LONGIDORUS ARTHENSIS SP. N. (NEMATODA: LONGIDORIDAE)
A VECTOR OF CHERRY ROSETTE DISEASE CAUSED BY A NEW NEPOVIRUS IN CHERRY TREES IN SWITZERLAND

BY

D. J. F. BROWN1), J. GRUNDER2), D. J. HOOPER3), J. KLINGLER2) and P. KUNZ2)

1) Scottish Crop Research Institute, Invergowrie, Dundee DD2 5DA, Scotland; 2) Nematology Section, Swiss Federal Research Station, 8820 Wadenswil, Switzerland; 3) Entomology and Nematology Department, Rothamsted Experimental Station, Harpenden AL5 2JQ, England

A new Longidorus species was found associated with cherry rosette disease (CRD), caused by an uncharacterised nepovirus, in cherry trees in Switzerland. Longidorus arthensis sp. n. is characterised by having a wide bluntly rounded, lip region almost continuous with the body contour, large evenly bilobed amphidial pouches, bluntly rounded tail, common, functional males and first stage juveniles with a pegged tail terminus. Populations of L. arthensis were recovered from four cherry orchards, in the Arth region of Switzerland, in which some trees showed CRD symptoms. Bait testing individual nematodes collected from all four orchards confirmed L. arthensis as the natural vector of a nepovirus causing CRD. Largest numbers of L. arthensis were recovered from the deeper soil layers, below 30 cm, therefore to optimise detection of the nematode, soil samples should be collected below 30 cm depth.

Keywords: virus transmission, vector relationship, nematode, morphology, taxonomy, nepovirus, Longidorus arthensis sp. n.

The English serotype of raspberry ringspot nepovirus (RRV) transmitted by Longidorus macrosoma Hooper, 1961 is the cause of Pfeffingen disease in cherry trees in the canton of Baselland, northwestern Switzerland. Virus infected trees exhibit a range of symptoms such as reduced vigour, short internodes, and small leaves frequently showing symptoms such as rosetting, distortions, enations, chlorosis and “oil flecking” in which the infected leaves have the appearance of being contaminated with spots of oil (Klingler et al., 1985; Buser, 1990).

During 1988 a row of cherry trees in an orchard at Erlihof and several trees in a second orchard, nearby at Sonnenberg, Arth in central Switzerland, exhibited symptoms similar to Pfeffingen disease. A sap-transmissible virus was recovered from the diseased trees which did not react in serology tests to RRV antiserum and shared little serological affinity with other nepoviruses (T. Hasler and P. Gugerli, pers. comm.). In subsequent years cherry rosette disease (CRD; T. Hasler pers. comm.) was recorded as spreading to adjacent trees. Also, cherry trees at another orchard at Talmatte, Arth, were found to be infected with CRD.

Initial soil sampling from the rhizosphere of diseased trees in orchards at Erlihof and Sonnenberg did not reveal the presence of L. macrosoma. However, a Longidorus species was recovered which resembled L. goodeyi but differed from it
by having equally lobed amphidial pouches and the presence of males. Klingler et al. (1983) had earlier identified populations of a *Longidorus* species in several apple orchards in Switzerland which they referred to as "*Longidorus* sp. (goodeyi?)". This species was not associated with a virus disease and was not fully identified. At that time D. J. Hooper, received specimens of the "*Longidorus* sp. (goodeyi?)" from J. Klingler and comparison of these earlier specimens with those from Erlihof revealed that all the specimens represented an underscribed *Longidorus* species.

This new *Longidorus* species is described here together with the results of laboratory investigations on the transmission of CRD infecting cherry trees in four orchards at Arth.

MATERIALS AND METHODS

Nematodes

Soil samples were collected from the rhizosphere of virus infected cherry trees in orchards at Erlihof, Sonnenberg, Talmatte and Steinerberg, near Arth. *Longidorus* nematodes were extracted initially by sieving and the nematodes then separated from soil debris in the resultant suspension by centrifugal flotation (Coolen & D’Herde, 1977, modified by P. Kunz). For taxonomic studies specimens were heat killed, fixed in TAF (Courtney et al., 1955), processed and mounted in anhydrous glycerol. In Switzerland, specimens were examined and measured with a microscope combined with a computer aided, pixel-based system from Zeiss AG, Switzerland. Photomicrographs of the anterior and posterior ends of specimens were obtained with the aid of video imaging software.

Populations of *L. elongatus* and *L. macrosoma* were tested at SCRI as vectors of the isolate of the nepovirus recovered from a tree exhibiting CRD symptoms. These nematodes are held as breeding cultures and originally were collected from a grass pasture, Ballo Hill, Dundee, and raspberry, Bury St Edmunds, England, respectively.

Nepovirus transmission by nematodes

The natural association of *Longidorus* nematodes from diseased orchards with the nepovirus causing CRD was examined in laboratories at SFRS and SCRI. Nematodes were recovered directly from orchard soil samples collected from the rhizosphere of diseased cherry trees. At SFRS nematodes were extracted from soil samples as described above and at SCRI by a decanting and sieving method (Brown & Boag, 1988).

Plastic Beem capsules, 0.5 cm³, were one-third filled with air-dried sand with a particle size <1500 µm and >500 µm. Water was then added to half-fill the capsules and a single nematode was hand-picked into each capsule. In a test