

Cecidomyiidae

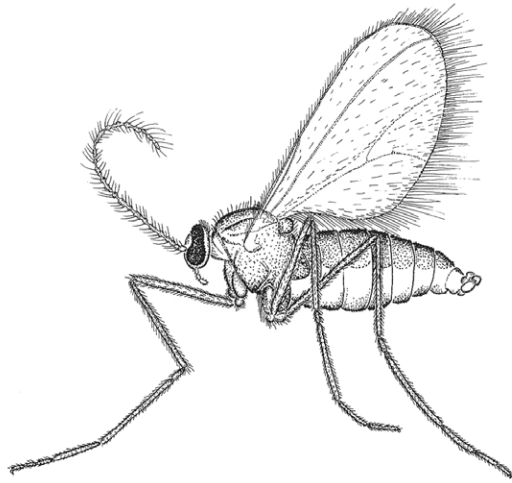
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(1998 Checklist: Marcela Skuhravá)

Last update: Jul 2024

Diagnosis: Small (mostly 0.5-3.0 mm, rarely 8.0 mm) delicate nematocerous flies, with marked sexual dimorphism in antennal and genitalic morphology; females sometimes markedly larger than conspecific males. Body mostly brownish to blackish with brighter, yellowish to orange abdomen. Vestiture composed of setae of various sizes and, not uncommonly, scales. Eyes in both sexes holoptic, with occasional reduction of lateral or dorsal ommatidia. Antenna short to excessively long, 6 to 60+ (often 12 or 14) flagellomeres. Flagellomeres either sessile or with narrow, subcylindrical apical portion of sometimes considerable length (called the neck), basal portion (called the node) with various types of sensilla, including setae (often conspicuously long and arranged in girdles) and circumfila (ring- or loop-shaped sensilla confined to Porricondylinae and Cecidomyiinae). Palpus with 1 to 4 setae-bearing segments, the soft, non-setose palpifer not counted. Legs long and fragile, often considerably longer than body. Tibial spurs absent. First tarsomeres of Winnertziinae, Porricondylinae and Cecidomyiinae appreciably shorter than second tarsomeres; most Heteropezini (in Winnertziinae) with fewer than 5 tarsomeres. Wing, except for a few apterous and brachypterous forms, well developed, as long as the body or longer; membrane usually densely setose or scaled; costa with a break at or near the junction of R_5 , otherwise venation with considerable intra-familial variation, generally reduced to a transversal vein R_s (which is largely absent in Cecidomyiinae) plus three to six longitudinal veins, both an anterior fork (M_1+M_2) and / or a posterior fork (M_4+CuA) may occur. Larvae white to orange; with characteristic, sclerotised sternal spatula on the ventral prothorax (a structure unique to Cecidomyiidae), which in some groups is lost.

Biology: The ancient feeding mode of cecidomyiid larvae is mycophagy (or sapromycophagy), which is retained in all non-Cecidomyiinae and some Cecidomyiinae. Mycophagous larvae, which pierce and suck fungal hyphae, thrive in plant debris, mostly leaf litter and dead wood, as well as in the topsoil of both wood- and grasslands. Their contribution to decomposition processes, although little studied, should be significant. Issues of host specificity provide a wide subject for future research. A few species were identified as pests in mushroom cultivations. Adults of mycophagous cecidomyiids, which are generally regarded as non-feeding, have a largely inconspicuous way of living. Some species occasionally attract attention by their large mating swarms (*Anarete*, *Micromya*) or by mass hatching (*Bryomyia*, *Campylomyza*, *Divellepidosis*, and others), which may gather thousands of individuals. The flight period in lowland Central Europe is typically from April to October (more than one generation per year may occur), with some specialists (whose biology is unknown) flying during the cold season, even above snow. The Malaise trapping technique has been instrumental in unveiling the true abundance and diversity of mycophagous cecidomyiids. The taxonomy of these nematocerans is still in its infancy, especially outside of Europe. Most extant members of the Cecidomyiinae are either plant eaters (including gall inducers on seed plants and, more rarely, ferns; therefore the vernacular name of the family, gall midges) or predators. Larvae of true gall midges



Cecidomyia pini,
male (CMPD2, p.73).

feed mostly by sucking plant juices, with most species being restricted to one host (monophagy) or a few related hosts (oligophagy); polyphagy, i.e. feeding on several host plants that are not closely related, is rather uncommon. There is an enormous biological variety, particularly regarding strategies to synchronise the cecidomyiid life cycle with that of the plant host(s). The diversity in morphological structures, both larval and adult, is no less immense. The species richness of gall midges, especially in the tropics, is inestimable. This diversity coevolved with the radiation of flowering plants since the Upper Cretaceous, rendering Cecidomyiinae the largest gall-making group among extant arthropods. Larvae of predatory Cecidomyiinae, mostly free-ranging, prey on small insects, mites and other arthropods; adults, particularly of *Lestodiplosini*, are among the smallest cecidomyiids known. The scientific study of both plant-feeding and predatory Cecidomyiinae happens in close association with host interactions, the consequence being that trap material is of minor interest in taxonomic studies of the group. Several species of phytophagous Cecidomyiinae are serious pests of plants cultivated as grains, fruits, vegetables, and forest trees; some predators are used as biocontrol agents.

Nomenclature and classification: According to *A Catalog of Cecidomyiidae (Diptera) of the World* (Gagné & Jaschhof 2021), which organises the family in six subfamilies (Catotrichinae, Lestremiinae, Micromyinae, Winnertziinae, Porricondyliinae and Cecidomyiinae). All subfamilies but the species-poor, relict Catotrichinae occur in Switzerland.

Number of species: CH: 257 (1998 Checklist: 237),
DE: 950 (including 264 non-Cecidomyiinae), SE: ~900 (including 639 non-Cecidomyiinae), Europe: ~2000, World: > 6600.

