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PRATYLENCHUS SPECIES OCCURRING IN ALGERIA (NEMATODA, PRATYLENCHIDAE)

by

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Summary. A survey carried out in Algeria revealed the occurrence of five species of *Pratylenchus*. The most common species were *P. penetrans*, often associated with date palm (*Phoenix dactylifera* L.), and *P. thornei* found in the rhizosphere of various cereal and vegetable crops. *P. pratensis*, *P. scribneri* and *P. neglectus* were occasionally found but always in low numbers. Brief descriptions and illustrations of the species are provided.

A survey of plant parasitic nematodes was carried out in March-April, 1973 in Algeria (Lamberti *et al.*, 1975). The species belonging to the genus *Pratylenchus* Filipjev that were found are illustrated and briefly described.

Nematodes were extracted from soil either by Cobb's wet sieve technique or sugar flotation and centrifugation, and from roots by incubation in a mist chamber. Specimens were then fixed in 5% hot formalin and mounted in anhydrous glycerin. Measurements and illustrations were made with the aid of a camera lucida.

Five species were found; they are, in order of frequency: *P. penetrans*, *P. thornei*, *P. pratensis*, *P. scribneri* and *P. neglectus*.

Geographical distribution of the species is indicated in fig. 3.

Descriptions

**PRATYLENCHUS PENETRANS (Cobb, 1917)
Filipjev et Schuurmans Stekhoven, 1941
(Fig. 1; Table I)**

P. penetrans was consistently found associated with date palms (*Phoenix dactylifera* L.) that had discoloured and necrotic roots as described by Lamberti (1973) and Lamberti *et al.* (1975). It occurred at Beni Ounif, Beni Abbes, Charonine, El Golea, Ghardaia, Metlili, Sidi Yahia and Biskra. A population without males was found at the Guelma Experimental Station in the rhizosphere of broad beans (*Vicia faba* L.) and wheat (*Triticum aestivum* L.).

Measurements of four populations of *P. penetrans* are reported in Table I.

Body of dead specimens generally straight; lip region low bearing three annules, slightly set-off from body contour; labial framework conspicuous, extending into body for two annules; stylet robust with rounded knobs, sometimes flattened anteriorly. Excretory pore at 86 (75-95) µm from anterior extremity, located 2-3 annules behind hemizonid (Fig. 1 A). Spermatheca rounded and full of sperms. Post-uterine sac 0.8-1.5 vulval body widths long (Fig. 1 F). Tail smooth, with hemispherical end, comprising 20-28 annules on the ventral side. Males abundant, similar to females, but slightly smaller.

Remarks. *Pratylenchus penetrans* is cosmopolitan and attacks a wide range of plants, both trees and vegetable crops. Of the species of the genus found in Algeria, it was the most represented and widespread. In general, measurements of the Algerian populations agree with those described previously (Corbett, 1973), except for the slightly shorter stylet. However, the population from Guelma, on broad beans was longer than those extracted from date palm. In two of seven samples collected at El Arfiane, *P. penetrans* was found mixed with *P. scribneri*.

**PRATYLENCHUS THORNEI Sher et Allen, 1953
(Fig. 2, A-E, H-J; Table II)**

P. thornei occurred in eight localities: in the rhizosphere or in the roots of Olive (*Olea europaea* L.) at Ben Jousef (locality Boufarik), Cypress (*Cupressus* sp.), at Ouzera, vegetable crops (meadow near palm-grove), at Adrar and wheat at Guelma (Experimental Station).

Measurements of four populations are reported in Table II.

Females are characterized in having three to four annules on the lip region, which is heavily sclerotized and continuous with the rest of the body; stylet moderately stout, with rounded to anteriorly flattened basal knobs. Excretory pore 80 (75-85) μm posteriad from head, immediately behind the hemizonid (Fig. 2 A). Spermatheca indistinct, empty. The post-uterine branch is slightly longer than body diameter at vulva. Tail with 18-25 annules, bluntly rounded, without striations around terminus (Fig. 2, H-J). Males of this species are very rare and they were not found during our survey.

