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Chloropid flies of the genus *Meromyza* Meigen, 1830 (Diptera: Chloropidae) of the fauna of North America

Злаковые мухи рода *Meromyza* Meigen, 1830 (Diptera: Chloropidae) фауны Северной Америки

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КЛЮЧЕВЫЕ СЛОВА: таблица для определения, Diptera, Chloropidae, *Meromyza*.

ABSTRACT: A key for 23 species of *Meromyza* Meigen, 1830 of the fauna of North America is proposed.

РЕЗЮМЕ: Составлена определительная таблица, включающая 23 вида *Meromyza* Meigen, 1830 фауны Северной Америки.

Our first revision of the Nearctic fauna of chloropid flies of *Meromyza* Meigen, 1830 was made on a rather large material (more than 500 specimens) gathered in various states of the USA including Alaska, as well as in Canada and Mexico. The main material was received from the Entomological Department of the Washington National Museum. In this material we found 20 species of *Meromyza,* 13 of which turned out to be new for science [Fedoseeva, 1971]. Besides, we were given gatherings from California for determination — material of the Academy of Science, San Francisco. 8 species of *Meromyza* were found in California, and 3 out of them were described by us as new ones [Fedoseeva, 1978].

It should be noted that before our work the latest list of *Meromyza* species produced in the well-known catalog Diptera of North America [Sabrosky, 1965] consists of 3 species: *M. americana* Fitch (syn. *flavipalpis* Malloch), *M. pratorum* Meigen (syn. *lineola* Carran), *M. saltatrix* L. (syn. *nigriventris* Macquart, syn. *punctifer* Becker, syn. *marginata* Becker).

M. saltatrix L. was really further found in North America — in Alaska, but in the above list *M. nigriventris* was ment under *M. saltatrix.* Previously it was informed about the separation of these species [Fedoseeva, 1960].

Such a complex synonymy comes out of history of the study of Meromyza in North America. The first and the only species described by Fitch [1856] was *M. americana*. Becker [1912] studying the fauna of Chloropidae of North America made a groundless joining of *M. americana* Fitch with *M. pratorum* Mg. Besides, Becker took *M. nigriventris* Macq., discovered there, for *M. saltatrix* L., just as it happened in Europe. Finally, as a new species — *M. punctifer,* Becker described the summer form of *M. nigriventris* Macq. Further Sabrosky made a synonym out of it, and *M. americana* Fitch was justly restored by him [Sabrosky, 1965]. Becker also described a new species *M. marginata* Beck. So, his list contains four species: *M. pratorum* var. *americana*, *M. saltatrix* var. *nigriventris, M. punctifer* and *M. marginata.*

Mallock [1914] gives his list of species of *Meromyza* of North America, which consists of two species: *M. pratorum* Mg., for which he took species *M. marginata* Beck., and a new species *M. flavipalpis* described by him.

Our studies have shown that the fauna of North America is rather rich in species of *Meromyza* genus — they are not three, as it was considered before, but more than twenty. We have found out that some species were combined. Besides, some species, which were previously brought together as synonyms, turned out to be independent ones. So, *M. flavipalpis* Mall. and *M. marginata* Beck. were re-established by us [Fedoseeva, 1971]. Finally, 16 species were described as new ones for science.

The present survey of the fauna of *Meromyza* of North America is represented in the form of a determinative table of the species.

1 (30). Palpi entirely light, seldom darkish on the very end.
2 (3). Mid stripe of mesonotum dark, not reaching scutellum; scutellum without stripe. Hypopigium with light, thick setae directed downwards; anterior gonites lancet-shaped, hind gonites semicircular, transparent joining anterior ones from the side (Fig. 13). Cerci of female acute towards apex (Fig. 27). 4.5–5 mm. USA: Ohio, Illinois .... *M. flavipalpis* Mall., 1914
3 (2). Mid stripe of mesonotum reaches scutellum; scutellum with a stripe.

