuni, US Military Base, 3 Aug. 1997 (Fujimori); 2 ♀, Ibo-gawa, Tatsuno, Hyogo Pref., 6 Oct. 1998 (MS).

*Distribution.* Japan; Russia (Primorskiy Krai).

**16. *Cerodontha (Poemyza) thunebergi* Nowakowski**

*Cerodontha (Poemyza) thunebergi* Nowakowski, 1967: 647; 1972: 742.

*Phytobia (Poemyza) atra* (Meigen), Sasakawa, 1961a: 369.

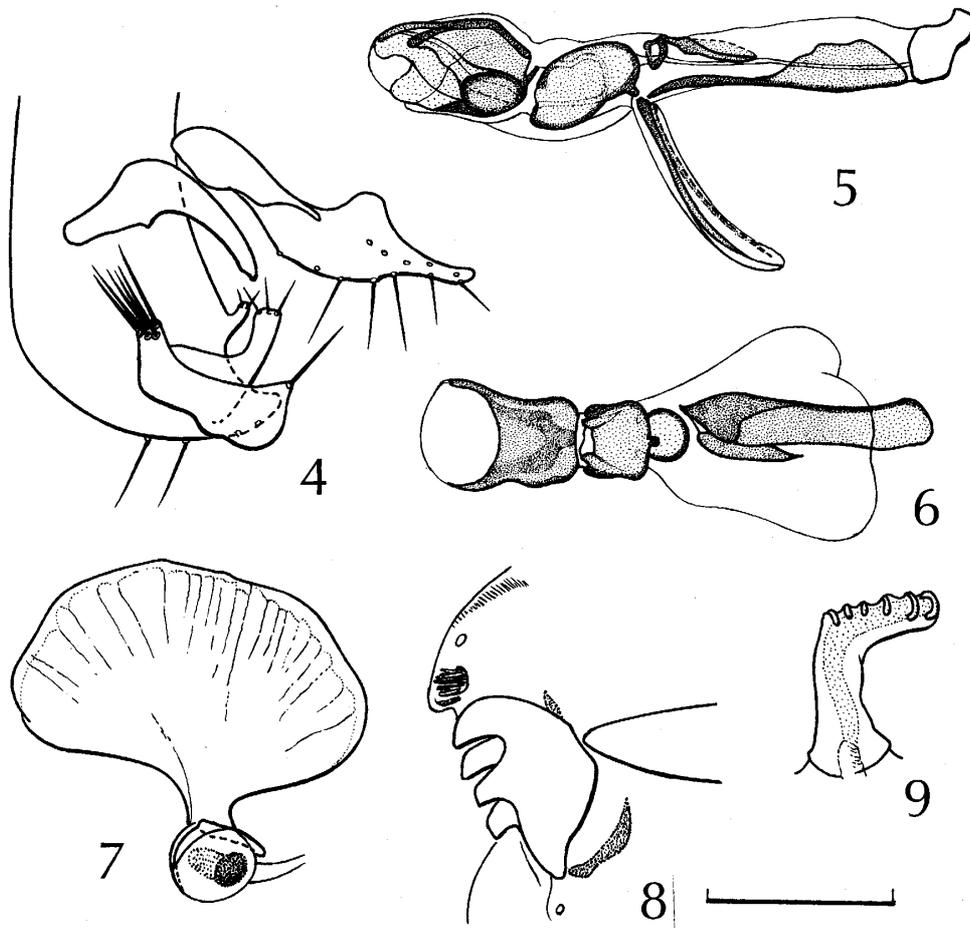
Externally as in *phragmitidis* (no. 11) but the lunule scarcely narrowed at middle; 0+3 dc; acr sparser, in six rows; distiphallic tubules longer and well-sclerotized (cf. Sasakawa, 1961a, fig. 48).

*Distribution.* Japan (Hokkaido); Finland, Czech Republic.

**17. *Cerodontha (Poemyza) togashii* sp. nov.** (Figs 4-9)

*Male.* Head including antenna and palp brown but occiput and postgena black, frontalia entirely and lunule dorsally blackened; dorsal orbit and first flagellomere of antenna slightly darkened. Thorax black; mesoscutum sparsely grayish-dusted, weakly shining, with lateral side and scutellum brown-tinged. Abdomen shiny brown; T6 and epandrium pale brown. Wing hyaline, veins yellowish at bases; calypter yellowish gray, with margin and fringe brown; halter yellow. Legs brownish black, fore knee indistinctly yellow, fore tibia brown, all tarsi brownish yellow except for terminal tarsomeres.

