

CILIATES OF THE GENERA *TRICHODINA*, *TRIPARTIELLA* AND *PARATRICHODINA* INVADING THE NILE FISH *CLARIAS LAZERA* AND *OREOCHROMIS NILOTICUS*

Said Noor El-Din and El-Said Naeim

Zoology Department , Faculty of Science , Tanta University.

Key words: Ciliates, *Trichodina maritinkae*, *T. magna*, *T. centrostrigeata*, *Tripartiella cichlidarum*, *Paratrachodina africana*, *Clarias lazera* *Oreochromis niloticus*.

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ABSTRACT

Five ectoparasitic ciliate species belonging to the genera *Trichodina*, *Tripartiella* and *Paratrachodina* were found on the gills of *Clarias lazera* and *Oreochromis niloticus* from the River Nile branches at Tanta city, Egypt. These ciliates include *Trichodina maritinkae* Basson and Van As, 1991, *T. magna* Van As and Basson , 1989 and *T. centrostrigeata* Basson *et.al.*, 1983, one species of the genus *Tripartiella* (first record in Africa), namely *T. cichlidarum* Basson *et.al.*, 1983 and one species of the genus *Paratrachodina* namely *P. africana* Kazubski and El-Tantawy, 1986. Full descriptions and systematic positions of collected species are given and discussed .

INTRODUCTION

Trichodinids are highly pathogenic to fish especially in fish culture, where severe mortality rates of fish occur due to heavy infestation of these parasites (Bayer, 1959 and Van As and Basson, 1987). The study on parasitic ciliates invading African freshwater fish was started in 1983 by Basson *et al.* From that time till now , the authors are regularly contributing to the literature about these trichodinids. Also, a small material was collected by Kazubski 1985 and 1986. On the other hand , a little knowledge on trichodinids so far exists of Nile fish .In this respect, the studies of Kazubski and El-Tantawy (1986), Noor El-Din and Naeim (1990), Abd el-Ghaffar *et.al.*(1996), Ali (1996) and Noor El-Din(1998) were the most concerned

MATERIAL AND METHODS

Clarias lazera and *Oreochromis niloticus* were collected from Nile Delta branches at Tanta city, Egypt. A large number of fish (274 *C. lazera* and 223 *O. niloticus*) were transported alive to the laboratory from March to December, 1989. Moreover, a small amount of fish (86 *C. lazera* and 68 *O. niloticus*) were examined at the collection site from June to September, 1991. Positive smears were air dried and impregnated with silver nitrate (2%) using a modified Klein's technique, as described by Lom (1958) and Wellborn (1967). The preparations were mounted in Canada balsam and examined under light microscope. The identification of collected parasites was carried out according to the key suggested by Lom (1958, 1964) and the line system of the denticular morphology suggested by Van As and Basson (1989, 1992). All measurements are in micrometers.

RESULTS

Trichodina maritinkae Basson and Van As, 1991. (Table 1, Fig 1 & 6).

Host and site : *Clarias lazera* (gills).

Description:

Median sized trichodinid with flattened disc - shaped body. The adhesive disc is concave and surrounded by a finely striated border membrane. Centre of adhesive disc is finely granular in silver impregnated specimens. Denticle composed of blade, central part and ray. Blade is sickle in shape with a curved distal surface. Tangent point is slightly lower than distal point. The anterior margin of blade has a slightly flattened apex while the posterior margin forms deep semi-lunar curve with deepest point in the middle of the curve. The curvature of anterior margin is not extending to Y+1 axis. The distal surface of blade is slightly parallel to the border membrane. The anterior apophysis of blade is indistinct. The central part extends to and sometimes beyond Y-1 axis. Ray is thin, of the same thickness throughout and ends by a round end. Also, they point in posterior direction to Y axis. Ray apophysis is prominent. Ratio of denticle above X axis to denticle below is nearly one. Macronucleus is C-shaped while the micronucleus is rounded to oval.

Trichodina magna Van As and Basson, 1989. (Table 1, Fig 2&7).

