

New records of Naidid worms (Oligochaeta: Naididae) in Euphrates River

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Abstract:

Naidid worms were sorted from 27 samples of aquatic macrophyta including *ceratophyllum demersum*, *Potamogeton crispus* and *Hydrilla verticellat* with associated filamentous algae were collected from Euphrates River at Al-Mussayab city, 60 Km southwest Baghdad. The result of sorted worms revealed the presence of eight species of subfamily Naidinae, which are consider as new records for Iraq, including *Stephensoniana trivandrana*; *Paranais frici*, *Ophidonais serpentine*, *Specaria josinae*, *Dero (Dero) evelinae*, *Dero (Aulophorus) indicus*, *Nais pseudobtusa* and finally *N. stolci*. This investigation includes morphological descriptions for each species illustrated by identification criteria photos.

Key words: Naididae; Naidid worms; Oligochaeta; Euphrates

Introduction:

Species of Naididae worms commonly inhabit sediments of rivers, streams and lakes (1). Due to their great ability to swim, they may have eyes, and are capable of exploring benthic habitat, (2) such as aquatic macrophytes (3), mosses and liverworts; (4), filamentous algae (5), sponges (6), and gastropod mollusks (7&8). Sharapova (9) indicated that abundance of niadid worms correlated to the abundance of macrophyta, which their communities were affected by roughness and lightness of the substrate.

Niadid worms previously, were grouped in the family Naididae (10 & 11), then according to data based on 18S rDNA sequences and other molecular and morphological data (2 & 12) family Naididae and family Tubificidae were combined together in family Naididae, includes Naidid and Tubificiod naidid worms (13).

Niadid species are small and transparent worms, with few millimeters length, eye present in some species, dorsal chaetae begin from II or

behind (III; IV, V or VI), clitellum in few segments in the region of gonads (segments IV-V; V-VI or VII-VIII) (10). Reproduction mostly asexual by paratomy. They also can show incidentally sexual reproduction. The alternation of these two modes of reproduction can follow a regular annual cycle, but in some species sexual reproduction is rare and erratic (5). These group comprise two subfamilies, Subfamily Naidinae, and subfamily Pristininae (13).

Tubificoid naidid worms referred to the species of previous family Tubificidae, and all its five subfamilies (Tubificinae, Rhyacodrilinae, Phallo-drilinae, Limnodriloidinae, and Telmatodrilinae) are now included within the family Naididae (13). This group of worms are the most common aquatic Oligochaeta in freshwater habitats. They are most commonly found in soft, organic matter rich sediments. Several species characteristically live at sites that receive organic pollution, as they are known to tolerate anoxic condition (

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10). Some species are deposit feeders utilizing organic detritus and its associated microflora. These Oligochaetes are hermaphrodite and reproduce by cross-fertilization, while a few species of them may reproduce asexually by architomy (11).

Recently, there are some interest toward the identification of aquatic oligochaeta in Iraq , including Naidid species in different aquatic habitat (14, 15,16, 17,18,19,20 &21). This study is concern with recording of some species collected from River Euphrates at Al-Mussayab city, 60Km, South Baghdad.

Material and Methods:

27 samples of aquatic macrophyta including *Ceratophyllum demersum* , *Potamogeton crispus* and, *Hydrilla verticellat* with associated filamentous algae were collected from Euphrates River at Al-Mussayab city, 60 Km. southwest Baghdad, using a hand eradication tools. The collected plants were transferred to the laboratory where they placed in an aquarium of (20X 40X20) cm. filled with river water, and aerated by electrical aquarium air pump. The sample was left for about 7-10 days at room temperature of (20-25⁰ C), before worms were collected carefully by dropping small amount of sediment using small dropper , add it to a 10 cm diameter petri dish and examined under dissecting microscope. Wet funnel procedure (21) also used to separate small worms from plants. The sorted worms then killed by adding few drops of 10% formalin, left for one hour before transferred to 70% ethanol as preservative.

The preserved specimens were mounted with polyvinyl lactophenol, and examined by compound microscope using 40X and 100X objective lenses. The identification criteria for each identified species were

photographed by digital camera mounted to the Olympus compound microscope. Photoshop , Picasa and windows photo programs were used to arrange, clarified and magnified the photos. The specimens were identified according to (10 & 11).

Results and Discussion:

Eight species of subfamily Naidinae were observed as a new records for Iraq including.

1-Stephensoniana trivandrana (Aiyer,1926)

Number of individuals collected = 56 with average length of 4.6 mm. About 90% of individuals were collected during September and October .

