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NEW DIAGNOSTIC CHARACTERS FOR *PRATYLENCHUS VULNUS*

by

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Summary. Morphological studies on root populations of *Pratylenchus vulnus*, collected from the rhizosphere of peach trees in Jiangsu province, China, revealed that some specimens had subspherical spermatheca, instead of oblong, and five lines in the lateral field instead of four, as previously described. Also, the middle band of the lateral field is areolated and the tail shape is variable. It is suggested that such data are considered as diagnostic characters.

A comparative study of root and soil populations of *Pratylenchus vulnus* has shown major differences in the biometrics of individuals collected from the rhizosphere of peach trees (Gao *et al.*, 1997). It was hypothesized that such variations were affected by the feeding habit of the nematode. Further morphometric and morphological studies on the populations with regard to possible diagnostic use of characters are reported here.

Materials and methods

Root samples were collected in the province Jiangsu at Xuzhou and Nanjing from the rhizosphere of peach trees infested by *Pratylenchus vulnus* Allen *et* Jensen. Trees at Xuzhou were five years old ornamental *Prunus davidiana* (Carr.) Franch., in sandy soil in the municipal nursery, whereas those at Nanjing in the southern region, were seven years old *P. persica* (L.) Batsch in clay soil.

Nematodes were extracted from roots by a modified Baermann funnel technique (White-

head and Hemming, 1965). Specimens were killed by gentle heating, fixed in TAF and mounted in glycerin. Measurements were taken with the aid of a camera lucida. For scanning electron microscopy (SEM) examination specimens were processed to Spur's low viscosity epoxy resin, coated with gold (Clark and Stone, 1975) and examined with a Hitachi SEM at accelerating voltage of 5, 10 or 25 KV. All measurements are expressed in μm unless otherwise specified.

PRATYLENCHUS VULNUS

Allen *et* Jensen, 1951

(Table I, Figs 1 and 2)

Description

Female: body relatively stout and long, slightly curved ventrally when killed by gentle heat. Cuticle marked by distinct fine transverse striae. Lip region low, apex slightly rounded to flattened, almost continuous with body contour, with three annules, the first annule smaller than the others. Heavily sclerotized framework. Stylet

TABLE I - *Morphometrics of Pratylenchus vulnus from China.*

Character	Population (locality)							
	Xuzhou		Nanjing		Allen and Jensen (1951)		Roman and Hirschmann (1969)	
	Female	Male	Female	Male	Female	Male	Female	Male
n	20	10	19	10	-	-	25	25
L	610±9.23 (503-674)	504±9.47 (459-559)	690±11.54 (601-814)	564.0±1.84 (490-686)	- (460-910)	- (460-470)	629.76 (537.3-708.8)	538.21 (475.1-592.1)
a	26.8±0.68 (20.8-30.0)	28.3±1.51 (21.7-34.0)	26.5±0.60 (22.6-30.7)	33.1±0.98 (30.4-38.4)	- (26.6-39.5)	- (28.3-39.2)	31.32 (25.2-35.8)	32.44 (29.9-36.3)
b	6.7±0.18 (4.8-8.4)	6.0±0.17 (5.2-6.8)	6.8±0.15 (6.0-9.0)	6.3±0.20 (5.3-7.2)	- (5.3-7.7)	- (5.3-7.4)	6.74 (5.7-7.7)	6.05 (5.6-6.7)
b'	4.4±0.10 (3.4-5.0)	4.2±0.10 (3.7-4.6)	5.0±1.93 (4.0-7.1)	4.5±1.77 (4.1-5.7)	- -	- -	- -	- -
c	20.3±0.34 (17.5-22.4)	19.6±0.73 (17.9-25.8)	21.7±0.76 (19.4-30.4)	20.0±0.21 (18.4-20.7)	- (14.2-27.7)	- (17.5-29.4)	19.89 (17.4-24.3)	19.75 (17.7-22.3)
V (%)	79.7±0.25 (73.3-82.9)	-	80.3±0.11 (78.6-82.8)	-	- (78-84.1)	-	79.52 (77.0-82.0)	-
T (%)	-	43.6±2.54 (30.6-55.5)	-	43.1±1.72 (35.2-52.1)	-	- (35.8-66)	-	45.08 (36.0-54.0)
stylet	16.4±0.15 (15.7-17.6)	14.9±0.08 (14.7-15.4)	16.9±0.17 (16.0-18.1)	15.7±0.25 (14.7-16.9)	- (16-18)	- (15-18)	14.88 (14.4-15.6)	13.82 (13.2-144.4)

