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**DIAGNOSTIC CHARACTERISTICS OF *PLESIOROTYLENCHUS STRIATICEPS*  
VOVLAS, CASTILLO *ET* LAMBERTI, 1993 (NEMATODA: TYLENCHIDA)  
FROM EAST MEDITERRANEAN REGION AND CENTRAL ANATOLIA**

by

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**Summary.** During a nematode survey conducted between 1993-1997 *Plesiorotylenchus striaticeps* Vovlas, Castillo *et* Lamberti, 1993 (Nematoda: Tylenchida) was found at Kozan, Tarsus (east Mediterranean region of Turkey), Polatli and Haymana (Central Anatolia) in the rhizosphere of citrus, grapevines and wheat. Differences between the populations found in this study and the population originally described are discussed.

During a survey of plant parasitic nematodes conducted in the main crops of the south-east Mediterranean region of Turkey in 1989-1990 an obviously undescribed species tentatively assigned to the genus *Rotylenchus* was found in the rhizosphere of grapevine at Tarsus, Turkey (Elekçioğlu, 1992). There were insufficient number of specimens to describe the species by the author, but later Vovlas *et al.* (1993) recovered the same species from the rhizosphere of grapevine at Osman (sic) (probably Osmaniye) and described it as *Plesiorotylenchus striaticeps*, sp. n., gen. n.

Since then, *P. striaticeps* has not been reported from elsewhere. More recent sampling in the south-east Mediterranean region and central Anatolia in 1993-1997 revealed some specimens of the same species from soil around sour orange and wheat (Elekçioğlu, 1996). Most of the measurements and descriptions of the populations accord with those of Vovlas *et al.* (1993), but some morphological and morphometrical differences were observed. Differences between populations of *P. striaticeps* found during this survey and the type population (Vovlas *et al.*, 1993) are discussed here.

**Material and methods**

Nematodes were isolated from soil samples by a modified Baermann funnel technique, killed by gentle heat, fixed in TAF and mounted in glycerine according to Seinhorst (1959). For SEM studies, nematodes were first fixed in 3% glutaraldehyde in 0.05 M phosphate buffer at pH 6.8, post fixed in buffered 2% OsO<sub>4</sub>, transferred to acetone series, critical point dried in liquid CO<sub>2</sub>, mounted on stubs, coated with gold (Shepherd and Clark, 1986), and examined under a Zeiss DSM 940 at an accelerating voltage of 5-7 kv.

According to measurements there were no differences among populations from Kozan, Tarsus and Konya. Therefore only measurements of the population 'Kozan' are given. Abbreviations used are defined in Siddiqi (1986).

**Results**

Measurements of females and males are given in Table I. Female body cylindrical, tapering

TABLE I - *Biometrics of Plesiorotylenchus striaticeps*.

