

# The genera of Anguinidae (Nematoda, Tylenchida)

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## SUMMARY

The family Anguinidae is redefined; it includes the genera *Anguina* Scopoli, 1777; *Nothanguina* Whitehead, 1959; *Afrina* g. n.; *Orrina* g. n.; *Subanguina* Paramonov, 1968; *Ditylenchus* Filipjev, 1936; *Nothotylenchus* Thorne, 1941, and *Diptenchus* Khan, Chawla & Seshadri, 1969. *Paranguina* Kirjanova, 1955 and *Cynipanguina* Maggenti, Hart & Paxman, 1974 are synonymised with *Anguina*.

## RÉSUMÉ

*Les genres de la famille des Anguinidae (Nematoda : Tylenchida)*

L'auteur redéfinit la famille des *Anguinidae*; celle-ci comprend les genres *Anguina* Scopoli, 1777, *Nothanguina* Whitehead, 1959, *Afrina* g. nov., *Orrina* g. nov., *Subanguina* Paramonov, 1968, *Ditylenchus* Filipjev, 1936, *Nothotylenchus* Thorne, 1941, et *Diptenchus* Khan, Chawla & Seshadri, 1969. *Paranguina* Kirjanova, 1955 et *Cynipanguina* Maggenti, Hart & Paxman, 1974 sont considérés comme synonymes mineurs d'*Anguina*. *Anguina poophila* Kirjanova, 1952 est synonymisé avec *A. agrostis* Steinbuch, 1799. *Nothanguina cecidoplastes* Goodey, 1934 est la seule espèce retenue dans le genre *Nothanguina*. *Nothanguina phyllobia* Thorne, 1934 devient l'espèce type d'*Orrina* g. nov. *Afrina* g. nov. comprend *A. hyparrheniae* (Corbett, 1966) comb. nov. et *A. tumefaciens* (Cobb, 1932) comb. nov. Dix-sept espèces appartenant aux genres *Anguina* ou *Paranguina* sont transférées au genre *Subanguina*. A l'intérieur des *Anguinidae* la complexité de la structure de la gonade femelle paraît être en relation avec le degré d'adaptation au parasitisme.

Paramonov (1962) considered the Anguininae a subfamily of Tylenchidae, and characterised this subfamily by the large number of oogonia and sexual dimorphism. He included the genera *Anguina* Scopoli, 1777, *Paranguina* Kirjanova, 1955, and *Nothanguina* Whitehead, 1959. Later on, the genus *Subanguina* Paramonov, 1968, was added. While recognising close affinities between *Anguina* and *Ditylenchus* Filipjev, 1936, Paramonov (1962, 1970) placed the latter in Tylenchinae. Wu (1967) found it difficult to separate these two genera and redefined both on the basis of the length of crustaformeria in relation to the length of spermatheca. Choi and Loof (1973) also discussed the status of *Anguina*

and *Ditylenchus* when they regarded *Subanguina* as synonymous with *Anguina*. In 1974, the new genus *Cynipanguina* Maggenti, Hart & Paxman, 1974, was proposed.

Siddiqi (1971) recognised the subfamilies Anguininae, Pseudhalenchinae and Sychnoty-chinae within the Anguinidae. However, Geraert and Kheiri (1970) studied the two known species of *Pseudhalenchus* Tarjan, 1958, and found that *P. minutus*, the type species, is closer to *Tylenchus* Bastian, 1865 s. l. than to *Ditylenchus*.

Golden (1971) proposed the new subfamily Ditylenchinae to accommodate *Ditylenchus*, *Pseudhalenchus* and *Diptenchus*, while in the Anguininae he included *Anguina*, *Paranguina* and

*Subanguina*. This has not been recognised by Hooper (1978) who synonymised Anguininae and Ditylenchinae.

Sumenkova (1975) and Geraert (1976) stated that *Nothotylenchus* Thorne, 1941 is probably synonymous with *Ditylenchus*, although they belong to different superfamilies.

In order to resolve the above confusion, extensive studies have been made of these groups and especially of *Anguina s. l.*

### Family Anguinidae Nicoll, 1935

#### GENERAL MORPHOLOGY

The cuticle of members of this family has delicate transverse annulations and no longitudinal lines were observed. Lateral field of the genera *Ditylenchus*, *Nothotylenchus* and *Diptenchenus* Khan, Chawla & Seshadri, 1969, has four to six incisures. The number of incisures on swollen adults of the remaining genera was impossible to count.

Stylet is thin and small, with the conus usually shorter than the shaft. In some *Anguina* species the conus may be slightly bent. Knobs small. Cephalic skeleton weakly developed. Stylet protractors attached to the knobs and the basal plate of the skeleton.

Oesophageal median bulb with or without refractive thickenings. Terminal bulb may be offset, slightly overlap intestine on dorsal side, or form a distinct lobe. The swollen adults of some genera may have irregularly shaped terminal bulb. Sometimes secretions of dorsal oesophageal gland may accumulate in isthmus or procorpus giving the appearance of a "storage organ" (Thorne, 1961). However, this depends on the physiological activity of a specimen and cannot be considered as a taxonomic character. Isthmus may be offset from terminal bulb by deep constriction. Cardia absent and anterior intestinal cells hyaline.

Female reproductive system prodelphic; post-uterine sac present, rarely absent. The few cells usually present in posterior branch of the reproductive system are remnants of an ancestral paired gonad. One female of *Anguina tritici* was seen with a long posterior gonad, but without a spermatheca. Vulval lips may be

protruded. A few tightly packed cells always present between uterine sac and crustaformeria. Crustaformeria of the genera least adapted to parasitism is in the form of quadricolumella: four rows of cells with four cells per row. The evolution toward parasitism is marked by increase in the number of cells in the crustaformeria; the greatest development occurs in *Anguina* and *Nothanguina* where it is a multinucleate tube. Spermatheca axial. Oogonia may be arranged in tandem with few cells in circumference, or with many cells in circumference. In the last case the rachis is probably present.