Remarks. Algerian populations of *P. thornei* are morphometrically similar to populations described previously and from other areas (Sher and Allen, 1953; Loof, 1960; D'Errico, 1970). They are also biometrically rather uniform. However, the specimens from Ouzera were larger and those from Guelma smaller than from the other populations. Such variability, which is not infrequent within this

species (Loof, 1960; Singh and Khan, 1981; Corbett and Clark, 1983), could be due to the effect of the host.

PRATYLENCHUS PRATENSIS (de Man, 1880)

Filipjev, 1936

(Fig. 2, B, K-M)

The measurements of the only population of *P. pratensis* found in Algeria in the rhizosphere of date palm in the oases of El golea are:

(7 females): $L = 551 \mu\text{m} \pm 38.5$ (493-607); $a = 25.2 \pm 3.7$ (21.4-30.3); $b = 6.6 \pm 0.4$ (5.9-7.1); $b' = 4.8 \pm 0.5$ (4.2-5.6); $c = 16.5 \pm 1.5$ (14.5-18.5); $c' = 2.6 \pm 0.3$ (2.1-3); $V = 77.6 \pm 0.8$ (76-78); $stylet = 15.9 \mu\text{m} \pm 0.8$ (14.5-17).

(3 males): $L = 486 \mu\text{m}$ (467-504); $a = 25.9$ (23.6-28.1); $b = 5.4$ (4.7-6.2); $b' = 4.4$ (4.1-4.6); $c = 19.7$ (16.8-23); $c' = 2.6$ (2.3-5); $T(2) = 50.6-52.5$; $stylet = 14.6 \mu\text{m}$ (14-15.3); $spicules = 16.1 \mu\text{m}$ (14.6-17.3); $gubernaculum = 4.6 \mu\text{m}$ (4.3-5).

TABLE I - *Morphometrics of Algerian populations of Pratylenchus penetrans*

Habitat	Mean \pm S. D. (Minimum - Maximum)							
	Locality	Date palm						Broad Bean
Rhizosphere of:	Metlili (oases)	Sidi Yahia and Biskra (oases)		El Arfiane (Experimental Station)		Guelma (Exp. Station)		
n	11 ♀♀	3 ♂♂	12 ♀♀	3 ♂♂	19 ♀♀	15 ♂♂	7 ♀♀	
L (μm)	530 \pm 29.2 (474-577)	531 (518-553)	518 \pm 46 (425-567)	511 (470-550)	545 \pm 59.6 (447-628)	514 \pm 31.5 (446-573)	622 \pm 26 (587-653)	
a	21.1 \pm 2.2 (18.9-25.7)	25.5 (23.9-28.6)	24 \pm 3.9 (20.3-30.6)	21.4 (20.4-22.6)	23 \pm 3.7 (19-30.9)	27.2 \pm 3.9 (22.6-33.5)	30.2 \pm 2.9 (25.8-32)	
b	5.2 \pm 0.8 (4.3-6.3)	4.8 -	5.4 \pm 0.7 (4.3-7)	- (4.8-4.9)	6.7 \pm 0.6 (5.9-7.6)	6.3 \pm 0.5 (5.5-7.1)	5.6 \pm 0.4 (5.2-6.1)	
b'	4.2 \pm 0.7 (3.1-5.1)	4.2 -	4.5 \pm 0.6 (3.7-5.7)	- (4.2-6.4)	4.3 \pm 0.7 (3.1-5.2)	4.8 \pm 0.7 (3.9-6.3)	4.8 \pm 0.3 (4.4-5.2)	
c	17.8 \pm 2.8 (12.8-23.6)	- (19.3-20.8)	17.2 \pm 2.3 (15.2-20.3)	20.9 (16.9-23.5)	17.5 \pm 1.8 (15.1-21)	18.6 \pm 1.4 (16.6-20.8)	21.7 \pm 1.2 (20.4-23.2)	
c'	2 \pm 0.4 (1.4-2.7)	- (2.5-2.9)	2.2 \pm 0.6 (2-2.9)	- (2.3-2.5)	2.3 \pm 0.5 (1.8-3.5)	2.6 \pm 0.3 (2.2-3.6)	2.2 \pm 0.1 (2.1-2.4)	
V	79 \pm 1.2 (77-81.5)	- -	79 \pm 1.7 (75.5-81)	- -	77 \pm 1.6 (74-80)	- -	79 \pm 2.4 (74.5-82)	
stylet (μm)	15.2 \pm 0.8 (13.3-16.5)	14.9 (14.8-15)	15.5 \pm 0.4 (15-16.3)	- (14-14.3)	15.5 \pm 0.7 (14-16.7)	14.4 \pm 0.8 (13.2-14.7)	16.1 \pm 0.6 (15.3-17.2)	
T	- -	- (39.8-41.3)	- -	49 (47-51.4)	- -	46.6 \pm 8.4 (36-57)	- -	
Spicules (μm)	- -	15.9 (14.3-17)	- -	16.6 (15.3-18.3)	- -	16.6 \pm 2.1 (13.2-22)	- -	
gubernaculum (μm)	- -	5.3 (3.7-7.4)	- -	- (4.6-5.9)	- -	4.9 \pm 0.8 (4.3-6.6)	- -	

