

World Catalog and Conspectus on the Family Periscelididae (Diptera: Schizophora)

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Introduction

The Periscelididae include flies associated with sap fluxes that exude from deciduous trees (Periscelidinae) or occur on monocots with water-holding bases (Stenomicroinae). The natural history of some genera, such as *Cyamops* Melander or *Planinasus* Cresson, is unknown. Specimens are seldom collected and are poorly represented in collections, and much of the species-level diversity remains to be described. The late C. W. Sabrosky, for example, reported over 100 undescribed species in *Stenomicroa* alone, which would double the size of the family. For many other genera there are also numerous undescribed species in extant collections. Typical of taxa that are rarely collected, many of the undescribed species are represented by single or very few specimens. Although occurring in temperate zones, the family exhibits much greater diversity in the tropics, especially the neotropics. This catalog and conspectus are presented here not only to summarize information about the family but also to encourage and facilitate research on all aspects of the biology of these flies.

Zoological catalogs, checklists, and equivalent databases are indispensable tools for anyone needing a reference to a currently accepted name and frequently to other information relating to that taxon, such as bibliographic and distributional data. This is possible because most information is filed under a species' scientific name, which is the key to retrieval of information from the literature. The system is dynamic, however, and subject to interpretation. The taxonomic literature is constantly changing to reflect recent work, and some species are known by more than one name. Thus a complete listing of names, including synonyms, is an important starting point for locating information, whether as the basis for applied and basic research or simply to satisfy a curiosity.

The information included in a catalog is usually arranged in a logical and organized format that allows for its convenient and rapid conveyance - in short, a quick and easy storage and retrieval system. The format and amount of information presented varies greatly, however. Our use of the term

catalog is intended to convey a more comprehensive treatment, including information on all valid names, synonyms, type species, and the status and deposition of primary types. The bibliographic section includes complete references (author, date, original citation), and distributional and other biotic information are also provided. Not all citations that occur in the literature of Periscelididae are included in this catalog or the bibliographic section, especially where we suspect that the species being treated was misidentified, and inclusion would further promulgate inaccurate distributional data.

Regional catalogs, checklists, and faunal treatments have contributed significantly to the compilation of this catalog. The most recent of these for a given region or country are as follows:

Catalogs: Sabrosky 1965a, 1965b (Nearctic), 1977 (Oriental), 1980 (Afrotropical); Prado 1975 (Neotropical); Papp 1984a, 1984b (Palearctic); Khoo 1989 (Australasian/Oceanian); Khoo and Sabrosky 1989 (Australasian/Oceanian).

Checklists: Hackman 1980 (Finland); Roháček 1987 (Czech Republic, Slovakia); Máca 1987 (Czech Republic, Slovakia); Morimoto 1989 (Japan); Nowakowski 1991 (Poland); Papp 1995b (Italy), 2001a, 2001b (Hungary); Poole & Gentili 1996 (Nearctic Region); Bächli 1998a, 1998b (Switzerland); Chandler 1998a, 1998b (British Isles); Tschirnhaus 1999 (Germany); Petersen 2001 (Denmark); Carles-Tolrá 2002 (Spain); Beuk & Zuijlen 2002 (Netherlands).

Faunal Treatments: Duda 1934 (Palearctic); Séguy 1934 (France); Sturtevant 1954 (Nearctic); Cole 1969 (western North America); Stackelberg 1970 (European Russia); Papp 1973 (Hungary); Bächli 1997 (Switzerland); Mathis and Papp 1998 (Palearctic); Sueyoshi & Mathis 2004 (Japan); Merz & Roháček 2005 (Switzerland); Grimaldi 2009 (Fiji).

Revisionary: *Cyamops*: Khoo 1985 (Australian); Baptista & Mathis 1994 (New World), 2000 (world). *Stenomicro*: Sabrosky 1965c (Asia), 1975 (Afrotropical). *Parascutops*: Mathis & Papp 1992. *Notioscelis*: Mathis 1993. *Diopsosoma*: Mathis & Rung 2004.

Fossil: Sturtevant 1963; Grimaldi & Mathis 1993; Evenhuis 1994.

Acronyms used in this catalog

To economize on space we have used acronyms for museums where primary type(s) are deposited. These acronyms are as follows:

AMS Australian Museum, Sydney, Australia.

AMNH American Museum of Natural History, New York, New York, USA.

- BMNH** former British Museum (Natural History), collection incorporated in the Natural History Museum, London, England.
- BBM** Bernice P. Bishop Museum, Honolulu, Hawaii, USA.
- CNC** Canadian National Collection, Ottawa, Ontario, Canada.
- DEI** Deutsches Entomologisches Institut, Müncheberg, Germany.
- HNHM** Hungarian Natural History Museum, Budapest, Hungary.
- INHS** Illinois Natural History Survey, Champaign, Illinois, USA.
- MNHNP** Muséum National d'Histoire Naturelle, Paris, France.
- MZUSP** Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil.
- NMP** Natal Museum, Pietermaritzburg, South Africa.
- NMW** Naturhistorisches Museum, Wien, Austria.
- NZAC** New Zealand Arthropod Collection, Auckland, New Zealand.
- SMO** Silesian Museum, Opava, Czech Republic.
- UCMP** University of California (Museum of Paleontology), Berkeley, California, USA.
- UMO** University Museum, Oxford University, Oxford, England.
- USNM** former United States National Museum, collection incorporated in the National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA.
- ZIL** Zoological Institute, Lund University, Lund, Sweden.
- ZMHU** Institut für Zoologie, Museum für Naturkund, Humboldt Universität, Berlin, Germany.

Diagnosis. Moderately small to moderately large flies (body length 2.5-5.0 mm), broad to slender. *Head:* Face uniformly sclerotized, protruding, ventral portion of face receded. Pedicel cap-like, with a dorsal cleft, bearing 1-2 dorsoapical setae; 1st flagellomere sharply deflexed, arising from ventral surface of pedicel; arista with dorsal and ventral rays. Ocellar seta, when present, inserted laterally to margin of ocellar tubercle (fossil *Procyamops* has as poorly developed seta inside ocellar tubercle); medial vertical seta absent or present; postvertical seta, when present, reduced and divergent; fronto-orbital setae 1-2 with one seta reclinate and other proclinate (both reclinate in some *Stenomicro*); interfrontal seta absent, or present, upright and slightly reclinate. *Thorax:* Dorsocentral setae usually 2, sometimes 1, none presutural; posterior intra-alar seta reduced; scutellar setae 1-2 marginal pairs, disc of scutellum bare. Wing hyaline or with infusate markings; true costal breaks absent; subcosta incomplete, not fused with vein R₁ apically; costa extended to vein R₄₊₅ or vein M; cell dm with a shallow longitudinal fold (Periscelidinae); cell cup typically present, although

vein CuA_2 either well developed or reduced. Midtibia bearing prominent, apicoventral seta. *Abdomen*: Male preabdomen consisting of 6 segments, with postabdomen either symmetrical or asymmetrical; surstylus discrete, articulated or fused with epandrium; cercus weakly sclerotized. Female abdomen with 7th tergite and sternite separate or fused to each other forming a complete ring (in *Cyamops* 6th tergite and sternite also fused to form a ring).

Adults of Periscelididae are readily distinguished from genera of Anthomyzidae and Aulacigastridae by the shape of the pedicel, which is cap like; by the arista, which bears dorsal and ventral rays (bipectinate); by the shallow, longitudinal fold in cell dm; and by the presence of cell cup, although vein CuA_2 is either well developed or reduced.

Egg (based on three European species of *Periscelis*). Light blue to violet; boat shaped, long ovoid in dorsal view, without filaments; ventral portion rather convex, lighter in color than dorsum, with fine, irregular, hexagonal network; dorsal portion darker, less convex but not flat, with 2 fine ribs that are confluent at apices, lacking network but microsculptured; micropyle inconspicuous.

Larvae. Papp (1995a) summarized the larval features of *Periscelis* (subgenera *Periscelis* and *Myodris*) as follows (see also Teskey 1976): body strongly flattened dorsoventrally; segments with fleshy digitiform processes laterally and with several other bulbous processes, all processes with large, partly curved spinules; subanal pads indistinct (there is a bifid inflated protuberance that can be extroverted from anus in *P. annulata*); anterior spiracles short, bulbiform with 5(4) small bulbous papillae; posterior spiracles (with latero-clinate intraspiracular hairs) on a pair of very long divergent spiracular processes; cephalopharyngeal skeleton with robust body (pharynx); mandibles very strong, composed of a curved apical part and a robust basal (posterior) part and with one pair of ventrobasal, midventral and dorsal processes each; extremely long and thin parastomal bar; well sclerotized dental sclerites and weakly sclerotized but complex labial sclerite; dorsal cornu much shorter than ventral; ventral cornu robust but simple. While larvae of *Myodris* are plump, those of *P. (Periscelis)* are slim; the lateral process of the posterior spiracle is distal in *Myodris* and proximal in *Periscelis* (extended to middle of posterior spiracle), aerial sack behind posterior spiracle conical (*Myodris*) or sausage-shaped (*Periscelis*).

Biology. The immature stages of *Periscelis*, and to an extent the adults, are associated with sap from bleeding deciduous trees (oak, elm, cottonwood,

etc.). Papp (1998) recently described the habits and habitats of three European species.

