

The delimitation of the Gnoristinae: criteria for the classification of recent European genera (Diptera, Mycetophilidae)

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A revised delimitation is proposed for the Gnoristinae of the Mycetophilidae s. str. (sensu Malloch) on the basis of some neglected taxonomic characters of adults. These characters include the distribution and structure of the weakly sclerotized folds of the abdominal sternites, the presence or absence of the sharply delimited rounded sensory depression on the antepenultimate palpomere, the shape of the female front tarsi, the presence or absence of bare areas between the scutal hair stripes and the bare mediotergite. The new classification corresponds largely to Edwards' system, with the following main exceptions: *Speolepta* Edwards, *Coelophthinia* Edwards and *Impleta* Plassman are removed to the Sciophilinae, the first two probably being rather close relatives of *Polylepta* Winnertz and *Phthinia* Winnertz, while *Syntemna* Winnertz (sensu Edwards), and tentatively also *Ectrepesthoneura* Enderlein and *Tetragoneura* Winnertz, are included in the Gnoristinae.

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1. Introduction

Winnertz (1863), Johannsen (1909) and Edwards (1925) divided the Mycetophilidae s. lat. into seven to ten subfamilies, of which several are today often considered to represent distinct families (Bolitophilidae, Ditomyiidae, Diadocidiidae, Keroplatidae, Sciaridae; see e.g. Tuomikoski 1966a, b, Väisänen 1984a). Malloch (1917) united the Sciophilinae and Mycetophilinae of Winnertz (1863) and Johannsen (1909) to constitute the family Mycetophilidae, but some authors have considered them to be separate taxa of the same rank (subfamilies) as Bolitophilinae, Ditomyiinae, Diadocidiinae, Keroplatinae, etc. (e.g. Colless 1970, Hutson et al. 1980). It seems quite evident that the Mycetophilidae, including Sciophilinae, Mycetophilinae and Manotinae, is a monophyletic entity. The Mycetophilinae appear to be a monophyletic grouping as well, but the Sciophilinae represent a paraphyletic residue to the family left when the Mycetophilinae and Manotinae (for the latter small subfamily, see Tuomikos-

ki 1966a) are removed. This was already clearly recognized by Hennig (1954). In the present article this opinion is adhered to: the family Mycetophilidae is considered to include the Mycetophilinae, Manotinae and the taxa included in the "Sciophilinae".

Tuomikoski (1966a) and Väisänen (1984a) have suggested that the tribes of Sciophilinae proposed by Edwards (1925), viz. his Mycomyini, Sciophilini, Gnoristini, and Leiini, should be given a subfamilial rank. I have recently discussed the phylogeny of the Mycomyinae, *Eudicrana* and Mycetophilinae (Väisänen 1984a) which can be relatively easily separated from the other "sciophiline" taxa. The rest of the proposed subfamilies are, however, in need of revision. Although the subfamilial rank seems to be correct for them, their revised delimitation is badly needed. For this reason, I try to present some new criteria for this subfamilial (or tribal) classification of Sciophilinae, Leiinae and especially Gnoristinae.

Traditionally the following genera are included in the Gnoristinae (Gnoristini sensu

Edwards): *Coelophthinia* Edwards, 1941, *Coelosia* Winnertz, 1863, *Speolepta* Edwards, 1925, *Dziedzickia* Johannsen, 1909, *Hadron-eura* Lundström, 1906, *Palaeodocosia* Meunier, 1904, *Gnoriste* Meigen, 1818, *Synapha* Meigen, 1818 (including *Empalia* Winnertz, 1863), *Apolephthisa* Grzegorzek, 1885, *Grzegorzekia* Edwards, 1941 (see Väisänen 1984b), and *Boletina* Staeger, 1840. Furthermore, Vockeroth recently (1980) described several new mycetophilid genera of which the following were included in the Gnoristinae: *Acadia*, *Aglaomyia*, *Saigusaia*, *Acomoptera*, *Adicroneura* and *Drepanocercus* (the latter three genera not examined). Of these genera, *Acadia* appeared to be a junior synonym for *Impleta* Plassman (Matile 1983), described from Swedish Lapland (Plassmann 1978). In addition, *Boletina flaviventris* (Strobl) (= *B. reuteri* Lundström), the isolated position of which has been already noticed previously (Hutson et al. 1980, Tuomikoski unpubl.), was transferred to *Saigusaia* by Matile (1983). Dr. J.R. Vockeroth has informed me about an additional undescribed Nearctic genus. Some of the traditional genera (*Dziedzickia* s.l., *Boletina*) are still heterogeneous, but their revision is beyond the scope of the present study.

