Revision of the Genus *Meromyza* MG. (Diptera: Chloropidae) in Japan, with Three Newly Recorded Species

Kenkichi KANMIYA

*Biological Laboratory, School of Medicine, Kurume University,
Mii-machi, Kurume, Fukuoka 830, Japan*

(Received June 3, 1978)

Three species of the genus *Meromyza* MG., *sibirica* FED., *inornata* BECKER and *pratorum* MG. are newly recorded in Japan. The injurious species in Japan, the wheat thigh chloropid fly, known as *M. saltatrix* (L.), is proven to divide into two different species, *M. nigri-ventris* MACQ. and *orientalis* FED. Short redescrptions on the six species are added with illustrations of the male genitalia. A key to the known species from Japan is presented.

INTRODUCTION

The genus *Meromyza* MEIGEN is estimated to comprise at least 67 species in the world, a large majority of which is distributed in the Palaearctic (46 species) and Nearctic Region (21 species). The systematics of the genus have been extensively studied and many new species have been established by FEDOSEEVA (1960 a, b, 1962, 1964, 1967, 1971a, b, c, 1974).

The members of the genus are associated with such Gramineous plants, namely, *Agropyron*, *Agrostis*, *Alopecurus*, *Bromus*, *Calamagrostis*, *Dactylis*, *Deschampsia*, *Elymus*, *Festuca*, *Hordeum*, *Phleum*, *Poa* and *Sasa* (NARTSHUK, 1972). Several species attack cereal crops, and particularly *M. nigri-ventris* MACQ. and *M. americana* FITCH have been known as economically important species for wheat, barley and rye.

Only two species have been known to occur in Japan under the names of *M. nipponensis* NISHIJIMA and *M. saltatrix* (L.). The former species inhabits young shoots of *Sasa kurilensis*, and is economically insignificant. The latter species, commonly known as the wheat thigh chloropid fly, has been given attention since it attacks wheat, barley, oats and rye in Hokkaido and northern Honshu (KUWAYAMA 1946, HIRATA 1950, 1951; NISHIJIMA, 1951, 1952, 1954, 1960, 1965).

Following the systematic studies of FEDOSEEVA (1961, 1966), the species which had been identified as *saltatrix* s. lat. has been divided into two species, *saltatrix* (L.) (inhabiting wild plants) and *nigri-ventris* MACQ. (injurious to wheat, barley, oats and rye). The latter species has two seasonal forms. The Japanese *saltatrix* which had been identified and studied by NISHIJIMA was also suggested by FEDOSEEVA (1961) to be changed for *nigri-ventris* MACQ.

In this paper, three species of the genus are newly recorded in Japan, and the species known as *saltatrix* (L.) is divided into two different species, namely *nigri-ventris* MACQ. (in Hokkaido) and *orientalis* FED. (in Hokkaido, Honshu and Kyushu). The latter species is confirmed to be usually associated with wild plants, and occasionally expands its host range to wheat in northern Honshu.

Genus *Meromyza* MEIGEN, 1830

MEIGEN, 1830, *Syst. Besch.* 6:163. Type-species: *Meromyza saltatrix* (L.) (= *Musca saltatrix* LINNÉ), by designation of MACQUART, 1835.

Meromyza: DUDA, 1933–1935, *Fliegen palaearkt. Reg.* **61**: 117–120.—SÉGUY, 1934, *Faune de France* **28**: 506–509. —SABROSKY, 1935, *Trans. Am. ent. Soc.* **61**: 215–217. —NISHIJIMA, 1955, *Ins. Matsum.* **19**: 51–53. —FEDOSEEVA, 1960, *Entom. Obozr.* **39**: 450–461. —FEDOSEEVA, 1960, *Nauchn. dokl. vysshey shkoly* **4**: 46–50. —PÉTERFI, 1961, *Folia entom. hung.* (series nova) **14**: 163–174. —FEDOSEEVA, 1962, *Entom. Obozr.* **41**: 470–474. —FEDOSEEVA, 1964, *Entom. Obozr.* **43**: 466–477.—FEDOSEEVA, 1967, *Entom. Obozr.* **46**: 439–441. —HUBICKA, 1967, *Bull. Acad. Polonaise des Sciences* **15**: 753–756. —FEDOSEEVA, 1971, *Entom. Obozr.* **50**: 911–930. —FEDOSEEVA, 1971, *Zool. Zhurn.* **50**: 945–948. —FEDOSEEVA, 1971, *Biol. Nauk.* **4**: 18–22. —FEDOSEEVA, 1974, *Entom. Obozr.* **53**: 916–924.

