

# Revision of the subfamily Meyliinae De Coninck, 1965 (Nematoda: Desmoscolecoida) with a discussion of its systematic position

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The Meyliinae contains seven species, belonging to four genera: *Boucherius* Decraemer & Jensen, 1982, *Gerlachius* Andrassy, 1976, *Meylia* Gerlach, 1956 and *Noffsingeria* Decraemer & Jensen, 1982, differentiated from each other primarily by the ornamentation of the body cuticle. The Meyliinae are compared with the Desmoscolecidae (*sensu* Lorenzen, 1969; Timm, 1970) and found to be unique in the position and structure of the amphids and in the reflexed branches of the female reproductive system. It is concluded that they belong to the Desmoscolecida, closely related to the Tricominae.

KEY WORDS:—Taxonomy – Nematoda – Desmoscolecoida – Meyliinae – revision.

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## INTRODUCTION

The family Meyliidae with the single subfamily Meyliinae was established by De Coninck (1965) for three rare *Meylia*-species described by Gerlach (1956): *M.*

*alata*, *M. lissa* and *M. spinosa*. In samples from Øresund (Denmark), Brittany (France), Loch Ewe (Scotland) and Carl Sound (Florida), we came across seven Meyliinae species; three of them were the species described by Gerlach (1956), the other four were new. Detailed descriptions of these seven species are given in Decraemer & Jensen (1982). The seven species represent four genera, two of which were already described: *Boucherius spinosus* (Gerlach, 1956) Decraemer & Jensen, 1982 syn. *Meylia spinosa* Gerlach, 1956; *Boucherius floridanus* Decraemer & Jensen, 1982; *Meylia alata* Gerlach, 1956; *Meylia vangoethemi* Decraemer & Jensen, 1982; *Noffsingeria omeri* Decraemer & Jensen, 1982; *Noffsingeria grandiamphis* Decraemer & Jensen, 1982; *Gerlachius lissus* (Gerlach, 1956) Andrassy, 1976 syn. *Meylia lissa* Gerlach, 1956. We give below the diagnoses of the family, subfamily and genera of Meyliidae prior to discussing their systematic position.

#### DIAGNOSES

##### *Genera of Meyliinae*

##### *Boucherius* Decraemer & Jensen, 1982 (Figs 1–6)

Desmoscoleoidea, Meyliidae. Cuticle finely annulated, each ring with a transverse row of fine spines. Somatic setae sparse, mainly in oesophagus and in tail region. Head truncated, not offset, with four cephalic setae at its base. Amphids large vesicular, posterior to insertion of cephalic setae, one to two head-widths for anterior end. Stoma short, unarmed. Oesophagus anteriorly muscular, posteriorly with large overlapping dorsal gland. Pseudocoelomocytes present. Two testes; spicules arched; gubernaculum with apophysis. Female reproductive system didelphic-amphidelphic with reflexed ovaries.

##### *Meylia* Gerlach, 1956 (Figs 7–13)

Desmoscoleoidea, Meyliidae. Cuticle finely annulated, with longitudinal differentiations of ridges or spines. Head offset, with four cephalic setae in anterior half or at its base. Amphids large, vesicular. Stoma minute. Oesophagus anteriorly muscular, posteriorly narrowing with large overlapping dorsal gland. Pseudocoelomocytes present. Two testes; spicules arched; gubernaculum with apophysis. Female reproductive system didelphic-amphidelphic with reflexed ovaries.

##### *Gerlachius* Andrassy, 1974 (Figs 14–15)

Desmoscoleoidea, Meyliidae. Cuticle extremely finely annulated, smooth appearance. Somatic setae sparse. Head truncated, not offset, with four cephalic setae at its base. Amphids large vesicular, largely subcephalic. Oesophagus muscular, posteriorly tapered, with large overlapping dorsal gland. Pseudocoelomocytes present. Two testes; spicules arched; gubernaculum with apophysis.

