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A REPORT OF SOME *XIPHINEMA* SPECIES OCCURRING IN PERU
(NEMATODA, DORYLAIMIDA)

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Records of species of *Xiphinema* Cobb from Peru are occasional and infrequent (Tarjan, 1969; Jatala, 1975; Lamberti and Bleve-Zacheo, 1979). In the nematode collection of the International Potato Center (CIP) in Lima, Peru, there are specimens belonging to this genus, collected in the past by one of us (Jatala). An examination of the slide collection revealed the presence of species still unreported from this country. The morphometrics of some females were studied and are commented on here.

Nematodes were fixed with 5% hot formalin and mounted in anhydrous glycerin.

Xiphinema brasiliense Lordello, 1951 occurred in the rhizosphere of mango trees (*Mangifera indica* L.) in San Ramon, the Jungle area. The morphometrics of this monodelphic species (only the posterior gonad is present) are as follows: $n=3 \text{ } \varnothing \text{ } \varnothing$; $L=2$ (1.99-2.02) mm; $a=34$ (32-36); $b=4.7$ (4.4-5); $c=59$ (53-65); $c'=0.9$ (0.9-0.98); $V=30$ (29-30); odontostyle=137 (135-139) μm ; odontophore=76 (74-78) μm ; oral aperture to guiding ring=128 (127-129) μm ; tail length=34 (31-37) μm .

The peruvian specimens of *X. brasiliense* (Fig. 1, a and b) do not differ morphologically from the original description (Lordello, 1951) based on specimens from the State of São Paulo, Brazil, with the value of the c ratio as amended by Sturhan (1963). Other brazilian populations differ from the peruvian in having a higher c' value (1.2-1.4) (Loof and Sharma,

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1979; Ferraz, 1980) and a slightly shorter odontostyle (111-127 μm) (Ferraz, 1980). This is the first record of *X. brasiliense* in Peru. According to Cohn and Sher (1972) it also occurs in Guatemala, Sri Lanka (Ceylon) and Nigeria and to Bajaj and Jairajpuri (1979) in India. Cohn and Sher (1972) consider *X. brasiliense* conspecific with *X. itanhaense* Carvalho, 1962.

Xiphinema floridae Lamberti et Bleve-Zacheo, 1979 was found in the rhizosphere of edible cane (*Canna edulis* Ker-Gawl) and *Citrus* sp. in Lima and of avocado (*Persea americana* Mill.) and *Citrus* sp. at Canete, the Coastal area, and Huaral (75 km north of Lima). Its biometric characters are: $n=6$ ♀ ♀; $L=2$ (1.9-2.3) mm; $a=43$ (39-47); $b=6.2$ (5.8-6.6); $c=63$ (58-73); $c'=1.3$ (1.1-1.4); $V=52$ (51-54); odontostyle=92 (77-96) μm ; odontophore=51 (48-51) μm ; oral aperture to guiding ring=78 (71-85) μm ; tail length=32 (31-34) μm .

Morphometrics (Fig. 1, c and d) of *X. floridae* from Peru fit well with the original description (Lamberti and Bleve-Zacheo, 1979). This is the first record for *X. floridae* outside Florida.

Xiphinema inaequale (Khan et Ahmad, 1975) Khan et Ahmad, 1977 (Lamberti and Bleve-Zacheo, 1979) was extracted from soil collected from the rhizosphere of mango trees at Merced, the Jungle area. Its biometric characters are: $n=3$ ♀ ♀; $L=1.8$ (1.7-1.85) mm; $a=44$ (41-46); $b=5.6$ (5.4-5.7); $c=59$ (56-62); $c'=1.3$ (1.3-1.4); $V=50$ (49.5-51); odontostyle=99 (97-101) μm ; odontophore=54 (52-56) μm ; oral aperture to guiding ring=83 (82-83) μm ; tail length=31 (29-33) μm .

Morphometrics (Fig. 1, e and f) of the population of *X. inaequale* from Peru are within the range of those of the original description (Khan and Ahmad, 1975) with the exception of a lower value of the c' ratio (1.6 in the original description). This is the first record of *X. inaequale* in the Americas, which to the best of our knowledge has not previously been reported from outside India.

Xiphinema index Thorne et Allen, 1950 occurred in the rhizosphere of *Vitis* sp. at Huaral, and Ica, the Coastal area. Its biometric characters are: $n=2$ ♀ ♀; $L=3.3$ -3.5 mm; $a=50$ -54; $b=6.9$ -7.4; $c=77$ -83; $c'=1$ -1.1; $V=38$; odontostyle=135-136 μm ; odontophore=71 μm ; oral aperture to guiding ring=123-125 μm ; tail length=42-43 μm .

