

XXII.

Free-living Nematodes
from Greenland, Land and
Freshwater.

By

Hjalmar Ditlevsen

1927.

Introduction.

No free-living land and freshwater Nematodes have hitherto been known from Greenland. As therefore in 1925 I heard, that Mag. scient. O. HAGERUP intended to go to Greenland with Capt. Ejnar Mikkelsen in the ensuing summer, I begged him to try to get me some material for the purpose of obtaining living specimens of land and freshwater Nematodes. Mag. HAGERUP very kindly promised to collect green turf and mosses and water plants after my indications, and to keep the samples in tin-boxes till his return.

It happened that HAGERUP came ashore only one day, near the colony "Sukkertoppen", but nevertheless he got time to collect material in several different localities. I beg also here to express my best thanks to him for his kindness.

The following year the two Austrian zoologists, Dr. REISINGER and Dr. STEINBÖCK went to Greenland, mainly for studying and collecting Planarians, and also these two colleagues were kind enough to collect material, according to my indications. I feel much indebted also to these two gentlemen and beg them to receive my sincere thanks for their kindness. Besides dredged marine material they collected land and freshwater material, and in this way I succeeded in getting Nematodes from different places between Upernivik and Godthaab.

In the following pages I shall deal with the land and freshwater forms, brought home by the above named three scientists. Specimens belonging to 22 species in all were found. Of these 22 species four are described as new to science;

the other eighteen are all known from the European Nematode fauna, and some of them have also been found in America.

A discussion of the question whether Greenland has received its Nematode fauna from America or from Europe would, for the present, be without any result; our knowledge of the geographical distribution of these animals is, on the whole, too scanty and especially, as to the Non-European world, practically very small. In U. S. A. an energetic work, concerning the biology and distribution of these animals, has been carried out during the later years; but the enormous extent of the American continent is the cause of the knowledge necessary in this connection not being at hand as yet.

As to the distribution of the species secured within Greenland I shall remark the following. At the list is seen that fifteen species were taken in the neighbourhood of "Sukkertoppen" and twelve at Disco; four at Kapisigdlit, three at Upernivik and only one at "Prøven". It is evident that these facts do not say anything about the real distribution of free-living Nematodes in Greenland and are only due to casual circumstances. But it is perhaps justifiable to conclude that e. g. *Dorylaimus Carteri* is one of the most common species and that *Plectus cirratus* also has a wide distribution. Besides this, the list only gives the species of land- and fresh-water Nematodes secured from the material, taken by the above-named scientists, and the places where the different species were taken.

	Kapisigdlit (Godth. Fj.)	Sukker- toppen	Disco	Prøven	Upernivik
<i>Tripyla papillata</i>	×
<i>Trilobus pseudallopheysis</i>	×	×
<i>Prismatolaimus dolichurus</i>	×	×
<i>Mononchus spectabilis</i>	×
<i>Mononchus papillatus</i>	×	×
<i>Mononchus brachyuris</i>	×	×
<i>Dorylaimus obtusicaudatus</i>	×
<i>Dorylaimus groenlandicus</i>	×
<i>Dorylaimus analatus</i>	×	×
<i>Dorylaimus conicaudatus</i>	×
<i>Dorylaimus Carteri typ.</i>	×	×	×	×	×
<i>D. Carteri lugdunensis</i>	×
<i>D. Carteri acuticauda</i>	×
<i>Dorylaimus Reisingeri</i>	×
<i>Dorylaimus stagnalis</i>	×
<i>Dorylaimus macrolaimus</i>	×
<i>Deontolaimus papillatus</i>	×
<i>Achromadora terricola</i>	×	×
<i>Plectus granulosis</i>	×
<i>Plectus cirratus</i>	×	×	×	..	×
<i>Monohystera pseudobulbosa</i>	×
<i>Tylenchus Davainei</i>	×

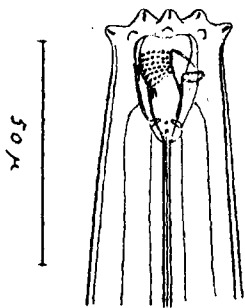


Fig. 8. *Mononchus brachyuris*. Front end.

MICOLETZKY and — as far as I am able to see — to the form *brachyuroides* of the same author.

As to the shape and structure, the buccal cavity agrees well with this form. The dorsal tooth is very large and the subventral teeth, opposite to the base of the dorsal tooth, are well developed, rather long, but thin (fig. 8). The serially arranged denticles are likewise well developed, and this also holds good of the small teeth-like prominences at the bottom of the buccal cavity.