P. (Myodris) annulata: Larvae of this species require a specific microhabitat and food. The food is fresh, non-mucous tree sap that flows over bark that has absorbed some of the liquid but that is still hard and has retained definite structure. The fresh sap is probably poor in microorganisms, at least relative to sap flows where *Brachyopa* or drosophilid larvae live. Lacking fresh sap, such as when sap flow is reduced or stopped during the summer, the larvae become dormant. Dormancy is broken if tree sap or even water reaches them and is detected by the larval mouth papillae. A drop of water placed locally on their body does not break dormancy.

The larvae in Papp's (1998) rearing trials were from eggs of the previous year. The eggs hatched and the larvae developed for a period of time (presumably reaching the third-larval instar) during the first year. Apparently the third-instar larva or perhaps the puparium overwinters. Papp excluded the possibility of mature third-instar larvae developing from eggs laid during the second year, as the first adults (males) were active in central Hungary on the 1st of May.

Although data are incomplete, it is probable that in "good years" larvae, which overwintered, could develop into adults early in the season, allowing for these adults to produce a second, late-summer generation. However, the possibility cannot be excluded that overwintering but undernourished larvae, lacking adequate, fresh sap, may overwinter a second year.

Periscelis (P.) nigra minor: Most adults were collected on wounds of elm trees (*Ulmus campestris*); they occur rarely on wounds of white poplar (*Populus alba*) or oak trees (*Quercus* spp.). Having located a host tree, the adults are prone to remain on the host tree: if disturbed they tend to fly up the tree, in many cases only for a distance of 0.5 to 1 m along the tree trunk. Flying to a neighboring tree usually occurs at a height of greater than 3 m, making it difficult to collect adults with a sweeping net.

The adults feed on the exuding sap. During the first days of activity, mostly or only males emerge. Their searching activity seems to be focused on finding trees with bleeding bark. So far as we can determine, the males do not establish "leks", although two males will maintain a distance from each other if possible. In early spring, or when the first adults have emerged, this species (i.e. its males) can be found, although rarely, on all kinds of sap fluxes or tree wounds. Later, the only food of the larvae is the sap from frost-cracks or from bases of dead twigs. Our observations suggest that the females have the ability to select a particular kind of sap, as larvae are not found in all types of wounds. Females do not visit, and conse-

quently larvae are not found in, thicker gelatinous layers of sap, unlike the larvae of *Aulacigaster falcata* Papp and *A. leucopeza* (Meigen). This seems likely based on morphological evidence, which has been corroborated with Papp's rearing trials. The morphological evidence is the rather short, caudal stigmal horns of *Periscelis* larvae that cannot be extended in contrast to the comparatively long and extendable horns of *Aulacigaster* larvae.

The larvae appear to be particular about their food, feeding on fresh-flowing sap in habitats that are not completely in the shade. The larvae live and move in the sap on the surface of bark. If sap flow is reduced, the larvae move upwards, towards the source of the sap. This is why Papp found larvae in bark crevices with the anterior half under the bark. The larvae are unable to wedge further under the bark, and are thus restricted primarily to the bark's surface. The bark structure of elm trees seems to be particularly suitable.

P. (P.) winertzii: The phenology of development of this rare species seems clear from the observations and collections made in Hungary. Adults emerge later to much later in the year (mid July to early September) than the former two species. They mate and lay eggs until the first days of September and the larvae develop to second- or third-instar larvae in September. This species overwinters as a third-instar larva, as adults were collected on the 14th and 23rd of May. Like *P. nigra minor*; *P. winertzii* has only one generation per year.

The eversible anal protuberance of the periscelidine larvae may have a role in osmotic regulation as the protuberances were immediately everted in a 1% sugar solution. The sugar (saccharose) is not a component of the larval food, and the larvae withdraw their heads even in the weakest solution of saccharose.

Williams (1939), reporting on *Stenomicroa orientalis* Malloch, discovered larvae at the water-holding leaf bases of several monocot species in Hawaii, including pineapple (*Ananas sativus* Schultes, Bromeliaceae) and some Liliaceae and Poaceae.

Distribution. Specimens of Periscelididae are seldom collected, and distributional data as a reflection of actual distributions suffer from sampling error. With this caution in mind, it is apparent that the family occurs primarily in tropical habitats with only occasional "excursions" into temperate zones. Thus the Neotropical fauna is especially diverse, as are the Australasian, Afrotropical, and Oriental faunas. Although there are 13 species in the Palearctic Region, many of these occur in Mediterranean habitats where the temperate climate is more moderated.

Table of genera

The following table lists the genera of Periscelididae in the order found in the catalog, with a summary of the number of species known from each zoogeographic region.

TAXON	DISTRIBUTION							Total
	NE	NT	PA	AF	OR	AU		
Periscelidinae								
Diopsosoma Malloch			1					1
Marbenia Malloch			1					1
Neoscutops Malloch			3					3
Parascutops Mathis & Papp			1					1
Periscelis Loew		3	5	8		1	1	18
Scutops Coquillett			7					7
Stenomicroinae								
Cyamops Melander		3	7	1	2	5	12	30
Planinasus Cresson			4					4
Procyamops Hoffeins & Rung				1				1
Stenocyamops Papp						1	4	5
Stenomicroa Coquillett			6	5	8	5	12	36
TOTALS		6	35	15	10	12	29	107
Subfamilies								2
Genera								11

Classification. The concept of Periscelididae, as adopted here, follows D. K. McAlpine (1978, 1983) and includes a few genera previously assigned to Aulacigastridae (*Cyamops* Melander, *Planinasus* Cresson, and *Stenomicroa* Coquillett). McAlpine characterized Periscelididae primarily by the caplike pedicel, which has a dorsal cleft, and its relationship to the first flagellomere. Although these characters are common to all Periscelididae, they also occur in Neurochaetidae (D. K. McAlpine 1978, Woodley 1982) and other Acalyptrate genera. In a recent phylogenetic study of the Opomyzoidea, using 28S ribosomal DNA and CAD (rudimentary) genes (Winkler *et al.* 2010), *Stenomicroa*, *Cyamops* and *Planinasus* grouped consistently with moderate support with the genus *Aulacigaster* and not with Periscelidinae. Moreover, the same analysis failed to find any support for a sister-group relationship between Periscelididae and Neurochaetidae. This study highlights the need to study the phylogeny of these groups in greater detail, and the results warrant further scrutiny.

Papp (1984b) proposed Stenomicrinae for the genus *Stenomicra* after D. K. McAlpine (1978, 1983) had transferred that genus, together with *Planinasus* and *Cyamops*, from the Aulacigastridae to the Periscelididae. Grimaldi & Mathis (1993), Baptista & Mathis (1994), and Mathis & Papp (1998) recognized two subfamilies (Periscelidinae and Stenomicrinae) in the Periscelididae, although the monophyly of only Periscelidinae is well corroborated as follows: (1) occiput with a silvery white, microtomentose area immediately adjacent to the posterior margin of the compound eye; (2) only one fronto-orbital seta, reclinate; (3) mouth opening large (this may be secondarily reduced in *Diopsosoma*, although this is difficult to determine, given the severe lateral distentions of the head); (4) costa short, extended only to vein R_{4+5} ; (5) vein CuA_2 reduced or absent; (6) cell dm with a fold running entire length; (7) postpronotal seta well developed; (8) 7th spiracle ("stigma") not free in female postabdomen; (9) several characters of the male terminalia (see Griffiths 1972). The genera comprising Periscelidinae are those that Hennig (1969) included in his more restricted concept of the family, viz: *Periscelis* Loew, *Marbenia* Malloch, *Neoscutops* Malloch, *Scutops* Coquillett, and *Diopsosoma* Malloch. Baptista & Mathis (1994) questioned the monophyly of Stenomicrinae and presented evidence that *Planinasus* might be more closely related to Periscelidinae. Griffiths (1972) considered the genera *Diopsosoma* and *Somatia* Schiner as Periscelididae. Mathis & Papp (1992) and Grimaldi & Mathis (1993), however, questioned this classification, and Mathis (1993) considered *Somatia* to be related to the Psilidae (Diopsoinea). In a recent review of *Diopsosoma* (Mathis & Rung 2004), we document conclusively that this genus belongs in Periscelidinae.

Although Stenomicrinae are recognized as a subfamily, evidence confirming the monophyly of this subfamily is vague or generally wanting. Thus, the genera here included in Stenomicrinae may eventually be placed elsewhere in the suprafamily Asteioinea (superfamily Opomyzoidea) and they may not be as closely related to each other as the classification adopted here would infer. Stenomicrinae are characterized as follows: Frons with 2 fronto-orbital setae, 1 reclinate, usually 1 proclinate; at least 1 vertical seta (apparently the lateral) present; postvertical setae usually lacking (present in some *Stenomicra*, where they are slightly divergent); ocellar setae lacking (present in fossil *Procyamops*); pedicel bearing 1 or more dorsoapical setae. Postpronotum frequently polished, lacking a well-developed seta; C extended to vein M; cell cup usually present, CuA_2 usually well developed (weakly developed or lacking in *Stenomicra*).

