

Taxonomic notes on Xylomyidae (Diptera)

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Abstract

The genera of Xylomyidae (=Solvidae) are discussed. *Formosolva* was reinstated as an independent genus by YANG and NAGATOMI (1993).

Key words: Taxonomy, Xylomyidae (=Solvidae), type species, family name, generic diagnosis

Introduction

PAPAVERO and ARTIGAS (1991) discussed the phylogeny of 3 genera (*Arthropeina*, *Macroceromys* and *Solva*) from America and described spermathecal structure in 3 genera and 4 species. YANG and NAGATOMI (1993) revised the Chinese Xylomyidae which contains 3 genera and 35 species. The present article deals with several problems in taxonomy of the Xylomyidae, arising from the two works just mentioned.

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Type species of *Xylomya*

The determination of type species becomes an essential problem to resolve, when taxa are divided. The under-mentioned notes follow JAMES (1965).

Genus *Xylomya* RONDANI

Subula MEIGEN, 1820, Syst. Besch., 2: 15 (preocc. SCHUMACHER, 1817). Type species, *Xylophagus varius* MEIGEN (RONDANI, 1856: 172). A manuscript name cited in specific synonymy.

Xylomya RONDANI, 1861, Dipt. Ital. Prodr., 4: 11 (n. name for *Subula* MEIGEN). Type species, *Xylophagus varius* MEIGEN (aut.).

Subulaomyia WILLISTON, 1896, Manual of the families and genera of North American Diptera. Ed. 2, p. 43 (as *Subula* Omyia; n. name for *Subula* MEIGEN, but deleted in Corrigenda, p. iv). Type species, *Xylophagus varius* MEIGEN (aut.).

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The type species of *Xylomya* (=replacement name for *Subula* MEIGEN, 1820) is "*Xylophagus varius* MEIGEN, 1820" from Europe, according to Rondani (1856). In this connection, VERRALL (1909: 220) wrote:

Synonymy.—This genus was known from 1820 to 1861 as *Subula* MEIG., but as that name had been preoccupied by SCHUMACHER in 1817 for a genus of Mollusca RONDANI substituted *Xylomyia*; the change was received with very little favour by dipterologists and even in 1886 OSTEN SACKEN declined to adopt it on the ground that "a change in a name of such old standing involves much more inconvenience than its retention;" I have however made close inquiry and I find that SCHUMACHER's genus is well established and in general use in Mollusca at the present time, and therefore I fear that the inconvenience of the change must be endured. WILLISTON's substitution of the name *Subulaomyia* in 1896 was made hastily without noticing that RONDANI had proposed *Xylomyia* thirty-five years previously.

The type of the genus *Subula* would apparently be *S. maculata* MEIG. because that is the species that MEIGEN figured, and is the first species of this section of MEIGEN's genus *Xylophagus*, and is the only one to which MEIGEN has actually united MEGERLE's generic and specific names (though MEIGEN received all three species from MEGERLE with suggested names); RONDANI however when proposing the name *Xylomya* in substitution for *Subula* gave *S. varia* as the type, possibly because it may have been the only species known to him. So long as *X. maculata* and *X. varia* remain in one genus it does not matter which is the type species, but in case of any further subdivision of the genus (which is not unlikely) I leave the matter to be adjudicated upon at that time; before however any new name might be proposed it would be well to ascertain further details about *Solva* of WALKER which was founded in 1862 and which has been sunk by OSTEN SACKEN as a synonym. The type specimen of *Macroceromys* BIGOT (1879) has markings on the thorax very similar to those of *X. maculata* but has very much longer antennae; unfortunately it has lost both wings, but it must be very closely allied to *Xylomyia* or even congeneric as OSTEN SACKEN suggested in 1886; the hind femora are not thickened and have no serration beneath.

The under-mentioned notes follow KRIVOSHEINA (1988).

Genus *Xylomya* RONDANI

Xylomya RONDANI, 1861: Dipt. Ital. Prodrumus, 4: 11, new name for *Subula* MEIGEN, 1820. Type species: *Xylophagus maculatus* MEIGEN, 1804: Klass. Beschr., 1 (2): 154 (aut.).

Subula MEIGEN, 1820: Syst. Beschr., 2: 15, a junior homonym of *Subula* SCHUMACHER, 1817 (Mollusca).