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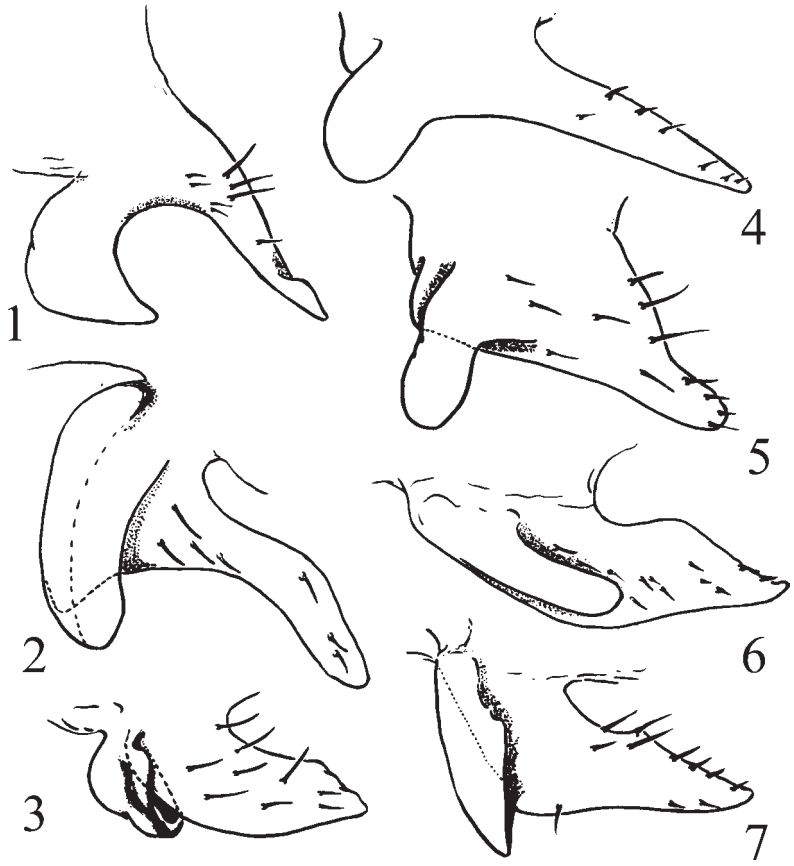


Figs 1—7. Gonites of *Meromyza* spp.: 1 — *M. sabroskyi* Fed.; 2 — *M. communis* Fed.; 3 — *M. bipuncta* Fed.; 4 — *M. columbi* Fed.; 5 — *M. laurelae* Fed.; 6 — *M. arizonica* Fed.; 7 — *M. canadensis* Fed.

Рис. 1—7. Гониты *Meromyza* spp.: 1 — *M. sabroskyi* Fed.; 2 — *M. communis* Fed.; 3 — *M. bipuncta* Fed.; 4 — *M. columbi* Fed.; 5 — *M. laurelae* Fed.; 6 — *M. arizonica* Fed.; 7 — *M. canadensis* Fed.

4 (5). Cheeks, besides light hairs, with black untidy setae. The apex of frontal triangle with fine wrinkles. Anterior gonites with narrow apical end (Fig. 16). 3.5 mm. USA: California ..... *M. modesta* Fed., 1978

5 (4). Cheeks without black setae along margin except usual one-two in the vibrissal angle.

6 (7). Stripes of mesonotum entirely brown* or bicolored with median stripe brown and lateral stripes black. Anterior gonites long, narrow, slightly curving distally (Fig. 2); coxites shovel-shaped, their back ends with protrusions linking on lower side of hypopigium. Cerci of female wide and short (Fig. 29). 3–3.5 mm. USA: from Alaska to California; Mexico ..... *M. communis* Fed., 1971

7 (6). Stripes of mesonotum entirely black.

8 (21). Head oblong, larger in profile than its height. Frons strongly protruding in front of eyes.

9 (10). Face not receding, vibrissal angle almost right; profile of face almost straight. Anterior gonites more or less quadrangular, wide at end, the apical margin oblique (Fig. 10). Cerci of female lancet-shaped (Fig. 30). 3.5—4 mm. USA: over all territory from Alaska to Florida; Canada, Bahama Islands. Damage cereals ..... *M. americana* Fitch, 1856

10 (9). Face receding, vibrissal angle obtuse.

11 (14). Hypopigium of male with long setae cruciate from below. Cerci of female with parallel lateral sides.