Character	Population from Kozan		After Vovlas <i>et al.</i> (1993)	
	Females (n=20) Mean±SD	Males (n=8) Mean±SD	Females (n=24) Mean±SD	Males (n=7) Mean±SD
L	1.2 mm±0.06 (1.0-1.5)	1.1 mm±0.07 (1.0-1.3)	1.55 mm±0.1 (1.2-1.7)	1.38 mm±0.1 (1.2-1.6)
a	30±0.8 (22-29)	34±1.3 (32-37)	24.7±1.2 (21.9-26.8)	34.4±2.2 (31-37)
b	8±0.3 (7-9)	7±0.3 (7-8)	6.8±0.5 (6.0-7.8)	6.1±0.6 (5.3-7.0)
b'	6±0.2 (5-7)	6±0.2 (5-6)	8.7±0.6 (7.6-9.4)	8.1±0.9 (7.3-9.0)
c	64±6.0 (44-94)	47±2.4 (44-53)	77.0±32.4 (50.5-105.4)	49.2±5.9 (40.6-56.0)
c'	0.6±0.04 (0.5-0.9)	1.0±0.8 (0.8-1.1)	0.7±0.1 (0.2-0.8)	1.1±0.1 (1.0-1.3)
dogo <sup>a</sup>	9 µm±0.5 (6.5-11.0)	10.5 µm±0.9 (9-11)	–	–
0	21±1.0 (14.5-27)	29±2.5 (26-38)	19±3.4 (12-22)	16±3.2 (13-20)
V or T	56±1.0 (50-59)	37±9.2 (24-50)	57±1.2 (55-59)	35±8.5 (26-48)
G <sub>1</sub> (n=10)	25±1.7 (21-29)	–	27±2.1 (25-29)	–
G <sub>2</sub> (n=10)	23±0.7 (21.5-25)	–	26±1.1 (25-27)	–
Stylet	43 µm±0.6 (40-45)	36 µm±1.3 (33-38)	47 µm±1.5 (45-50)	39 µm±1.1 (37-40)
m	48±0.8 (45-51)	51±1.8 (46-54)	46±1.6 (43-49)	50±1.6 (47-52)
Metenchium	20 µm±0.4 (18-22)	18 µm±0.9 (16.5-20.0)	–	–
Telenchium	22 µm±0.5 (20.5-24.5)	18 µm±0.9 (15-20)	–	–
S	1.4±0.03 (1.3-1.5)	1.6±0.07 (1.5-1.8)	–	–
Stylet knob width	9 µm±0.3 (8-11)	6 µm±0.5 (5-7)	–	–
Median bulb length	23 µm±0.9 (20-26)	21 µm±2.3 (18-26)	–	–
Median bulb width	17 µm±0.7 (13.5-20.0)	14 µm±2.0 (12-20)	–	–
MB	62±2.3 (54.0-75.5)	55±2.3 (52-59)	–	–
Excretory pore location	156 µm±8.8 (132-191)	147 µm±13.3 (113-165)	–	–
Lip region width	14.5 µm±0.4 (14.0-16.5)	13±0.3 (12-14)	–	–
Lip region height	8 µm±0.2 (8-9)	9 µm±0.4 (8-10)	–	–
Width at midbody	50 µm±2.2 (41-58)	35 µm±2.6 (31-38)	–	–
Annule width at midbody	2.4 µm±0.1 (2-3)	2.2 µm±0.1 (2-3)	–	–
Width of lateral field	11 µm±0.6 (9-14)	8 µm±0.5 (7-9)	–	–
Tail length	21 µm±2.1 (1.7-33)	25.5 µm±1.9 (24-29)	22 µm±5.0 (8-33)	29 µm±4.9 (23-36)
Spicules	–	43 µm±1.4 (41-45)	–	47 µm±2.0 (45-50)
Gubernaculum	–	15 µm±2.0 (10-17)	–	17 µm±1.8 (15-19)

<sup>a</sup> Dorsal oesophageal gland opening from base of stylet knobs.

slightly towards anterior, ventrally almost spirally curved. Cuticle with distinct transverse striation; annules 2.0-2.9 (2.4)  $\mu\text{m}$  wide at mid-body, 1.9-3.0 (2.5)  $\mu\text{m}$  on mid-body and 1.9-2.5 (2.2)  $\mu\text{m}$  on tail. Lateral field marked by four equally spaced incisures, 9-14 (11)  $\mu\text{m}$  wide at mid-body and occupying 1/4 to 1/5 of the mid-body width, beginning at the level of the base of the stylet conus and extending to the end of the tail; areolations are present only along the neck region. No longitudinal lines present outside of the lateral field. Cuticle with two distinct layers; outer layer 1.7-2.2 (1.95)  $\mu\text{m}$  and inner layer 1.3-1.7 (1.4)  $\mu\text{m}$  thick at mid-body. Lip region conoid, truncate, 8-9 (8)  $\mu\text{m}$  high and 14-16.5 (14.5)  $\mu\text{m}$  wide, slightly set off, without visible annulation but with longitudinal striae; anteriorly indented with weakly off-set labial disc (Fig. 1a-b). Labial framework strongly developed, with outer margins extending two or three annules behind the basal plate. Stylet about three times as long as lip region width and 1.3-1.5 times as long as body width at level of knobs. Conus slightly shorter than shaft. Basal knobs rounded or slightly indented anteriorly, well marked off from shaft, 8-11 (9)  $\mu\text{m}$  wide, corresponding to 20-35 (30%) of body diameter. Orifice of dorsal oesophageal gland 6.5-11 (9)  $\mu\text{m}$  from stylet base. Procorpus of oesophagus cylindrical, with a slight narrowing immediately before the median bulb, 41-66 (57)  $\mu\text{m}$  long which is 23-29 (25%) of the total oesophageal length. Median oesophageal bulb well developed, oval 20-26x13.5-20  $\mu\text{m}$ , 0.42-0.52 times as long as corresponding body diameter; valvular apparatus elongated, measuring 7.0-10.0x3.5-7.0  $\mu\text{m}$ . Isthmus 25-32  $\mu\text{m}$  long, 12-14% of oesophagus length, encircled by the nerve ring midway. Nerve ring located usually at level of excretory pore. Excretory pore 132-191 (156)  $\mu\text{m}$  behind anterior end, located at level of oesophago-intestinal junction or 2-30  $\mu\text{m}$  anterior to it. Hemizonid 2-2.5 annules long, located 0-7 annules posterior to excretory pore, exceptionally anterior. Vulva