Type species: *Xylophagus maculatus* MEIGEN, 1804: Klass. Beschr., 1 (2): 154 (des. WESTWOOD, 1840: Synopsis: 130); *Xylophagus varius* MEIGEN, 1820: Syst. Beschr., 2: 14 (des. RONDANI, 1856:

Dipt. Ital. Prodrumus, 1: 172 (as "*Subula varia* MEGRL."); invalid, second type-designation.

Xylomyia; unjustified emendation.

According to KRIVOSHEINA (1988), the type species of *Xylomya* is not "*Xylophagus varius*" but "*Xylophagus maculatus*", because WESTWOOD (1840: 130) designated it, prior to RONDANI (1856: 172). I follow KRIVOSHEINA (1988) concerning the type species of *Xylomya*.

Which is the valid family name, Xylomyidae or Solvidae

NAGATOMI and TANAKA (1971) adopted the family name Solvidae, instead of Xylomyidae, because the name *Solva* WALKER, 1859 is older than *Xylomya* RONDANI, 1861 and the latter was thought not to differ generically from the former.

However, the family name Xylomyidae has been widely used and since, before 1961, the

name Solvidae had not won general acceptance, it is better to use Xylomyidae than Solvidae.

Genera of Xylomyidae

In Athericidae and Therevidae, a number of genera have recently been erected, based on the species previously included in other genera. In comparison with these families, the generic concept of Xylomyidae may be too broad, especially in NAGATOMI and TANAKA (1971) where *Solva* is treated as a subgenus of *Xylomya* [= *Solva* (*Macroceromys*) in NAGATOMI and TANAKA, 1971].

It is therefore desirable to revise the Xylomyidae of the world but, to my regret, the material before me is still scanty. However, the genera of Xylomyidae are discussed below to some extent for consideration by future workers.

Separation of *Solva* from *Xylomya*

External characters

NAGATOMI and TANAKA (1971) separated *Solva* from *Xylomya* [= *Solva* (*Macroceromys*) in NAGATOMI and TANAKA, 1971]) by the following 4 external characters: "(1) Abdominal tergum 1 with a basal semicircular patch (which is membranous, concave in principle, paler in color, and weak in thickness of integument) and which is large and nearly extending to apical margin of segment (fig. 1B); (2) palpus 2-segmented; (3) hind femur swollen and roughly as wide as hind coxa and its ventral margin except basal portion with a row of teeth (which may be inconspicuous in *procera* FREY) (figs. 12–15); (4) vein between 2nd basal- and 4th posterior cell absent or very short (except for *procera* FREY)". In *Xylomya*, "(1) A basal patch on abdominal tergum 1 (which is paler in color and weak in thickness of integument) inconspicuous or ending far before apical margin of segment (fig. 1A); (2) palpus 1-segmented; (3) hind femur not swollen and much narrower than hind coxa and without a row of teeth at ventral margin; (4) vein between 2nd basal- and 4th posterior cell distinct."

At the time character (1) was thought to be the most important at generic level.

DANIELS (1976) studied 7 species of *Solva* from Papua New Guinea and Australia and found that character (1) is intermediate in degree of development between *Solva* and *Xylomya*. In *Solva basiflava* YANG et NAGATOMI from China, the basal concave patch on abdominal tergum 1 is narrow (as in *Xylomya*).

According to DANIELS (1976): the presence or absence of a vein between 2nd basal- and 4th posterior cell varies with species and individual in *Solva* species from Papua New Guinea and Australia. This vein is distinct in many species of *Solva* from China.

In *Solva confusa* HOLLIS from Burma: vein between 2nd basal- and 4th posterior cell is distinct; antenna much longer than usual in *Solva* (antenna over 3 times as long as head; segment 1 about 1.5 times as long as segment 2; each flagellomere longer than wide; flagellomere 1 as long as scape + pedicel; flagellomere 8 pointed and longer than flagellomere

1); "hind femur hardly swollen and with a few small tubercles on the apical half on the inner ventral line" (after HOLLIS, 1962).

So, thickness of hind femur is not useful in some species for separating *Solva* (s. lat.) from *Xylomya*.

In *Solva varia* MEIGEN from Europe and NE China: vein between 2nd basal- and 4th posterior cell is distinct; antenna may be longer than usual in *Solva*; hind femur is somewhat swollen but has no ventral teeth.

Thus, some species of *Solva* (s. lat.) do not have characters (1), (3) and (4) of *Solva*. Conversely, it should be noted that no species of *Xylomya* has the characters (1)–(4) of *Solva*.

