RESEARCH NOTE

Pathogenicity of *Meloidogyne Incognita* on Potato

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Meloidogyne incognita Chitwoodi, a root knot nematode is considered as a serious pest of potato in the Kalpitiya peninsula in the North Western region of Sri Lanka. The root knot problem on potato in the district of Nuwara Eliya, a main potato growing area is negligible when compared with that of Kalpitiya. Optimal climatic conditions which prevail in maha, the potato growing season in Kalpitiya area, enhance the infestation. This peninsula receives 80% of the total annual rainfall of 1000 mm from October to March. The maximum and minimum soil temperatures vary from 34°/23°C in December to 40°/35°C in March. These climatic factors along with the sandy soil and frequent irrigation help the nematode to multiply rapidly.

A study was undertaken to obtain information on the pathogenicity of *Meloidogyne incognita* on potato crop as it will be useful to evaluate crop loss assessment and to find proper control measures.

Nematode populations obtained from infested tubers collected from Kalpitiya area, multiplied on tomato plants were used to inoculate potato plants. Potato seeds of the variety, Desiree were used to establish plants in pots (3 l) containing steam-sterilized soil mixture (sand 80%, clay 7%, silt 4% and organic matter 3%). Ten days after planting, the plants were inoculated with 2000 eggs and juveniles per pot. Inoculated plants were grown under greenhouse conditions at the Central Agricultural Research Institute, Gannoruwa with day and night temperatures of 26°/18°C respectively. The extent and type of damage of plants, roots and tubers were observed 2 and 3 months after inoculation (MAI).

At two MAI, small galls were observed on primary roots of the plants. These galls consisted of single or several females with egg masses. Microscopic examination of these roots showed a radial arrangement of nematodes around the vascular cylinder. This is

evidence that the juveniles have penetrated toward the vascular tissues to obtain nourishment. In this study several nematodes (2—7) were found to reside at the same locus. The roots, stolons and tubers in potato were examined at 3 MAI. The lateral roots were all galled with irregular enlargements of roots having mature females with egg masses. Tubers of potato were heavily damaged, deformed with longitudinal cracking and rough appearance with scabs and knots on the skin. Many females with egg masses were found in the knots. Sections of infested tubers showed dark brown patches inside. This was due to the invasion of juveniles into internal tissues. Lesions were observed within the exterior of the vascular ring and in the pith. Brownish round-shaped bodies were observed inside tubers. These bodies act as protective baskets for the developing nematodes. Microscopical examination of these egg masses showed that first stage juveniles were common inside eggs and second stage juveniles were common among eggs but never found outside the protective baskets.

The uniformity of distribution and development of nematodes within tubers suggested that under the conditions of this study, penetration has occurred primarily through the stolons before tuberization was initiated and that development of the nematodes and tubers have progressed simultaneously. As the tubers enlarged, the lesions became uniformly spaced around the vascular cylinder generally in the cortex, but occasionally within the pith. Second stage juveniles were not observed inside mature tubers. This indicates that they are incapable of penetrating the suberized periderm.

The walls of the cortical cells abutting the matrix of the egg masses turn brown probably due to the oxidation of phenolic compounds. These host cells form a protective basket which serves to maintain the integrity of the egg mass and juveniles which emerge from it. These baskets are not susceptible to dissolution by pectinase and juveniles which emerge from the eggs appear incapable of escaping from them untill they are broken by an external force. This mechanism serves to ensure the survival of the species. *Meloidogyne* eggs inside the protective baskets remained viable throughout the periods of unsuitable conditions even though the tubers were dehydrated.

Results of this study indicate that the heavy infections of *M. incognita* can cause serious yield loss to the potato crop due to the formation of deformed tubers. These infected tubers will also help to disseminate the nematode from field to field *via* seed potato which can adversely affect the potato production in this country.