In separating his Sciophilinae s. lat. tribes (and the subfamilies Sciophilinae and Mycetophilinae) Edwards (1925) used mainly characters of the chaetotaxy of the wings, thorax and legs, wing venation, the number and position of ocelli, and the structure of the last abdominal segments. Some additional characters of adults not used by Edwards (1925, 1941) are here used to characterize the subfamilies more precisely and to solve some problematic relationships of the European genera: 1. the distribution and structure of the weakly sclerotized fold-lines on the abdominal sternites, 2. the presence or absence of the sensory pit on the antepenultimate segment of the maxillary palp (third from the apex; probably third palpomere but basal segments often very short and obscured), 3. the presence or absence of the "mid-tibial organ", 4. the shape of the female front tarsi, 5. the presence or absence of the bare intervening stripes between the dorsocentral, acrostical and (supra- and intra-) alar bristles of the scutum, 6. the presence and absence of setae on the mediotergite. Vockeroth (1980) described several new Nearctic genera using some of the

above taxonomic characters as well. Plachter (1979a, b, c, 1981), Zaitsev (1979), and Mazzini and Santini (1983) have recorded some new information on the immature stages of Mycetophilidae, but at present this data is still so limited that a classification cannot be based mainly on such characters. However, these studies provide some additional information on the systematic position of certain genera. This is true also for the studies on the structure of the thoracic sclerites (Shaw 1948, Shaw & Shaw 1951), which have so far been used relatively little in the classification of the Mycetophilidae.

2. Material

The study is based mainly on the material of the Zoological Museum, the University of Helsinki. Some additional specimens were studied from the following collections: Biosystematics Research Institute, Ottawa, Canada; Natur-Museum Senckenberg, Frankfurt a. M., FRG; Museum National d'Histoire Naturelle, Paris, France. The Finnish material is mainly preserved in alcohol, which makes the study of certain neglected characters easier than from pinned specimens. For most of the Nearctic and exotic genera only the literature was examined. In this respect the article by Vockeroth (1980) provides a good deal of suitable information. Moreover, a large amount of other mycetophilid genera were preliminarily studied for comparative purposes. Prof. Risto Tuomikoski has placed at my disposal some notes on various Mycetophilidae, and these have proved inspiring in many cases. These notes include detailed morphological observations on some genera not studied by the present author.

3. Delimitation of the Gnoristinae

3.1 Traditional diagnosis

The description and the diagnostic characters of the subfamily Gnoristinae in the present sense are much the same as those of the tribe Gnoristini in Edwards' system. Edwards (1925: 565) stated of his tribe:

"In this tribe may be included a few genera in which the wing-membrane is devoid of macrotrichia and the postnotum is quite bare, but all of which have R_1 quite long; they cannot therefore be included either in the Sciophilini or in the Leiini. With the possible exception of *Speolepta* these genera appear to form a natural group; in fact some of them are so close that it is difficult to find satisfactory characters for their separation."

That the grouping may be natural is indicated by some additional, apparently

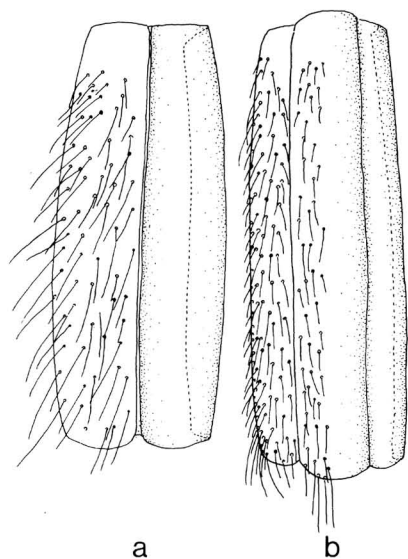


Fig. 1. Abdominal sternite 4. — a: *Gnoriste bilineata* (Gnoristinae). — b: *Leptomorphus walkeri* (Sciophilinae).

apomorphic, character states not used by Edwards. Such is the presence of a weakly sclerotized concave median fold on some abdominal sternites (Fig. 1), which is present in most genera of the Gnoristinae but otherwise only in the very different subfamily Mycetophilinae (and in some Bolitophilidae and Sciaridae). In most Sciophilinae corresponding roughly to the Sciophilini of Edwards it is replaced by two widely separated similar folds, whereas in the Mycomyinae, Leiinae and Manotinae any such lines appear to be absent, probably representing the plesiomorphic character state.