Male genitalic characters

According to NAGATOMI and TANAKA (1971) and YANG and NAGATOMI (1993), *Solva* is separated from *Xylomya* by having the following male genitalic characters: (1) tergum 9 (= epandrium) without a pair of postero-lateral processes; (2) sternum 10 one-lobed or so; (3) sternum 8 without a pair of apical flat processes (excluding *Solva procera* FREY from Japan).

In *Xylomya*: (1) tergum 9 with a pair of postero-lateral processes; (2) sternum 10 tri-lobed; (3) sternum 8 with a pair of apical flat processes (it is so in *Solva procera* from Japan).

In many species of *Xylomya*: sternum 9 (= hypandrium) is isolated from gonocoxites and U-shaped (with mid-anterior margin deeply concave). In some species of *Xylomya*: isolated sternum 9 is absent, but gonocoxites are fused with each other at ventral anterior part as in many species of *Solva*, where gonocoxites are sometimes separated.

In *Xylomya*: (4) "interbasis" is present, (5) "gonostylus" is constricted at base or demarcated (excluding *Xylomya chekiangensis* (ÔUCHI) from China), (6) aedeagus without a ventral (sometimes dorsal) tube arising around middle. In *Solva*, the presence or absence in each of the characters (4)–(6) varies with species.

Female genitalic characters

According to WEBB (1984) on the Nearctic Xylomyidae: female furca U-shaped and without anterior apodeme in *Solva*, and Y-shaped and with anterior apodeme in *Xylomya*.

According to YANG and NAGATOMI (1993) on the Chinese Xylomyidae: female furca is Y-shaped in *Solva gracilipes* YANG et NAGATOMI, rather Y-shaped in *Solva tigrina* YANG et NAGATOMI, and U-shaped in *Xylomya chekiangensis*.

The cercus is generally wider in *Xylomya* than in *Solva* and *Formosolva*. See YANG and NAGATOMI (1993).

Spermathecal characters

PAPAVERO and ARTIGAS (1991) described and illustrated spermathecae in the following genera and species: *Macroceromys pallidifemur* (MALLOCH, 1917); *Macroceromys simillinus* (STEYSKAL, 1947); *Solva* sp.; *Arthropeina fulva* LINDNER, 1949. *Macroceromys* is thought to be identical with *Xylomya* (whose type species is not *varia* but *maculata*).

According to PAPAVERO and ARTIGAS (1991), the spermathecal characters are given as

below.

Xylomya [= *Macroceromys*]: "three spermathecae present, the lateral ones with a long duct (reaching first abdominal segment and bending backwards to segment 5) and more or less ovoid capsules, the median one with a very short duct and an exceedingly voluminous capsule (twice or more volume of lateral ones) (figs. 1-4)."

Solva: "Central spermatheca totally absent, not even vestige of duct left, the lateral spermathecae with an extremely long duct, which perform seven and a half bends inside the abdomen (figs. 5-7)."

Arthropeina: "Spermathecae: only the lateral ones present, the ducts moderately long, coiled; the central spermatheca represented only by a short, whip-like remnant of the duct (figs. 8-9)."

The spermatheca should be further studied when more material of the Xylomyidae is available.

Status of various genera

Arthropeina LINDNER, 1949 (Ann. Mag. Nat. Hist. (12) 1: 789. Type species: *Arthropeina fulva* LINDNER, 1949 from Brazil). The following diagnosis is extracted from the original description: antennal flagellum abruptly becoming narrower in apical roughly 1/2 (see fig. 3 in LINDNER, 1949); costa ends at apex of vein M₁; vein M₂ not reaching to wing margin; vein between 2nd basal- and 4th posterior cell distinct; hind femur moderately thickened and without ventral teeth. *Arthropeina* contains only 1 species.

PAVAVERO and ARTIGAS (1991) added the following important characters to the diagnosis of *Arthropeina*: "Palpus two-segmented. Abdominal tergum 1 with a more or less large, semicircular, basal membranous (the integument very thin and transparent), anteriorly concave, pale area, which extends almost to the posterior margin of that tergite [cf. HENNIG, 1967: figs. 24-25; p. 19]. Antennal flagellum with the basal 6 flagellomeres fused, spindle-shaped, the 7th flagellomere short but evident, the 8th greatly elongate, almost as long as the basal six flagellomeres together."

