

## RESEARCH NOTE/NOTA DE INVESTIGACIÓN

### FIRST REPORT OF THE DAGGER NEMATODES *XIPHINEMA INDEX* AND *XIPHINEMA PACHTAICUM* ON GRAPEVINE IN ALGERIA

D. Smaha<sup>1</sup>, F. Mokrini<sup>2</sup>, S.-E. Laasli<sup>3</sup>, A. Hamel<sup>4</sup>,  
S. Khayi<sup>2</sup>, D. Iraqi<sup>2</sup>, R. Lahlali<sup>5</sup>, A. A. Dababat<sup>6\*</sup>

<sup>1</sup>Department of Agricultural and Forestry Zoology, National High School of Agronomy (ENSA), Frères Ouadek, Hacen Badi, El-Harrach, Algeria; <sup>2</sup>Biotechnology Research Unit, Regional Center of Agricultural Research of Rabat, National Institute of Agricultural Research (INRA), Avenue Ennasr, BP 415 Rabat Principale, Rabat 10090, Morocco; <sup>3</sup>Laboratory of Botany, Mycology, and Environment, Faculty of Science, Mohammed V University, Rabat, Morocco; <sup>4</sup>Biology Research Unit, M'Hamed Bouguerra University, Boumerdès, Algeria; <sup>5</sup>Phytopathology Unit, Department of Plant Protection, Ecole Nationale d'Agriculture de Meknes, km. 10, Route Haj Kaddour, B.P. S/40, 50001 Meknes, Morocco; <sup>6</sup>International Maize and Wheat Improvement Center (CIMMYT), P.K. 39, Emek, 06511 Ankara, Turkiye; \*Corresponding author: [A.Dababat@cgiar.org](mailto:A.Dababat@cgiar.org)

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#### ABSTRACT

Smaha, D., F. Mokrini, S.-E. Laasli, A. Hamel, K. S. Khayi, D. Iraqi, R. Lahlali, A. A. Dababat. 2023. First report of the dagger nematodes *Xiphinema index* and *Xiphinema pachtaicum* on grapevine in Algeria. *Nematropica* 53:67-69.

In 2021, during a survey in the Djelfa region of Algeria, the dagger nematodes *Xiphinema index* and *Xiphinema pachtaicum* were found infesting grapevine (*Vitis vinifera*). These nematodes were identified based on their morphological/morphometric features and then confirmed via molecular analysis of the D2D3 region (26S rRNA). Microscopic assessment of females indicated the occurrence of both *X. index* and *X. pachtaicum* on the grapevine. The 28S D2D3 sequences shared more than 98.82% sequence similarity with GenBank references for *X. pachtaicum* and *X. index*. To our knowledge, this is the first report of *X. index* and *X. pachtaicum* infecting grapevine in Algeria.

*Keywords:* Algeria, *Xiphinema index*, *Xiphinema pachtaicum*, diagnosis, grapevine

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#### RESUMEN

Smaha, D., F. Mokrini, S.-E. Laasli, A. Hamel, K. S. Khayi, D. Iraqi, R. Lahlali, A. A. Dababat. 2023. Primer reporte de los nematodos daga *Xiphinema index* y *Xiphinema pachtaicum* en vid en Argelia. *Nematropica* 53:67-69.

En 2021, durante un estudio en la región de Djelfa en Argelia, se encontraron las especies de nematodos daga *Xiphinema index* y *Xiphinema pachtaicum* infestando la vid (*Vitis vinifera*). Las poblaciones de nematodos daga se identificaron en función de sus características morfológicas/morfométricas y luego se confirmaron mediante análisis molecular de la región D2D3 (ARNr 26S). La evaluación microscópica de las hembras indicó la presencia tanto de *X. index* como de *X. pachtaicum* en la vid. Las secuencias de 28S D2D3 compartían más del 98.82% de similitud de secuencia con las referencias de GenBank para las dos especies *X. pachtaicum* y *X. index*. Hasta donde sabemos, este es el primer informe de *X. index* y *X. pachtaicum* que infectan la vid en Argelia.