Key to the species of *Meromyza* from Japan

1. Palpus infuscated with black entirely or on apical half.....2
Palpus entirely yellow or infuscated with black on apical end6
2. Frontal triangle yellow except for blackened ocellar tubercle; occiput and postgena not entirely blackened; mesonotum yellow in ground color, with several distinct mesonotal stripes; scutellum also yellow, more or less with a brown stripe medially; hind femur yellow.....3
Frontal triangle entirely black and semi-shiny; occiput and postgena completely blackened; mesonotum and scutellum entirely blackish-brown; hind femur largely blackened.....
.....*nipponensis* NISHIJIMA
3. Mesonotum broad and nearly square, length not more than $1.2 \times$ width; dorsal surface of abdominal tergites entirely black shining, or yellow with 3 dark stripes apparent on 1–4th segments.....4
Mesonotum narrow and elongate, length at least $1.2 \times$ width; dorsal surface of abdominal tergites, largely yellow with a median black longitudinal stripe.....*sibirica* FEDOSEEVA
4. Mesonotal stripes predominantly blackened; dorsal surface of abdominal tergites largely black and semi-shiny, or median longitudinal dark stripe changed to dark patch on 5–6 segments.....5
Mesonotal stripes largely reddish yellow or at most partially brown anteriorly and laterally; dorsal surface of abdominal tergites largely yellow with 3 longitudinal dark stripes
.....*nigriventris* MACQUART (summer form)
5. Ocellar tubercle with a small rounded black macula which is not spreading; frontal triangle paler than frons, with black or brown lateral boundaries; surstylus oblong, length nearly $1.6 \times$ width, directed downwards; distal part of posterior paramere broad and duck-billed in form, with convex ventral margin*orientalis* FEDOSEEVA
Ocellar tubercle with a square, large, black macula, front corners of which touch lateral boundaries of frontal triangle; frontal triangle same color as frons, without darkly margined lateral boundaries; surstylus short, bulging distally, with innerdistal part widening inwardly; distal part of posterior paramere elongated-triangular, with a nearly straight ventral margin
.....*nigriventris* MACQUART (spring form)
6. Weak frons beyond anterior level of eye; mesonotal stripes blackish brown to brown, the median stripe slightly beyond middle of length of mesonotum; scutellum entirely yellow; lower margin of posterior paramere concave; surstylus well-developed, nearly $1.25 \times$ as deep as epandrium in lateral view.....
.....*inornata* BECKER
Distinct frons beyond anterior level of eye; mesonotal stripes largely black, the median stripe extending to scutoscuteellar suture; scutellum yellow with a black median stripe; lower margin of posterior paramere convex medially; surstylus remarkably reduced in a small finger form, nearly $1/4 \times$ as deep as epandrium in lateral view*pratorem* MEIGEN

Meromyza nipponensis NISHIJIMA

Meromyza nipponensis NISHIJIMA, 1955, *Ins. Matsum.* **19**: 51 (Hokkaido).

Meromyza nipponensis: NARTSHUK, 1974, *Entom. Obozr.* **53**: 697.

This species is characteristic in having entirely blackened mesonotum and scutellum. Highly modified features are also seen in the structures of the male genitalia, in which the anal plate is narrow and elongated-triangular. The surstylus extends not ventrally as in other species but horizontally, and the basal process of the posterior paramere is very broad and long.

♂ *genitalia*. Epandrium black, densely clothed with black hairs, about $1.14 \times$ as deep as long in profile; surstylus flattened and plate-like, about $1.7 \times$ as long as wide, articulated horizontally with innerventral side of epandrial notch, bearing rather strong, spine-like bristles dorsally and interiorly; basal process of the posterior paramere very broad, about $1/2$ of the length of the distal paramere; aedeagal apodeme nearly straight at ventral side in profile, basal part of the apodeme as long as the distal part, distal part of the apodeme very broad, deeply depressed in a spoon form in dorsal view; aedeagus not cylindrical, deep-channelled form and strongly bending upwards in profile.

Figs. 1-4. *Meromyza nipponensis* NISHIJIMA, ♂. 1. Epandrium and surstylus, dorsal view. 2. Posterior paramere, innerside, lateral view. 3. Hypandrium and phallic organs, ventral view. 4. Phallic organs, lateral view.

Distribution. Japan (Hokkaido, Honshu); Kunashiri and Shikotan Islands, Sakhalin.

Specimens examined. [Hokkaido]: Mt. Yubari, Sorachi (1 ♀, 10. viii. 1966, K. KUSHIGEMATI leg.; 1 ♂ 2 ♀ ♀, 15. vii. 1967, T. SAIGUSA leg.; 1 ♂ 2 ♀ ♀, 15. vii. 1967, M. HONDA leg.; 1 ♀, 15. vii. 1967, 1 ♀, 16. vii. 1967, A. NAKANISHI leg.). Odaito, Nemuro (1 ♂ 1 ♀, 1. viii. 1967, T. SAIGUSA leg.). Nukabira, Fujikawa, Tokachi (18 ♂ ♂ 1 ♀, 18. vii. 1967, 5 ♂ ♂, 19. vii. 1967, T. SAIGUSA leg.; 2 ♀ ♀, 19. vii. 1967, A. NAKANISHI leg.). Ashoro, Tokachi (1 ♂, 26. vii. 1967, M. HONDA leg.). Mt. Rausu, Shari, Abashiri (1 ♀, 3. viii. 1967, H. SHIMA leg.). Nopporo, Sapporo (2 ♂ ♂, 7. vii. 1964, K. KUSHIGEMATI leg.; 1 ♀, 22. vii. 1969, 1 ♂, 24. vii. 1969, M. Suwa leg.). Mt. Moiwa, Sapporo (4 ♂ ♂ 4 ♀ ♀, 11. vii. 1967, A.