Ceratosolva de MEIJERE, 1914 (Tijdschr. Ent. 56 [Suppl.]: 21. Type species: *Ceratosolva cylindricornis* de MEIJERE, 1914 from Java). *Ceratosolva* may possibly be a valid genus. However, the revival of *Ceratosolva* is premature, unless the structure of the male genitalia of type species can be clarified.

The original description of *Ceratosolva* de MEIJERE is as follows: "In den meisten Merkmalen mit *Xylomyia* ROND. übereinstimmend, aber durch die bedeutend längeren Fühler, deren Glieder länger als breit sind, verschieden. Körpergestalt wie bei *Xylomyia*. Stirne des ♀ schmal, nach unten allmählich etwas verbreitert. Fühler so lang wie Kopf+Thorax, cylindrisch; die 8 Geißelglieder alle gleichstark, länger als breit, das Endglied an der Spitze abgerundet, ohne Endborste. Taster aufgerichtet, ziemlich lang und dick. Schildchen unbewehrt. Vorderhüften vorn an der Spitze mit einem kurzen breiten Zahn. Hintersehenkel mässig verdickt, unten mit einer Längsreihe sehr kleiner, stumpfer Dörnchen,

welche zwischen der kurzen, aber dichten Behaarung wenig auffällig sind. Sporne am Ende der Tibien sind nur an den Mittelbeinen erkennbar, aber auch hier kurz. Hinterleib bandförmig, das 7^{te} Glied kurz (♀), aber sichtbar. Auch das Flügelgeäder wie bei *Xylomyia*, also 4^{te} Hinterrandzelle und Analzelle geschlossen; Discoidalzelle lang gestreckt."

Coenomyiodes BRUNETTI, 1920 (Fauna Br. India, Dipt. 1: 110. Type species: *Coenomyiodes edwardsi* BRUNETTI, 1920 from Assam). According to the original description: tibial spur formula is 1:2:2 and the scutellum has 2 short blunt spines. NAGATOMI (1982: 139) wrote, "I have reexamined the holotype female of *Coenomyiodes edwardsi* BRUNETTI, 1920, in the British Museum (Natural History) and have found that the scutellum has no spines and the fore tibia has no spur" (see also WOODLEY, 1989: 1371). This genus contains only 1 species whose male is unknown.

It is unwise to treat *Coenomyiodes* as a junior synonym of *Xylomya*, until the male genitalia are examined.

Macroceromys BIGOT, 1877 (Annal. Soc. Entom. France, sér. 5. Bull. p. 73. Type species: *Macroceromys fulviventris* BIGOT, 1879 from Mexico). I have not seen the type species of *Macroceromys*. The antenna of *fulviventris* is much longer than usual in *Xylomya*, but I still doubt if *Macroceromys* is a valid genus. Although further study is needed for a final decision, *Macroceromys* is treated as a synonym of *Xylomya* in YANG and NAGATOMI (1993), following STEYSKAL (1947), JAMES (1965, 1975), WEBB (1984), PAPAVERO and ARTIGAS (1991), etc.

Nematoceropsis PLESKE, 1925 (Encyc. ent. B, 2. Dipt. 2: 175. Type species: *Nematoceropsis ibex* PLESKE, 1925 from South Primorye [=longicornis MATSUMURA, 1915, and *takachihoi* ÔUCHI, 1943]). KRIVOSHEINA (1988) treated *Nematoceropsis* as a junior synonym of *Macroceromys*. The antennae of *longicornis* (= *ibex*) and *matsumurai* NAGATOMI et TANAKA, 1971 (from Japan) are much longer than in *Xylomya*, but their male genitalia are not significantly different from those of *Xylomya* (see figures in NAGATOMI and TANAKA, 1971). *Nematoceropsis* is treated as a synonym of *Xylomya* in YANG and NAGATOMI (1993).

Revival of *Formosolva*

Formosolva JAMES, 1939 (as a subgenus of *Solva*) (Arb. morph. taxon Ent. Berl. 6: 32. Type species: *Solva (Formosolva) concavifrons* JAMES, 1939 from Taiwan) was treated as a junior synonym of *Solva* by NAGATOMI and TANAKA (1971). However, *Formosolva* was revived as an independent genus and its generic diagnosis was discussed by YANG and NAGATOMI (1993).