Key to extant subfamilies, genera, and subgenera

1. Fronto-orbital setae 2; ocellar setae absent. Costa long, extended to vein M; vein CuA₂ usually well developed, usually with a distinct cell cup (weak or lacking in some *Stenomicro*); postpronotum lacking a well-developed seta (*Stenomicroinae*) 2
- Fronto-orbital seta 1; ocellar setae present, well developed. Costa short, extended only to vein R₄₊₅, not vein M; vein CuA₂ weak or lacking, cell cup absent; postpronotum bearing a well-developed seta (*Periscelidinae*) 5
2. Frons with 1 pair of interfrontal setae; eyes bare. Katepisternum with 2 subequal setae. Hindfemur bearing anterodorsal, preapical seta..... *Planinasus* Cresson
- Frons lacking interfrontal setae; eyes microsetulose, sometimes sparsely. Katepisternum bearing 1 prominent seta. Hindfemur lacking anterodorsal, preapical seta..... 3
3. Fronto-orbital setae reclinate or occasionally mesocline, lacking a procline seta. Metanotum bulging; supra-alar seta lacking; lateral scutellar setae 1 pair, apical. Wing with anal lobe greatly reduced; alula indistinct; vein CuA₂ weak or lacking; cell cup usually lacking *Stenomicro* Coquillett
- Fronto-orbitals comprising 1 procline and 1 reclinate setae; medial vertical seta absent. Metanotum not bulging; supra-alar seta present, well developed; lateral scutellar setae variable but usually 2. Wing with a distinct anal lobe and alula; vein CuA₂ present, well developed; cell cup present..... 4
4. Medial vertical seta lacking. Face in profile shallowly arched. Hindtibia without large, ventroapical spur. Crossvein bm-cu present, cell bm at least partially separate if not distinct from cell dm. Abdominal sternites less broad; male terminalia strongly asymmetrical, especially surstyli; ejaculatory apodeme very large.....
..... *Cyamops* Melander
- Medial vertical seta present. Face in profile angulate. Hindtibia with a large, ventroapical spur. Crossvein bm-cu absent, making cells bm and dm confluent. Abdominal sternites very broad. Male terminalia nearly asymmetrical, surstyli completely so; ejaculatory apodeme very small *Stenocyamops* Papp
5. Eye borne on conspicuous stalk; antenna semiporrect. A presutural supra-alar seta well developed; anepisternum setose; scutellum tri-

- angular, apex pointed and bearing apical patch of setae
*Diopsosoma* Malloch
- Eye not borne on conspicuous stalk; antenna not porrect. Lacking a presutural seta; anepisternum bare of setae; scutellar apex broadly rounded to truncate, lacking apical patch of setae 6
6. Vein R_1 bearing numerous setulae along dorsum 7
- Vein R_1 lacking setulae along dorsum 8
7. Vein R_{2+3} curved anteriorly toward costa to just beyond R_1 , thereafter reverse curved more or less evenly, shallowly, and parallel to costa until merger with latter; apical section of vein M usually conspicuously arched; 1 posterior dorsocentral seta
 *Neoscutops* Malloch
- Vein R_{2+3} more or less evenly arched throughout length except just before apex; apical section of vein M straight or very shallowly arched; 2 posterior dorsocentral setae *Marbenia* Malloch
8. Dorsal area of face distinctly flattened, shieldlike. Wing with at least apical 1/3 conspicuously infusate..... 10
- Dorsal area of face not distinctly flattened and shieldlike. Wing variable but usually mostly hyaline (*Periscelis* Loew) 9
9. Prescutellar acrostichal setulae moderately well developed, distinct from other acrostichal setulae; crossvein dm-cu straight and well developed throughout length; male genitalia lacking digitiform process at base of epandrium between surstylus and cercus .
*Periscelis* subgenus *Myodris* Lioy
- Prescutellar acrostichal setulae undifferentiated; crossvein dm-cu weakened to completely attenuate anteriorly, usually angulate or curved toward base, sometimes nearly straight; male genitalia with a ventrally oriented, narrow process at the ventral margin of the epandrium between the surstylus and cerci.....
*Periscelis* subgenus *Periscelis* Loew
10. Wing irrorate (speckled); mesonotum dull, densely microtomentose, mostly gray, with several brown spots; a pair of distinct prescutellar acrostichal setae. Arista with 3-4 dorsal branches.....
 *Parascutops* Mathis & Papp
- Wing darkly infumate on apical 1/2-1/3 and with subapical, transverse, white area or band; mesonotum very thinly to moderately microtomentose, subshiny to shiny; prescutellar acrostichal setae lacking. Arista with 6 or more dorsal branches.....*Scutops* Coquillett

Family Periscelididae Oldenberg

Periscelidinae Oldenberg, 1914: 41 [as a subfamily of Drosophilidae].

Type genus: *Periscelis* Loew, 1858.

Periscelidae. Hendel 1916: 297 [family status].

Periscelididae. Stackelberg 1933: 4 [correct orthography], 1970: 216 [fauna, European Russia]; Duda 1934: 1-13 [fauna, Palearctic Region]; Séguy 1934: 394-395 [fauna, France]; Sturtevant 1954: 551-556 [fauna, Nearctic Region, world catalog]; Hennig 1958: 600, 633-635 [discussion, phylogenetic relationships], 1971: 37 [discussion, phylogeny], 1973: 58 [discussion]; Sabrosky 1965a: 710, 1965b: 820 [Nearctic catalog], 1977: 231 [Oriental catalog], 1980: 648-649 [Afrotropical catalog]; Cole 1969: 376-377 [fauna, western North America]; Papp 1973: 76-79 [fauna, Hungary], 1984a: 233-234, 1984b: 61-62 [Palearctic catalog], 1995b: 14 [checklist, Italy], 2001a: 344, 2001b: 344-345 [checklist, Hungary]; Prado 1975: 1-3 [Neotropical catalog]; Khoo 1989: 550 [Australasian/Oceanian catalog]; Khoo and Sabrosky 1989: 551 [Australasian/Oceanian catalog]; Hackman 1980: 129 [checklist, Finland]; Roháček 1987: 255 [checklist, Czech Republic, Slovakia]; Máca 1987: 277 [checklist, Czech Republic, Slovakia]; McAlpine 1989: 1465 [review, classification, phylogeny]; Morimoto 1989: 808 [checklist, Japan]; Nowakowski 1991: 187 [checklist, Poland]; Poole & Gentili 1996: 65, 206 [checklist, Nearctic]; Bächli 1997: 32 [fauna, Switzerland], 1998a: 260, 1998b: 289 [checklist, Switzerland]; Chandler 1998a: 142, 1998b: 143 [checklist, British Isles]; Mathis and Papp 1998: 285-294 [fauna, Palearctic Region]; Tschirnhaus 1999: 170-171 [checklist, Germany]; Petersen 2001: 207 [checklist, Denmark]; Carles-Tolrá 2002: 180 [checklist, Spain]; Beuk & Zuijlen 2002: 275 [checklist, Netherlands]; Sueyoshi & Mathis 2004: 74-84 [fauna, Japan].

Subfamily PERISCELIDINAE Oldenberg

Periscelidinae Oldenberg, 1914: 41. Type genus: *Periscelis* Loew 1858.

Duda 1934: 1-13 [fauna, Palearctic Region]; Séguy 1934: 394-395 [fauna, France]; Sturtevant 1954: 551-556 [fauna, Nearctic Region, world catalog]; Hennig 1958: 600 [discussion, phylogenetic relationships], 1973: 58 [discussion]; Sabrosky 1965a: 710 [Nearctic catalog]; Cole 1969: 376-377 [fauna, western North America];

Stackelberg 1970: 216 [fauna, European Russia]; Papp 1973: 76-79 [fauna, Hungary], 1984a: 233-234 [Palearctic catalog], 1995b: 14 [checklist, Italy], 2001a: 344 [checklist, Hungary]; Prado 1975: 1-3 [Neotropical catalog]; Khoo 1989: 550 [Australasian/Oceanian catalog]; Hackman 1980: 129 [checklist, Finland]; Máca 1987: 277 [checklist, Czech Republic, Slovakia]; Nowakowski 1991: 187 [checklist, Poland]; Poole & Gentili 1996: 206 [checklist, Nearctic]; Bächli 1997: 32 [fauna, Switzerland], 1998a: 260 [checklist, Switzerland]; Chandler 1998b: 143 [checklist, British Isles]; Mathis and Papp 1998: 285-294 [fauna, Palearctic Region]; Tschirnhaus 1999: 170 [checklist, Germany]; Petersen 2001: 207 [checklist, Denmark]; Carles-Tolrá 2002: 180 [checklist, Spain]; Beuk & Zuijlen 2002: 275 [checklist, Netherlands]; Sueyoshi & Mathis 2004: 74-84 [fauna, Japan].

Genus DIOPSOSOMA Malloch

Diopsosoma Malloch, 1932: 267. Type species: *primum* Malloch, by original designation. Prado, 1975: 1 [Neotropical catalog]; Mathis & Rung 2004: 303-309 [revision].

primum Malloch. NT: Peru (Loreto).

Diopsosoma primum Malloch, 1932: 267. Peru. Loreto: Iquitos. HT ♂ USNM [USNM type number 43865]. Prado 1975: 1 [Neotropical catalog]; Mathis & Rung 2004: 303-309 [revision].

Genus MARBENIA Malloch

Marbenia Malloch, 1931: 31. Type species: *peculiaris* Malloch, by original designation. Prado 1975: 1 [Neotropical catalog].

peculiaris Malloch. NT: Panama.

Marbenia peculiaris Malloch, 1931: 32. Panama. Porto Bello. HT ♀ USNM [USNM type number 43127]. Prado 1975: 1 [Neotropical catalog].