Frons 1.6 times as wide as eye, converging ventrally; parafrontalia slightly broadened at lateral side of lunule,



Figs 4-9. Male genitalia and puparium of *Cerodontha (Poe.) togashii* n. sp. (paratype). 4, cercus, processus longus and surstylus; 5, phallus, lateral view; 6, phallus, ventral view, omitted hypophallus; 7, ejaculatory apodeme; 8, mandibles, lateral view; 9, posterior spiracle, lateral view. Scale=0.1 mm.

not projecting above eye in profile, bearing two ors and two ori; oh rather long, arranged in denser row distinctly below upper ori; lunule higher than broad, almost as high as frontal length between its dorsal margin and anterior ocellus; eye bare, 1.5 times as high as wide; gena narrow, 1/9-1/10 of eye height; antenna with first flagellomere slightly wider than long, rounded apically, with short pile; arista slightly shorter than eye height, microscopically pubescent.

Mesoscutum with 0+3 dc, first postsutural dc only a little longer than acr, eight rows of acr. Wing: Costa extending to  $M_1$ , with three sections in proportion of 2.6 : 1 : 0.6, r-m before middle of discal cell, ultimate section of  $M_1$  about 4.5 times as long as penultimate, ultimate section of  $CuA_1$  about 1.5 times as long as penultimate.

T6 2.3-2.7 times as long as T5, 1.7 times as wide as long, with a group of eight long setae at middle before posterior margin. Epandrium (Fig. 4) without anal process, with short tubercle, which is provided with two short setae, at postero-ventral corner; cercus distinctly narrowed ventrally; surstylus consists of two processes, bearing six long setae on anterior tip and one long seta at postero-dorsal corner, and three setulae on tip of inner posterior process. Hypandrium about 1/2 length of phallapodeme (540  $\mu$ m), with side piece broad. Phallus 3/5 length of phallapodeme; distiphallus (Figs 5-6) broader than mesophallus and narrowly separated from that; hypophallus narrow; ejaculatory apodeme (Fig. 7) 150  $\mu$ m long, greatly expanded, 190  $\mu$ m broad.

Body length 1.7 mm, wing length 2.0 mm.

*Female*. Similar to male, but abdomen brown to black, T6 2.7-3 times as long as T5; ovipositor sheath shiny black; wing length 1.9-2.2 mm, second costal section thrice as long as third, ultimate section of  $CuA_1$  rarely twice as long as penultimate.

*Holotype*. ♂ (OMNH TI 207), Bessho-cho, Kanazawa, Ishikawa Pref., emerg. 14 June 1982 (I. Togashi).

*Paratypes*. 1 ♂, Kanazawa, Ishikawa Pref., emerg. 28 Apr. 1972 (Togashi); 3 ♀, same data as holotype; 2 ♀, Koiji, Uchiura-machi, Ishikawa Pref., emerg. 26 Apr. & 3 May 1986, larvae coll. 27 Mar. 1986 (Togashi); 1 ♀, Hiraga, Matsudo, Chiba Pref., emerg. 8 May 1983 (K. Okazaki).

*Distribution*. Japan (Honshu).

*Puparium*. Yellowish brown, 2-2.2 mm in length. Mandible (Fig. 8) with 2 teeth; posterior spiracle (Fig. 9) projected downwards in a form of L, with 6-7 bulbs; spinal pattern as 3A=5-6 · 2 on lateral side.

*Host plant*. *Phyllostachys pubescens* (Bambuseae).

*Remarks*. This species has the specific male genitalia, differing from all the known species of the genus in the structures of surstylus and phallus.

*Etymology*. The species is named after the collector of the holotype, Dr. I. Togashi.

### Subgenus *Butomyza* Nowakowski

*Cerodontha* (*Butomyza*) Nowakowski, 1967: 633.

Type-species: *Agromyza angulata* Loew, 1869: 47 (as *semiposticata* Hendel, 1920).

This subgenus is differentiated from the subgenus *Poemyza* by the broad and semicircular lunule, and from the subgenus *Dizygomyza* by the closer positioning of the antennal bases and the small first flagellomere in both sexes. The chaetotaxy and structure of the phallus show a close relationship with *Dizygomyza* than with *Poemyza*, that is, prsc is usually well-developed, the mid tibial pd are 1-2, and the distiphallus is connected with the mesophallus through a membranous gap between them. The larva has usually the raspy tubercles below the bases of posterior spiracles, and they are mostly the leaf-miners on the Cyperaceae.

Eight species are recorded from Japan, of which *C. (B.) staryi* is very common. The long finger-like anal process on the epandrium in *C. (B.) eminula* n. sp. is similar to that of European *C. (Phytagyromyza) flavocingulata* (Strobl, 1909; cf. epandrium: Spencer, 1976, fig. 353), but it is clear that the new species belongs to this subgenus on the basis of the wing venation and the phallic character.