None of the national faunas in Europe is studied thoroughly enough for all the three major trophic groups (phytophages, mycophages, predators) as to give realistic estimates of species numbers. The European country with the largest number of recorded species

is Germany (950 species see Skuhrová et al. 2014, Jaschhof & Jaschhof 2021a). In Sweden, the mycophagous subfamilies of Cecidomyiidae are represented with more than 800 species, and the predatory Lestodiplosini with more than 70 species (Jaschhof & Jaschhof 2021b). Based on that, the occurrence of close to 2000 different Cecidomyiidae in Sweden seems possible, considering that plant-feeding Cecidomyiinae are poorly surveyed there, and the inventory of fungivores and predators is far from being complete.

Level of faunistic knowledge in Switzerland: Moderate for phytophagous species, very poor for mycophagous and predatory species. A conservative estimate for Switzerland is 1000-1200 species (including 500-600 Cecidomyiinae).

General references: Dorchin et al. (2019) [phylogeny, Cecidomyiinae], Gagné & Jaschhof (2021) [catalogue, world species, classification], Jaschhof (1998) [general, revision, Palaearctic and Nearctic species of Catotrichinae, Lestremiinae and Micromyinae], Jaschhof & Jaschhof (2009) [general, revision and keys, Nordic Lestremiinae and Micromyinae], Jaschhof & Jaschhof (2013) [general, revision and keys, Swedish Winnertziinae and Porricondylinae], Mamaev & Krivosheina (1993) [larvae], Redfern (2011) [biology], Roskam (2019) [keys, plant galls of Europe], Roskam & Carbonnelle (2015) [galls pictures], Shorthouse & Rohfritsch (1992) [biology], Skuhrová (1997) [catalogue, Palaearctic species, outdated for non-Cecidomyiinae], Skuhrová & Skuhrový (2010) [biogeography, European fauna], Skuhrová & Skuhrový (2022) [general, biology, European fauna].

References to the Swiss fauna: Affolter (1990), Antonin (1984), Appel (1891), Bächli et al. (2014), Bachmann (1950), Baggiolini (1960), Bollinger (1968), Bremi (1847), Carl (1978, 1982), Clausen (1950), Corti (1904), Deshusses (1933), Deshusses & Deshusses (1936), Faes & Staehelin (1929), Fischer & Pivot (1992), Forster et al. (2018), Gagné & Jaschhof (2021), Gangolf (1886), Häflinger (1945), Hieronymus (1890), Hofer (1910), Houard (1919), Keller (1989), Kieffer (1898, 1909), Kutter & Winterhalter (1933), Löw (1885), Marty (2021), Merz et al. (2002, 2006), Madziara-Borusiewicz (1963), Moreillon (1913, 1916, 1922), Nikolei (1958, 1961), Perriraz (1909), Roskam (1977, 1979), Rübsaamen (1892, 1912, 1917), Skuhrová (1998), Skuhrová & Skuhrový (1997a, 1997b), Skuhrová et al. (2006), Thomas (1890, 1892, 1893, 1902), Trotter (1923), Vallot (1827), Valloton (1969), Vogler (1906), Wermelinger et al. (1995), Wermelinger & Skuhrová (2007), Widmann 2024a, b, c) Zogg et al. (1949, 1950, 1951).

Checklist

Cecidomyiinae N1

Acericecis Gagné, 1983

- *vitrina* (Kieffer, 1909) !

Aphidoletes Kieffer, 1904

- *aphidimyza* (Rondani, 1847) !

Arthrocnodax Rübsaamen, 1895

- *coryligallarum* (Targioni-Tozzetti, 1886) !

- *erianeus* (Bremi, 1847) L

- Aschistonyx* Rübsaamen, 1917
 - *carpinicolus* Rübsaamen, 1917 !
- Asphondylia* Loew, 1850
 - *bitensis* Kieffer, 1888 L
 - *coronillae* (Vallot, 1829) L
 - *echii* H. Loew, 1850 !
 - *hornigi* Wachtl, 1880 !
 - *ononidis* F. Löw, 1873 !
 - *verbasci* (Vallot, 1827) !
- Bayeriola* Gagné, 1991
 - *salicariae* (Kieffer, 1888) !
 - *thymicola* (Kieffer, 1888) !
- Blastomyia* Kieffer, 1913
 - *origani* (Tavares, 1902) L
- Bremiola* Rübsaamen, 1915
 - *onobrychidis* (Bremi, 1847) !
- Cecidomyia* Meigen, 1803 N2
 - *bicolora* Kieffer, 1913 L
 - *gemini* Bremi, 1847 L N3
 - *grisea* Bremi, 1847 L N4
 - *limbitorquens* Bremi, 1847 L
 - *pilosa* Bremi, 1847 L
 - *pini* (De Geer, 1776) !
 - *polymorpha* Bremi, 1847 L
 - *varicolor* Bremi, 1847 L N5
- Clinodiplosis* Kieffer, 1894
 - *botularia* (Winnertz, 1853) !
 - *cilicrus* (Kieffer, 1889) !
- Coniophora* Nijveldt, 1959
 - *graminicola* Nijveldt, 1959 L
- Contarinia* Rondani, 1860
 - *acerplicans* (Kieffer, 1889) !
 - *aconitifloris* Stelter, 1962 L
 - *aequalis* Kieffer, 1898 !
 - *asclepiadis* (Giraud, 1863) !
 - *baeri* (Prell, 1931) !
 - *barbichei* (Kieffer, 1890) !
 - *campanulae* (Kieffer, 1895) !
 - *carpini* Kieffer, 1897 !
 - *coryli* (Kaltenbach, 1859) !
 - *craccae* Kieffer, 1897 L
 - *cucubali* Kieffer, 1909 !
 - *cybelae* Gagné, 1972 !
 - *fagi* Rübsaamen, 1921 !
 - *galeobdolonis* Kieffer, 1909 !
 - *helianthemis* (Hardy, 1850) L

