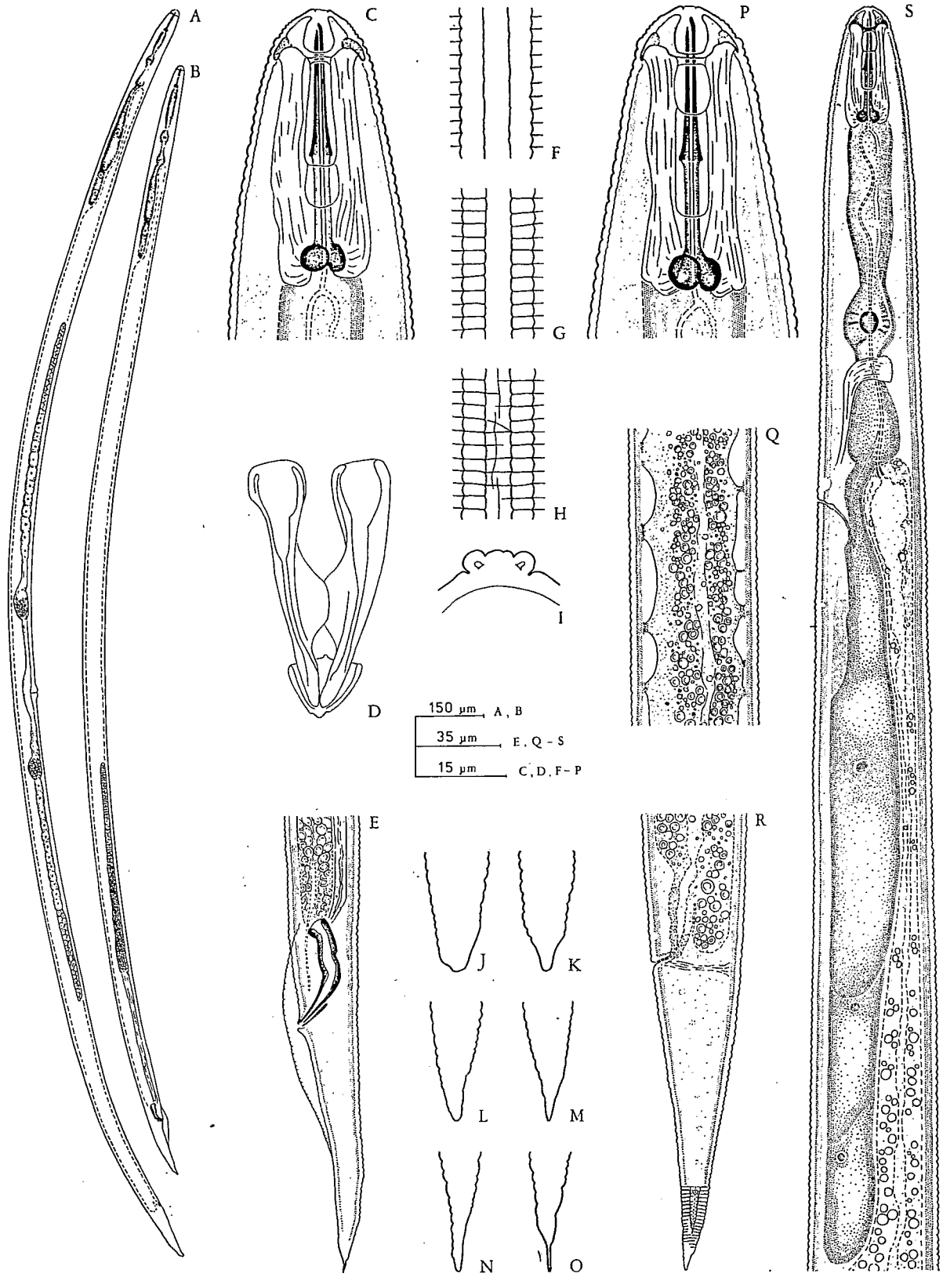
C.I.H. Descriptions of
Plant-parasitic Nematodes
Set 5, No. 68

HIRSCHMANNIELLA SPINICAUDATA



Hirschmanniella spinicaudata (Schuurmans-Stekhoven). A. Female. B. Male. C. Male head end. D. Spicules and gubernaculum (ventral view). E. Male tail. F, G, H. Female lateral field. I. Cross section of female lateral field. J–O. Female tail tips. P. Female head end. Q. Female mid-body portion showing "Thornean cells". R. Female tail. S. Female oesophageal region. (Specimens from rice field, Djibelor, Sénégal).