12 (13). Third antennal segment oblong. Hind gonites of male directed anterior, their tips not protruded beyond lower margin of anterior gonites (Fig. 22). Cerci of female with blunt apex (Fig. 25). 4–4.5 mm. Eurasia, North America — USA: Alaska, Idaho ..... *M. pratorum* Mg., 1838

13 (12). Third antennal segment square or rounded, its length not larger than width. Hind gonites directed posterior, their tips by far protruded beyond lower margin of anterior gonites (Fig. 12). Cerci of female elliptical at end. 4 mm. USA: Idaho, Alaska, Michigan; Canada: Ontario province .... *M. frontosa* Fed., 1971

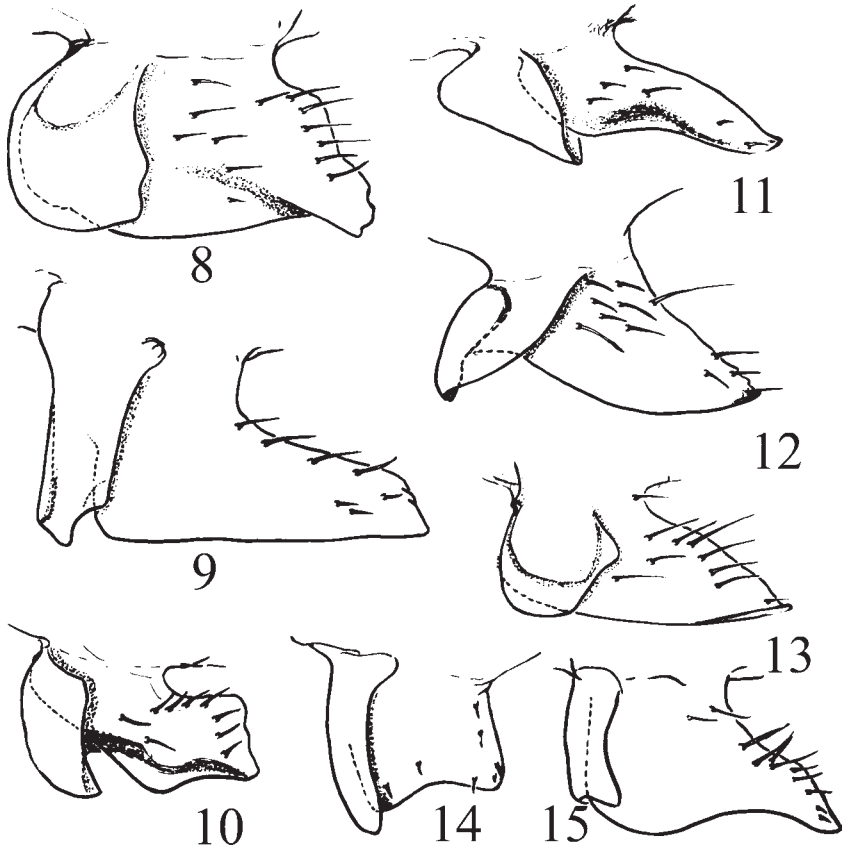
14 (11). Hypopygium of male with short setae not cruciate below. Cerci of female lancet-shaped.

15 (16). Frontal triangle distinctly bordered, border darkbrown, widening near the base and apex, and forming there oblong spots. Veins of wings black. Anterior gonites oblong, with oblique apical margin; hind gonites closely join anterior ones from lateral side, not protruding beyond their lower margin (Fig. 6). Face strongly receding. 3–3.5 mm. USA: Arizona ..... *M. arizonica* Fed., 1971

16 (15). Frontal triangle not bordered or, if so, border narrow, nowhere broad. Veins of wings light gray or yellowish.

17 (18). Hind femurs scarcely conspicuous, their breadth not more than double breadth of hind tibiae. Gonites of hypopygium of male with deep hollow below and with narrow, long anterior end (Fig. 1). Body narrow, slender. 3 mm. USA: Nebraska ..... *M. sabrosky* Fed., 1971

* Specimens found in Mexico on 17th Nov., 1917 had brown stripes.



Figs 8–15. Gonites of *Meromyza* spp.: 8 — *M. rara* Fed.; 9 — *M. pilosa* Fed.; 10 — *M. americana* Fitch.; 11 — *M. affinis* Fed.; 12 — *M. frontosa* Fed.; 13 — *M. flavipalpis* Mall.; 14 — *M. truncata* Fed.; 15 — *M. mutabilis* Fed.

