



www.freudenberger.net

# Nematode control

with resistant mustard and radish varieties

Beet nematodes can cause huge damage in sugar beet crops. Despite the use of nematode-tolerant beet varieties, recent research findings have shown that yields can be further boosted if nematode-resistant radish varieties are grown. This is because radish is sufficiently deep-rooted to combat beet nematodes which also live and can cause damage in deeper layers of the soil. The catch crop needs to be sown early if this is to succeed. One option is to sow radish as coated seed in existing crops approximately 3 weeks before harvesting.

The advantage of resistant mustard varieties is that they can be sown even later, until early September, and still provide effective control in mild autumns. This late-sown mustard is also insurance against unwanted nematode breeding. In regions where stem nematodes can occur, it is vital to grow radish as it stops the pest from breeding. Mustard encourages the pest to breed.

## How resistant mustard and radish varieties control beet nematodes

Specific substances in root secretions from resistant varieties attract beet cyst nematode larvae, which penetrate the roots. This interferes significantly with the development of larvae into sexually mature animals in the plant. Most of the nematodes are male, with hardly any females, which leads to decline in the nematode population. The proportion of females depends on the resistance of the variety. Females make up 10-20% of the population in varieties with grade 2 resistance, and less than 10% in varieties with grade 1 resistance.

## It's worth growing a catch crop

Growing radish has proven to be effective for many years on farms which grow potatoes intensively, and is sometimes very profitable. In a crop rotation trial in the Lower Rhine region, yields have for years been found to be over 10% higher when radish is grown after cereals in a crop rotation system including potatoes. Commercially significant diseases such as *Rhizoctonia solani* are also less frequent. Radish varieties are also able to significantly reduce numbers of organisms transmitting tobacco rattle virus, thereby improving the quality of the produce.

## Pests in vegetable crops

The demand by vegetable growers for multiple-resistant radish varieties is increasing all the time. The yields and quality of the produce improves when these varieties are grown, as is the case with sugar beet and potatoes as well. The soil health of intensively farmed vegetable plots is also improved. The water retention capacity and drainage of the land improves. Soil fauna are also encouraged, an effect which can only be beneficial and have a positive impact on the humus balance. Resistance to gall-forming nematodes is undergoing official testing. These nematodes, members of the genus *Meloidogyne*, can cause significant damage. The mechanism of action is based on the idea that the nematodes penetrate the roots but that the radish then forms cork layers which cause the nematodes to starve. The nutrient cells which are important to the nematodes are no longer formed.

## No growth without fertiliser

All plants grown as catch crops need sufficient nutrients. This is why the application of nitrogen fertiliser is essential. Farmers must always comply with the rules of the Fertiliser Decree.

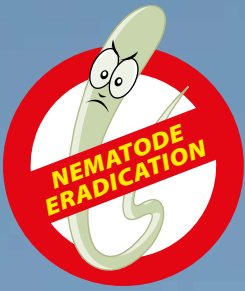
Sufficient crop density must also be achieved. In the case of mustard or radish, this is 180-200 plants per m<sup>2</sup>. This translates into sowing rates of 25 kg/ha for radish in most cases and 20-22 kg/ha for mustard.

A dense crop suppresses weeds. Cruciferous weeds such as wild radish or shepherd's purse encourage the reproduction of beet nematodes as well as gall-forming and free-living nematodes.

## Good for the soil

Growing catch crops has other advantages in addition to these benefits. The strong root systems which radish and mustard produce result in large amounts of soil-borne nitrogen. This is stored in the roots and the parts of the plant growing above ground, and the following year it becomes available as part of the mineralisation of the main crop.

Consequently, some additional investment is necessary to grow the crop, but if the right approach is taken the earnings outweigh the costs.



**1.** Root secretions of resistant mustard or radish plants attract larvae from the cysts into the soil.

**4.** As a result, only very few cysts can be formed. The nematode population declines dramatically.



**2.** Larvae penetrate root tissue.

**3.** Sex differentiation: The poor nutrition conditions for females mean that almost all the nematodes which develop are male (up to 99 per cent; in resistant species, the ratio of males to females is 50:50).