Male with paired spicules, (an aberrant male of *Subanguina picridis* had three spicules). Gubernaculum not protrusible. Bursa usually envelops most of the tail. Testis similar in structure to ovary. Sperm rounded.

DIAGNOSIS : Tylenchoidea. Cuticle delicately annulated. Deirids usually present, phasmids not observed. Amphidial apertures pore-like, labial. Stylet short, weakly developed. Cephalic skeleton not or weakly sclerotized. Median bulb present or absent, with or without refractive thickenings. Cardia lacking, anterior intestinal cells hyaline. Female gonad prodelphic, spermatheca axial, with a sphincter between uterine sac and crustaformeria. Tail of both sexes conoid. Bursa envelops most of the tail.

SYNONYMS : *Nothotylenchinae* Thorne, 1941, s. n., *Ditylenchinae* Golden, 1971.

#### TYPE GENUS

*Anguina* Scopoli, 1777

= *Paranguina* Kirjanova, 1955, s. nov.

= *Cynipanguina* Maggenti, Hart & Paxman 1974, s. nov.

#### OTHER GENERA

*Nothanguina* Whitehead, 1959

*Afrina* g. nov.

*Orrina* g. nov.

*Subanguina* Paramonov, 1968

*Ditylenchus* Filipjev, 1936

*Nothotylenchus* Thorne, 1941

*Diptenchenus* Khan, Chawla & Seshadri, 1969

The proposed diagnosis limits the Anguinidae to the genera with labial amphids, no cardia, an axial spermatheca, and with a sphincter between uterine sac and crustaformeria. Presence or absence of refractive thickenings in median bulb is considered at present as a generic character. Therefore, the subfamily Nothotylenchinae is synonymised with Anguinidae, and *Nothotylenchus* is included in the latter family. The taxonomic position of other genera of Nothotylenchidae should be further investigated. I share the opinions of Sumenkova (1975) and Geraert (1976) that *Ditylenchus* and *Nothotylenchus* may be identical. However, both certainly need more work and regrouping, and I prefer not to propose any change at this time.

## KEY TO THE GENERA OF ANGUINIDAE

1. Gonads with many cells in circumference . . . . . 2
- . Gonads with one or two cells in circumference . . . . . 4
2. Median bulb large, with refractive thickenings . . . . . 3
- . Median bulb fusiform, without thickening . . . . .  
     . . . . . *Nothanguina*
3. Crustaformeria a long multinucleate tube; no mucro at tail tip . . . . . *Anguina*
- . Crustaformeria as four rows of cells, fourteen cells in a row; tail tip with mucro . . . . . *Afrina*
4. Median bulb with refractive thickenings . . . . . 5
- . No refractive thickening in oesophageal lumen . . . . . 7
5. Crustaformeria as quadricolumella . . . . . 6
- . Crustaformeria as four rows of cells, eight to twelve cells in a row . . . . . *Subanguina*
6. Posterior uterine sac present; vagina perpendicular to the body axis . . . . . *Ditylenchus*
- . No posterior uterine sac; vagina oblique to the body axis . . . . . *Diptlenchus*
7. Median bulb fusiform; oesophageal glands in a terminal bulb offset from intestine . . . . .  
     . . . . . *Nothotylenchus*
- . Median bulb absent; oesophageal glands in a lobe; dorsal nucleus posterior to oesophago-intestinal junction . . . . . *Orrina*

Genus *Anguina* Scopoli, 1777

= *Paranguina* Kirjanova, 1955, s. nov.

= *Cynipanguina* Maggenti, Hart & Paxman, 1974, s. nov.

DIAGNOSIS: Anguinidae. Mature females swollen. Median oesophageal bulb with refractive thickenings. Isthmus separated from terminal bulb

by a constriction. Crustaformeria, a long multinucleate tube composed of more or less hexagonal cells. Ovary with many oogonia in circumference. Testes usually with two flexures. Bursa enclose most of the tail, except the tip. Form galls on stems, leaves and/or inflorescences of grasses, *A. balsamophila* is an exception, infesting a dicotyledon.

## TYPE SPECIES

*A. tritici* (Steinbuch, 1799) Chitwood, 1935

## OTHER SPECIES

*A. agropyri* Kirjanova, 1955

= *Paranguina agropyri* Kirjanova, 1955

*A. agropyronifloris* Norton, 1965

*A. agrostis* (Steinbuch, 1799) Filipjev, 1936

= *A. poophila* Kirjanova, 1952, s. nov.

*A. amsinckiae* (Steiner & Scott, 1935) Thorne, 1961

*A. australis* Steiner, 1940

*A. balsamophila* (Thorne, 1926) Filipjev, 1936

*A. danthoniae* (Maggenti, Hart & Paxman, 1974) comb. nov.

= *Cynipanguina danthoniae* Maggenti, Hart & Paxman, 1974

*A. funesta* Price, Fisher & Kerr, 1979

*A. graminis* (Hardy, 1850) Filipjev, 1936

*A. microlaenae* (Fawcett, 1938) Steiner, 1940

*Paranguina* and *Cynipanguina* are synonymised with *Anguina* because studies of type material and additional collections did not show any differences. The type specimens of the type species of both genera were killed in cold fixative, causing much distortion. Well fixed and processed specimens of *A. agropyri*, type species of *Paranguina*, showed that the additional oesophageal gland described by Kirjanova (1955) was a fixation artefact. Since Kirjanova (1955) in the same paper used both *P. agropyri* and *A. agropyri*, no new combination is proposed.

The stem-like oesophageal extension described as a main differentiating character for *Cynipanguina* is also a fixation artefact. The same conditions were seen among species of *Anguina*.