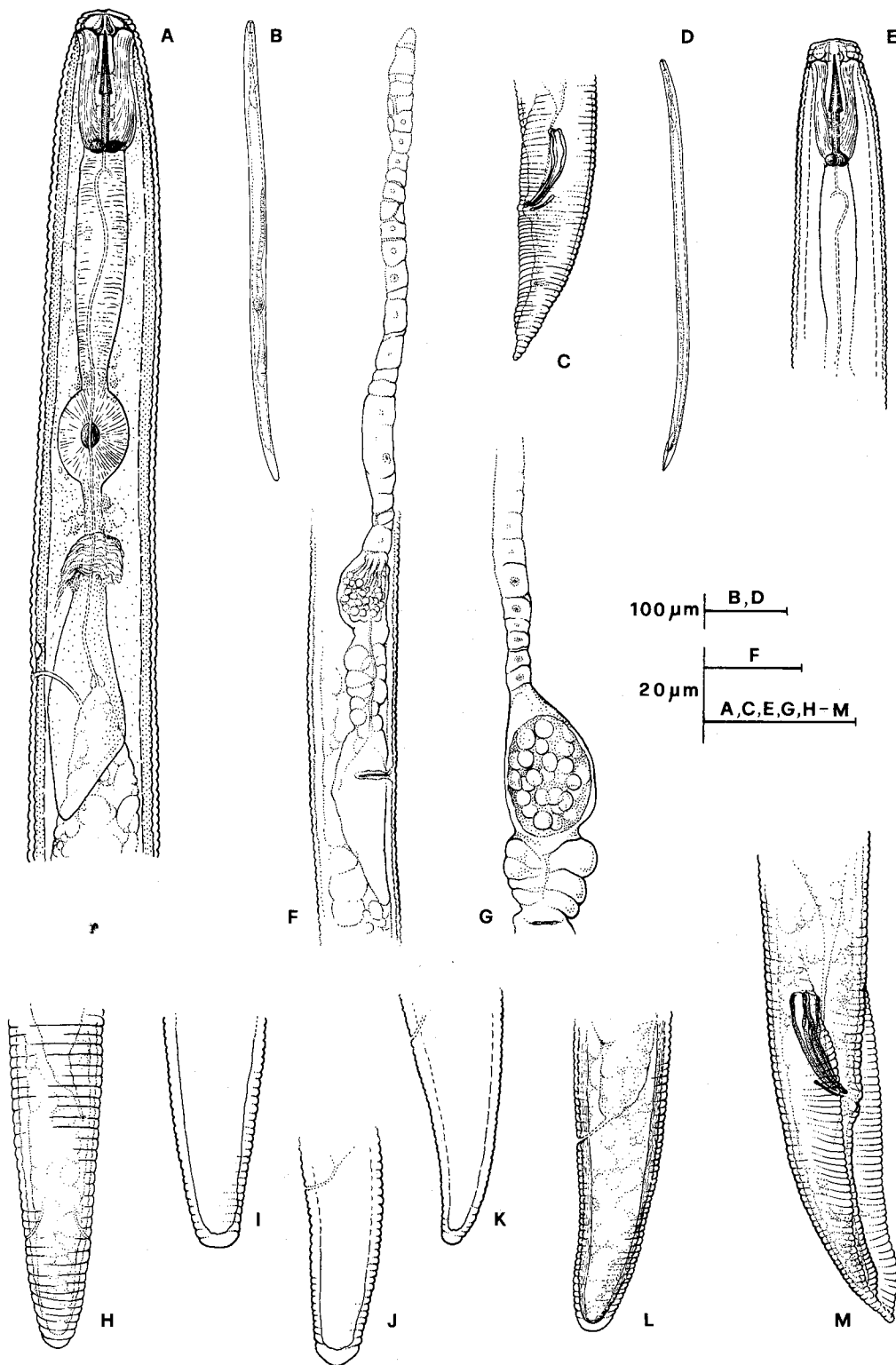


Fig. 1 - *Pratylenchus penetrans* (A-M). A, female oesophageal region; B, entire female; C, M, male tails; D, entire male; E, male anterior end; F, female gonad; G, female spermatheca; H-L, female tails.

