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## SPECIES OF POTATO CYST NEMATODE FROM THE XYLOPHAGOU AREA IN CYPRUS

by

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In Cyprus, the potato cyst nematode was first reported from the Xylophagou area (Panayi, 1974). It was originally thought that only *Globodera rostochiensis* was present having been introduced into the country during the last two or three decades with seed potatoes from Northern Europe. The objective of this work was to investigate whether both *G. rostochiensis* (Woll.) Mulvey *et* Stone and *G. pallida* (Stone) Mulvey *et* Stone are present in Cyprus by studying juvenile morphology and reproduction on differential hosts.

### *Materials and methods*

Soil samples were taken with a trowel from five widely separated fields near the village of Xylophagou, each sample consisting of 5 or 6 sub-samples taken over about  $\frac{1}{3}$  acre. Root exudate was collected weekly from actively growing Arran Banner plants, membrane filtered (0.22  $\mu$ m) and stored in a refrigerator at a temperature around 7°C. Cysts were extracted with the Fenwick can, and then soaked in tap water for 14 days before placing in root exudate. Eggs from about 40 cysts from each location (L<sub>1-5</sub>) were hatched in root exudate collected from Arran Banner plants. Stylet length was measured in heat-relaxed juvenile mounted in warm lactophenol; head tip to base of stylet knobs, medium bulb valve to excretory pore and clear tail length were measured in heat-relaxed specimens in water. Stylet lengths of three juveniles from each of 20 cysts per field population

were also measured, after mounting the specimens in warm lactophenol. Distance from anus to nearest edge of fenestra and cyst fenestral length were measured on 20 cysts from each location and Granek's ratio, as defined by Hesling (1973), was calculated.

The following potato cultivars were used to differentiate potato cyst nematode species present in field populations (H. W. Howard, personal com.); Arran Banner (susceptible to *G. rostochiensis* and *G. pallida*) Maris Piper (gene H<sub>1</sub>, susceptible to *G. pallida*<sub>1,2,3</sub>) and H<sub>56/25</sub> (genes H<sub>1</sub>H<sub>2</sub> susceptible to *G. pallida*<sub>2,3</sub>). Plants in pots were each inoculated with 30 viable cysts of similar size from each location in February, 1977 and cysts were extracted in mid May. There were three replicate pots for each location/host treatment.

### *Results and discussion*

The variations of stylet length and of distance from head tip to base of stylet knobs were much lower than those of distance from medium bulb valve to excretory pore and length of the jalin portion of tail (Table I). The range in stylet length (20.7-22.7  $\mu\text{m}$ ) in the field samples indicated that *G. pallida* might be present in our potato fields. Juveniles from single cysts were therefore measured in an effort to minimize the error due to the large variability usually occurring with natural field populations (Fig. 1).

Juveniles from single cyst population had stylet lengths from 20.7-21.5  $\mu\text{m}$  with the exception of population five where lengths formed two groups, in the ranges 20.8-21.4  $\mu\text{m}$  and 22.0-22.4  $\mu\text{m}$  (Fig. 1). Stylet measurements indicate that *G. rostochiensis* and *G. pallida* are present in Cyprus, with an average stylet length of 20.6 and 22.2  $\mu\text{m}$  respectively. Granek's ratio (Table II) also indicated the presence of both species (Stone, 1977). In all populations, there were specimens having a Granek's ratio below 3 but only nematodes from population five reproduced on the resistant cultivars Maris Piper and H<sub>56/25</sub> (Table III); evidently due to the greater number of *G. pallida* individuals present in that population (L<sub>5</sub>) than the others.

Many thanks are due to Dr. A. R. Stone, Rothamsted Experimental Station, for reviewing the manuscript and Dr. H. W. Howard, Plant Breeding Institute, Cambridge, U.K. for supplying the H<sub>56/25</sub> potato cultivar.