##### *Noffsingeria* Decraemer & Jensen, 1982 (Figs 16–21)

Desmoscoleoidea, Meyliidae. Cuticle annulated, annules interrupted by a narrow lateral field. Somatic setae sparse. Head offset, with four cephalic setae in

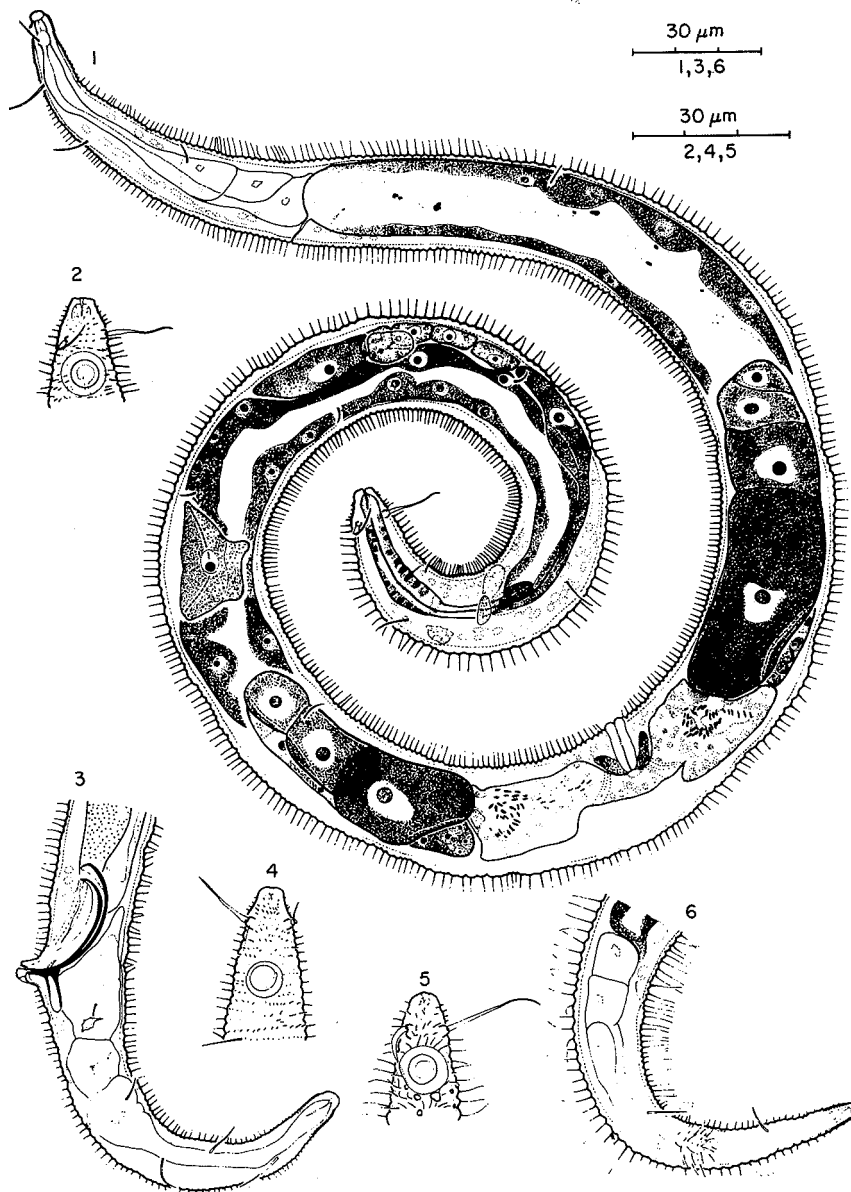
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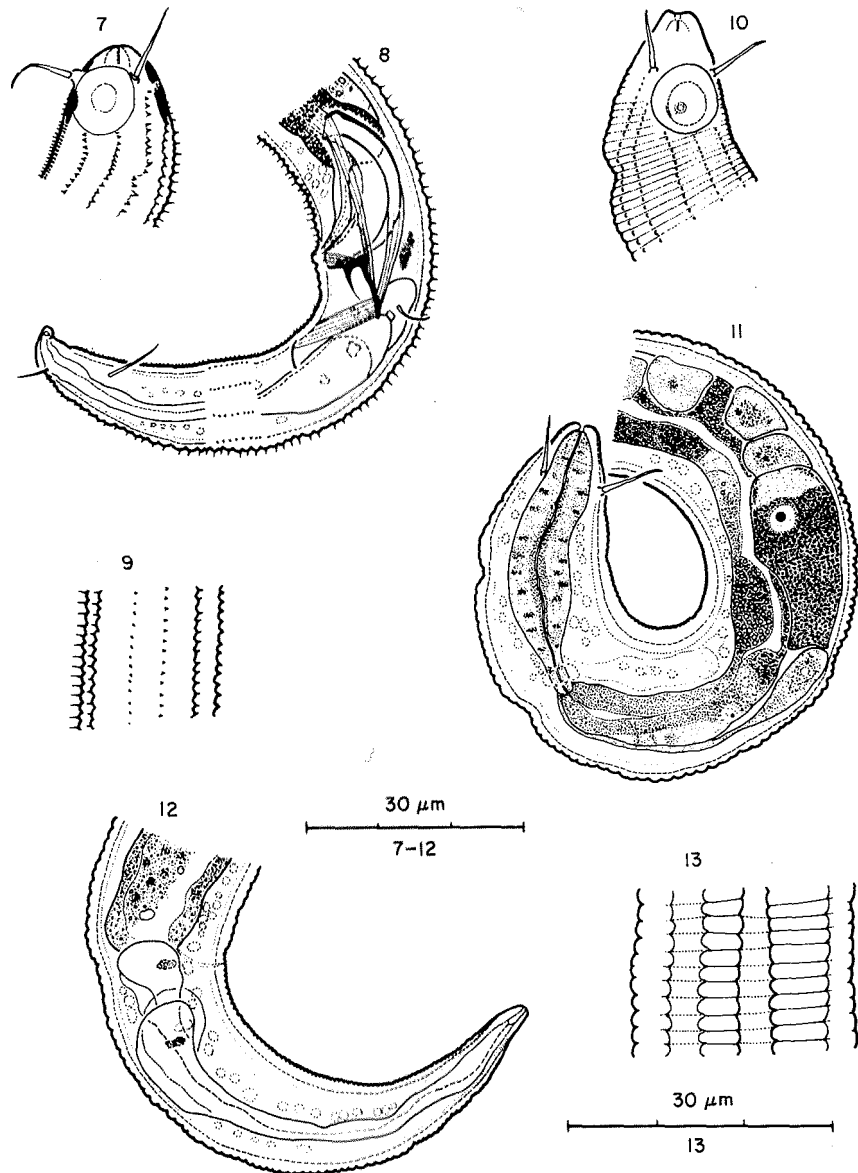
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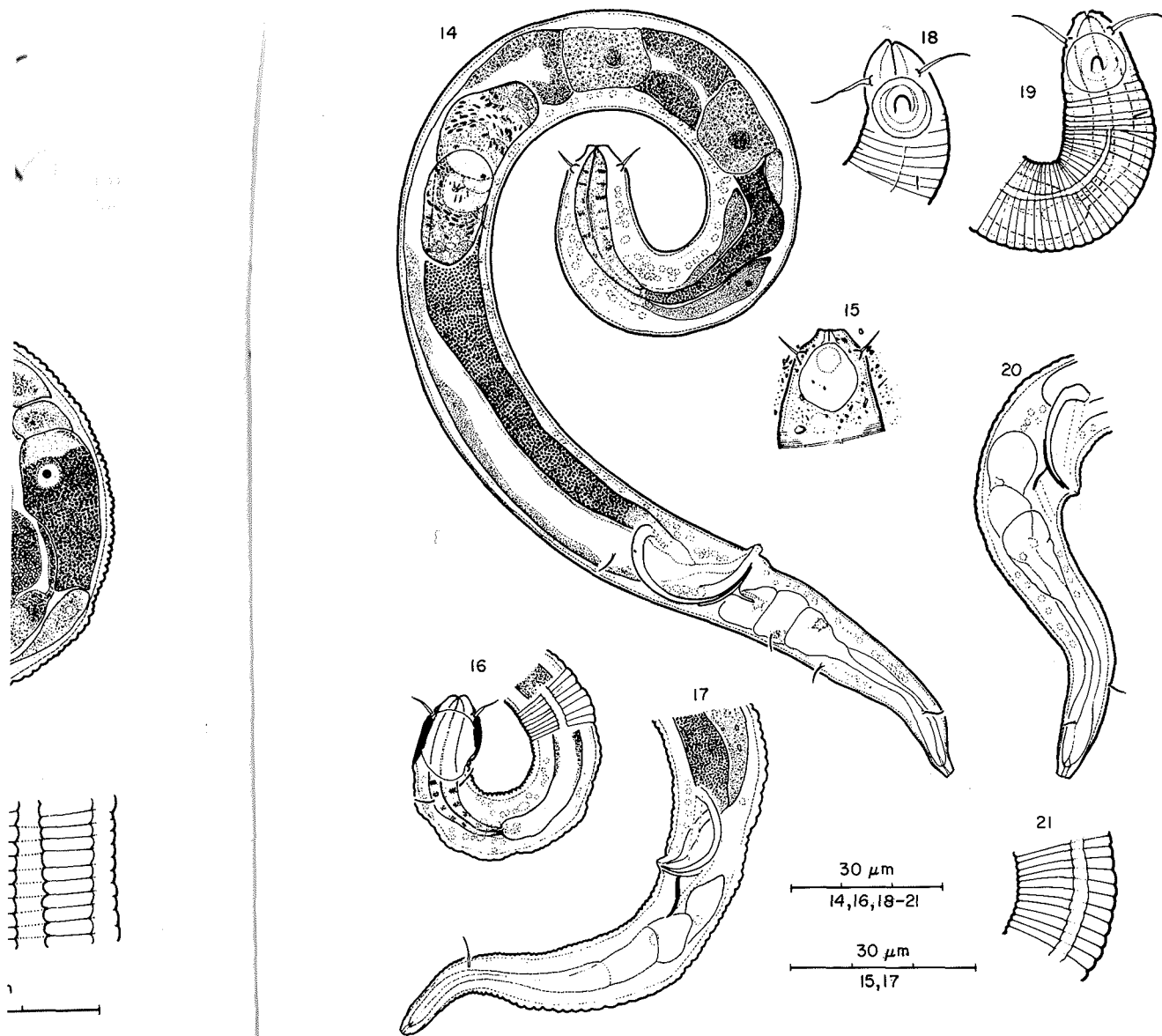
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Figures 1-6. *Boucherius spinosus* (after Decraemer & Jensen, 1982). Fig. 1, Female, entire specimen. Fig. 2, Female, surface view of head. Fig. 3, Male, posterior body region. Fig. 4, Male, surface view of head. Fig. 5, Female from Scotland, surface view of head. Fig. 6, Female from Scotland, posterior body region with a zone in surface view.