Genus NEOSCUTOPS Malloch

Neoscutops Malloch, 1926: 25. Type species: *rotundipennis* Malloch, by original designation. Prado 1975: 1 [Neotropical catalog]; Amorim & Vasconcelos 1991: 37-39 [fauna, Brazil].

cariri Amorim & Vasconcelos. **NT:** Brazil (Paraíba).

Neoscutops cariri Amorim & Vasconcelos, 1991: 37. Brazil. Paraíba: João Pessoa, Campus Universitário. HT ♀ MZUSP.

peruvianus Hennig. **NT:** Peru (Madre de Dios).

Neoscutops peruvianus Hennig, 1969: 603. Peru. Madre de Dios: Avispas, 400 m. HT ♂ CNC [CNC type number 9927]. Prado 1975: 1 [Neotropical catalog]; Amorim & Vasconcelos 1991: 39 [key, Brazil].

rotundipennis Malloch. **NT:** Colombia, Costa Rica, Panama.

Neoscutops rotundipennis Malloch, 1926: 25. Costa Rica. San Mateo, Higuito. HT ♀ (fungus covered) USNM [USNM type number 28459]. Prado 1975: 1 [Neotropical catalog]; Amorim & Vasconcelos 1991: 39 [key, Brazil].

Genus PARASCUTOPS Mathis & Papp

Parascutops Mathis & Papp, 1992: 368. Type species: *Scutops maculipennis* Malloch, by original designation.

maculipennis (Malloch). **NT:** Mexico (Districto Federal).

Scutops maculipennis Malloch, 1926: 24. Mexico. Districto Federal: Mexico City. HT ♀ USNM [USNM type number 28458]. Prado 1975: 2 [Neotropical catalog]; Amorim & Vasconcelos 1991: 42 [key, Brazil]; Mathis & Papp 1992: 371 [generic combination].

Parascutops maculipennis. Mathis & Papp, 1992: 371 [revision; generic combination].

Genus PERISCELIS Loew

Periscelis Loew, 1858: 113. Type species: *annulipes* Loew, by subsequent designation [Sturtevant 1923: 1]. Schiner 1863: 271 [revision, European species]; Becker 1905: 217 [Palearctic catalog]; Duda 1934: 5 [revision, Palearctic species]; Sturtevant 1923: 1 [synonymy with *Microperiscelis*], 1954: 552-556 [fauna, Nearctic Region]; Sabrosky 1965a: 710 [Nearctic catalog]; Papp 1973: 77 [Hungary], 1984a: 233 [Palearctic catalog], 1988: 273 [discussion, figures]; Prado 1975: 1 [Neotropical catalog]; Poole & Gentili 1996: 206 [checklist, Nearctic]; Mathis & Papp 1998: 292 [Palearctic fauna].

Subgenus *Myodris* Lioy

Myodris Lioy, 1864: 1103 [as a genus]. Type species: *Notiphila annulata* Fallén, by original designation.

Meronychina Enderlein, 1914: 327 [as a genus]. Type species: *Notiphila annulata* Fallén, by monotypy. Syn. Sturtevant 1954.

Meronychia. Misspelling. Enderlein 1917: 72.

Microperiscelis Oldenberg, 1914: 37, 42 [as a genus]. Type species: *Notiphila annulata* Fallén, by subsequent designation [Sturtevant 1923: 1]. Syn. Sturtevant 1923: 1.

Phorticoides Malloch, 1915: 86 [as a genus]. Type species: *Phorticoides flinti* Malloch, by original designation. Syn. Sturtevant 1954.

amberifera Grimaldi & Mathis. **NT:** Dominican Republic (amber).

Periscelis (Myodris) amberifera Grimaldi & Mathis, 1993: 387. Fossil; Dominican Republic. HT ♀ AMNH [AMNH type number DR-8-207A]. Grimaldi & Mathis 1993: 387 [specific provenance unknown; inclusion in a large piece of amber (4.0 X 3.3 cm) that is dark yellow]. Evenhuis 1994: 424 [review].

annectans Sturtevant. **NT:** Mexico (Chiapas) (amber).

Periscelis annectans Sturtevant, 1963: 122. Fossil; Mexico. Chiapas: Las Cruces landslide, 23 km SE Simojovel, 6.8 km SE Rancho Santo Domingo. HT ? UCMP [Paleontology type number 12639]. Grimaldi & Mathis 1993: 393 [revision]; Evenhuis 1994: 424 [review].

annulata (Fallén). **PA:** Czech Republic, Denmark, France, Germany, Great Britain, Hungary, Israel, Italy, Japan, Netherlands, Russia (European Part), Slovakia, Spain, Sweden, Switzerland.

Notiphila annulata Fallén, 1813: 250. Sweden. ST ♂♀ ZIL.

Ephydra annulata. Meigen, 1830: 114 [revision]; Macquart 1835: 536 [revision].

Drosophila annulata. Zetterstedt, 1846: 2546 [revision].

Periscelis annulata. Loew, 1858: 118 [generic combination]; Schiner 1863: 272 [revision]; Lamb 1904: 277 [list, England]; Becker 1905: 217 [Palearctic catalog]; Collin 1911: 230 [list, England]; Sturtevant 1954: 553 [fauna, Nearctic Region]; Cole 1969: 377 [fauna, western North America]; Stackelberg 1970: 216 [fauna, European Russia]; Papp 1973: 79 [fauna, Hungary], 1981: 226 [fauna, Hungary], 1995b: 14 [checklist, Italy]; Máca 1987: 257 [checklist, Czech Republic, Slovakia]; Carles-Tolrá 1992: 250 [list, Spain], 2002: 180 [checklist, Spain]; Bächli 1997: 32 [fauna,

- Switzerland], 1998a: 260 [checklist, Switzerland]; Petersen 2001: 207 [checklist, Denmark]; Beuk & Zuijlen 2002: 275 [checklist, Netherlands]; Freidberg & Mathis 2002: 46-47 [list, Israel]; Bächli *et al.* 2006: [biology].
- Myodris annulata*. Lioy, 1864: 1103 [generic combination].
- Microperiscelis annulata*. Oldenberg 1914: 37 [generic combination]; Duda 1934: 10 [revision]; Séguy 1934: 394-395 [fauna, France]; Nowakowski 1991: 187 [list, Poland].
- Periscelis (Microperiscelis) annulata*. Hackman 1980: 129 [checklist, Finland]; Papp 1984a: 234 [Palearctic catalog], 1988: 277 [figs. of terminalia], 1998b: 143 [checklist, British Isles].
- Periscelis (Myodris) annulata*. Tschirnhaus 1999: 170 [checklist, Germany]; Papp 2001a: 334 [checklist, Hungary]; Sueyoshi & Mathis 2004: 79 [review, Japan].
- Meronychina annulata*. Enderlein 1914: 327 [generic combination].
- Meronychia [sic] annulata*. Enderlein 1917: 72.
- brodzinskyi** Grimaldi & Mathis. **NT:** Dominican Republic (amber).
Periscelis (Myodris) brodzinskyi Grimaldi & Mathis, 1993: 391. Fossil; Dominican Republic; HT ♀ AMNH [AMNH type number DR-8-207B]. Grimaldi & Mathis 1993: 391 [specific provenance unknown; inclusion is a large piece of amber (4.0 X 3.3 cm) that is dark yellow]. Evenhuis 1994: 424 [review].
- chinensis** Papp & Szappanos. **PA:** China.
Periscelis (Myodris) chinensis Papp & Szappanos, 1998: 236. China. Heilongkiang: Charbin. HT ♀ HNHM. Papp & Szappanos 1998: 236 [on wounds of *Populus*].
- facianota** Grimaldi & Mathis. **NT:** Dominican Republic (amber).
Periscelis (Myodris) facianota Grimaldi & Mathis, 1993: 389. Fossil; Dominican Republic. HT ♀ AMNH [AMNH type number 11856]. Grimaldi & Mathis 1993: 389 [specific provenance unknown; inclusion is in a small piece of amber (0.7 X 1.3 cm; 1.1 X 1.3 cm before cutting) that is medium yellow]; Evenhuis 1994: 424 [review].
- flinti** (Malloch). **NE:** USA (Alabama, Illinois, Maryland, Nebraska, New Mexico, South Dakota, Wisconsin).
Phorticoides flinti Malloch, 1915: 87. USA. Illinois. Champaign: Urbana. LT ♂ [designated by Frison 1927: 187] INHS.
Periscelis annulata of authors [not Fallén]. Misidentification. Sturtevant 1923: 1 [discussion], 1954: 553 [discussion]; Sabrosky 1965a: 710 [Nearctic catalog]; J. F. McAlpine 1987: 895, 898.
Periscelis flinti. Sturtevant 1954: 556 [generic combination].

kabuli Papp. **PA:** Afghanistan.

Periscelis (Microperiscelis) kabuli Papp, 1988: 274. Afghanistan. Kabul: Aliabad, university park, 1800 m. HT ♂ HNHM.

Subgenus *Notioscelis* Mathis

Notioscelis Mathis, 1993: 16. Type species: *Periscelis fasciata* Mathis, by original designation.

fasciata Mathis. **AU:** Australia (New South Wales, Queensland).

Periscelis (Notioscelis) fasciata Mathis, 1993: 16. Australia. New South Wales: Mooney Creek near Gosford. HT ♂ AMS.

Periscelis sp. Khoo 1989: 550 [unidentified species].