Also, a sharply delimited rounded sensory depression on the third palpomere, though lacking in some genera in Gnoristinae as probably in all Sciophilinae, is indicative of the coherence of the Gnoristinae, as is the tendency of the female front tarsi in many Gnoristinae to become somewhat dilated beneath. The latter character state occasionally emerges in different parts of the Mycetophiloidea system. It is known for some Diadocidiidae and Bolitophilidae, and in the Mycetophilinae, but not for any Sciophilinae, Leiinae or Manotinae. Finally, the presence of bare intervening areas between the scutal hair stripes (as in the Mycomyinae) and the always

bare mediotergite are characteristic of the Gnoristinae.

Since no single character used for the delimitation of the subfamily (especially against the somewhat heterogenous Sciophilinae) is absolutely diagnostic, the position of certain genera must be discussed separately in some detail.

3.2 *Speolepta*

Edwards (1925) indicated some doubt about the inclusion of *Speolepta* Edwards (in his Gnoristini). He created this genus to accommodate the species *leptogaster* Winnertz, originally described as a *Polylepta*. Though having the wing membrane, the intervening areas between the scutal stripes, the pleurotergites and the mediotergite bare, the genus still does not have much in common with the Gnoristinae but resembles more the genera of Sciophilinae, such as *Paratinia* and *Aneura* Marshal (New Zealand, Chile) which likewise have the mediotergite devoid of macrotrichia. Moreover, *Paratinia* has macrotrichia in the apical part of the wing membrane only, and one species has practically bare wings. In *Speolepta*, the shape of the head and mouthparts (with no rounded sensory pit on the antepenultimate palpal segment), the long legs with a very slender abdomen with a fairly large seventh and a visible eighth segment in the male, and the venation with a comparatively short cubital fork are more reminiscent of *Aneura*, *Phthinia* and *Coelophthinia* than of the real Gnoristinae as limited here.

A peculiar apomorphic feature of some Sciophilinae, viz. and elongate "sense organ" of special structure on the male middle tibiae (Fig. 2), which is well developed in *Polylepta*, *Phthinia* and *Coelophthinia*, and indicated in some *Neuratelia* species (not in *N. nemoralis* (Meigen)) is present in *Speolepta* as well. This "mid-tibial organ" is less conspicuous in *Speolepta* than in *Polylepta*, because it does not strongly modify the contours of the tibia, and therefore has escaped the attention in the former genus (Edwards 1925: 566: "Middle tibiae of male simple, without swelling at base"). However, Chandler (1980) mentioned that *Speolepta*, which also according to him closely resembles *Phthinia* except in the absence of macrotrichia on the wing mem-

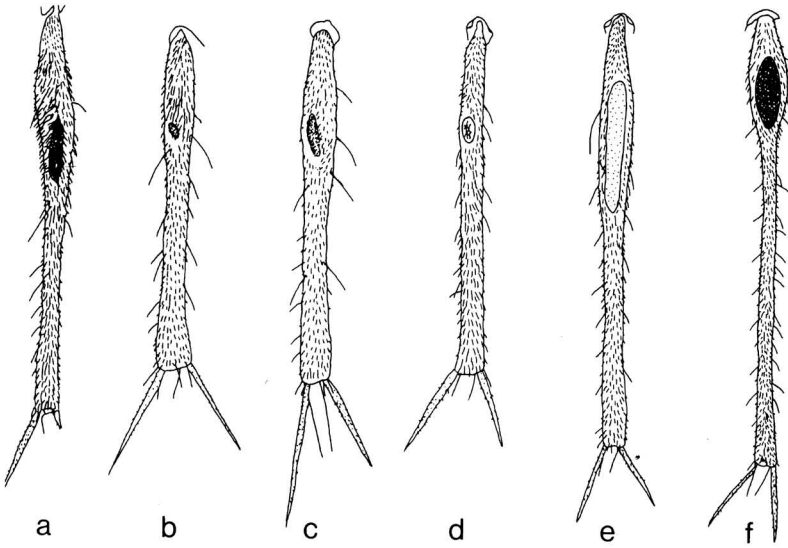


Fig. 2. Dorsal view of right male mid tibia showing the "mid-tibial organ". — a: *Tetragnoneura* sp. near *tibialis*. — b: *Ectrepesthoneura hirta*. — c: *Ectrepesthoneura bicolor*. — d: *Synapha fasciata*. — e: *Coelophthimia thoracica*. — f: *Polylepta guttiventris*. Redrawn from Chandler (1980).

