

Control of *The Sugar-Beet Nematode* in Alberta

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The sugar-beet nematode,¹ found so far on only 13 farms in Alberta, is a serious pest of sugar beets. No commercial variety is resistant. It also attacks other cultivated plants, including red beet, mangel, cabbage, cauliflower, turnip, swede turnip, rape, brussels sprout, broccoli, radish, cress, mustard, and rhubarb. Even some of our common weeds are hosts, such as lambsquarters, oakleaf goosefoot, shepherdspurse, chickweed, curled dock, stinkweed, and weeds of the wild mustard family.

The nematode was found in Western Canada for the first time near Taber, Alberta, in 1961. By 1964, cysts had been seen on 10 farms in the Taber district, 1 near Raymond, and 2 near Lethbridge. Elsewhere in Canada it is found only in sugar-beet-producing areas near St. Catharines and Sarnia, Ontario, where it has been a pest for some 33 years. The nematode is also an important pest of sugar beets in Montana.

LIFE HISTORY

The nematode spends all its life below the soil surface. It overwinters as an egg in a cyst, which is the dead body of the female. The cyst protects the eggs until conditions are suitable for hatching.

The tiny larvae hatch and leave the cyst, especially in the presence of certain substances given out by the roots of host plants. They enter the rootlets of the host plants, where both sexes develop.

In June or July the female nematode bursts through the rootlet. She is now in the 'white cyst,' or egg-producing stage. At maturity her body is filled with eggs and turns into a brown, hard cyst. Both kinds of cysts are visible to the naked eye.

The adult male leaves the root just before the 'white cyst' stage of the female and lives only long enough to fertilize the female.

The cyst stays in the soil after the crop is harvested and lies semi-dormant until the next susceptible crop is grown. In the interval between host crops a few larvae emerge each year and probably die of starvation. This, along with natural enemies, gradually reduces the numbers of the nematode.

¹*Heterodera schachtii* Schmidt.

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Figure 1.—A field of sugar beets near Taber, Alberta, severely infested with the sugar-beet nematode. The beets are wilted and stunted and have some yellow leaves.

Figure 2.—A normal beet (left) and three beets severely stunted by the nematode. Note the “hairiness” of the root at the right. This often indicates that the nematode is present. *Figure 3.*—Part of a heavily infested root. The arrow points to one of the cysts.



RECOGNIZING AN INFESTATION

If you see small patches in your beet field where the plants are stunted and unhealthy (Figure 1), your field may be infested with the nematode. If enough nematodes are present, the beets die and leave bare patches.

When a beet is heavily infested, the outer leaves wilt, turn yellow, and die. The central leaves may stay green but they are usually small and numerous. When the attack is not severe, the green foliage may increase later in the season but the root remains stunted. You can easily pull the injured beet from the soil. The root has many lateral rootlets, giving it a whiskered appearance (Figure 2). If you look closely at an infested root in late June, you may see the tiny, white, lemon-shaped cysts (Figure 3).

CONTROL

Preventing Spread

Although the nematodes themselves travel only a few feet each year, moving the cysts or infested soil to new areas spreads the pest rapidly. Most new infestations begin from tare dirt from sugar factories. This should therefore be put in holes, sloughs, or other waste areas, preferably at or near the piling yard, and not used on farms.

Irrigation water and farm implements can also spread the nematode. Clean the machinery used in infested fields as much as is practical before moving it to uninfested areas.

If only small areas in a field show signs of damage, you may keep the nematode from spreading by planting these areas to a crop that is not susceptible, preferably alfalfa or a suitable grass.

Cultural Control

When you grow sugar beets or other susceptible crops too often on an infested field, the nematodes increase rapidly in number. To avoid severe damage, do not grow susceptible crops more often than once every four years. Suitable ones for southern Alberta beet-growing areas include corn, beans, peas, potatoes, sweet clover, alfalfa, grasses, onions, wheat, barley, oats, rye, and sunflowers. Get rid of all weeds.

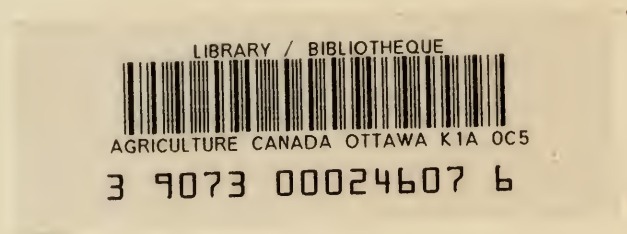
Plant early and keep the soil fertile and moist enough to promote early growth and to help the plants withstand a nematode attack.

Fumigants

No known practical fumigant rids a field of the nematode. Fumigants are expensive but do reduce the numbers of the pest enough to increase yields in the treatment year. By the end of the growing season, however, the cysts may be more abundant than before the treatment. You cannot grow beets on the same land the next year without fumigating again.

Fumigate only when no other land is available for beets. To eliminate the nematode from a small area, plant nonsusceptible crops for at least four years after fumigation.

Consult a specialist before using a fumigant. The chemicals used are extremely toxic to most plants and warm-blooded animals.



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