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Hirschmanniella spinicaudata (Schuurmans-Stekhoven, 1944) Luc & Goodey, 1964.
Syn. *Tylenchorhynchus spinicaudatus* Schuurmans-Stekhoven, 1944; *Radopholus lavabri* Luc, 1957; *Hirschmannia spinicaudata* (Schuurmans-Stekhoven, 1944) Luc & Goodey, 1962

14.242

MEASUREMENTS Zaïre (formerly Belgian Congo), lectotype female, after Luc & Goodey, 1962): 1 ♀: L = 2.1 mm; a = 42; b′ = 5.4; c = 17; c′ = 3.7; V = 57; stylet = 40 μm; anterior part of stylet = 21 μm.
(Venezuela; after Sher, 1968): 18 ♀♀: L = 2.88–3.49 (3.17) mm; a = 48–72 (60); b = 12–18 (16); b′ = 5.2–9.5 (6.5); c = 21–26 (24); c′ = 3.1–4.7 (3.9); V = 50–57 (53); stylet = 42–50 (47) μm.
7 ♂♂: L = 2.30–2.95 (2.72) mm; a = 52–71 (60); b = 14–17 (15); b′ = 5.4–9.2 (7.3); c = 22–24 (23); c′ = 3.2–5.1 (4.2); stylet = 42–45 (43) μm; spicules = 46–54 (51) μm; gubernaculum = 16–20 (18) μm.
(Sénégal; present authors): 20 ♀♀: L = 2.44–3.16 (2.84) mm; a = 49.4–62.9 (55.8); b = 12.7–17.0 (14.9); b′ = 5.0–7.6 (5.8); c = 20.4–28.3 (23.9); c′ = 3.0–3.8 (3.3); V = 51.5–58.5 (54.5); stylet = 44–48 (46) μm; anterior part of stylet = 23–26 (24) μm.
20 ♂♂: L = 2.12–2.64 (2.37) mm; a = 48.7–60.7 (56.2); b = 11.3–15.8 (13.3); b′ = 4.6–6.3 (5.2); c = 18.0–23.3 (20.3); c′ = 3.2–5.7 (4.7); stylet = 40–44 (41.5) μm; anterior part of stylet: 21–24 (22) μm; spicules = 41–51 (48.5) μm; gubernaculum = 13–16 (15) μm.

DESCRIPTION **Female** (based on several populations from Cameroon, Ivory Coast and Sénégal): Body elongate, straight or ventrally curved when heat relaxed; cuticle transversely striated; striae about 3 μm apart in the middle of the body; lateral fields with four incisures, **transverse striae crossing the 3 bands or only the 2 outer ones**; less frequently, the lateral fields are plain; in some specimens a very faint irregular fifth longitudinal line appears in the central band (Figs. F–I). Lip region high, hemispherical, continuous, with 4–6 (usually 5) annules; labial framework heavily sclerotized, extending posteriorly over 3 body annules. Cephalids not seen. Hemizonid extending 2 annules, situated 2–4 annules in front of excretory pore; hemizonion faint, 15–18 annules posterior to excretory pore; caudalid present, extending 1–2 annules and situated 4–5 annules in front of anus. **Spear long (over 40 μm)** knobs rounded, 5–7 μm high, 7–9 μm across. Median oesophageal bulb ovoid; oesophageal glands elongate, overlapping intestine ventrally or latero-ventrally. Intestine separated from hypodermal layer by so-called "Thorneian cells" (Fig. Q); **intestine slightly overlapping rectum** more or less distinctly (Fig. R). Two genital branches; ovaries with one row of oocytes; spermatheca globular, with sperms; vagina and vulva without any peculiarity. Tail elongate-conoid; **extremity** variable (in same population), from **rounded to effilate, but never indented or with a distinct mucro; striae extending almost to terminus** (Figs. J–O); phasmids pore-like, situated in the posterior third of the tail, 17–24 annules from the terminus.

Male: Lip region, oesophagus and intestine as in female; stylet slightly shorter. Spicules arcuate, cephalated, flanged on the inner edges; gubernaculum curved, simple (Fig. D). Bursa crenate, extending from the level of distal end of spicules to posterior third of the tail. Tail elongate-conoid; terminus as in female. Phasmids situated on the posterior third of the tail.

See also Luc 1957; Luc & Goodey, 1962; Sher, 1968.

Note: The so-called "Thorneian cells" appeared to the authors, in fixed material, to be optically empty. It is suggested that these structures are nothing more than large vacuoles; the "septa" between the "cells", according to this hypothesis, are interpreted as the connections of the intestinal cells with the hypodermal layer.