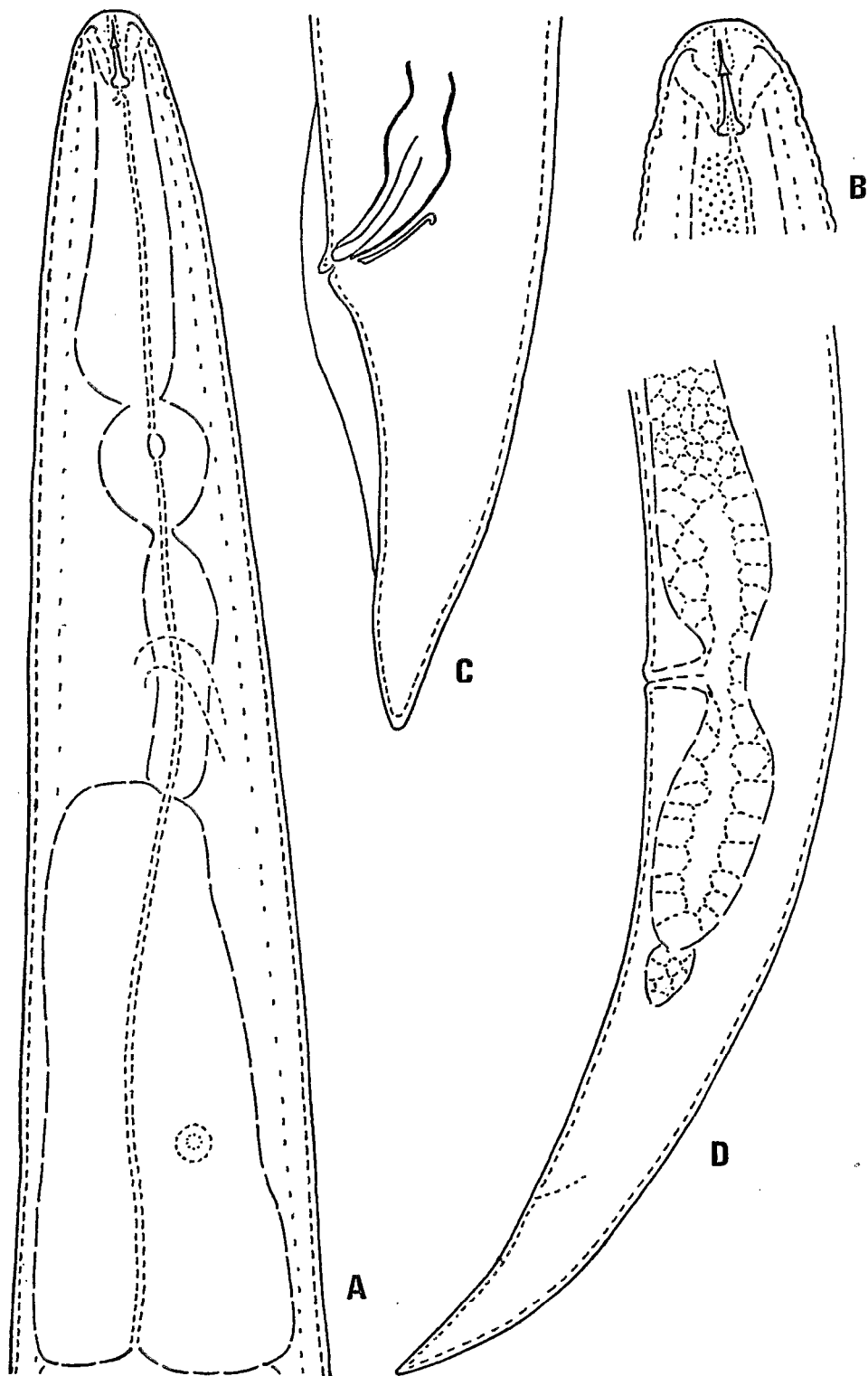


Fig. 1. *Anguina tritici*. A : oesophageal region, B : head, C : tail of male, D : posterior end of female.