*Palabras clave* : Argelia, *Xiphinema index*, *Xiphinema pachtaicum*, Diagnóstico, vid

Grapevine (*Vitis vinifera*) is considered one of the most important perennial crops worldwide, especially in temperate and some tropical regions (Demir, 2014). In Algeria, the area allocated for this crop is estimated at 61,000 ha (DSISP, 2020). Dagger nematodes (*Xiphinema* spp.) are migratory ectoparasitic nematodes that are associated with various hosts and cause tremendous yield loss of grapevines. In addition, several species are known as vectors of viruses (e.g., nepoviruses) (Brown *et al.*, 1993). In August 2021, a survey was conducted in the grape-growing area (50 ha) of the Djelfa region (Had S'hari Province) of Algeria (35°23'35.2" N; 3°21'59.0" E). Soil samples were collected 30 cm deep and 50 cm from two grape varieties ('Italia' and 'Red Globe'). The vines showed distinct symptoms such as leaves yellowing, reduced vigor, and root tip swellings. Nematodes were extracted from soil using the Baermann funnel method (Hooper, 1990) and processed for morphological and molecular identification. Two *Xiphinema* species (*X. index* and *X. pachtaicum*) were detected based on key morphological features of females (Lamberti *et al.*, 2002). The morphometrics of both identified species are shown in Table 1, and are within the range indicated by Fayaz *et al.* (2022) for *X. index* and Orlando *et al.* (2016) for *X. pachtaicum*. Females of *X. index* were spiral-shaped with a hemispherical lip region; the odontostyle was

needle-shaped and odontophore with distinct basal flanges. Females of *X. pachtaicum* had a C-shaped body with a distinct lip region offset by a constriction as well as a robust odontostyle and a weak flanged odontophore. To confirm the morphological diagnosis, molecular analysis was conducted. To confirm the identity of both *X. pachtaicum* and *X. index*, DNA was extracted from single females ( $n = 3$ ) following the protocol of Holterman *et al.* (2006). The D3 expansion region of the 28S rRNA gene was amplified using the primers forward D2a (5' ACAAGTACCGT-GAGGGAAAGTTG 3') and reverse D3b (5' TGCGAA-GGAACCAGCTACTA 3'). The PCR products were purified and sequenced (Macrogen, Inc., Seoul, Korea). All sequences obtained [GenBank Accession Nos. OP820074, OP820075, OP820076, and OP820077 (*X. pachtaicum*); OP820078, and OP820079 (*X. index*)] were compared with available sequences from the GenBank database including several species of *Xiphinema*. The Blastn results showed that 28S D2D3 sequences shared 98.82% and 98.96% sequence identity with GenBank references for *X. pachtaicum* and *X. index*, respectively. Morphological and molecular identification demonstrated that the populations of dagger nematodes from the grapevine-growing area in the Djelfa region of Algeria were *X. index* and *X. pachtaicum*. An average of eight *X. index* and six

Table 1. Morphometric measurements of *Xiphinema index* and *Xiphinema pachtaicum*. Measurements are in  $\mu\text{m}$ , and numbers are represented as mean  $\pm$  standard deviation (range) ( $n = 3$ ).

Character	<i>Xiphinema index</i> (Females)	<i>Xiphinema pachtaicum</i> (Females)
n	8	10
L	2,700 $\pm$ 34.7 (2,600–3,100)	1,850 $\pm$ 27.4 (1,790–1,897)
a	55 $\pm$ 3.2 (53.8–60.5)	62 $\pm$ 1.7 (58–66)
b	6.8 $\pm$ 0.6 (5.9–7.3)	6.5 $\pm$ 0.3 (5.4–6.9)
c	72.6 $\pm$ 4.8 (65–83)	59 $\pm$ 5.3 (53–64)
c'	1.1 $\pm$ 0.1 (1–1.2)	1.8 $\pm$ 0.3 (1.4–2.3)
V	39.1 $\pm$ 2.5 (36–42)	53.2 $\pm$ 2 (49–58)
Lip region width	14.5 $\pm$ 0.9 (13.8–15.1)	8.3 $\pm$ 0.7 (8.1–9.7)
Odontostyle	125 $\pm$ 6.1 (116–155.3)	84 $\pm$ 2.9 (77–89)
Odontophore	74.8 $\pm$ 5.9 (69–96.9)	47 $\pm$ 4.2 (43–58)
Pharynx	302 $\pm$ (296–309)	288 $\pm$ 11.5 (270–316)
Body width	48.2 $\pm$ (46.6–55.3)	28.5 $\pm$ 0.6 (28–30)
Anal body width	36.26 $\pm$ 1.4 (34.2–39)	16.8 $\pm$ 1.7 (16–19)
Tail length	37.8 $\pm$ 1.8 (35.4–39.2)	29.2 $\pm$ 2.3 (27–35)
Anterior end to vulva	335.9 $\pm$ 24 (322.6–356.4)	978 $\pm$ 49 (890–1,034)

*X. pachtaicum* per 100 cm<sup>3</sup> soil were found. To our knowledge, this is the first report of these *Xiphinema* species in Algeria.

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