Subgenus *Periscelis* Loew

Periscelis Loew, 1858: 113 [as a genus]. Type species: *annulipes* Loew, by subsequent designation [Sturtevant 1923: 1].

Sphyroperiscelis Sturtevant, 1923: 1 [as a genus]. Type species: *wheeleri* Sturtevant, by original designation. Syn. Sturtevant 1954.

Parclioscena Enderlein, 1936: 177. Type species: *Periscelis winertzii* Egger, by monotypy. Syn. Papp 1984.

annulipes Loew. **PA:** Czech Republic, Finland, France, Germany, Hungary, Poland, Slovakia, Switzerland.

Periscelis annulipes Loew, 1858: 118. Poland. Wrocław [= Breslau]. LT ♂ [designated herein] ZMHU. Schiner 1863: 272 [revision]; Becker 1905: 217 [Palearctic catalog]; Duda 1934: 68 [revision]; Séguy 1934: 395 [fauna, France]; Hackman 1980: 129 [checklist, Finland]; Máca 1987: 257 [checklist, Czech Republic, Slovakia]; Bächli 1997: 32 [fauna, Switzerland], 1998a: 260 [checklist, Switzerland].

Periscelis (Periscelis) annulipes. Papp 1984a: 234 [Palearctic catalog], 2001a: 344 [checklist, Hungary]; Nowakowski 1991: 187 [list, Poland]; Tschirnhaus 1999: 170 [checklist, Germany].

heegeri Duda. **PA:** Austria.

Drosophila variegata of Heeger [not Fallén]. Misidentification. Heeger 1852: 777-779.

Periscelis (Microperiscelis) heegeri Duda, 1934: 2. Austria. ST ? NMW. Papp 1984a: 234 [Palearctic catalog, listed as a *nomen dubium* and as an unavailable name “in lack of type-specimen designation.” The designation of a type specimen, however, is not a condition of availability.].

kaszabi Papp. **OR:** Vietnam.

Periscelis (Microperiscelis) kaszabi Papp, 1988: 278. Vietnam. Cuc phuong: Ninh binh. HT ♀ HNHM.

nebulosa Hendel. **NT:** Argentina.

Periscelis nebulosa Hendel, 1913: 389. Argentina. Buenos Aires. ST 4? NMW. Prado 1975: 1 [Neotropical catalog].

Periscelis argentina. Hennig 1969: 602 [nomen nudum].

nigra (Zetterstedt). **PA:** England, Finland, Germany, Great Britain, Hungary, Russia (European part), Sweden.

Asteia nigra Zetterstedt, 1860: 6430. Sweden. Skåne: Stora Råby [= "Ulmi ad Råby prope Lund" (55°41'N, 13°13'E)] and Räftea (55°43.5'N, 13°17.7'E). ST ♂ ZIL. Becker 1905: 219 [Palearctic catalog].

Periscelis nigra. Schiner, 1863: 273 [generic combination, list]; Collin 1911: 320 [list, England]; Stackelberg 1970: 216 [fauna, European Russia]; Robertson 2002: 172-173 [natural history].

Periscelis (Periscelis) nigra. Hackman, 1980: 129 [checklist, Finland]; Papp 1984a: 234 [Palearctic catalog], 1998: 117 [biology], 2001a: 344 [checklist, Hungary]; Chandler 1998b: 143 [checklist, British Isles]; Tschirnhaus 1999: 170 [checklist, Germany].

occidentalis Sturtevant. **NE:** USA (Arizona, California, Colorado, Nevada, New Mexico, Washington).

Periscelis occidentalis Sturtevant, 1954: 554. USA. California. Riverside: Cottonwood Springs, near Mecca. HT ♀ USNM [USNM type number 61473]. Sturtevant 1954: 554 [fauna, Nearctic Region]; Sabrosky 1965a: 710 [Nearctic catalog]; Cole 1969: 377 [fauna, western North America]; Prado 1975: 2 [Neotropical catalog]; Poole & Gentili 1996: 206 [checklist, Nearctic].

schulzei Duda. **PA:** Germany.

Periscelis schulzei Duda, 1934: 9 [as a variety of *nigra*]. Germany. Leipzig, Connew. HT ♂ Schulze's Collection [probably destroyed in World War II; personal communication, H. Schumann to L. Papp].

wheeleri (Sturtevant). **NE:** Canada (British Columbia), USA (Florida, Massachusetts, New Jersey, Pennsylvania, Washington).

Sphyroperiscelis wheeleri Sturtevant, 1923: 2. USA. Massachusetts. Barnstable: Naushon Island. HT ♂ AMNH.

Periscelis wheeleri. Sturtevant 1954: 553-554 [fauna, Nearctic Region, generic combination]; Sabrosky 1965a: 710 [Nearctic catalog]; Cole 1969: 377 [fauna, western North America]; Poole & Gentili 1996: 206 [checklist, Nearctic].

winertzii Egger. **PA:** Austria, France, Germany, Great Britain, Hungary, Netherlands, Switzerland.

Periscelis winertzii Egger, 1862: 780. Austria. ST ♂♀ NMW.

Periscelis winnertzii. Misspelling. Schiner 1863: 272 [revision].

Periscelis winnertzi. Misspelling. Becker 1905: 217 [Palearctic catalog]; Oldenberg 1914: 37 [Europe]; Duda 1934: 11 [revision]; Papp 1973: 79 [fauna, Hungary]; Bächli 1997: 32 [fauna, Switzerland], 1998a: 260 [checklist, Switzerland]; Beuk & Zuijlen 2002: 275 [fauna, Netherlands].

Periscelis (Periscelis) winnertzii. Misspelling. Papp 2001a: 344 [checklist, Hungary].

Microperiscelis winnertzi. Séguy 1934: 394 [France].

Periscelis (Microperiscelis) winnertzi. Misspelling. Papp 1984a: 234 [Palearctic catalog]; Chandler 1998b: 143 [checklist, British Isles].

Periscelis (Myodris) winnertzi. Misspelling. Tschirnhaus 1999: 170 [checklist, Germany].

Parclioscena winnertzii. Misspelling. Enderlein 1936: 177 [generic combination].

Genus SCUTOPS Coquillett

Scutops Coquillett, 1904: 97. Type species: *fascipennis* Coquillett, by original designation. Sturtevant 1954: 555 [synonymy]; Prado 1975: 2 [Neotropical catalog]; Amorim & Vasconcelos 1991: 39-44 [fauna, Brazil].

Panamenia Curran, 1934: 323. Type species: *chapmani* Curran, by original designation. Syn. Sturtevant 1954.

chapmani (Curran). **NT:** Costa Rica, Panama.

Panamenia chapmani Curran, 1934: 323. Panama. Barro Colorado Island. HT ♂ AMNH.

Scutops chapmani. Sturtevant, 1954: 556 [generic combination]; Prado 1975: 2 [Neotropical catalog].

fascipennis Coquillett. **NT:** Costa Rica, El Salvador, Guatemala, Guyana, Nicaragua, Panama.

Scutops fascipennis Coquillett, 1904: 97. Nicaragua. Chinandega. ST ♂ USNM [USNM type number 7806]. Malloch 1926: 24 [discussion]; Prado 1975: 2 [Neotropical catalog].

goianiensis Amorim & Vasconcelos. **NT:** Brazil (Goiás).

Scutops goianiensis Amorim & Vasconcelos, 1991: 42. Brazil. Goiás: Goiânia. HT ♀ MZUSP.

lopesi Amorim & Vasconcelos. **NT:** Brazil (Rio de Janeiro).

Scutops lopesi Amorim & Vasconcelos, 1991: 39. Brazil. Rio de Janeiro: Rio de Janeiro. HT ♂ MZUSP.

marcgrafi Amorim & Vasconcelos. **NT:** Brazil (Paraíba).

Scutops marcgrafi Amorim & Vasconcelos, 1991: 42. Brazil. Paraíba: João Pessoa (Campus Universitário). HT ♀ MZUSP.

peruanus Hennig. **NT:** Peru.

Scutops peruanus Hennig, 1952: 615. Peru. Meshagua, Urubamba River. HT ♂ DEI. Prado 1975: 2 [Neotropical catalog]; Amorim & Vasconcelos 1991: 43 [key, Brazil].

striatus Hennig. **NT:** Peru (Madre de Dios).

Scutops striatus Hennig, 1969: 604. Peru. Madre de Dios: Avispas, 400 m. HT ♀ CNC [CNC type number 9928]. Prado 1975: 2 [Neotropical catalog]; Amorim & Vasconcelos 1991: 42 [key, Brazil].

Subfamily STENOMICRINAE Papp

Stenomicrinae Papp 1984b: 61 [as the family Stenomicridae]. Type genus: *Stenomicra* Coquillett 1900. Papp 1984b: 61-62 [Palearctic catalog], 2001b: 344-345 [checklist, Hungary]; Roháček 1987: 255 [checklist, Czech Republic, Slovakia]; Khoo and Sabrosky 1989: 551 [Australasian/Oceanian catalog]; Morimoto 1989: 808 [checklist, Japan]; Poole & Gentili 1996: 65 [checklist, Nearctic]; Bächli 1998b: 289 [checklist, Switzerland]; Mathis & Papp 1998: 293-294 [fauna, Palearctic Region]; Chandler 1998a: 142 [checklist, British Isles]; Tschirnhaus 1999: 171 [checklist, Germany]; Roháček & Barták 2001: 377-379 [list]; Papp, in Papp *et al.*, 2006: 208-220 [key to genera, fauna, Thailand]; Grimaldi 2009: 1-59 [fauna, Fiji].

