

Subgeneric Classification of the Genus *Cheilosia* Meigen, 1822 (Diptera, Syrphidae)

A. V. Barkalov

Institute of Animal Systematics and Ecology, Siberian Department, Russian Academy of Sciences, Novosibirsk,
630091 Russia

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Abstract—The nomenclature and subgeneric classification of the genus *Cheilosia* Mg. (Syrphidae) have been studied. Seven new subgenera, *Eucartosyrphus*, *Floccocheila*, *Pollinocheila*, *Montanocheila*, *Nephocheila*, *Conicheila*, *Convocheila*, and *Rubrocheila*, subgenn. n., are described and a key to all the subgenera is constructed. Drawings of male genitalia of representatives of all subgenera, and those of head and antennae of some subgenera, are given.

The genus *Cheilosia* Mg. comprises about 480 species, most of them distributed in the Palaearctic, with approximately 150 species known in the Nearctic, and 20–30 species, in the Oriental Region. In spite of the great number of papers with descriptions of genera close to *Cheilosia* and the subgenera of this genus (Bigot, 1882, 1883; Oldenberg, 1916; Shannon, 1922; Portevin, 1927; Shiraki, 1930; Enderlein, 1936; Hull, 1949; Hellén, 1949; Hull, Fluke, 1950; Shatalkin, 1975), the classification of *Cheilosia* is still obscure. The problems of classification of this genus were considered in detail by Goffe (1944), who discussed all genus-group taxa closely related to *Cheilosia*, known to him, and placed names of some of them in synonyms. The subgeneric structure of *Cheilosia* was considered by Hull and Fluke (1950). Shatalkin (1975) described a new subgenus and synonymized *Cartosyrphus* with *Cheilosia*. In the latest paper dealing with the classification of this genus (Barkalov, 1983), 8 groups were distinguished and a new subgenus *Neocheilosia* was described based on the anatomy of the male genitalia of the Siberian species. The material from different regions of Eurasia examined since that time and analysis of the literature have enabled several improvements of the subgeneric classification of *Cheilosia*. No attempt is made here to present the classification of the entire genus, which will be dealt with in a separate publication.

The terminology used in this paper is the one adopted in the Russian literature (Stackelberg, 1969) [this statement refers only to the Russian text.—Ed.]. The principal characters are illustrated in Figs. 1 and 2. Most of the drawings are original; the publications from which other figures are reproduced are cited in the text.

The following taxa were included in the genus *Cheilosia* by different authors.

Cheilosia Meigen, 1822; type species *Syrphus flavipes* Panzer, 1798, by subsequent designation (Coquillett, 1910).

Chilosia Agassiz, 1846; unjustified emendation of *Cheilosia* Meigen.

Endoiasimyia Bigot, 1882; type species *Endoiasimyia indiana* Bigot, 1882, by original designation.

Cartosyrphus Bigot, 1883; type species *Syrphus paganus* Meigen, 1822, by subsequent designation (Shannon, 1922).

Taeniochilosia Oldenberg, 1916; type species *Chilosia atriseta* Oldenberg, 1916, by original designation.

Chilomyia Shannon, 1922; type species *Cheilosia occidentalis* Williston, 1882, by original designation.

Hiatomyia Shannon, 1922; type species *Cheilosia willistoni* Snow, 1895, by original designation.

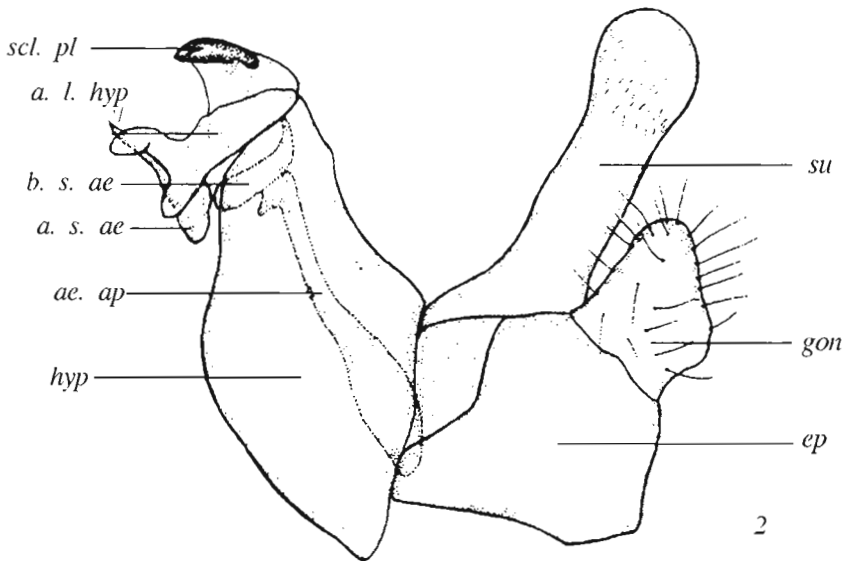
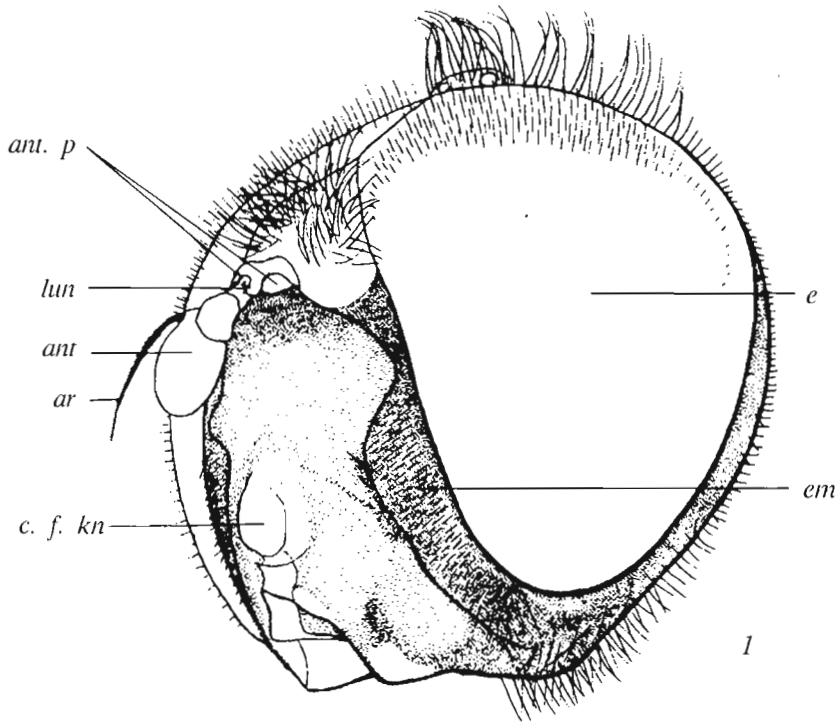
Sonatomyia Shiraki, 1930; type species *Sonatomyia formosana* Shiraki, 1930, by original designation.

Chaetochilosia Enderlein, 1936; type species *Eristalis mutabilis* Fallén, 1817, by original designation.

Dasychilosia Enderlein, 1936; type species *Syrphus variabilis* Panzer, 1798, by original designation.

Portevinia Goffe, 1944; type species *Eristalis maculatus* Fallén, 1817, by original designation.

Eocheilosia Hull, 1949; type species *Cheilosia ronana* Miller, 1921, by original designation.



