Nematological Notes.

By

Hjalmar Ditlevsen.

Zoological Museum, Copenhagen.

(With Plate II).

I.

Last year I occasionally obtained by the kindness of Mag. P. Kramp some material washed off from Algæ, Hydroids and stones, all originating from the pier of the little harbour of the Skaw.

This material, for which I beg Mr. Kramp to receive my sincere thanks has furnished several free-living Nematodes among which some proved to be of special interest.

Krampia n. g.

I shall first deal with a genus not hitherto described, which I give the name of *Krampia* after Mag. Kramp, who was the first to capture it.

Nematodes of a shape rather slender, almost filiform. The greater part of the body is of about equal width only slightly tapering towards the ends. In the formemost part it begins to taper at about the base of the œsophagus towards the base of the buccal cavity from where it tapers more quickly so that the head appears somewhat constricted. The head is truncate and provided with four lips which are rounded and somewhat swollen, and which seem to be movable. A ring of rather stout setæ is situated round the head, two on each lip, as far as I have been able to ascertain. Rather fine and scanty hairs are spread over the foremost part of the body, especially in the œsophageal region. The cuticle is smooth and seems to be devoid of striæ.

The buccal cavity is funnel-shaped with thickened chitin-intima but no teeth are found. At the level of the buccal cavity

there are seen some chitinous thickenings which seem to have their place in the outer layer of the œsophagus itself (fig. —), a feature rather strange and, as far as I am aware, hitherto unique among freeliving Nematodes. The œsophagus, rather thin in its distal part, increases evenly towards its base, where it is somewhat expanded without forming a true bulb. The nerve ring is of considerable size and situated at about the middle of the œsophagus.

Ventral gland present. Excretory duct opens on the ventral lip cephalad to the setæ, by means of a very long chitinous tube issuing from a rather large ampulla. Female organ unsymmetrical; the vulva is situated a considerable distance behind the middle. Spicules rather straight. There are no accessory pieces, no supplementary organ, no masculine papillæ.

Krampia acropora n. sp.

Pl. II, figs. 1, 2, 5.

Three specimens are present, one male, the length of which makes 3,0 mm, one mature female at a length of 3,2 mm, the uterus of which contains eight shell-eggs, and a young specimen, not sexually differentiated and only measuring 1,8 mm.

The shape is slender, almost filiform and only slightly tapering towards the ends. The greater part of the body is of about equal width. The front end tapers slightly from about the base of the œsophagus till the base of the buccal cavity; from here it tapers more quickly so that the head appears somewhat constricted. The front-end is truncate and provided with four, presumably movable lips, distally rounded and somewhat swollen. In the hind-part the body keeps its width until caudad to the vulva whence it tapers slightly towards the anal aperture. The tail is short, conical in both sexes, and ventrally curved.

The cuticle is smooth; even with immersion lens (Zeiss Apochr. 2 mm) I have not been able to perceive the slightest trace of striæ. On the head is found a crown of eight rather stout setæ, situated two on each of the four lips. Moreover rather fine and scanty hairs are found spread over the foremost part of the body, especially in the œsophageal region. No lateral organ is observed.

The buccal cavity is rather spacious and regularly funnel-

shaped; its walls are thickened, smooth, and devoid of teeth. The œsophagus is of about equal width throughout the greater part of its length; only in the proximal third it increases towards its base where it is somewhat expanded without forming a true bulb. The nerve ring, which is distinct and rather thick, is situated at about the middle of the œsophagus. As far as I have been able to ascertain there are seen at the level of the buccal cavity in the outer layer of the œsophagus itself some chitinous differentiations presenting themselves as rodlike features. The are plainly seen in the figure 0. As far as I am aware something like this is hitherto unique among freeliving Nematodes.

The ventral gland is lengthened and situated along the side of the intestine a considerable distance behind the base of the œsophagus. I have the impression that it is of considerable size but as it is rather indistinct I am not sure that I have succeeded in observing its limits. Its efferent apparatus is of particular interest; as usual in freeliving Nematodes the duct is of protoplasmatic structure and is a part of the secernating cell itself; it is of considerable width and ends with a large ampulla which is of the same structure as the duct. From this ampulla issues an exceedingly long efferent tube of chitinous structure and opening in the very front end on the ventral side of the ventral lip, cephalad to the cephalic bristles. This feature is, as far as I am aware, quite unique among freeliving Nematodes. The length of the tube makes in the fullgrown female of 3,2 mm 48 μ; only a small part of the ampulla is formed by the tube and consequently this part is chitinous.

I shall here remark that, concerning a uniform nomenclature, I call the protoplasmatic part of the efferent apparatus, „*efferent duct*“ and the chitinous part, originating from a cuticular invagination „*efferent tube*“ as I did in my last papers dealing with freeliving Nematodes. It will, I think, be convenient to keep distinct these two designations.