The lateral organ is very obvious, especially in one specimen. It is rather large and situated immediately in front of the base of the dorsal tooth.

Fig. 8 plainly shows this.

The tail is conical, but

it is in shape somewhat different from that common in the European form, which is just like that figured by STEINER 1916 in his paper dealing with free-living Nematodes from Nova-Zembla. In the specimens from Greenland there is no curve on the ventral side of the tail, as shows fig. 9. The excretory pore of the caudal gland is obviously dorsal.

I have been in doubt whether I should establish a nova species or not for this form, but as my material is rather scanty, and as most of the species of *Mononchs* with series of denticles in the buccal cavity, have hitherto been only little investigated, I have preferred — at any rate previously — to refer it to *M. brachyuris*.

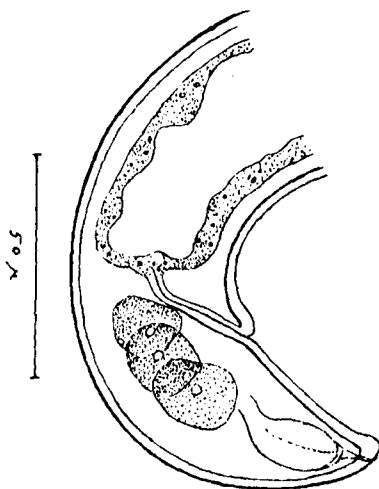


Fig. 9. *Mononchus brachyuris*. Tail.

Subfam. *Dorylaiminæ*.*Dorylaimus* Dujardin.*Dorylaimus obtusicaudatus* Bastian.

Locality: Disco. ca. 50 m. above the level of the sea.
19. 8. 1926. Reisinger and Steinböck.

Female: Length 2,5 mm. $\alpha = 21,4$; $\beta = 3,5$; $\gamma = 50$.
Vulva 53,3 %.

The two female specimens at hand originate from Disco, both of them from the same locality. They agree well with the European specimens in most respects. The spear is rather stout, and the lips are well developed, with obvious papillæ. Also the layers of the cuticle of the tail were easily observed.

Dorylaimus (Subg. *Doryllium*) *groenlandicus* n. sp.

Locality: Disco. Above the Arctic Station. At a brook.
19. 8. 1926. Steinböck and Reisinger.

Female: Length 2,5 mm. $\alpha = 25$; $\beta = 6$; $\gamma = 50$.
Vulva 43,3 %.

Only one specimen was secured, a fully developed female. Although this specimen in many respects agrees well with the *D. macrodorus* of DE MAN, so well that there can be no doubt about its belonging to the subgenus *Doryllium*, it differs, on the other side, so much from the European form that I have found it natural to establish a new species for the Greenland specimen.

Most important is perhaps the size of the Greenland specimen which remarkably exceeds the dimensions indicated for European specimens, the length of which, according to MICOLETZKY, is between 0,9 and 1,7 mm. But in other respects too it differs rather considerably.

In the front end the body begins to taper at about the

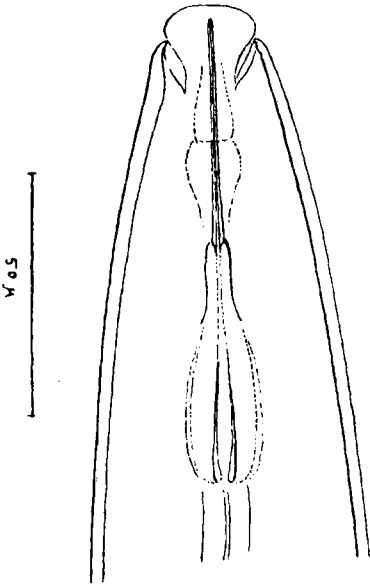


Fig. 10. *Dorylaimus groenlandicus*. Front end.

rate in the specimen figured, considerably longer than the distal part. The two parts are very different in structure; the distal half consists of the proper spear, strongly chitinized and thick-walled, the lumen in its interior is obvious but very narrow, and the apical opening is found on the side immediately behind the tip. The proximal half is relatively weakly chitinized, and the lumen in its interior is increasing towards the base; it is provided with three projecting wings of a somewhat other shape than in the European species, the difference being easily seen, when comparing my figure with the figure of DE MAN (Pl. XXVI, fig. 110a) in

level of the base of the oesophagus; it then tapers evenly till the level of the proximal end of the spear, from where it tapers rather quickly unto the front end. The head is rounded, but no lips are obvious, and no papillæ were observed; at its base the openings of the large lateral organs are situated; they are seen in profile in the figure 10. The spear is long and, as usual, it is possible to distinguish two parts, which are, in the species under consideration, of exactly the same length. According to the figure of DE MAN, the proximal part is in the European form, at any