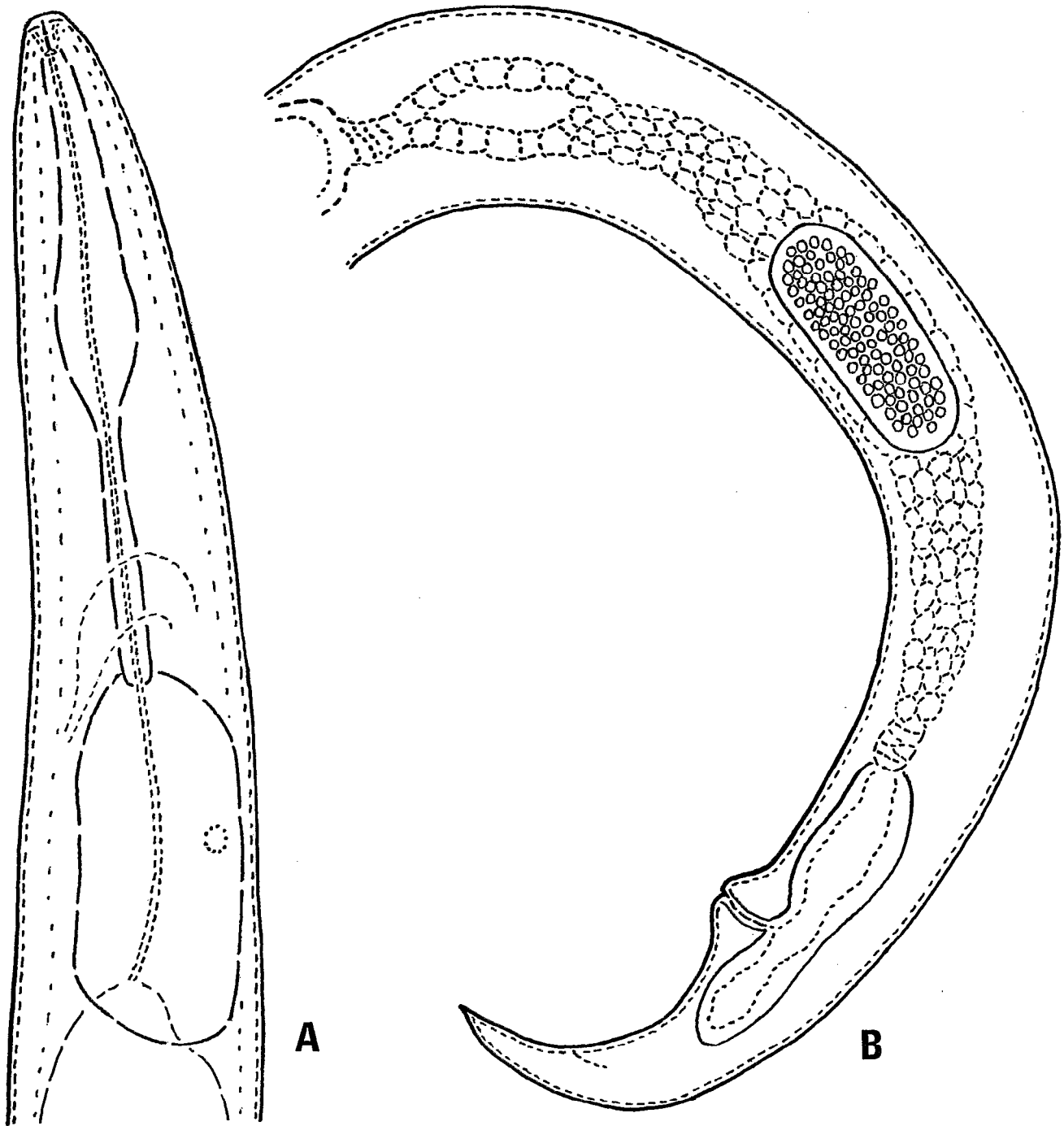


Fig. 2. *Nothanguina cecidoplastes*. A : oesophageal region, B : posterior end of female.

*A. poophila* is considered synonymous with *A. agrostis* because studies of types and other collections did not show any differences. Both were found on the same host.

Adults of different species of *Anguina* are morphologically indistinguishable, although they develop on different hosts in widely separated geographical areas. More work is needed before a full revision of this genus can be presented.

Only those synonyms of the species mentioned in this paper are listed, when they are not included in the excellent check lists of Tarjan and Hopper (1974, 1977, 1978).

### Genus *Nothanguina* Whitehead, 1959

DIAGNOSIS : Anguinidae. Mature females swollen. Median bulb poorly developed, without refractive thickenings. Isthmus separated from basal bulb by a constriction. Crustaformeria a long multinucleate tube composed of more or less hexagonal cells. Ovary with many oogonia in circumference. Testes reflexed. Bursa does not enclose tail tip. Spicules complicated, no gubernaculum. Forms galls on leaves of grasses.

#### TYPE AND UNIQUE SPECIES

*N. cecidoplastes* (T. Goodey, 1934) Whitehead, 1959

DIFFERENTIAL DIAGNOSIS : This genus is closest to *Anguina*, but differs by having a poorly developed median bulb without refractive thickenings, and by lacking a gubernaculum. Bursa smaller than in *Anguina*, but since only one species of *Nothanguina* is known this cannot be considered as a generic character.

### Genus *Afrina* g. nov.

DIAGNOSIS : Anguinidae. Mature females swollen. Median bulb with refractive thickenings. Isthmus separated by a constriction from terminal bulb. Crustaformeria formed by four rows of cells, fourteen cells in a row. Testes often with two flexures. Tail of both sexes conical, tail tip mucronate. Bursa notched at

the posterior end, almost reaches tip but does not enclose mucro. Forms galls on leaves of grasses.

#### TYPE SPECIES

*A. hyparrheniae* (Corbett, 1966) comb. nov.  
= *Anguina hyparrheniae* Corbett, 1966

#### OTHER SPECIES

*A. tumefaciens* (Cobb, 1932) comb. nov.  
= *Anguina tumefaciens* (Cobb, 1932) Filipjev & Schuurmans Stekhoven, 1941

DIFFERENTIAL DIAGNOSIS : *Afrina* g. nov. occupies an intermediate position between *Anguina* and *Subanguina*. It is close to *Anguina* by oesophageal constriction, many oogonia in circumference, and flexures of testes, while similarity to *Subanguina* is indicated by structure of crustaformeria.

*Anguina spermophaga* Steiner, 1937 most probably belongs to this genus but no specimens were available and a final decision cannot be made.

Specimens of *Afrina* g. nov. examined were from southern Africa and Australia.

### Genus *Orrina* g. nov.

DIAGNOSIS : Anguinidae. Mature females slightly or not swollen. No median bulb and no refractive thickenings in oesophageal lumen. Oesophageal glands form a lobe overlapping intestine. Nucleus of dorsal gland posterior to oesophago-intestinal junction. Isthmus short and narrow. Crustaformeria in form of quadricolumella. Ovary with few oogonia in circumference. Forms galls on leaves of *Solanum elaeagnifolium* Cav.