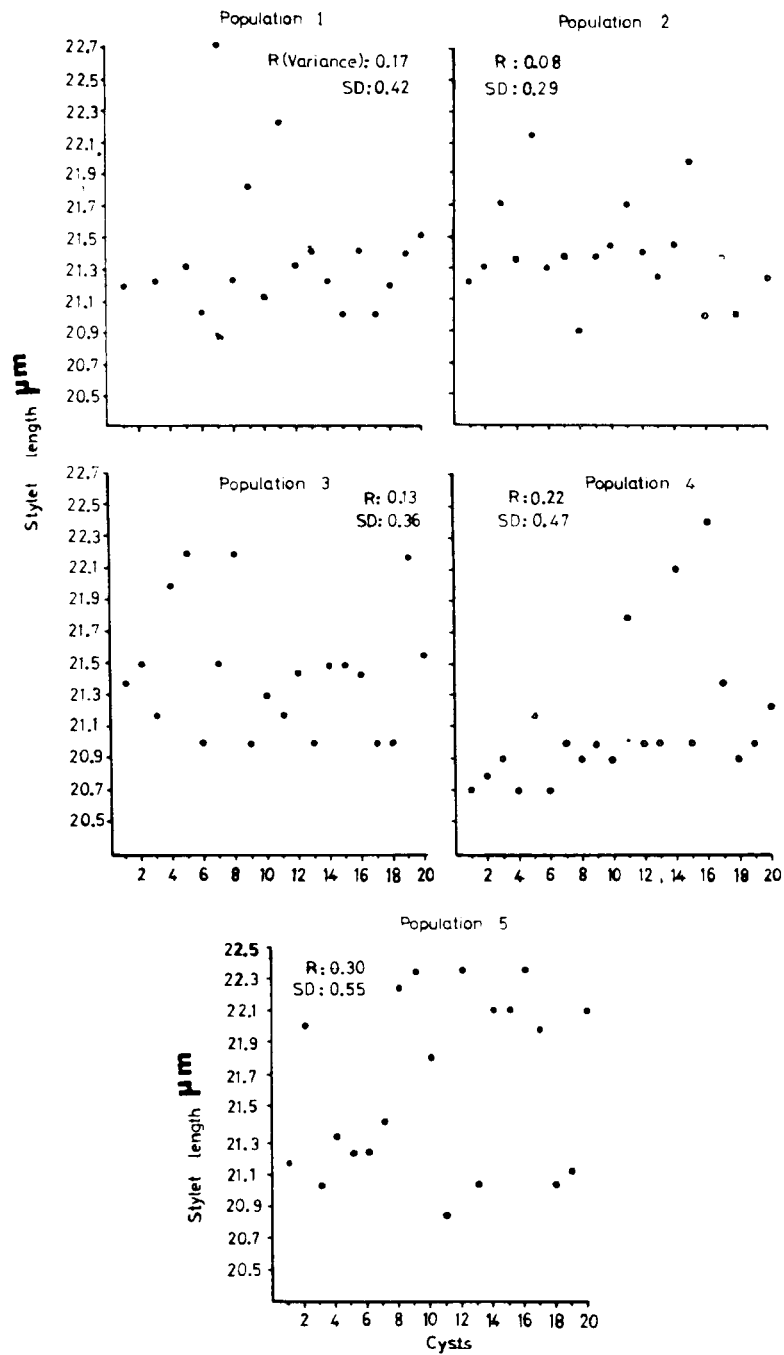


Fig. 1 - Measurements of the distance between stylet knobs and stylet tip in juveniles of potato cyst nematode from individual cysts.

Table I - Measurements of potato cyst nematode juveniles from *Xylophagou* area ( $n = 20$ ).

Location	Stylet length ( $\mu\text{m}$ )	Head tip to stylet knobs ( $\mu\text{m}$ )	Median bulb valve to excretory pore ( $\mu\text{m}$ )	Jalin tail length ( $\mu\text{m}$ )	
L <sub>1</sub>	Mean	21.2	24.4	35.2	26.1
	S.D	0.6	0.6	4.8	1.5
L <sub>2</sub>	Mean	21.2	24.3	36.2	25.3
	S.D	0.5	0.5	3.1	1.5
L <sub>3</sub>	Mean	20.8	24.0	34.8	25.7
	S.D	0.8	0.5	2.6	1.4
L <sub>4</sub>	Mean	20.7	23.5	39.5	27.6
	S.D	0.3	0.4	4.2	2.3
L <sub>5</sub>	Mean	21.6	24.1	36.8	25.5
	S.D	0.6	0.8	5.8	1.0
L <sub>1-5</sub>	Mean	21.1	24.1	36.5	26.0
	S.D	0.6	0.6	4.1	1.5

Table II - Granek's ratio and other related measurements of the potato cyst nematode at *Xylophagou*.

Location	n	Mean distance from anus to nearest edge of fenestra ( $\mu\text{m}$ )	Min.	Max.	Granek's ratio				
					Category				
					2.0-2.5	2.6-3.1	3.2-3.7	3.7	Mean
L <sub>1</sub>	25	69 ± 10.5	52	90	0	5	3	17	3.9 ± 0.8
L <sub>2</sub>	21	65 ± 13.6	45	94	2	1	8	10	3.8 ± 0.8
L <sub>3</sub>	19	67 ± 13.3	50	100	0	6	5	8	3.6 ± 0.6
L <sub>4</sub>	21	73 ± 17.7	50	115	0	4	4	13	3.8 ± 0.7
L <sub>5</sub>	28	64 ± 13.6	42	90	3	6	8	11	3.4 ± 0.8

Table III - New cysts produced on resistant potato plants relative to Arran Banner = 100.

Location	Arran Banner	Maris Piper (H <sub>1</sub> )	H <sub>56/25</sub> (H <sub>1</sub> H <sub>2</sub> )	Remarks
L <sub>1</sub>	64	5	2	Mainly <i>G. rostochiensis</i>
L <sub>2</sub>	13	—	—	<i>G. rostochiensis</i>
L <sub>3</sub>	488	<1	2	Mainly <i>G. rostochiensis</i>
L <sub>4</sub>	131	3	—	Mainly <i>G. rostochiensis</i>
L <sub>5</sub>	17	94	111	Mainly <i>G. pallida</i>

## S U M M A R Y

In Cyprus, a taxonomical study based on morphological features and host test revealed the presence of the potato cyst nematodes *Globodera rostochiensis* and *G. pallida*. Stylet length for the first species averaged 20.6  $\mu\text{m}$  while the latter species averaged 22.2  $\mu\text{m}$ . It is assumed that *G. rostochiensis* is the predominant species.

## R I A S S U N T O

*Specie di nematodi cisticoli della patata nella zona di Xilophagou, a Cipro.*

Uno studio basato su caratteristiche morfologiche ed ospiti differenziali ha rivelato la presenza in Cipro di entrambe le specie del nematode cisticolo della patata, *Globodera rostochiensis* e *G. pallida*. La lunghezza media dello stiletto della prima specie era 20,6  $\mu\text{m}$ , mentre quella della seconda specie era 22,2  $\mu\text{m}$ . Si ritiene che *G. rostochiensis* sia la specie prevalente.

## L I T E R A T U R E C I T E D

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Accepted for publication on 11 May 1980.