brane, has this peculiar structure on the basal of the mid tibia emphasized, adjacent setulae being longer than elsewhere on the tibia (resembling *Coelophthimia*, *Phthinia* and *Polylepta*). The function of this organ is unknown but Chandler suggested that it might be involved in courtship. A similar structure has been described in the fossil genera *Proboletina* Meunier and *Loewiella* Meunier (Edwards 1940). In addition, Freeman (1951: 64) mentioned its presence in both sexes in Neotropical species referred to *Coelosia* ("not only present in the male as in the other *Coelosia* spp.!!"), but whose systematic position seems most uncertain.

The secondary mesepisternal suture (see below, *Coelophthimia*), characteristic of *Polylepta*, *Phthinia*, *Coelophthimia*, and some *Aneura* species, is not well developed in *Speolepta* but is sometimes indicated in the anterior part of the katepisternum of the mesothorax. The fold lines of the abdominal sternites are of no help in this case, since they could not be clearly demonstrated in *Speolepta*, *Aneura*, *Phthinia*, and *Coelophthimia*, perhaps because of the narrowness and the generally pale colour of the sternites in the species studied. In *Paratinia*, *Polylepta* and *Neuratelia* these folds are paired in the manner characteristic of the Sciophilinae.

Plachter (1981) has studied the structures of the eggshells of several Mycetophiloidea, including those of *Boletina nigricea* Staeger,

Ectrepesthoneura hirta (Winnertz), *Apo-lephthisa subincana* (Curtis) and *Speolepta leptogaster* (Winnertz) (= *S. dissona* Plassmann) of his wide Mycomyinae and *Monoclona "miki"* Kert." (cf. Zaitsev 1983) and *Phthinia humilis* Winnertz of his Sciophilinae. The chorionic type 2.2 (plastron present, chorion uniform, very thin and translucent) which is frequent in the Sciaridae, was found among Mycetophilidae only in *Speolepta* and *Phthinia*. This seems to support the close relationship between these two genera (cf. Plachter 1981).

The above discussion shows that there is little doubt that the affinities of *Speolepta* are with the Sciophilinae rather than with the Gnoristinae as delimited here.

3.3 *Impleta*

Impleta Plassmann differs from most other Holarctic genera placed in the traditional Gnoristini, but agrees with *Speolepta*, in having Sc short and ending free. This genus has a scutum with dense subappressed hairs on the entire surface, abdominal sternites without fold-lines, and the vein R₁ relatively short. The genus seems to fit better into the Sciophilinae in the present sense in spite of the lack of macrotrichia on the wing membrane (like *Speolepta*) and the presence of a sensory area on the basal half of the

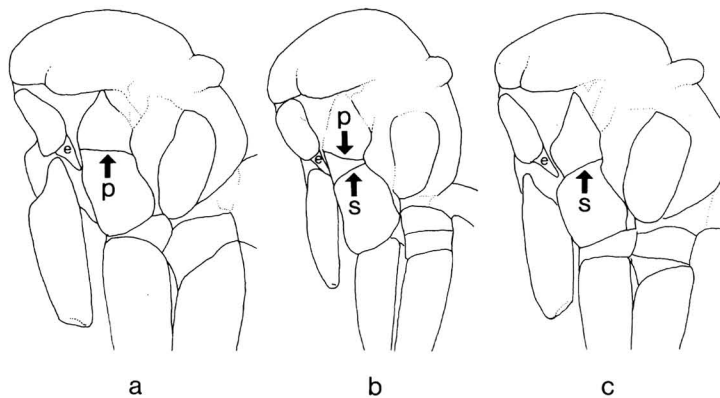


Fig. 3. Thoracic sclerites of some Mycetophilidae, showing the position of the prothoracic epimeron (e), and the primary (p) and secondary (s) mesepisternal sutures. — a: *Saigusaia* (Gnoristinae). — b: *Phthinia* (Sciophilinae). — c: *Mycomya* (Mycomyinae).

dorsomedian surface of the "third" palpomere (Vockeroth 1980; head missing from the *I. consorta* holotype).