#### TYPE AND UNIQUE SPECIES

*O. phyllobia* (Thorne, 1934) comb. nov.  
= *Nothanguina phyllobia* (Thorne, 1934)  
Thorne, 1961

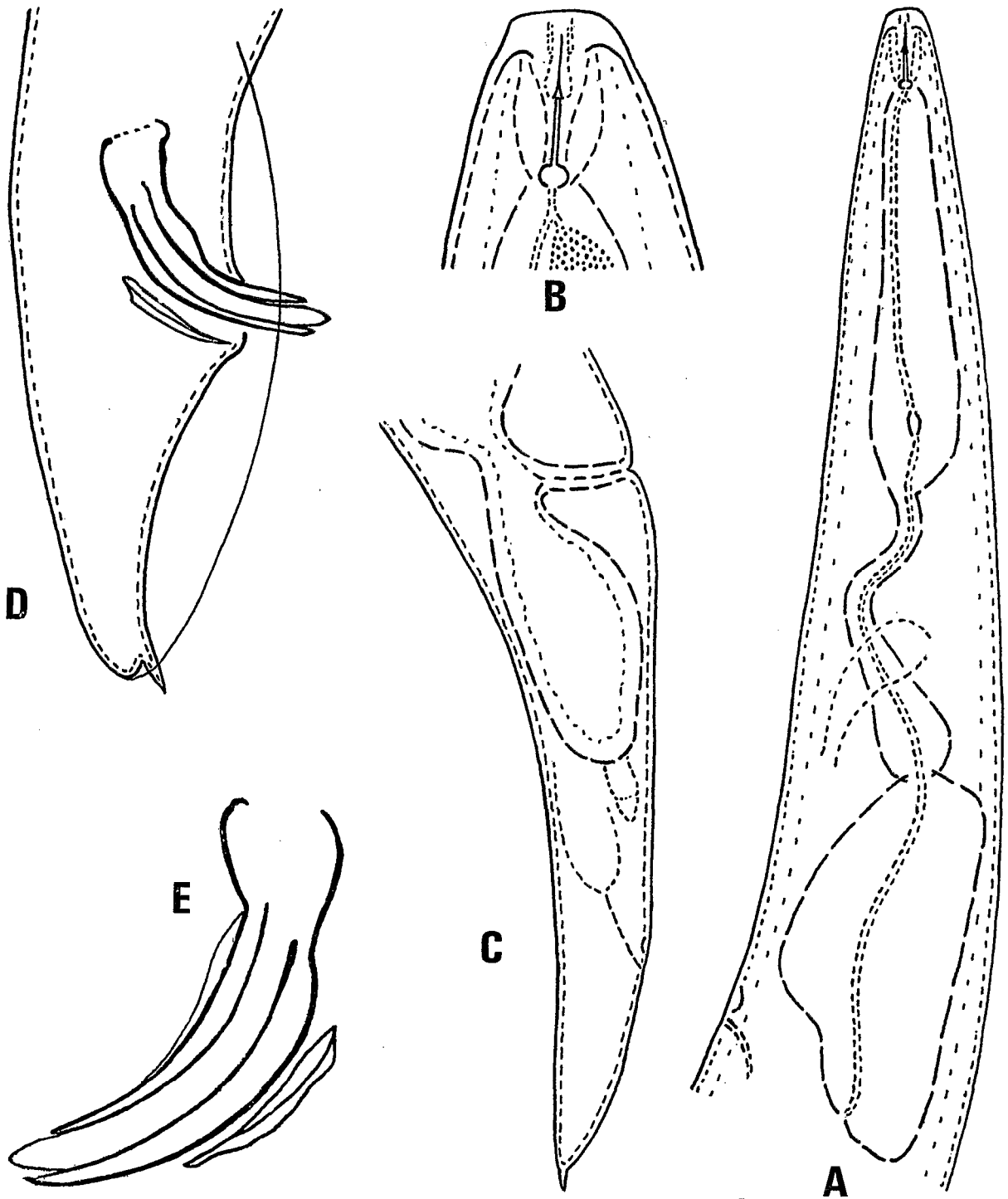


Fig. 3. *Afrina hyparrheniae*. A : oesophageal region, B : head, C : posterior end of female, D : posterior end of male, E : spicules and gubernaculum of male.