Host and site : *Oreochromis niloticus* (skin and gills)

Description:

Large trichodinid with disc-shaped body. The adhesive disc is concave and surrounded by a finely striated border membrane. Centre of adhesive disc is finely granular in silver impregnated specimens. Blade is narrow, sickle shape and its distal surface is curved. Tangent point is slightly lower than distal point. The anterior margin of blade is rounded with slightly flattened apex, while the posterior margin forms deep semi-lunar curve with deepest point in the centre. Connection between blade and central part is delicate. Central part is robust, extending more than half way past Y axis. Point of central part is rounded. Apophysis of ray is prominent. Shape of central part above X axis is similar to section below. Ray is thin, tapering slightly to sharp rounded point that directed anteriorly and extends past Y+1 axis, sometimes between Y and Y+1 axis. Macronucleus is a C-shaped. Also an oval micronucleus is detected.

Trichodina centrostrigata Basson *et al.*, 1983. (Table 1, Figs 3&8)

Host and site : *Oreochromis niloticus* (skin and gills)

Description:

A median sized trichodinid with cylindrical shaped body. The adhesive disc is concave and surrounded by a finely striated border membrane. The centre of adhesive disc has 11-14 ridges. Blade is truncate with a distal surface slightly rounded and not parallel to the border membrane. Blade varies from broad head or in some cases narrower head. The tangent point is situated lower than distal surface. The anterior margin of blade varies from curved to angular. The anterior surface in most cases extends to Y+1 axis, sometimes beyond this line. Blade apophysis in some specimens is hardly visible. Posterior margin forms L shaped. The central part is conical in shape and extends beyond Y-1 axis. Ray apophysis is small, sometimes hardly visible. Ray is straight of varying thickness and tapering gradually to sharp rounded point. It extends between Y and Y+1 axis, sometimes past Y+1 axis. Macroucleus is C shaped, while micronucleus is oval.

Paratrichodina africana Kazubski and El-Tantawy, 1986. (Table 1, Fig 4&9)

Host and site: *Oreochromis niloticus* (gills)

Description:

Small trichodinids with a bell-shaped body. The adhesive disc is surrounded by a finely striated border membrane. The centre of adhesive disc is similar to the rest of adhesive disc in silver impregnated specimens. Blade is similar to equilateral triangle with its base situated upwards. The distal surface of blade is usually rounded and parallel to the border membrane. The central part has a transverse inclined process with the blade settled near its anterior margin, while the posterior margin of this process carries the ray. This process is arranged in such a way that its anterior arm rests on the posterior arm of the preceding denticle, while the posterior arm carries the anterior arm of the next one. Ray is short, straight and has equal thickness, sometimes slightly enlarges posteriorly. Nuclear apparatus was not detected in the investigated specimens.

Tripartiella cichlidarum Basson *et al.* 1983. (Table 1, Fig 5&10)

Host and site : *Oreochromis niloticus* (gills).

Description :

Median sized trichodinid with a disc to bell-shaped body. The adhesive disc is concave and surrounded by a finely striated border membrane. Blade is triangular in shape, its apophysis is indistinct. The narrow base of blade, by which it joins the central part, extends anteriorly in a short and thin projection. This projection fits into the corresponding notch in preceding denticle. Thus, the denticles are wedged together both by central parts and by projections. Ray is short and tapers to a sharp rounded end. The macronucleus is C shaped, while the micronucleus is hardly visible in the investigated specimens

DISCUSSION

Trichodina maritinkae Basson and Van As, 1991.

Noor El-Din and Naeim (1990) described *Trichodina* sp I on the gills of *Clarias lazera*. They declared that this species showed close similarities with

Trichodina mutabilis Kazubski and Migala, 1968. Naiem (1992) designated this parasite as a new species *Trichodina aegypticus*. During examination of material, it was found that, these trichodinids are closely related to *Trichodina maritinkae* Basson and Van As, 1991, from the gills of *Clarias gariepinus* in South Africa. This parasite was also recorded on gills of *C. stappersii* and *C. theodora* in South Africa (Van As and Basson, 1992). In Egypt, the parasite was recorded on the gills of *C. gariepinus* from lake Wadi El-Raian (Ali, 1996). Our record confirms the specificity of this parasite for members of family Clariidae (Van As and Basson, 1992). The overall body dimensions of our material are slightly smaller than that recorded on *C. gariepinus* by Basson and Van As (1991); and Ali (1996) on *C. stappersii* and *C. theodora* by van As and Basson (1992). Also, our materials have a smaller number of denticles but still fall within the range of the type populations collected by Van As and Basson (1992).

Trichodina magna Van As and Basson, 1989.