3.4 *Coelophthinia*

Coelophthinia Edwards was created by Edwards (1941:67) with *thoracica* Winnertz as the type species. The species was originally described as *Phthinia* by Winnertz (1863). Edwards (1925) transferred it to *Coelosia* on the account of the absence of macrotrichia on the wing membrane and the very small size of the retracted seventh and eighth abdominal segments of the male, and subsequently (1941) he made it the type of his new genus *Coelophthinia* of the Gnoristinae. However, the features of the wing chaetotaxy and the small size of the caudal abdominal segments in *Coelophthinia* must be considered as convergent with the Gnoristinae, not as synapomorphies, since the genus shows no other similarities with the Gnoristinae but on the contrary a number of features, including apparent synapomorphies, in common with *Phthinia* or in general with the Sciophilinae. The shape of the head and the mouthparts (small labella, no sensory pit on the palpi) resemble those of *Phthinia* and *Aneura*. The intervening areas between the stripes of the longer hairs on the scutum are hairy, and the mediotergite possesses distinct bristles in its lower part as in many Sciophilinae but in no Gnoristinae.

In most Mycetophiloidea the suture between the anepisternum and katepisternum of the mesothorax is nearly horizontal or declines

more or less distinctly posteriorly (Fig. 3). In this type the posterior tip of the prothoracic epimeron (see Shaw 1948, Shaw & Shaw 1951) meets the anterior edge of the katepisternum of the mesothorax far below the anterior end of the suture, which is here called the primary mesepisternal suture. In some genera there seems to be present another suture or at least a shallow depression declining distinctly anteriorly and meeting the tip of the prothoracic epimeron. The latter is here called the secondary mesepisternal suture, because its presence is considered to represent a derived condition. In some Mycetophilidae (Eudicraninae, Mycomyinae, Mycetophilinae; see Väisänen 1984a) there is only the anteriorly declining suture left.

Like *Polylepta*, *Phthinia*, and some species of *Aneura*, *Coelophthinia* has a secondary suture between the anepisternum and the katepisternum of the mesothorax. This secondary mesepisternal suture is inclined downwards anteriorly so as to meet the apex of the prothoracic epimeron. In the Gnoristinae only the primary suture is present and usually declines distinctly posteriorly. *Coelophthinia* even lacks the primary suture which is retained in *Polylepta*, *Phthinia* and *Aneura* besides the secondary one. The venation is much like that of *Phthinia*, specially in the shape of the short cubital fork. The "mid-tibial organ" in *Coelophthinia* is well-developed even in the female sex and is of the same structure as in *Polylepta*, *Speolepta* and *Phthinia*. The tarsi are slender, attenuated towards the apex, without an empodium, and with fine, almost straight claws, as in *Polylepta*, *Aneura*, *Speolepta*, and *Phthinia*. The abdomen is

slender, almost as in *Phthinia* and, as in this genus, without distinct ventral folds. The male terminalia resemble those of *Polylepta* and some *Phthinia* in that the styli (gonostyli) are reduced and the prolonged tips of the coxites (gonocoxites) replace them as claspers. Evidently Winnertz (1863) recognized the affinities of *Coelophthinia thoracica* correctly. It is no doubt rather closely related to *Phthinia* and not to *Coelosia* or other Gnoristinae at all.

It thus seems correct to exclude *Coelophthinia* in the same way as *Speolepta* from the Gnoristinae and to transfer them to the Sciophilinae.

3.5. *Syntemna*

As suggested above, the Sciophilinae very probably include taxa without wing macrotrichia. On the other hand, *Syntemna* (= *Loewiella* Meunier according to Hutson et al. 1980) in the sense of Edwards could be included in the Gnoristinae in spite of the presence of macrotrichia on its wing membrane. Already Edwards (1925: 556) noted that *Syntemna* "on account of its much reduced seventh abdominal segment may be more related to the Gnoristini". This genus shows no other features typical to the Sciophilinae, but many of those of the Gnoristinae: a sharply delimited sensory pit on the antepenultimate palpal segment (see Fig. 4), bare intervening areas between the scutal hair stripes, bare mediotergite, a single median fold in the abdominal sternites, dilated front tarsi in females of at least some species, and finally also a course of the subcosta similar to that of *Hadroneura* and *Dziedzickia* in the Gnoristinae. In addition, the difficulties of some authors to place *Syntemna* and *Dziedzickia* species in the correct genus can be seen as an indication of their relationship, not only as a superficial resemblance (note the new combinations and synonymy given by Vockeroth 1980: 543).