The female organ is single. The vulva is situated a considerable distance behind the middle; the antevaginal part of the body is in proportion to the postvaginal part as about 3 to 1. No vaginal glands have been observed. In the uterus are found eight shell-eggs of the usual ovoid shape. The spicules are rather straight

and provided with a knob in their proximal end; distally they are somewhat expanded and end with an acute tip. Their length makes 30 μ. Supplementary organ and masculine papillæ are lacking.

Female: $\alpha = 57$, $\beta = 8$, $\gamma = 50$.

Male: $\alpha = 75$, $\beta = 8$, $\gamma = 75$.

Seuratiella.

In my paper "Marine freliving Nematodes from Danish waters" I established a new genus, named *Seuratia* after the French Nematologist Seurat. Seurat was kind enough to inform me that the name *Seuratia* was already preempted and proposed to alter the name into *Seuratiella*. I am glad to be able to follow his proposition now as a new species of the named genus was found in the material from the Skaw.

Seuratiella pellucida n. sp.

Pl. II, figs. 4, 7, 8.

Only a single specimen is present, a male the length of which makes 1,2 mm. The body is rather slender and of about the same width througout its whole length. The head is truncate and the foremost part of the body tapers from about at the level of the excretory pore towards the front.

The cuticle is — as in the earlier described species of this genus — transversally striated and provided with a system of minute points, arranged in transverse rows. As in *Seuratiella gracilis* these points are hardly visible under high magnifying powers (Apochr. 2 mm). On the head is found a ring of rather stout setæ, somewhat longer than those known in species from the Limfjord. The lateral organ is of the same spiral-shape as in *S. gracilis* but inconsiderably smaller. While in the latter the diameter of the spiral makes 6 μ it only measures c. 5 in *S. pellucida*. I shall remark that the specimen of *S. gracilis* is of the same length as the specimen of *S. pellucida*, namely 1,2 mm.

The buccal cavity is deeper and not as wide as in *S. gracilis*, a feature which is plainly seen when comparing the respective figures of the front part of the two species. No trace of teeth is found. As in *S. gracilis* an eye-spot is seen a short distance be-

hind the lateral organ. It is beyond doubt that this eye which consists of a cyathiform pigment heap has been lens-bearing as has presumably also been the case in *S. gracilis* in which the pigment-heap is of essentially the same shape.

Oesophagus is of uniform width throughout its whole length. The nerve ring is rather indistinct and situated at the beginning of the proximal third of the œsophagus. The intestinal cells are crowded with large refringing granules.

In *S. gracilis* I have not succeeded in observing a ventral gland; but as this organ is present in *S. pellucida* it is probably not missing in the former. In the species under consideration it is situated some distance behind the base of the œsophagus and alongside the intestine. The excretory pore is found at about the level of the eye-spot, c. 25 μ behind the front in the specimen at my disposal.

The spicules are slightly curved and provided with an inconspicuous dilatation in the proximal end, behind which is seen a necklike constriction. The accessory pieces are rather large and acute in their proximal end. Distally they are expanded and form a sheath which surrounds the the distal part of the spicules, not unlike what is found in certain species of *Cyatholaimus* no doubt a closely related genus. As in *S. gracilis* three small supplementary organs are seen, and cephalad to these a single, large supplementary organ. This latter is in the species under consideration large and almost straight, not curved as in *S. gracilis*. The distance between two of the small supplementary organs makes c. 10 μ. The distance between the large supplementary organ and the most cephalad of the small organs makes c. 30 μ, and the distance from the most caudad of the small supplementary organs to the anal aperture makes c. 25 μ.

$\alpha = 37{,}5$. $\beta = 7{,}1$. $\gamma = 25$.

Oncholaimus skawensis n. sp.

Pl. II, figs. 3, 6.

Among the Nematodes from the harbour of the Skaw was found a single male specimen of an Oncholaimus which I have not been able to refer to any known species.

The shape is rather slender, almost filiform; the body is not

convoluted in preserved condition, only slightly curved. The length makes 2,8 mm. It is of about equal width throughout its whole length; only in the extremitis it is slightly tapering. The cuticle appears to be smooth and no markings neither transverse nor longitudinal are seen. The head is provided with a crown of rather short setæ, presumably eight in number. No lateral organ has been observed.

The buccal cavity is rather long in proposition to its width; its length makes c. 30 μ while its width is only 14 μ. Of the teeth the left subventral one is the largest. The œsophagus is of medium length and of about equal width throughout its whole length; only towards its base it increases somewhat. The nerve ring is situated inconsiderably cephalad to the middle of the œsophagus. The intestinal cells are crowded with refringing granules. The ventral gland is situated somewhat behind the base of the œsophagus, and the excretory pore about 50 μ behind the front. Immediately behind the excretory pore a rather stout bristle is seen.