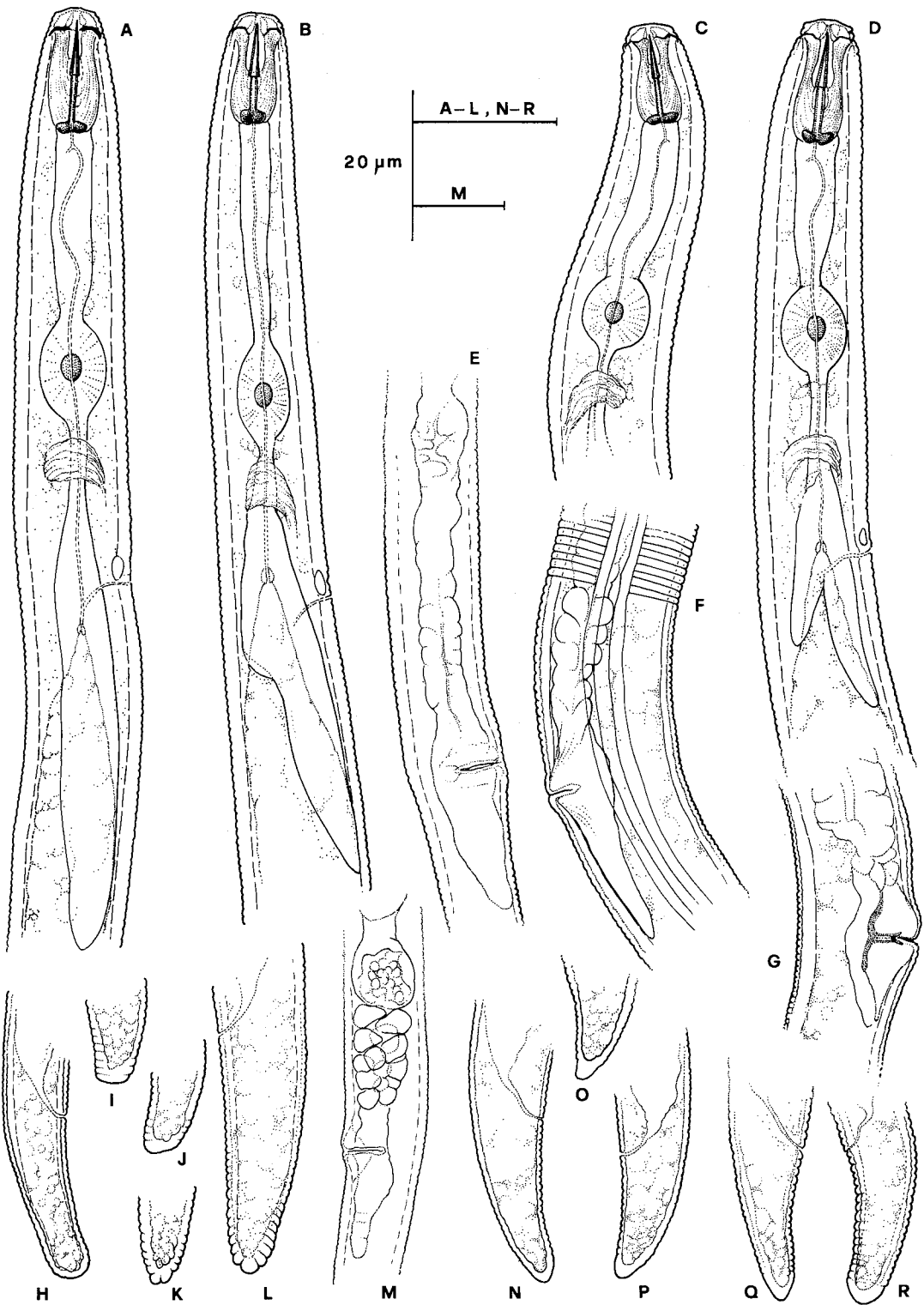


Fig. 2 - *Pratylenchus thornei* (A, E, H-J). A, female oesophageal region; E, female gonad posterior end; H-J, female tails. *Pratylenchus pratensis* (B, K-M). B, female oesophageal region; K, L, female tails; M, female gonad posterior end. *Pratylenchus scribneri* (C, F, N-P). C, female anterior end; F, vulval region; N-P, female tails. *Pratylenchus neglectus* (D, G, Q, R). D, female oesophageal region; G, vulval region; Q, R, female tails.