Most of the above gnoristine characters of *Syntemna* are clearly in an apomorphic state, whereas the hairiness of the wings may be interpreted as being in a plesiomorphic character state and accordingly naturally less important for the delimitation of the Gnoristinae. It can be mentioned that the vagueness of the wing membrane chaetotaxy as used traditionally in tribal delimitation has been repeatedly suspected either directly or indirect-

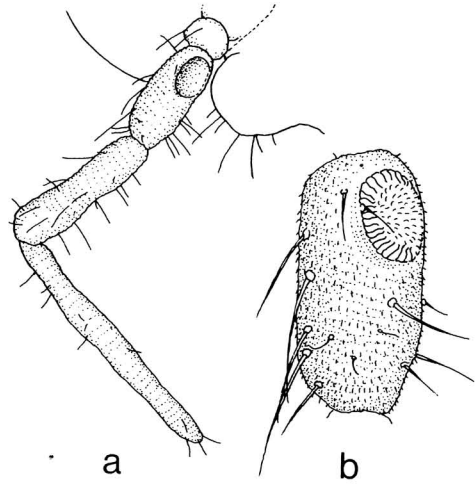


Fig. 4. Palp of *Saigusia flaviventris* and the position of the palpal pit. — a: palp. — b: antepenultimate palpal segment enlarged.

ly (e.g. Shaw & Shaw 1951, Chandler 1980, Hutson et al. 1980, Vockeroth 1980).

3.6 *Ectrepesthoneura* and *Tetragoneura*

The tentative inclusion of *Tetragoneura* Winnertz and *Ectrepesthoneura* Enderlein in the Gnoristinae was already briefly suggested by Tuomikoski (1966: 221 "... the genera *Ectrepesthoneura* and *Tetragoneura* should almost certainly be excluded [from Leiinae], as being rather close allies of *Synapha* (Gnoristinae)."), but without argumentation. Edwards (1925) placed them in his Leiini because of the characters in their wing venation, but otherwise they do not seem to fit particularly well into this group. In the Gnoristinae they likewise seem to have an isolated systematic position but not so distinctly as in the Leiinae. In their wing venation, especially in the shortness of Sc and R₁, they resemble such rather aberrant Leiinae as *Docosia* and *Megophthalmidia*, but this similarity may be interpreted as convergence. No true Leiinae possess the "sciophiline cell", the small cell delimited distally by R₄ (Vockeroth 1980: R₂₊₃), which is present in most *Tetragoneura* and *Ectrepesthoneura*. The pleural structure is in these two genera more of the gnoristine than the leiine type. The bare intervening areas between the scutal

hair stripes are not well-developed, as indeed they are not in most of the Leiinae studied in this respect, but then there is the undoubtedly gnoristine *Apolephthisa* with the same character. The hind coxae possess a complete stripe of bristles and hairs like that in the Gnoristinae, while the true Leiinae known to the author have the middle and upper part of the hind coxae bare, except perhaps for a patch of hairs in the upper hind corner. A kind of "mid-tibial organ" (differing in structure from that of certain Sciophilinae), lacking in the Leiinae, is present in the males of many *Tetragoneura* and all known *Ectrepesthoneura* species (according to Chandler (1980) the excluded Japanese species described by Sasakawa (1961) are probably Sciaridae). It occurs also in the Gnoristinae, in *Synapha*, e.g. *S. fasciata* Meigen but not in *S. vitripennis* (Meigen). No species of Leiinae studied has any folds on the abdominal sternites as have most of the Gnoristinae, as well as *Tetragoneura* and *Ectrepesthoneura*. Of the Gnoristinae, *Apolephthisa* and *Synapha* are similar to these two genera in the structure of the head and chaetotaxy of the short legs.

Chandler (1980) recorded that some species hitherto included in *Ectrepesthoneura* and *Tetragoneura* (*E. gracilis* Edwards and several Nearctic *Tetragoneura* species) have the abdomen and legs more slender and have differences in wing venation and genital structures which suggest a closer relationship with *Dziedzickia* Johannsen. This presence of "intermediate" species can be considered a further indication of the correct position of the two enigmatic genera in the Gnoristinae.

According to Plachter (1980), *Ectrepesthoneura hirta*, *Boletina nigricoxa* and *Apolephthisa subincana* are of the chorionic type 1.1. in their eggshells (plastron present, chorion complex, consisting of more than one layer, outer egg surface with longitudinal ridges) but this type may be widely distributed ("characteristic for the subfamily Mycomyiinae" in Plachter's wide sense). However, he pointed out that particularly in the two former species the elements of the outer egg surface are quite similar.

Vockeroth (1980) used for the Leiini sensu Edwards the tribal name Tetragoneurini. If *Tetragoneura* and *Ectrepesthoneura* are removed from the Leiini, the name Leiinae (or Leiini) should naturally be used again.