The spicules are almost straight and provided with a little knob in the proximal end; behind the knob is a necklike constriction whence the spicule increases in width. Towards the distal end it tapers rather strongly. No accessory pieces have been observed. The length of the spicules makes c. 36 μ. Round the ano-genital aperture is found a cup-shaped invagination, the edge of which is set with short, coarse bristles with acute tip. The tail is rather thin, almost finger-shaped. On its ventral side is found two blunt projections in each of which is seen a slightly curved spine with very acute tip. These spines having their proximal ends in the interior of the tail penetrate the cuticle and their distal ends project on the ventral side of the tail. I have not been able to decide whether these spines are hollow and efferent ducts for glands or whether they are solid.

$\alpha = 58,_3$. $\beta = 7,_{14}$. $\gamma = 35,_0$.

II.

In the summer 1917 I had a stay at the Fresh-water biological laboratory at Suserup for which I am much indebted to the Director, Dr. Wesenberg-Lund. It was my intention to study the Nematode-fauna of some of our lakes, localities which I had hitherto not had the opportunity of examining.

Unfortunately I had not the full advantage of my stay which I was obliged to interrupt before the time on account of ill-helth. But as till now I have had no opportunity to resume my investigations rationally, I have found it suitable to impart communication of different species of land- and freshwater forms which I have met with in Suserup and in other localities during the last years.

The following species mentioned are all new to the Danish fauna with the exception of Chromadora Örleyi.

Aphanolaimus aquaticus Daday.

This interesting form was first taken in Ungarn and described by v. Daday. Later on it was known from the East Alps and from Bukowina (Micoletzky), from Switzerland, where it was taken in the lake of Geneva (Stefansky) and in mosses from the High-Alps (Menzel). Furthermore it was recorded from South-Africa, Sambesi (Micoletzky). It thus proves to be a species with a wide geographical range.

During my stay at Suserup a single male specimen was captured in the lake of Tjustrup-Bavelse. It was found in bottom material, and in spite of earger searching I did not succeed in finding any more.

The Danish specimen agrees rather well with the copious description by Micoletzky. As to the preanal papillæ I shall state as following. There are nine in all; in shape the chitinous ducts differ somewhat from those in the figure of Micoletzky. While in the latter the named ducts are seen as perfectly straight rods the same organs are in Danish specimen slightly curved and provided with a little, but plainly observable knoblike dilatation in their proximal end. — It is perhaps a question, whether these papillæ are to be called so or not more correctly supplementary

organs. In the form under consideration the chitinized "rods"s are in my opinion efferent ducts for glands or perhaps a glandular syncytium having its place in the body-cavity. In the figure by Micoletzky this glandular mass is plainly seen and Micoletzky mentions it in the text as "eine drüsige Partie". It is in my opinion difficult to see any essential difference between these papillæ in *Aphanolaimus* and the corresponding organs in the males of other freeliving Nematodes, f. i. *Seuratiella* or *Parasabatieria ornata*; in the latter I have stated the presence of a similar glandular syncytium. Perhaps the supplementary organs in such genera as *Enoplolaimus*, *Thoracostoma* and *Phanoderma* are more highly differentiated, but also in these forms they seem to be homologous organs; in the last named genera they are hitherto only found single.

Chromadora Ratzeburgensis Linst.

In the lake of Tjustrup-Bavelse were found two species of *Chromadora* both exceedingly common, namely *C. Öleyi* d. M. and *C. Ratzeburgensis* Linst., the last named new to the Danish fauna. The œcological behavior of these two species is mainly the same and their occurrence in the different biocœnoses mainly the same. I have noted the following:

C. Örleyi: In chalk on Potamogeton lucens-leaves, in Spongilli, in chalk on stones at the shore (Krustenstein of Micoletzky), mud on Unio-shells. *C. Ratzeburgensis*: In the bottom near the shore, in chalk on Potamogeton lucens-leaves, in chalk on stones at the shore, among Algæ on Nymphæa (Aufwuchs of Micoletzky).

In his important paper dealing with the freeliving Nematodes of the East Alps H. Micoletzky states that *C. Ratzeburgensis* occurs in the „Attersee" „als dominierende Uferform" and „in allen untersuchten Biocœnosen aufgefunden". It is interesting that the same is practically the case with the same species in the lake of Tjustrup-Bavelse in Denmark, and also proves to hold good for the closely related form *C. Örleyi*, at any rate at that time in which I had an opportunity of investigating the conditions in this respect.

Trilobus grandipapillatus Brakenhoff.