- *hyperici* Barnes, 1952 !
- *hypochoeridis* (Rübsaamen, 1891) !
- *jaapi* Rübsaamen, 1914 !
- *jacobaeae* (Loew, 1850) !
- *lonicerearum* (F. Löw, 1877) L N6
- *loti* (De Geer, 1776) !
- *lysimachiae* (Rübsaamen, 1893) !
- *medicaginis* Kieffer, 1895 !
- *melanocera* Kieffer, 1904 L
- *nasturtii* (Kieffer, 1888) !
- *onobrychidis* Kieffer, 1895 L
- *petioli* (Kieffer, 1898) !
- *pisi* (Winnertz, 1854) L
- *polygonati* Rübsaamen, 1921 !
- *populi* (Rübsaamen, 1917) !
- *pyrivora* (Riley, 1886) L
- *quercina* (Rübsaamen, 1890) !
- *rubicola* Kieffer, 1909 !
- *schlechtendaliana* (Rübsaamen, 1893) !
- *scrophulariae* Kieffer, 1896 ! N13
- *solani* (Rübsaamen, 1891) !
- *sorbi* (Kieffer, 1894) ! N13
- *steini* (Karsch, 1881) !
- *tiliarum* (Kieffer, 1890) !
- *tritici* (Kirby, 1798) L
- *vincetoxici* Kieffer, 1909 !
- Coquillettomyia* Felt, 1908
 - *lobata* (Felt, 1907) ! N7
- Craneiobia* Kieffer, 1913
 - *corni* (Giraud, 1863) !
- Cystiphora* Kieffer, 1892
 - *leontodontis* (Bremer, 1847) L
 - *sanguinea* (Bremer, 1847) !
 - *sonchi* (Bremer, 1847) !
 - *taraxaci* (Kieffer, 1888) !
- Dasineura* Rondani, 1840
 - *acrophila* (Winnertz, 1853) !
 - *affinis* (Kieffer, 1886) !
 - *alpestris* (Kieffer, 1909) !
 - *aucupariae* Kieffer, 1909 L
 - *auritae* (Rübsaamen, 1915) !
 - *axillaris* (Kieffer, 1896) L
 - *berberidis* (Kieffer, 1909) !
 - *bistortae* (Kieffer, 1909) L
 - *bupleuri* (Wachtl, 1883) L
 - *centaureae* (Kieffer, 1909) L

- *clausilia* (Bremi, 1847) L N8
- *crataegi* (Winnertz, 1853) !
- *cytisi* (Kieffer, 1909) L
- *daphnephila* (Kieffer, 1909) L
- *daphnes* (Kieffer, 1901) L
- *engstfeldi* (Rübsaamen, 1889) !
- *excavans* (Kieffer, 1909) !
- *fastidiosa* Roskam, 1979 !
- *fraxinea* (Kieffer, 1907) !
- *fraxini* (Bremi, 1847) !
- *glechomae* (Kieffer, 1889) !
- *gleditchiae* Osten Sacken, 1866 L
- *hyperici* (Bremi, 1847) !
- *interbracta* Roskam, 1979 !
- *irregularis* (Bremi, 1847) !
- *jaapi* (Rübsaamen, 1914) L
- *kellneri* (Henschel, 1875) !
- *kiefferiana* (Rübsaamen, 1891) L
- *lamiicola* (Mik, 1888) !
- *lathyri* (Kieffer, 1909) !
- *lathyricola* (Rübsaamen, 1890) !
- *lupulinae* (Kieffer, 1891) !
- *mali* (Kieffer, 1904) !
- *medicaginis* (Bremi, 1847) !
- *odoratae* Stelter, 1982 ! N13
- *periclymeni* (Rübsaamen, 1889) !
- *phyteumatis* (F. Löw, 1885) !
- *plicatrix* (H. Loew, 1850) !
- *populeti* (Rübsaamen, 1889) !
- *pseudococcus* (Thomas, 1890) L
- *pteridis* (Müller, 1871) ! N13
- *pustulans* (Rübsaamen, 1889) !
- *pyri* (Bouché, 1847) !
- *ranunculi* (Bremi, 1847) !
- *rhododendri* (Kieffer, 1909) !
- *rosae* (Bremi, 1847) !
= *rosarum* (Hardy, 1850)
- *rubella* (Kieffer, 1896) !
- *senecionis* (Rübsaamen, 1916) !
- *strumosa* (Bremi, 1847) !
- *subpatula* (Bremi, 1847) L
- *tetensi* (Rübsaamen, 1891) !
- *teucris* (Tavares, 1903) !
- *thomasi* (Kieffer, 1909) !
- *thomasiana* (Kieffer, 1888) !
- *tiliae* (Schrank, 1803) !