In this species the body wall is brownish colour, encrusted with foreign matter and have thick glandular epithelium (Plate 1a) ; prostomium wide and rounded in shaped (plate1b) . Dorsal bundles beginning in II, with 2-4 hair and 2-3 needle anteriorly, reduced to 1-2 posteriorly. Needle chaetae simple pointed with tapering distal end (Plate 1b). Ventral chaetae 4 per bundle anteriorly decreasing to 2 posteriorly, with upper tooth longer than lower one, the difference between the teeth increase toward backwards, all with proximal nodulus (plate 1 c & d). No sexual individuals were detected during study period. This species is cosmopolitan and recorded in different places wideworld including India (22) ; USA (23) ; Africa (24); Argentina (25&26) ; Biwa lake , central japan (27) , the east coastal region of the Pasfic Ocean (11) ; Taiwan (28) ; and in Italy (29).

2-Paranais frici Hrabe, 1941

Eight specimens were sorted during Dec. – Feb. , with average length of 2.7 mm (plate 2a). Genus *Paranias* is characterized by the absence of hair chaetae. The dorsa and the ventral bundles with the same type of chaetae,

and dorsal bundle start from V. In *P. frici*, all chaetae have a longer upper tooth.(plate 2b&c). This species is considered as a new record to Iraq, while the closely related species *P. littoralis* was recorded in Iraqi southern marshes by (15) and in Tigris river by (21) . In Turkey *P. frici* was recorded by (29 & 30). This species is very common in freshwater habitat (11). It was also recorded in China by(31) ; in South Africa (33) ; and in Australia (34).

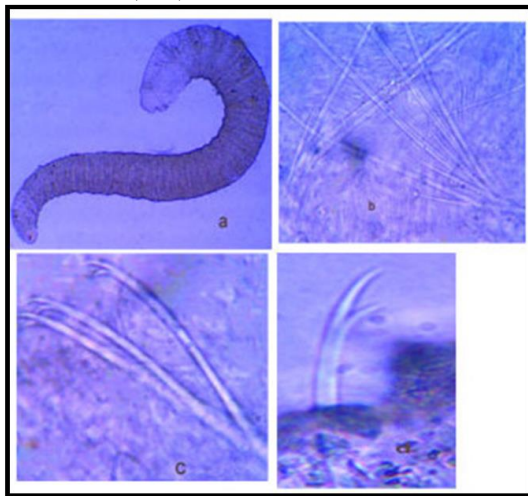


Plate 1: *Stephensoniana trivandrana*
a-Whole worm; b- dorsal bundles c- anterior ventral bundle; d- posterior ventral bundle

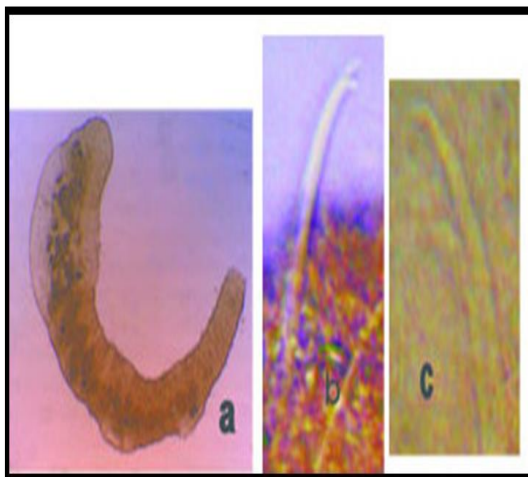


Plate 2: *Paranais frici*
a: Whole worm; b: dorsal chaetae ; c: ventral chaeta

3-Ophidonais serpentina (Müller, 1773)

Total number of 187 individuals were sorted during January - may samples, with a higher relative abundance in March and April. Average length was 4.8 mm, body wall with sensory papillae, encrusting with foreign particles (Plate 3 a), Rectangular eyes presents). Sexual individuals were found in the samples during April, with broad clitellum (plate 3 b), and a pair of sexual bundles of 2-3 penial chaetae, with a broader distal end forming a hook (plate 3 c). This species is characterizes by their dorsal chaetae ,which started from VI , one per bundle , stout, straight, with blunt ,double -pointed or simple distal end Plate 3 d) . All ventral chaetae of one form, 2-6 per bundle with longer upper tooth, those of II longer than the rest, in II-V with proximal to medium nodulus , in the following segments the nodulus medium- distal. (Plate 3e This species is considered as a new record to Iraq, while in turkey it was recorded by (35, 36, and 37). Previously this species was recorded in Japan by,(27); South Africa (33); and in Argentine (38).