4. Characterization of the Gnoristinae

4.1 Description

On the basis of the above discussion a following morphological description can be given for the proposed subfamily Gnoristinae (Gnoristini Edwards 1925: 546–547, 565–566; emend.) of the Mycetophilidae (sensu Malloch):

Ocelli three, the laterals remote from the eye-margins. Antennae usually not tipped with recurved sensory hairs. Antepenultimate palpomere frequently with a depressed rounded sensory area on the inner (anterior) surface. The hairy and bristly stripes of the scutum usually leaving distinct bare intervening areas between each other. The strongest thoracic hairs smooth and finely pointed. Anepisternum and katapisternum of mesothorax never fused; the suture between them in most cases declining posteriorly, never anteriorly so as to meet the apex of the prothoracic epimeron, the latter wedge-shaped, not conspicuously narrowed or broadened. Mediotergite always bare. Wings usually without macrotrichia on the membrane. Humeral cross-vein rather short and moderately oblique; costa produced; Sc usually long, typically complete, but either Sc₁ or Sc₂ may be lacking; r-m typically short and oblique, much shorter than R₁; medial fork much longer than its stem; cubital fork stalked. Hind coxae with a sparse but usually complete row of bristly hairs along the outer hing margin. Tibial setulae not arranged in definite longitudinal rows; the spiny tibial bristles not very long or stout; front tibia with a well developed apical brush area. Empodium nearly always present, though small; claws with a median or subbasal tooth beneath. Female front tarsi sometimes dilated beneath. Abdominal sternites 2 to 3, or more, typically with a median weakly sclerotized concave fold line; male seventh abdominal segment usually small.

4.2 Exceptions to the above general description

According to Edwards (1940), the fossil genera *Palaeoanaclinia* Meunier and *Proboletina* Meunier have the lateral ocelli touching the eyes. In the recent genera they may be rather close to the eyes but hardly in real contact with them (in *Saigusaia* ocellus is

separated from eye margin only by about 0.5 to 1.0 times its own diameter). In some *Boletina* and *Synapha* species there is a rudiment of the 15th flagellomere of the antennae indicated by a couple of recurved sensory hairs. The palpi lack a sharply delimited sensory area in *Hadroneura*, *Gnoriste*, *Boletina* (p.p.), *Coelosia*, *Apolephthisa* and *Synapha* (p.p.), which genera in this respect represent the plesiomorphic character state and agree with the Sciophilinae. In *Apolephthisa* the bare stripes of the scutum are indistinct. *Sytemna* possesses macrotrichia at least on a part of the wing membrane. In *Coelosia* and *Boletina* (p.p.) the vein r-m is longer than usual and nearly longitudinal, appearing as a direct basal continuation of R₅. This feature is hardly synapomorphic with the similar condition in the Leiinae but rather a result of convergent evolution. The row of bristly hairs along the hind margin of the hind coxae is incomplete in *Coelosia* and *Saigusaiia*; the condition somewhat approaches that in the Leiinae and Mycetophilinae, but is, again, hardly to be interpreted as a sign of a true relationship. In some genera, e.g. *Saigusaiia* and *Synapha*, and likewise in certain fossil genera (Edwards 1940), a slight indication of the tibial setulae to be arranged in longitudinal rows on some parts of the tibiae is seen, but this is a common trend in various parts of the mycetophiloid system and cannot be used as proof of affinity of these gnoristine genera with the Mycomyinae, Manotinae, or Mycetophilinae. The males of *Synapha*, *Ectrepesthoneura* and *Tetragoneura* may possess a kind of "mid-tibial organ" of different structure from that in some Sciophilinae (*Polylepta*, *Phthinia*, *Coelophthinia*, and *Speolepta*). The apical brush area on the front tibiae is poorly developed and limited in some exotic species of the *Dziedzickia* group. The empodium is much reduced, at least in *Grzegorzekia*, and probably in *Austrosynapha* as well. The claws are enlarged and variously modified in the males of some species of *Boletina*, *Gnoriste*, and *Synapha*. The seventh and sometimes also the eighth segment of the male abdomen are rather conspicuous in a few genera (*Hadroneura*, *Sytemna*, *Grzegorzekia*) which thus have retained the plesiomorphic character state typical of the Sciophilinae. The median fold of the abdominal sternites may be absent (some *Boletina* spp., *Coelosia*), or broad and indistinct (*Hadroneura*, *Grzegorze-*

kia) or else narrowly doubled in a couple of distal segments (*Sytemna*, *Dziedzickia*); in most Sciophilinae it is replaced by two widely separated similar furrows. More exceptions are to be found in the genera *Tetragoneura* and *Ectrepesthoneura* (see above).