Figures 7-13. Figs 7-9, *Meylia vangoethemi* (after Decraemer & Jensen, 1982). Fig. 7, Surface view of head of holotype male. Fig. 8, Posterior body region with detail of body wall in surface view of holotype male. Fig. 9, Surface view of detail of body region at level of the vas deferens. Figs 10-13, *Meylia alata* (after Decraemer & Jensen, 1982). Fig. 10, Female, surface view of head. Fig. 11, Female, anterior body region. Fig. 12, Female, posterior body region. Fig. 13, Female, surface view of detail of body wall just posterior of the vulva.



Figures 14-21. Figs 14, 15, *Gerlachius lissus* (after Decraemer & Jensen, 1982). Fig. 14, Male, entire specimen. Fig. 15, Male, head region in surface view. Figs 16, 17, *Noffsingeria grandiamphis* (after Decraemer & Jensen, 1982). Fig. 16, Anterior body region with head and part of the body wall in surface view of holotype male. Fig. 17, Posterior body region of holotype male. Figs 18-21, *Noffsingeria omeri* (after Decraemer & Jensen, 1982). Fig. 18, Holotype male, head in surface view. Fig. 19, Male, anterior body region in surface view. Fig. 20, Male, posterior body region. Fig. 21, Male, detail of body wall in surface view.

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anterior half. Amphids large vesicular. Stoma minute, unarmed. Oesophagus muscular, tapered posteriorly. Two testes; spicules arched; gubernaculum with apophysis.