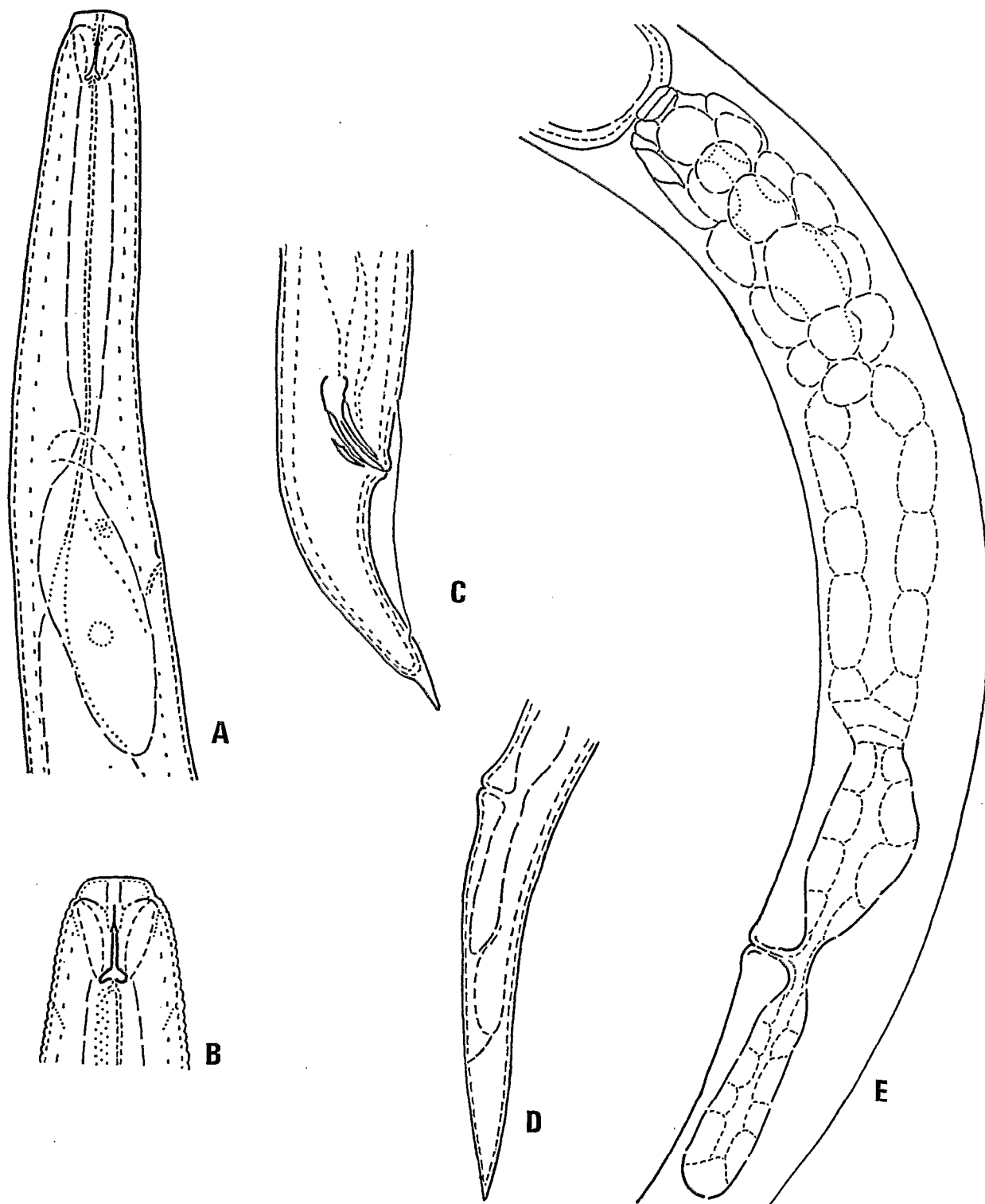


Fig. 4. *Orrina phyllobia*. A : oesophageal region, B : head, C : tail of male, D : posterior end of female, E : part of female reproductive system.



DIFFERENTIAL DIAGNOSIS: *Orrina* g. nov. stands somewhat separately by having overlapping oesophageal lobe.

*O. phyllobia* is known from Texas and Arizona only.

The generic name *Orrina* g. nov. is given in honour of Dr. C. C. Orr, in recognition of his excellent studies on the biology of this species.

### Genus *Subanguina* Paramonov, 1968

DIAGNOSIS : Anguinidae. Mature females may or may not be swollen. Median bulb with refractive thickenings. Isthmus separated by constriction. Crustaformeria with four rows of cells, 8-12 cells in a row. Ovary with few oogonia in circumference. Testes usually not reflexed. Forms galls on roots, stems, leaves and/or inflorescences of plants belonging to many families.

#### TYPE SPECIES

*S. radicolica* (Greiff, 1972) Paramonov, 1968

#### OTHER SPECIES

*S. askenasyi* (Bütschli, 1873) comb. nov.  
= *Anguina askenasyi* (Bütschli, 1873)  
Krall, 1971

*S. brenani* (T. Goodey, 1945) comb. nov.  
= *Anguina brenani* (T. Goodey, 1945)  
Kirjanova & Krall, 1971

*S. calamagrostis* (Wu, 1967) comb. nov.  
= *Anguina calamagrostis* Wu, 1967

*S. centaurea* (Kirjanova & Ivanova, 1968)  
comb. nov.  
= *Paranguina centaurea* Kirjanova & Ivanova, 1968

*S. chartolepidis* (Poghossian, 1966) comb. nov.  
= *Anguina chartolepidis* Poghossian, 1966

*S. cousinia* (Kirjanova & Ivanova, 1968)  
comb. nov.  
= *Paranguina cousinia* Kirjanova & Ivanova, 1968

*S. ferulae* (Ivanova, 1977) comb. nov.  
= *Anguina ferulae* Ivanova, 1977

*S. graminophila* (T. Goodey, 1933) comb. nov.  
= *Anguina graminophila* (T. Goodey, 1933)  
Thorne, 1961

= *A. tridomina* Kirjanova, 1958, s. nov.

*S. kopetdaghica* (Kirjanova & Shagalina, 1969) comb. nov.  
= *Anguina kopetdaghica* Kirjanova & Shagalina, 1969

*S. millefolii* (Löw, 1874) comb. nov.  
= *Anguina millefolii* (Löw, 1874) Filipjev, 1936

*S. mobilis* (Chit & Fisher, 1975) comb. nov.  
= *Anguina mobilis* Chit & Fisher, 1975

*S. montana* (Kirjanova & Ivanova, 1968)  
comb. nov.  
= *Paranguina montana* Kirjanova & Ivanova, 1968

*S. moxae* (Yokoo & Choi, 1968) comb. nov.  
= *Anguina moxae* Yokoo & Choi, 1968

*S. picridis* (Kirjanova, 1944) comb. nov.  
= *Paranguina picridis* (Kirjanova, 1944)  
Kirjanova & Ivanova, 1968

*S. plantaginis* (Hirschmann, 1978) comb. nov.  
= *Anguina plantaginis* Hirschmann, 1978

*S. polygoni* (Poghossian, 1966) comb. nov.  
= *Anguina polygoni* Poghossian, 1966

*S. varsobica* (Kirjanova & Ivanova, 1968)  
comb. nov.  
= *Paranguina varsobica* Kirjanova & Ivanova, 1968

DIFFERENTIAL DIAGNOSIS : *Subanguina* differs from *Ditylenchus* by the structure of its crustaformeria.

*Anguina pustulicola* Thorne, 1934, and *A. klebahni* Goffart 1942, may also belong to the genus *Subanguina*. However, the original descriptions are not adequate to classify them to genus, and specimens were not available for examination. Therefore they are placed in *genus et species inquirenda*.

The genus *Subanguina* contains many sibling species and detailed biological investigations are necessary before any revision can be presented.

