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## ON THE IDENTITY OF *XIPHINEMA AMERICANUM* IN CHILE WITH A KEY TO THE *XIPHINEMA* SPECIES OCCURRING IN CHILE

by

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**Summary.** In 1971 Allen *et al.* reported *Xiphinema americanum sensu lato* in association with different fruit crops and grape from various localities in Chile. From an examination of Allen's slides which are in the nematode collection of the Departamento de Sanidad Vegetal de la Facultad de Ciencias Agrarias y Forestales de la Universidad de Chile it was concluded that *X. americanum sensu stricto* does not occur in Chile. The specimens studied were identified as *X. californicum*, *X. floridae*, *X. inaequale*, *X. pachtaicum*, *X. peruvianum* and *X. utahense*. The morphometric characters of the species of *Xiphinema*, so far found in Chile, are provided together with a key for their identification.

In 1971 Allen *et al.*, reported *Xiphinema americanum sensu lato* in association with different fruit crops and grape from various localities in Chile.

In view of the taxonomy of the group proposed by Lamberti and Bleve-Zacheo (1979), it seemed appropriate to re-identify their specimens which are kept in the nematode collection of the Departamento de Sanidad Vegetal de la Facultad de Ciencias Agrarias y Forestales de la Universidad de Chile, kindly supplied by Mrs. A. Valenzuela. Nematodes were heat relaxed and fixed with 5% hot formalin and mounted in anhydrous glycerine.

Study of the slides containing specimens which had previously been identified as *X. americanum* Cobb revealed the presence of six species, all of which were considered to be distinct from the original identification of Allen *et al.*, (1971).

The morphometrics of females of these re-identified species are commented on here.

*Xiphinema californicum* Lamberti *et* Bleve-Zacheo, 1979 occurred in the rhizosphere of papaya (*Carica damarcensis* Hook) at La Serena in the IV Region. The biometric characters of the two females studied are: L=2 mm; a=58-60; b=7.2-8.5; c=64-68; c'=1.4; V=53; odontostyle=87-88  $\mu$ m; odontophore=46-49  $\mu$ m; oral aperture to guiding ring=76-77  $\mu$ m; tail length=29-31  $\mu$ m, well within the range of the Californian and the Mexican populations (Lamberti *et* Bleve-Zacheo, 1979). *X. californicum* occurs in South America also in Brazil (Lamberti *et al.*, 1987a).

*Xiphinema floridae* Lamberti *et* Bleve-Zacheo, 1979 was found in the Region Metropolitana at Buin, in the rhizosphere of grapevine; at Melipilla in the rhizosphere

of almond trees; at Santiago in the rhizosphere of walnut trees; and in a soil sample collected at Calera de Tango. The biometrics of two females from Buin, the only ones well preserved, are: L=1.9-2.1 mm; a=49-51; b=5.8-6.4; c=55-75; c'=1.3; V=50-53; odontostyle=90-91  $\mu$ m; odontophore=44-48  $\mu$ m; oral aperture to guiding ring=75-76  $\mu$ m; tail length=28-34  $\mu$ m. The Chilean specimens of *X. floridae* do not differ morphometrically from those from Peru (Lamberti *et al.*, 1987).

*Xiphinema inaequale* (Khan *et* Ahmad, 1975) Khan *et* Ahmad, 1977 occurred in the rhizosphere of grapevine at San Vicente, VI Region. Its biometric characters are: n=6 ♀ ♀; L=2.2 (2-2.3) mm; a=50 (41-58); b=6.6 (6.2-7); c=64 (58-72); c'=1.3 (1.2-1.6); V=52 (51-54); odontostyle=96 (89-100)  $\mu$ m; odontophore=51 (50-52)  $\mu$ m; oral aperture to guiding ring=82 (76-88)  $\mu$ m; tail length=34 (32-38)  $\mu$ m. This Chilean population of *X. inaequale* has a larger body than populations from India (Khan *et* Ahmad, 1975; Khan *et* Ahmad, 1977) and from Peru (Lamberti *et al.*, 1987a).

