

NEMATODES ASSOCIATED WITH GRAPEVINES

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One half of the world's grape plantings are in Europe, where over 6 million hectares are planted. Wherever vineyards occur several kinds of phytoparasitic nematodes are usually present, and serious losses in grape production may result from their presence. The purpose of this circular is to present a list of nematodes that are considered serious pests of grape and to also list phytoparasites detected in grape surveys around the world (Table 1).

NEMATODE PATHOGENS OF GRAPEVINE

Dagger Nematodes (*Xiphinema* spp.) Fig. 1-A: *Xiphinema index* Thorne & Allen, 1950: This nematode found throughout the world in vineyards could be considered the most serious pest of grape since it not only damages grape plants directly by feeding or damaging roots but also vectors grapevine fanleaf virus. Roots attacked by this pest exhibit swollen root tips, profuse secondary root production, browning and collapse of epidermal and subepidermal cells overlying hypertrophic multinucleate cells. *Xiphinema americanum* Cobb, 1913: This pest is highly pathogenic on grape and vectors peach rosette mosaic, tobacco ringspot, and tomato ringspot viruses in the United States only. *Xiphinema italiae* Meyl, 1953: This pest vectors grapevine fanleaf virus in Europe. *Xiphinema diversicaudatum* (Micoletzky, 1927) Thorne, 1939: This pest vectors Arabis mosaic virus of grapes in France, Germany, and Hungary. *Xiphinema coxi* Tarjan, 1964: A pest that vectors Arabis mosaic and tobacco ringspot virus.

Root-knot nematodes (*Meloidogyne* spp.) Fig. 1-B: Five species of root-knot nematodes attack grapevines (Table 1). All species cause root galling, weight loss, and, in some cases, severe injury to the vineyard.

Lesion nematodes (*Pratylenchus* spp.): Eight species of lesion nematodes have been reported from grapevines (Table 1). *Pratylenchus vulnus* Allen & Jensen, 1951 is considered a serious pest of grapevines and causes lesions that first appear light brown then darken, eventually enlarging by coalescence. In severe cases lesions girdle the roots. Secondary root development is inhibited.

Needle nematodes (*Longidorus* spp.): Fifteen species of needle nematodes have been associated with grape plantings (Table 1). *Longidorus elongatus* (deMan, 1876) Thorne & Swanger, 1936 is highly pathogenic on grapevine and *L. attenuatus* Hooper, 1961 vectors tomato black ring virus in Germany.

Ring nematodes (*Criconeimoides* spp.): Seven species of ring nematodes have been associated with grapes (Table 1). Only *Criconeimoides xenoplax* Raski, 1962 has been shown to cause severe damage to grape plantings.

Stubby-root nematodes (*Trichodorus* spp.): Five species of stubby-root nematodes have been found associated with grapes (Table 1). *Trichodorus christiei* Allen, 1957 reduced shoot and root growth and produced necrotic stubby roots in inoculated plants. *T. minor* Colbran, 1956 reduced grape plant weight and caused chlorophyll defects in foliage.

Nematodes that have been shown to damage grapevines, but not severely, include: *Helicotylenchus pseudo-robustus* (Steiner, 1914) Golden, 1956, *Paratylenchus hamatus* Thorne & Allen, 1950, *Rotylenchulus reniformis* Linford & Oliveria, 1940, and *Tylenchulus semipenetrans* Cobb, 1913.

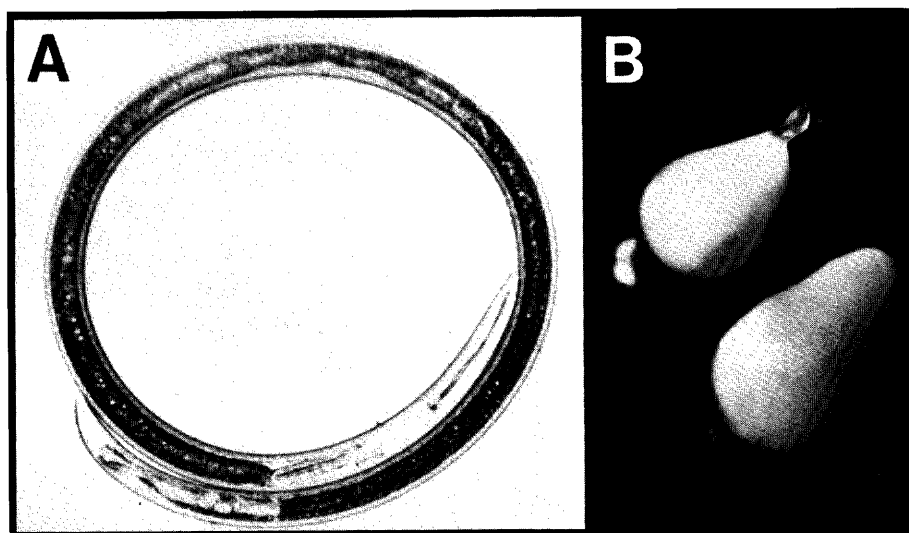


Figure 1. Females of two of the most damaging nematode genera that parasitize grapevines. A. *Xiphinema*. B. *Meloidogyne*.