It is certain that *Formosolva* belongs to *Solva* (s. lat.).

Separation of *Solva procera* from other *Solva* species

Solva procera (FREY, 1960) from Japan belongs to *Solva* (s. lat.) by having the following

characters: palpus 2-segmented; hind femur swollen and roughly as wide as hind coxa, and with a row of ventral teeth (which are small and indistinct in *procera*); abdominal tergum 1 with a large semicircular membranous patch; male tergum 9 without a pair of postero-lateral processes; male sternum 9 absent; female furca U-shaped (see fig. 3 in NAGATOMI and IWATA, 1976).

Solva procera may be separated from other *Solva* species by having the male sternum 8 with a pair of apical flat processes (as in *Xylomya*) and is peculiar among the *Solva* species by having a pair of large (wide and long) ventral processes arising near base (= anterior part) of gonocoxites, which is apparently homologous with that in *Solva flavoscutellaris* (MATSU-MURA), however.

Solva procera may possibly be a member of *Ceratosolva* whose male genitalia are not yet studied. In any case, it is almost certain that the male genitalic character in *procera* is not worthy of generic value.

It is necessary in *procera* to study the female genitalia and spermatheca, as well as tergum 8 and sternum 10 of the male genitalia for further comparison.

Gonostylus and interbasis in NAGATOMI and TANAKA (1971) and YANG and NAGATOMI (1993)

It is not necessarily certain that the "gonostylus" and "interbasis" in NAGATOMI and TANAKA (1971) and YANG and NAGATOMI (1993) are correctly interpreted. It is possible that "gonostylus" is a part of the gonocoxite and "interbasis" is the gonostylus. Furthermore, it is almost certain that the "interbasis" in *Solva procera* (see fig. 15 in NAGATOMI and TANAKA, 1971) is not the interbasis (which is homologous with that in *Macroceromys* [= *Xylomya*] in NAGATOMI and TANAKA, 1971) but a ventral process arising near the base of the gonocoxite. If so, it is homologous with that in *Solva flavoscutellaris* (see fig. 12 in NAGATOMI and TANAKA, 1971).

Size of antenna

In *Formosolva* species and *Solva procera* the antenna is much longer than usual in *Solva* species. It is very necessary to assess antennal size variation within *Solva* (s. str.). In addition to being much longer, some features occur which are here judged as providing generic characters in *Formosolva*.

In *Macroceromys* and *Nematoceropsis* the antenna is also much longer than usual in *Xylomya*. However apart from larger size of antenna, no significant generic character is detected at least in *Nematoceropsis*.

Further study is also necessary of antennal structure as well as antennal size when more material of Xylomyidae becomes available.

Solva ichneumoniformis ENDERLEIN, 1912 (from Sumatra), *Solva longicornis* ENDERLEIN,

1913 (from Sumatra) and *Solva confusa* HOLLIS, 1962 (from Burma) have much longer antennae and their true generic position remains uncertain at present.

What characters constitute antennal structure? They are: (1) shape of flagellum (parallel-sided or tapering apically; flattened or cylindrical); (2) relative lengths and widths of segments 1–2 and flagellomeres 1–8; (3) degree of fusion in flagellum; (4) number and situation of sensory patch on flagellum, etc.

It appears to me at present that antennal size and structure alone is not useful in separating genera, apart from the extreme case in *Arthropeina*. It should be supported by other characters in order to establish the validity of respective genera.

Concluding remarks

The type species of *Xylomya* is not *varia* (which belongs to *Solva*) but *maculata* which was designated as such by WESTWOOD (1840) prior to RONDANI (1856). See KRIVOSHEINA (1988).

It is better to use the name Xylomyidae rather than Solvidae, because the latter name had not won general acceptance before 1961.

It was thought that the large membranous patch on abdominal tergum 1 is the most important generic character in *Solva*. However, this character is intermediate in degree of development between *Solva* and *Xylomya* in *Solva* species from Papua New Guinea and Australia. See DANIELS (1976).

The vein between the 2nd basal- and 4th posterior cell is distinct in *Xylomya* but very often absent in *Solva*. The presence or absence of this vein varies with species or individual in *Solva*. See, e.g. DANIELS (1976) and YANG and NAGATOMI (1993).

Separation of *Solva* from *Xylomya* is discussed, based on external and genitalic characters. *Formosolva* was revived as an independent genus in YANG and NAGATOMI (1993).