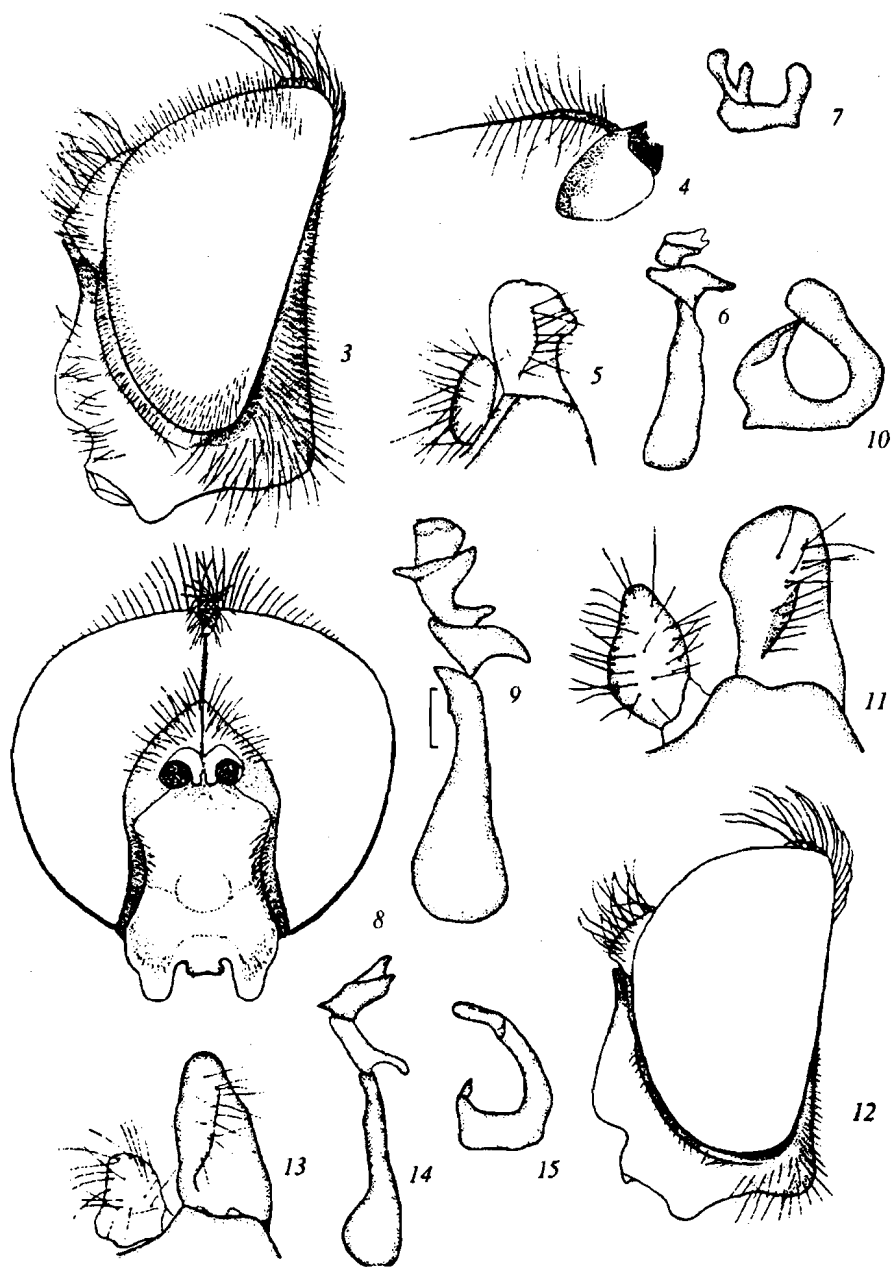
1, 2. *Cheilosia* Mg. (1) *Ch. (Cheilosia) flavipes* (Panz.), male head, front view; (2) *Ch. (Taeniochilosia) pilifer* (Beck.), hypopygium, lateral view. *ar*, Arista; *ae. ap*, aedeagal apodeme; *a. l. hyp*, anterior lobe of hypandrium; *ant*, antenna; *ant. p*, antennal sockets; *ae*, apical sclerite of aedeagus; *b. s. ae*, basal sclerite of aedeagus; *c. f. kn*, central facial knob; *e*, compound eye; *em*, eye-margins; hypandrium; *gon*, cercus; *hyp*, hypandrium; *lun*, lunula; *scl. pl*, sclerotized plate; *su*, surstylus.

Neocheila Hellén, 1949; type species *Chilosia freyi* Hellén, 1949, by original designation.

Chromocheilosia Hull et Fluke, 1950; type species *Chilosia bicolor* Shannon et Aubertin, 1933, by original designation.

Nigrocheilosia Shatalkin, 1975; type species *Eristalis pubera* Zetterstedt, 1838, by original designation.

Neocheilosia Barkalov, 1983; type species *Eristalis morio* Zetterstedt, 1838, by original designation.



Figs. 3–15. *Cheilosia* Mg. (3–7) *Ch. (Endoiasimyia) formosana* (Shir.); (8–11) *Ch. (Cheilosia) pagana* (Mg.); (12–15) *Ch. (Eucartosyrphus) longula* (Zett.). (3, 12) Male head, lateral view; (4) 2nd and 3rd antennal segments, lateral view; (5, 11, 13) surstylus and cercus, lateral view; (6, 9, 14) aedeagus and apodeme, lateral view; (7, 10, 15) anterior lobe of hypandrium, lateral view; (8) head, front view.

Some of these taxa have been transferred with subgeneric rank to other syrphid genera, as follows.

Eocheilosia Hull, 1949 was included in *Platycheirus* Lep. et Serv.

Type species of the subgenus *Anocheila* Hellén, 1949 was described from a specimen subsequently identified as *Melanostoma dubium* (Zett.). When this

species synonymy was revealed, *Anocheila* was synonymized with *Melanostoma* Schiner.

Chromocheilosia Hull et Fluke, 1950 was established for a group of species with the light abdomen from Chile and subsequently transferred to the genus *Myolepta* New. as a subgenus.

Portevinia Goffe, 1944 has been promoted to genus with good reason. This name was proposed to replace

Cartosyrphus misinterpreted by Portevin (1927). The genus *Portevinia* includes species with bare eyes, jointed antennal sockets (Fig. 27), bare or almost bare arista, wide eye-margins, and central facial knob. All these characters are also present in *Cheilosia*, but the large lunula (unusual for the genus *Cheilosia*), almost separated eyes in male, and the very characteristic anatomy of the male genitalia (Figs. 28–30) support Portevin's and Goffe's concept of this group as a distinct genus.

The rest of the taxa included in *Cheilosia* are considered below.

Genus **CHEILOSIA** Meigen, 1822

Subgenus **Cheilosia** s. str.

=*Chilosia* Agassiz, 1846; =*Cartosyrphus* Bigot, 1883; =*Chilomyia* Shannon, 1922, **syn. n.**; =*Dasychilosia* Enderlein, 1936 (synonymy: Goffe, 1944); =*Chaetochilosia* Enderlein, 1936 (synonymy: Goffe, 1944).

The type species, *Syrphus flavipes* Panzer, having the following characters: eye bare in female and hairy in male; antennal sockets widely separated (Fig. 1); body relatively slender and small (7–11.5 mm); wings hyaline, lacking dark spots; genitalia as in Figs. 22–24. In the vast majority of species of the nominotypical subgenus eyes hairy in both sexes. Two characters uniting all species of this subgenus: widely separated antennal sockets and structure of the apical sclerite of aedeagus, with wide anterior lobes and no posterior lobes (Figs. 9, 18, 21, 24).

Cartosyrphus was established as a genus for 17 species of *Cheilosia* with bare eyes and arista. Shannon (1922) designated *Syrphus paganus* Meigen, 1822 as type species and added two characters to the generic classification: face mostly bare, antennal sockets jointed. Subsequently, *Cartosyrphus* was treated as a subgenus (Fluke et Hull, 1945; Wirth et al., 1965; Peck, 1988). The analysis of the structure of the male genitalia by Shatalkin (1975) revealed its similarity with that in *Cheilosia* s. str. (Figs. 9–11). In addition, I found that *Ch. pagana* possesses separated antennal sockets (Fig. 8) and, occasionally, minute hairs on the eyes. Consequently, the name *Cartosyrphus* Bigot, 1883 should be considered a junior synonym of *Cheilosia* s. str., to which *Ch. pagana* belongs.

Chilomyia Shannon, 1922 was established as a subgenus in *Cheilosia* for the species with pubescent face,

hairy eyes, and separated antennal sockets. The type species of this subgenus has no considerable differences from species of the subgenus *Cheilosia* s. str. The structure of the genitalia, i.e., the shape of the anterior lobe of hypandrium, aedeagus, and surstylus, is similar to that in the group of species related to *Ch. proxima* (Zett.) (Figs. 16–21). I think that the characters separating *Chilomyia* are insufficient because they combine heterogeneous species and are subject to intraspecific variation. Thus, *Chilomyia* Shannon, 1922 should be considered a junior synonym of *Cheilosia* Meigen.

Neither the characteristics of the subgenus *Dasychilosia* Enderlein, 1936, nor the type species, *Syrphus variabilis* Panzer, 1798, differ in any significant detail from *Chilomyia* Shannon, 1922. Since the synonymy of the latter name with *Cheilosia* Meigen was substantiated above, the name *Dasychilosia* should be considered a junior synonym of *Cheilosia*.