NAKANISHI, leg.). [Honshu]: Shirakabako, Nagano Pref. (4♂♂3♀♀, 20. vii. 1970, K. KANMIYA leg.). Shigakogen, Nagano Pref. (4♂♂6♀♀, 23. vii. 1970, K. KANMIYA leg.).

Host plants. *Sasa kurilensis* (RUPR.) MAKINO et SHIBATA (NARTSHUK, 1972).

***Meromyza sibirica* FEDOSEEVA**

Meromyza sibirica FEDOSEEVA, 1961, *Entom. Obozr.* **40**: 706 (East Siberia).

Meromyza sibirica: FEDOSEEVA, 1964, *Entom. Obozr.* **43**: 474. —NARTSHUK, 1972, *Insects of Mongolia*, *Nauka* **1**: 922. —NARTSHUK, 1976, *Acta. Zool. Acad. Sci. Hung.* **22**: 364.

This species is characterized by the following features. Median mesonotal stripe strongly narrowing posteriorly, extending slightly beyond middle of mesonotum, and never reaching the scutoscuteellar suture in a black color; frontal triangle yellow, without any black margination on lateral boundaries, with a small rounded black ocellar spot; occiput weakly infuscated with brown; frons longer than wide, nearly parallel, and weakly projecting beyond anterior level of eye for about same depth of gena in lateral view; 3rd antennal segment as long as deep, rounded anteriorly; basal segments of arista more yellowish than distal segment; thoracic pleura with yellow patches except for blackened hypopleuron; dorsal surface of abdominal tergites largely yellow with a longitudinal black stripe medially.

♂ *genitalia*. Epandrium rather small, light brown, about $1.3\times$ as deep as long in lateral view; surstylus long, produced ventrally, about $1.7\times$ as long as wide, bluntly rounded apically in lateral view, and weakly diverging distally in dorsal view; anal plate rectangular, about $1.14\times$ as long as wide; posterior paramere with a narrow

Figs. 5-8. *Meromyza sibirica* FEDOSEEVA, ♂. 5. Epandrium and surstylus, dorsal view. 6. Posterior paramere, innerside, lateral view. 7. Hypandrium and phallic organs, ventral view. 8. Phallic organs, lateral view.

and elongated distal process which is strongly curved medially, abruptly narrowed at distal 2/3; basal process of posterior paramere nearly oblong, not strong ventrally; aedeagus cylindrical, about $2.5 \times$ as long as wide, weakly broadened basally and weakly curved dorsally in lateral view.

Distribution. Japan (Hokkaido, Honshu); Primorsk Region, Altay, Transbaykal, N. Kazakstan, S. Siberia, Mongolia.

Specimens examined. Onbetsu, Kushiro, Hokkaido (1 ♂, 31. viii. 1967, T. SAIGUSA leg.). Shirakabako, Nagano Pref. (32 ♂ ♂ 26 ♀ ♀, 20. vii. 1970, K. KANMIYA leg.).

This species is recorded here for the first time in Japan.

Meromyza nigriventris MACQUART

Meromyza nigriventris MACQUART, 1835, *Suit. à Buff.* **2**: 590.

Meromyza punctifer BECKER, 1912, *Ann. Mus. Hung.* **10**: 24.

Chlorops hordei MATSUMURA, 1927, *Ins. Matsum.* **1**: 127. By NISHIJIMA, 1952, as synonym of *M. saltatrix* (L.).

Meromyza saltatrix: NISHIJIMA, 1952, *Oyo-Kontyu* **8**: 22–28. —NISHIJIMA, 1960, *J. Fac. Agr. Hokkaido Univ.* **51**: 381–448. Suggested by FEDOSEEVA, 1961, *Entom. Obozr.* **40**: 708.

Meromyza nigriventris: FEDOSEEVA, 1960, *Nauchn. dokl. vysshey. shkoly* **4**: 47. —FEDOSEEVA, 1961, *Entom. Obozr.* **40**: 708. —FEDOSEEVA, 1966, *Entom. Obozr.* **45**: 199, 205. —ZUSKA, 1966, *Beitr. Ent.* **16**: 538. —NARTSHUK, 1969, *Fl. Fauna in steppe and desert of Cent. Kazakstan, Nauk.* p. 442. —NARTSHUK, SMIRNOV and FEDOSEEVA, 1970, *Clas. ins. Eur. part of USSR*, V **2**: 428. —FEDOSEEVA, 1971, *Entom. Obozr.* **50**: 924. —NARTSHUK, 1972, *Insects of Mongolia* **1**: 919–920. —NARTSHUK, 1972–1973, *Acta Musei Moraviae* **56–57**: 343. —NARTSHUK, 1973, *Folia Ent. Hung.* **26**: 274. —NARTSHUK, 1975, *Insects of Mongolia* **3**: 611. —NARTSHUK, 1976, *Fragmenta Faunistica* **20**: 410.

