



# plant disease

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## First Report of the Cereal Cyst Nematode (*Heterodera filipjevi*) on Wheat in Algeria

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Cereal cyst nematodes (CCNs) are an important group of sedentary plant-parasitic nematodes that restrict production of cereal crops throughout the world (Smiley et al. 2017). *Heterodera filipjevi* is considered one of the most destructive *Heterodera* species and cause significant damage in global wheat production (Dababat et al. 2015). In April 2016, two populations of cyst nematode were collected from Lamtar (35° 4' 14" N; 0° 47' 53" W) and Telagh (34° 47' 6" N; 0° 34' 23" W) wheat (*Triticum durum*) fields of Sidi Bel Abbes province in Algeria. The wheat fields had stunted patches, poor plant growth, chlorotic lower leaves, and few or no tillers. Cyst extraction from soils taken from the Lamtar and Telagh fields resulted in 9 and 11 cysts per 100 cm<sup>3</sup> of soil, respectively. The cysts were extracted from soil using a Fenwick can technique (Fenwick, 1940) and identified by morphology and morphometric analysis as well as by ITS-rDNA sequencing. Morphologically, the cysts were lemon shaped with a posterior protuberance. The vulval cone was bifenestrated with horseshoe-shaped semifenestra and had strongly developed bullae, and underbridge. Measurements (range, mean ± sd) of cysts (n = 12) were: body length including neck (670 to 871 µm, 782.6 ± 47.0); body width (360 to 510 µm, 455 ± 42); neck length (75 to 129 µm, 99.2 ± 18.6); fenestra length (40 to 59 µm, 48.4 ± 8.5); and width (22 to 28 µm, 25 ± 2.4); underbridge (78 to 88 µm, 83 ± 5); and vulval slit (6 to 10 µm, 7.7 ± 1.6).



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### FOCUS ISSUE

## Epidemiology:

Past, Present, and Future Impacts on Understanding Disease Dynamics and Improving Plant Disease Management



Measurements of J2 (n = 15): body length (458 to 588  $\mu\text{m}$ ,  $524 \pm 26$ ); stylet (23 to 26  $\mu\text{m}$ ,  $24.3 \pm 0.8$ ) with anchor-shaped basal knobs; tail (46 to 61  $\mu\text{m}$ ,  $57.7 \pm 3.1$ ); and hyaline tail terminal (29 to 40  $\mu\text{m}$ ,  $33.5 \pm 2.1$ ). The values of the morphological and morphometrical characters of both populations were within the range of those from *H. filipjevi* (Subbotin et al. 2003). Molecular observations were performed and DNA was extracted from two juveniles from two different cysts separately (Holterman et al. 2006). Ribosomal DNA from the ITS was PCR amplified from a single cyst from each population using primers TW81 (5'-GTTTCCGTAGGTGAACCTGC-3') and AB28 (5'-ATATGCTTAAGTTCAGCGGGT-3') (Subbotin et al. 2003), respectively, and sequenced. Two of the nucleotide sequences of ITS (Accession Nos. KX574302 and KX574299) regions were submitted to GenBank. To verify the identity of the sequences, sequenced products were subjected to a database search using BLAST. This comparison revealed a sequence-similarity of 98-99% with *H. filipjevi*. Therefore, the morphological and molecular data revealed the existence of *H. filipjevi* in Algeria. Reproduction of *H. filipjevi* on the durum wheat (cv. Capa) was confirmed by inoculating 500 viable eggs onto 5-week-old wheat seedlings grown in pots (10cm height and 7cm diam) filled with sterilized sand at 22 °C. Pots of non-inoculated seedlings served as controls. Sixty-three days after inoculation, an average of (46 cysts, n=3) were extracted from both soil and root, demonstrating multiplication on this host. No cyst was found on the control plants. To our knowledge, this detection represents the first report of *H. filipjevi* in Algeria. Since wheat has an important socioeconomic value for Algeria, additional surveys are needed in other wheat growing areas and control measures should be taken to stop the multiplication of this species. The use of resistant wheat varieties and proper crop rotation is recommend.