### Key to Japanese species

1. Fringe of calypter white to whitish yellow..... 2

- Fringe of calypter ochrous brown to brownish black.....3
2. Parafrontalia brown but yellow below ors, gena and scape brownish yellow; distiphallus with ventral fins on distal part of tubule..... 24. *staryi* (Stary)
- Parafrontalia and antenna entirely brownish black; gena brown; distiphallic tubules without fins..... 21. *eucaricis* Nowakowski
3. Anal process of epandrium less than twice as long as broad..... 4
- Anal process 3.5 times as long as broad..... 20. *eminula* n. sp.
4. Fringe of calypter ochrous brown; distiphallus almost as long as mesophallus.....5
- Fringe of calypter brown to black; distiphallus longer than mesophallus..... 6
5. All knees yellow; tubules of distiphallus diverging distally..... 22. *hakusana* n. sp.
- Only fore knee yellow; distiphallic tubules parallel, each with serration of several minute teeth on dorsal side before apex..... 18. *angulata* (Loew)
6. Fringe of calypter brown; distiphallic tubules weakly curved ..... 19. *caricivora* (Groschke)
- Fringe of calypter jet-black; distiphallic tubules form a regular semicircle..... 23. *pseuderrans* (Hendel)

**18. *Cerodontha (Butomyza) angulata* (Loew) [Suge-hamoguribae]**

*Agromyza angulata* Loew, 1869: 47.

*Dizygomyza semiposticata* Hendel, 1920: 131.

*Phytobia (Poemyza) semiposticata* (Hendel), Groschke, 1954: 138; Sasakawa, 1955: 67; 1961a: 375.

*Cerodontha (Dizygomyza) angulata* (Loew), Spencer, 1967: 6.

*Cerodontha (Butomyza) angulata*, Griffiths, 1968: 65.

This black species is peculiar in the presence of serration of several minute teeth on the dorsal side of distiphallic tubule before apex. The larva forms the whitish green, long mine on the leaf of *Carex* spp.; the pupation takes place on the ground. The puparium has a pair of short horns on the dorsal side of the first abdominal segment and four bulbs on the posterior spiracle.

*Specimens examined.* 2 ♀, Ashiu, Kyoyo Pref., 17 Oct. 1982 (MS); 1 ♂ 1 ♀, Hiraga, Matsudo, Chiba Pref., emerg. 9-15 June 1983, reared from larvae on *Carex gibba* (K. Okazaki); 3 ♂ 9 ♀, Ashiu, Kyoto Pref., 27 July 1983 (MS); 8 ♂ 4 ♀, Kibune, Kyoto, 8 & 11 June 1987 (MS).

*Distribution.* Japan (Hokkaido, Kuriles., Honshu); Holarctic, British Guyana.

**19. *Cerodontha (Butomyza) caricivora* (Groschke)**

*Phytobia (Poemyza) caricivora* Groschke, 1954: 138.

*Cerodontha (Butomyza) caricivora* (Groschke), Nowakowski, 1967: 635; Sasakawa, 1993: 342.

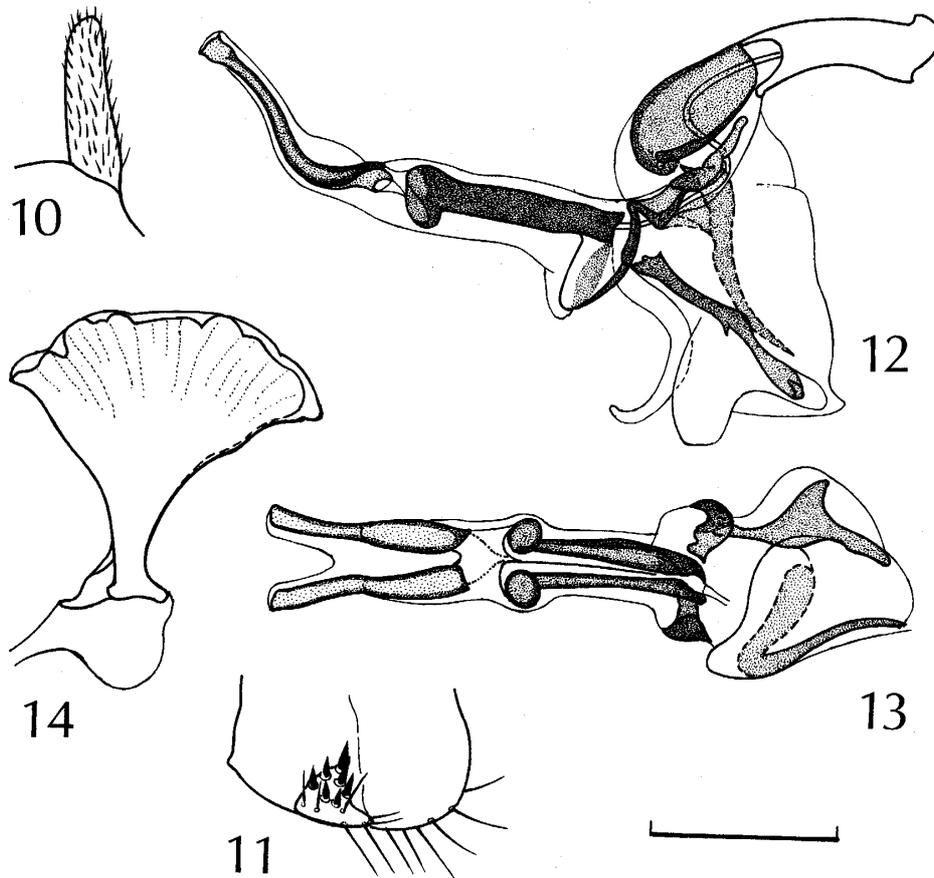
Closely resembling *eucaricis* (no. 21) and *pseuderrans* (no. 23), with following points of difference: calypter white to whitish yellow, with pale brown fringe; r-m at or beyond middle of discal cell; surstylus with 6-9 spines on tip; distiphallus weakly curved, with tubules each curved outwards in basal half and those parallel-sided in distal part.