- *tortilis* (Bremer, 1847) !
- *tortrix* (F. Löw, 1877) !
- *trifolii* (F. Löw, 1874) !
- *tympani* (Kieffer, 1909) !
- *ulmaria* (Bremer, 1847) !
- *urticae* (Perris, 1840) !
- *viciae* (Kieffer, 1888) !
- *violae* (F. Löw, 1880) L
- *virgaeaureae* (Liebel, 1889) !
- *xylostei* (Kieffer, 1909) !
- Didymomyia* Rübsaamen, 1912
 - *tiliacea* (Bremer, 1847) !
- Drisina* Giard, 1893
 - *glutinosa* Giard, 1893 !
- Dryomyia* Kieffer, 1898
 - *circinans* (Giraud, 1861) L
- Etsuhoa* Inouye, 1959
 - *sabinae* (Kieffer, 1898) L
- Feltiella* Rübsaamen, 1910
 - *acarisuga* (Vallot, 1827) L
- Geocrypta* Kieffer, 1913
 - *braueri* (Handlirsch, 1884) !
 - *galii* (H. Loew, 1850) !
 - *trachelii* (Wachtl, 1885) L
- Geomyia* Skuhrová, 2006
 - *alpina* Skuhrová, 2006 !
- Gephyraululus* Rübsaamen, 1916
 - *raphanistri* (Kieffer, 1886) !
- Harmandiola* Skuhrová, 1997
 - *cavernosa* (Rübsaamen, 1899) !
 - *globuli* (Rübsaamen, 1989) !
 - *populi* Rübsaamen, 1917 !
 - *pustulans* Kieffer, 1909 L
 - *tremulae* (Winnertz, 1853) L
- Hartigiola* Rübsaamen, 1912
 - *annulipes* (Hartig, 1839) !
- Hygrodiplosis* Kieffer, 1912
 - *vaccinii* (Kieffer, 1897) L
- Iteomyia* Kieffer, 1913
 - *capreae* (Winnertz, 1853) !
- Jaapiella* Rübsaamen, 1916
 - *alpina* (F. Löw, 1885) L
 - *bryoniae* (Bouché, 1847) !
 - *cirsiicola* Rübsaamen, 1915 !
 - *compositarum* (Kieffer, 1888) !
 - *floriperda* (F. Löw, 1888) !

- *genisticola* (F. Löw, 1877) L
 - *hedickei* Rübsaamen, 1921 !
 - *knautiae* Rübsaamen, 1917 !
 - *loticola* (Rübsaamen, 1889) !
 - *medicaginis* (Rübsaamen, 1912) !
 - *schmidti* (Rübsaamen, 1912) !
 - *veronicae* (Vallot, 1827) !
 - *volvens* Rübsaamen, 1917 !
- Janetiella* Kieffer, 1898
- *thymi* (Kieffer, 1888) L
- Kaltenbachiola* Hedicke, 1938
- *strobi* (Winnertz, 1853) !
- Kiefferia* Mik, 1895
- *pericarpicola* (Bremi, 1847) !
- Lasioptera* Meigen, 1818
- *arundinis* Schiner, 1854 !
 - *carophila* F. Löw, 1874 !
 - *flexuosa* (Winnertz, 1853) L
 - *rubi* (Schränk, 1803) !
- Lestodiplosis* Kieffer, 1894
- *achilleae* Barnes, 1928 ! N9
 - *chrysanthemi* Kieffer, 1913 ! N10
 - *coni* (Kieffer, 1920) !
 - *holstei* Kieffer, 1920 !
- Loewiola* Kieffer, 1896
- *centaureae* (F. Löw, 1875) L
- Macrodiplosis* Kieffer, 1895
- *inflexa* (Bremi, 1847) L
 - *pustularis* (Bremi, 1847) !
 - = *dryobia* (F. Löw, 1877)
 - *roboris* (Hardy, 1854) !
 - = *volvens* Kieffer, 1895
- Macrolabis* Kieffer, 1892
- *heraclei* (Kaltenbach, 1862) !
 - *hieracii* Rübsaamen, 1917 !
 - *hippocrepidis* Kieffer, 1898 L
 - *lamii* Rübsaamen, 1915 !
 - *luceti* Kieffer, 1899 !
 - *podagrariae* Stelter, 1962 !
 - *ruebsaameni* Hedicke, 1938 !
 - *stellariae* (Liebel, 1889) !
- Mayetiola* Kieffer, 1896
- *destructor* (Say, 1817) L
 - *poae* (Bosc, 1817) L
- Mikiola* Kieffer, 1896
- *fagi* (Hartig, 1839) !

- Mikomya* Kieffer, 1912
 - *coryli* (Kieffer, 1901) !
- Monarthropalpus* Rübsaamen, 1892
 - *flavus* (Schrank, 1776) !
- Mycodiplosis* Rübsaamen, 1895
 - *melamporae* (Rübsaamen, 1889) !
 - *saundersi* Barnes, 1927 !
- Obolodiplosis* Felt, 1908
 - *robiniae* (Haldeman, 1847) !
- Oligotrophus* Latreille, 1805
 - *juniperinus* (Linnaeus, 1758) !
 - *panteli* Kieffer, 1898 !
- Ozirhincus* Rondani, 1840
 - *millefolii* (Wachtl, 1884) !
- Parallelodiplosis* Rübsaamen, 1910
 - *galliperda* (F. Löw, 1889) !
- Phegomyia* Kieffer, 1913
 - *fagicola* (Kieffer, 1901) ! N13
- Physemocecis* Rübsaamen, 1914
 - *hartigi* (Liebel, 1892) !
 - *ulmi* (Kieffer, 1909) !
- Placochela* Rübsaamen, 1916
 - *ligustri* (Rübsaamen, 1899) !
 - *nigripes* (F. Löw, 1877) !
- Planetella* Westwood, 1840 N2
 - *bremii* (Kieffer, 1898) L
 - *brunnea* (Rübsaamen, 1892) L
 - *cornuta* (Bremi, 1847) L
 - *grandis* (Meigen, 1804) !
- Plemeliella* Seitner, 1908
 - *abietina* Seitner, 1908 L
 - *betulicola* (Kieffer, 1889) !
- Putoniella* Kieffer, 1896
 - *pruni* (Kaltenbach, 1872) L
- Rabdophaga* Westwood, 1847
 - *degeerii* (Bremi, 1847) L
 - *heterobia* (H. Loew, 1850) L
 - *iteobia* (Kieffer, 1890) !
 - *marginemtorquens* (Bremi, 1847) !
 - *paliumparens* Stelter, 1977 !
 - *rosaria* (H. Loew, 1850) !
 - *saliciperda* (Dufour, 1841) L
 - *salicis* (Schrank, 1803) !
 - *strobilina* (Bremi, 1847) !
 - *terminalis* (H. Loew, 1850) !
- Resseliella* Seitner, 1906

