

## TAXONOMIC PROBLEMS WITHIN THE DESMOSCOLECIDA (NEMATODA)

by

WILFRIDA DECRAEMER

Instituut voor Dierkunde, Rijksuniversiteit Gent,  
Ledeganckstraat 35, B 9000 Gent, Belgium

### ABSTRACT

A few examples are given of variability and taxonomic difficulties within the Desmoscolecida as well at species level as at genus level. The diagnostic characters generally used within two genera : *Desmoscolex* CLAPARÈDE, 1863 and *Tricoma* COBB, 1894 and the status of the genus *Quadricoma* FILIPJEV, 1922 are discussed.

### INTRODUCTION

The taxonomical problems in the *Desmoscolecida* on species level vary according to the genus. For several genera the value of the characters generally used within the order e.g. the number of main rings, the setal pattern, differs. Since little is known about variability it is difficult to judge the diagnostic value of many characters used. This paper deals with a few examples of variability and taxonomic difficulties : (1) at species level within two genera : *Desmoscolex* CLAPARÈDE, 1863 and *Tricoma* COBB, 1894 and (2) at genus level with the acceptance or not of the genus *Quadricoma* FILIPJEV, 1922.

### I. SOME TAXONOMIC DIFFICULTIES AT SPECIES LEVEL

#### 1. Genus *Desmoscolex* CLAPARÈDE, 1863

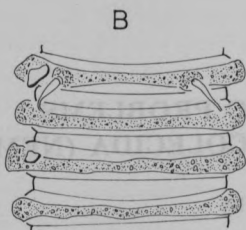
A first important character is the number of main rings. Within the genus *Desmoscolex* two types of main rings can be found : (1) the desmoscolecoid type (STEINER, 1916, p. 324 ; DECRAEMER, 1976, p. 125) and (2) the tricoid type (STEINER, 1916, p. 324 ; DECRAEMER, 1977b, p. 6) (Fig. 1A, 1B).

Considering the number of main rings in all species of *Desmoscolex* known, it was found that the majority of species (i.e. 52 out of 69) possesses 17 main rings of the typical desmoscolecoid type. Consequently a first major distinction is made between these and the other species possessing a larger number of main rings. Within the latter group the number of main rings is still used for distinguishing further between 8 species having 18 main rings of desmoscolecoid type (in two species one animal formed an exception with 19 rings) and the remaining species with 22-44 main rings. Among the latter group the species with the largest number of main rings, i.e. from about 29 rings on have a tricoid type of main ring ; thus in the group containing the species with the largest number of rings the type of main ring is used as an additional diagnostic character.



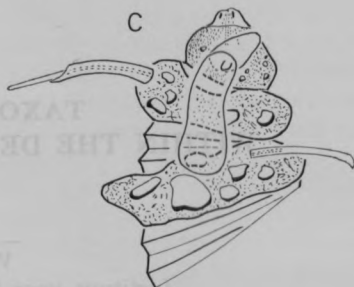
30 μm

A



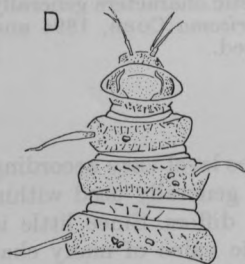
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B



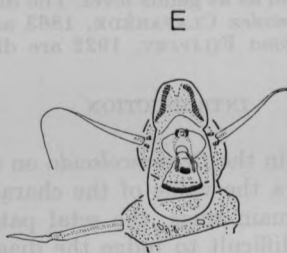
30 μm

C



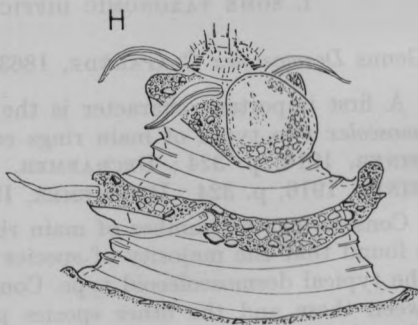
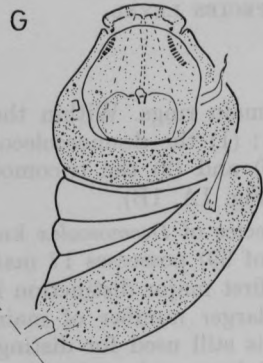
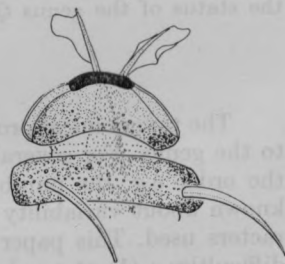
50 μm

D



30 μm

E



30 μm

H

Only two examples of sexual dimorphism in the number of main rings are known : *D. aquaedulcis* STAMMER, 1935 with 18 rings in males, 22 rings in females and *D. velifer* TIMM, 1970 with 43-44 rings in males, 31-38 rings in females.