TABLE 1. PHYTOPARASITIC NEMATODES ASSOCIATED WITH GRAPE PLANTINGS

<i>Amplimerlinius globigerus</i> Siddiqi, 1979	<i>L. profundorum</i> Hooper, 1966	<i>Rotylenchus quarta</i> (Andrassy, 1958) Sher, 1961
<i>Aphelenchoides</i> sp.	<i>L. proflae</i> Lamberti & Zacheo, 1977	<i>Rotylenchulus macdonatus</i> Dasgupta, Raski & Sher, 1968
<i>Belonolaimus longicaudatus</i> Rau, 1958	<i>L. siddiqi</i> Abouli-Eid, 1970	<i>R. nemiformis</i> Linford & Oliveria, 1940
<i>Criconema</i> sp.	<i>L. tardicauda</i> Merzhevskaia, 1951	<i>Scutellonema bangalorensis</i> Khan & Nanjappa, 1972
<i>Criconemoides amorphus</i> deGrisse, 1965	<i>L. vineacula</i> Sturhan & Weischer, 1964	<i>S. brachyurum</i> Steiner, 1938
<i>C. amorphus</i> deGrisse, 1965	<i>Macroposthonia complaxa</i> deGrisse & Loof, 1965	<i>S. commune</i> Van den Berg, 1973
<i>C. croatoloides</i> (Cobb, 1924) Taylor, 1936	<i>M. macrolobata</i> (Jairajpuri & Siddiqi, 1963) deGrisse & Loof, 1965	<i>Telotylenchus astratus</i> Khan & Nanjappa, 1971
<i>C. curvatum</i> Raski, 1952	<i>Macroposthonia maskaha</i> Heyns, 1970	<i>T. impar</i> Khan & Darekat, 1979
<i>C. hispalensis</i> Arias, Delgado, Lopez, Pedregal & Jimenez Millian, 1963	<i>M. similis</i> Cobb, 1918	<i>Telotylenchus</i> sp.
<i>C. mutabile</i> Taylor, 1936	<i>Meloidogyne arenaria</i> Chitwood, 1952	<i>Trichodorus christiei</i> Allen, 1957
<i>C. xenopla</i> Raski, 1952	<i>M. arenaria</i> (Neal, 1889) Chitwood, 1949	<i>T. minor</i> Colbran, 1956
<i>Crossonema cinellae</i> Steiner, 1949	<i>M. incognita</i> (Kofoid, 1919) Chitwood, 1949	<i>T. nanus</i> Allen, 1957
<i>Discoariconemella yosifovitchi</i> Krnjaic, 1967	<i>M. javanica</i> (Treub, 1885) Chitwood, 1949	<i>T. pachydermis</i> Seinhorst, 1954
<i>Ditylenchus dipsaci</i> (Kuhn, 1857) Filipjev, 1936	<i>M. thamsii</i> Chitwood, Specht & Havis, 1952	<i>T. primitivus</i> (deMan, 1880) Micoletzky, 1922
<i>Gotholasteinera</i> sp.	<i>Merlinius brevidans</i> (Allen, 1955) Siddiqi, 1970	<i>Trichotylenchus astratus</i> Khan & Nanjappa, 1971
<i>Gnatholacus minus</i> Raski, 1962	<i>M. macrophasmidius</i> Khan & Darekar, 1979	<i>Tylenchorynchus aduncus</i> deGurian, 1967
<i>G. peraticus</i> Raski, 1962	<i>Paralongidorus epimikius</i> Dalmasso, 1969	<i>T. clarius</i> Allen, 1955
<i>Helicotylenchus abunamai</i> Siddiqi, 1972	<i>P. marinus</i> (Butschli, 1874) Siddiqi, 1964	<i>T. cylindricus</i> Cobb, 1913
<i>H. californicus</i> Sher, 1966	<i>Paratylenchus balacovi</i> Raski, 1975	<i>T. latus</i> Allen, 1955
<i>H. canadensis</i> Massem, 1961	<i>P. hamatus</i> Thorne & Allen, 1950	<i>T. mashoodi</i> Siddiqi & Basir, 1959
<i>H. conicephalus</i> Siddiqi, 1972	<i>P. lepidus</i> Raski, 1975	<i>Tylenchulus semipenetrans</i> Cobb, 1913
<i>H. digitiformis</i> Ivanova, 1967	<i>P. nanus</i> Cobb, 1923	<i>Tylenchulus filiformis</i> Bütschli, 1873
<i>H. digonicus</i> Perry, 1959	<i>P. prociectus</i> Jenkins, 1956	<i>Xiphinema americanum</i> Cobb, 1913
