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TWO *HEMICRICONEMOIDES* (NEMATA: CRICONEMATIDAE) FROM VENEZUELA

by
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Summary. In the course of a nematode survey in Venezuela, two Criconematid species identified as *Hemicriconemoides communis* and *H. mangiferae* were found. *H. communis* was found around roots of *Psidium guajava* in Mara Municipality (Zulia State) and is recorded for the first time in Venezuela, and *H. mangiferae* was recorded in many areas. Measurements and light microscope photomicrographs of both species are given together with scanning electron microscopy illustrations of *H. communis*.

Resumen. *Dos* Hemicriconemoides (*Nemata*: *Criconematidae*) *de Venezuela*. Durante un muestreo de nematodos en Venezuela, fueron encontrados dos Criconematidos identificados como *Hemicriconemoides communis* y *H. mangiferae*. *H. communis* fue encontrado alrededor de raíces de *Psidium guajava* en el municipio Mara (Estado Zulia) y es señalado por primera vez en Venezuela y *H. mangiferae* se encontró en muchas áreas. Se incluyen mediciones y microfotografías tomadas al microscopio de luz de ambas especies y de *H. communis* tomadas en el microscopio electrónico de barrido.

Little is know of the occurrence of the genus *Hemicriconemoides* in Venezuela; only *H. mangiferae* and *H. cocophillus* have been detected and studied. The first being associated with cacao and the second with sugar cane (Dasgupta *et al.*, 1969; Pinochet and Raski, 1975).

During nematode surveys carried out in Venezuela, soil samples were collected from several cultivated habitats. Some of the samples contained abundant populations of criconematids identified as *Hemicriconemoides mangiferae* Siddiqi, 1961 and *H. communis* Edward *et* Misra, 1963.

The morphometrics and the geographical distribution of these two species are illustrated and discussed in this article.

Materials and methods

Nematodes were extracted from soil samples by Seinhorst's (1962a) method. Specimens for light microscopy were killed and fixed in formalin-propionic acid 4:1, then processed to glycerin by Seinhorst's (1962b) rapid method. Specimens preserved in formalin-propionic acid were also used for SEM observations. The specimens were coated with platinum gold and observed by SEM at 10 KV accelerating voltage.