TYPE HABITAT AND LOCALITY Fresh water, Vitsumbi Bay, Lake Edouard, Zaïre; no type host.

SYSTEMATIC POSITION Tylenchida: Tylenchoidea: Pratylenchidae: Pratylenchinae: *Hirschmanniella* Luc & Goodey, 1964; type-species.

DISTRIBUTION AND HOSTS *H. spinicaudata* has been mainly recorded parasitizing flooded rice (*Oryza sativa*) in tropical Africa: Cameroon (Luc, 1957), Gambia (Fortuner & Merny, 1973), Ivory Coast (Sher, 1968), Nigeria (Caveness, 1967), Sénégal (Fortuner & Merny, 1973), Upper-Volta (Germani, pers. comm.). It has also been found in Zaïre (Schuurmans-Stekhoven, 1944) and in Zambia (Sher, 1968), with no indications of host. In Nigeria *H. spinicaudata* was recorded from soil around sugar cane (*Saccharum officinarum*) but not mentioned in roots of this crop (Sher, 1968). In Ivory Coast (Merny, 1972) additional hosts are some Cyperaceae growing in flooded rice fields, *Cyperus viridis, Cyperus* sp., *Fimbristylis dichotoma, Mariscus longibracteatus. H. spinicaudata* was also recorded in the vicinity of roots of *Lycopersicon esculentum* and *Hibiscus esculentus* in Sénégal (Netscher, 1970), but these two crops were growing in fields in which rice had previously grown. Outside Africa, *H. spinicaudata* was recorded in Venezuela on rice (Sher, 1968) and in California on *Typha* sp. (Sher, 1968) and on *Juncus* sp. (Siddiqui, Sher & French, 1973).

H. spinicaudata was frequently found together with *H. oryzae* in flooded rice fields in Nigeria (Caveness, 1967), Gambia, South of Sénégal (Fortuner & Merny, 1973) and Venezuela (Yepez, 1973).

BIOLOGY AND LIFE-HISTORY (Data from Merny, 1970, 1970a, 1972 and Fortuner & Merny, 1973). In the African countries where extensive surveys of flooded rice fields were made, *H. spinicaudata* is often the most frequent and abundant species: in northern Ivory Coast, it was recorded in 85 % of the rice fields, but only in 19 % in the central area where rice fields have not been established for so long a period; in Casamance (South of Sénégal) it occurs in 63 % of the rice fields, but only in 40 % in nearby Gambia where *H. oryzae* is more frequent (73 %) and it is practically absent in the northern part of Sénégal where *H. oryzae* is the prevalent species. All stages from second stage larvae to adult can penetrate the roots of rice; experimentally, maximum penetration occurs on 20–30 day-old rice. At this time, the population increases in the roots (up to 600 nematodes per gram of root) and few nematodes are found in the soil. The nematodes begin to leave the roots when the panicles appear and the soil population is maximum at the time of ripening (up to 6,000 nematodes per dm^3 of soil). In the interval between two rice crops, *H. spinicaudata* can maintain itself in rice ratoons or in some weeds (see above); it was demonstrated experimentally that, in the absence of host plants, all stages of *H. spinicaudata* survive in larger numbers in dry soil than in wet or flooded soil: in the former, 27 % of the original population is still alive after 10 months; in the latter all are dead after only 4 months. This is mainly because nematodes in the many old roots survive better when the roots do not rot; however, the less numerous soil population decreases more rapidly in dry soil.

HOST-PARASITE RELATIONSHIPS Individuals of *H. spinicaudata* are entirely situated in the roots; the young larvae lie straight, along the central cylinder, but the oldest larvae and adults are usually coiled; individuals and eggs appear isolated in the roots (Luc, 1957). In micro-plots (Merny, 1970) *H. spinicaudata* had a depressive effect on tillering and reduced the number of panicles and the fresh weight. In rice fields of North Cameroon (Lavabre, 1959) numerous patches of various sizes (from a few square metres to several ares) where rice plants were yellowing and etiolated, but of the same size as healthy plants, were attributed to the presence of *H. spinicaudata.*

CONTROL No control treatments or experiments have been reported concerning this nematode.

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M. LUC
Muséum National d'Histoire Naturelle,
Laboratoire de Zoologie (Vers),
43 Rue Cuvier,
Paris, 5 ème,
France.
R. FORTUNER
Laboratoire de Nématologie,
O.R.S.T.O.M.,
Dakar, Sénégal.

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