This parasite was firstly described by Basson *et.al.*, 1983 as *Trichodina pediculus*. Through the application of the new system of denticular morphology, Van As and Basson (1989) separated these trichodinids in a new species, *T. magna*. This parasite was also recorded by the same authors (1992) on skin, fins and gills of *Marcuseneius macrolepidotus*, *Hepsetus odoe*, *Schilbe mystus*, *Oreochromis andersoni*, *Serranochromis angusticeps* and *Tilapia rendalli* from Zambezi River in South Africa. Abdel-Ghaffar *et.al.* (1996) also described this parasite from cultured tilapia fishes from El-Serow fish farm in the Nile Delta, Egypt. It was found that the population of *T. magna* in the present study has the overall body dimensions that were larger than those recorded by Van As Basson, 1992, and Abdel-Ghaffar *et.al.* (1996). Also, the blade is much broader in the investigated population. *T. magna* was considered as a common parasite of Cichlidae in Africa and may have a wide distribution among African freshwater fish.

Trichodina centrostrigata Basson *et. al.*, 1983

Noor El-Din and Naiem (1990) described *Trichodina sp. II* from gills of *T. nilotica*. The authors declared that this parasite showed close similarities with *T. pacifica* Stein, 1979 (syn. *T. miranda* Stein, 1979). The analysis of these materials showed that this parasite is not typically *T. pacifica*. Although the orientation of rays to Y, Y+1, Y-1 axis in some specimens is similar to that of *T. pacifica*, the latter has comparatively large body with thick blades and long rays (Fig. 11). In addition, *T. pacifica* is a parasite of European marine fish. The presence of rod-like central ridges, its number and arrangement, and denticular morphology are closely related to *T. centrostrigata*. This parasite was first recorded by Basson *et. al.* (1983) in South Africa, then by Van As and Basson (1992) in the Zambesi River system. In Egypt, the parasite was first described by Kazubski and El-Tantawy (1986) from gills of *T. nilotica*. The authors did not apply silver impregnation technique which makes the comparison so difficult. Abd El-Ghaffar *et. al.* (1996) also described this species from cultured tilapia in El-Serow fish farm in the Nile Delta. The record of *T. centrostrigata* on *C. lazera* by Naiem (1991) may be accidental during the transportation of fish in bottles containing *O. niloticus*. This was confirmed by the absence of this parasite on *C. lazera* which was examined directly in the site of collection. The population of *T. centrostrigata* in the present study has the overall body dimensions and overall size of denticles though their individual components are slightly smaller than those recorded by Abd El-Ghaffar *et. al.* (1996) and Van As and Basson (1992).

Paratrichodina africana Kazubski and El-Tantawy, 1986.

P. africana had been primarily described under the name *Tripartiella sp.* (Kazubski, 1985). The same authors (1986) transferred this parasite to the genus *Paratrichodina* Lom, 1963. The absence of incision in the central part of denticles and the shape of blade allow us to place this parasite under the genus *Paratrichodina*. This parasite was also described in Egypt by Abd el-Gaffar *et. al.* (1996) and Ali (1996). The population of *Paratrichodina africana* in the present study has the overall body dimensions and the overall size of denticles and their individual components are more larger than those recorded on fish from El-Serow fish farm (Abdel-Gaffar *et. al.* 1996) and those found on fish from Wadi El-Raian (Ali, 1996).

Tripartiella Cichlidarum Basson et. al., 1983.

Noor El-din and Naiem (1990) described *Tripartiella* sp. from the gills of *Tilapia nilotica*. They declared that this species showed close similarities with *Tripartiella bulbosa* Davis, 1947. The analysis of our material showed that the orientation of blades and rays in relation to Y, Y+1 and Y-1 axis differs in both species, also, the curve of blade with the ray is much deeper in *T. bulbosa* (Fig12). Basson and Van As (1986) described the new species *Tripartiella clavodonta*, *T. lechridens*, *T. leptospina*, *T. macrosom*, *T. nana* and *T. orthodens* from fish ponds, rivers and lakes in South Africa. These species are significantly different from *T. cichlidarum* in denticle shape and dimensions as well as size. *T. cichlidarm* in the present study represents the first record on African freshwater fish.