Chaetochilosia Enderlein, 1936 was established on the basis of the presence of strong black setae on posterior margin of the scutellum in some species. Long ago, this character was criticized as widely varying by Hellén (1912). It was demonstrated that it varies not only between species within several species-groups, but also within some species. In addition, this character unites species very widely heterogeneous in all other characters. This is why I follow Goffe (1944) in considering *Chaetochilosia* a junior synonym of *Cheilosia*.

The subgenus comprises 178 taxa: *Ch. abagoensis* Skuf., *Ch. abbreviata* Shir., ?*Ch. acutilabris* (Beck.), *Ch. aerea* Duf., ?*Ch. aestivalis* (Beck.), ?*Ch. albipes* (Shir.), *Ch. albipila* Mg., *Ch. albitarsis* (Mg.), *Ch. albohirta* (Hell.), ?*Ch. amicorum* van der Goot, *Ch. angustipennis* (Beck.), *Ch. annulifemur* (Stack.), *Ch. antennalis* (H.-B.), ?*Ch. asakawaensis* Shir., *Ch. aterrima* (Sack), *Ch. atypica* Bark., ?*Ch. baldensis* (Marc.), *Ch. balkana* Vuj., *Ch. barbata* Lw., ?*Ch. barovskii* (Stack.), *Ch. bergenstammi* (Beck.), ?*Ch. bombylioides* (Hull), ?*Ch. brachyptera* Palma, ?*Ch. brachysoma* Egg., *Ch. bracusi* Vuj. et Clauss., ?*Ch. brevipennis* (Beck.), ?*Ch. brunnipennis* (Beck.), *Ch. canicularis* (Panz.), *Ch. carbonaria* Egg., *Ch. certa* Bark. et Cheng, ?*Ch. chipsanii* Mats., *Ch. chloris* (Mg.), ?*Ch. christophori* (Beck.), *Ch. clama* Clauss. et Vuj., ?*Ch. confinis* (Beck.), *Ch. cynocephala* Lw., *Ch. difficilis* (H.-B.), ?*Ch. diminuta* (Shir.), ?*Ch. distinguenda* Shir., ?*Ch. dombressonensis* (Beck. in Rougemont), ?*Ch. elongata* Shir., *Ch. exigua* Bark. et Peck,

?*Ch. facialis* Shir., *Ch. flavipes* (Panz.), *Ch. fraterna* (Mg.), *Ch. frontalis* Lw., ?*Ch. fulvipes* (Mats.), ?*Ch. fuscipennis* Shir., ?*Ch. gerstaeckeri* (Beck.), ?*Ch. gibbosa* (Beck.), *Ch. gigantea* (Zett.), *Ch. gracilis* (Hell.), ?*Ch. granulata* (Beck.), *Ch. griseifacies* Vuj., *Ch. griseiventris* Lw., *Ch. grossa* (Fall.), ?*Ch. hattoriae* Shir., ?*Ch. hirayamaensis* Shir., ?*Ch. hirticincta* Brun., *Ch. hypena* (Beck.), *Ch. iberica* M.-G. et Clauss., *Ch. impressa* Lw., ?*Ch. ingraca* Stack., ?*Ch. isshikii* (Mats.), *Ch. iwawakiensis* (Shir.), *Ch. jacutica* Bark., *Ch. japonica* (H.-B.), ?*Ch. kalatopensis* Nayar, *Ch. kaszabi* Peck in Stack. et Peck, *Ch. katara* Clauss. et Vuj., ?*Ch. komabaensis* Shir., ?*Ch. lapponica* (Beck.), *Ch. lasiopa* Kow., ?*Ch. lata* (Shir.), *Ch. latifrons* (Zett.), *Ch. latigena* Bark. et Peck, *Ch. lenis* (Beck.), *Ch. lenta* (Beck.), *Ch. leptorhyncha* (Shir.), ?*Ch. limbicornis* (Strobl), *Ch. longipennis* (Shir.), *Ch. longiptera* Shir., ?*Ch. longiventris* (Beck.), ?*Ch. makiana* (Shir.), *Ch. maroccana* (Beck.), *Ch. matsumurana* (Shir.), *Ch. melanopa melanopa* (Zett.), *Ch. melanopa redi* Vuj., *Ch. melanura melanura* (Beck.), *Ch. melanura rubra* (Vuj.), ?*Ch. miyatakei* Shir., ?*Ch. mixta* (Beck.), *Ch. mutabilis* (Fall.), *Ch. nebulosa* (Verr.), ?*Ch. nigroaenea* Brun., ?*Ch. nigra* Shir., ?*Ch. niitakana* (Shir.), *Ch. nikkoensis* (Shir.), ?*Ch. nopporoana* (Shir.), *Ch. oblonga* Bark., *Ch. occulta* Bark., ?*Ch. ochreipila* (Shir.), ?*Ch. ochripes* (Shir.), ?*Ch. ocularis* (Shir.), ?*Ch. okazakii* Shir., ?*Ch. okunii* (Shir.), *Ch. omissa* (Beck.), ?*Ch. opaca* (Shir.), *Ch. orthotricha* Vuj. et Clauss., *Ch. pagana* (Mg.), *Ch. pamirica* Bark. et Peck, *Ch. parachloris* (H. -B.), *Ch. paragigantea* Bark., *Ch. pascuorum* (Beck.), ?*Ch. pedestris* (Beck.), ?*Ch. pilosa* Shir., *Ch. pini* (Beck.), ?*Ch. plumbella* (Beck.), ?*Ch. plumbiventris* Brun., *Ch. pollinata* Bark., ?*Ch. pollinosa* (Beck.), *Ch. primoriensis* Bark., ?*Ch. primulae* (Hering), *Ch. proxima* (Zett.), *Ch. pseudogrossa* Stack., *Ch. psilophthalma* (Beck.), *Ch. punctigenis* (Hell.), ?*Ch. rakurakuensis* (Shir.), *Ch. reniformis* (Hell.), *Ch. rhynchops* Egg., *Ch. rodgersi* (Wainw.), *Ch. rotundiventris* (Hell.), ?*Ch. ruficollis* (Beck.), *Ch. rufiventris* Peck, *Ch. rufimana* (Beck.), *Ch. sapporensis* (Shir.), ?*Ch. saxifragae* (Hering), ?*Ch. schineri* Egg., *Ch. schnabli* (Beck.), *Ch. sera* Bark., ?*Ch. shirakiana* Bark., ?*Ch. shirakii* Peck, *Ch. sichotana* (Stack.), ?*Ch. siciliana* (Beck.), *Ch. sini* Bark. et Cheng, ?*Ch. splendida* (Shir.), *Ch. sootryeni* Nielsen, ?*Ch. strigillata* (Beck.), ?*Ch. strobli* (Beck.), *Ch. subarctica* Hell., ?*Ch. submodesta* (Beck.), *Ch. sulcifrons* Kapl. in Kaplan & Thompson, ?*Ch. superba* (Beck.), *Ch. suspecta* Bark. et Cheng, *Ch. teberdensis* Bark., ?*Ch. tendens* Curr., *Ch. tokushimaensis* Shir.,

?*Ch. toniuci* Bräd., *Ch. transcaucasica* Stack., ?*Ch. tumidilabris* (Beck.), ?*Ch. tupro* (Speiser), *Ch. tyanshanica* Bark. et Peck, ?*Ch. umbrisquama* (Beck.), ?*Ch. uniformis* (Beck.), *Ch. urakawensis* (Shir.), *Ch. urbana urbana* (Mg.), *Ch. urbana ampla* Bark. et Peck, *Ch. ussuriana* Bark., *Ch. variabilis* (Panz.), *Ch. velutina* Lw., *Ch. vernalis* (Fall.), ?*Ch. violaceozonata* Palma, *Ch. vujici* Clauss. et Doczk., *Ch. vulpina* (Mg.), ?*Ch. yanoi* Shir., *Ch. yesonica* Mats., *Ch. zoltani* Peck.