- *theobaldi* (Barnes, 1927) L
- Rhopalomyia* Rübsaamen, 1892
 - *artemisiae* (Bouché, 1834) !
 - *chrysanthemi* (Ahlberg, 1939) L
 - *foliorum* (H. Loew, 1850) !
 - *hypogaea* (F. Löw, 1885) !
 - *ptarmicae* (Vallot, 1849) L
 - *ruebsaameni* Thomas, 1893 L
 - *tubifex* (Bouché, 1847) L
- Rondaniola* Hedicke, 1938
 - *bursaria* (Bremi, 1847) !
- Sackenomyia* Felt, 1908
 - *reaumurii* (Bremi, 1847) !
- Schizomyia* Kieffer, 1889
 - *galiorum* Kieffer, 1889 !
- Semudobia* Kieffer, 1913
 - *betulae* (Winnertz, 1853) !
 - *skuhravae* Roskam, 1977 !
 - *tarda* Roskam, 1977 !
- Sitodiplosis* Kieffer, 1913
 - *mosellana* (Géhin, 1857) L
 - *phalaridis* Abbas, 1986 L
- Spurgia* Gagné, 1990
 - *esulae* Gagné, 1990 !
 - *euphorbiae* (Vallot, 1827) !
 - = *capitigena* (Bremi, 1847)
- Taxomyia* Rübsaamen, 1912
 - *taxi* (Inchbald, 1861) !
- Thecodiplosis* Kieffer, 1895
 - *brachyntera* (Schwägrichen, 1835) !
- Tricholaba* Rübsaamen, 1917
 - *trifolii* Rübsaamen, 1917 !
- Wachtliella* Rübsaamen, 1916
 - *stachydis* (Bremi, 1847) !
- Zeuxidiplosis* Kieffer, 1904
 - *giardi* (Kieffer, 1896) !
- Zygiobia* Kieffer, 1913
 - *carpini* (F. Löw, 1874) L

Lestremiinae

- Lestremia* Macquart, 1826
 - *leucophaea* (Meigen, 1818) !

Micromyinae

- Aprionus* Kieffer, 1894
 - *inquisitor* Mamaev, 1963 !

Campylomyza Meigen, 1818
 - *flavipes* Meigen, 1818 !

Porricondyliinae

Asynapta Loew, 1850
 - *strobi* (Kieffer, 1920) !
Claspettomysia Grover, 1964
 - *formosa* (Bremer, 1847) L

Winnertziinae

Heteropeza Winnertz, 1846
 - *pygmaea* Winnertz, 1846 L
Miastor Meinert, 1864
 - *metraloas* Meinert, 1864 L

Excluded species

Cecidomyia frischii Bremer, 1847 N11
Contarinia sambuci (Kaltenbach, 1873)
Camptomysia fenestralis (Bremer, 1847) N12
Porricondyla flava (Meigen, 1818) N12

Notes

- N1 Faunistic data of mostly Cecidomyiinae are discussed in detail by Skuhrová & Skuhrový (1997a, b). These studies treat the history of gall midge investigation in Switzerland, review all faunistic papers and present the results of several collecting trips (56 localities) of the authors between 1993-1996. These faunistic papers are listed below and references to all species marked with «L» (literature data) in the list (that is without precise reference) can be traced in Skuhrová & Skuhrový (1997a), unless otherwise stated.
- N2 Bremer (1847) may be regarded as the founder of scientific gall midge study, not only in Switzerland but in all of Europe. He described or named about 40 species and gathered a relatively rich collection of plant galls and dry-pinned gall inducers, which is now deposited in ETHZ. Types were not designated. Unfortunately, the collection is in a bad condition, making it impossible to undertake a revision of his species, which were often rather insufficiently described in catch-all genera, such as *Cecidomyia* and *Planetella*.
- N3 *Cecidomyia gemini*: only gall described, material probably lost.
- N4 *Cecidomyia grisea*: material probably lost.
- N5 *Cecidomyia varicolor*: material probably lost.
- N6 *Contarinia lonicerearum*: only recorded on *Lonicera xylosteum* L. in Switzerland (Vogler 1906, Moreillon 1916, Skuhrová & Skuhrový 1997a, Marty 2021), removed from synonymy with *C. sambuci* Kaltenbach, 1873 by Skuhrová & Skuhrový (2009), the latter only occurring on *Sambucus*.
- N7 *Coquillettomysia lobata* (Felt, 1907): New record for the Swiss fauna (Widmann 2024a).
- N8 *Dasineura clausilia* (Bremer, 1847): mentioned by Moreillon (1916) and Skuhrová & Skuhrový (1997a). Stelzer (1993) mentioned that these galls are caused by mites, not by gall midges. The midge larvae noticed by Bremer (1847) in the galls need further study; they are probably inquiline or mite predators (Gagné & Jaschhof 2021).
- N9 *Lestodiplosis achilleae* Barnes, 1928: New record for the Swiss fauna (Widmann 2024b).
- N10 *Lestodiplosis chrysanthemi* Kieffer, 1913: New record for the Swiss fauna (Widmann 2024c).
- N11 *Cecidomyia frischii*: probably identical with a later described species. Material lost, status unclear.
- N12 *Cecidomyia fenestralis* Bremer, 1847 (regarded as *Camptomysia* by some authors) and *Cecidomyia flava* Meigen, 1818 (regarded as *Porricondyla* by some authors) recorded by Bremer (1847) are considered as nomina dubia and have been consequently removed from the list.
- N13 The following species have been first recorded from Switzerland by Marty (2021): *Contarinia scrophulariae*, *C. sorbi*, *Dasineura odoratae*, *D. pteridis* and *Phegomyia fagicola*.

