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ARTICLE

First record of the species *Helicotylenchus crassatus* Anderson, 1973 (Nematoda: Hoplolaimidae) in Iraq

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ABSTRACT

A survey for the isolation and identification of the nematodes parasitising ornamental plants was conducted in Misan province (southern of Iraq) involving a number of ornamental plants selected, namely Callistemon (bottlebrush), Eucalyptus and Nerium (oleander) in the Faculty of Agriculture gardens. For the first time a species of plant-parastic nematode of the family Hoplolaimidae was recorded. Iraq ranges of the population of this recovered species has been discussed and illustrated using morphometric and morphological characters, also some important characteristic characters which can be used in some taxonomic keys. The representative Helicotylenchus crassatus from iraqin are characterized by having (a of 26.9-27.8 µm, V of 62.4-66.8 µm, M of 41.2-44.4 µ m, Stylet length of 25.8-28.7 µm and 7-9 µm tail annuli. The tail is short, pointed at the end bearing 7 to 9 rings on its surface and phasmid between anus and tail tip. The morphology and morphometrics agree with those in original descriptions.

Keywords: *First Record; Helicotylenchus crassatus; Morphometric; Morphological; Plant-Parastic Nematodes*

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INTRODUCTION

Nematodes are invertebrates that have no segments and can be found in soil, marine or freshwater. Some species are free living; others are plant or animal parasites. Their bodies are usually elongated but in some parasitic forms the female biggies, and becomes lemon-, kidney-, or pear-like in shape. From the simplest organization it can be seen that the body consists of an external body wall and an internal digestive system in between is the body fluid (Abebe *et al*., 2011). These worms are extremely diverse and widespread across a large variety of habitats; Hugot *et al*. (2001) spoke of their great importance in animal biodiversity. Plant-parasitic nematodes can damage plants in any of the following parts: roots, stems, leaves, flowers, or seed. Very little work has been done to formally describe their diversity (Abebe *et al*., 2011) and yields losses due to these pests can be significant. *Helicotylenchus* is a genus of root associated spiral nematodes that is part of the family Hoplolaimidae. The single species known for this genus is '*Helicotylenchus crassatus*', which has been recorded with various host plants. The study aimed to isolate and identify a species of plant-parasitic nematode belonging to the family Hoplolaimidae, found on certain ornamental trees.

MATERIALS AND METHODS

Samples of soil were taken from under the roots of Callistemon (bottlebrush), Eucalyptus and Nerium (oleander), grown in the ornamental plant sections of the College of Agriculture, University of Misan in the southern part of Iraq. The sample period was 2023-2024, and the sampling occurred early in October. Immediately, eighteen samples were taken from the soil of depths 4-40 cm randomly using small digging tools. Samples were stored in sealed bags with the sampling location, date and sample number in a refrigerator until the processing. Each sample weighed 1-2 kg. The nematodes were extracted by the tray method of Whitehead and Hemming (1965).

Specimens were extracted and heat killed in 4% formaldehyde and then placed in anhydrous glycerin after De Grisse (1969). The nematode species were mounted on a permanent slide in very small quantity of glycerin. The morphological examination and measurements were done under the compound microscope (Optika-LUX), with a drawing tube attached. Using an Optika digital microscope and camera, suitable preserved specimens were photographed. Head shape and position, form and basal knobs of the stylets and the different morphometric characters and indices applied in the taxonomy of *Helicotylenchus* (Steiner, 1945) were used in the species identification.

RESULTS AND DISCUSSION

***Helicotylenchus* Steiner, 1945**

***Helicotylenchus crassatus* Anderson, 1973 (Figures 1)**

Measurements see (Table 1)

Female

The body is vermiform after fixation and may be curved ventrally, and sometimes "G" shaped. Mid bodly cuticular annules are 1·1–1·3 µm wide. Head is rounded and provided with 3-4 annules, cephalic framework is prominent. The conus is about half of the total length and the stylet is strong, rounded at the base and rather coarse. Median oesophageal bulb is a round, oval with distinct oesophageal valve. On the dorsal surface the oesophagus covers the intestine posteriorly. It contains a forward and a backward directed ovary each. The vulva is clearly separated and not covered with a flap. The tail is short with distinct point; there are 7–9 ventral annules. The phasmid is located in between anus and tip of the tail about 3-4 annules from the tip.

Male= Not found.

REMARKS

Helicotylenchus crassatus was described by Anderson, 1973 from soil around the roots of aspen (Populus tremuloides Michx.) near Idaho Springs, Clear Creek County, Colorado. Subsequently, the species was reported in North America, Europe and Asia (Loof, 1965; Gómez Barcina *et al*., 1989; Choi *et al*., 2000; Eskandari *et al*., 2010; Geraert, 2010; Hosseinvand et al., 2023). In the present study, identification was made by comparing recovered specimens with Sher (1966) and Siddiqi (1972) diagnostic descriptions as well as diagnostic taxonomic keys of *Helicotylenchus*. The morphology and morphometrics observed were most similar to those of *H. crassatus*.

The general agreement was found when compared with Anderson's (1973) original description, with the exception of a ratio which varied from 26.9-27.8 in the Iraqi population and 28.5-32.3 in the original description. Specimens were collected in the area of the research station which was affiliated with the College of Agriculture, Misan Province, south-eastern Iraq (GPS coordinates as given in the original manuscript: 31 degree 81 minute 31.69 second N, 47 degree 14 minute 21.60 second E). In the present work, for the first time, *H. crassatus* is recorded from Iraq, and is recorded here in association with Callistemon which is also a first host record for this plant.