Рис. 8–15. Гониты *Meromyza* spp.: 8 — *M. rara* Fed.; 9 — *M. pilosa* Fed.; 10 — *M. americana* Fitch.; 11 — *M. affinis* Fed.; 12 — *M. frontosa* Fed.; 13 — *M. flavipalpis* Mall.; 14 — *M. truncata* Fed.; 15 — *M. mutabilis* Fed.

18 (17). Breadth of hind femur almost triple breadth of hind tibia. Lower margin of anterior gonites almost straight, not concave.

19 (20). Mesonotum up to scutellum quadrate. Mid stripe of mesonotum in pre-scutellum part narrowed. Anterior gonites large, broad at base, and only near the very end sharply narrowed (Fig. 5). 4 mm. USA: Wyoming, Arizona, Nebraska; Canada: Saskatchewan .. *M. laurelae* Fed., 1971

20 (19). Mesonotum up to scutellum oblong. Stripes of mesonotum of same breadth along all length. Anterior gonites narrow, sword-shaped (Fig. 4). Cerci of female Fig. 26. 3–3.5 mm. USA: Idaho, Utah, Alaska ..... *M. columbi* Fed., 1971

21 (8). Head short and high, its height in profile not less than length.

22 (27). Profile of face not curving, vibrissal angle straight. Frons protruded before eyes not more than breadth of jowls.

23 (26). Frontal triangle bordered.

24 (25). Occiput in middle pale. Anterior gonites narrow, knife-shaped, gradually narrowing to free end (Fig. 20). 4 mm. Russia: East Siberia; North America: Alaska .... *M. transbaicalica* Fed., 1967

25 (24). Occiput in middle dark. Anterior gonites broad near base, more or less triangular (Fig. 7). 3–3.5 mm. Canada: Saskatchewan ..... *M. canadensis* Fed., 1971

26 (23). Frontal triangle not bordered. Hypopigium of male with very long setae on sides. Anterior gonites broad, more or less quadrangular, their free end as if cut (Fig. 8). 4 mm. USA: Montana ..... *M. rara* Fed., 1971

27 (22). Frons protruded before eyes more than breadth of jowls; profile of face arcuate, vibrissal triangle obtuse.

28 (29). Occiput with median spot. Frontal triangle usually bordered. Anterior gonites broad, trapeziform, with straight lower margin (Fig. 9). Cerci of female long and narrow with ends directed to each other (Fig. 28). 3.5–4 mm. USA: Arizona, Washington, California, Oregon, Utah, Mexico . ..... *M. pilosa* Fed., 1971

29 (28). Occiput pale without spots. Frontal triangle not bordered. Anterior gonites narrow and oblong, slightly curved. 3–3.5 mm. (see item 6)*M. communis* Fed., 1971