As shown in the key, this species has seasonal forms. Because the spring form is quite similar to *orientalis* FED. in having entirely black mesonotal stripes and uniformly blackened dorsal abdominal tergites, discrimination of the two species is rather difficult at first sight. The preliminary keys are given in Tables 1 & 2 for discrimination by using conventional characters. The two species are most clearly separable by the shape of the posterior paramere of the male genitalia, namely, its distal part is elongated triangular in shape with a nearly straight ventral edge in *nigriventris*, while its distal

Table 1. CONVENTIONAL DISCRIMINATION IN THE EXTERNAL CHARACTERS BETWEEN
M. orientalis AND *M. nigriventris* (SPRING FORM)

	<i>Meromyza orientalis</i> FEDOSEEVA Specimens collected in spring	<i>Meromyza nigriventris</i> MACQUART Spring form
Frontal triangle	Paler than frons, usually marked by black margin laterally.	Same color as frons, without black margin laterally.
Ocellar tubercle	With a small black spot which does not touch lateral boundaries of frontal triangle.	Largely blackened, usually touches lateral boundaries of frontal triangle.
Occiput and postgena	Infuscated with brown immediately behind frontal triangle.	Both partly infuscated with dark brown, making ternate maculae.
Mesonotal stripes	Median stripe nearly parallel-sided, or rather weakly broadened posteriorly.	Median stripe broadened anteriorly, and gradually narrowed posteriorly.
Sternopleuron	Largely yellowish brown ventrally, or partly darkened on dorsal side.	Usually with an entirely black macula.
Fore and mid-femora	Without brownish macula.	Usually with dirty brown blots on posterodorsal surface.

Table 2. CONVENTIONAL DISCRIMINATION IN THE EXTERNAL CHARACTERS BETWEEN
M. orientalis AND *M. nigriventris* (SUMMER FORM)

	<i>Meromyza orientalis</i> FEDOSEEVA Specimens from Hokkaido and Tohoku in July and August	<i>Meromyza nigriventris</i> MACQUART Summer form
Frontal triangle	Somewhat paler than frons, laterally marked by brown margin.	Nearly same color as frons, without dark margin.
Ocellar tubercle	Blackened by a small spot, not broadened.	Same as <i>M. orientalis</i> .
Occiput and postgena	Entirely yellow, or only occiput weakly infuscated with brownish yellow behind frontal triangle.	Both entirely yellow.
Mesonotal stripes	Entirely black or only partly brown near in front of scutoscutellar suture.	Entirely brownish yellow or at most darkened on anterior parts and before scutoscutellar suture.
Median mesonotal stripe	Narrowed posteriorly, reaching to scutoscutellar suture.	Strongly narrowed posteriorly, not reaching to scutoscutellar suture.
Abdominal tergites	Yellow with longitudinal brown median stripe on 1-4th segments, but with broad brown maculae on 5-6th segments.	Each segment with distinct longitudinal brown stripe.

Figs. 9-12. *Meromyza nigriventris* MACQUART, ♂. 9. Epandrium and surstylus, dorsal view. 10. Posterior paramere, innerside, lateral view. 11. Hypandrium and phallic organs, ventral view. 12. Phallic organs, lateral view.

part is rather broad and duck-billed in form, with a convex ventral edge in *orientalis*. The distinction of the seasonal forms in *nigriventris* is shown in the key and also in the Tables 1 & 2.

♂ *genitalia*. Surstylus attached to posterior corner of epandrium, curving posteriorly in lateral view, in dorsal view surstylus short, as in that of *protorum* MG., bulging distally, innerdistal end of surstylus extruding interiorly with rather stout several setae marginally; anal plate broad, quadrate with many long bristles on dorsal side; hypandrium with two medial basal processes which are not so elongated; aedeagus cylindrical, curving at middle in lateral view, and gradually narrowing distally in dorsal view; distal process of posterior paramere narrowly elongated-triangular, with nearly straight ventral edge.

Distribution. Japan (Hokkaido); widely distributed in the Holarctic Region.

Specimens examined. [Hokkaido]: Obihiro, Tokachi (1♂1♀, 21. v. 1951, H. INOUE leg., 1♂1♀, 3. vii. 1951, S. KATO leg., 1♂, 3. vii. 1951, I. HATTORI leg.). Kotoni, Ishikari (3♀♀, 20. vi. 1949, 6♂♂3♀♀, 25. vi. 1951, 1♀, 6. vii. 1951, S. KATO leg.; 4♂♂4♀♀, 25. vi. 1951, I. HATTORI leg.; 2♂♂, 21. v. 1951, 1♂, 30. v. 1951, 1♂, 2. vi. 1951, 1♂, 5. vi. 1951, 1♂1♀, 7. vi. 1951, 1♀, 8. vi. 1951, 1♀, 9. vi. 1951, 1♂1♀, 15. vi. 1951, 2♀♀, 18. vi. 1951, 1♂1♀, 25. vi. 1951, 1♂, 27. vi. 1951, 2♂♂7♀♀, 1. viii. 1951, 3♂♂1♀, 8. viii. 1951, Y. NISHIJIMA leg.). Makari, Ishikari (1♀, 24. vi. 1949, Y. NISHIJIMA leg.). Minenobu, Ishikari (1♂, 19. vi. 1949, Y. MANO leg.). Sapporo, Ishikari (1♀, 19. vi. 1949, 1♂, 16. v. 1951, 3♂♂6♀♀, 25. v. 1951, 1♂, 13. vi. 1951, Y. NISHIJIMA leg.: 1♀, 27. vi. 1951, I. HATTORI leg.).