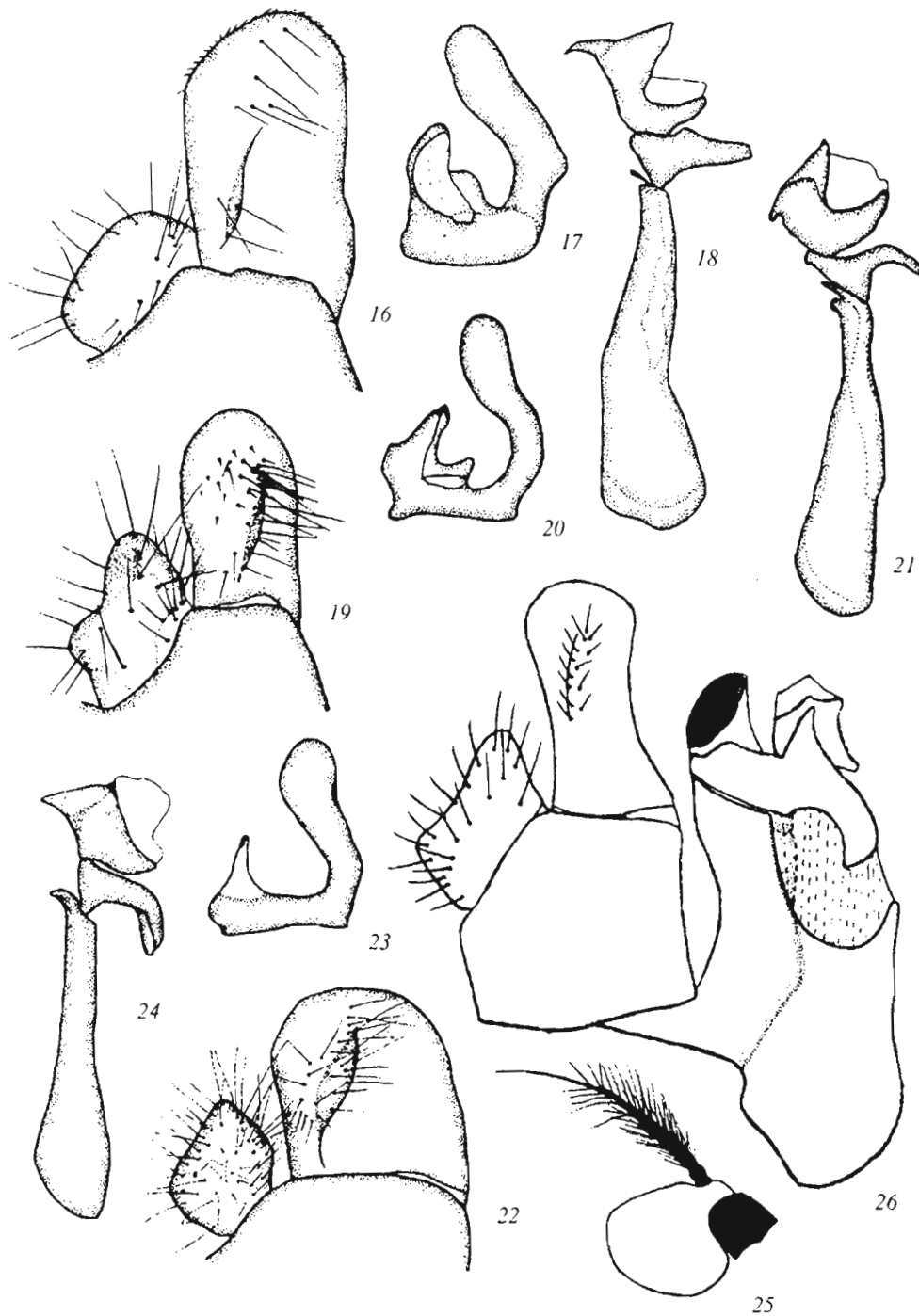
Species whose names are given with question mark are placed in this and the following subgenera tentatively as I have not examined the structure of their male genitalia.

Subgenus *Endoiasimyia* Bigot, 1882

= *Sonanomyia* Shiraki, 1930—synonymy after Hull et Fluke, 1950.

Since *Endoiasimyia* was described as a genus it was discussed neither by Goffe (1944) in the revision of the subgeneric classification of *Cheilosia*, nor by subsequent specialists (Knutson et al., 1975; Peck, 1988). However, Curran (1928), who studied the fauna of the Malay Peninsula and definitely had specimens of *E. Indiana* in his possession, believed that it belongs to the genus *Cheilosia*, although, possibly, it deserves being separated in a separate subgenus. I follow his opinion, because representatives of *Endoiasimyia* possess all characters typical of the genus *Cheilosia*. Species of both the taxa have a characteristic "Cheilosian" habitus: slender shining body, slender legs, moderately large head, and rather long wings. The head in *Endoiasimyia* has the central facial knob and eye-margins typical of *Cheilosia* (Fig. 3). The only difference is in the pubescence of the arista (Fig. 4), but many species of *Cheilosia* possess arista with long pubescence (subgenus *Hiatomyia*—Fig. 25). There are no fundamental differences from *Cheilosia* in the structure of the hypopygium (Figs. 5–7) with elongate surstylus and bipartite aedeagus. The characteristic structure of the anterior lobes of hypandrium with bifurcate left process is not sufficient, in my opinion, for separation of *Endoiasimyia* in a separate genus, and I consider it a subgenus of *Cheilosia*.

The subgenus comprises 8 species: *Ch. acuticornis* Curr., *Ch. apicalis* Brun., *Ch. formosana* (Shir.), *Ch. hiraii* Shir., *Ch. iidai* (Shir.), *Ch. indiana* Bigot, *Ch. javanensis* de Meij., *Ch. plumicornis* Sack.



Figs. 16–26. *Cheilosia* Mg. (16–18) *Ch. (Cheilosia) occidentalis* Will.; (19–21) *Ch. (Cheilosia) proxima* (Zett.); (22–24) *Ch. (Cheilosia) flavipes* (Panz.); (25, 26) *Ch. (Hiatomyia) signatseta* (Hunt.). (16, 19, 22) surstylus and cercus, lateral view; (17, 20, 23) anterior lobe of hypandrium, lateral view; (18, 21, 24) aedeagus and apodeme, lateral view; (25) 2nd and 3rd antennal segments, lateral view; (26) hypopygium, lateral view.

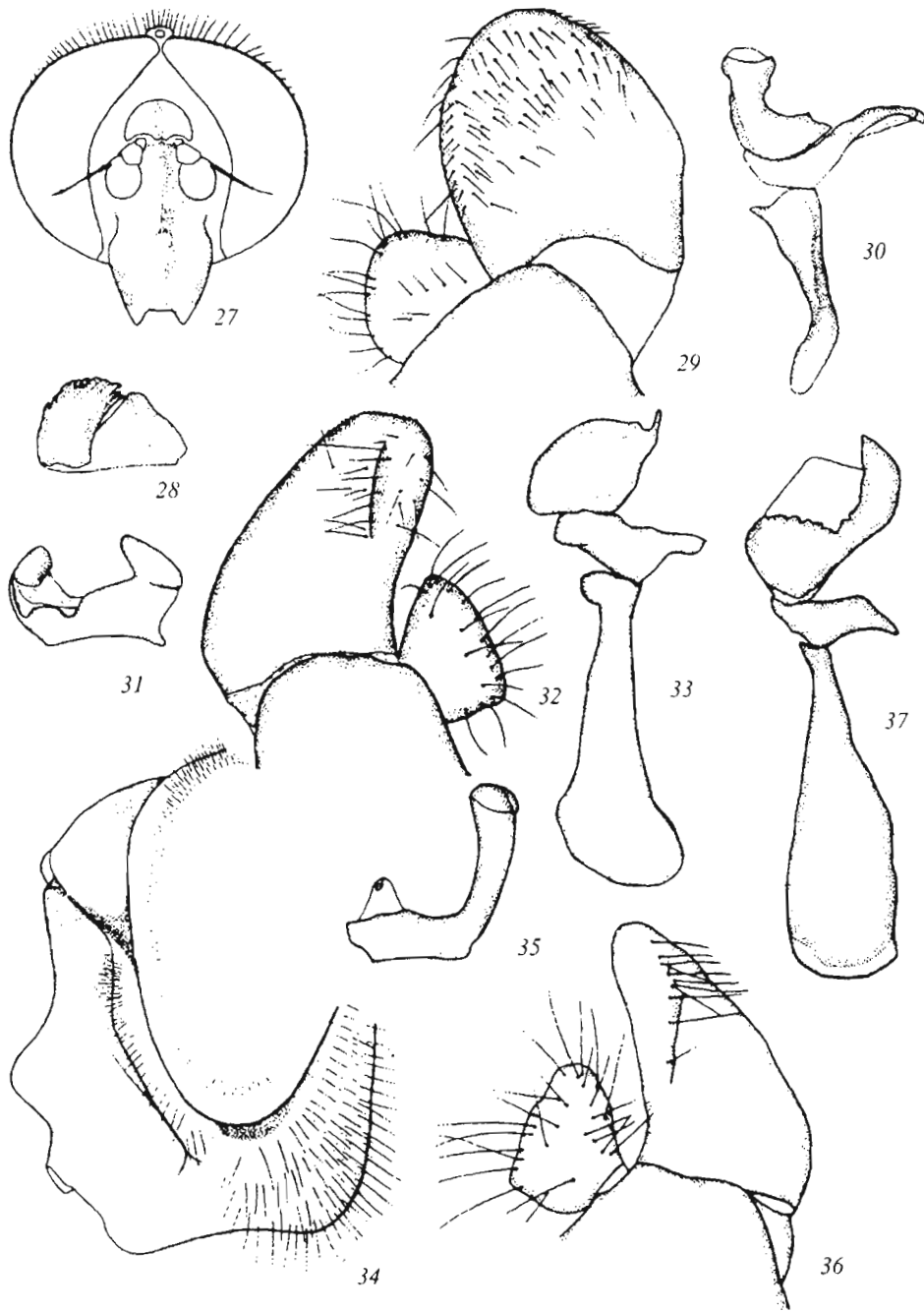
Subgenus *Taeniochilosia* Oldenberg, 1916