<i>H. ditystera</i> (Cobb, 1893) Sher, 1961	<i>P. vandenbrandei</i> deGrisse, 1962	<i>X. arenarium</i> Luc & Dalmasso, 1964
<i>H. elegans</i> Roman, 1965	<i>Pratylenchoides israelensis</i> Raski, 1973	<i>X. brevicolle</i> Lordello & d'Acosta, 1961
<i>H. exaltus</i> Sher, 1966	<i>Pratylenchus coffeae coffeae</i> (Zimmerman, 1898) Filipjev & Schuurmans Stekhoven, 1941	<i>X. bulgariensis</i> Stoinov, 1964
<i>H. minzi</i> Sher, 1966	<i>P. arenatus</i> Loof, 1960	<i>X. coati</i> Tarjan, 1964
<i>H. multicaudatus</i> (Cobb, 1893) Golden, 1956	<i>P. mingus</i> Sher & Allen, 1953	<i>X. diversicaudatum</i> (Micoletzky, 1927) Thorne, 1939
<i>H. pseudorobustus</i> (Steiner, 1914) Golden, 1956	<i>P. neglectus</i> (Rensch, 1924) Filipjev & Schuurmans Stekhoven, 1941	<i>X. elongatum</i> Schuurmans Stekhoven
<i>H. tunisiensis</i> Siddiqi, 1963	<i>P. pratensis pratensis</i> (deMan, 1880) Filipjev, Schuurmans Stekhoven, 1941	<i>X. haliei</i> Luc, 1958
<i>H. varicaudatus</i> Yuen, 1964	<i>P. scribneri</i> Steiner, in Sherbakoff & Stanley, 1943	<i>X. index</i> Thorne & Allen, 1950
<i>H. vulgaris</i> Yuen, 1964	<i>P. thornei</i> Sher & Allen, 1953	<i>X. ingens</i> Luc & Dalmasso, 1964
<i>Hemiariconemoides californicus</i> Pinochet & Raski, 1951	<i>P. wilms</i> Allen & Jensen, 1951	<i>X. italica</i> Meyl, 1953
<i>H. chitwoodi</i> Esser, 1960	<i>Pungentus thornei</i> Goodey, 1942	<i>X. mediterraneum</i> Martelli & Lamberti, 1967
<i>Hemiclitiophora conida</i> Thorne, 1955	<i>Quintinulatus aquitatus</i> (Allen, 1955) Siddiqi, 1971	<i>X. meridicum</i> Heyns, 1971
<i>Heterodera</i> sp.	<i>Rotylenchus alpinus</i> Eroshenko, 1976	<i>X. monhysterum</i> Brown, 1967
<i>Longidorus africanus</i> Merny, 1966	<i>R. bucephalus</i> Golden, 1956	<i>X. neovittatus</i> Dalmasso, 1969
<i>L. apulus</i> Lamberti & Zacheo, 1977	<i>R. cypricus</i> Antoniou, 1980	<i>X. ophiohysterium</i> Siddiqi, 1961
<i>L. attenuatus</i> Hooper, 1961	<i>R. fallonobustus</i> Sher, 1965	<i>X. pachitacum</i> (Tulaganov, 1938) Kirjanova, 1951
<i>L. caespitiicola</i> Hooper, 1961	<i>R. glabratus</i> Kankina & Tebenkova, 1980	<i>X. rivosi</i> Dalmasso, 1969
<i>L. closealongatus</i> Stoinov, 1964	<i>R. goodeyi</i> Loof & Oostenbrink, 1958	<i>X. sahelense</i> Dalmasso, 1969
<i>L. elongatus</i> (deMan, 1876) Thorne & Swanger, 1936	<i>R. gracilendens</i> Saur, 1958	<i>X. turicum</i> Luc & Dalmasso, 1964
<i>L. euonymus</i> Mali & Hooper, 1973	<i>R. incultus</i> Sher, 1965	<i>X. vitis</i> Heyns, 1974
<i>L. juvenilis</i> Dalmasso, 1969	<i>R. ivanovae</i> Kankina & Tebenkova, 1980	<i>X. vittatus</i> Luc, Lima, Weischer & Flegg
<i>L. macrostoma</i> Hooper, 1961	<i>R. pumilus</i> (Perry, 1959) Sher, 1961	<i>Zygotylenchus guenaria</i> Tobar Jimenez, 1963
<i>L. maximus</i> (Butschli, 1874) Thorne & Swanger, 1936		

The data in this paper are based on 474 references filed in the DPL nematology host file under *Vitis*.