Host plants. *Triticum aestivum* LINNÉ (=wheat), *Hordeum vulgare* LINNÉ (=barley), *Secale cereale* LINNÉ (=rye), *Phleum pratense* LINNÉ (NARTSHUK, 1972).

Meromyza orientalis FEDOSEEVA

Meromyza orientalis FEDOSEEVA, 1964, *Entom. Obozr.* **43**: 473 (S. Sakhalin).

It is particularly difficult to distinguish *orientalis* FED. from *nigriventris* MACQ. in female specimens, since characteristics of the female terminalia are not well known. FEDOSEEVA (1964) discriminated the two species by the color of the arisal segments, namely, *orientalis* with unicolored dark brown segments, and *nigriventris* with pale yellow basal segments and dark brown distal segment. The color of arisal segments is, however, not applicable to either Japanese species because it varies with individuals.

♂ *genitalia*. Epandrium light brown, rather small, about $1.7\times$ as deep as surstylus in lateral view, with weak marginal bristles; surstylus about $1.6\times$ as long as wide, directed downwards, oblong and weakly pointed at end in lateral view; aedeagal apodeme blackly sclerotized, almost straight, without a distinct flexion at the middle, and nearly in parallel; in dorsal view, surstylus directed ventrally, nearly in parallel, gradually narrowed exteriorly at distal $4/7$ of the length; aedeagus rather long, about $2.6\times$ as long as wide, weakly constricted medially and not strongly broadened basally; posterior paramere broadened basally, rather strongly concave on the lower margin, convex on the upper margin, and with an obtuse end at the apex; basal process of posterior paramere neither large nor protruded ventrally.

Distribution. Japan (Hokkaido, Honshu, Kyushu); S. Sakhalin.

Specimens examined. [Hokkaido]: Kitami, Abashiri (5♂♂1♀, 24. vii. 1951, Y. NISHIJIMA leg.). Hamakoshimizu, Abashiri (9♂♂2♀♀, 3. vii. 1967, T. SAIGUSA leg.). Shari, Abashiri (1♂4♀♀, 3. viii. 1967, T. SAIGUSA leg.). Mt. Rausudake, Abashiri (5♀♀, 5. viii. 1967, H. SHIMA leg.). Apoi, Hidaka (1♀, 28. vi. 1967, M. SUWA leg.). Onbetsu, Kushiro (8♂♂7♀♀, 31. vii. 1967, T. SAIGUSA leg.). Odaito, Notsuke, Nemuro (1♀, 1. viii. 1967, T. SAIGUSA leg.). Wakkasakanai, Souya (11♂♂

Figs. 13-16. *Meromyza orientalis* FEDOSEEVA, ♂. 13. Epandrium and surstylus, dorsal view. 14. Posterior paramere, innerside, lateral view. 15. Hypandrium and phallic organs, ventral view. 16. Phallic organs, lateral view.