Some variability in the number of main rings occurs in the species with a number of rings higher than 25 (e.g. in *D. vinealis* WEISCHER, 1962 : 11♀♀ with 25-29 rings). Among the 17-ring species no variability in the number of rings was ever noticed except for *D. geraerti* DECRAEMER, 1974 where a male specimen was found with only 16 rings ; it was however considered as aberrant and having lost a ring between its 8th and 9th main ring as could be deduced from the setal pattern.

A second important diagnostic character in *Desmoscolex* is the setal pattern. Departures from the typical scheme for 17-ring species (TIMM, 1970) are characteristic for a given species. In a few species e.g. *D. dimorphus* DECRAEMER, 1975, *D. sieverti* FREUDENHAMMER, 1975 sexual dimorphism occurs in the setal pattern. As far as I know, apart from sexual dimorphism, only one example *D. falcatus* LORENZEN, 1969 was found showing an intraspecific variability in the setal pattern among specimens from different localities (cf. DECRAEMER, 1975, p. 248).

Third, the head shape, the shape and length of the amphids (cf. Fig. 1C-1G) are usually of taxonomic value e.g. the possession of a rostrum (Fig. 1C) and the elongation of the amphids as in *D. aetosus* DECRAEMER, 1975. However several species may possess a similar head structure as e.g. in *D. geraerti*, *D. nymphianus* DECRAEMER, 1974, *D. brevisetosus* DECRAEMER, 1974.

Fourth, the presence or absence of cephalic setae, their length, shape (with or without a membrane) and the position of the cephalic setae on the head are of great diagnostic value (Fig. 1C-1H).

In males the copulatory apparatus, mainly the length and shape of the spicules may be of diagnostic value ; the gubernaculum can rarely be used since it often is lacking or if present it consists of a thin trough-like structure parallel to the spicules in about all the species known so far.

Additional characters such as the shape and length of the end rings and spinneret, the structure of the cuticular rings (with or without spines or pores) are often given some diagnostic value.

Fig. 1. — Genus *Desmoscolex*

- A : *D. aetosus* (♂) : detail of dorsal body wall at the level of main rings 10 and 11 : desmoscolecoid type (cf DECRAEMER, 1976)  
 B : *D. labiosus* (♀ : nr. 4454 Landbouwhogeschool, Wageningen) : surface view of part of body wall at the level of main rings 9-12 : tricoid type (cf DECRAEMER, 1976)  
 C : *D. aetosus* : surface view of head, lateral side (♂) (cf DECRAEMER, 1975)  
 D : *D. leptus* : surface view of head, lateral side (♀) (cf DECRAEMER, 1975)  
 E : *D. longisetosus* : surface view of head, lateral side (holotype ♂) (cf DECRAEMER, 1975)  
 F : *D. spinosus* : surface view of head, lateral side (♀) (cf DECRAEMER, 1976)  
 G : *D. falcatus* : surface view of head, lateral side (holotype ♂) (cf DECRAEMER, 1974)  
 H : *D. velifer* : surface view of head, dorsal side (♂) (cf TIMM, 1970, fig. 41).

### Conclusion

Considering the diagnostic value of the number of main rings we can conclude that when that number is low, it is constant and when it is higher, then its diagnostic value is more limited and a certain range of variability should be taken into account. As appears from the data mentioned above, most characters used to characterize species and to distinguish them from one another are surface ones, which give only a partial picture of the structure and may be more subjected to variation than internal features. Detailed morphological studies of the anatomy of many species of *Desmoscolex* (DECRAEMER, 1976) showed a large similarity between them. Consequently at the present time the internal organs can rarely be of any use for distinguishing species. In future further detailed studies of the female reproductive system and of the anterior sensorial organs would presumably be of greater help in solving taxonomic problems within this group.

### 2. Genus *Tricoma* COBB, 1894

In this genus the taxonomic problems are even larger than in other genera of the *Desmoscolecida*. This is due to (1) the large number of species, (2) the many inaccurate and superficial descriptions and figures lacking data on internal organs, anterior sensorial structures and labial region, (3) descriptions based on a single specimen even when orientated in a dorso-ventral position, (4) the emphasis put on the number of main rings without taking into account the occurrence of a possible variation. Two species, *T. dimorpha* DECRAEMER, 1977 and *T. similis* COBB, 1912, illustrate the large variabilities that can occur in characters used as diagnostic features (such as the number of main rings, body length and genital setae). Both species are easily distinguished from all other species of the genus.