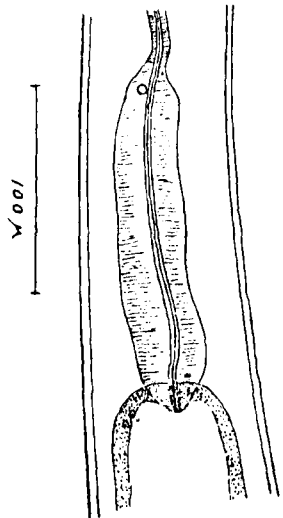


Fig. 11. *Dorylaimus groenlandicus*. Hind part of the oesophagus.

his great monograph of the Dutch free-living Nematodes (1884). The distal half is, as in the European species too, surrounded by a sort of sheath or gubernaculum, which is presumably able to manage the movements of the long spear.

The oesophagus is relatively short in the specimen from Disco. While DE MAN indicates the value of β to 4—4½ in Dutch specimens, the same proportion is 6 in *D. groenlandicus*; its distal part is very narrow, then it suddenly widens at about the beginning of the hindmost third or somewhat more (fig. 11).

The female pore is found somewhat in front of the middle, and the ovaries are symmetrical and reflexed. The tail is very short and rounded, nearly semiglobular in shape (fig. 12).

Finally, I shall add that only the distal part of the spear is replaced during the moult. Already STEINER has stated this fact in 1914 for his *D. macrodoroides*, and this also holds good of *D. groenlandicus* and of the following species as well, presumably of all species, belonging to the subgenus *Doryllium*. Besides, it is a question if *D. macrodoroides* Steiner is to be referred to this subgenus.

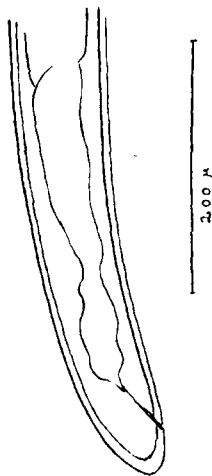


Fig. 12. *Dorylaimus groenlandicus*.
Hind part.

***Dorylaimus* (Subg. *Doryllium*) *analatus* n. sp.**

Locality: Kapisigdlit (the Fjord of Godthaab). 9. 7.—24. 8. 1926. Steinböck and Reisinger.

Upervnik. In moss. Aug. 1926. Steinböck and Reisinger.

Female: Length 1,8 mm. $\alpha = 24,4$; $\beta = 5,0$; $\gamma = 55,0$.
Vulva 50,9 %.

Two full-grown females and some few young specimens are present.

Presumably this form belongs to the subgenus *Doryl-*

lium, the structure of the spear being the same as in the foregoing species; only the wing-like outgrowths of the hindmost part seem to lack entirely, (wherefore I have named it *analatus*.)

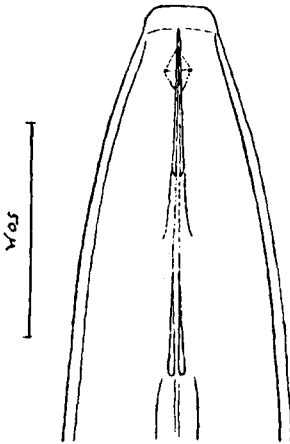


Fig. 13. *Dorylaimus analatus*. Front end.

The body-shape is about the same as in *D. groenlandicus*. In the front end it tapers somewhat more. The lip-region is marked by a shallow furrow; it is truncate and the lips are indistinct. Papillæ are obvious but tiny. The lateral organ was not observed.

The spear is, as said, of the same structure as in *D. groenlandicus* and in *D. macrodorus* de Man; it is divided in two parts, a proximal and a distal; the latter is strongly chitinized and straight; it is relatively

thick at the base and tapers evenly towards the apex. The lumen of the interior opens, as in the foregoing species, immediately behind the tip. The proximal part is weakly chitinized and, in contradistinction to the two other species of this genus, it lacks the wing-like outgrowths. While in *D. groenlandicus* the distal and the proximal part of the spear were of the same length, the proximal part is, in the species under consideration, somewhat longer than the distal; the proportion is easily seen in the fig. 13.