usually with rounded basal knobs, occasionally with sloping anterior surface on one of the knobs. Median oesophageal bulb oval to almost rounded. Nerve ring surrounding oesophagus just behind the median bulb. Hemizonid at the excretory pore level or one annule anterior. Oesophagus overlapping the intestine ventrally by 1.5 to 2 times the body width. Excretory pore situated at the level of nerve ring to the oesophago-intestinal junction. Reproductive tube with one ovary extending anteriorly but not reaching the oesophageal glands, usually outstretched, occasionally reflexed. Ovary with oocytes in single row except in the germinal region. Spermatheca oblong to subspherical, usually filled with sperms. Postvulval sac 42.1 μm (30.6-51.0) long; about two vulval body widths long with rudimentary ovary. Vulval lips not protruding. Shape of tail variable, typically ta-

pering with narrowly rounded to subacute smooth tip, occasionally irregular. Tail annules 27 (20-34). Phasmids slightly anterior to middle of tail. Lateral field 1/4-2/5 of body width, with four lateral lines. The two outer lines crenate, and the two inner lines straight. SEM micrographs show that the middle band is narrower than the outer bands. Lateral field areolated with parallel striae, with the middle band less areolated. The four lateral lines extend beyond the phasmids almost to terminus of tail. Occasionally lateral field with a fifth additional lateral line.

Male: common, body slender, slightly curved ventrally, generally similar to female in the appearance of head and oesophagus. The bursa envelopes tail. Phasmids located slightly posterior to middle of tail, extending into bursa. Single testis outstretched. Spicules arcuate, and of normal shape. Gubernaculum slightly arcuate.