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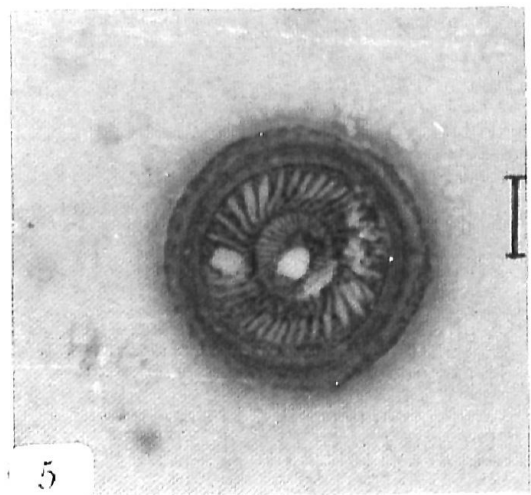
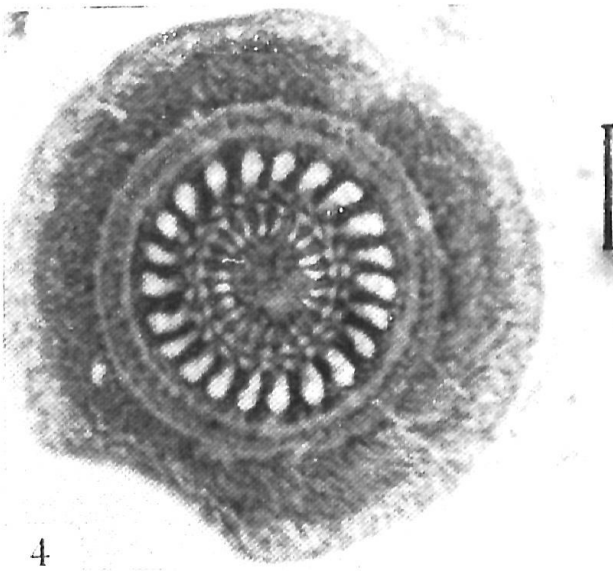
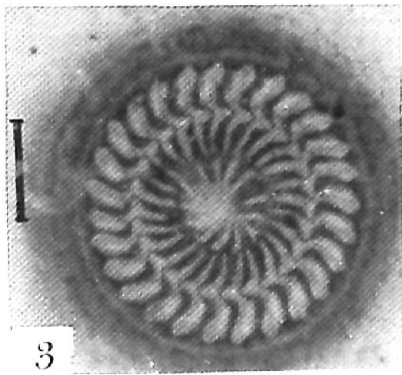
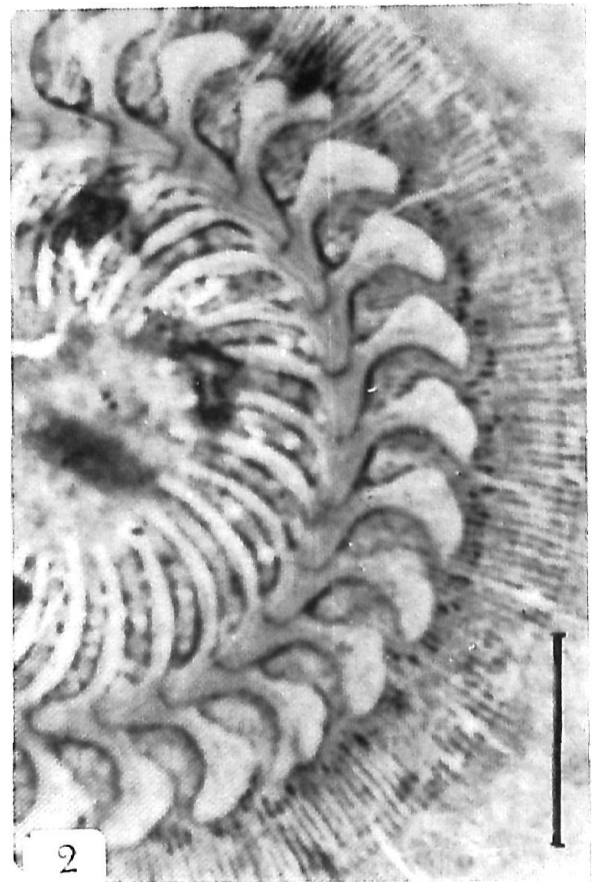
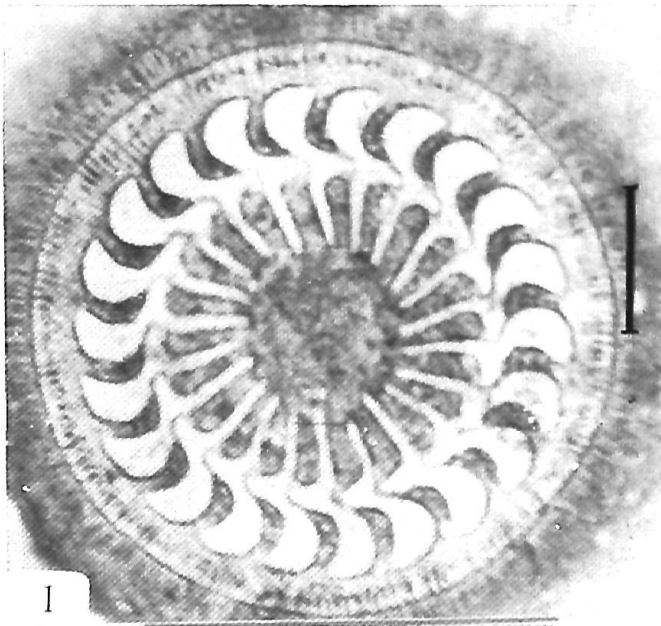
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LEGEND OF FIGURES