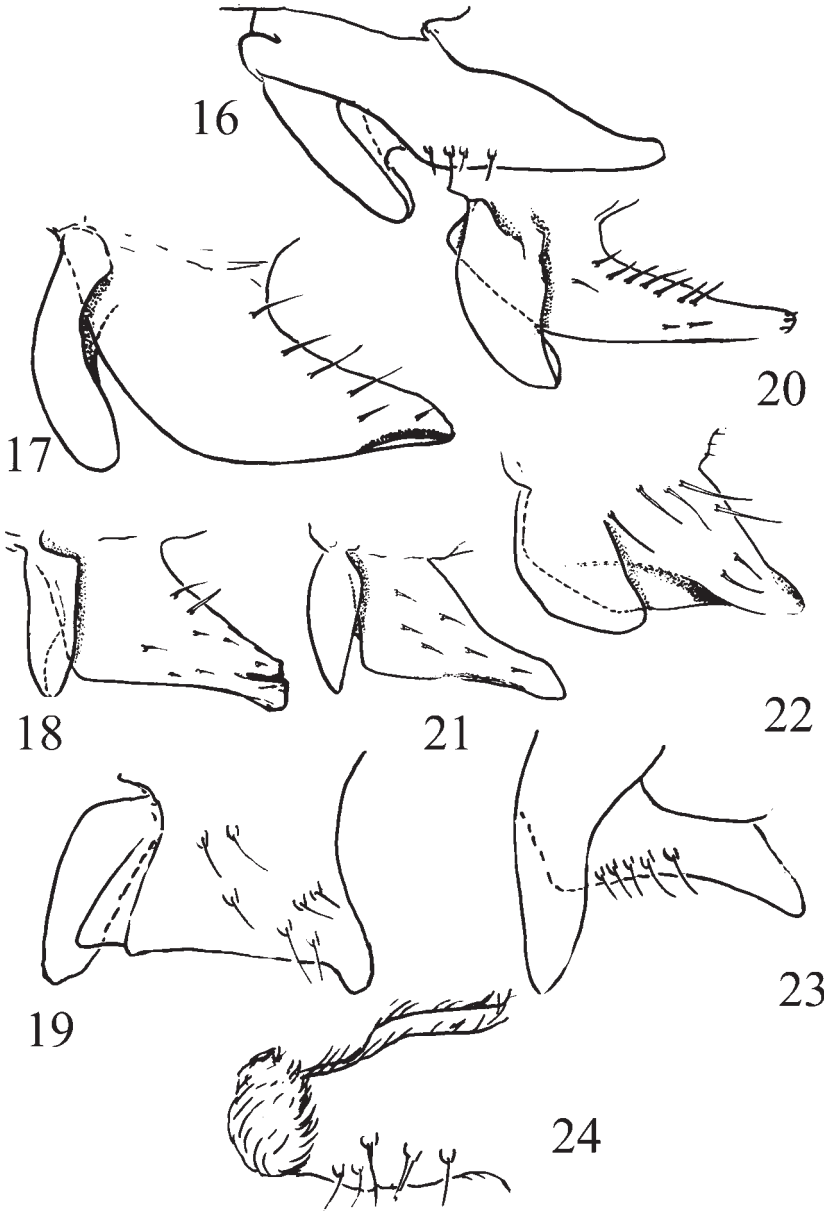
30 (1). Palpi entirely or partly black in distal half.

31 (32). Stripes of mesonotum not entirely black, more often partly brown or auburn. Lower margin of gonites straight. 3—3.5 mm. Eurasia; West states of USA: Oregon, Washington, Idaho, California. Larvae develop in cereal stems. Summer form .... *M. nigriventris* Macq., 1835 (=*M. punctifer* Beck.)

32 (31). Stripes of mesonotum entirely black.

33 (36). Length of head in profile considerably greater than height; jowls wider than breadth of third antennal segment.

34 (35). Frontal triangle distinctly bordered, its lateral sides near apex slightly concave. Hind femurs considerably thickened, their breadth almost four times the breadth of hind tibiae.



Figs 16–24. 16–23 — gonites of *Meromyza* spp., *M. modesta* Fed. (16), *M. marginata* Beck. (17), *M. saltatrix* L. (18), *M. vladimirovae* Fed. (19), *M. transbaicalica* Fed. (20), *M. nigriventris* Macq. (21), *M. pratorum* Mg. (22), *M. opacula* Fed. (23); 24 — surstiles of *Meromyza vladimirovae* Fed.

Рис. 16–24. 16–23 — гониты *Meromyza* spp., *M. modesta* Fed. (16), *M. marginata* Beck. (17), *M. saltatrix* L. (18), *M. vladimirovae* Fed. (19), *M. transbaicalica* Fed. (20), *M. nigriventris* Macq. (21), *M. pratorum* Mg. (22), *M. opacula* Fed. (23); 24 — сурстили *Meromyza vladimirovae* Fed.

Anterior gonites of male obtusely sickle-shaped (Fig. 17). 4–4.5 mm. USA: Arizona, Wyoming, Washington, California ..... *M. marginata* Beck., 1912

35 (34). Frontal triangle not bordered, sometimes its limits only slightly outlined, its sides straight. Breadth of hind femur not more than three times the breadth of hind tibia. Anterior gonites not sickle-shaped but more or less quadrangular (Fig. 10). 3.5–4 mm. (see item 9) .... *M. americana* Fitch, 1856