In order to establish the extent and limit of respective genera, more study is needed of the male and female genitalia, spermatheca, antennal size and antennal structure, etc. from more material on a world basis.

References

- DANIELS, G. 1976. The Xylomyidae (Diptera) of Australia and Papua New Guinea. *J. Aust. ent. Soc.*, 15: 453–460.
- de MEJERE, J. C. H. 1914. Studien über südostasiatische Dipteren. VIII. *Tijdschr. Ent.*, 56 (suppl.): 1–99, 3 pls.
- ENDERLEIN, G. 1913. Dipterologische Studien. V. Zur Kenntnis der Familie Xylophagidae. *Zool. Anz.*, 42: 533–552.
- HENNIG, W. 1967. Die sogenannten "niederen Brachycera" im Baltischen Bernstein (Diptera: Fam. Xylophagidae, Xylomyidae, Rhagionidae, Tabanidae). *Stuttgart. Beitr. Naturkunde*, 174: 1–51.
- HOLLIS, D. 1962. New and little known Stratiomyidae (Diptera, Brachycera) in the British Museum. *Ann. Mag. nat. Hist.*, (13) 5: 557–565.
- JAMES, M. T. 1965. Family Xylomyidae. In: *A catalog of the Diptera of America north of Mexico*. (Eds. Stone, A. et al.), pp. 298–299. U.S. Dept. Agric. *Handbk.*, No. 276.

- 1975. Family Xylomyidae. In: A catalogue of the Diptera of the Americas south of the United States (Ed. Museu de Zoologia, Universidae de São Paulo), 4 pp.
- KRIVOSHEINA, N. P. 1988. Family Xylomyidae (Solvidae). In: Catalogue of Palearctic Diptera, Vol. 5. (Eds. Soós, A. and PAPP, L.), pp. 38-42. Akadémiai Kiadó, Budapest.
- LINDNER, E. 1936-38. 18. Stratiomyidae. In: Die Fliegen der palaearktischen Region (Ed. LINDNER, E.), 4(1): 1-218. Stuttgart.
- 1949. Neotropische Stratiomyiden des Britischen Museum in London. Theil I. Ann. Mag. nat. Hist., (12) 1: 782-821.
- NAGATOMI, A. 1975. Family Solvidae (Xylomyidae). In: A catalog of the Diptera of the Oriental Region. Vol. II. (Eds. DELFINADO, M. D. and HARDY, D. E.), pp. 10-13. The University Press of Hawaii, Honolulu.
- 1982. Geographical distribution of the lower Brachycera (Diptera). Pac. Insects, 24: 139-150.
- and IWATA, K. 1976. Female terminalia of lower Brachycera, I. Beitr. Ent., 26: 5-47.
- and TANAKA, A. 1971. The Solvidae of Japan. Mushi, 45: 101-146.
- PAPAVERO, N. and ARTIGAS, J. N. 1991. Phylogeny of the American genera of Solvidae (Xylomyidae) (Diptera), with illustrations of the female spermatheca. Gayana Zool., 55: 101-113.
- RONDANI, C. 1856. Dipterologiae Italicae prodromus. Vol. 1. 228 pp. Parma. (not seen)
- STEYSKAL, G. C. 1949. A revision of the Nearctic species of *Xylomya* and *Solva* (Diptera, Erinnidae). Papers of the Michigan Academy of Science, Arts and Letters, 31: 181-190.
- VERRALL, G. H. 1909. British flies. V. Stratiomyidae and succeeding families of the Diptera Brachycera of Great Britain. 780 pp. Edinburgh.
- WEBB, D. W. 1984. A revision of the Nearctic species of the Family Solvidae (Insecta: Diptera). Trans. Amer. Ent. Soc., 110: 245-293.
- WESTWOOD, J. O. 1840. Synopsis of the genera of British insects, as appendix of Westwood: An introduction to the modern classification of insects, London: 1-158, Diptera: 125-154. (not seen)
- WOODLEY, N. E. 1989. Phylogeny and classification of the "orthorrhaphous" Brachycera. In: Manual of Nearctic Diptera, Vol. 3 (Eds. McALPINE, J. F. and WOOD, D. M.), pp. 1371-1395. Research Branch Agriculture Canada, Monograph No. 32.
- YANG, D. and NAGATOMI, A. 1993. The Xylomyidae of China (Diptera). South Pacific Study, 14: 1-84.

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