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FIRST RECORD OF *HETERODERA CYPERI* IN SPAIN

by

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Summary. *Heterodera cyperi* is found for the first time in Spain, on roots of *Cyperus esculentus*. Stunting and failure of plant emergence are evident in infested fields. A brief description of the Spanish population is provided.

In autumn 1988, a sandy soil field near Valencia, Spain, planted with *Cyperus esculentus* L. showed patches with stunted plants and failures of emergence. Cyst of *Heterodera* observed on the root systems were identified as *H. cyperi* Golden, Rau *et* Cobb, 1962.

Heterodera cyperi was first described from Florida, North Carolina and Arkansas, United States of America (Golden *et al.*, 1962). In 1972 Mulvey supplemented its description with measurements and illustrations of vulval cone. *H. cyperi* has also been reported from Southern India associated with *Cynodon dactylon* (Kumar, 1980) in coffee plantations and in Northern India (Siddiqi *et al.*, 1980).

Nut Grass is mainly grown in the Region of Valencia, occupying about 470 hectares, with an annual production of 6204 tones (Anuario de Estadística Agraria, 1993). The crop has economic importance because is used to produce a refreshing summer drink (horchata) made by macerating in water the tuberous roots. Moreover *H. cyperi* is reported for the first time from Europe.

Material and Methods

C. esculentus diseased plants were collected and air dried. Cysts were collected from root systems and J2's and eggs were recovered from inside the cysts. They and cysts vulvar cones were mounted in lactophenol for microscopic observation and measurements.

Description

Heterodera cyperi Golden, Rau *et* Cobb, 1962.

Second stage juveniles (n=20): body length = 479.8 ± 25.9 (441-532) μm ; body width = 18.3 ± 1.5 (16.6-20.4) μm ; a = 26.2 ± 1.9 (23.4-28.8) μm ; stylet length = 19.8 ± 1.5 (17.6-21.9) μm ; tail length = 66.1 ± 5.8 (61.9-79.0) μm ; tail width at anus level = 12.8 ± 1.5 (10.9-14.7) μm ; c = 7.3 ± 0.6 (6.1-8.5); c' = 5.0 ± 0.4 (4.9-5.8); hyaline terminus length = 29.3 ± 3.2 (24.2-35.2) μm ; hyaline length/stylet length = 1.5 ± 0.2 (1.3-1.7); dorsal oesophageal gland orifice at 4.4 ± 0.6 (3.8-5.7) μm from base of stylet; me-

dian bulb-anterior end distance = 68.2 ± 4.6 ($62.8-75.2$) μm .

Body vermiform tapering towards posterior end, head with cephalic sclerotization and set off from the body averaging 3.5×7.1 μm . Cuticular annulation distinct, averaging 1.6 μm . at the middle of the body; stylet strong with rounded knobs; hemizonid distinct, located immediately anterior to excretory pore at about 20% of body length; tail tapering with round terminus with indistinct phasmids.

Cysts (n = 20): length = 581 ± 54.6 ($476-663$) μm .; width = 405.9 ± 44.6 ($294-457$) μm . L/W 1.4 ± 0.11 ($1.2-1.6$); vulval slit length = 30.9 ± 4.7 ($27.6-35.2$) μm .; fenestral length = 37.2 ± 6.3 ($28.0-45.2$) μm .; fenestral width = 27.5 ± 4.6 ($20.2-34.7$) μm .; bassin width = 10.1 ± 1.5 ($8.5-13.3$) μm .

Ligth brown in colour, lemon-shaped with protruding neck and vulval cone; thin and transparent cuticle, with zig-zag cuticular marking; visible anus; ambifenestrated vulvar cone with long vulval slit and flimsy underbridge (it often appears broken on the microscopic slides), sometimes bifurcated at the endings; bullae have not been observed in the specimens studied.

Eggs (n = 20): length = 91.2 ± 3.5 ($85-98$) μm .; width = 36.8 ± 1.4 ($35-40$) μm .; L/W = 2.5 ± 0.1 ($2.3-2.6$). Shell hyaline without visible markings.

Discussion

Cyst measurements (L, W and L/W) seem to agree with those of the original description of *H. cyperi* (Golden *et al.*, 1962). However, they are somehow larger than those described by

Mulvey (1972) (L = 410-450 μm .; W = 270-300 μm .). Fenestrae are also larger ($27-35 \times 20-28$ μm) in Mulvey's population, while the vulval slit length coincides with Mulvey description ($30-35$ μm). Eggs are smaller than in the original description: L = 104 ($95-110$) μm . W = 40 ($38-42$) μm . In second-stage juveniles, tail of Spanish specimens is longer than in the original description: 60 ($56-63$) μm as is its hyaline portion. In contrast with this, distance between stylet knobs and oesophageal gland orifice is shorter in our specimens than in the original description: 5.2 ($4.8-6.1$) μm .

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