*Specimens examined.* 1 ♀, Ashoro, Hokkaido, 16 June 1954 (MS); 1 ♂, Kibune, Kyoto, emerg. 20 July 1991, reared from larva on *Carex* sp. 8 July 1991 (T. Imura); 1 ♂, Sotsuka, Ohtsu, Shiga Pref., 12 July 1995 (MS); 1 ♀, Mt. Zozo-yama, Shirakwa-mura, Gifu Pref., 14 May 1999 (MS); 1 ♂, Kamichihara, Yakuno-cho, Kyoto Pref., emerg. 6 June 2002, puparium on *Carex idzuroei* coll. on 13 Apr. 2002 (MS).

*Distribution.* Japan (Hokkaido, Honshu); Europe.

**20. *Cerodontha (Butomyza) eminula* sp. nov. (Figs 10-14)**

*Male.* Black: head with frons except for ventral margin of frontalia, dorsal part of lunule and gena dark brown; arista brown; thorax sparsely grayish-dusted, mesoscutum laterally and scutellum weakly shining, mesopleural suture and base of wing whitish yellow; abdomen shiny, epandrium and anal process dark brown. Wing hyaline; veins pale brown, distinctly yellow at bases; calypter yellow, with margin and fringe dark brown; halter yellow. Legs



Figs 10-14. Male genitalia of *Cerodontha* (*But.*) *eminula* n. sp. (paratype). 10, anal process; 11, surstylus; 12-13, phallus, lateral and ventral views; 14, ejaculatory apodeme. Scale=0.1 mm.

brownish black, fore knee distinctly yellow, fore tibia and all tarsi yellowish to pale brown.

Frons wider than long, 1.6-1.8 times as wide as eye; parafrontalia not or very slightly (between levels of lower ors and lower ori) projecting above eye in profile, very slightly broadened below level of lower ori just laterad of lunule; ors and ori each two; oh distinct but in a sparse row; lunule higher than semicircle but slightly lower than basal width (5 : 6) which is equal to frontal length between anterior ocellus and dorsal margin of lunule; gena 1/6-1/7 of eye height; antennae separated at bases in distance of nearly 1/2 of scape diameter; facial carina narrow; first antennal flagellomere round, as long as broad, slightly wider than genal height (4 : 3), distinctly pilose; arista slightly shorter than eye height, pubescent.

Mesoscutum with 1+3 dc, 4(-6) rows of acr, prsc 1/3-1/2 length of posteriormost dc. Wing: Costa extending to  $M_1$  but very weak beyond tip of  $R_{4+5}$ , with three sections in proportion of 2.7-3.5 : 1 : 0.6-0.7; r-m at or before middle of discal cell; ultimate section of  $M_1$  2.5-3.2 times as long as penultimate; ultimate section of  $CuA_1$  about 2/3 length of penultimate. Mid tibia with one or two pd.

Epaandrium with anal process (Fig. 10) very long (90  $\mu$ m), about 3.5 times as long as broad, hairy; surstylus (Fig. 11) with seven spines and five setae. Hypandrium of normal shape, 280  $\mu$ m long. Phallus (Figs 12-13) 3/5 length of phallapodeme (680  $\mu$ m), basiphallus shortest, distiphallus almost as long as mesophallus, slightly curved at base, with tubules slightly diverging distally; ejaculatory apodeme (Fig. 14) 150  $\mu$ m long, 170  $\mu$ m in greatest width.

Body length 2.3 mm; wing length 2.4 (holotype)-2.5 mm.

*Female*. Similar to male, but abdomen brownish black; parafrontalia not projecting above eye margin in profile, not broadened ventrally; gena 1/9-1/10 of eye height; acr always in six rows; body length 2.5-2.6 mm; wing length 2.7-2.8 mm.

*Holotype*. ♂ (OMNH TI 208), Kibune, Kyoto, 24 May 1982 (MS). *Paratypes*. 1 ♂ 3 ♀, same data as holotype.

*Distribution*. Japan (Honshu).

*Remarks.* The male of this species is unique in having the long anal process on the epandrium, differing from all the known Palaearctic species of *Butomyza*. This species resembles *C. (B.) staryi* with the widely-spaced antennal bases and the long anal process, but in *eminula* the distance between bases of antennae is nearly 1/2 of the scape diameter, while in *staryi* 1/2-3/4 (rarely as wide as in both sexes); the anal process is longer (60  $\mu$ m in *staryi*); the ultimate section of  $CuA_1$  is distinctly shorter, while in *staryi* 0.9-1.5 times as long as penultimate.