#### a) *Tricoma dimorpha* (Figs. 10, 11 in DECRAEMER, 1977b)

In a first study of the type material of *T. dimorpha* from Yonge Reef (Australia) a tentative distinction was made between two different forms based on a difference in the total number of main body rings and in the number of tail rings : (1) a « typical » form with 61-65 main rings and 12-13 tail rings in males ; 62-67 main rings and 12-13 tail rings in females and (2) an « aberrant » form with only male specimens having 52-54 main rings and 10-11 tail rings.

No differences were found between both forms in habitus, setal pattern, copulatory apparatus, internal organs and detailed morphology of the head region.

Later on, other specimens of *T. dimorpha* became available from Gannet Cay (Australia). Among them two male specimens were found possessing a number of main rings lying in between the range recorded for the « typical » and the « aberrant » form i.e. with 58 and 60 rings. The number of tail rings was respectively 11 and 12.

Taking into account the specimens from Gannet Cay, *T. dimorpha* can no longer be split up on the basis of the number of main rings since the larger the number of specimens available the greater the chance to cover completely the difference in number of main rings observed in the type material.

Apart from a variability in the number of main rings in *T. dimorpha* there was also a relative large variation in body length. One male and one female paratype were clearly longer than the other specimens : 600  $\mu\text{m}$  ( $\delta$ ) against 305-370  $\mu\text{m}$  (other males) ; 650  $\mu\text{m}$  ( $\text{f}$ ) against 335-410  $\mu\text{m}$  (other females).

b) *Tricoma similis* (cf. Figs. in COBB, 1912 ; Figs. 30-35 in DECRAEMER, 1977b)

In *T. similis* the following variations were found in diagnostic features : (1) the number of main rings varies between 80 and 85 in males and between 77 and 84 in females, (2) in males the number and position of the genital setae (mostly 2 setae situated on rings 55 and 57) varies between 1 and 3 setae situated between rings 52 and 62 and (3) in females the position of the vulva varies from ring 43-46 or interzones 43-44, 44-45.

Apart from the number of main rings, following characters are used as diagnostic features : the setal pattern, the head- and amphid-shape, the length and shape of spicules and gubernaculum. More recently (DECRAEMER, 1977b) an attempt was made to study the internal organs, the labial region and anterior sensorial organs more in detail so that they could also be used in solving taxonomic problems.

Considering the setal pattern, it was found that the number of subdorsal setae is mostly constant within the same species and differs only slightly among species with 9, 11 and 13 pairs as most frequent numbers. The subventral setae vary in number within the species and among different species.

#### Conclusion

From the large intraspecific variation observed in the number of main rings in *T. dimorpha* we can conclude that this character generally accepted as the most or one of the most important diagnostic features in the genus *Tricoma*, is of more limited value. The number of main rings may be helpful for the identification of species, but should not be overweighted especially since for the majority of the species nothing is known about its variability.

The diagnostic value of the setal pattern in the genus *Tricoma* is more limited compared with that in *Desmoscolex* (see above).

## II. TAXONOMIC DIFFICULTIES AT THE GENUS LEVEL

Some taxonomic problems of the *Desmoscolecida* exist at the generic level e.g. the status of the genus *Quadricoma* FILIPJEV, 1922.

The original diagnosis of FILIPJEV (1922) is of little use, but on the basis of characters of the type species *Quadricoma loricata* FILIPJEV, 1922 (cf. also DECRAEMER, 1978) the genus can be clearly distinguished from other genera.

In contradiction with LORENZEN (1969) who synonymized without comment *Quadricoma* with *Tricoma* while introducing a new subfamily Tricominae, I am inclined to follow TIMM (1970) and FREUDENHAMMER (1975) who considered *Quadricoma* as a separate genus.

However, the differences between both genera : *Quadricoma* and *Tricoma* are relatively small. The main difference is found in the shape of the main rings i.e. all main rings quadricomoid and with a clear ring of inversion in *Quadricoma* (see TIMM, 1970, p. 38 ; DECRAEMER, 1978) while in *Tricoma* the main rings are mainly tricoid except for those in the extreme anterior body region and tail which may be quadricomoid in some species ; an inversion rings is always lacking (Fig. 2A, 2B, 2D).