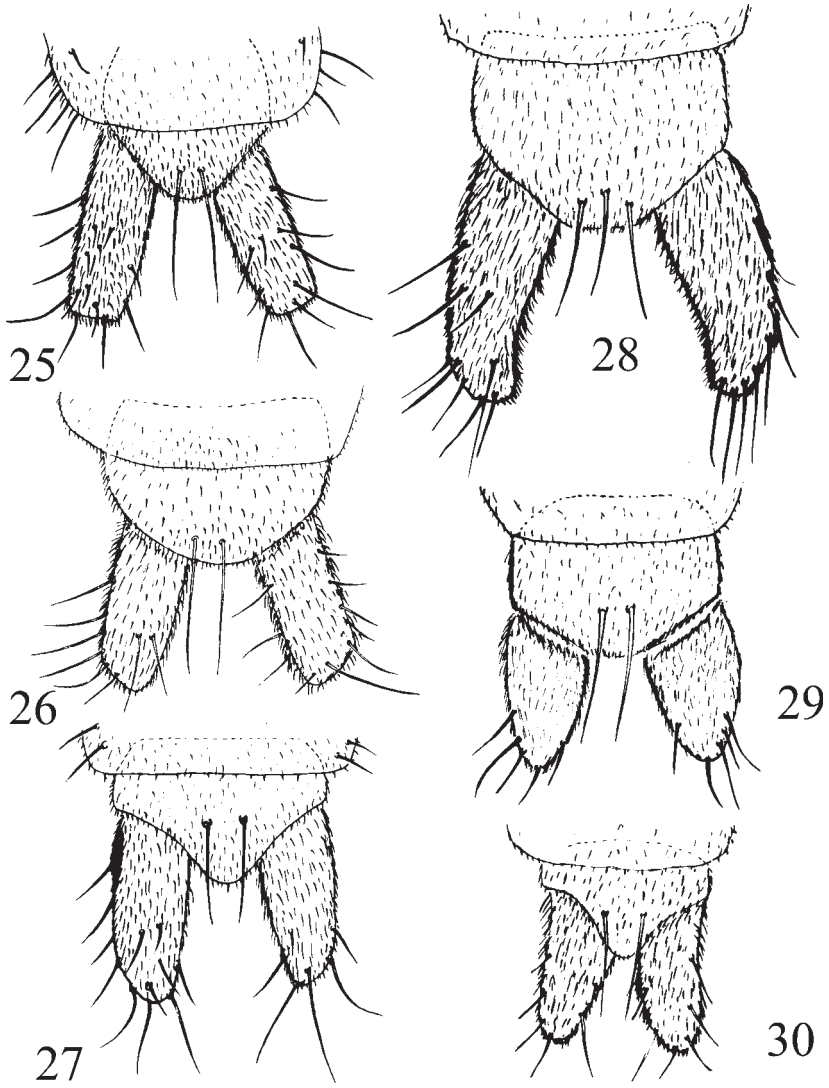
36 (33). Length of head in profile less than its height, if equal or slightly more the face receding.

37 (46). Frontal triangle although partly but bordered.

38 (39). Border of lateral sides of frontal triangle near base widens forming a spot on each side. Anterior gonites equibroad throughout, apical margin oblique; hind gonites — spoon-shaped (Fig. 3). 4 mm. USA: Oregon .... *M. bipunctata* Fed., 1971

39 (38). Border of lateral sides of frontal triangle having the same breadth throughout, spots near base of triangle absent.

40 (41). Frons much protruded, its length before eyes equal to that of third antennal segment. Face oblique backwards, vibrissal angle obtuse (Fig. 23). 3 mm. Mexico .... *M. opacula* Fed., 1978



Figs 25—30. Cerci of female of *Meromyza* spp.: 25 — *M. pratorum* Mg.; 26 — *M. columbi* Fed.; 27 — *M. flavipalpis* Mall.; 28 — *M. pilosa* Fed.; 29 — *M. communis* Fed.; 30 — *M. americana* Fitch.

Рис. 25—30. Церки самок *Meromyza* spp.: 25 — *M. pratorum* Mg.; 26 — *M. columbi* Fed.; 27 — *M. flavipalpis* Mall.; 28 — *M. pilosa* Fed.; 29 — *M. communis* Fed.; 30 — *M. americana* Fitch.

41 (40). Frons protruded before eyes less than length of third antennal segment; face almost not oblique backwards, vibrissal angle right.

