A NEW ROOT-KNOT NEMATODE ATTACKING POTATOES IN THE PACIFIC NORTHWEST

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Root-knot nematodes (Meloidogyne spp.) are one of the most important plant-parasitic nematodes in the world. In the Pacific Northwest they are especially important on potatoes. If root-knot nematodes are present a grower can lose his entire crop unless proper control measures are used.

The most common root-knot nematode in the Pacific Northwest is the northern root-knot nematode, Meloidogyne hapla. This nematode is widespread in Washington, Oregon, and Idaho. The southern root-knot nematode, M. incognita, occurs in Oregon and has been reported in Quincy, Wa.

Recently a new root-knot nematode species has been discovered attacking potatoes in areas of Idaho and Washington. Limited surveys have shown the presence of this new species in potato tubers from the Columbia Basin regions of Washington and the Snake River regions of Idaho. Dr. A. M. Finley, Plant Pathologist, University of Idaho feels that this new species is the predominent root-knot nematode in Idaho. This nematode has also been found associated with wheat and corn from the Nyssa, Or. area. Its wide distribution suggests that is has been present in the Northwest for some time but has not been previously detected or recognized as a new species.

This new Meloidogyne sp. not only differs from the other 36+ root-knot species morphologically but also in the host range. Preliminary studies show that this new species reproduces well on such hosts as potato, tomato, sugarbeet, wheat, corn, oat and barley, but not on pepper (Table 1). M. hapla reproduces well on potato, tomato and pepper, but not on wheat, corn, oat or barley (Table 1). This is significant since wheat and corn are commonly grown in rotation with potatoes to reduce M. hapla populations. This nematode can be separated from M. hapla based on host differentiation using wheat and pepper. Furthermore, greenhouse experiments indicate that this nematode infects potato tubers more rapidly than M. hapla and may be able to survive and reproduce at lower temperatures.

Symptoms produced on potato tubers are similar to those produced by M. hapla -- i.e. galls and "lumps" on the surface with internal brown spots. However, on tomatoes this new species causes almost no galling on the roots, whereas M. hapla forms small but distinct galls and M. incognita forms large galls. Tomato seedlings are commonly used to bioassay for root-knot nematodes in soil. Because of lack of or only slight galling, roots must be examined with the aid of a dissecting microscope to determine presence of this new species.

In 1978 and 1979 several potato crops were severely damaged by this new species. These fields were fumigated prior to spring planting, but fumigation failed to provide effective control. Early indications are that this nematode is more aggressive (able to migrate more rapidly and farther) and has a greater reproductive capability in this environment than has M. hapla. The presence of this new species may also be the reason why root-knot nematode control with non-fumigant nematicides such as Temik (aldicarb) have been inconsistent.

These preliminary experimental results and observations indicate that this new root-knot nematode, together with M. hapla, poses a very serious problem for several commodities, but, especially potato producers in the Pacific Northwest. Studies are continuing to determine the nematode distribution, host range, life cycle, environmental adaptation, its migrating capabilities, its pathogenicity and control.

Table 1. Reproductive potential of Meloidogyne hapla and Meloidogyne N. sp. on several hosts after 50 days.

HOST[A]	M. HAPLA[B]	MELOIDOGYNE SP.[B]
POTATO, RUSSET BURBANK	820	6,100
TOMATO, RUTGERS	4,400	3,800
WHEAT, FIELDERS SPRING	1	5,980
CORN, PX46 (NORTHRUP KING)	0	1,900
SWEET CORN, JUBILEE	0	330
OAT, PARK	3	2,330
BARLEY, BOYER WINTER	2	1,110
SUGARBEET	135	845
PEPPER, CALIF. WONDER	2,050	60

A 1,000 NEMATODE EGGS WERE ADDED TO SEEDLINGS IN 10-CM CLAY POTS AFTER PLANTS WERE 4 WKS. OLD.

B VALUES ARE MEAN OF LARVA EXTRACTED FROM SOIL AND ROOTS OF FIVE REPLICATES.