3 ♀ ♀, 1. viii. 1967, T. SAIGUSA leg.). Mt. Yubaridake, Sorachi (2 ♂ ♂, 15. vii. 1967, T. SAIGUSA leg.). Obihiro, Tokachi (4 ♂ ♂ 5 ♀ ♀, 22. vi. 1951, Y. NISHIJIMA leg.). Ashoro, Tokachi (2 ♂ ♂ 5 ♀ ♀, 21-22. vii. 1955, K. YASUMATSU leg.; 2 ♀ ♀, 18. vii. 1967, T. SAIGUSA leg.). Mt. Daisetsuzan, Kamikawa (1 ♂, 26. vii. 1951, Y. NISHIJIMA leg.). Nagayama, Ishikari (1 ♂ 2 ♀ ♀, 6. vii. 1951, S. KATO leg.). Souunkyo, Kamikawa (1 ♂ 3 ♀ ♀, 26. vii. 1951, Y. NISHIJIMA leg.; 1 ♂, 10. vii. 1960, S. TAKAGI leg.). Kotoni, Ishikari (1 ♂, 17. viii. 1951, Y. NISHIJIMA leg.). Nopporo, Ishikari (1 ♀, 18. vi. 1966, M. SUWA leg.). Touya, Iburi (1 ♂, 7. vii. 1967, T. KOCHA leg.). [Honshu]: Kogawara, Aomori Pref. (2 ♂ ♂ 6 ♀ ♀, 31. v. 1969, K. KANMIYA leg.). Anihata, Iwate Pref. (2 ♂ ♂, 2. viii. 1970, K. KANMIYA leg.). Ikezaki, Miyagi Pref. (4 ♀ ♀, 24. viii. 1966, M. SUWA leg.). Narugo, Miyagi Pref. (1 ♂, 25. viii. 1966, M. SUWA leg.). Koshi-gun, Niigata Pref. (2 ♀ ♀, 17. v. 1950, 2 ♂ ♂, 18. v. 1950, 1 ♀, 19. v. 1950, 3 ♂ ♂ 1 ♀, 20. v. 1950, 1 ♀, 21-22. v. 1950, all emerged data, reared from wheat, S. TAKAGI leg.). Niigata, Niigata Pref. (1 ♂, 27. viii. 1958, K. KAMIJO leg.). Ohmagari, Akita Pref. (1 ♂, 6. vi. 1953, 2 ♂ ♂, 7. vi. 1953, 1 ♂, 10. vi. 1953, N. FUKUHARA leg.). Sakata, Yamagata Pref. (1 ♂, 10. viii. 1959, 2 ♀ ♀, 13. viii. 1959, all emerged data, collector unknown). Matsubarako, Nagano Pref. (1 ♀, 7. ix. 1950, S. KATO leg.). Iizuna, Nagano Pref. (2 ♂ ♂, 3. viii. 1969, O. YATA leg.). Sugadaira, Nagano Pref. (1 ♀, 30. viii. 1968, Y. HIRASHIMA leg.). Mt. Yatsugadake, Nagano Pref. (1 ♂ 1 ♀, 13. viii. 1969, O. YATA leg.). Utsukushigahara, Nagano Pref. (2 ♀ ♀, 9. viii. 1969, O. YATA leg.). Mt. Togakushi, Nagano Pref. (7 ♂ ♂ 2 ♀ ♀, 8. viii. 1969, O. YATA leg.). Kirigamine, Nagano Pref. (7 ♂ ♂ 5 ♀ ♀, 21. vii. 1970, K. KANMIYA leg.). Shirakabako, Nagano Pref. (3 ♂ ♂ 5 ♀ ♀, 20. vii. 1970, K. KANMIYA leg.). Matsumoto, Nagano Pref. (11 ♂ ♂ 17 ♀ ♀, 20. v. 1969, K. KANMIYA leg.). Mt. Kiso-ontake, Nagano Pref. (1 ♂ 1 ♀, 22. v. 1969, K. KANMIYA leg.). [Kyushu]: Chojabaru, Oita Pref. (14 ♂ ♂ 3 ♀ ♀, 26. vii. 1969, 3 ♂ ♂ 1 ♀, 10. x. 1969, 1 ♂ 1 ♀, 18. v. 1970, K. KANMIYA leg.). Sujiyu, Oita Pref. (2 ♂ ♂ 1 ♀, 2. ix. 1968, K. KANMIYA leg.). Mt. Kirishima, Kagoshima Pref. (3 ♀ ♀, 15. vii. 1969, O. YATA leg.).

Host Plants. *Triticum aestivum* LINNÉ (=wheat), *Agropyron tsukushiense* (HONDA) OHWI var. *transiens* (HACKEL) OHWI (HIRATA, 1951).

Remarks. After comparing the Japanese specimens with those from the type-locality, the author found that the Japanese specimens tend to have a posterior paramere which is narrower distally and concave on the lower margin. This species is clearly distinguishable from *nigriventris* by the shape of the surstylus and posterior paramere. No seasonal form of this species has been recorded in the world, except the summer specimens from Yamagata Pref. in Japan. These have brownish mesonotal stripes with a narrowing and disturbed median stripe.

***Meromyza inornata* BECKER**

Meromyza inornata BECKER, 1910, *Arch. Zool.* **1**: 44 (Siberia).

Meromyza inornata: DUDA, 1933-1935. *Fliegen palaearkt. Reg.* **61**: 119. —FEDOSEEVA, 1960, *Nauchn. dokl. vysshey shkoly* **4**: 48. —FEDOSEEVA, 1964, *Entom. Obozr.* **43**: 476. —NARTSHUK, 1972, *Insects of Mongolia, Nauk.* **1**: 918. —NARTSHUK, 1973, *Folia ent. hung.* (ser. nov.), suppl. **26**: 273. —NARTSHUK, 1974, *Insects of Mongolia, Nauk.* **2**: 372. —NARTSHUK, 1975, *Insects of Mongolia, Nauk.* **3**: 611. —NARTSHUK, 1976, *Acta Zool. Acad. Sci. Hung.* **22**: 363.

This species is characterized by the following features. Palpus narrow and entirely yellow; frontal triangle entirely yellow except for a small black ocellar tubercle; occiput and postgena mostly yellow; arista with yellow basal segments; mesonotum nearly as long as wide, black and brown stripes on mesonotum, median stripe slightly beyond middle of mesonotal length; scutellum yellow, without black median stripe;

Figs. 17-20. *Meromyza inornata* BECKER, ♂. 17. Epandrium and surstylus, dorsal view. 18. Posterior paramere, innerside, lateral view. 19. Hypandrium and phallic organs, ventral view. 20. Phallic organs, lateral view.

thoracic pleura yellow.