- Fig. 1 : Photomicrograph of silver impregnated of adhesive disc of *Trichodina maritinkae* Basson & Van As , 1991.(Scale bar = 10 μ m).
- Fig. 2: Photomicrograph of silver impregnated of adhesive disc of *Trichodina magna* Van As & Basson 1989. (Scale bar =10 μ m).
- Fig. 3: Photomicrograph of silver impregnated of adhesive disc of *Trichodina centrostrigeata* Basson *et.al.*, 1983.(Scale bar = 10 μ m).
- Fig. 4: Photomicrograph of silver impregnated of adhesive disc of *Paratrichodina africana* Kazubski & El-Tantawy, 1986. (Scale bar = 10 μ m).
- Fig. 5: Photomicrograph of silver impregnated of adhesive disc of *Tripartiella cichlidarum* Basson *et.al.*, 1983. (Scale bar = 10 μ m).Diagrammatic drawing of the denticles according to Van As & Basson , (1989; 1992).
- Fig. 6: *Trichodina Maritinkae* Basson & Van As ,1991. (Scale bar = 10 μ m).
- Fig. 7: *Trichodina magna* Van As & Basson , 1989 .(Scale bar =10 μ m).
- Fig. 8: *Trichodina centrostrigeata* Basson *et.al.*, 1983 .(Scale bar =10 μ m).
- Fig. 9: *Paratrichodina africana* Kazubski & El-Tantawy , 1986. (Scale bar = 10 μ m).
- Fig. 10: *Tripartiella cichlidarum* Basson *et.al.*, 1983.(Scale bar = 10 μ m).
- Fig. 11: *Trichodina pacifica* Stein , 1979, redrawn from Stein,1979.(Figure not drawn to scale).
- Fig. 12: *Tripartiella bulbosa* Davis,1947, redrawn from Shulman,1984. (Figure not drawn to scale).



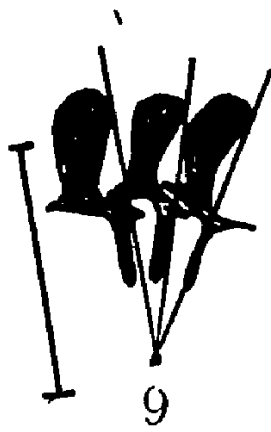
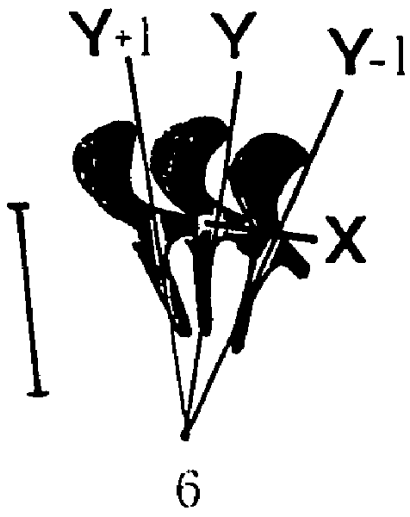


Table (1)