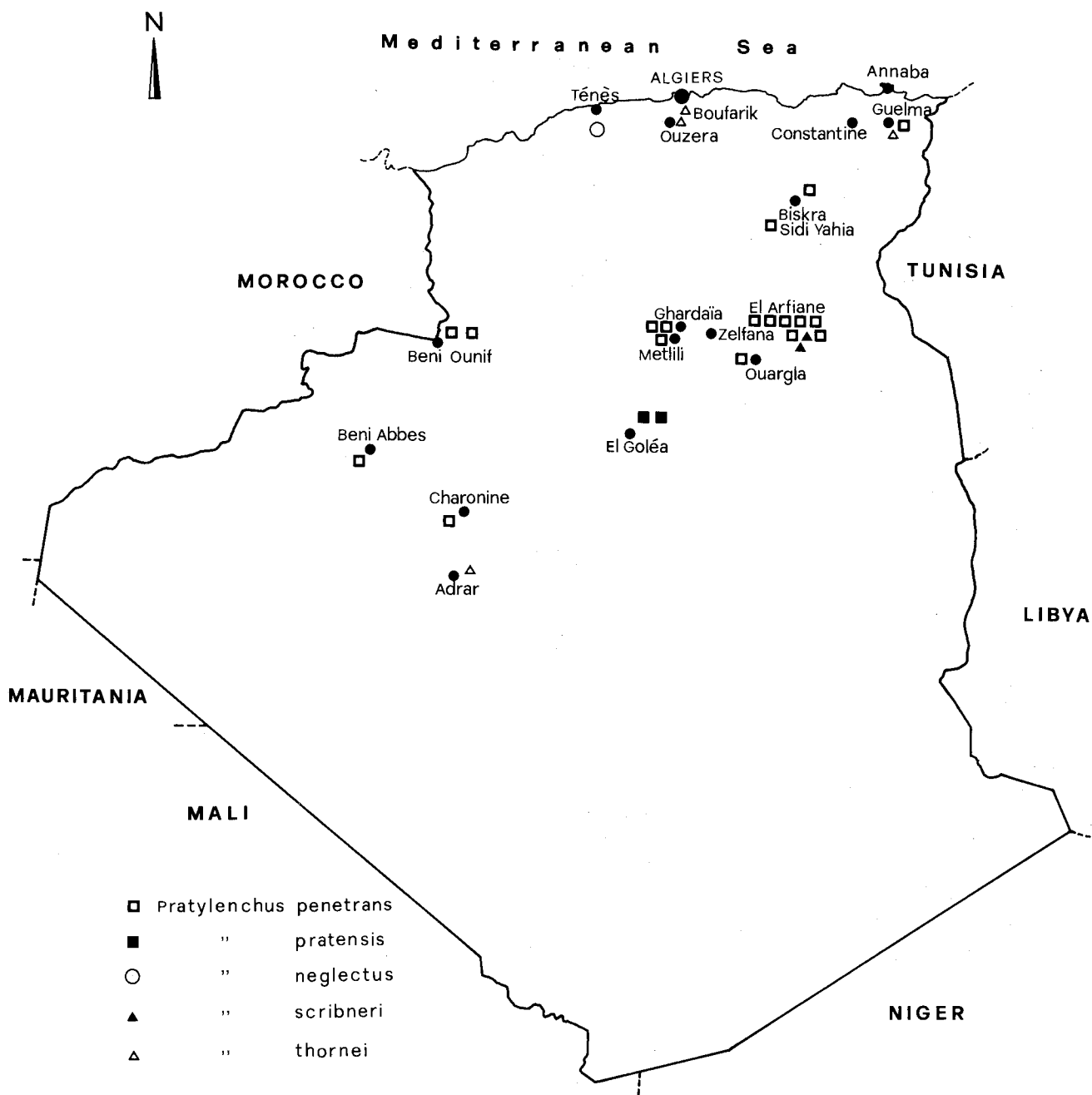


Fig. 3 - Geographical distribution of species of *Pratylenchus* found in Algeria.

TABLE II - *Morphometrics of Algerian populations of Pratylenchus thornei*

Habitat Locality	Rhizosphere of:	Mean \pm S. D. (Minimum - Maximum)			
		Vegetable Crops Adrar (oases)	Olive Bounfarik (Ben Jousef)	Cypress Ouzera	Wheat Guelma (Exp. St.)
n		9 ♀♀	11 ♀♀	18 ♀♀	6 ♀♀
L (μm)		529 \pm 23.5 (447-673)	520 \pm 32 (468-615)	552 \pm 47 (480-645)	513 \pm 28 (467-550)
a		28.3 \pm 2 (26-30)	26.2 \pm 2.6 (22.7-29.1)	30.1 \pm 2.9 (25.7-32.9)	32 \pm 3.9 (26.3-35.9)
b		60 \pm 0.7 (50.-7.1)	4.7 \pm 0.2 (4.5-5.7)	4.4 \pm 0.3 (4.3-5.2)	4.2 -
b'		3.8 \pm 0.7 (2.9-4.4)	4 \pm 0.2 (3.9-4.4)	3.9 \pm 0.6 (2.9-4.5)	3.6 -
c		19.1 \pm 1.7 (17-21)	21.8 \pm 1.5 (20-23.5)	20.5 \pm 2.8 (18.5-25.4)	21.3 \pm 2 (18.3-23.5)
c'		2.5 \pm 0.5 (1.9-3)	2 \pm 0.3 (1.8-2.4)	2.6 \pm 0.2 (2.2-2.8)	2.4 \pm 0.2 (2.3-2.8)
V		76 \pm 3.3 (69-81)	78 \pm 0.6 (76.5-79)	76 \pm 1.9 (74-80)	78 \pm 1 (77-79)
stylet (μm)		16.1 \pm 0.6 (15.5-17)	15.5 \pm 0.4 (15-16)	16.2 \pm 0.5 (15.6-17)	15.2 \pm 0.4 (14.4-15.7)

Female lip region composed of three annules, sometimes difficult to see; cephalic framework moderately sclerotized. Stylet stout, with basal knobs rounded or anteriorly cupped (Fig. 2 B). Excretory pore just behind the hemizonid. Spermatheca large, oval to round in shape, usually filled with sperms (Fig. 2 M). Post-uterine sac slightly longer than vulval body width. Tail coarsely annulated, bearing 21-29 annules (Fig. 2 K, L).

Remarks. Compared with the Dutch population (Loof, 1974), the Algerian specimens have a slightly longer stylet (14.5-16 μm vs. 13-15 μm), as observed by Frederick and Tarjan (1989) in their revision of the genus. The other morphometric characters correspond with the values given by other authors (Seinhorst, 1968; Inserra *et al.*, 1979; Handoo and Golden, 1989); they agree also with those of *P. pratensisobrinus* (Bernard, 1984) but differ in the tail ($c = 14.5-18.5$ vs. 12-15; $c' = 2.1-3$ vs. 2.8-3.7) and in the smaller number of tail annules (21-28 vs. 23-37).