42 (43). Ocellar spot large, usually quadrate; basic half of frontal triangle darkened. Stripes of mesonotum broad, usually merged at front. Abdomen almost entirely black. Lower margin of anterior gonites straight (Fig. 21). 3 mm. Larvae develop in cereal stems. Spring form. (see item 31) ..... *M. nigriventris* Macq., 1835

43 (42). Ocellar spot not large, oval. Base of frontal triangle not darkened. Abdomen with longitudinal stripes or cords, never black entirely.

44 (45). Head is high, its height (in profile) exceeds length. Hind femur considerably thickened, and not less than three times as broad as hind tibia. Anterior gonites broad at base and only at apex narrow and sharp (Fig. 15). 3.5–4 mm. USA: Idaho ..... *M. mutabilis* Fed., 1971

45 (44). Head oblong, its length exceeds height. Hind femur slightly thickened and only twice as broad as hind tibia. Anterior gonites narrow all over the length, gradually becoming acute towards apex (Fig. 11). 3.5 mm. USA: Colorado, Utah ..... *M. affinis* Fed., 1971

46 (37). Frontal triangle not bordered.

47 (48). Height of frontal triangle half as much again as its base. Head elongate, its length in profile exceeds height. Face receding, profile considerably curved. Vibrissal angle obtuse. Anterior gonites short, almost quadrate, their anterior end slightly turned down (Fig. 19). Surstiles of male rather long, in the main half on inner side noticeably swollen, and turned outside on end (Fig. 24). 3 mm. Canada: British Columbia ..... *M. vladimirovae* Fed., 1978

48 (47). Height of frontal triangle equal to its base. Head (lateral view) almost quadrate. Face not receding. Vibrissal angle straight.

49 (50). Occiput in middle pale, without spots. Third antennal segment elongate. Anterior gonites short and broad, almost quadrate (Fig 14). 3.5–4 mm. USA: Idaho .... *M. truncata* Fed., 1971

50 (49). Occiput in middle with a spot. Third antennal segment quadrate or semicircular. Anterior gonites elongate, their anterior end narrow and slightly curving perpendicular to long axis of gonites (Fig 18). 3–3.5 mm. Eurasia; USA: Alaska ..... *M. saltatrix* L., 1766

Thus, 23 species of chloropid flies of *Meromyza* Mg. genus have been found in North America. In conformity with the geographic distribution all species except separate findings can be divided, according to their volume, into several unequal groups.

First of all, the group of species common for Eurasia and North America: *M. nigriventris*, *M. pratorum*, *M. saltatrix* and *M. transbaicalica* has been marked out. The first three species which are broadly distributed in Palearctic, in North America have rather narrow areas: *M. nigriventris* and *M. pratorum* inhabit the western part of the USA, and *M. saltatrix* has been found only in Alaska. Also only in Alaska *M. transbaicalica* has been found which is widely spread in our East Siberia.

Some information regarding the distribution of *Meromyza* Mg. species was given in our survey of 1986 [Fedoseeva, 1986] which contained 72 species of the genus as well as our observations on the connections of the palearctic and nearctic faunas. We consider palearctic *M. nigriseta* Fed., *M. sibirica* Fed., *M. sororcula* Fed. and North-American *M. communis*, *M. flavipalpis* and *M. columbi* as vicarious accordingly. Out of the large "*pratorum*" group East-Siberian species *M. jacutica* Fed. and *M. eugenii* Fed. are the most similar to American ones. Out of the American species *M. americana* and *M. communis* have the broadest distribution, their areas extending from Alaska and Canada to Mexico and from the Pacific to the Atlantic Coast.

It should be noted that judging by the material which we possess the West of North America is richer in *Meromyza* species than the East. Such species as *M. mutabilis*, *M. bipuncta*, *M. arizonica* and *M. pilosa*, which are usual in the west states of the USA, have not been found in the East of North America as well as the above-mentioned species common for Eurasia and North America.

At last, we would like to note that *Meromyza* is a golarctic genus. The comparison of palearctic and nearctic faunas of *Meromyza* shows that the number of species pevails in Palearctic: out of the 74 species of *Meromyza* genus of the world fauna [Fedoseeva, 1986] known to us, 55 were found in Palearctic, 23 — in North America, out of which 4 species, as it has already been stated, are common for both faunas.

In conclusion we wish to note that some species both in Eurasia and in North America possess brightly expressed seasonal variability: *M. nigriventris* and *M. communis* flies of the spring generation are colored darker than of the summer one.

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