References

- Affolter F. 1990. Étude structurale et dynamique du complexe d'Hyménoptères parasitoïdes s'attaquant aux Cécidomyies céréales *Sitodiplosis mosellana* (Géhin) et *Contarinia tritici* (Kirby) (Dipt., Cecidomyiidae). Thesis, Délémont.
- Antonin P. 1984. Cécidomyies des feuilles (*Dasyneura pyri* Bch.) et des poirettes (*Contarinia pyrivora* Riley). Revue suisse de viticulture, d'arboriculture et d'horticulture 16: 101-102.
- Appel O. 1891. Compte rendu de l'Excursion de la Société botanique suisse aux Morteys, les 21 et 22 août 1891. III. Galles (Zoocécidies). Archives des Sciences Physiques et naturelles (Genève) 26: 643-644.
- Bächli G., Merz B. & Haenni J.-P. 2014. Dritter Nachtrag zur Checkliste der Diptera der Schweiz. Entomo Helvetica 7: 119-140.
- Bachmann F. 1950. Untersuchungen über die Gallmücke *Thomasiana theobaldi* Barnes an Himbeerruten. Schweizer Zeitschrift für Obst- und Weinbau 59: 386-392.
- Baggiolini M. 1960. Une cause importante du dépérissement du framboisier: la cécidomyie de l'écorce (*Thomasiana theobaldi* Barnes). Revue Horticole Suisse 33: 80-84.
- Bollinger A. 1968. Morphologische, phänologische und ökologische Untersuchungen an der Erbsengallmücke (*Contarinia pisi* Winn., Itonidae, Diptera) im Drescherbsen-anbauggebiet der Ostschweiz. Thesis, Zürich.
- Bremi J.J. 1847. Beiträge zu einer Monographie der Gallmücken. *Cecidomyia* Meigen. Neue Denkschriften der Allgemeinen Schweizerischen Gesellschaft für die Gesamten Naturwissenschaften 9: 1-71.
- Carl K.P. 1978. Beobachtungen über die natürlichen Feinde der Apfelblatt-Gallmücke. Obstbau Weinbau, Mitteilungen des Südtiroler Beratungsrings 15(3): 77-79.
- Carl K.P. 1982. Biologie, natürliche Feinde und Bekämpfung der Birnenblattgallmücke, *Dasyneura pyri*. Erwerbs-Obstbau 24: 166-169.
- Clausen R.-L. 1950. Observations sur la Cécidomyie de la violette *Dasyneura affinis* Kieffer. Mitteilungen der Schweizerischen Entomologischen Gesellschaft 23: 200-206.
- Corti A. 1904. Contribution à l'étude de la cécidologie suisse. Bulletin de l'Herbier Boissier, 2^e série 4: 1-17.
- Deshusses L. 1933. Insectes nuisibles aux cultures. Mitteilungen der Schweizerischen Entomologischen Gesellschaft 15(11): 474-486.
- Deshusses J. & Deshusses L. 1936. Diptères nuisibles aux cultures, nouveaux pour la faune Suisse ou peu connus. Mitteilungen der Schweizerischen Entomologischen Gesellschaft 16: 740-749.
- Dorchin N., Harris K.M. & Stireman III J.O. 2019. Phylogeny of the gall midges (Diptera, Cecidomyiidae, Cecidomyiinae): Systematics, evolution of feeding modes and diversification rates. Molecular Phylogenetics and Evolution 140: 106'602.
- Faes H. & Staehelin M. 1929. Les parasites, insectes et champignons des arbres fruitiers. Résultats des traitements d'hiver, de printemps et d'été effectués au cours de l'année 1928. Annuaire Agricole de la Suisse 30: 125-148.
- Fischer S. & Pivot D. 1992. Apparition en Suisse de la cécidomyie *Dasineura gleditschiae* O.S. (Diptera, Cecidomyiidae) ravageur du févier commun *Gleditsia triacanthos* L. Revue suisse de viticulture, arboriculture, horticulture 24(4): 203-204.
- Forster B., Schmitt M. & Thimonier A. 2018. *Dryomyia circinans* (Giraud, 1861) – Erstbeobachtung der Zerreichen-Gallmücke in der Schweiz (Diptera: Cecidomyiidae). Entomo Helvetica 11: 161-163.
- Gagné R.J. & Jaschhof M. 2021. A Catalog of the Cecidomyiidae (Diptera) of the World. 5th ed. Digital. 813 pp. https://www.ars.usda.gov/ARSystemFiles/80420580/Gagne_Jaschhof_2021_World_Cat_5th_Ed.pdf
- Gangolf G. 1886. *Cecidomyia saliciperda* Duf. Societas Entomologica (Zürich) 1: 109.
- Häfflinger E. 1945. Die *Chrysanthemum*-Gallmücke, eine für die Schweiz neuer Schädling. Mitteilungen des Biologischen Labors des Instituts Rudolf Geigy, Basel, Gärtnermeister 50: 1-7.
- Hieronymus G. 1890. Beiträge zur Kenntnis der europäischen Zoocécidien und der Verbreitung derselben. Jahresbericht der Schlesischen Gesellschaft für Vaterländische Cultur (Breslau) 68: 49-272.
- Hofer J. 1910. Die Birnengallmücke *Diplosis (Contarinia) pirivora* Ril. Schweizer Landwirtschaft Zeitschrift 1910: 47.
- Houard C. 1919. Galles d'Europe. Marcellia 16: 108-125.
- Jaschhof M. 1998. Revision der « Lestremiinae » (Diptera, Cecidomyiidae) der Holarktis. Studia Dipterologica, Supplement 4, 552 pp.
- Jaschhof M. & Jaschhof C. 2009. The Wood Midges (Diptera: Cecidomyiidae: Lestremiinae) of Fennoscandia and Denmark. Studia Dipterologica, Supplement 18, 333 pp.