*Etymology.* The specific name is from the Latin, meaning 'projecting' and refers to the anal process on the epandrium.

### 21. *Cerodontha (Butomyza) eucaricis* Nowakowski

*Cerodontha (Butomyza) eucaricis* Nowakowski, 1967: 636; Sasakawa, 2002: 33.

This black species with the wing length 2.4 ( $\sigma$ )-2.9 ( $\rho$ ) mm shows a close relationship with *C. (B.) staryi* (see no. 24) in the coloration of the calypter fringe, but is immediately distinguishable by the black face, antenna and gena. The surstylus is provided with six spines, the phallus is nearly 3/4 length of the phallapodeme (800  $\mu$ m), the distiphallus curves in a regular semicircle, the hypandrium is slightly less than half of phallapodeme.

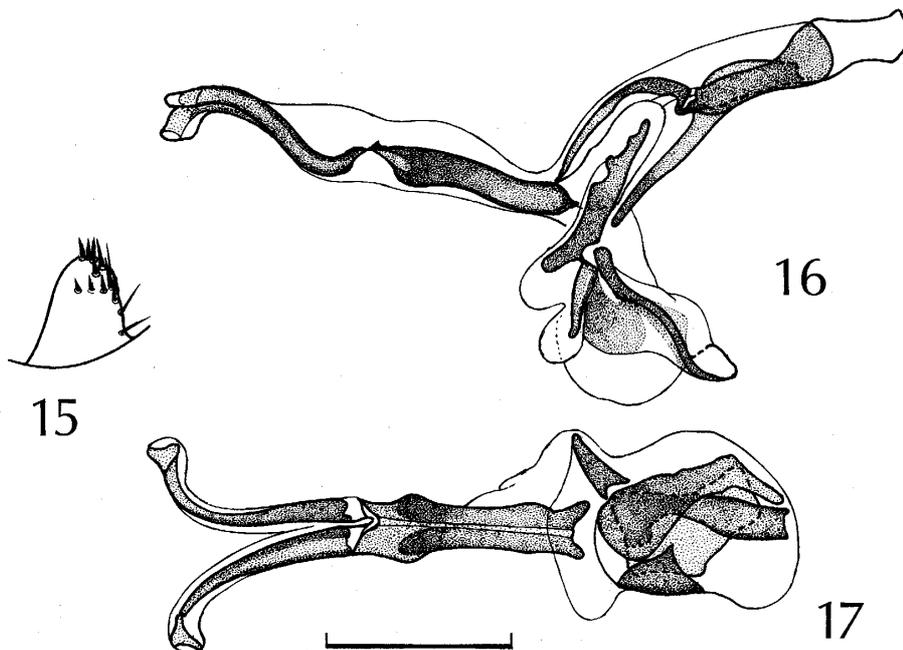
*Specimens examined.* 2  $\sigma$  3  $\rho$ , Monzen, Obama, Fukui Pref., emerg. 17-19 June 2002, reared from larvae on *Carex dimorpholepis* coll. 10 June 2002 (MS).

*Distribution.* Japan; Holarctic.

### 22. *Cerodontha (Butomyza) hakusana* sp. nov. (Figs 15-17)

*Male.* Black; parafrofrontalia shiny, dark brown but inner dorsal margin distinctly pale; lunule and gena brown; antenna and palp dark brown; thorax and abdomen shiny, scutellum slightly brown-tinged, notopleuron brown, mesopleural suture and wing base whitish yellow. Wing hyaline, veins pale brown but yellowish at bases; calypter yellowish gray, with margin dark brown, fringe yellowish brown; halter yellow. Legs dark brown, all knees yellow on apical 1/4-1/5 of femora, fore tibia and all tarsi brown.

Frons twice as wide as eye, converging ventrally; parafrofrontalia broadened at lateral side of lunule, slightly projecting above eye margin in profile; ors and ori each two; oh in sparse row; lunule higher than semicircle, as high as frontal length between anterior ocellus and dorsal margin of lunule; eye bare, slightly higher than broad; gena about 1/8 of eye height; pm five; antennae separated at bases in distance of 2/3 as wide as diameter of scape, first



Figs 15-17. Male genitalia of *Cerodontha (But.) hakusana* n. sp. (holotype). 15, surstylus; 16-17, phallus, lateral and ventral views. Scale=0.1 mm.

flagellomere small, as long as wide, nearly 1/5 as high as eye, rounded apically, with pile minute; arista as long as eye height, minutely pubescent.

Mesoscutum with 1+3 dc (presutural dc short), 5-6 rows of acr, without prsc. Wing: Costa extending to  $M_1$ , with three sections in proportion of 3 : 1 : 0.6, r-m slightly before middle of discal cell, ultimate section of  $M_1$  thrice as long as penultimate, ultimate section of  $CuA_1$  3/4 length of penultimate.