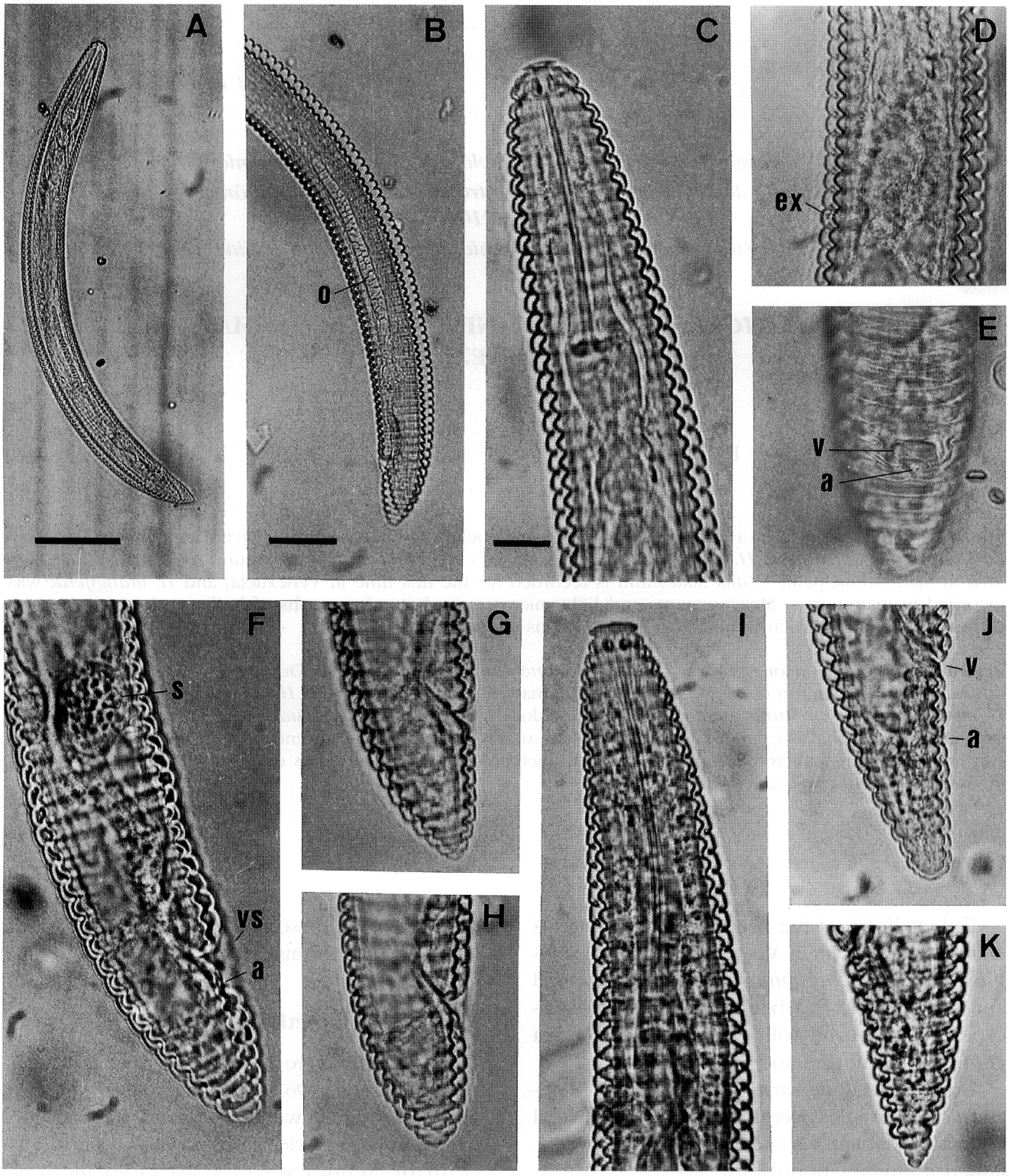

Fig. 1 - Light microscope photomicrographs of female of *Hemicriconemoides communis* (A-H) and H. mangiferae (I-K): A, entire female; B, ovary (o); C, anterior body; D, excretory pore (ex) in lateral view; E, vulva-anal area, in ventral view (v = vulva; a = anus); F, posterior region, spermatheca (s) with sperms, vulvar sheath (vs) and anus (a); G-H, posterior body terminus; I, anterior body; J-K, posterior body terminus (v = vulva; a = anus). Scale bars = 60 µm in A; Scale bars = 30 µm in B; Scale bars in C = 10 µm in C, D, E, F, G, G, H, I, J, K).

***HEMICRICONEMOIDES COMMUNIS* Edward *et* Misra, 1963**

(Fig. 1A-H; Fig. 2; Table I)

Body cylindrical slightly curved ventrally with conical terminus (Fig. 1A). Lip region of female slightly off set. Two labial annules, the first smaller than the second (Fig. 2B). Labial disc slightly elevated in lateral view (Fig. 1C and 2A). Annules 3.8-4.8 µm wide at mid-body. Stylet knobs 6.7-7.7 µm across. Oesophagus typical for the genus. Excretory pore on the 29th-31th annule from the anterior end and 7-9 annules from basal bulb (Fig. 1D). Ovary monodelphic (Fig. 1B), extending to 122 µm below basal bulb. Vulva situated on the 8th-9th annule from tail terminus; vulvar sheath well developed (Fig. 1F and 2C). Tail conical with rounded terminus (Fig. 1G and 2D). Anus one annule behind vulva (Fig. 1E and 1F).

Habitat and locality: specimenes were collected from around roots of *Psidium guajava* L. at Mara Municipality, Zulia State, western Venezuela.

Remarks: measurements and morphology of *H. communis* closely conform with the original description (Edward and Misra, 1963), except for the shorter stylet (51-58 µm in the type population). *H. communis* is similar to *H. cocophillus*. However, it differ from it mainly for tail shape, digitate in *H. cocophillus*. Dasgupta *et al.* (1969) and Siddiqi (1986) considered *H. communis* as a synonym of *H. cocophillus* but Raski and Luc (1987) and Esser and Vovlas (1990) disagreed.