Character	<i>T. marinkae</i> n = 21	<i>T. magna</i> n = 26	<i>T. centrostrigella</i> n = 24	<i>P. affricana</i> n = 20	<i>T. cichlidarum</i> n = 8
Diameter of:					
Body	44.5 ± 2.5 (40-48)	97.8 ± 9.9 (80 - 114)	35.7 ± 1 (33.8 - 37.3)	33.6 ± 3.5 (28 - 40)	33.4 ± 2.4 (30 - 38)
Adhesive disc	40.8 ± 0.9 (39 - 42)	72.2 ± 6.7 (60 - 83)	30.9 ± 0.8 (29.4 - 32.2)	28.8 ± 0.7 (27.5 - 30)	28.5 ± 0.5 (27.6 - 29.3)
Denticular ring	23.7 ± 0.4 (23 - 24.2)	39.5 ± 0.9 (38 - 41.4)	18 ± 0.7 (16.8 - 19.3)	12.5 ± 0.5 (11.4 - 13)	12.3 ± 0.7 (11 - 13.1)
Border membrane width	3.4 ± 0.3 (3.3-8)	6.1 ± 0.7 (5 - 7.3)	2.8 ± 0.3 (2.2 - 3.2)	4.1 ± 0.2 (3.8 - 4.5)	2.6 ± 0.3 (2.1 - 3)
Number of radial pins	13.7 ± 2.1 (10-16)	11.7 ± 1.2 (10 - 13)	6.2 ± 1.1 (5 - 8)	10.3 ± 0.4 (10 - 11)	6.5 ± 0.7 (6 - 8)
Number of denticles	21.2 ± 0.8 (20-22)	25.2 ± 1.4 (23 - 27)	27.4 ± 1.1 (26 - 30)	23.1 ± 2 (20-27)	37.6 ± 3 (34 - 41)
Dimension of a denticle					
Blade length	5.1 ± 0.3 (4.8 - 5.7)	5.6 ± 0.3 (5 - 6.2)	4.2 ± 0.4 (3.4 - 4.7)	4.4 ± 0.4 (3.7 - 4.9)	3.5 ± 1.1 (1.7 - 4.8)
Central part width	2.6 ± 0.3 (2-3)	3.3 ± 0.2 (3 - 8)	2.1 ± 0.3 (1.6 - 2.7)	1.5 ± 0.2 (1 - 1.8)	1.6 ± 0.4 (1 - 2.2)
Ray length	4.9 ± 0.6 (4.2 - 5.5)	7 ± 0.5 (6.2 - 8)	3.5 ± 0.3 (3 - 4)	3 ± 0.2 (2.6 - 3.3)	2.6 ± 0.4 (2 - 3.4)
Span	12.1 ± 0.6 (11.3 - 13)	15.1 ± 0.7 (14 - 16.3)	8.3 ± 0.4 (7.6 - 9)	8.3 ± 0.4 (7.4 - 9)	7.7 ± 0.6 (6.5 - 8.3)
Macronucleus width	31 ± 2.2 (26 - 34)	58.6 ± 11 (43 - 75)	30 ± 5.4 (19 - 38)		3.4 ± 1.4 (1.4 - 15.3)
Macronucleus thick	4.7 ± 0.7 (3.8 - 6.2)	3.5 ± 0.8 (2.5 - 5)	3.5 ± 0.8 (2.5 - 5)		2.4 ± 0.4 (1.9 - 3.2)
Micronucleus length	6.9 ± 0.9 (5.6 - 8.3)	7.2 ± 1.3 (5.7 - 9.8)	2.9 ± 0.8 (1.4 - 4.2)		
Micronucleus width	4 ± 0.5 (3.1 - 4.8)	4.6 ± 0.7 (3.5 - 6.1)	2 ± 0.7 (1.2 - 3.3)		

الهدديات من أجناس التريكودينا ، التريارتيللا والبارتريكودينا التي تنطفل على أسماك القرموط والبلطى النيلية.

سعيد نور الدين - السعيد نعيم

كلية العلوم- جامعة طنطا

تشمل هذه الدراسة على وصفا تصنيفيا لخمسة أنواع من الطفيليات الأولية للهدية التي تنطفل على جلد وخياشيم أسماك القرموط والبلطى النيلية فى منطقة الغربية (الأفرع النيلية بمدينة طنطا) وهى { تريكودينا مارتينيكا ، تريكودينا ماحنا ، تريكودينا سينتروستريجاتا ، تريارتيللا سكالدريم و باراتريكودينا أفريكانا } . ويعتبر تريارتيللا سكالدريم نوعا جديدا بالنسبة للبيئة الأفريقية ، وشملت الدراسة أيضا مقارنة بين بعض هذه الأنواع ومثيلاتها فى أماكن مختلفة من جنوب أفريقيا ومصر ، وكذلك ومقارنة بعض هذه الأنواع والأنواع الأوربية المتشابهة معها .