S6 twice as wide as long, emarginated on posterior 1/3; S5 2/3 width of S6 and 1/2 length of S6. Epandrium with anal process 35  $\mu\text{m}$  long, about twice as long as wide; surstylus with 11 spines in two rows and a few setae. Hypandrium 230  $\mu\text{m}$  long, with side piece broadly united at base (about 1/4 as long as entire length of hypandrium). Phallapodeme 600  $\mu\text{m}$  long; phallus 260  $\mu\text{m}$  long, hypophallus densely covered with sensillae near apex of membrane, distiphallus slightly longer than mesophallus, diverging distally. Ejaculatory apodeme small, 120  $\mu\text{m}$  long, 75  $\mu\text{m}$  in greatest width.

Body and wing length 1.8 mm, respectively.

*Female.* Differs from male in following points: parafrontalia and gena paler than those of male, inner margin of parafrontalia entirely pale; T5-6 with posterior margin yellow; gena nearly 1/5 of eye height; antennae separated at bases in distance of 1/2 of scape diameter, first flagellomere 1/4 as high as eye height; r-m distinctly before middle of discal cell; ultimate section of  $M_1$  2.5 times as long as penultimate; body and wing length 2.2 mm.

*Holotype.* ♂ (OMNH TI 209), Mt. Hakusan, Ishikawa Pref., 18 July 1999 (MS); abdomen and genitalia stored in short polyethylene tubule with glycerol. *Paratype.* ♀, same data as holotype.

*Distribution.* Japan (Honsu).

*Remarks.* This species is somewhat similar to *C. (B.) staryi* in having the widely-spaced antennal bases and the distinct anal process on the epandrium, but is recognized by the dark fringe on the calypter, the pale knees of all legs, and the short ultimate section of  $CuA_1$ , and the absence of prsc. Also, it differs from *angulata* in the characters given in the key. The densely spinose surstylus and the divergent distiphallus of *hakusana* are distinctive.

*Etymology.* The specific name is derived from the type locality.

### 23. *Cerodontha (Butomyza) pseuderrans* (Hendel)

*Dizygomyza (Poemyza) pseuderrans* Hendel, 1931: 46.

*Cerodontha (Butomyza) pseuderrans* (Hendel), Nowakowski, 1967: 635.

*Cerodontha (Dizygomyza) fonsecai* Spencer, 1971: 154.

This species can be compared with *C. (B.) eucaricis* in the curvature of the distiphallus, but is readily distinguishable by having the black fringe on the dark margin of calypter. The male genitalia of these two species can be separated by the differences in the number of spines on the surstylus and the structure of distal end of the mesophallus, that is, the epandrium is provided with six black, stout setae along the inner postero-ventral margin in addition to four spines on the surstylus, and the mesophallus is more projected ventrally at end than that of *eucaricis*.

The specimens examined had usually two ori (not three as stated by Nowakowski, 1973; only two females examined provided with three ori on one side only), and the following wing characters: r-m situated normally (not rare by Nowakowski) almost at middle of discal cell, ultimate section of  $CuA_1$  usually 4/5 length of penultimate, and 2.3-2.6 mm in length. Other external characters are quite agreeable with the original description.

The larva is known as the leaf-miner of *Carex hirta* in Europe.

*Specimens examined.* 2 ♂4 ♀, Kibune, Kyoto, 27 May 1980 (Y. Yoshiyasu); 10 ♂5 ♀, Ashiu, Kyoto Pref., 14 July 1990 (MS).

*Distribution.* Japan (new record); Europe.

### 24. *Cerodontha (Butomyza) staryi* (Starý)

*Dizygomyza staryi* Hering, Starý, 1930: 49.

*Cerodontha (Butomyza) staryi* (Starý), Nowakowski, 1967: 635.

*Phytobia (Dizygomyza) flavicornis* Sasakawa, 1955: 70 (= *honshuensis* Henshaw and Howse n. name, 1989).

The head is partially yellowish: the parafrontalia yellow below the base of lower ors, the yellowish-brown face darkened in the antennal grooves, and the gena brownish yellow. The gena is narrow, 1/8-1/10 of eye height. See the remarks of *eminula* n. sp. (no. 20). The distiphallus is distinctive.

The larva is whitish (not yellow, Nowakowski, 1973) and 4.2-4.7 mm in length; the pale brown posterior spiracle is projected ventrally in a form of long spine with one elongated ventral bulb, and two dorsal bulbs situated on the postero-dorsal base of spine. The pupation takes place within the leaf-sheath.