Among the type material of *Q. noffsingeriae* DECRAEMER, 1977 a male and a female specimen were found possessing (as opposed to the other specimens) only quadricomoid rings in the anterior part of the body and in the tail region ; the rings

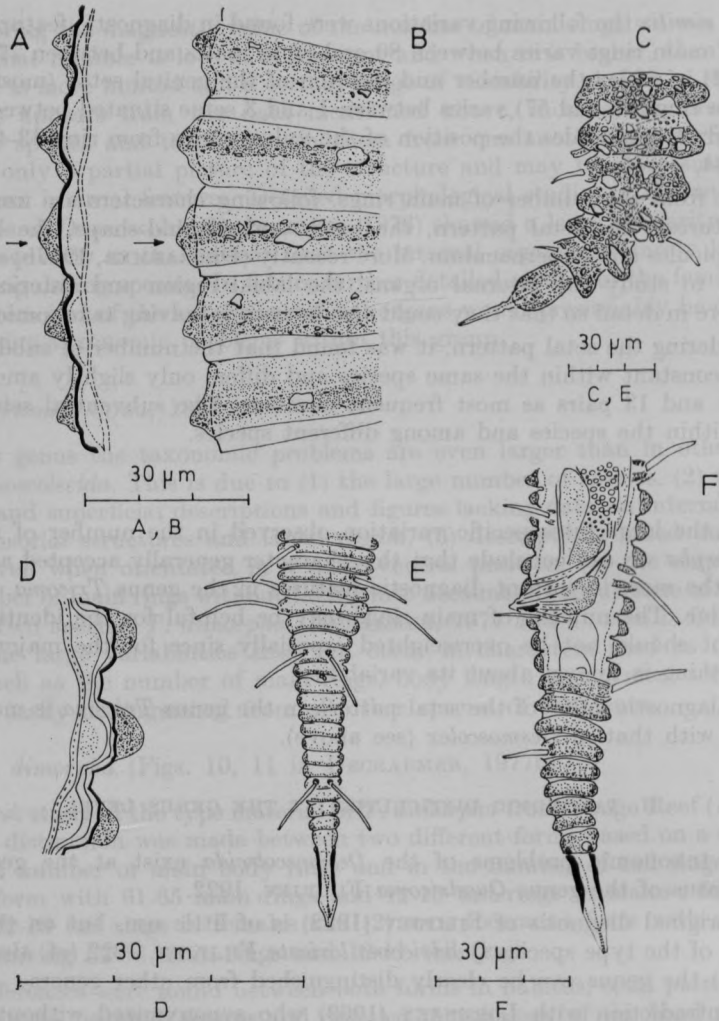


Fig. 2. — Genera *Quadricoma* and *Tricoma*.

- A : *Q. crassicomoides* : detail of dorsal body wall a level of main rings 29 and 33 (cf DECRAEMER, 1978)
- B : *Q. crassicomoides* : surface view of part of body wall at level of main rings 29 and 33 (cf DECRAEMER, 1978)
- C : *Q. noffsingerae* (♀) : surface view of tail region (cf DECRAEMER, 1977c)
- D : *T. similis* (♂) : detail of dorsal body wall (cf DECRAEMER, 1977b)
- E : *T. dimorpha* : surface view of the ventral side of the posterior body region of a female (cf DECRAEMER, 1977b)
- F : *T. dimorpha* : posterior body region of a male (cf DECRAEMER, 1977b).

situated in between are tricomoid, also due to the absence of foreign material on the interzones. Consequently no ring of inversion was observed in both specimens. If only a specimen was found showing the aberrance in the structure of the main rings the definition of the genus based only on the shape on the rings would be uncertain.

However, apart from the structure of the main rings additional characters may be used in distinguishing both genera i.e. (1) the shape of the endring and spinneret. In *Quadricoma* the spinneret consists of a fine, elongated, naked structure, offset from the broader covered anterior part of the end ring; in *Tricoma* the naked spinneret is short, not offset from the covered anterior part of the end ring which gradually tapers posteriorly. (2) The shape of the head: the conspicuous triangular head shape in lateral view typical for *Tricoma*, is not present in *Quadricoma*.

#### Conclusion

Since the genus *Quadricoma* can be clearly distinguished from *Tricoma* mainly on the base of the structure of the main rings and since until now as far as I know only one exception (*Q. noffsingerae*) exists I tentatively recognize *Quadricoma* as a separate genus for practical reasons and until more detailed studies of both genera will allow well founded conclusions.

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