The specimens fit well (Fig. 1, g and h) with the original morphological description of *X. index* (Thorne and Allen, 1950) but are larger than the average lengths of californian and italian populations (Martelli and Lamberti, 1967; Lamberti et al., 1985). This is the first record of *X. index* from Peru.

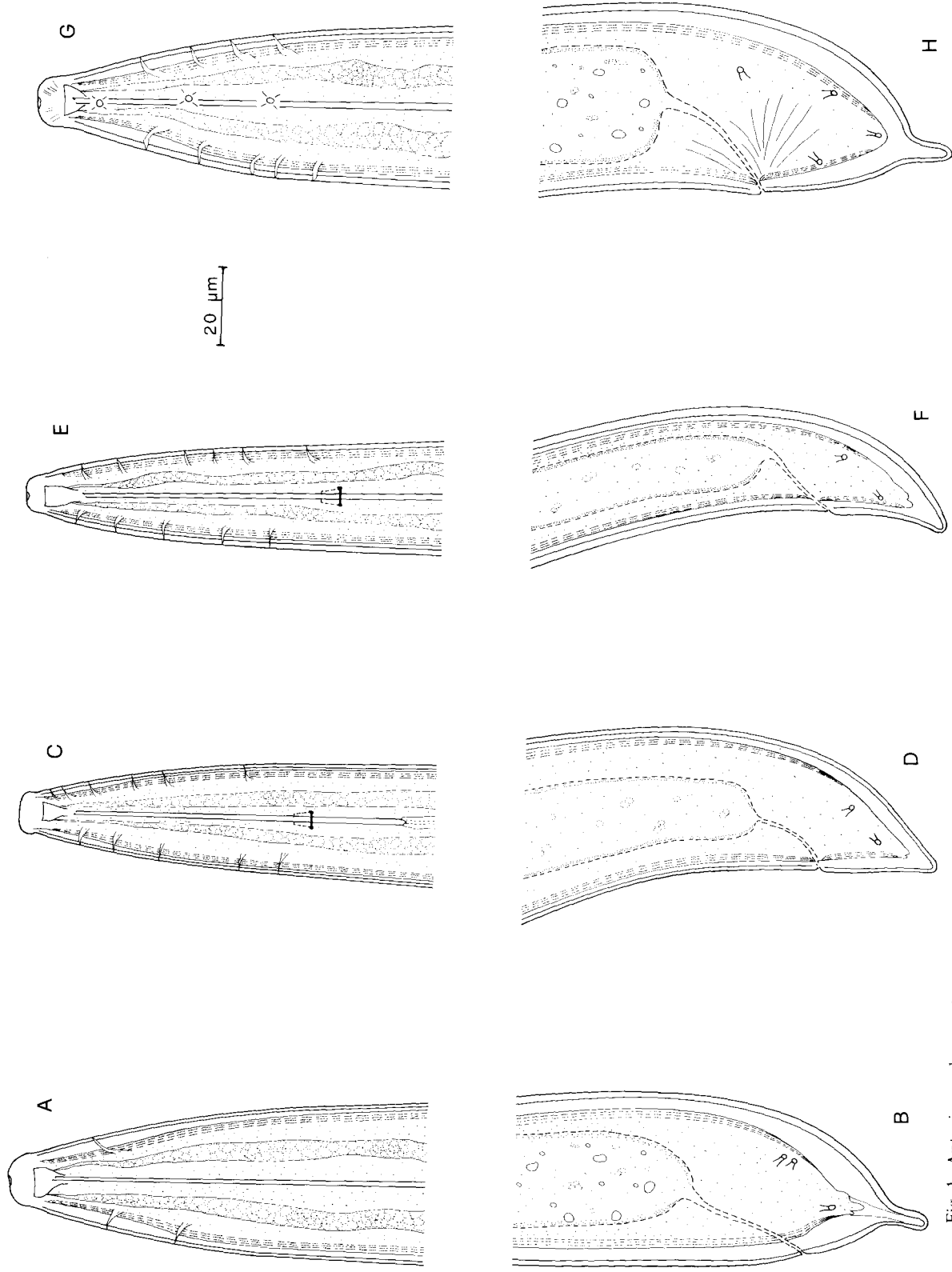


Fig. 1 - Anterior and posterior regions of *Xiphinema brasiliense* (A and B), *X. floridae* (C and D), *X. inaequale* (E and F) and *X. index* (G and H).