=*Nigrocheilosia* Shatalkin, 1975, **syn. n.**

In C. Claussen's opinion (personal communication), *Ch. atrisetata* belongs to the group of species, separated by Shatalkin (1975) into the subgenus *Nigrocheilosia*.

Consequently, the name *Nigrocheilosia* Shatalkin, 1975 should be considered a junior synonym of *Taeniochilosia*.

The subgenus *Taeniochilosia* comprises species with the bare face and eyes and black legs. C. Claus-



Figs. 27–37. *Cheilosia* Mg. and *Portevinia* Goffe. (27–30) *Portevinia maculata* (Fall.); (31–33) *Cheilosia* (*Taeniochilosia*) *pubera* (Zett.); (34–37) *Ch.* (*Neocheilosia*) *morio* (Zett.). (27) Male head, front view (after Stackelberg, 1930); (28, 31, 35) anterior lobe of hypandrium, lateral view; (29, 32, 36) surstylus and cercus, lateral view; (30, 33, 37) aedeagus and apodeme, lateral view; (34) male head, lateral view.

sen (personal communication) considers the dense and long pubescence of the arista to be an aberrant character. An analysis of some other species with the bare eyes and partly yellow legs (the group of species close to *Ch. caerulescens* Mg.), performed by me, has shown no fundamental differences from *Taeniochilosia*

(Figs. 31–33) in the structure of the hypopygium. In this context, the morphological characteristic of the subgenus is broadened. The subgenus unites species with the bare eyes and clearly jointed or nearly separated antennal sockets [if the anterior process of the lunula reaches the upper part of the face, but is not

merged with it (Fig. 27)], the anterior lobes of the hypandrium have a characteristic, strongly sclerotized plate with the dentate inner margin (Fig. 31)*, apical sclerite of the aedeagus wide-oval along anterior margin and with elongate lobes in posterior part (Fig. 33)].

In a recent monograph devoted to the *Cheiliosia* species from the Balcans, Vudjić (1996) treated *Taeniochilosia* (= *Nigrocheilosia*) as a distinct genus. I cannot agree with this view because the separation of a certain group of species in a genus presumes the existence of a clear morphological hiatus between this and other groups of the same rank, whereas nearly all characters on which the separation of *Taeniochilosia* is based are present in other subgenera. For example, the bare eyes and connate antennal sockets are typical of the subgenera *Eucartosyrphus* and *Hiatomyia*; some features of the male genitalia structure can also be found in other subgenera (e.g., in *Convocheila*). In my opinion, an important argument for inclusion in *Cheiliosia* is the typical "Cheilosian" habitus of the species of *Taeniochilosia*, mentioned above. All this confirms the subgeneric rank of *Taeniochilosia* Oldenberg, 1916 within the genus *Cheiliosia* Mg.

The subgenus comprises 52 taxa: *Ch. ahenea* (von Roser), *Ch. alpestris* (Beck.), *Ch. antiqua* (Mg.), *Ch. aratica* Bark., *Ch. aristata* Bark. et Ståhls, *Ch. armeniaca* Stack., *Ch. atriseta* (Old.), *Ch. bakurianiensis* Kuzn., *Ch. barkalovi* Ståhls in Bark. et Ståhls, *Ch. beckeri* Strobl, *Ch. caerulescens caerulescens* (Mg.), *Ch. caerulescens calculosa* Skuf., *Ch. changaica* Peck, *Ch. claussenii* Bark. et Ståhls, *Ch. crassisetata* Lw., *Ch. derasa* Lw., *Ch. faucis* (Beck.), *Ch. gagatea* Lw., *Ch. grisella* (Beck.), *Ch. hercyniae* Lw., ?*Ch. imperfecta* (Beck.), *Ch. impudens* (Beck.), *Ch. insignis* Lw., ?*Ch. intermedia* Bark., *Ch. kerteszi* (Szil.), *Ch. kolomietsi* Bark., *Ch. laeviseta* Clauss., *Ch. laeviventris* Lw., *Ch. latigena* Bark. et Peck, *Ch. loewi* (Beck.), *Ch. longistyla* Bark. et Peck, *Ch. lukashovae* Bark., *Ch. marginata* (Beck.), *Ch. nigripes* (Mg.), *Ch. nivalis* (Beck.), *Ch. parvicornis* (Beck.), *Ch. pedemontana* Rond., *Ch. personata* Lw., *Ch. pilifera* (Beck.), *Ch. pollinifacies* Stack., *Ch. pubera* (Zett.), *Ch. sahlbergi* (Beck.), *Ch. sibirica* (Beck.), *Ch. signaticornis* (Beck.), *Ch. stackelbergi stackelbergi* Bark. et Peck, *Ch. stackelbergi aliena* Bark. et Peck, *Ch. tonsa* Sack, *Ch. vangaveri* Timon-David,

?*Ch. varians* (Beck.), *Ch. venosa* Lw., *Ch. vicina* (Zett.), *Ch. violovitshi* Bark.

Subgenus *Hiatomyia* Shannon, 1922

The subgenus is characterized by the bare eyes and face, jointed antennal sockets, and plumose arista (Fig. 25). The typical features of the male genitalia are the shape of the excision in the hypandrium and ventrally directed right process of the anterior lobe of the hypandrium (Fig. 26). This set of characters clearly outlines the group of 22 North American species (Wirth et al., 1965) which I consider, following Hull et Fluke (1950), to be a subgenus.

Subgenus *Neocheilosia* Barkalov, 1983

The subgenus is established for species with the hairy eyes, separate antennal sockets, wide face and frons (Fig. 34), with hairs present only in the upper part of the face near eye-margins, and with a characteristic structure of the genitalia (Figs. 35–37).

Neocheilosia comprises 3 species: *Ch. convexifrons* Stack., *Ch. morio* (Zett.), and *Ch. mutini* Bark.