The oesophagus is somewhat longer in *D. analatus* than in *D. groenlandicus*, but regarding the scanty material at hand this proportion is of only insignificant importance. Also in this species the oesophagus is very narrow in its distal part and widens rather quickly caudad to the nerve ring. The intestine is — a

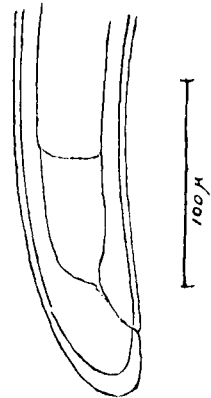


Fig. 14. *Dorylaimus analatus*. Hind part.

feature which also holds good of *D. groenlandicus* — very spacious, and in optical section its width is about twice the width of the proximal part of the oesophagus, a feature, obviously seen in fig. 11.

A fact of presumably some systematic importance is that the differentiated, anterectal part of the intestine is relatively much longer in *D. groenlandicus* than in *D. analatus* which is shown in the figs. 12 and 14.

The female pore is, in the species under consideration, situated inconsiderably caudad to the middle of the body. The ovaries are symmetrical and reflexed.

The tail is short and rounded (fig. 14).

Dorylaimus conicaudatus n. sp.

Locality: Kapisigdlit. The Fjord of Godthaab. 9. 7.—24. 8. 1926. Reisinger and Steinböck.

Female: Length 2,0 mm. $\alpha = 30$; $\beta = 6,1$; $\gamma = 30$.
Vulva 41,7 %.

This very nice form is present in several specimens, some of which are fullgrown females, while the rest comprises young individuals. No male was seen.

This species is beyond doubt nearly related to the subgenus *Doryllium*. It has a straight, rather long and relatively slender spear, and this is continued by a pseudo-spear much like that known in STEINER'S *D. macroroides*, but it is easily distinguished from this form, by means of the relatively short oesophagus and the shape of the tail.

The front end narrows quickly, and in this respect it is very much like *D. groenlandicus*. The head is rounded and neither lips nor papillæ are obvious (fig. 15).

The foremost half of the oesophagus

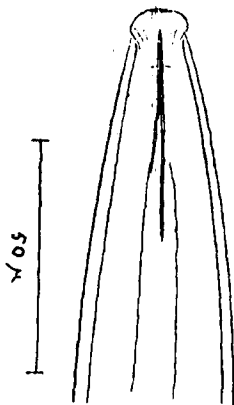


Fig. 15. *Dorylaimus conicaudatus*. Front end.

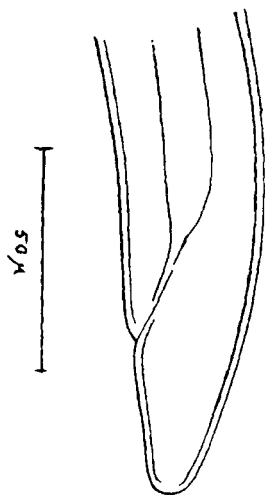


Fig. 16. *Dorylaimus conicaudatus*. Hind part.

Unfortunately I was not able to observe where it opens; I am most inclined to mean that it must be into

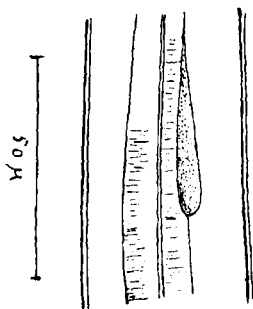


Fig. 18. *Dorylaimus conicaudatus*. Oesophageal gland.

is thin, and at the end of this the nerve ring is found; it is hardly observable, and behind it the oesophagus increases towards its base. Immediately caudad to the nerve ring a pear-shaped, rather lengthened, body is observed (fig. 18). It is situated at the ventral side of the oesophagus and is much like the ventral gland, known in most of the marine species of free-living Nematodes. It was observed in nearly all the specimens at hand, but

and not at the surface of the body. The ante-rectum is relatively long and makes almost the half of the length of the oesophagus.

As to the shape of the tail, I shall remark that in most of the specimens it is conical with rounded tip as shows the fig. 16; but in some few it is somewhat more acute as in fig. 17, only the tip is never pointed.

The female pore is situated somewhat cephalad to the middle of the body. The ovaries are rather short and symmetrical. Though several full-grown females are present, not a single was seen with shell-eggs in the uterus.

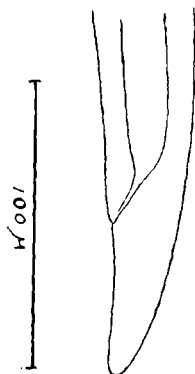


Fig. 17. *Dorylaimus conicaudatus*. Hind part of a specimen with more acute tail.