TABLE I - *Morphometrics of females (n=20) of* Hemicriconemoides communis *from the rhizosphere of guava in Venezuela.*

Character	Range		Mean	Standard Desviation (±)
	Min	Max		
Body length (µm)	388	445	406	17.7
Body width (µm)	22.1	29.8	26.9	1.9
Stylet length (µm)	47	50	48.2	1.2
Stylet knobs width (µm)	6.7	7.7	7.1	0.3
Annuli thikness at mid-body (µm)	3.8	4.8	4.2	0.3
Oesophagus total length (µm)	76.0	87.2	80.8	3.0
V (%)	92.3	94.2	93.2	0.5
Ratios: a	13.0	16.7	15.2	0.9
b	4.7	5.4	5.0	0.2
c	13.4	18.0	15.1	1.2
Vulva-terminus distance (µm)	23.8	31.2	27.7	2.2
R	105	113	111	2.6
RV	8	9	8.8	0.4
Ran	7	8	7.8	0.4
RVan	1	1	1	
Rex	29	31	30.5	0.8

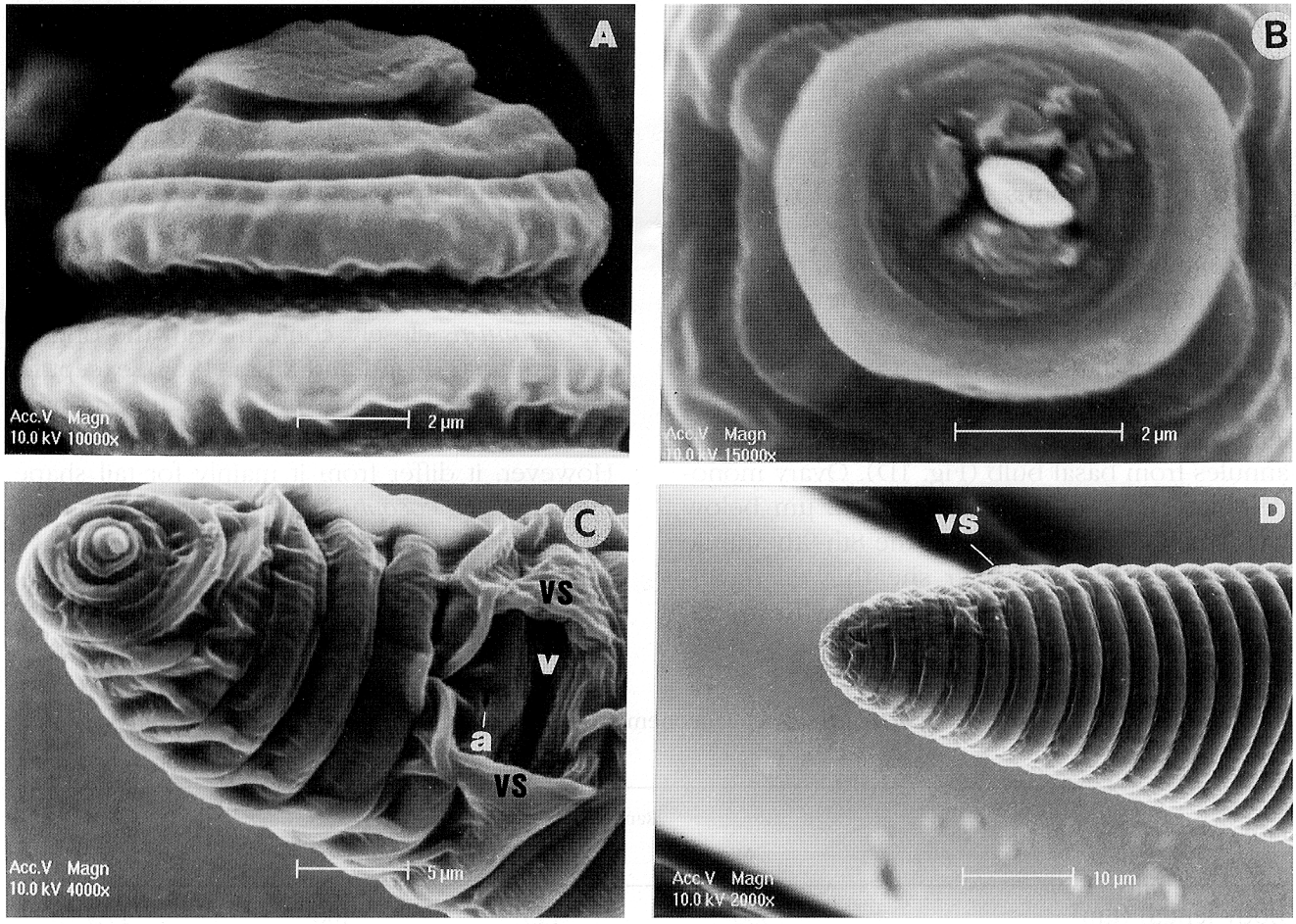

Fig. 2 - SEM photomicrographs of female of *H. communis*: A-B, anterior body region; C, vulva-anal area in ventral view (v = vulva; a = anus; v = vulvar sheath); D, posterior body region (vs = vulvar sheath).