♂ *genitalia*. Epandrium light brown, clothed sparsely with short hairs, about $2 \times$ as deep as surstylus in lateral view; anal plate very broad, nearly rectangle; surstylus produced ventrally, about $1.25 \times$ as deep as long and very broad in lateral view, widened distally and truncated at the apical margin in dorsal view; innerdistal corner of surstylus closed very strongly in dorsal view; basal process of posterior paramere broad; distal process of the paramere with dorsal margin deeply concave, with ventral margin weakly convex, pointed on the apical end; dorsodistal part of posterior paramere curving exteriorly; aedeagus well-developed and elongated, broadened basally and bending upward.

Distribution. Japan (Hokkaido); Primorsk Region, Kamchatka, Tuva, Transbaykal, E. Siberia, Mongolia.

Specimens examined. Onbetsu, Kushiro, Hokkaido (1 ♂ 1 ♀, 31. vii. 1967, T. SAIGUSA leg.).

Remarks. This species is distinguishable from others in that the surstyli are especially broad and closed, anal plate quadrate, distal process of posterior paramere deeply concave dorsally, and the basal process of the paramere broad and well-curved. The shortened median mesonotal stripe is rather similar to that of *sibirica* FEDOSEEVA, but is distinct from this in having yellow palpus and another form of posterior paramere.

This species is recorded here for the first time in Japan.

Meromyza pratorum MEIGEN

Meromyza pratorum MEIGEN, 1830, *Syst. Besch.* **6**: 165.

Meromyza pratorum: DUDA, 1933–1935, *Fliegen palaearkt. Reg.* **61**: 119. —SÉGUY, 1934, *Faune de France* **28**: 507. —STACKELBERG, 1956, *Trudy Zool. Inst. Acad. Nauk.* **24**: 179. —FEDOSEEVA, 1960, *Entom. Obozr.* **39**: 458. —NARTSHUK, 1962, *Entom. Obozr.* **41**: 471. —FEDOSEEVA, 1964, *Entom. Obozr.* **43**: 476. —NARTSHUK, 1969, *Fl. Fauna steppe desert Cent. Kazakstan, Nauk. USSR* p. 442. —FEDOSEEVA, 1971, *Entom. Obozr.* **50**: 924. —NARTSHUK, 1972, *Insects of Mongolia, Nauk.* **1**: 917. —NARTSHUK, *Folia entom. hung.* (ser. nov.) **26**: 272. —NARTSHUK, 1974, *Insects of Mongolia, Nauk.* **2**: 373. —NARTSHUK, 1975, *Insects of Mongolia, Nauk.* **3**: 612. —NARTSHUK, 1976, *Acta Zool. Acad. Sci. Hung.* **22**: 364.

This species is characterized by the following features. Head about $1.13 \times$ as long as deep in lateral view; frons produced beyond anterior level of eye for about the length of 3rd antennal segment in lateral view, broadly rounded on anterior margin dorsally; frontal triangle entirely yellow, without black-margined lateral boundaries, with a small black ocellar spot; palpus entirely yellow; 3rd antennal segment a little longer than deep, with an angulate anterior corner; mesonotum about $1.2 \times$ as long as wide; mesonotal stripes entirely black, the median stripe extending to scutoscuteellar suture; abdominal tergites variously infuscated but not entirely black.

♂ *genitalia*. Epandrium very large, as long as wide in lateral view, thickly clothed with long hairs on posterodorsal and ventral margin, especially long and strong on each ventral bulging and distally curving; surstylus remarkably reduced in lateral view, a small fingerform, about $1/4 \times$ as deep as epandrium, weakly broadened apically, rounded at end in dorsal view; anal plate very broad, not clearly demarcated; basal part of aedeagal apodeme about $1/2 \times$ as long as distal part, broadened distally; distal process of posterior paramere broadened basally, nearly triangular and flattened, with a sharp ridge vertically at dorsodistal part, strongly convex at middle and then narrowing toward apex on ventral margin.

Figs. 21-24. *Meromyza pratorum* MEIGEN, ♂. 21. Epandrium and surstylus, dorsal view. 22. Posterior paramere, innerside, lateral view. 23. Hypandrium and phallic organs, ventral view. 24. Phallic organs, lateral view.

Distribution. Japan (Hokkaido, Honshu); Soviet Union, Mongolia, West Europe, Alaska, Central America.

Specimens examined. Wakasakanai, Soya, Hokkaido (2 ♀ ♀, 1. viii. 1967, T. SAIGUSA leg.). Kamikochi, Nagano Pref., Honshu (2 ♂ ♂, 3. ix. 1963, T. HIDAOKA leg.).

This species is recorded here for the first time in Japan.