PRATYLENCHUS SCRIBNERI Steiner, in Sherbakoff and Stanley, 1943 (Fig. 2, C, F, N-P)

A population of *P. scribneri* was found in the rhizosphere of date palm, in the grounds of the Experimental Station of El Arfiane. The morphometric characters are:

(9 females): $L = 417 \mu\text{m} \pm 34$ (370-487); $a = 20.1 \pm 2.6$ (16.2-23.7); $b = 5.8 \pm 0.5$ (5.2-6.4); $b' = 3.7 \pm 0.5$ (3.3-4.9); $c = 19.9 \pm 1.5$ (17.5-22.4); $c' = 1.9 \pm 0.3$ (1.7-2.4); $V = 76 \pm 1.0$ (75-77.5); $G = 27 \pm 4.1$ (22-34); *stylet* = $13.3 \mu\text{m} \pm 0.5$ (12.6-14).

No males were found.

Female lip region low, slightly set-off, bearing two annules of different width (Fig. 2 C). Labial sclerotization weakly marked. Stylet with round basal knobs, sometimes cupped anteriorly. Spermatheca difficult to see; post-uterine branch 13-25 μm long, 1-1.3 times the body width at vulva (Fig. 2 G). Tail conoid, with 14-21 annules on ventrally and smooth tip (Fig. 2 N, P).

Remarks. This species was found with *P. penetrans*. Morphometrically, the populations from Algeria correspond, more or less, with previous descriptions (Loof, 1985) but with minor differences such as a slightly shorter body (although Loof states that: "marked length variations exist in this species"), wider body and shorter stylet (12.6-14 µm vs. 14-16 µm after Loof, 1985).

PRATYLENCHUS NEGLECTUS (Rensch, 1924)
Filipjev et Schuurmans Stekhoven, 1941
(Fig. 2, D, G, Q-R)

A few specimens of *P. neglectus* were collected from the rhizosphere of apricot (*Prunus armeniaca* L.) at El Asnam, with *P. thornei*. Their measurements are:

(3 females): $L = 422 \mu\text{m}$ (390-475); $a(2) = 23.1-25.4$; $b(2) = 4.8-5.8$; $b'(2) = 4.0-4.3$; $c(2) = 18.8-20.9$; $c'(2) = 1.9-2.3$; $V = 83$ (83); $m = 48$ (48-49); $G(2) = 20-42$; *stylet* = 16.7 µm (15.5-17.3).

No males were found.

Remarks. Their main morphometrical characters, such as the lip region with two annules, spear knobs anteriorly indented, short post-uterine sac and the unstriated conoid tail, are in line with those reported previously (Townshend and Anderson, 1976).

During this study other specimens of *Pratylenchus* were found but it was not possible to ascertain their identity because of their poor preservation and paucity of adults.

In conclusion, the results of this survey indicate that the most important species of *Pratylenchus* in Algeria is *P. penetrans* which causes noticeable damage to date palms as a direct parasite and probably as an incitant of bayoud, a tracheomycotic disease caused by *Fusarium oxysporum* f. sp. *albedinis* (Lamberti, 1973). The two pathogens may act synergistically. The second most widespread species is *P. thornei*, which has a large number of hosts and causes damage to various plants when present in large numbers (Thorne, 1961). *P. pratensis*, *P. scribneri* and *P. neglectus* do not seem to be of economic importance in Algeria.

Key to the identification of the species of *Pratylenchus* occurring in Algeria.

1. Lip region with two annules 2
 Lip region with more than two annules 3
2. Stylet short, less than 15 µm long;
 vulva at 76 (75-77.5)% *P. scribneri*
 Stylet more than 15 µm long; vulva at 83% .. *P. neglectus*

3. Lip region high, heavily sclerotized, bearing 3-4 annules; spermatheca indistinct, empty; males absent .. *P. thornei*
 Lip region low, moderately sclerotized, bearing 3 annules; spermatheca rounded, full of sperms; males present ... 4
4. Female tail symmetrical, having a smooth terminus; excretory pore 2-3 annules behind hemizonid
 *P. penetrans*
 Female tail asymmetrical, with a coarsely annulated terminus; excretory pore immediately behind hemizonid
 *P. pratensis*.

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