HEMICRICONEMOIDES MANGIFERAE **Siddiqi, 1961** (Fig. 1I-K; Table II)

Cuticular sheat attached to body at anterior end, vulva and sometimes tail. Lip region slightly set off. Labial disc slightly elevated, rounded at top (Fig. 1I). Excretory pore on the 35th-36th annule. Annules 3-4.2 µm wide at mid-body. Stylet knobs 5.2-7.2 µm across. Vulvar sheath lacking. Tail conoid with pointed terminus (Fig. 1J-K).

Discussion

H. mangiferae is almost cosmopolitan in the tropics and subtropics where it is an important parasite of fruit crops, such as banana, citrus, date palm, litchi, mango and pineapple (Siddiqi, 1977), sapodilla and tamarind (McSorley, 1992). In Venezuela it was found in the rizosphere of several perennial and annual crops (Table III). Mango populations were as high as 1000 nematodes/100 cm^3 of soil. The species is widely dis-

TABLE II - *Morphometrics of females (n=20) of* H. mangiferae *from the rhizosphere of mango at Maracay in Venezuela.*

Character	Range		Mean	Standard Desviation (±)
	Min	Max		
Body length (µm)	478	574	532	28.5
Body width (µm)	26.6	29.0	27.7	0.9
Stylet length (µm)	71	77	72.6	2.0
Stylet knobs width (µm)	5.2	7.2	6.8	0.6
Annuli thikness at mid-body (µm)	3.0	4.2	3.8	0.6
Oesophagus total length (µm)	101	116	107	4.4
V (%)	92	93	92.6	0.5
Ratios: a	18.0	20.4	19.2	0.8
b	4.7	5.3	5.0	0.2
c	18.0	21.5	19.4	1.4
Vulva-terminus distance (µm)	16.2	19.0	18.0	1.3
R	141	148	144	2.0
RV	12	15	13.5	0.8
Ran	9	11	10.3	0.7
RVan	3	4	3.2	0.4
Rex	35	36	35.5	0.5

TABLE III - *Crops and location associated with* H. mangiferae *in Venezuela.*

Crop	Location
Citrus (*Citrus* spp.)	Bejuma (Carabobo State); Albarico and San Felipe (Yaracuy State); Cumaná (Sucre State); Guayabita (Aragua State).
Lemon (*Citrus volkameriana* Pasq.)	Paya and Turmero (Aragua State)
Citrumelo swingle [*Citrus sinensis* L. Osbeck x *Poncirus trifoliata* (L.) Raf.]	Paya and Turmero (Aragua State).
Mango (*Mangifera indica* L.)	Maracay and Zuata (Aragua State).
Cacao (*Theobroma cacao* L.)	Maracay, Ocumare de la Costa (Aragua State).
Plantain (*Musa* AAB)	El Vigía (Mérida State).
Banana (*Musa* AAA)	Turmero (Aragua State); Nueva Esparta State.
Tamarindus (*Tamarindus indica* L.)	Maracay (Aragua State).
Peach (*Prunus persica* L.)	Colonia Tovar (Aragua State).
Date palm (*Phoenix dactylifera* L.)	Nueva Esparta State.
Pine (*Pinus caribaea* Morelet)	Maracaibo (Zulia State).
Cotton (*Gossypium hirsutum* L.)	La Luz Municipality (Barinas State).
Peanut (*Arachis hypogaea* L.)	El Tigre (Anzoátegui State).
Tomato (*Lycopersicon esculentum* L.)	Paya and Turmero (Aragua State).

tributed in association with mango throughout the world (McSorley, 1981; Cohn and Duncan, 1990) and its pathogenicity to mango has been demostrated (Saeed, 1974 cited by McSorley, 1992). Damage and symptoms of the attacks of *H. mangiferae* on mango in Florida (U.S.A.) are described and correlated with population density (McSorley *et al.*, 1980; McSorley *et al.*, 1981) as well as its pathogenicity to tamarind and sapodilla (McSorley, 1992). All these crops are cultivated in Venezuela and the nematode was found associated with mango and tamarind; sapodilla was not sampled. No damage to plants has up to now been reported, but due to its wide distribution in Venezuela, pathogenicity studies are necessary. Nothing is known about the pathogenicity of *H. communis*.

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Accepted for publication on 17 June 1995.