Two females of *Xiphinema pachtaicum* (Tulaganov, 1938) Kirjanova, 1951 were found in the rhizosphere of a walnut tree in Santiago in the Region Metropolitana. The biometrics are: L=1.7-1.9 mm; a=51-52; b=6.1-8.2; c=58-64; c'=1.4-1.5; V=57-58; odontostyle=88-89  $\mu$ m; odontophore=49-55  $\mu$ m; oral aperture to guiding ring=68-73  $\mu$ m; tail length=28-29  $\mu$ m. They fit within the range of the European and Asiatic populations (Lamberti and Bleve-Zacheo, 1979).

*Xiphinema peruvianum* Lamberti *et* Bleve-Zacheo, 1979 occurred in the VI Region, in the rhizosphere of peach trees at Coinco, in the rhizosphere of grapevine at Peumo and in a soil sample collected at La Rinconada

in the Region Metropolitana. The biometric characters of the population from Coinco are:  $n=10 \text{ } \varnothing \text{ } \varnothing$ ;  $L=2$  (1.8-2.2) mm;  $a=46$  (38-57);  $b=6.8$  (5.9-8.5);  $c=61$  (53-69);  $c'=1.4$  (1.1-1.6);  $V=54$  (52-56); odontostyle=97 (95-102)  $\mu\text{m}$ ; odontophore=50 (48-54)  $\mu\text{m}$ ; oral aperture to guiding ring=79 (76-85)  $\mu\text{m}$ ; tail length=33 (32-35)  $\mu\text{m}$ . The Chilean populations of *X. peruvianum* differ from those from Peru in having a longer body and odontostyle and a posteriorly situated vulva (Lamberti and Bleve-Zacheo, 1979; Lamberti *et al.*, 1987).

A female of *Xiphinema utahense* Lamberti *et* Bleve-Zacheo, 1979 was extracted from a soil sample collected at La Comunidad, Pica in the I Region. Its biometric characters are:  $L=2$  mm;  $a=56$ ;  $b=6.4$ ;  $c=68$ ;  $c'=1.2$ ;  $V=53$ ; odontostyle=96  $\mu\text{m}$ ; odontophore=48  $\mu\text{m}$ ; oral aperture to guiding ring=82  $\mu\text{m}$ ; tail length=29  $\mu\text{m}$ . This specimen was erroneously reported as *X. rivesi* Dalmasso (Lamberti *et al.*, 1987b).

Allen *et al.* (1971) also reported *X. index* and *X. vuittenezi* from Chile. The biometric characters of the Chilean populations of the two species are as follows:

*Xiphinema index* Thorne *et* Allen, 1950 from the rhizosphere of grapevine at Talagante in the Region Metropolitana:  $n=5 \text{ } \varnothing \text{ } \varnothing$ ;  $L=3.1$  (2.9-3.3) mm;  $a=59$  (48-67);  $b=7.2$  (6-8.3);  $c=78$  (67-90);  $c'=1.1$  (0.9-1.3);  $V=41$  (39-43); odontostyle=133 (129-137)  $\mu\text{m}$ ; odontophore=70 (68-74)  $\mu\text{m}$ ; oral aperture to guiding ring=112 (103-121)  $\mu\text{m}$ ; tail length=40 (35-44)  $\mu\text{m}$ .

*Xiphinema vuittenezi* Luc, Lima, Weischer *et* Flegg, 1964 from the rhizosphere of apricot trees at Maipu in the Region Metropolitana:  $n=7 \text{ } \varnothing \text{ } \varnothing$ ;  $L=3.5$  (3-3.9);  $a=56$  (47-68);  $b=6.9$  (6.4-7.7);  $c=93$  (82-123);  $c'=0.8$  (0.7-1);  $V=50$  (46-51); odontostyle=129 (122-133)  $\mu\text{m}$ ; odontophore=77 (75-79)  $\mu\text{m}$ ; oral aperture to guiding ring=115 (109-120)  $\mu\text{m}$ ; tail length=38 (32-42)  $\mu\text{m}$ . This Chilean population of *X. vuittenezi* is biometrically closer to Italian populations rather than to those from central Europe (Martelli and Lamberti, 1967).

Thus, in total, eight *Xiphinema* species are now known to occur in Chile. They can be identified by means of the following key.