#### Family Meyliidae

Desmoscolecoidea. Somatic setae not differentiated, with tricomoid setal pattern or sparse. Male reproductive system with two testes. Female reproductive system didelphic-amphidelphic with ovaries outstretched or reflexed.

#### Subfamily Meyliinae

Desmoscolecoidea. Cuticle annulated, except for *Gerlachius lissus* holotype male. Amphids large vesicular with inner spiral structure, lying postcephalic in *B. spinosus* and cephalic to subcephalic in the other species. Head-cuticle, usually smooth, is thickened and sclerotized in *M. vangoethemi* and *N. grandiamphis*, in the other species it is thin. Oesophagus anteriorly muscular, posteriorly tapering, usually with large overlapping dorsal gland. Pseudocoelomocytes present in *B. spinosus*, *B. floridanus*, *G. lissus*, *M. alata* and *N. omeri*, not observed in *M. vangoethemi* and *N. grandiamphis*. Two testes; spicules arched; gubernaculum with apophysis. Female reproductive system didelphic-amphidelphic with reflexed ovaries.

#### SYSTEMATIC POSITION OF THE MEYLIINAE DE CONINCK, 1965

De Coninck (1965) and Vitiello & De Coninck (1968) considered the Meyliidae with the Meyliinae as part of the Desmoscolecoidea, excluding the Greeffiellidae; the latter were classed within the Greeffiellioidea. Timm (1970), Freudenhammer (1975) and Decraemer (1977) found the Meyliidae to belong to the Monhysterina rather than to the Desmoscolecida. Gerlach & Riemann (1973) put the Meyliidae (with the Meyliinae) together with the Desmoscolecidae (with the Desmoscolecinae and the Greeffiellinae) within the Desmoscolecida.

Andrassy (1974) established the suborder Meyliina with one family Meyliidae within the Desmoscolecida. According to Andrassy (1976) evolution took a double course within the Desmoscolecida: the primitive forms belong to the Meyliina (with Meylioidea), the more specialized forms to the Desmoscolecina (with Desmoscolecoidea, Greeffiellioidea).

Lorenzen (1981) classed the Meyliidae within the Desmoscolecoidea based on: (1) the insertion of four cephalic setae on peduncles; (2) the spinous ornamentation of the body rings in *B. spinosus*; (3) the dorsally coiled inner spiral structure of the amphids representing spirality of the corpus gelatum; (4) the body proportions corresponding with many Tricominae. According to Lorenzen (1981) the Meyliidae include the Meyliinae, the Gerlachiinae and the Tricominae; they are distinguished from the Desmoscolecidae by the smaller number of somatic setae on the dorsal than on the ventral surface of the body.

Comparing a large number of desmoscolecid-species with the seven species of the Meyliinae, we found that they resemble the Desmoscolecidae with the Desmoscolecinae, Greeffiellinae, Tricominae (*sensu* Lorenzen, 1969) in the following features:

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**Head:**

- (i) Head shape triangular or hemispherical in side view.
- (ii) Structure of the head cuticle (thickened or sclerotized in some Meyliinae as in nearly all desmoscolecoid adults).
- (iii) Presence of four cephalic setae inserted on peduncles (except in *B. floridanus* and *M. alata* with directly inserted setae as in *Greeffiella* spp.).
- (iv) Vesicular appearance of the amphids.
- (v) Head offset in some Meyliinae as in about all desmoscolecoid adults; head not offset in other Meyliinae as in some juveniles of *Desmoscolex* Claparède, 1863 and in some Greeffiellinae.
- (vi) Head cuticle bearing spines (= continuation of spinous ornamentation of the body cuticle) in *B. spinosus* as found in some juveniles of *Desmoscolex*, *Prototricoma* Timm, 1970 and *Hapalomus* Lorenzen, 1969.

**Body cuticle:** Annulated and ornamented with spines in *B. spinosus* as in juveniles of Tricominae and in adults of Greeffiellinae and *Prototricoma longicauda* Timm, 1970.