- Jaschhof M. & Jaschhof C. 2013. The Porricondyliinae (Diptera: Cecidomyiidae) of Sweden, with notes on extralimital species. *Studia Dipterologica*, Supplement 20, 392 pp.
- Jaschhof M. & Jaschhof C. 2021a. Verzeichnis der mykophagen Gallmücken (Diptera: Cecidomyiidae excl. Cecidomyiinae) Deutschlands, mit Beschreibung von *Henria schumannii* n. sp. *Entomologische Nachrichten und Berichte* 65(2): 121-135.
- Jaschhof M. & Jaschhof C. 2021b. Mycophagous gall midges (Diptera: Cecidomyiidae excl. Cecidomyiinae) in Sweden: status report after 15 years of taxonomic inventory, annotated taxonomic checklist, and description of *Camptomyia alstromi* sp. nov. *Entomologisk Tidskrift* 142(3): 105-184.
- Keller S. 1989. Auftreten der Erbsengallmücke *Contarinia pisi* Winn. bei Konservenerbsen und Möglichkeiten ihrer Bekämpfung. *Landwirtschaft Schweiz* 2: 57-62.
- Kieffer J.-J. 1898. Synopse des Cécidomyies d'Europe et d'Algérie décrites jusqu'à ce jour. *Bulletin de la Société d'Histoire Naturelle de Metz*, 2^e série 8(20): 1-64.
- Kieffer J.-J. 1909. Contributions à la connaissance des insectes gallicoles. *Bulletin de la Société d'Histoire Naturelle de Metz*, 3^e série, 2(26): 1-35.
- Kutter H. & Winterhalter W. 1933. Untersuchungen über die Erbsenschädlinge im St.-Gallischen Rheintale während der Jahre 1931 und 1932. *Landwirtschaftliches Jahrbuch der Schweiz* 47: 273-338.
- Löw F. 1885. Beiträge zur Naturgeschichte der gallenerzeugenden Cecidomyiden. *Verhandlungen der Zoologisch-Botanischen Gesellschaft in Wien* 35: 483-510.
- Mamaev B.M. & Krivosheina N.P. 1993. The larvae of the gall midges (Diptera, Cecidomyiidae) – comparative morphology, biology, keys. (Translated & edited by J.H. Wieffering, J.C. Roskam). Balkema, Rotterdam, 293 pp.
- Marty T. 2021. Fünf neue Gallmückenarten (Diptera, Cecidomyiidae) für die Schweiz. *Entomo Helvetica* 14: 123-126.
- Merz B., Bächli G. & Haenni J.-P. 2002. Erster Nachtrag zur Checkliste der Diptera der Schweiz. *Mitteilungen der Entomologischen Gesellschaft Basel* 51(3-4)(2001): 110-140.
- Merz B., Bächli G. & Haenni J.-P. 2006. Zweiter Nachtrag zur Checkliste der Diptera der Schweiz. *Mitteilungen der Entomologischen Gesellschaft Basel* 56(4): 135-165.
- Madziara-Borusiewicz K. 1963. Die schädlichen und parasitischen Insekten der Fichtenzapfen der Schweiz. *Schweizer Zeitschrift für Forstwesen* 114: 337-240.
- Moreillon M. 1913. Première contribution au catalogue des zoocécidies de la Suisse. *Bulletin de la Société Vaudoise des Sciences Naturelles* 49: 251-286.
- Moreillon M. 1916. Seconde contribution au catalogue des zoocécidies de la Suisse. *Bulletin de la Société Vaudoise des Sciences Naturelles* 51: 143-171.
- Moreillon M. 1922. Troisième contribution au catalogue des zoocécidies de la Suisse. *Bulletin de la Société Vaudoise des Sciences Naturelles* 54: 423-441.
- Nikolei E. 1958. Untersuchungen über den Generationswechsel pädogenetischer Gallmücken (Vorläufige Mitteilung). *Revue Suisse de Zoologie* 65(2-3): 390-396.
- Nikolei E. 1961. Vergleichende Untersuchungen zur Fortpflanzung heterogener Gallmücken unter experimentellen Bedingungen. *Zeitschrift für Morphologie und Ökologie der Tiere* 50: 281-329.
- Perriraz J. 1909. Contribution à l'étude des monstruosités chez *Thymus serpyllum* et *Arabis alpina*. *Bulletin de la Société Vaudoise des Sciences Naturelles* 45: 409-415.
- Redfern M. 2011. *Plant galls*. London: Harper Collins, 562 pp.
- Roskam J.C. 1977. Biosystematics of insects living in female birch catkins. I. Gall midges of the genus *Semudobia* Kieffer (Diptera, Cecidomyiidae). *Tijdschrift voor Entomologie* 120: 153-197.
- Roskam J.C. 1979. Biosystematics of insects living in female birch catkins. II. Inquiline and predaceous gall midge species belonging to various genera. *Netherlands Journal of Zoology* 29: 283-351.
- Roskam J.C. 2019. *Plant Galls of Europe: Vol. 1-3*. KNNV-publishers, Zeist, The Netherlands, 2200 pp.
- Roskam J.C. & Carbone S. 2015. Annotated checklist of the gall midges from the Netherlands, Belgium and Luxembourg (Diptera: Cecidomyiidae). *Nederlandse Faunistische Mededelingen* 44: 47-167.
- Rübsaamen E.H. 1892. Die Gallmücken des Königlichen Museums für Naturkunde zu Berlin. *Berliner Entomologische Zeitschrift* 37: 319-411, pls. VII-XVII.
- Rübsaamen E.H. 1912. Ueber deutsche Gallmücken und Gallen. *Zeitschrift für wissenschaftliche Insektenbiologie* 8: 354-357.
- Rübsaamen, E.H. 1917. Cecidomyidenstudien VI. Sitzungsberichte der Gesellschaft Naturforschender Freunde zu Berlin 1917: 36-99.