slightly posterior to mid-body with distinct double epiptygma (Fig. 1c-d). Reproductive system with two genital branches equally developed, outstretched. Spermathecae roundish axiel, mostly filling more than half body width, filled with sperm. No eggs observed. Rectum 14.4-20.0 (17.5)  $\mu\text{m}$  (n=5) or 0.47-0.62 times anal body width. Tail shorter than anal body width; its shape varying from broadly rounded, hemispherical to dorsally convex; 5-12 (8) annules on ventral side, terminus striated (Fig. 1e-f). Phasmids pore like, located 0-7 (3) annules mostly anterior to anus. Outer layer of cuticle at tail end 1.8-3.2 (2.5)  $\mu\text{m}$  thick, inner layer 2.2-3.2 (2.8)  $\mu\text{m}$ .

Male similar in general appearance to female. Lip region rarely very faint annulated. Stylet shorter than that of female. Gubernaculum 9.7-17.2 (13.9)  $\mu\text{m}$  long. Spicule ventrally arcuate 41.0-42.8 (42.0)  $\mu\text{m}$  long. Bursa extending to the end of tail.

### Locations and hosts

Vovlas *et al.* (1993) found *P. striaticeps* at Osman (sic) (probably Osmaniye) in the rhizosphere of grapevine. This species was also found by Elekçioğlu (1992, 1996) at Kozan in the rhizosphere of citrus, at Tarsus in the rhizosphere of grapevine and at Haymana and Polatli (Konya) in the rhizosphere of wheat.

### Diagnosis and discussion

*P. striaticeps* is considered by Vovlas *et al.* (1993) as a new genus because of following morphological characters: lip region conical, continuous, labial disc prominent, elevated and rectangular, no transverse annulation, lip sectors not differentiated, basal lip annule with six longitudinal striations and strong stylet and short and rounded tail with annulation following its contour. These generic characters are