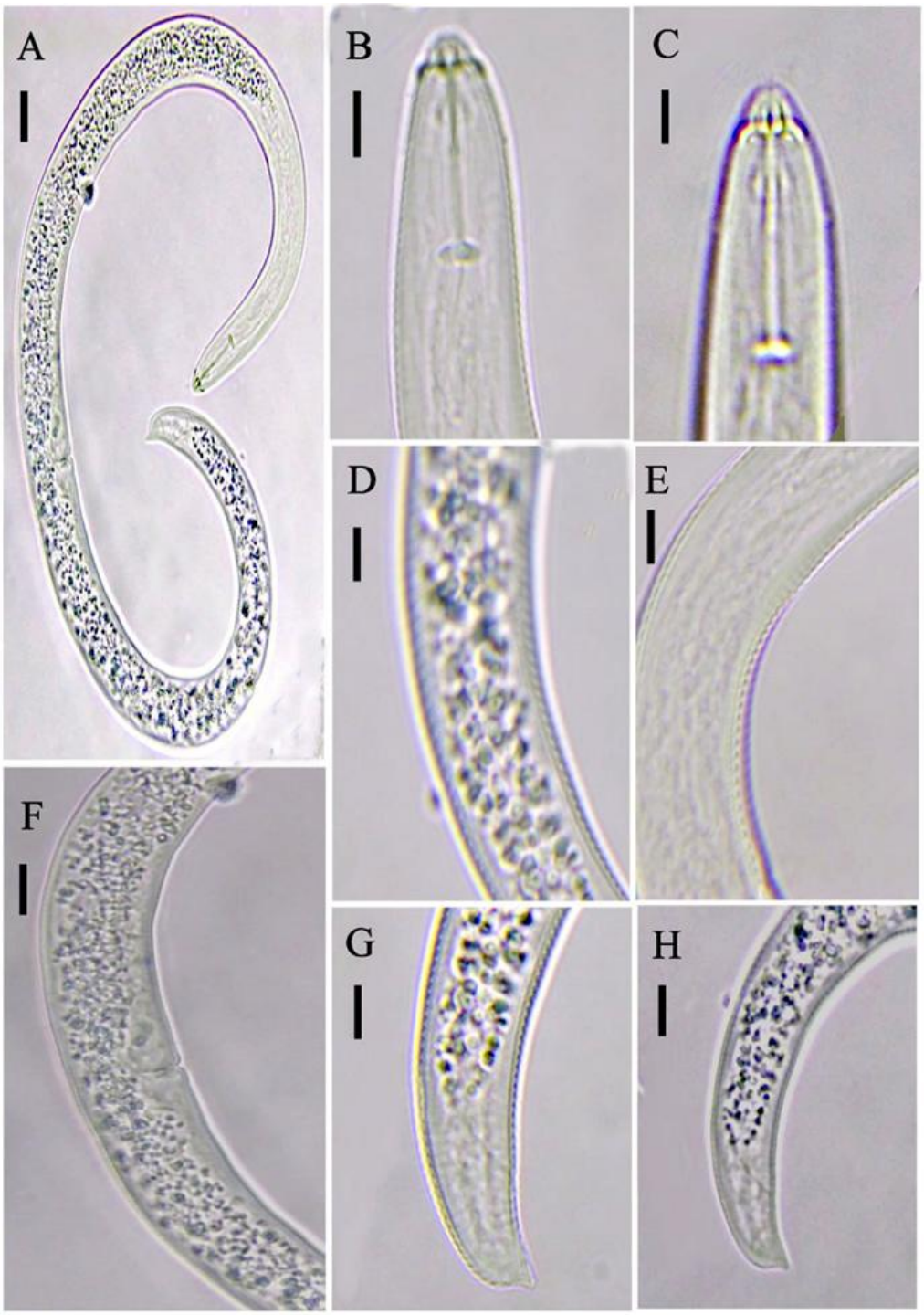


Figure (1) Light micrographs of Helicotylenchus crassatus Anderson, 1973 from Iraq. (A) Entire female; (B, C) anterior region; (D, E) median bulb and posterior oesophageal region (arrow indicates the excretory pore); (F) mid-body at the vulva; (G, H) posterior region and tail. Scale bars: A and B, 50 µm; C–I, 10 µm.

Table (1) Morphometrics of *Helicotylenchus crassatus* Anderson, 1973 from Misan province, Iraq.

Characters	*H. crassatus* Present study	Anderson, 1973
	Females	Females
n	5	-
L	720± (690-768)	761 (694-894)
a	27.5± (26.9-27.8)	29(28.5–32.3)
b	5.4± (4.8-5.9)	6.0 (5.0-7.2)
c	40± (39.6-41.6)	36 (30-42)
c′	1.2± (1.0-1.4)	1.2 (0.9-1.5)
V%	63.8± (62.4-66.8)	61 (59-62)
Stylet length	26.5± (25.8-28.7)	28 (27-29)
M	42.7± (41.2-44.4)	43 (41-46)
Body width	22.7± (21.2-23.2)	-
Excretory pore	110.9± (107.7-112.4)	-
Vulval body width	21.3± (20.6-21.8)	-
Anal body width	12.8± (12.2-13.4)	-
Tail length	18.6± (17.5-19.2)	22 (18-25)
Tail annuli	8± (7-9)	-

All measurements are in micrometres and are presented as mean (range), as reported in the original table.

CONCLUSIONS

Based on the morphological and morphometric evidence, the collected population has been identified as Helicotylenchus crassatus. Most characters were similar to Anderson's (1973) description; but the ratio was lower in the present population (26.9–27.8) than in the original description (28.5–32.3). The samples were obtained from soil surrounding ornamental flower gardens in Misan province, Iraq. The study provides information on H. crassatus as new record for Iraq and Callistemon as not reported association previously.

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Conflict of interest: There is no conflict of interest.

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