4.3 Genera included

The following recent European genera are here included in the Gnoristinae: *Gnoriste*, *Boletina*, *Coelosia*, *Hadroneura*, *Sytemna*, *Dziedzickia*, *Apolephthisa*, *Grzegorzekia*, *Synapha*, *Saigusaiia*, *Tetragoneura*, and *Ectrepesthoneura*. The inclusion of the latter two is only tentative.

In addition, the South American genera *Austrosynapha* Tonnoir and *Schnusea* Edwards evidently belong here. Of the Nearctic genera described by Vockeroth (1980) *Aglaomyia* certainly belongs here, but the systematic position of at least *Drepanocercus* and *Adicroneura* is somewhat uncertain and not considered here. *Acadia* (= *Impleta*) should probably be transferred to the Sciophilinae (see above). According to Vockeroth (1980), *Acomoptera* despite the absence of wing macrotrichia is similar in several respects to *Paratinia* and may be closely related to that sciophiline genus.

According to Edwards (1940), the following genera from Baltic amber belong to the Gnoristinae: *Sciobia* (Loew) (*Palaeoempalia* Meunier), *Palaeoboletina* Meunier, *Palaeoanaclynia* Meunier, *Proboletina* Meunier, *Dianeptia* Loew, *Archaeoboletina* Meunier, *Loewiella* Meunier, *Palaeodocosia* Meunier (*Palaeotrichonta* Meunier, ? *Sciomorpha* Meunier). In addition, he synonymized *Willistoniella* Meunier with *Ectrepesthoneura* and *Sciarella* Meunier with *Tetragoneura*. He also mentioned that *Heeriella* Meunier is similar to *Tetragoneura* in most respects.

4.4 Relationships to other subfamilies

The median fold on the abdominal sternites in typical Gnoristinae is otherwise found among the family in the Mycetophilinae, which likewise have the wing membrane devoid of macrotrichia (as this term is inaccurately, and I think incorrectly, used in the Mycetophiloidea taxonomy) and a bare mediotergite.

But since the two subfamilies are otherwise very different, these similarities are insufficient for phylogenetic speculations.

The difficulties of delimitation of the Gnoristinae against the subfamilies Sciophilinae and Leiinae may or may not be indicative of relationship. It is felt that the affinity with the Leiinae is not very close. If the Gnoristinae is delimited as proposed here to include *Ectrepesthoneura* and *Tetragoneura*, the residue of the Leiinae, with *Docosia* as a possible exception, is probably monophyletic (with inferred synapomorphies: wing membrane without macrotrichia, mediotergite bare, tibia with strong bristles, male seventh abdominal segment small and retracted, R₁ short).

The similarity with the Sciophilinae appears more pronounced but rests largely on symplesiomorphy. As indicated by the above subfamilial description, the Gnoristinae cannot be considered as a monophyletic entity based on strictly cladistic argumentation. The apomorphies of the Gnoristinae are either limited to a part of the subfamily (underlying synapomorphies?) or they are shared by certain representatives of the other subfamilies (convergences?). However, the hypopygial and wing characters indicate a very close relationship of at least most genera and the group may even be monophyletic instead of the earlier probable polyphyly. It seems possible that the Gnoristinae represent a branch of the Sciophilinae, but apparently numerous con-

vergences obscure the picture. The subfamily Sciophilinae still remains rather heterogeneous and it may contain taxa of comparable rank to the other subfamilies of the Mycetophilidae. Thus, the proposed delimitation of the Gnoristinae is nothing but a transient stage towards a phylogenetic classification of the fungus gnats.

Plachter's (1979a, b, c) studies on the immature stages of the Mycetophiloidea resulted in his division of the traditional Sciophilinae into Sciophilinae including only *Sciophila* and *Phthinia*, and into Mycomyinae including all the others. The argumentation of this division may provide certain characters (e.g. in the structure of the maxillary palp of the larva) to recognize the Sciophilinae in the present sense, but the classification based on so few genera cannot be used yet. The position of the present Gnoristinae among Plachter's Mycomyinae apparently rests on plesiomorphies. A closer study of the amber genera, as well as the immature stages, is obviously needed for the clarification of the relationships of the subfamilies.

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