Plate 3: *Ophidonais serpentina*
a: whole asexual worm b: anterior end of sexual individual showing clitellar region; c: penial chaetal bundle ; d: dorsal chaeta; e:ventral chaetae

4-*Specaria josinae*.(Vejdovsky, 1883)

Only six individuals were sorted during January and February, with average length of 6.2 mm. Eye absent (plate 4a). This species is characterized by the presence of hair chaetae and needle chaetae in the dorsal bundles (plate 4b. Dorsal chaetae beginning in VI, with 2-3 needle and 1-2 hair ; needles resemble ventral chaetae, but slightly straighter, with equal teeth, and a distal nodulus, hair chaetae twice as long as needle., Ventral chaetae all of one type, 3-4 per bundle, curved in which the upper tooth is equal but slightly thinner than the lower one, and median nodulus. (plate 4 c&d). This species was recorded in Turkey by (39), and (11) referred to it in North East Europe .

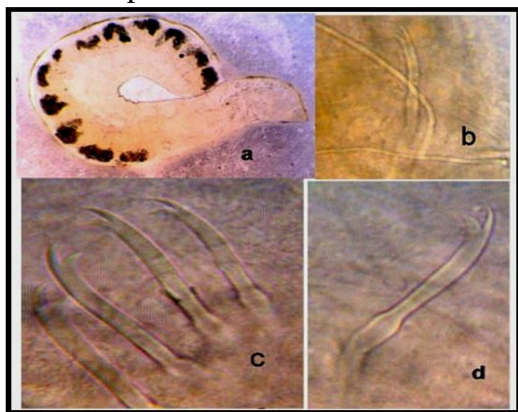


Plate 4: *Specaria josinae*

a, whole worm; b, dorsal bundle; c, anterior ventral bundle; d, posterior ventral chaeta

5-*Dero (Dero) evelinae* Marcus, 1943

Four individuals were sorted with average length of 8.6mm and about 37 segments. Eye absent. Dorsal bundles start from VI with 1 hair and 1 bifid needle, needles with single intermediate tooth (plate 5 b&c). Ventral bundles of II-V, with 3-4 chaetae, longer than the rest, with dorsal tooth 1.5 time as long as the lower one, nodulus proximal (plate 5d). Ventral chaetae from VI on , 4-5 per bundle, , with thicker lower tooth , but as long as upper one. (plate 5e).

Brachial fossa with 8 pairs of finger-like gills , partly bilobed.(plate 5f).

(10) referred to presence of this species in Brazil, and it recorded in Argentine by (25).

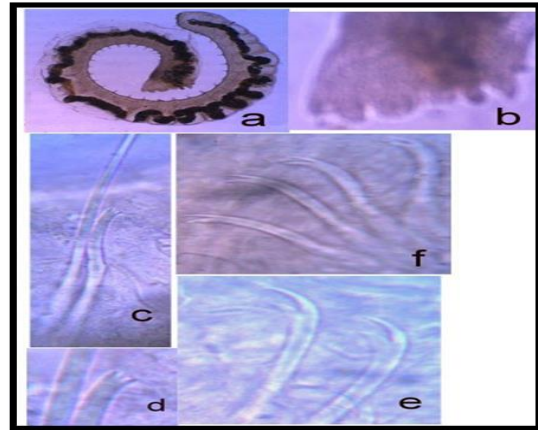


Plate 5: *Dero (Dero) evelinae*

a:, whole worm; b: brachial fossa; c: dorsal bundle d: tip of needle chaeta ; e, tip of the anterior ventral chaetae; f: posterior ventral bundle

6-*Dero (Aulophorus) indicus* Stephenson 1931

Prostomium triangular (Plate 6b), eyes absent, brachial fossa, wide, cup-shape with three pairs of gills and one pair short divergent palps(plate 6b). dorsal chaetae from V, contains 1 bayonet- shaped hair chaetae, and 1 needle, with equal teeth , some of them with one middle intermediate tooth, and some others have no intermediate tooth (plate 5 d). Ventral chaetae 3-4 per bundle , those of II-V with proximal nodulus and thinner upper tooth, but about twice as long as lower tooth (plate 6f&g),. From VI, ventral chaetae with upper tooth thinner but as long as lower one , shorter posteriorly.(Plate 6h) . This species was recorded by (11) in Europe, and in Turkey by (40).

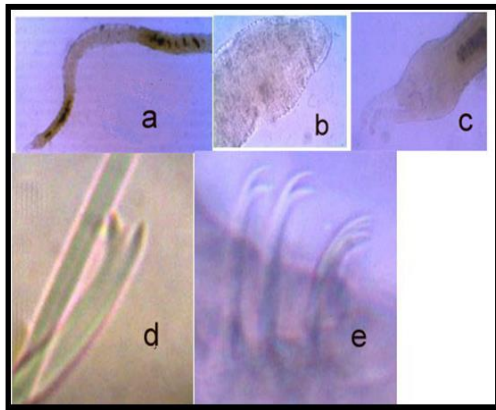


Plate 6: *Dero (Aulophorus) indicus*
 a, posterior portion of worm showing region of budding; b, anterior portion of the worm; c, brachial fossa; d, dorsal chaetal bundle; e, ventral chaetal bundle