### Genus *Ditylenchus* Filipjev, 1936

DIAGNOSIS : Anguinidae. Mature females not swollen. Median bulb with refractive thicke-

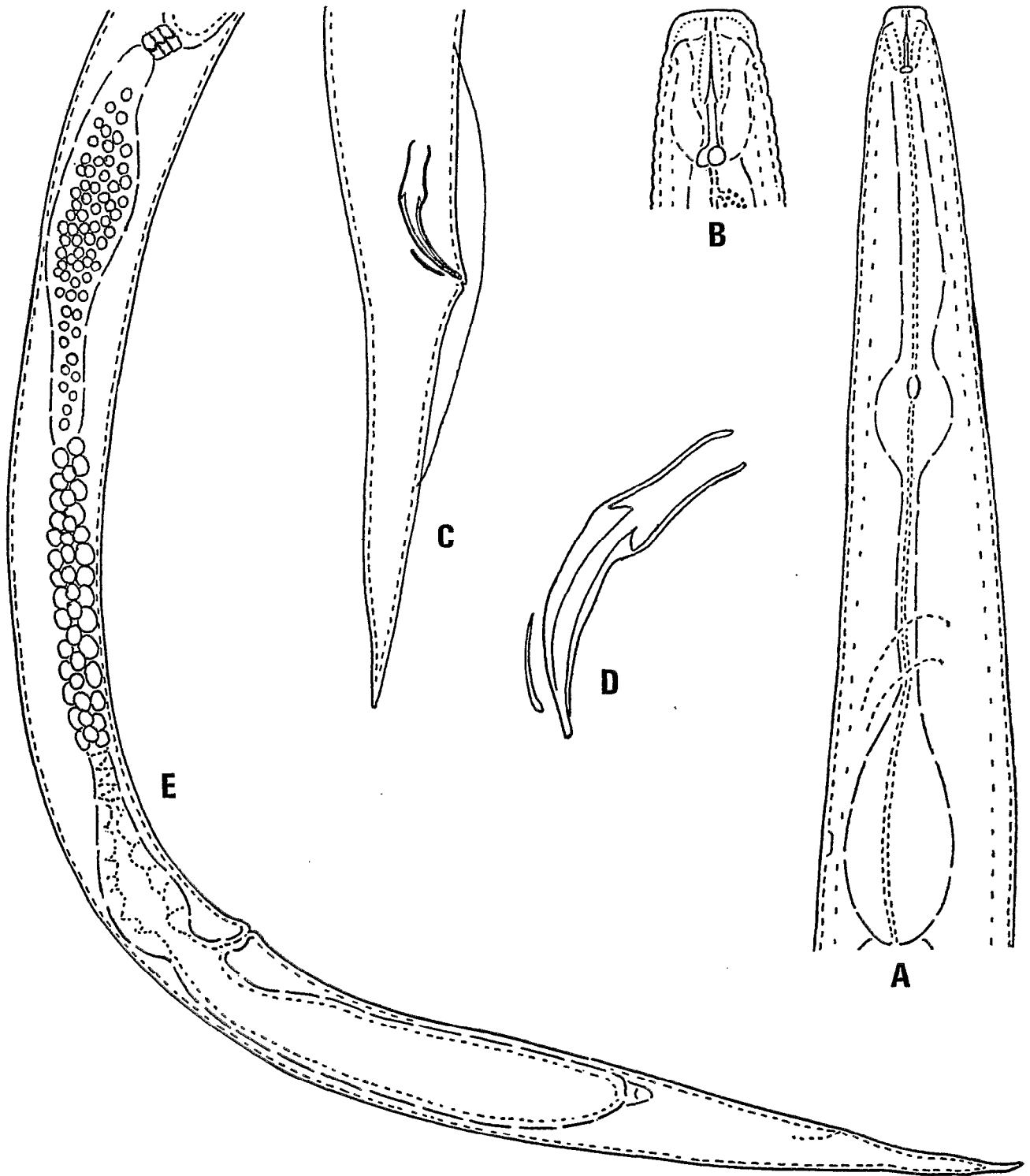


Fig. 5. *Subanguina radicolica*. A : oesophageal region, B : head, C : tail of male, D : spicule and gubernaculum, E : posterior part of female showing reproductive system.

nings. Isthmus not separated by constriction. Crustaformeria in form of quadricolumella. Ovary with 1-2 oogonia in circumference. Vagina perpendicular to body axis. Testes usually without flexures. Tail of both sexes conical, rounded or pointed at the end. Soil inhabiting fungal feeders or obligatory parasites of higher plants.

## TYPE SPECIES

*D. dipsaci* (Kühn, 1859) Filipjev, 1936

DIFFERENTIAL DIAGNOSIS : *Ditylenchus* differs from *Nothotylenchus* by the presence of refractive thickenings in median bulb, and from *Subanguina* by the structure of crustaformeria.

This genus probably contains several sibling species.

Genus *Nothotylenchus* Thorne, 1941

DIAGNOSIS : Anguinidae. Mature females not swollen. Median bulb weakly developed or absent, without refractive thickenings. Isthmus not separated by a constriction. Crustaformeria in form of quadricolumella. Ovary with one or two oogonia in circumference. Vagina perpendicular to body axis. Testes usually not reflexed. Bursa short, or extending up to 2/3 of tail length. Soil and fresh water nematodes, probably most feed on fungi.

## TYPE SPECIES

*N. acris* Thorne, 1941

DIFFERENTIAL DIAGNOSIS : It differs from *Ditylenchus* by structure of oesophagus only.

Sumenkova (1975) in her review of this genus mentioned eight groups of species. *Ditylenchus* and *Nothotylenchus* need very detailed taxonomic studies and regrouping.