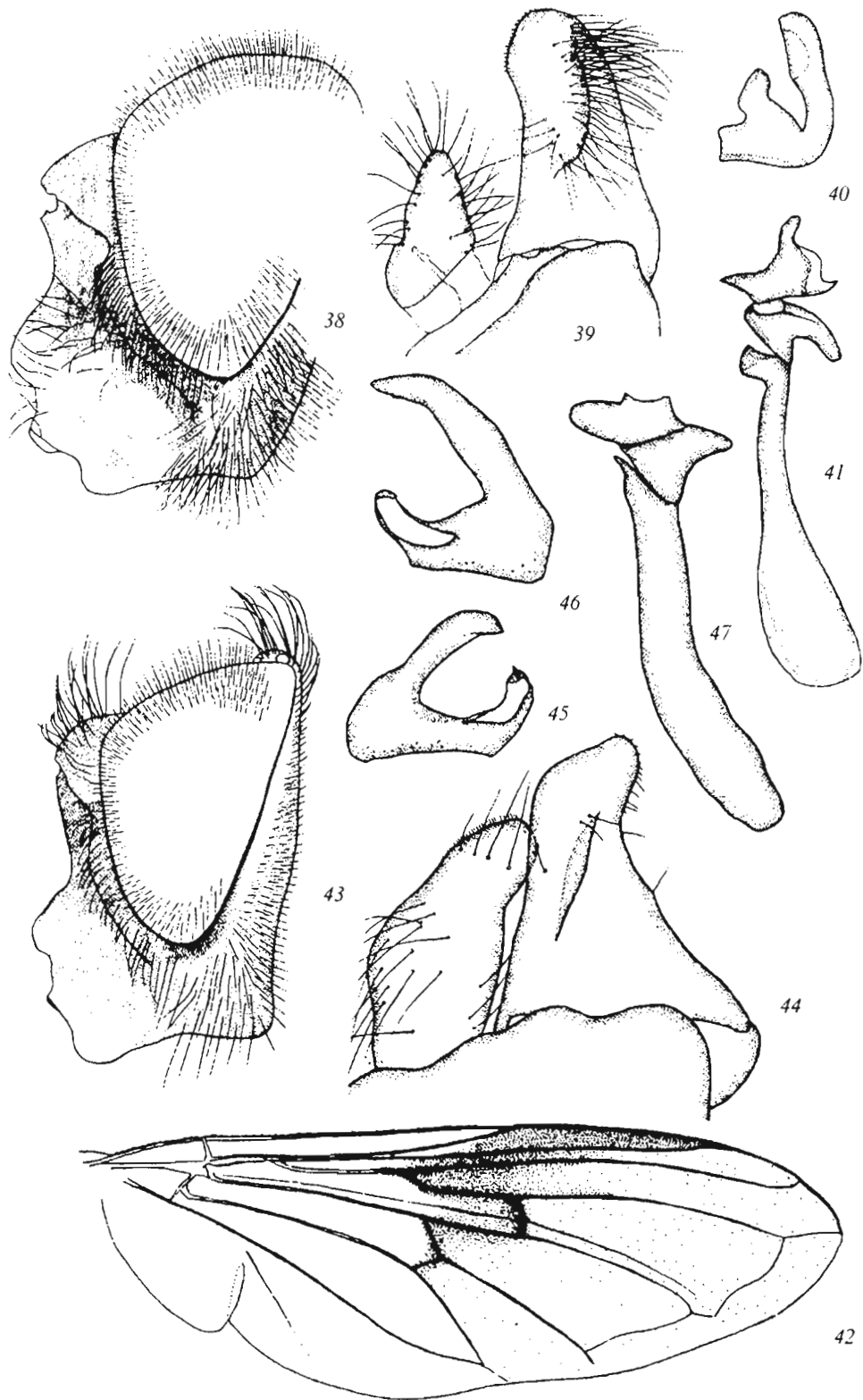
Thus, by the beginning of the author's study, only 5 *Cheiliosia* subgenera had sufficient morphological characteristics. Based on an analysis of the hypopygium structure in the species from Siberia and the Russian Far East (Barkalov, 1983), 8 types of the male genitalia were distinguished, of which 3 correspond to particular subgenera. An examination of the morphology of *Cheiliosia* from other parts of the Palaearctic Region revealed several additional constant variants of the hypopygium structure. In addition, species with common type of the male genitalia were found to share some other characters. As the groups of species based on these character sets are clearly outlined, I am describing them here as subgenera.

Subgenus *Eucartosyrphus* Barkalov, subgen. n.

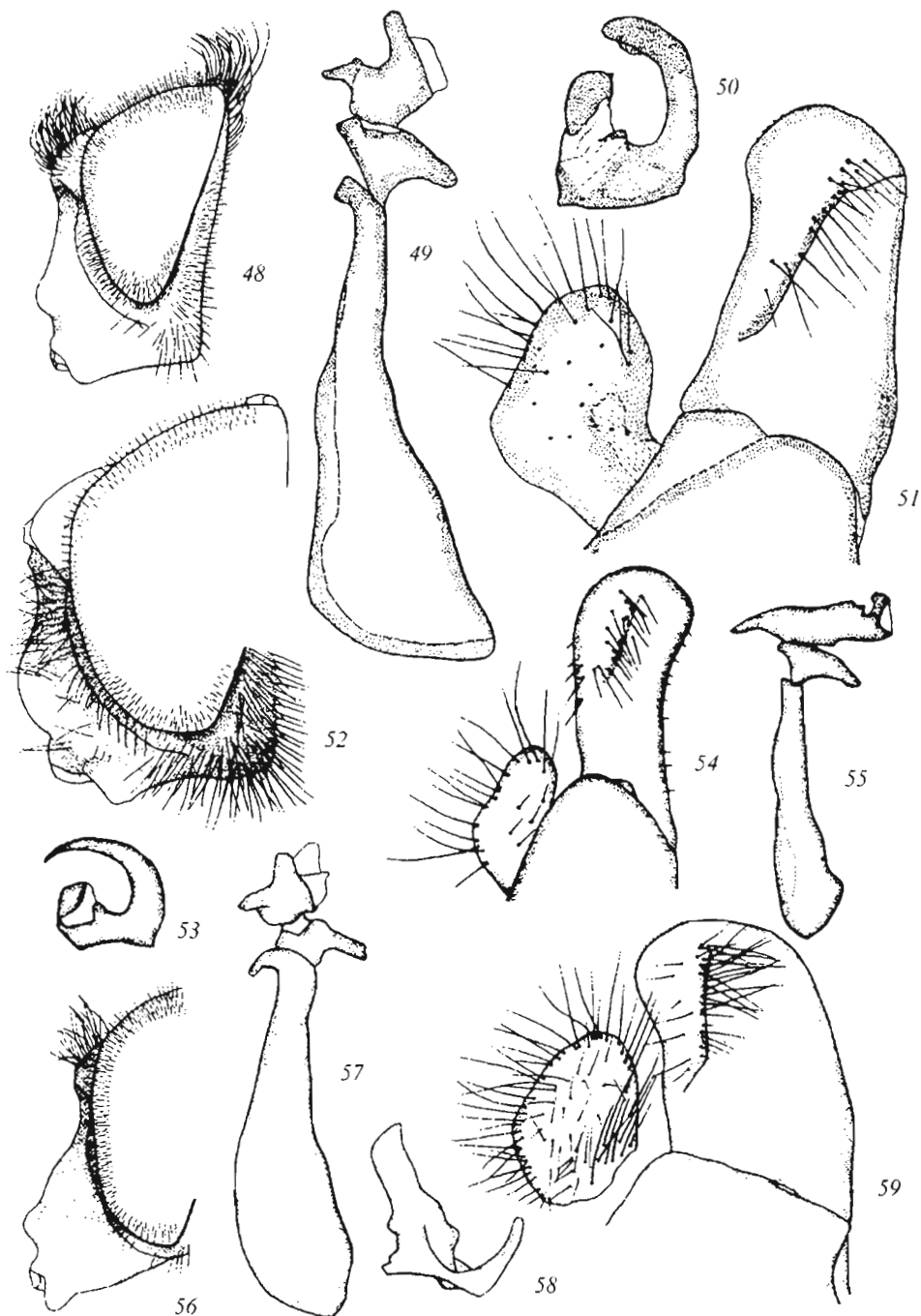
Type species *Eristalis longulus* Zetterstedt, 1838.

Eyes bare; antennal sockets jointed; body slender and relatively short; wings hyaline or infuscate along their entire length; apical sclerite of aedeagus without lobes in anterior part and with two lobes in posterior part (Fig. 14); anterior lobes of hypandrium with large right projections and small left projections bearing poorly sclerotized plate (Fig. 15); surstylus and cercus of shape typical of the genus (Fig. 13).

* As the male of *Ch. (Taeniochilosia) atriseta* was not known before, a drawing of the genitalia of *Ch. (Taeniochilosia) pubera* (Zett.) showing their ground plan in the subgenus is given here.



Figs. 38–47. *Cheilosia* Mg. (38–42) *Ch. (Floccocheila) illustrata* (Harr.); (43–47) *Ch. (Pollinocheila) fasciata* Schin. et Egg. (38, 43) Male head, lateral view; (40, 45, 46) anterior lobe of hypandrium, lateral view; (39, 44) surstylus and cercus, lateral view; (41, 47) aedeagus and apodeme, lateral view; (42) wing.