7-Nais pseudobtusa (Piguet 1942)

Number of individuals collected was only five, with average length of 3.5 mm. and 17 segments. Eyes conspicuous (Plate 7a). Dorsal chaetae, with hair and needle, 1-2 each per bundle, Needle with long pointed tip, and nodulus 1/3 from the tip (plate 7b). Ventral chaetae in the anterior segments (II-V), 3-4 per bundle, longer and straighter than the rest, with upper tooth about 1.5 time as long as lower on, and proximal nodulus (plate 7c). Segments from VI on, with ventral chaetae 2-4 per bundle, thicker than the former, with distal nodules, and slightly longer but thinner upper tooth (plate 7d). This species is cosmopolitan recorded in Asia, Africa, and South America (10). It was recorded in North America (41), North East Europe (11); South America (33), Australia (42) and in Estonia (43). In Turkey the species was recorded by (31 & 37).

8-Nais stolci (Hrabe, 1981)

Ten individuals were sorted belong to this species with average length of 2.3 mm and average number of segments was 28. In this species eyes relatively small, dorsal bundles contain one hair and one needle chaeta per

bundle (plate 8a). Needle chaeta have parallel long parallel teeth (Plate 8b). ventral bundles with 3-5 chaetae per bundle. Ventral bundles of II-V have long thin chaetae with upper tooth twice as long as lower tooth (plate 8c). From VI – XII 2-3 enlarge chaetae per bundle with upper tooth 4 times longer than lower one (plate 8 d&e), the number of chaetae in each bundle increase to 4-5 per bundle and the upper tooth decrease gradually to reach equal length in the posterior bundles. (Plate 8f). This species was mentioned by (11) in Europe, and it was recorded by (40) in Turkey.

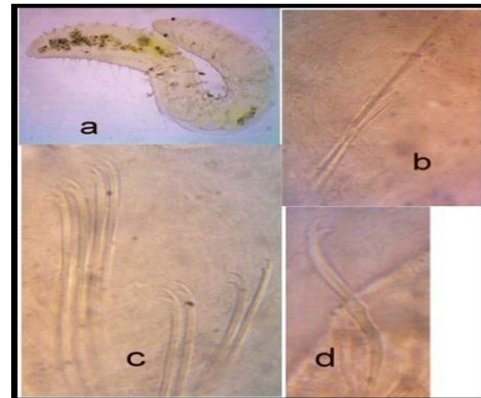


Plate 7: *Nais pseudobtusa*
 a: whole mount; b: dorsal bundle; c: ventral chaeta of II; d: posterior ventral chaeta

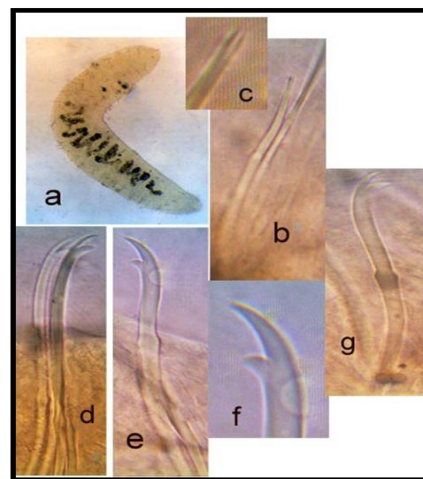


Plate 8: *Nais stolci*
 a: whole mount; b: dorsal bundle; c: tip of the needle chaeta; d: ventral bundle of II; e: ventral bundle of VI; f: tip of the ventral chaeta of IIX; g: posterior ventral chaetae

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تسجيل جديد لأنواع ديدان النايدد في نهر الفرات عند مدينة المسيب جنوب غرب بغداد

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الخلاصة:

عزلت ديدان النايدد من 27 عينة من النباتات المائية شملت الانواع *Ceratophyllum demersum* و *Potamogeton crispus* و *Hydrilla verticellat* اضافة الى الطحالب الخيطية المرتبطة بها. جمعت العينات من نهر الفرات وسط مدينة المسيب 60 كم جنوب بغداد. اوضحت نتائج العزل تسجيل ثمانية انواع لاول مرة في العراق وشملت الانواع *Stephensoniana trivandrana* و *Paranais frici* و *Ophidonais* و *serpentine* و *Specaria josinae* و *Dero (Dero) evelinae* , و *Dero (Aulophorus) indicus* و *Nais pseudobtusa* واخيرا" النوع *N. stolci* . تضمنت الدراسة ايضا" الوصف المظهري لكل نوع موضعا" بصور للصفات التشخيصية .