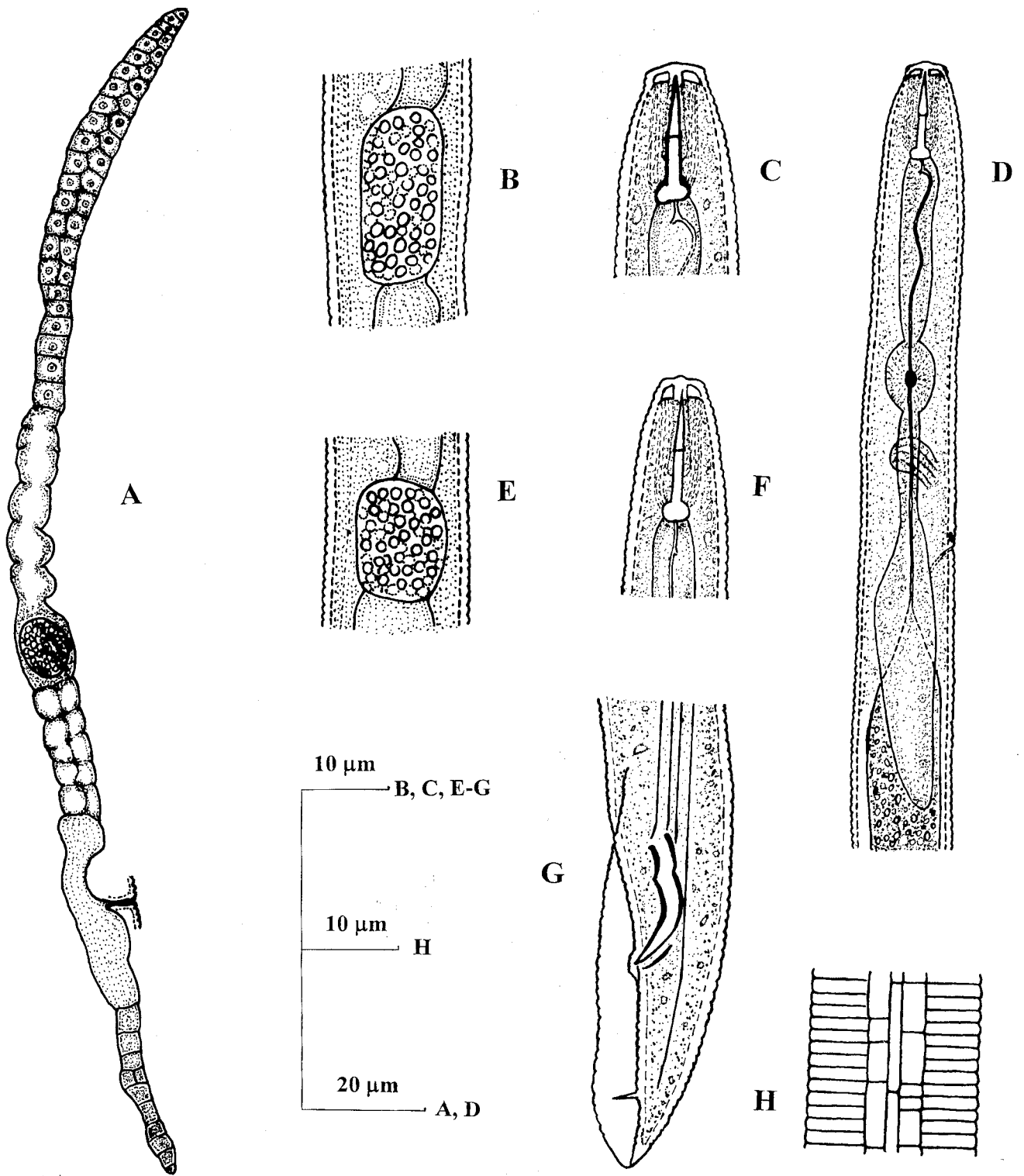


Fig. 1 - *Pratylenchus vulnus* from China: A, female genital tract; B and E, spermatheca; C, female head; D, female anterior region; F, male head; G, male tail; H, lateral field.