48–59. *Cheilosia* Mg. (48–51) *Ch. (Montanocheila) alpina* (Zett.); (52–55) *Ch. (Convocheila) cumanica* (Szil.); (56–59) *Ch. (Convocheila) bombiformis* (Mats.). (48, 52, 56) Male head, lateral view; (49, 55, 57) aedeagus and apodeme, lateral view; (50, 53, 58) anterior lobe of hypandrium, lateral view; (51, 54, 59) surstylus and cercus, lateral view.

The subgenus comprises: *Ch. abdominalis* Shir., *Ch. angustigenis* (Beck.), *Ch. aokii* Shir., *Ch. basalis* (Mats.), *Ch. cystorhyncha* Bark., *Ch. fumipennis* (Mats.), *Ch. josankeiana* (Shir.), *Ch. kulinensis* (Mats.), *Ch. latifaciella* (Shir.), *Ch. longula* (Zett.),

Ch. mupinensis Bark., *Ch. nartshukae* Bark. et Peck, *Ch. nuda* (Shir.), *Ch. pallipes* Lw., *Ch. pilipes* (Big.), *Ch. polja* Bark., *Ch. posjetica* Bark., *Ch. rufipes* (Preyss.), *Ch. scutellata* (Fall.), *Ch. victoria* (H.-B.), *Ch. zinovievi* Stack.

Subgenus *Floccocheila* Barkalov, subgen. n.

Type species *Musca illustrata* Harris, [1780].

Eyes hairy (Fig. 38); antennal sockets separated; black or brown spot present in the middle of wing (Fig. 42); body large and wide, densely covered with long hairs; apical sclerite of aedeagus with fused anterior lobes and free posterior lobes (Fig. 41); left process of the lobe of hypandrium shifted to its middle, right process straight and uniformly wide (Fig. 40).

The subgenus comprises 10 species-group taxa: *Ch. brunnipilosa* Shir., *Ch. eurodes* (Shir.), *Ch. illustrata illustrata* (Harr.), *Ch. illustrata magnifica* (Hell.), *Ch. illustrata portschinskiana* (Stack.), *Ch. himalayensis* (Brun.), *Ch. motodomariensis* Mats., *Ch. neversicolor* Bark., *Ch. saraensis* Shir., *Ch. versicolor* Curr.

Subgenus *Pollinocheila* Barkalov, subgen. n.

Type species *Cheilosia fasciata* Schiner et Egger, 1853.

Eyes hairy (Fig. 43); antennal sockets separated; wings hyaline or infuscate apically; body slender, abdomen with distinct spots of gray dusting; sclerites of aedeagus tightly fused, occasionally making it look as one-segmented (Fig. 47); posterior lobes of apical sclerite of aedeagus absent, anterior lobes of hypandrium asymmetrical (Figs. 45, 46), their left process with small sclerotized plate apically (Fig. 46); cercus strongly enlarged (Fig. 44).

The subgenus comprises 5 species: *Ch. fasciata* Schin. et Egg., *Ch. lithophila* Bark., *Ch. lucida* Bark. et Cheng, *Ch. parafasciata* Bark., *Ch. semifasciata* (Beck.)

Subgenus *Montanocheila* Barkalov, subgen. n.

Type species *Eristalis alpinus* Zetterstedt, 1838.

Eyes hairy; antennal sockets separated; body wide, robust, often covered with dense, relatively long hairs; face always wide; wings with brown spot in the middle or hyaline; apical sclerite of aedeagus with two pairs of lobes (Fig. 49); left process of the anterior lobe of hypandrium with fused on inner side, often pointed apically sclerotized plate (Fig. 50).

The subgenus comprises 29 species (one of them with 2 subspecies): *Ch. alpina* (Zett.), *Ch. balu balu* Viol., *Ch. balu jugorica* Bark., *Ch. chrysocoma* (Mg.),

Ch. dacica Bräd., *Ch. distincta* Bark. et Cheng, *Ch. erratica* Bark. et Peck, *Ch. gorodkovi* Stack., *Ch. grahami* Bark., *Ch. grummi* Stack., *Ch. heptapotamica* Stack., *Ch. kirgizorum* Peck, *Ch. kiritshenkoi* Stack., *Ch. kozlovi* Bark. et Peck, *Ch. kuznetsovae* Skuf., *Ch. lutea* Bark., *Ch. montana* Egg., *Ch. nudifacies* (Beck.), *Ch. nudiseta* (Beck.), *Ch. pictipennis* Egg., *Ch. songarea* (Beck.), *Ch. subalbipila* (Viol.), *Ch. subpictipennis* Clauss., *Ch. thalassica* Peck, *Ch. tibetana* Stack., *Ch. tibetica* Bark. et Peck, *Ch. vtorovi* Peck, *Ch. xanthella* Bark. et Peck, *Ch. zlotini* Peck, *Ch. zmilampis* Viol.

Subgenus *Nephocheila* Barkalov, subgen. n.

Type species *Nephomyia bombiformis* Matsumura, 1916.

Eyes hairy; antennal sockets separated; face distinctly protruded anteroventrally (Fig. 56); body wide and large (smaller in the second species of the subgenus), densely covered with long hairs; wings with brown spot in the middle, or hyaline; apical sclerite of aedeagus with anterior lobes directed outwards and posterior lobes well developed (Fig. 57); anterior lobes of hypandrium with strongly enlarged left and slender and short right processes (Figs. 58); surstylus and cercus of shape typical of the genus (Fig. 59).

The subgenus comprises two species: *Ch. bombiformis* (Mats.) and *Ch. edashigei* (Shir.).

Subgenus *Conicheila* Barkalov, subgen. n.

Type species *Cheilosia conifacies* Stackelberg, 1963.

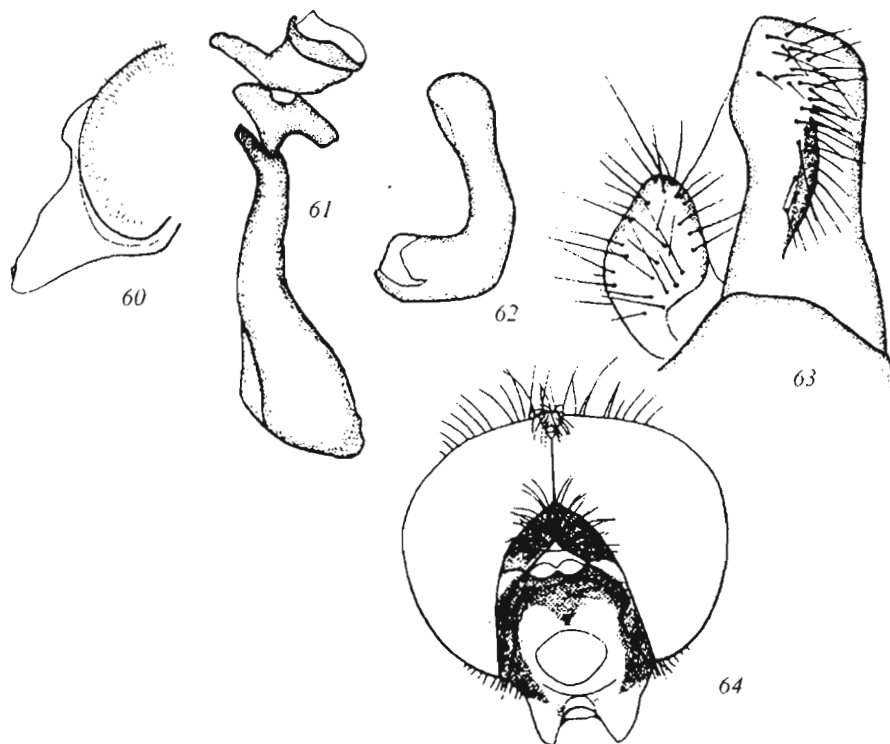
Eyes hairy; antennal sockets separated; face conically protruded (Fig. 60); wings hyaline; body relatively small, slender, shining, sparsely covered with short hairs; anterior, unflattened part of mesopleura without hairs. Structure of male genitalia characterized by presence of long anterior lobe and absence of posterior lobe in apical sclerite of aedeagus (Fig. 61); anterior lobes of hypandrium without left process (Fig. 62); surstylus with characteristic swelling in apical half (Fig. 63).

The subgenus is monotypical.