Last year in the month of July I secured a male of this form near Frederiksdal at the border of the lake of Furesø. It was taken in coarse sand on grass-roots about one m from the edge of the water. It is a rather small specimen but fully sexually developed. In preserved condition it has rolled up the foremost part of the body leaving only the hind-part with the papillæ and the tail stretched out. On account of this fact I have not been able to measure with any certainty the length of the animal; I estimate it to about 1,3 mm. On the other side it was easy to measure the lengh of the tail and the distances between the papillæ. The length of the tail makes 160 μ.

From the anal aperture	to the	first (hindmost)	papilla	48	μ.
— first papilla	—	second	—	39	-
— second —	—	third	—	54	-
— third —	—	fourth	—	39	-
— fourth —	—	fifth	—	39	-
— fifth —	—	sixth	—	33	-

Compared with the measurements of Brakenhoff and Micoletzky, who found the species under consideration in the East-Alps and in Bukowina, it is worth noticing that there is relatively not so great a distance between the second and third papilla in the Danish specimen as in the above mentioned. The specimen from Germany taken by Brakenhoff seems in this respect to agree with the East-European form, taken by Micoletzky. Another feature which is common to the Eastern and German forms but which does not hold good for the Danish specimen is the fact, that the foremost papilla is much smaller than the other ones. In the Danish specimen all six papillæ are of about the same size, c. 15 μ. Brakenhoff indicates 24 μ as average size for the four papillæ save the hindmost and the foremost. It may appear that this is very much compared with the dimensions of the papillæ in the specimen from Frederiksdal, but it must be remembered that the German specimen in length makes 2,5 mm, the Danish only c. 1,3. Micoletzky indicates a size which is $^1/_2$—$^1/_{2,5}$ of the body-width: in the Danish specimen the same proportion makes

$^1/_{2,7}$. Thus the papillæ in the Danish specimen seem to be inconsiderably smaller.

As to the question of the specific value of this form I shall not venture to express any opinion on account of the lack of sufficient material: as is known Brakenhoff has established it as a new species while Micoletzky considers it as a mere variety of *T. gracilis*.

Cephalobus ciliatus (v. Linst.) d. M.

This species was found in material for which I am indebted to Stud. mag. Lieberkind. It originates from a strand-meadow on the Island of Mors in the Limfjord. The locality is near the water and in winter and early spring temporarily overflowed. Mature specimens were found in May.

Dorylaimus Leuckarti Btsli.

This species which hitherto was not observed in Denmark has proved to be rather common on roots of plants in Charlottenlund forest, near Copenhagen. It was found in moist and fat mould.

Bibliography.

Bastian, N. C. 1865. Monograph on the Anguillulidæ, or free Nematoids, Marine, Land, and Freshwater. Trans. Linn. Soc. London XXV.

Brakenhoff, H. 1913. Nematodenfauna des nordwestdeutschen Flachlandes. Abh. Nat. Ver. Brem. Bd. XXII, H. 2.

v. Daday, E. 1898. Die freilebenden Nematoden Ungarns, Zool. Jahrb. Bd. 10. Syst.

Ditlevsen, Hj. 1911. Danish freeliving Nematodes. Vid. Medd. Naturh. Foren. København. Vol. 63.

— 1919. Marine free-living Nematodes from Danish waters. Vid. Medd. Dansk Naturh. Foren. Vol. 70.

de Man, J. G. 1884. Die, frei in der reinen Erde und im süssen Wasser lebenden Nematoden der Niederländischen Fauna. Leiden.

Micoletzky, Heinrich. 1914. Freilebende Süsswasser-Nematoden der Ost-Alpen. Zool. Jahrb. Bd. 36. Syst.

— 1917. Freilebende Süsswasser-Nematoden der Bukowina. Zool. Jahrb. Bd. 40. Syst.

Explanation of the Plate II.

Fig. 1. Krampia acropora n. g. n. sp. Front end. Winkel Homog. Imm. 2,3 mm. Comp. Oc. 4

— 2. Krampia acropora. Mature female specimen.

— 3. Oncholaimus skawensis n. sp. Hind part of male specimen. Winkel Homog. Imm. 2,3 mm. Comp. Oc. 4.

— 4. Seuratiella pellucida n. sp. Front end. Zeiss Apochr. 2 mm Comp Oc. 4.

— 5. Krampia acropora n. g. n. sp. Hind part of male specimen. Winkel Homog. Imm. 2,3 mm. Comp. Oc. 4.

— 6. Oncholaimus skawensis n. sp. Front end. Winkel Homog. Imm. 2,3 mm. Comp. Oc. 4.

— 7. Seuratiella pellucida n. sp. Spicular apparatus and supplementary organs. Zeiss Apochr. 2 mm. Comp. Oc. 4.

— 8. Seuratiella pellucida n. sp. Hind part of male specimen.

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