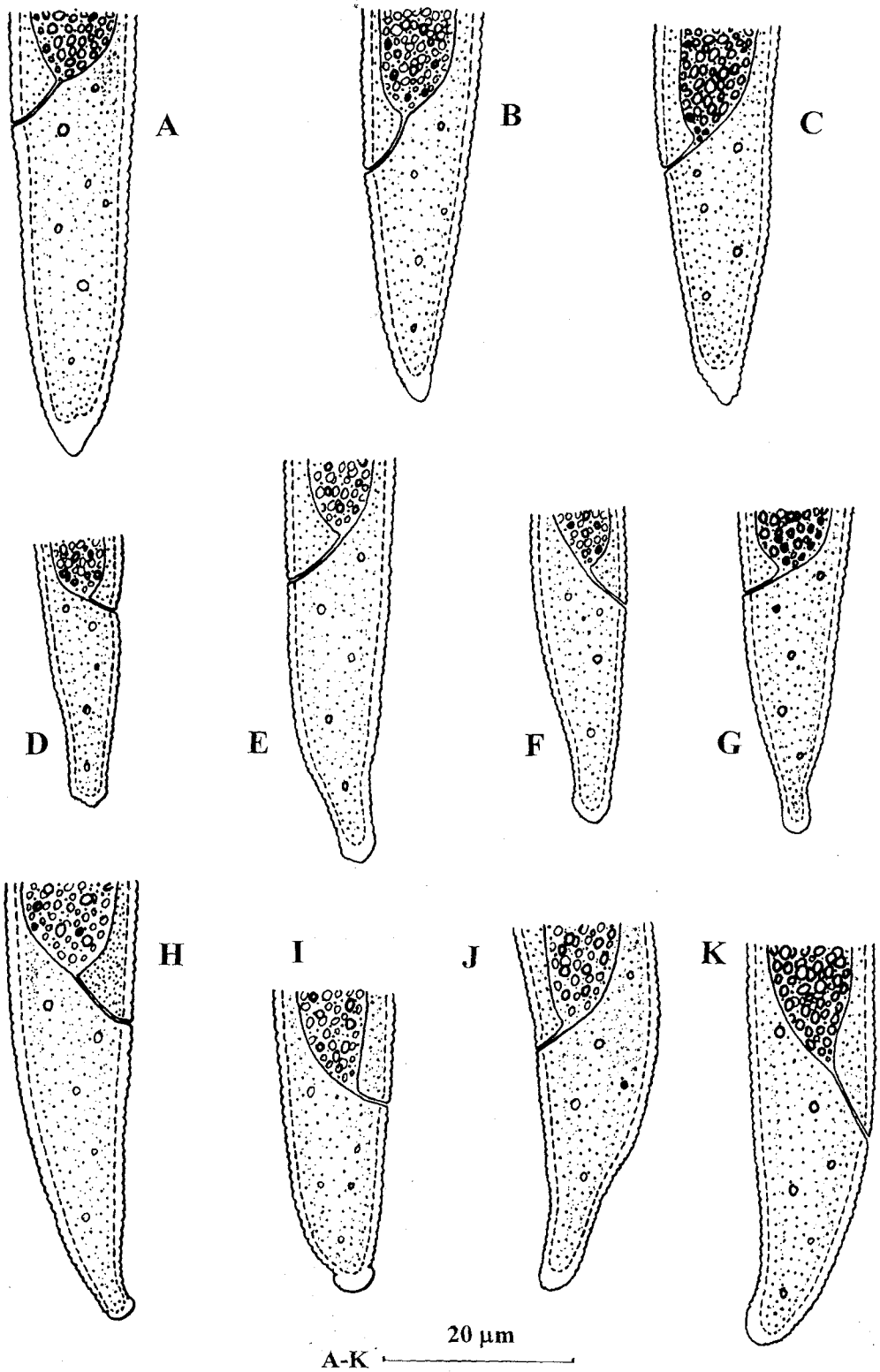


Fig. 2 - Variations in the female tail of *P. vulnus* from China.

Discussion

The morphometrics of specimens of *P. vulnus* from Xuzhou were similar to those from Nanjing, except for the shorter body length (L) and slightly shorter stylet (Table D). These differences are considered to relate to locality and host plant. In the original description of *P. vulnus*, Allen and Jensen (1951) did not indicate whether the specimens were obtained from roots or soil. They listed two host plants of *P. vulnus* but did not specify from which the specimens were measured. The morphology of the natural populations of *P. vulnus* from the roots of peach in Xuzhou and Nanjing differs from those previous descriptions in the following characters: i) *P. vulnus* was reported to have oblong spermatheca and four lateral lines (Allen and Jensen, 1951), but some specimens of *P. vulnus* from Jiangsu have subspherical spermatheca and occasionally five lateral lines; ii) the middle band of the lateral field is narrower than the outer bands and the lateral field is areolated with parallel striae, with the middle band less areolated and finally the tail shape is relatively variable. These data may be considered as diagnostic characters of *P. vulnus* now.

Marked variation in length exists within this species (Table D). The range of body length (L) of the specimens of *P. vulnus* from both localities in Jiangsu is less than that of the original description of *P. vulnus* (Allen and Jensen, 1951)

and greater than that reported by Roman and Hirschmann (1969) from a population cultured on callus tissue. The morphometric and morphological variations of *P. vulnus* discussed above further support the authors' viewpoint as reported previously (Gao *et al.*, 1997) that micro-habitats of populations of plant nematodes probably play an important role in their morphological variation, and the suggestion that the source of specimens be given in detail in the description and identification of plant nematodes, especially in the description of new species.

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Literature cited

- ALLEN M. W. and JENSEN H. G., 1951. *Pratylenchus vulnus*, new species (Nematoda: Pratylenchidae), a parasite of trees and vines in California. *Proc. helminthol. Soc. Washington*, 18: 47-50.
- CLARK S. A. and STONE A. R., 1975. A simple method of preparing nematodes for scanning electron microscopy using Spur's low viscosity epoxy resin. *Nematologica*, 21: 256-257.
- GAO X., CHENG H. and FANG C., 1997. A new type of morphological variation of *Pratylenchus vulnus* on peach from China. *Intern. J. Nematol.*, 7: 147-151.
- ROMAN J. and HIRSCHMANN H., 1969. Morphology and morphometrics of six species of *Pratylenchus*. *J. Nematol.*, 1: 363-368.
- WHITEHEAD A. G. and HEMMING J. R., 1965. A comparison of some quantitative methods of extracting small vermiform nematodes from soil. *Ann. appl. Biol.*, 55: 25-38.