#### Key to the species of *Xiphinema* occurring in Chile.

- |   |                      |
|---|----------------------|
| 1. Tail rounded with a more or less developed mucro | 2                    |
| Tail conoid   | 3                    |
| 2. Mucro well developed,                            |                      |
| V about 40  | <i>X. index</i>      |
| Mucro reduced to a bulge,                           |                      |
| V about 50  | <i>X. vuittenezi</i> |

- |  |                        |
|--|------------------------|
| 3. Lip region continuous with rest of body               | <i>X. inaequale</i>    |
| Lip region separated from rest of body                   | 4                      |
| 4. Lip region expanded                                   | 5                      |
| Lip region separated from rest of body by a constriction | 6                      |
| 5. V over 55   | <i>X. pachtaicum</i>   |
| V less than 55   | <i>X. californicum</i> |
| 6. Tail symmetrically conoid and straight                | <i>X. floridae</i>     |
| Tail dorsally convex with rounded terminus               | 7                      |
| 7. Hyaline portion of tail about 5 $\mu\text{m}$         | <i>X. utahense</i>     |
| Hyaline portion of tail about 10 $\mu\text{m}$           | <i>X. peruvianum</i>   |

#### Conclusions

From the results of this investigation of species of *Xiphinema* occurring in Chile, it seems that *X. americanum sensu stricto* (Lamberti and Bleve-Zacheo, 1979) does not occur in that country. Of the eight species discussed in this paper five constitute new records for Chile, namely *X. californicum*, *X. floridae*, *X. inaequale*, *X. peruvianum* and *X. utahense*. *X. utahense* is reported for the first time from South America, while *X. pachtaicum* has already been reported as *X. mediterraneum* Martelli *et* Lamberti from Easter Island (Gallo, 1979).

#### Literature cited

- ALLEN M.W., NOFFSINGER E.M. and VALENZUELA A., 1971 - Nematodos en huertos y viñedos de Chile. *Agricultura Tecnica*, 31: 115-119.
- GALLO D.P., - 1979 - Nematodos fitofagos de Isla de Pascua. V. Région (1ª contribucion). *Idesia Depto Agricultura, Universidad del Norte-Arica*, 5: 225-230.
- KHAN S.H. and AHMAD S., 1975 - Longidoroidea (Thorne, 1935) n. rank (Nematoda: Dorylaimina) with description of *Xiphinema neoamericanum* n. sp. from India and proposal of a new name for *X. americanum sensu* Carvalho (1956) non Cobb, 1913. *Nematol. medit.*: 3: 23-28.
- KHAN S.H. and AHMAD S., 1977 - *Xiphinema inaequale* nom. nov. (syn. *X. neoamericanum* Khan *et* Ahmad, 1975). *Nematol. medit.*, 5: 93.
- LAMBERTI F. and BLEVE-ZACHEO T., 1979 - Studies on *Xiphinema americanum sensu lato* with descriptions of fifteen new species (Nematoda, Longidoridae). *Nematol. medit.*, 7: 51-106.
- LAMBERTI F., JATALA P. and AGOSTINELLI A., 1987 - A report of some *Xiphinema* species occurring in Peru (Nematoda, Dorylaimida). *Nematol. medit.*, 15: 103-109.
- LAMBERTI F., ROCA F., SHARMA R.D., PIMENTEL J.P., AGOSTINELLI A., ANTONIO H. and LORDELLO R.R.A., 1987a - On the occurrence of species of *Xiphinema* in Brazil. *Nematologia Brasileira*, 11: 286-291.
- LAMBERTI F., VALENZUELA A., ROCA F. and AGOSTINELLI A., 1987b - On the identity of *Xiphinema americanum* in Chile. Abstracts of the XIX Annual Meeting OTAN, 18-23 October, 1987, Santiago, Chile, p. 10.
- MARTELLI G.P. and LAMBERTI F., 1967 - Le specie di *Xiphinema* Cobb, 1913 trovate in Italia e commenti sulla presenza di *Xiphinema americanum* Cobb (Nematoda, Dorylaimoidea). *Phytopathol. medit.*, 6: 65-85.