*Specimens examined.* 1 ♂ 2 ♀, Kibune, Kyoto, 15 May 1952 (MS); 2 ♂ 3 ♀, Mt. Hiei, Kyoto, emerg. 15 Apr. 1980, reared from larvae coll. 28 July 1980, on *Carex* sp. (MS); 1 ♂, Hanase, Kyoto, 15 May 1981 (MS); 1 ♀, Kunda, Kyoto Pref., 27 May 1982 (MS); 4 ♂ 9 ♀, Mt. Taikoyama, Tango, Kyoto Pref., 28 May & 8 June 1982 (MS); 5 ♂ 3 ♀, Ashiu, Kyoto Pref., 17 Sept. 1982 & 27 July 1983 (MS); 1 ♂, Kurondo Park, Katano, Osaka Pref., 26 July 1983 (MS); 3 ♂ 3 ♀, Minami-Yamashiro, Kyoto Pref., 23 July 1985 (MS); 1 ♀, Nigorigawa, Kosaka-cho, Gifu Pref., 13 Aug. 1989 (MS); 1 ♂ 1 ♀, Imperial Palace, Tokyo, 20 May 1996 (T. Hayashi); 1 ♂ 4 ♀, Kami-Otoineppu, Teshio, Hokkaido, 25-28 July 1958 (MS).

*Distribution.* Japan (Hokkaido, Honshu); Europe.

### Subgenus *Dizygomyza* Hendel

*Dizygomyza* Hendel, 1920: 130; 1931: 83.

*Cerodontha* (*Dizygomyza*), Nowakowski, 1962: 102.

Type-species: *Agromyza morosa* Meigen, 1830.

This subgenus is recognizable externally by the semicircular lunule, widely-spaced antennal bases and the enlarged first antennal flagellomere covered densely with the whitish pile in the male. The larval posterior spiracles retain the primitive arrangement of three bulbs. The larvae are all the leaf-miners on Cyperaceae, Juncaceae, Poaceae and Iridaceae. The occurrence of six species are known in Japan.

### Key to Japanese species

- |   |                                |
|---|--------------------------------|
| 1. Abdomen with anterior tergites yellow laterally.....   | 25. <i>bimaculata</i> (Meigen) |
| Abdomen entirely black.....   | 2                              |
| 2. Mesoscutum with lateral side from posterior margin of postpronotal lobe to notopleuron yellow..... | 30. <i>suturalis</i> (Hendel)  |
| .....   | 3                              |
| Mesoscutum with lateral side black or brown-tinged.....   | 3                              |
| 3. All knees yellow.....  | 4                              |
| Only fore knee yellow.....  | 28. <i>iridicola</i> (Koizumi) |
| 4. Oh entirely reclinate.....   | 5                              |
| Oh reclinate and proclinate.....  | 29. <i>omissa</i> (Spencer)    |
| 5. Acr numerous, in 5-8 rows.....   | 27. <i>ireos</i> (Goureau)     |
| Acr sparser, in 4-6 rows.....   | 26. <i>caricicola</i> (Hering) |

### 25. *Cerodontha* (*Dizygomyza*) *bimaculata* (Meigen) [Suzumenoyari-hamoguribae]

*Agromyza bimaculata* Meigen, 1830: 182.

*Dizygomyza* (*Dizygomyza*) *bimaculata* (Meigen), Hendel, 1931: 88.

*Cerodontha* (*Dizygomyza*) *bimaculata*, Nowakowski, 1962: 135; Sasakawa and Matsumura, 1998: 11.

*Phytobia* (*Dizygomyza*) *luctuosa* (Meigen), Sasakawa, 1961a: 380.

This species is recognizable by the shiny, black parafrontalia, silvery-gray pruinose lunule, the enlarged first flagellomere of antenna covered thickly with long, white pile in the male, the whitish-gray dusted mesoscutum, the yellow anterior abdominal tergites (T2-3 or 4) on the lateral sides and the white fringe on the calypter.

Male genitalia are distinctive as follows: Epandrium with anal process and small protuberance just above postero-ventral corner; surstylus with 1(-2) strong spine(s) and 2-4 spine-like setae; distiphallic tubules slightly

longer than mesophallus, curving upwards.

The larval host plants are *Luzula* spp. (Juncaceae).

*Specimens examined.* 2 ♂, Kibune, Kyoto, 16 Apr. 1958 (MS); 3 ♂1 ♀, Mt. Ushio, Kyoto, 3 May 1958 (MS); 1 ♂, Saga, Kyoto, 5 May 1958 (MS); 2 ♂, Momoyama, Kyoto, 3 June 1958 (MS); 4 ♂1 ♀, Oono Exp. Forest of Kyoto Pref. Univ., Kyoto Pref., 1 June 1971 (MS); 1 ♂, Kibune, Kyoto, 27 May 1980 (MS); 2 ♂, Sasayama, Hyogo Pref., 10 May 1981 (MS); 3 ♂1 ♀, Hanase, Kyoto, 15 May 1981 (MS); 2 ♂, Kibune, Kyoto, 24 May 1982 (MS); 2 ♀, Takao, Kyoto, 30 Apr. 1986 (MS); 1 ♂, Hodani, Hirakata, Osaka Pref., 18 June 1989 (MS); 1 ♂, Kunda, Tango, Kyoto Pref., 27 June 1993 (MS); 6 ♂5 ♀, Kurondo Park, Katano, Osaka Pref., 29 Apr. & 2 May 1994 (MS); 1 ♂, Sotsuka-cho, Otsu, Shiga Pref., 12 July 1995 (MS); 2 ♂, Iwakuni US Military Base, 20 May 1998 (Fujimori); 1 ♂, Kibune, Kyoto, 18 May 2000 (MS); 2 ♀, Hase, Sakurai, Nara Pref., 25 Apr. 2001 (MS); 5 ♂, Yakuno-cho, Kyoto Pref., 13 Apr. 2002 (MS); 1 ♀, Arima, Hyogo Pref., 14 Apr. 2002 (MS); 1 ♂, Yakuno-cho, Kyoto Pref., 6 June 2002 (MS); 2 ♂, Kurume, Fukuoka Pref., 9 June 1999 (K. Kanmiya).