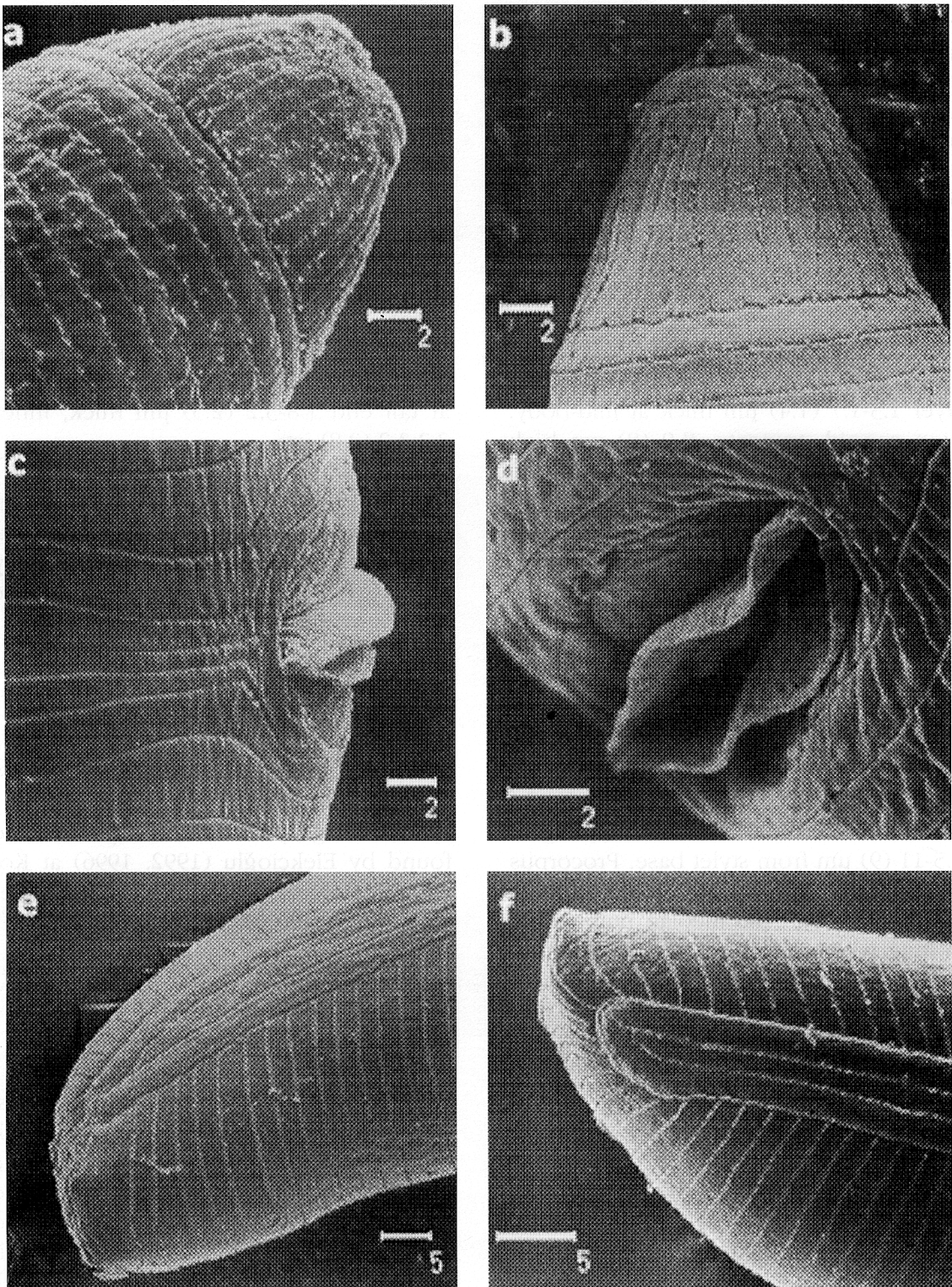


Fig. 1 - SEM micrographs of *Plesiorotylenchus striaticeps* (Scale bar =  $\mu\text{m}$ ): a and b, lip region; c and d, vulva region; e and f, tail region.

essentially the same for all specimens of the four populations obtained from different plants sampled during this study. Previously Elekçioğlu (1992) suggested that this species might belong to *Calvatylus* or *Rotylenchus*. Jai-rajpuri and Siddiqi (1979) placed the species with a cephalic region lacking distinct annulation into the genus *Calvatylus*. Ferraz (1980) synonymized *Calvatylus* with *Rotylenchus*; the synonymization was accepted by Fortuner (1987), Zancada and Lima (1985) and Brzeski (1993), but was ignored by Siddiqi (1986) who even transferred *Rotylenchus nexus* to *Calvatylus*. However, the description provided by Vovlas *et al.* (1993) clearly separated *Plesiorotylenchus* from *Rotylenchus*. This finding is strongly supported by the observations presented here: lip area is distinctive for the presence of longitudinal striae radially disposed; lip regions of juveniles, females and males are surmounted by a distinct rectangular labial disc; absence of lip sectors (*Rotylenchus* typically with 6 sectors).

Besides the great similarity between our specimens and those described by Vovlas *et al.* (1993) at the generic level there are some morphometrical and morphological characters that are distinct: relatively shorter stylet (40-45 µm vs 45-50 µm), body annuli at mid-body thicker (1.9-3.0 µm vs. 3.0-3.5 µm), hemizonid location different (0-7 annuli posterior to excretory pore vs. 0-2 annuli anterior), phasmid location (0-7 annuli anterior to anus vs. 0-4 annuli anterior to anus), relatively shorter spicules (41-45 µm vs. 45-50 µm) (Table I). Vulval epiptygma from these specimens seem more prominent (Fig. 1c-d) than it is given by Vovlas *et al.* (1993). These characters show only little variation among all our samples regardless of geographical area or host plant. Although morphometric characters are often variable they are important criteria in distinguishing nematode species (Brown and Boag, 1989). However, because only one species is included in the genus *Plesiorotylenchus*, the

observed differences in the specimen collected in the 1993-1997 survey may not hold at species level.

Recently, Baujard (1994) placed *Scutellone-ma truncatum* Sher, 1964 in the genus *Plesiorotylenchus* because of it having characters similar to those described by Vovlas *et al.* (1993). It is likely that nematode species with similar characteristics may be found in other families and might be transferred to the genus *Plesiorotylenchus* if these families are revised.

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