**Digestive system:** Oesophagus with anterior muscular part and posteriorly narrowing as in Tricominae.

**Male reproductive system:** With two testes as in Tricominae.

**Female reproductive system:** Didelphic-amphidelphic as in all desmoscolecoids.

**Somatic setae:** Not differentiated as they are in Tricominae (Lorenzen, 1969).

The Meyliinae differ from the Desmoscolecidae (sensu Lorenzen, 1969) in the following characters:

- (1) **Amphids:** The inner spiral structure is absent in the Desmoscolecidae; however, in some species of *Desmoscolex* (e.g. *D. longisetosus* Timm, 1970) the vesicular amphids are not single structures, but presumably derived from a spiral structure. Amphids in Desmoscolecidae are never completely subcephalic as they are in *B. spinosus*.
- (2) **Head:** Always offset in adult Desmoscolecidae, except in some species of Greeffiellinae.
- (3) **Female reproductive system:** With outstretched ovaries in Desmoscolecidae (top of one of the branches may be reflexed); in Meyliinae ovaries always reflexed.
- (4) **Somatic setae:** In Meyliinae are not paired, inserted directly on the body cuticle, scarce: about equal in number on dorsal and ventral body side, showing no clear pattern of distribution.
- (5) **Pseudocoelomocytes:** In dorsal to subdorsal position and one or two large cells partly surrounding the intestine in Meyliinae, but never observed in the Desmoscolecidae.
- (6) **Body cuticle:** The following structures in Meyliinae were not observed in the Desmoscolecidae: extremely fine annulation as in *G. lissus*, an interrupted annulation with lateral field as in *Noffsingeria*, an ornamentation with longitudinal differentiation as in *M. vangoethemi*.

## DISCUSSION

We agree with Lorenzen (1981) that the Desmoscolecoida Shipley, 1896 consist of two families, Desmoscolecidae Shipley, 1896 and Meyliidae De Coninck, 1965

and that the Desmoscolecidae has two subfamilies, the Desmoscolecinae Shipley, 1896 and the Greeffiellinae Filipjev, 1929.

Within the Meyliidae we recognize two subfamilies instead of three as in Lorenzen (1981): the Meyliinae De Coninck, 1965 and the Tricominae Lorenzen, 1969. The subfamily Gerlachiinae Andrassy, 1976 is synonymized with Meyliinae since we found a male specimen of *G. lissus* with a finely annulated body cuticle and large vesicular amphids with obscure inner spiral structure, thus possessing the characters of the Meyliinae. The Meyliinae and the Tricominae are differentiated by the following features: Meyliinae, ovaries reflexed, amphids vesicular with inner spiral structure; Tricominae, ovaries extended, amphids vesicular without inner spiral structure.

The Meyliidae are, however, not always characterized by a larger number of somatic setae on the ventral than on the dorsal surface of the body, a holapomorphic character of the Meyliidae according to Lorenzen (1981). We observed nearly equal numbers of setae on both sides of the body in *B. spinosus* and a larger number of subdorsal somatic setae in *M. vangoethemi* and *G. lissus*. In juveniles of *Tricoma* and *Quadricoma*, the number of subdorsal setae is larger than the number of subventral setae (one exception in *Q. freudenhammeri* Decraemer, 1978 with one seta on both sides of the body).

The Meyliidae can mainly be differentiated from the Desmoscolecidae by two testes and a tricomoid setal pattern.

Since the Meyliinae possess reflexed ovaries, they can no longer be considered part of the order Monhysterida, the holophyly of the latter being founded on the holapomorphy that the ovaries are out-stretched (Lorenzen, 1981). Therefore we prefer to maintain the Desmoscolecoida within a separate order Desmoscolecida Filipjev, 1929 (as Desmoscolecata Filipjev, 1929).

#### CONCLUSIONS

The most obvious differences between the Meyliinae and the other desmoscolecids are the structure and position of the amphids, the reflexed ovaries in the female reproductive system, the annulation of the body cuticle in some species and the setal pattern.

The Meyliinae show the greatest affinity with Tricominae adults in having a male reproductive system with two testes and with Tricominae juveniles in general habitus, body annulation and ornamentation and setal pattern.

The Meyliinae clearly belong to the Desmoscolecoida and are considered primitive because of the spiral structure of the amphids, the homonomous body annulation, the more or less tricomoid setal pattern, and by neotenic characters in some species (head not clearly offset, head cuticle not sclerotized and spinous ornamentation of the body cuticle).

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