Genus CYAMOPS Melander

Cyamops Melander, 1913: 291. Type species: *nebulosus* Melander, by original designation. Sturtevant 1954: 557-559 [revision]; Hennig 1958: 633 [generic characters, relationships], 1969: 610-613 [discussion]; Sabrosky 1958: 169-171 [revision], 1965b: 820 [Nearctic catalog]; Khoo 1985: 527-536 [revision, Australian species]; Khoo & Sabrosky 1989: 551 [Australasian/Oceanian catalog]; Baptista & Mathis 1994: 1-25 [revision, New World species], 2000: 481-506 [review]; Poole & Gentili 1996: 65 [checklist, Nearctic]; Grimaldi 2009: 23-27, 38 [key, fauna, Fiji].

alessandrae Mathis & Sueyoshi. **AU:** New Zealand.

Cyamops alessandrae Mathis & Sueyoshi, 2011: 34. New Zealand. North Island: WO: Whangamarino Peat Bog (37°20.9'S, 175°06.8'E). HT ♂ NZAC.

americus Baptista & Mathis. **NT:** Costa Rica, Honduras, Mexico (Chiapas).

Cyamops americus Baptista & Mathis, 1994: 14. Mexico. Chiapas: El Triunfo, 49 km S Jaltenango. HT ♂ USNM.

australicus Hennig. **AU:** Australia (Northern Territories, Queensland).

Cyamops australicus Hennig, 1969: 612. Australia. Queensland: Brisbane. HT ♂ ANIC. Khoo 1985: 535 [revision]; Khoo & Sabrosky 1989: 551 [Australasian/Oceanian catalog].

banvaneue Baptista & Mathis. **OR:** Laos.

Cyamops banvaneue Baptista & Mathis, 2000: 501. Laos. Vientiane: Ban Van Eue. HT ♂ BBM.

buenorum Baptista & Mathis. **NT:** Mexico (Chiapas).

Cyamops buenorum Baptista & Mathis, 1994: 18. Mexico. Chiapas: Cacahoatan, 7 km N. HT ♂ USNM.

claudiensis Khoo. **AU:** Australia (Northern Territories, Queensland, Western Australia).

Cyamops claudiensis Khoo, 1985: 530. Australia. Queensland: Claudie River, Mt. Lamond. HT ♂ AMS. Khoo & Sabrosky 1989: 551 [Australasian/Oceanian catalog].

colombianus Baptista & Mathis. **NT:** Colombia.

Cyamops colombianus Baptista & Mathis, 1994: 19. Colombia. Rio Raposo. HT ♂ USNM.

crobyi Mathis & Sueyoshi. **AU:** New Zealand.

Cyamops crobyi Mathis & Sueyoshi, 2011: 37. New Zealand. North Island: AK: Cascade (36°53.2'S, 174°31.2'E). HT ♂ NZAC.

dayi Khoo. **AU:** Australia (New South Wales, Queensland).

Cyamops dayi Khoo, 1985: 532. Australia. New South Wales: Sydney, Collaroy. HT ♂ AMS. Khoo & Sabrosky 1989: 551 [Australasian/Oceanian catalog].

delta Khoo. **AU:** Australia (New South Wales, Queensland, Tasmania, Victoria).

Cyamops delta Khoo, 1985: 534. Australia. New South Wales: Blue Mountain, Wentworth Falls. HT ♂ AMS. Khoo & Sabrosky 1989: 551 [Australasian/Oceanian catalog].

fasciatus Baptista & Mathis. **NT:** Brazil (São Paulo).

Cyamops fasciatus Baptista & Mathis, 1994: 20. Brazil. São Paulo: Serra da Cantareira Chapado. HT ♂ MZUSP.

femobrunneus Grimaldi. **AU:** Fiji.

Cyamops femobrunneus Grimaldi, 2009: 23-26. Fiji. Taveuni: Cakaudrove Prvince, 5.6 km SE Tavuki Village, Devo Peak, 1187 m. HT ♂ BBM.

femoctenidius Grimaldi. **AU:** Fiji.

Cyamops femoctenidius Grimaldi, 2009: 26-27. Fiji. Taveuni: Cakaudrove Prvince, 5.6 km SE Tavuki Village, Devo Peak, 1187 m. HT ♂ BBM.

femoratus Baptista & Mathis. **OR:** Philippines.

Cyamops femoratus Baptista & Mathis, 2000: 498. Philippine Islands. Negros Oriental: Lake Balinsasayao. HT ♂ BBM.

fiji Baptista & Mathis. **AU:** Fiji.

Cyamops fiji Baptista & Mathis, 2000: 493. Fiji. Viti Levu Island: Lami, 0-200 m. HT ♂ BBM.

freidbergi Baptista & Mathis. **AF:** Madagascar.

Cyamops freidbergi Baptista & Mathis, 2000: 489. Madagascar. Nosy Be, Lakobe Res. Forest SE. HT ♂ USNM.

fumipennis Papp. **OR:** Thailand.

Cyamops fumipennis Papp, in Papp *et al.*, 2006: 209. Thailand: Trang Prov., Khao Chong Botanic Garden. HT ♂ HNHM.

funkae Baptista & Mathis. **NT:** Guyana.

Cyamops funkae Baptista & Mathis, 2000: 483. Guyana. CEIBA [field station], ca. 40 km S Georgetown, 06°29.9'N, 58°13.1'W. HT ♂ USNM.

halteratus Sabrosky. **NE:** Canada (New Brunswick, New Foundland, Nova Scotia, Ontario, Quebec), USA (Massachusetts, New Hampshire, Ohio, Utah, Wisconsin).

Cyamops halterata Sabrosky, 1958: 170. USA. Wisconsin: Washburn County. HT ♀ USNM [USNM type number 64220]. Sabrosky 1965b: 820 [Nearctic catalog]; Baptista & Mathis 1994: 8-10 [revision]; Poole & Gentili 1996: 65 [checklist, Nearctic].

hotei Sueyoshi. **PA:** Japan (Honshu, Kyushu).

Cyamops hotei Sueyoshi, 2004: 75. Japan. Honshu. Saitama: Ogose, south hill of Hiki. HT ♂ Tamaki's personal collection.

imitatus Sturtevant. **NE:** USA (Indiana, Massachusetts, Virginia).

Cyamops imitata Sturtevant, 1954: 559. USA. Indiana. Tippecanoe: La Fayette. HT ♀ USNM [USNM type number 61474]. Sabrosky 1958: 169 [key], 1965b: 820 [Nearctic catalog]; Baptista & Mathis 1994: 10 [revision]; Poole & Gentili 1996: 65 [checklist, Nearctic].

kaplanae Baptista & Mathis. **OR:** Thailand.

Cyamops kaplanae Baptista & Mathis, 2000: 503. Thailand. South Khao Sok National Park, Rt. 401. HT ♂ USNM.

laos Baptista & Mathis. **OR:** Laos.

Cyamops laos Baptista & Mathis, 2000: 500. Laos. Vientiane: Ban Van Eue. HT ♂ BBM.

micronesicus Baptista & Mathis. **AU:** Caroline Islands (Yap).

Cyamops micronesicus Baptista & Mathis, 2000: 490. Micronesia. Caroline Islands: Yap. Yap Town. HT ♂ USNM.

nebulosus Melander. **NE:** Canada (New Brunswick, Nova Scotia, Ontario, Quebec), USA (Connecticut, Florida, Georgia, Indiana, Maryland, Massachusetts, North Carolina, New Jersey, New York, Pennsylvania, Virginia, West Virginia).

Cyamops nebulosus Melander, 1913: 292. USA. Massachusetts. Barnstable: Woods Hole. HT ♀ USNM. Sturtevant 1954: 558 [revision]; Sabrosky 1958: 170 [revision], 1965b: 820 [Nearctic catalog]; Teskey 1987: 893 [fig. of head]; Baptista & Mathis 1994: 11-14 [revision]; Poole & Gentili 1996: 65 [checklist, Nearctic].

neotropicus Hennig. **NT:** Brazil (São Paulo), Costa Rica (San José), Peru (Cuzco).

Cyamops neotropicus Hennig, 1969: 612. Peru. Cuzco: Quincemil, 700 m. HT ? (abdomen missing) CNC [CNC type number 9932]. Baptista & Mathis 1994: 21 [revision].

nigeriensis Baptista & Mathis. **AF:** Namibia, Nigeria.

Cyamops nigeriensis Baptista & Mathis, 2000: 487. Nigeria. NW State: Badeggi Rice Research Station. HT ♂ USNM.

papuensis Baptista & Mathis. **AU:** New Guinea.

Cyamops papuensis Baptista & Mathis, 2000: 495. Papua New Guinea. NE Morobe District: Mindik, 1200-1600 m. HT ♂ BBM.

pectinatus Khoo. **AU:** Australia (Australian Capital Territory, New South Wales, Queensland, Tasmania).

Cyamops pectinatus Khoo, 1985: 528. Australia. New South Wales: Minnamurra Falls, near Kiama. HT ♂ AMS. Khoo & Sabrosky 1989: 551 [Australasian/Oceanian catalog]; Baptista & Mathis, 2000: 497 [review].

sabroskyi Baptista & Mathis. **NT:** Brazil (Rio de Janeiro).