Xiphinema paritaliae Loof *et* Sharma, 1979. Only one female was found in the rhizosphere of *Citrus* sp. in the Jungle area of the Department of Puno. Its biometric characters are: L=3.9 mm; a=68; b=8.8; c=44; c'=3.1; V=40; odontostyle=120 μ m; odontophore=62 μ m; oral aperture to guiding ring=98 μ m; tail length=90 μ m.

The specimen (Fig. 2, a and b), although larger (L=3.3-3.6 mm in the original description) and with a shorter odontostyle (130-136 μ m in the original description) than the type population from the State of Bahia, Brazil (Loof and Sharma, 1979), falls in the range of other populations reported from different localities of Brazil (Ferraz, 1980). *X. paritaliae* is also reported for the first time from Peru.

Xiphinema peruvianum Lamberti *et* Bleve-Zacheo, 1979 was found in the rhizosphere of maize (*Zea mais* L.) at Poccismayo, near Trujillo, Northern Coastal area, of avocado at Canete and of edible cane and *Citrus* sp. in Lima and Huaral. Its biometrics are: n=17 ♀ ♀; L=1.9 (1.5-2.1) mm; a=48 (41-55); b=6.2 (5.2-7.1); c=59 (52-75); c'=1.4 (1.2-1.8); V=53 (51-55); odontostyle=89 (85-99) μ m; odontophore=48 (42-53) μ m; oral aperture to guiding ring=73 (67-81) μ m; tail length=32 (26-36) μ m.

The specimens (Fig. 2, c and d) are almost indetical to those of the type population which was also collected in Lima from the rhizosphere of citrus trees (Lamberti and Bleve Zacheo, 1979), with the exception of being slightly larger. The five specimens included in this group and which were found in the rhizosphere of *Citrus* sp. are probably from the type locality.

Xiphinema vulgare Tarjan, 1964 occurred in the rhizosphere of *Citrus* sp. at Yurimaguas, the lower Amazon basin of the Jungle area. Its biometric characters are: n=2 ♀ ♀; L=2.76-2.78 mm; a=45-46; b=6.8-7.4; c=56-59; c'=1.5; V=40-40.5; odontostyle=116-119 μ m; odontophore=73 μ m; oral aperture to guiding ring=100-105 μ m; tail length=47-49 μ m.

The specimens (Fig. 2, e and f) differ from the type population from Florida (Tarjan, 1964) in having a longer odontostyle (104 μ m in the type population) and lower value of c' ratio (1.8 in the type population) but are almost identical to populations reported from various localities in Brazil (Loof and Sharma, 1979; Ferraz, 1980; Rashid *et al.*, 1986) and Surinam (Loof and Maas, 1972). *X. vulgare* is reported also from Mauritius (Williams and Luc, 1977) and Indonesia (Brown *et al.*, 1981) and is recorded for the first time in Peru. It was considered by Cohn and Sher (1972) as a junior synonym of *X. setariae* Luc, 1958, but Luc and Dalmasso (1975) rejected such synonymy and reverted to *X. vulgare* as a valid species.