ACKNOWLEDGEMENTS

I wish to express my sincere thanks to Dr. J. YUKAWA, Entomological Laboratory, Kagoshima University for his kind reading of the manuscript. I am much indebted to Dr. E. P. NARTSHUK, Zoological Institute, Academy of Sciences of USSR, and Dr. L. I. FEDOSEEVA, Department of Entomology, Moscow State University, for their kindness in offering the materials and advices. My deepest thanks are also due to Prof. Y. NISHIJIMA of Obihiro University, Prof. Y. HIRASHIMA of Kyushu University, Dr. S. TAKAGI and Dr. M. SUWA of Hokkaido University, Mr. N. FUKUHARA of the National Institute of Agricultural Sciences, for their kindness in giving me an opportunity to examine their collections, and to Prof. T. SAIGUSA, Prof. A. NAKANISHI, Mr. H. SHIMA and Mr. O. YATA of Kyushu University, and Mrs. M. YAFUSO of Ryukyu University, for offering me valuable materials.

SELECTED REFERENCES

- BECKER, TH. (1910) Chloropidae. Eine monographische Studie. I. Teil. Palaearktische Region. *Arch. Zool.* **1**: 33–174.
- DUDA, O. (1933–1935) Chloropidae. In Lindner, *Die Fliegen der Palaearktischen Region* **61**: 1–248.
- FEDOSEEVA, L. I. (1960 a) The *Meromyza* Mg. fauna (Diptera, Chloropidae) of the USSR, *Nauchn. dokl. vyshey shkoly* **4**: 46–51 (In Russian).
- FEDOSEEVA, L. I. (1960 b) The species of the genus *Meromyza* Meig. (Diptera, Chloropidae) in the environs of Moscow. *Entom. Obozr.* **39**: 450–461 (In Russian).
- FEDOSEEVA, L. I. (1961) New Palaearctic species of the genus *Meromyza* Mg. (Diptera, Chloropidae). *Entom. Obozr.* **40**: 704–709 (In Russian).
- FEDOSEEVA, L. I. (1962) On some European species of the genus *Meromyza* Mg. (Diptera, Chloropidae). *Entom. Obozr.* **41**: 470–474 (In Russian).
- FEDOSEEVA, L. I. (1964) Species of the genus *Meromyza* Mg. (Diptera, Chloropidae) in the Asiatic part of the USSR. *Entom. Obozr.* **43**: 466–477 (In Russian).
- FEDOSEEVA, L. I. (1967) New species of *Meromyza* Mg. (Diptera, Chloropidae) from Transbaikalia. *Entom. Obozr.* **46**: 439–441 (In Russian).
- FEDOSEEVA, L. I. (1971 a) A contribution to the fauna of grass flies from the genus *Meromyza* (Diptera, Chloropidae) in Mongolia. *Zool. Zhurn.* **50**: 945–948 (In Russian).
- FEDOSEEVA, L. I. (1971 b) A revision of Nearctic species of the genus *Meromyza* Mg. (Diptera, Chloropidae). *Entom. Obozr.* **50**: 911–930 (In Russian).
- FEDOSEEVA, L. I. (1971 c) Newly obtained grass flies *Meromyza* (Diptera, Chloropidae) from Palaearctic Region. *Biol. Nauka* **4**: 18–22 (In Russian).
- FEDOSEEVA, L. I. (1974) On the taxonomy of grass flies of the genus *Meromyza* Mg. (Diptera, Chloropidae). *Entom. Obozr.* **53**: 916–924 (In Russian).
- HIRATA, M. (1951) On the new injurious insects of wheat in Honshu. *Plant. Prot.* **5**: 385–387 (In Japanese).
- KUWAYAMA, S. (1946) Injurious insects on wheat. *Hokuno-Sosho* **11**: 95 (In Japanese).
- MATSUMURA, S. (1927) A new injurious dipterous insects of barley. *Ins. Matsum.* **1**: 127.
- NARTSHUK, E. P. (1969) *Flora and fauna in steppe and desert of Central Kazakstan (Chloropidae, Diptera)*. Academia Nauk, USSR pp. 437–443 (In Russian).
- NARTSHUK, E. P. (1972) *Phylogeny in Chloropidae (Diptera) and its evolution*. Report on the 23 th annual reading in the memory of N. A. HOLODKOWSKOVA, Nauka pp. 3–94 (In Russian).
- NARTSHUK, E. P., E. S. SMIRNOV and L. I. FEDOSEEVA (1970) In BEI-BIENKO, *Classification of insects in the European part of USSR, V. Diptera* **2**: 399–439 (In Russian).
- NISHIJIMA, Y. (1952) On the seasonal form of *Meromyza saltatrix* (LINNÉ) (Diptera, Chloropidae) in Hokkaido. *Oyo-Kontyu* **8**: 22–28 (In Japanese).
- NISHIJIMA, Y. (1955) Notes on Chloropidae of Japan, with description of a new species. *Ins. Matsum.* **19**: 51–53.
- NISHIJIMA, Y. (1960) Studies on the barley stem maggot, *Meromyza saltatrix* (L.) with special reference to the ecological aspects. *Journ. Fac. Agr. Hokkaido Univ.* **51**: 381–448.