Cyamops sabroskyi Baptista & Mathis, 1996: 245. Brazil. Rio de Janeiro: Rio de Janeiro, Paineiras. HT ♂ MZUSP.

samoensis Baptista & Mathis. **AU:** Samoa.

Cyamops samoensis Baptista & Mathis, 2000: 495. American Samoa. Tutuila Island: Leone Area. HT ♂ USNM.

truncatus Khoo. **AU:** Australia (Northern Territories, Queensland).

Cyamops truncatus Khoo, 1985: 533. Australia. Queensland: North Maria Creek, near Silkwood. HT ♂ AMS. Khoo & Sabrosky 1989: 551 [Australasian/Oceanian catalog].

Genus PLANINASUS Cresson

Planinasus Cresson, 1914: 245. Type species: *ambiguus* Cresson, by original designation. Cresson 1914: 245 [in family Ephydriidae], 1918: 65 [discussion, genus probably not in Ephydriidae]; Malloch 1934: 52 [generic key in family Perisceli[di]idae]; Curran 1934: 327 [generic key in family Drosophilidae]; Hennig 1969: 614-616 [revision in family Aulacigastridae]; D. K. McAlpine 1983: 56 [discussion, assigned to family Periscelididae].

Schizochaeta Malloch, 1934: 52. Type species: *shannoni* Malloch, by original designation. Syn. Hennig 1969.

ambiguus Cresson. **NT:** Belize, Costa Rica (Cartago, Guanacaste), Ecuador, Guatemala, Mexico (Chiapas), Peru (Huánuco, Madre de Dios), Tobago, Venezuela (Aragua).

Planinasus ambiguus Cresson, 1914: 246. Costa Rica. Cachi, Valley of Rio Naranjo. HT ♂ ANSP [ANSP type number 6064]. Hennig 1969: 615 [list, Peru].

electrus Grimaldi & Mathis. **NT:** Dominican Republic (amber).

Planinasus electrus Grimaldi & Mathis, 1993: 396. Fossil; Dominican Republic. HT ♀ AMNH [AMNH type number DR-8-208]. Grimaldi & Mathis 1993: 396 [specific provenance unknown; size of amber 1.1 X 1.3 cm, nearly flat]; Evenhuis 1994: 424 [review].

shannoni (Malloch). Mathis. **NT:** Ecuador (Orellana), Peru (Loreta).

Schizochaeta shannoni Malloch, 1934: 53. Peru. Loreta: Iquitos. HT ♂ USNM [USNM type number 49549].

Planinasus shannoni. Hennig 1969: 614 [generic combination].

venezuelensis Hennig. **NT:** Venezuela.

Planinasus venezuelensis Hennig, 1969: 615. Venezuela. Caripito. HT ♂ AMNH.

Genus PROCYAMOPS Hoffeins & Rung

Procyamops Hoffeins & Rung, 2005: 24. Type species: *succini* Hoffeins & Rung, by original designation.

succini Hoffeins & Rung. **PA:** Baltic amber.

Procyamops succini Hoffeins & Rung, 2005: 24. Fossil; Baltic amber. HT ♂ DEI.

Genus STENOCYAMOPS Papp

Stenocyamops Papp, in Papp *et al.* 2006: 216. Type species: *thaii* Papp, by original designation. Grimaldi 2009: 28-38 [fauna, Fiji].

luteus Grimaldi. **AU:** Fiji.

Stenocyamops luteus Grimaldi, 2009: 28-30. Fiji. Viti Levu: Naitasiri Province, Namosi Road, 200 m. HT ♂ AMNH.

pseudoluteus Grimaldi. **AU:** Fiji.

Stenocyamops pseudoluteus Grimaldi, 2009: 29-33. Fiji. Viti Levu: Naitasiri Province, Namosi Road, 200 m. HT ♂ AMNH.

robustus Grimaldi. **AU:** Fiji.

Stenocyamops robustus Grimaldi, 2009: 33-37. Fiji. Viti Levu: Naitasiri Province, Nakobalevu Road, 394 m. HT ♂ AMNH.

thaii Papp. **OR:** Thailand.

Stenocyamops thaii Papp, in Papp *et al.* 2006: 217. Thailand: Doi Phu-ka National Park, headquarters. HT ♂ HNHM.

vittatus Grimaldi. **AU:** Fiji.

Stenocyamops vittatus Grimaldi, 2009: 33-37. Fiji. Vanua Levu: Bua Province, 6 km NW Kilaka, Satiqere Range, 146 m. HT ♂ BMM.

Genus STENOMICRA Coquillett

Stenomicro Coquillett, 1900: 262. Type species: *angustata* Coquillett, by original designation. Malloch 1927: 23-26 [revision]; Hende 1931: 10-12 [redescription]; Sturtevant 1954: 560 [revision, synonymy]; Hennig 1958: 633-635 [generic characters, relationships]; Sabrosky 1965b: 820 [Nearctic catalog], 1965c: 209-218 [revision, Asian species], 1975: 663-676 [revision, Afrotropical species, synonymy], 1980: 648-649 [Afrotropical catalog]; Papp 1984b: 62 [Palearctic catalog], 2001b: 345 [checklist, Hungary]; Khoo & Sabrosky 1989: 551 [Australasian/Oceanian catalog];

- Poole & Gentili 1996: 65 [checklist, Nearctic]; Chandler 1998a: 142 [checklist, British Isles]; Tschirnhaus 1999: 171 [checklist, Germany]; Merz & Roháček 2005: 519-539 [review and key to species of western Palearctic]; Grimaldi 2009: 4-22 [fauna, Fiji].
- Podocera* Czerny, 1929: 93. Type species: *ramifera* Czerny, by monotypy. Syn. Hendel 1931. Irwin 1982: 235 [synonymy with *Diadelops*].
- Neoscaptomyza* Séguéy, 1938: 347. Type species *bicolor* Séguéy, by original designation. Syn. Sabrosky 1975.
- Diadelops* Collin, 1944: 265. Type species: *delicatus* Collin, by monotypy. Synonymy with *Stenomicroa*, Sturtevant 1954: 560. Synonymy with *Podocera*, Irwin 1982.
- albibasis*** Sabrosky. **PA:** Japan (Honshu).
Stenomicroa albibasis Sabrosky, 1965c: 214. Japan. Honshu: Kyoto, Kibune. HT ♀ USNM [USNM type number 67514]; Morimoto 1989: 808 [checklist, Japan].
Stenomicroa (Podocera) albibasis. Papp 1984b: 62 [Palearctic catalog]; Sueyoshi & Mathis 2004: 79 [review, Japan].
- anacrostichalis*** Grimaldi & Mathis. **NT:** Dominican Republic (amber).
Stenomicroa anacrostichalis Grimaldi & Mathis, 1993: 401. Fossil; Dominican Republic. HT ♀ AMNH [AMNH type number 63]. Grimaldi & Mathis 1993: 401 [specific provenance unknown; size of piece of amber 1.4 X 0.9 cm, dark yellow]; Evenhuis 1994: 425 [review].
- angustata*** Coquillett. **NT:** Puerto Rico.
Stenomicroa angustata Coquillett, 1900: 262. Puerto Rico. Bayamon and Utuado. ST ♀ USNM [USNM type number 4380]. Sturtevant 1923: 5 [discussion], 1954: 560 [revision]; Sabrosky 1965b: 820 [Nearctic catalog]; Poole & Gentili 1996: 65 [checklist, Nearctic].
- angustiforceps*** Sabrosky. **OR:** India, Japan (Ryukyu Islands, Taiwan, Thailand), Nepal. **PA:** Japan (Honshu).
Stenomicroa angustiforceps Sabrosky, 1965c: 216. Nepal. Taplejung District: North Sangu, 5,000 ft. HT ♂ BMNH. Sabrosky 1977: 231 [Oriental catalog]; Papp, in Papp *et al.* 2006: 211 [fauna, Thailand].
Stenomicroa (Stenomicroa) angustiforceps. Papp 1984b: 62 [Palearctic catalog]; Sueyoshi & Mathis 2004: 81-83 [review, Japan].
- argentata*** Sabrosky. **OR:** Malaysia, Thailand.
Stenomicroa argentata Sabrosky, 1965c: 215. Malaysia. Selangor: Kepong Forest Reserve. HT ♀ USNM [USNM type number 67515]. Sabrosky 1977: 231 [Oriental catalog]; Papp, in Papp *et al.* 2006: 211 [fauna, Thailand].

ariela Grimaldi. **AU:** Fiji.

Stenomicra ariela Grimaldi, 2009: 4-5. Fiji. Viti Levu: Naitasiri Province, Nakobalevu Road, 394 m. HT ♂ AMNH.

australis Malloch. **AU:** Australia (Queensland).

Stenomicra australis Malloch, 1927: 25. Australia. Queensland: Kalbo, Innisfail. HT ♂ BMNH. Khoo & Sabrosky 1989: 551 [Australasian/Oceanian catalog].

bicolor (Séguy). **AF:** Congo, Kenya.

Neoscaptomyza bicolor Séguy, 1938: 348. Kenya. Mt. Elgon (east slope), Elgon Saw Mill, Camp II, 2470 m. HT ♀ MNHNP.

Stenomicra bicolor: Sabrosky 1975: 671 [generic combination], 1980: 648 [Afrotropical catalog].

biconspicua Sabrosky. **AF:** South Africa, Cameroon, Ivory Coast, Nigeria.