*Distribution.* Japan (Kuriles, Honshu, Kyushu); Europe.

*Remarks.* Two females collected at Hase, Sakurai, Nara Pref. (25 Apr. 2001) had the brown-tinged anterior margin between cross vein h and apex of vein R<sub>1</sub> and along the anterior base of cell R<sub>1</sub>. Mid tibia is provided rarely with one short pd.

#### 26. *Cerodontha (Dizygomyza) caricicola* (Hering) [Suge-oo-moguribae]

*Dizygomyza caricicola* Hering, 1926: 483.

See Sasakawa and Matsumura, 1998: 11. The distiphallid tubules are conspicuously longer than those of *bimaculata*, 2-2.5 times as long as mesophallus, curving upwards at right angle to mesophallus, recurved downwards distally to form a semicircle. Larval host plant: *Carex* spp.

*Distribution.* Japan; Europe, Russia.

#### 27. *Cerodontha (Dizygomyza) ireos* (Goureau) [Ayame-hamoguribae]

*Agromyza ireos* Robineau-Desvoidy, Goureau 1851: 135 (as *ircos*, printing error).

*Dizygomyza (Dizygomyza) iraeos* (Robineau-Desvoidy), Hendel, 1931: 86; Koizumi, 1953: 44; Sasakawa, 1961a: 378 (as *Phytobia*).

*Cerodontha (Dizygomyza) ireos*, Nowakowski, 1967: 642.

The distiphallid tubules are curved at right angle to the mesophallus and slightly recurved at apex (Sasakawa, 1961a, fig. 56d). Genital (♂ ♀) and larval characters: See Sasakawa (1961a, fig. 56c-n). The larva mines the leaf of *Iris* spp.

*Distribution.* Japan; Europe, Russia.

#### 28. *Cerodontha (Dizygomyza) iridicola* (Koizumi) comb. n. [Himeayame-hamoguribae]

*Dizygomyza (Dizygomyza) iridicola* Koizumi, 1953: 48, 54; Sasakawa, 1961a: 379 (as *Phytobia*).

This leaf-miner of *Iris ensata* var. *hortensis* differs from *ireos* in the pale coloration of head (frontalia yellowish brown, parafrontalia brownish black, lunule yellow), and in having four rows of acr, the short ultimate section of CuA<sub>1</sub> (about 3/5 length of penultimate) and only the yellow fore knee. The characters of male genitalia are not known.

*Distribution.* Japan.

#### 29. *Cerodontha (Dizygomyza) omissa* (Spencer) comb. n.

*Phytobia (Dizygomyza) omissa* Spencer, 1961: 86; Sasakawa, 1967: 116.

Closely resembling *caricicola* with following points of difference: frontalia and parafrontalia brown rather than black, some oh reclinate but others distinctly proclinate, wing length shorter (2.2 mm in female), and ultimate and penultimate sections of CuA<sub>1</sub> equal. The male and host plant are not known.

*Distribution.* Japan (Ryukyus); Formosa.

**30. *Cerodontha (Dizygomyza) suturalis* (Hendel)** [Suge-kiberi-hamoguribae]

*Dizygomyza (Dizygomyza) morosa* var. *suturalis* Hendel, 1931: 91.

*Cerodontha (Dizygomyza) suturalis* (Hendel), Spencer, 1971: 157.

*Phytobia (Dizygomyza) morosa* (Meigen), Frick, 1953: 71; Groschke, 1954: 145; Sasakawa, 1955: 72..

*Phytobia (Dizygomyza) morosa suturalis* (Hendel), Sasakawa, 1961a: 381.

The distinctive character of this species is the yellow notopleural area, differing from *caricicola* and *ireos*. Male and female genitalia: See Sasakawa, 1961a, fig. 59. Larval host plant: *Carex* spp.

*Specimens examined.* 3 ♂, Kibune, Kyoto, 24 Apr. 1958 (MS); 1 ♂, Kibune, emerg. 8 July 1991, on *Carex* sp. (T. Imura).

*Distribution.* Japan (Hokkaido, Honshu); Europe, China, Mongolia.

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