Genus *Diptenchus* Khan, Chawla & Seshadri, 1969

DIAGNOSIS : Anguinidae. Female not swollen. Median bulb with refractive thickenings. Isth-

mus not separated by constriction. Crustaformeria in form of quadricolumella. Ovary with one or two oogonia in circumference. Vagina oblique to the body axis, vaginal walls refractive. No post-vulval uterine sac. Tail of both sexes conical.

## TYPE AND UNIQUE SPECIES

*D. indicus* Khan, Chawla & Seshadri, 1969

DIFFERENTIAL DIAGNOSIS : *Diptenchus* differs from *Ditylenchus* by structure of the vagina and lack of post-vulval uterine sac.

Type specimens from Dr. Khan fitted the original description, although cardia and phasmids were not seen.

*D. indicus* is known from one collection from New Delhi.

## ACKNOWLEDGEMENTS

Many people contributed to this work by sending slides or discussing various aspects of Anguinidae taxonomy. I want to express to all of them my sincere appreciation. Most cordial thanks are due to Eino Krall who put his collection at my disposal and whose deep interest in nematode evolution stimulated this work. The following helped in various ways, and this paper would not have been completed without their efforts : J.G. Baldwin, A.F. Bird, R.H. Brown, W.N. Chizhov, R.C. Colbran, E. Geraert, D.J. Hooper, T.S. Ivanova, E. Khan, P.A.A. Loof, R. McLeod, E.M. Noffsinger, D.C. Norton, C.C. Orr, T.S. Skarbilovich, G.I. Solov'eva, D. Sturhan, B. Stynes and H. Triantaphyllou.

## REFERENCES

- ANDRÁSSY, I. (1976). *Evolution as a basis for systematization of nematodes*. Budapest, Akadémiai Kiadó, 288 p.
- CHOI, Y.E. & LOOF, P.A.A. (1973). Redescription of *Anguina morae* Yokoo & Choi, 1968 (Tylenchida). *Nematologica*, 19 : 285-292.
- GERAERT, E. (1976). The female reproductive system in *Deladenus* and *Heratylus* with a redefinition of the oviduct in the Tylenchida (Nematoda). *Nematologica*, 22 : 437-445.
- GERAERT, E. & KHEIRI, A. (1970). The female gonads and oesophageal structure in the genus *Pseudhalenchus* (Nematoda : Tylenchida). *Nematologica*, 16 : 197-202.

- GOLDEN, A.M. (1971). Classification of the genera and higher categories of the order Tylenchida (Nematoda). In : Zuckerman, B.M., Mai, W.F. & Rohde, R.A. (Eds) *Plant Parasitic Nematodes*, Vol. 1, New York, Academic Press : 191-232.
- HOOPER, D.J. (1978). Structure and classification of nematodes. In : Southey, J.F. (Ed.) *Plant Nematology*, London, H.M.S.O. : 3-45.
- HOPPER, B.E. & TARJAN, A.C. (1977). *Supplement for the year 1972 to nomenclatorial compilation of plant and soil nematodes*. Ottawa, Agric. Canada Res. Branch, 17 p.
- HOPPER, B.E. & TARJAN, A.C. (1978). *Supplement for the year 1978 to nomenclatorial compilation of plant and soil nematodes*. Ottawa, Agric. Canada Res. Branch, 21 p.
- KIRJANOVA, E.S. (1955). Pyrejnaja ugrica — *Paranguina agropyri* Kirjanova, gen. et sp. n. (Nematodes). *Trudy zool. Inst.*, 18 : 42-52.
- PARAMONOV, A.A. (1962). *Osnovy fitogelmintologii. Tom I*. Moskva, Izdat. Akad. Nauk SSSR, 480 p.
- PARAMONOV, A.A. (1970). *Osnovy fitogelmintologii. Tom III*. Moskva, Izdat. Akad. Nauk SSSR, 253 p.
- SIDDIQI, M.R. (1971). Structure of the oesophagus in the classification of the superfamily Tylenchoidea (Nematoda). *Indian J. Nematol.*, 1 : 25-43.
- SUMENKOVA, N.I. (1975). *Nematody rastenij i pochvy. Neotylenchoidea*. Moskva, Nauka, 197 p.
- TARJAN, A.C. & HOPPER, B.E. (1974). *Nomenclatorial compilation of plant and soil nematodes*. DeLeon Springs, U.S.A. Soc. of Nematologists, 419 p.
- THORNE, G. (1961). *Principles of nematology*. New York, McGraw-Hill Book Co., 553 p.
- WU, L.Y. (1967). *Anguina calamagrostis*, a new species from grass with an emendation of the generic characters for the genera *Anguina* Scopoli, 1777 and *Ditylenchus* Filipjev, 1936 (Tylenchidae : Nematoda). *Can. J. Zool.*, 45 : 1003-1010.

NOTE ADDED ON PROOF

Two more genera were recently proposed within Anguinidae :

*Heleroanguina* Tchizhov, 1980, cannot be differentiated from *Subanguina* and must be considered its junior synonym. *Anguina graminophila* is mentioned as type species of *Heleroanguina*, but this taxon is not cited as new combination.

*Safranema* Siddiqi, 1980, differs from *Ditylenchus* by having long oesophageal lobe. No differences are mentioned between *Safranema* and *Ditylenchus* species with oesophagus overlapping intestine, as *D. destructor* and *D. myceliophagus*.

REFERENCES

- SIDDIQI, M. R. (1980). Two new nematode genera, *Safranema* Anguinidae and *Discotylenchus* Tylenchidae, with descriptions of three new species. *Proc. helminth. Soc. Wash.*, 47 : 85-94.
- TCHIZHOV, T. N. (1980). O taksonomitcheskom statusе nekotorykh vidov roda *Anguina* Scopoli, 1777. *Biul. Vsesojuzn. Inst. Gelmint.*, 26 : 83-95.

Accepté pour publication le 20 mai 1980.