Stenomicra biconspicua Sabrosky, 1975: 675. South Africa. Pondoland, Port St. Johns. HT ♂ BMNH. Sabrosky 1980: 648 [Afrotropical catalog].

brunnea Grimaldi. **AU:** Fiji.

Stenomicra brunnea Grimaldi, 2009: 5. Fiji. Taveuni: Cakaudrove Province, 5.6 km SE Tavuki Village, Devo Peak, 1187 m. HT ♂ BBM.

castanea Grimaldi. **AU:** Fiji.

Stenomicra castanea Grimaldi, 2009: 5. Fiji. Viti Levu: Naitasiri Province, 4.8 km N Veisari Settlement, log road to Waivudawa, 300 m. HT ♂ BBM.

claripennis (Papp). **OR:** Thailand, Vietnam.

Podocera claripennis Papp, in Papp *et al.* 2006: 213. Thailand: Fang, Mae Fang National Park. HT ♂ HNHM.

Stenomicra claripennis. **NEW COMBINATION.**

cogani Irwin. **PA:** Great Britain.

Stenomicra cogani Irwin, 1982: 235. Great Britain. Wales: Anglesey, Llanfflewyn, grid ref. 23/353891. HT ♂ BMNH.

Stenomicra (Stenomicra) cogani. Tschirnhaus 1999: 171 [checklist, Germany]; Chandler 1998a: 142 [checklist, British Isles]; Merz & Roháček 2005: 521, 536 [key].

deemingi Sabrosky. **AF:** Nigeria, Rwanda.

Stenomicra deemingi Sabrosky, 1975: 669. Nigeria. North Nigeria: Maska Fish Farm. HT ♂ USNM [USNM type number 73275]. Sabrosky 1980: 648 [Afrotropical catalog].

delicata (Collin). **PA:** Germany, Great Britain, Switzerland.

Diadelops delicata Collin, 1944: 266. United Kingdom. England: Suffolk, Sussex Lodge, Newmarket. LT ♂ [designated by Merz & Roháček 2005: 522] UMO.

- Stenomicro (Podocera) delicata*. Papp 1984b: 62 [Palearctic catalog]; Tschirnhaus 1999: 171 [checklist, Germany]; Merz & Roháček 2005: 522-527 [revision, lectotype designation, figs.].
- Stenomicro (Diadelops) delicata*. Chandler 1998a: 142 [checklist, British Isles].
- distincta** Grimaldi. **AU:** Fiji.
Stenomicro distincta Grimaldi, 2009: 17-19. Fiji. Viti Levu: Naitasiri Province, Savura Topline Road, 150 m. HT ♂ AMNH.
- distinctipennis** (Collin). **AU:** Fiji.
Diadelops distinctipennis Collin, 1951: 47. Fiji. Viti Levu: Nadurulou-lou. ST ♂♀ UMO.
Stenomicro distinctipennis. Sabrosky 1965c: 212 [new combination, as probable synonym of *S. fascipennis*]; Grimaldi 2009: 19 [new status, revision, part of “*fascipennis*” species complex].
- fascipennis** Malloch. **AU:** Guam, Hawaii, Solomon Islands. **OR:** India, Japan (Ryukyu Islands), Malaysia, Philippines, Sri Lanka, Taiwan. **PA:** Japan (Ogasawara, Honshu).
Stenomicro fascipennis Malloch, 1927: 26. Philippines. Luzon: Mt. Makiling. HT ♀ USNM. Sabrosky 1977: 231 [Oriental catalog]; Morimoto 1989: 808 [checklist, Japan]; Grimaldi 2009: 22-23 [discussion of “*fascipennis*” species complex].
- Stenomicro (Podocera) fascipennis*. Papp 1984b: 62 [Palearctic catalog]; Khoo & Sabrosky 1989: 551 [Australasian/Oceanian catalog]; Sueyoshi & Mathis 2004: 79-81 [review, Japan].
- Podocera ramifera* Czerny, 1929: 94. Sri Lanka. Peradeniya: Botanical Garden. HT ♂ NMW. Sabrosky 1965c: 212 [probable synonym].
- flava** Papp. **OR:** Thailand.
Stenomicro flava Papp, in Papp *et al.* 2006: 211. Thailand. Fang: Mae Fang National Park. HT ♂ HNHM.
- flavida** Hennig. **NT:** Costa Rica (San José).
Stenomicro flavida Hennig, 1956: 148. Costa Rica. San José: San José, 8 km W, Farm La Caja. HT ♂ DEI.
- jordanensis** Freidberg & Mathis. **PA:** Israel.
Stenomicro jordanensis Freidberg & Mathis, 2002: 48. Israel. Park Ha-Yarden. HT ♂ TAU. Merz & Roháček 2005: 521, 536 [key].
- nigricolor** Sabrosky. **AF:** Réunion.
Stenomicro nigricolor Sabrosky, 1975: 670. France. Réunion: Forêt de Bébour. HT ♂ MNHNP. Sabrosky 1980: 648 [Afrotropical catalog].

orientalis Malloch. **AU:** Hawaii.

Stenomicra orientalis Malloch, 1927: 25. USA. Hawaii: Mountain View. HT ♂ USNM. Khoo & Sabrosky 1989: 551 [Australasian/Oceanian catalog].

palida Grimaldi. **AU:** Fiji.

Stenomicra palida Grimaldi, 2009: 6. Fiji. Viti Levu: Naitasiri Province, 4 km WSW Solo-i-Suva Village, Mt. Nakobalevu, 372 m. HT ♂ BBM.

parataeniata Hennig. **NT:** Costa Rica (San José).

Stenomicra parataeniata Hennig, 1956: 149. Costa Rica. San José: San José, 8 km W, Farm La Caja. HT ♀ DEI.

rufithorax Sabrosky. **AF:** Ivory Coast, Nigeria.

Stenomicra rufithorax Sabrosky, 1975: 665. Nigeria. Membilla Plateau, Ngel Nyaki. HT ♂ USNM [USNM type number 73274]. Sabrosky 1980: 649 [Afrotropical catalog].

sabroskyi Grimaldi & Mathis. **NT:** Dominican Republic (amber).

Stenomicra sabroskyi Grimaldi & Mathis, 1993: 399. Fossil; Dominican Republic. HT ♀ AMNH [AMNH type number DR-6-15D]. Grimaldi & Mathis 1993: 399 [specific provenance unknown; size of amber 0.9 X 0.6 cm]; Evenhuis 1994: 425 [review].

soniae Merz & Roháček. **PA:** Bulgaria, Czech Republic, Germany, Hungary, Romania, Slovakia, Switzerland.

Stenomicra delicata of authors [not Collin]. Misidentification. Papp 1978: 198 [fauna, Hungary]; Bächli 1997: 34 [fauna, Switzerland], 1998b: 289 [checklist, Switzerland]; Roháček 1997: 79 [checklist, Czech Republic, Slovakia]; Roháček & Barták 2001: 378 [list].

Stenomicra (Podocera) delicata of Roháček [not Collin]. Misidentification. Roháček 1983: 133 [fauna, Czech Republic, Slovakia], 1986: 146 [fauna, Slovakia], 1987: 255 [checklist, Slovakia], 1995a: 173 [checklist, Czech Republic, Slovakia], 1995b: 150 [fauna, Slovakia].

Stenomicra (Podocera) soniae Merz & Roháček, 2005: 528. Czech Republic. CS, Kunice-garden, 49.6°N, 14.4°E. HT ♂ SMO.

stuckenbergi Sabrosky. **AF:** South Africa.

Stenomicra stuckenbergi Sabrosky, 1975: 668. South Africa. Zululand: Eshowe, Dhlinza Forest. HT ♂ NMP. Sabrosky 1980: 649 [Afrotropical catalog].

sylpha Grimaldi. **AU:** Fiji.

Stenomicra sylpha Grimaldi, 2009: 6. Fiji. Taveuni: Cakaudrove Province, 5.3 km SE Tavuki Village, Devo Peak, 1064 m. HT ♂ BBM.

taeniata Hennig. **NT:** Costa Rica (San José).

Stenomicra taeniata Hennig, 1956: 148. Costa Rica. San José: San José, 8 km W, Farm La Caja. HT ♂ DEI.

tokotaai Grimaldi. **AU:** Fiji.

Stenomicra tokotaai Grimaldi, 2009: 5. Fiji. Taveuni: Cakaudrove Province, Devo Peak Radio Tower, 1200 m. HT ♂ BBM.

trimaculata Sabrosky. **AF:** South Africa.

Stenomicra trimaculata Sabrosky, 1975: 672. South Africa. Natal: Drakensberg, Giant's Castle Reserve. HT ♂ NMP. Sabrosky 1980: 648 [Afrotropical catalog].

unicospicua Sabrosky. **AF:** Cameroon, Kenya, Nigeria, South Africa.

Stenomicra unicospicua Sabrosky, 1975: 674. South Africa. Natal: Pinetown district, Gillitts. HT ♂ NMP. Sabrosky 1980: 648 [Afrotropical catalog].

variegata (Papp). **OR:** Thailand.

Podocera variegata Papp, in Papp *et al*, 2006: 215. Thailand: Fang, Mae Fang National Park. HT ♀ HNHM.

Stenomicra variegata. **NEW COMBINATION.**

xoutha Grimaldi. **AU:** Fiji.

Stenomicra xoutha Grimaldi, 2009: 17. Fiji. Viti Levu: Naitasiri Province, Nakobalevu Mountain, 340 m. HT ♂ BBM.

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