- Shorthouse J.D., Rohfritsch O. 1992. *Biology of Insect-Induced Galls*. Oxford University Press, New York, Oxford, 285 pp.
- Skuhrová M. 1997. Family Cecidomyiidae. In: Papp L. & Darvas B. (eds). *Contributions to a Manual of Palaearctic Diptera (with special reference to flies of economic importance)*. Vol. 2, Nematocera and Lower Brachycera: 71-204. Budapest, Science Herald, 592 pp.
- Skuhrová M. 1998. 22. Cecidomyiidae. In: Merz B., Bächli G., Haenni J.-P. & Gonthier Y. (eds). *Diptera - Checklist. Fauna Helvetica 1: 131-137*. CSCF / SEG, Neuchâtel, 369 pp.
- Skuhrová M. & Skuhrový V. 1997a. Gall midges (Diptera: Cecidomyiidae) of Switzerland. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft* 70: 133-176.
- Skuhrová M. & Skuhrový V. 1997b. Beitrag zur Kenntnis der Gallmückenfauna (Diptera, Cecidomyiidae) der Schweiz. *Mitteilungen der Entomologischen Gesellschaft Basel* 47: 12-21.
- Skuhrová M. & Skuhrový V. 2010. Species richness of gall midges (Diptera, Cecidomyiidae) in Europe (West Palaearctic): biogeography and coevolution with host plants. *Acta Societatis Zoologicae Bohemicae* 73(2009): 87-156.
- Skuhrová M. & Skuhrový V. 2021. *The Gall Midges of Europe*. KNNV Publishing, 456 pp.
- Skuhrová M., Skuhrový V. & Meyer H. 2014. Gall midges (Diptera: Cecidomyiidae: Cecidomyiinae) of Germany – Faunistics, ecology and zoogeography. *Faunistisch-Ökologische Mitteilungen, Supplement* 38: 1-200.
- Skuhrová M., Stöcklin J. & Weppler T. 2006. *Geomyia* n. gen. *alpina* n. sp. (Diptera: Cecidomyiidae), a new gall midge species associated with flower heads of *Geum reptans* (Rosaceae) in the Swiss Alps. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft* 79: 107-115.
- Stelter H. 1993. Untersuchungen über Gallmücken XXXVIII: Synonymie europäischer Arten der Gattung *Rhabdophaga* Westwood, 1847. *Beiträge zur Entomologie* 43(2): 387-391.
- Thomas F.A.W. 1890. Larve und Lebensweise der *Cecidomyia pseudococcus*, n. sp. *Verhandlungen der Zoologisch-botanischen Gesellschaft in Wien* 40: 65, 301-306.
- Thomas F.A.W. 1892. Alpine Mückengallen. *Verhandlungen der Zoologisch-botanischen Gesellschaft in Wien* 42: 356-376.
- Thomas F.A.W. 1893. Zwei hochalpine Rhopalomyia-Arten. *Verhandlungen der Zoologisch-botanischen Gesellschaft in Wien* 43: 301-309.
- Thomas F.A.W. 1902. Die Dipterocecidien von *Vaccinium uliginosum* mit Bemerkungen über Blattgrübchen und über terminologische Fragen. *Marcellia* 1: 146-161.
- Trotter A. 1923. *Miscellanea Cecidologicae*. VII(1). Di alcune galle della zona alpina della Svizzera. *Marcellia* 20: 97-103.
- Vallot J.N. 1827. *Compte rendu des travaux de l'Académie; partie des Sciences*. *Mémoires de l'Académie des Sciences, Arts et Belles-Lettres de Dijon* 1827: 39-112.
- Vallotton R. 1969. Contribution à la biologie de la Cécidomyie du pois *Contarinia pisi* Winn. (Diptera, Cecidomyiidae) avec étude particulière du phénomène de la diapause. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft* 42: 241-293.
- Vogler P. 1906. Zoocécidien von St. Gallen und Umgebung I. *Jahrbuch der St. Gallischen Naturwissenschaftlichen Gesellschaft* 1905: 311-342.
- Wermelinger B., Hirscheidt J. & Fecker B. 1995. Abundance and emergence of spruce cone insects in different parts of Switzerland. *Journal of Applied Entomology* 119: 9-15.
- Wermelinger B. & Skuhrová M. 2007. First records of the gall midge *Obolodiplosis robiniae* (Haldeman) (Diptera: Cecidomyiidae) and its associated parasitoid *Platygaster robiniae* Buhl & Duso (Hymenoptera: Platygasteridae) in Switzerland. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft* 80: 217-221.
- Widmann C. 2024a. [*Coquilletomyia lobata*]. <https://www.inaturalist.org/observations/198744744>
- Widmann C. 2024b. [*Lestodiplosis achilleae*]. <https://www.inaturalist.org/observations/198913305>
- Widmann C. 2024c. [*Lestodiplosis chrysanthemi*]. <https://www.inaturalist.org/observations/202434385>
- Zogg H., Horber E. & Salzmann R. 1949. Pflanzenschutz. *Landwirtschaftliches Jahrbuch der Schweiz* 63: 383-395.
- Zogg H., Horber E. & Salzmann R. 1950. Pflanzenschutz. *Landwirtschaftliches Jahrbuch der Schweiz* 64: 432-442.
- Zogg H., Horber E. & Salzmann R. 1951. Auftreten von Krankheiten und Schädlingen im Feldbau. *Landwirtschaftliches Jahrbuch der Schweiz* 65: 512-531.