Dorylaimus Carteri Bastian.

Locality: Near "Sukkertoppen". In a damp bog with Eriophorum and Sphagnum 25. 8. 1925. O. Hagerup.

Near "Sukkertoppen". At a brook; under Salix herbacea. 25. 8. 1925. O. Hagerup.

Near "Sukkertoppen". Rather dry heath; under Cassiope hypnoides. 25. 8. 1925. O. Hagerup.

Near "Sukkertoppen". Meadow, fortnightly overflowed by sea-water. 25. 8. 1925. O. Hagerup.

Near "Sukkertoppen". In a spring with Sphagnum. 25. 8. 1925. O. Hagerup.

Disco. ca. 50 m. above the level of the Sea. 19. 8. 1926. Reisinger and Steinböck.

Disco. ca. 100 m. above the level of the Sea. 19. 8. 1926. Reisinger and Steinböck.

Disco. Above the Arctic Station; at a brook. In moss. 19. 8. 1926. Reisinger and Steinböck.

Kapisigdlit (The Fjord of Godthaab). 9. 7.—24. 8. 1926. Reisinger and Steinböck.

Upervivik. In moss. Aug. 1926. Reisinger and Steinböck.

Upervivik. In a spring with Sphagnum. 25. 8. 1926. Reisinger and Steinböck.

Upervivik. ca. 100 m. above the level of the Sea. 25. 8. 1926. Reisinger and Steinböck.

Upervivik. The top of the island. 26. 8. 1926. Reisinger and Steinböck.

"Prøven". 28.—31. 8. 1926. Reisinger and Steinböck.

Female: Length 2 mm. $\alpha = 34,3$; $\beta = 4,1$; $\gamma = 20$.
Vulva 50 %.

Male: Length 2,5 mm. $\alpha = 37,5$; $\beta = 4,8$; $\gamma = 25$.

Young: Length 1,6 mm. $\alpha = 33,3$; $\beta = 4,5$; $\gamma = 20$.

There is no doubt that the species under consideration is very common in Greenland; it proves to be present in material from almost every station, and ca. 200 specimens in all are at hand. Males are relatively frequent; ca. twenty among hundred specimens

Bibliography.

- ALLGÉN, CARL, Beiträge zur Kenntnis der freilebenden Nematoden Schwedens. Arkiv för Zoologi. Bd. 18A. 1925.
- BRAKENHOFF, H., Beitrag zur Nematodenfauna des nordwestdeutschen Flachlandes. Abh. Nat. Ver. Bremen Bd. 22. 1913.
- BÜTSCHLI, O., Beiträge zur Kenntnis der freilebenden Nematoden. Nova Acta Leop.-Carol. Vol. 36. 1873.
- Zur Kenntnis der freilebenden Nematoden, insbesondere der des Kieler Hafens. Abh. Senckenb. naturf. Ges. Frankfurt a. M. Bd. 9. 1874.
- COBB, N. A., The Mononchs (Mononchus Bastian 1866), A Genus of free-living predatory Nematodes. Nematology 1917.
- Estimating the Nema population of soil. Agricultural Technol. Circular I. Washington 1918.
- One hundred Nemas. Contributions to a science of Nematology IX. Baltimore 1920.
- DADAY, E., Die freilebenden Süßwassernematoden Ungarns. Zool. Jahrb. Bd. 10 (Syst.). 1898.
- DITLEVSEN, HJ., Danish free-living Nematodes. Vid. Medd. fra Dansk Naturh. Foren. Bd. 63. 1911.
- Nematological Notes. *ibid.* Bd. 74. 1921.
- HOFMÄNNER, B., Beitrag zur Kenntnis der Nematodenfauna des Müdäsees in Pommern. Festschr. f. Zschöcke. Basel 1920.
- HOFMÄNNER, B. u. MENZEL, R., Die freilebenden Nematoden der Schweiz. Rev. Suisse de Zool. Bd. 23. 1915.
- DE MAN, J. G., Die frei in der reinen Erde und im süßen Wasser lebenden Nematoden der niederländischen Fauna, Leiden 1884.
- Helminthologische Beiträge. Tijdschr. Nederl. dierk. Vereen. (2). Vol. 1. 1885.
- Observations sur quelques espèces de Nématodes terrestres libres de l'île de Walcheren. Ann. Soc. zool. malacol. Belgique. Bd. 41. 1906.
- Contribution à la connaissance des Nématodes libres de la Seine et des environs de Paris. Ann. Biol. Lacustre. Bd. 2. 1907.

