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ROOT-KNOT EELWORM OF POTATOES

By OLGA M. GOSS, B.Sc. (Hons.), Plant Pathologist

IN market gardens, the widespread occurrence and economic importance of root-knot eelworm has long been recognised, but in potato-growing areas the presence of the pest is sometimes overlooked. This is because tuber quality rather than total yield is affected. With a light infection, symptoms on the tubers may escape notice even when the crop is dug. However, the planting of infested tubers may lead to the contamination of new areas, and therefore the disease should be avoided particularly in crops grown for seed.

SYMPTOMS

Above Ground.

Unlike other crops, such as root vegetables and tomatoes, which frequently show severe stunting and unthriftiness when attacked by eelworm, the potato usually develops no abnormal above ground symptoms, and it is not till the tubers are harvested that the eelworm damage can be detected.

Tubers.

External symptoms are visible either as lumps or swellings on the surface (Fig. 1) or as roughened slightly raised areas closely resembling common scab in appearance (Fig. 2). However, when the surface skin is shaved off, differences are obvious, for areas of clear translucent tissue in sharp contrast to the opaque white tissue of the normal potato are evident (see Fig. 3). These cleared areas may extend up to 1/3 in. into the potato. Frequently the female worms can be seen with the naked eye deeply embedded in them (see Figs. 4 and 5). Unlike most plant parasitic eelworms, which are worm-like and invisible to the naked eye, the mature female root-knot eelworm assumes an almost spherical form about 1/32 in. in diameter. They are pearly white in colour and can be easily dug out of the potato with a needle or pointed knife. These females lay their eggs in sac-like structures which becomes brown in colour as they mature and so gives the cut potato a fly-specked appearance. At maturity the egg sacs are larger than the females and partially surround them.

Fig. 1.—(Left) Potato tuber infected with root-knot eelworm showing swellings or lumps caused by the disease. (Right) Healthy tuber for comparison
LIFE HISTORY OF ROOT-KNOT EELWORMS ON POTATOES

The worm-like larvae which have hatched from eggs in the soil enter the roots or young tubers of the potato plant. They now become sedentary and, in the tuber, feed on the stored starch giving rise to the cleared areas mentioned above. In the course of a few weeks, mature, rounded egg-laying females develop. Sometimes the larvae emerge from the eggs whilst still in the potato, giving rise to a massed infection, whilst at other times the egg sac is freed into the soil by rupture of the epidermis and breakdown of the external potato tissues. Such freed eggs can produce new infection sites on other tubers or remain in the soil ready to infect subsequent crops.

Fig. 2.—(Left) Potato tuber infected with root-knot eelworm showing the scab like lesions frequently found associated with the disease. (Right) Healthy tuber for comparison.

Fig. 3.—Skin partially shaved off a diseased tuber to show the cleared translucent areas (appear grey in photograph) below the scabs. These are in sharp contrast to the opaque white tissue of the potato. Other diseases such as common scab do not show this clearing of the potato tissues.

Fig. 4.—Cross section through an infected potato. Note the cleared areas extending below the skin (again appearing grey) and the female worms deeply embedded in the tissue.
CONDITIONS FAVOURABLE TO DEVELOPMENT

Growth and reproduction is more rapid in warm weather than in cold and therefore the damaging effects of eelworms are greatest during the summer months. There are indications that excessive moisture favours the galling of the tubers.

MEANS OF TRANSMISSION

The root-knot eelworm may be introduced to new areas in a number of ways, including—

(1) Soil on implements—e.g., cultivators, etc.
(2) Drainage from infested areas.
(3) Planting of infected seed potatoes.
(4) Planting of infected seedlings, e.g., tomatoes, tobacco, etc.

Planting of infected seed potatoes is probably the most important. If the seed is heavily infected, diseased tubers are readily detected but light infections can easily escape notice unless very careful sorting is carried out.

Standard fungicidal dips do not control eelworm as the females are so deep-seated in the tubers.

CONTROL

Carefully cull out all seed pieces showing suspicious symptoms, to avoid introducing the disease to clean areas.

Clean all soil from implements when going from infested to clean areas.

If it is essential to grow potatoes on badly-infested soil, fumigation before planting with DD or E.D.B. should be considered (see Leaflet 2451).

Avoid including tomatoes or tobacco in the crop rotation programme as these plants are susceptible to many of the same diseases as potatoes (including root-knot eelworm).

Fig. 5.—Enlargement of a section through the end of a galled potato. Note the clearing of tissue and the embedded females some of which are surrounded by egg sacs.

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