Subgenus *Convocheila* Barkalov, subgen. n.

Type species *Chilosia cumanica* Szilády, 1938.

Eyes hairy (*Ch. cumanica*, *Ch. sulcifrons* Kaplan) or bare (*Ch. laticornis* Rond., *Ch. parallobi* Malski); antennal sockets widely separated; pubescence on



Figs. 60–64. *Cheilosia* Mg. (60–63) *Ch. (Conicheila) confacies* Stack.; (64) *Ch. (Taeniochilosia) vicina* (Zett.). (60) Male head, lateral view; (61) aedeagus and apodeme, lateral view; (62) anterior lobe of hypandrium, lateral view; (63) surstylus and cercus, lateral view; (64) head, front view.

upper part of eye-margins elongate (Fig. 52); frons wide, convex; wings hyaline; body slender; apical sclerite of aedeagus elongated, its anterior lobes large, widely separated; posterior lobes small (Fig. 55); anterior lobes of hypandrium with distinct sclerotized plate on left process and with gently curved dorsally right process (Fig. 53); surstylus elongate, slender (Fig. 54).

The subgenus comprises 6 species: *Ch. arkita* Zimina, *Ch. cumanica*, *Ch. laticornis* Rond., *Ch. lola* Zimina, *Ch. parallobi* Malski, *Ch. sulcifrons* Kaplan.

Subgenus ***Rubrocheila*** Barkalov, subgen. n.

Type species *Cheilosia egregia* Barkalov et Cheng, 1998.

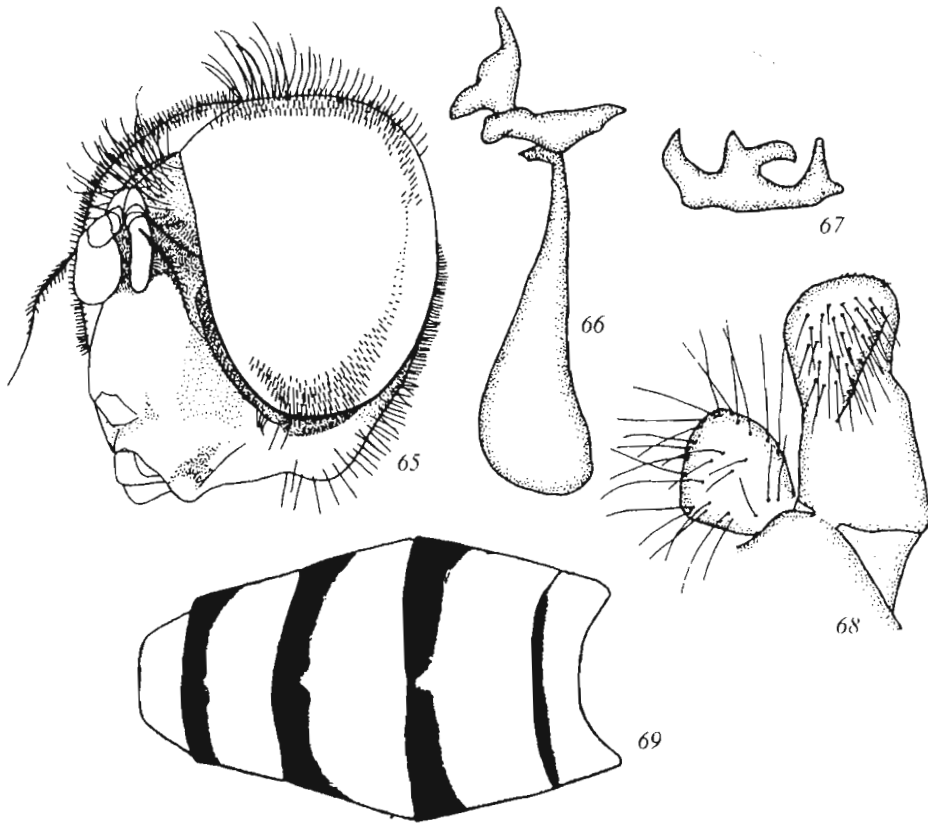
Eyes hairy, antennal sockets connate, face moderately protruding forward, arista with long but not plumose hairs, wings lacking contrasting spots; body slender and small, covered with relatively sparse and short hairs; abdomen orange with black fasciae along posterior margins of tergites. Anterior lobes of hypandrium with 4 projections (Fig. 66), apical sclerite of aedeagus with widely separate anterior and posterior lobes, cercus not enlarged.

The subgenus includes one species.

Thus, 13 subgenera are distinguished in the genus *Cheilosia*, all of them except *Hiatomyia* being represented in the Old World fauna. The Nearctic fauna is known incompletely and will be analyzed in a succeeding publication.

A Key to Subgenera of *Cheilosia*

- 1 (6). Eyes bare, anterior process of lunula not reaching upper part of face (Fig. 64); if reaching, then only touching but not merging with it.
 - 2 (3). Arista with plumose pubescence (Fig. 25) ***Hiatomyia*** Shann.
 - 3 (2). Arista bare or with short simple hairs.
 - 4 (5). Right projection of anterior lobe of hypandrium short and wide (Fig. 31) ***Taeniochilosia*** Oldenb.
 - 5 (4). Right projection of anterior lobe of hypandrium long and narrow, bent in apical part (Fig. 15) ***Eucartosyrphus*** subgen. n.



Figs. 65–68. *Cheilosia (Rubrocheila) egregia* Bark. et Cheng. (64) Male head, lateral view; (65) aedeagus and apodeme, lateral view; (66) anterior lobe of hypandrium, lateral view; (67) surstylus and cercus, lateral view; (68) female abdomen, dorsal view.

- 6 (1). Eyes hairy; if bare, then anterior process of lunula widely jointed with upper part of face (Fig. 1).
- 7 (8). Abdomen orange with black bands along posterior margins of tergites. Anterior lobe of hypandrium with 4 projections (Fig. 66). *Rubrocheila* subgen. n.
- 8 (7). Abdomen black or dark brown; if with light spots, then anterior lobe of hypandrium of different structure.
- 9 (10). Arista with plumose pubescence (Fig. 4) *Endoiasimyia* Big.
- 10 (9). Arista bare or with short simple hairs.
- 11 (12). Wings with distinct brown spot in the middle (Fig. 42). Flies large, bumble-bee like. Left projection of anterior lobe of hypandrium shifted medially (Fig. 40) *Floccocheila* subgen. n.
- 12 (11). Wings without median spot; flies not bumble-bee like. If flies large, with dark spot in the middle of wings, then left projection of anterior lobe of hypandrium of different shape (Fig. 58).
- 13 (14). Face conically protruded (Fig. 60), anterior lobe of hypandrium lacking left projection (Fig. 62) *Conicheila* subgen. n.
- 14 (13). Face less protruded (Figs. 48, 52, 56), anterior lobe of hypandrium with more or less developed left projection (Figs. 50, 53, 58).
- 15 (12). Sclerites of aedeagus tightly fused, aedeagus looking one-segmented (Fig. 47); cercus enlarged, comparable in size to surstylus (Fig. 44) *Pollinocheila* subgen. n.
- 16 (15). Sclerites of aedeagus distinctly separated (Figs. 24, 49, 55, 57); cercus considerably smaller than surstylus (Figs. 22, 51, 54, 59).
- 17 (18). Apical sclerite of aedeagus extended laterally (Fig. 55); surstylus narrow (Fig. 54) *Convocheila* subgen. n.
- 18 (17). Shape of apical sclerite of aedeagus and surstylus different (Figs. 24, 49, 51, 57, 59).

- 19 (20). Apical sclerite of aedeagus without anterior but with large posterior lobes (Fig. 37) *Neocheilosia* Bark.
- 20 (19). Apical sclerite of aedeagus with anterior lobes (Figs. 24, 49, 57).
- 21 (22). Left projection of anterior lobe of hypandrium wide, considerably wider and longer than right one (Fig. 58) *Nephocheila* subgen. n.
- 22 (21). Left projection of anterior lobe of hypandrium smaller than right one (Fig. 50).
- 23 (24). Apical sclerite of aedeagus with wide and large anterior lobes, lacking posterior lobes (Fig. 24) *Cheilosia* Mg.
- 24 (23). Apical sclerite of aedeagus with 2 pairs of lobes, the anterior and posterior ones (Fig. 49) ...
..... *Montanocheila* subgen. n.

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