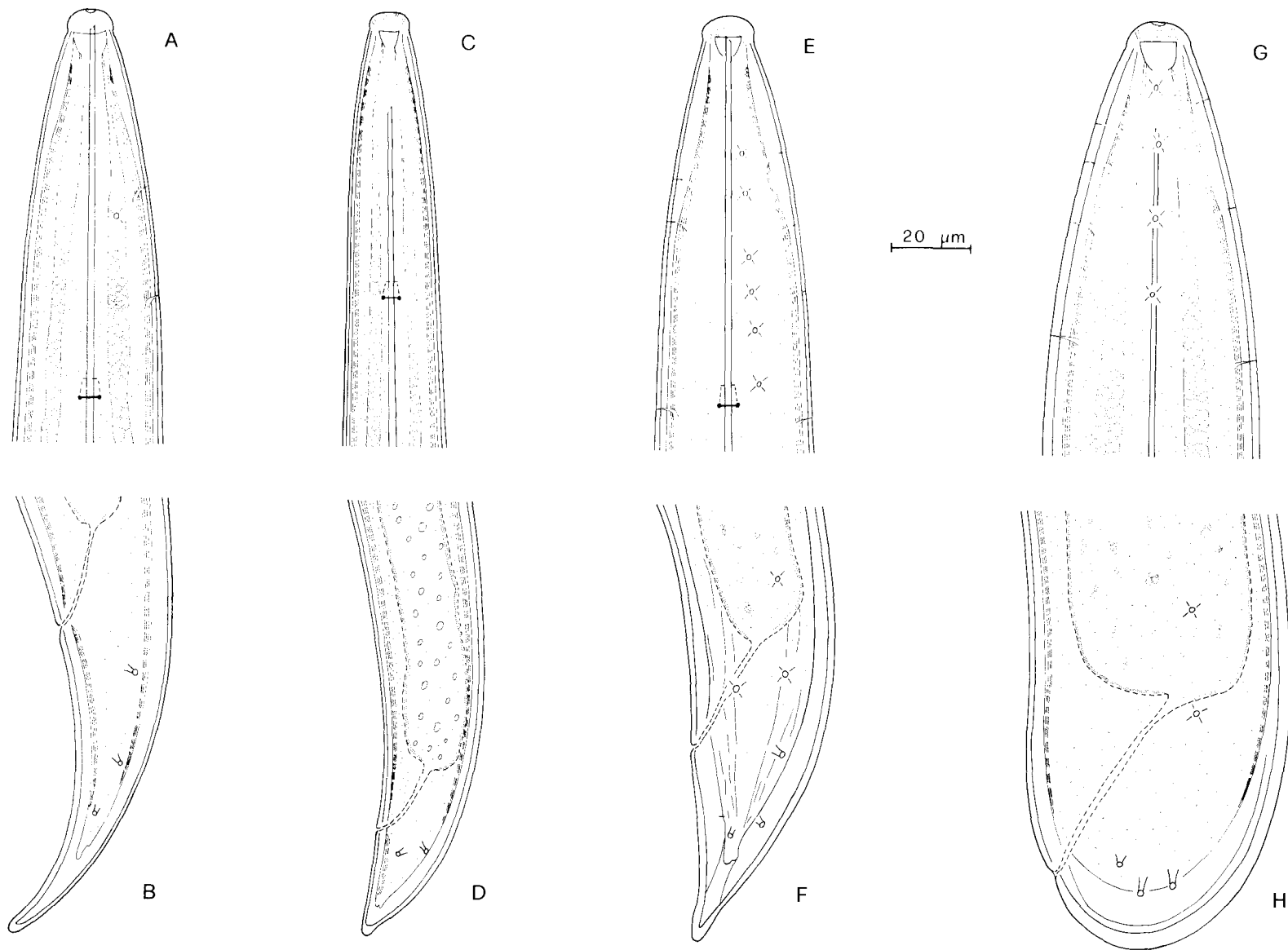


Fig. 2 - Anterior and posterior regions of *Xiphinema paritaliae* (A and B), *X. peruvianum* (C and D), *X. vulgare* (E and F) and *Xiphinema* sp. (G and H).

Xiphinema sp. was reported from Peru by Jatala (1975) as a case of endotokia matricida. It is a monodelphic, rounded tail species related to *X. ensiculiferum* (Cobb, 1893) Thorne, 1937 and *X. hygrophilum* Southey et Luc, 1973, which in our opinion represents an undescribed species. However, it is not described here because we possess only one female (Fig. 2, g and h) found in a potato field at Limbani, Department of Puno. Its measurements are: L=2.5 mm; a=30; b=5.5; c=131; c'=0.4; V=35; odontostyle=132 μm ; odontophore=88 μm ; oral aperture to guiding ring=119 μm ; tail length=19 μm .

R E M A R K S

Eight species of *Xiphinema* are reported from Peru. Six of them, namely *X. brasiliense*, *X. floridae*, *X. inaequale*, *X. index*, *X. paritaliae* and *X. vulgare*, constitute the first records for this country. The occurrence of *X. brasiliense*, *X. paritaliae* and *X. vulgare* might have been expected as they are widespread in Brazil which is geographically close (Loof and Sharma, 1979; Ferraz, 1980; Rashid et al., 1986). Also it is not surprising to record the presence of *X. index* as this species has a worldwide distribution, which is closely related to that of its host, grapevine (Siddiqi, 1974), and of *X. floridae*, which frequently occurs in the north American tropics (Florida) (Lamberti and Bleve-Zacheo, 1979). Conversely, the occurrence of *X. inaequale* is unexpected as up to now it has been reported only from India (Khan and Ahmad, 1975; Bajaj and Jairajpuri, 1979).

Although these observations are not the results of a survey, it may be concluded that *X. peruvianum*, which was identified as *X. americanum* by Tarjan in his study on the group (1969), is widespread in Peru, at least in the Lima area.

More material is needed to ascertain the status of *Xiphinema* sp. and eventually to describe it as a new species.

S U M M A R Y

Eight species belonging to the genus *Xiphinema* Cobb are reported from Peru. *Xiphinema brasiliense*, *X. floridae*, *X. inaequale*, *X. index*, *X. paritaliae* and *X. vulgare* constitute new records for the country. *X. peruvianum* seems to be widespread in the Lima area. Additional material is needed to ascertain the status of *Xiphinema* sp. which probably represents an undescribed species.

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