- DE MAN, J. G., Helminthologische Beiträge. Zool. Jahrb. Supplement XV. 1912.
- Beitrag zur Kenntnis der in Norwegen frei in der reinen Erde lebenden Nematoden. Tijdschr. d. Nederl. dierk. Vereen. (2). Bd. 16. 1917.
- Nouvelles recherches sur les Nématodes libres terrioles de la Hollande. Capita Zoologica. Bd. 1. 1921.
- MARCINOWSKI, K., Parasitisch und semiparasitisch an Pflanzen lebende Nematoden. Arb. biol. Anst. Land- u. Forstwissensch. Bd. 7. 1909.
- MICOLETZKY, H., Freilebende Süßwasser-Nematoden der Ostalpen mit besonderer Berücksichtigung des Lunzer Seengebietes. Zool. Jahrb. Syst. Bd. 36. 1914.
- Freilebende Süßwasser-Nematoden der Bukowina. *ibid.* Bd. 40. 1917.
- Freie Nematoden aus dem Grundschlamm norddeutscher Seen. Arch. Hydrobiol. Bd. 13. 1922.
- Zur Nematodenfauna des Bodensees. Intern. Revue Hydrobiol. Bd. 10. 1922.
- Die freilebenden Erd-Nematoden. Arch. f. Naturgesch. Jahrg. 87. Abt. A. 1922.
- Letzter Bericht über freilebende Nematoden aus Suez. Sitzungsber. Akad. Wiss. Wien. Mathem.-naturw. Kl. Bd. 133. 1924.
- Zur Kenntnis tropischer, freilebender Nematoden aus Surinam, Trinidad und Ostafrika. Zool. Anz. Bd. 64. 1925.
- Die freilebenden Süßwasser- und Moornematoden Dänemarks. K. D. Vid. Selsk. Skr. Naturv. og mathem. Afd. 8. R. X. 2. 1925.
- SCHNEIDER, G., Beitrag zur Kenntnis der im Uferschlamm des Finnischen Meerbusens freilebenden Nematoden. Acta Soc. pro fauna et flora Fennica. Bd. 27. 1906.
- Süßwassernematoden aus Estland. Zool. Anz. Bd. 29. 1906.
- Synopsis der in den süßen Wassern von Ost-, Nord- und Mitteleuropa freilebenden Nematoden. Acta Soc. pro fauna et flora Fennica. Bd. 44. 1916.
- Die Odontopharyngiden der nördlichen Ostsee. Zool. Anz. Bd. 66. 1926.
- Zweiter Beitrag zur Kenntnis der Brackwasser-Nematoden Finnlands. Acta Soc. pro fauna et flora Fennica. Bd. 56. 1926.
- SCHNEIDER, W., Freilebende Süßwassernematoden aus ostholsteinischen Seen. Arch. Hydrobiol. Bd. 13. 1922.
- Niederrheinische freilebende Nematoden. Zool. Anz. Bd. 56. 1923.
- SKWARRA, L., Freilebende Nematoden Ostpreussens. Schrift. Physik-ökonom. Gesellsch. Königsb. Pr. Jahrg. 63. 1922.

- STEFANSKI, W., Recherches sur la faune des Nématodes libres du bassin du Léman. Diss. Genève 1914.
- Sur les races de *Trilobus gracilis*. Revue Suisse Zool. Vol. 25. 1917.
 - Etude sur les Nématodes muscicoles des environs de Zakopane (Masif du Tatra polonais). Bull. Acad. Polon. des Sc. et des Lettr. Math. Nat. Sér. B. Sc. Nat. 1923, 1924.
- STEINER, G., Freilebende Nematoden aus der Schweiz. Arch. Hydrobiol. Bd. 9. 1914.
- Freilebende Nematoden von Nowaja-Semlja. Zool. Anz. Bd. 47. 1916.
 - Über das Verhältnis der marinen freilebenden Nematoden zu denen des Süßwassers und des Landes. Biol. Zentralbl. Bd. 37. 1917.
 - Die von A. Monard gesammelten Nematoden der Tiefenfauna des Neuenburger Sees. Bull. de la Soc. Neuchâteloise des Sc. nat. Bd. 43. 1919.
- THORNE, GERALD, Utah Nemas of the Genus *Mononchus*. Trans. Amer. Microsc. Soc. Vol. 43. 1924.