FACT SHEET 12

Nematicides and sweetpotato

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Overview of pest nematodes

Plant-parasitic nematodes are small (generally <1 mm), non-segmented, thread-like worms that live in the soil. They mainly feed on underground plant parts, particularly roots; causing stunting, wilting and unthriftiness, and also leading to market quality issues in sweetpotato storage roots. Nematode feeding damage may also allow fungi and bacteria to invade the plant. Plant-parasitic species prefer coarse-textured and sandy soils. The main plant-parasitic nematodes affecting sweetpotato are root-knot, reniform and lesion nematodes.

What are nematicides?

Nematicides are chemicals used to control nematodes. They are available in various forms and belong to different chemical groups. Depending whether they vaporise in the soil or not they may be classified as fumigants or non fumigant.

Fumigant nematicides

Fumigants may be sold as liquids, but when they are applied to the soil they form a gas which spreads through the spaces between soil particles. While some fumigants may also dissolve into the soil water surrounding the soil particles, excessive soil moisture may act as a constraint to the fumigant's dispersal. Fumigants are more volatile in warm soils and less in cool soils. Due to these factors, soil fumigants have optimum soil temperature and soil moisture ranges required for effective soil treatment. Soil preparation, fumigant placement depth and surface sealing can also be critical to success.

Soils are generally fumigated 2-3 weeks prior to planting the crop. How long before is dependent on factors such as the fumigant used, rate, soil moisture and soil temperature. Enough time must be allowed for all of the fumigant residues to disperse prior to planting to avoid damaging the crop.

Non-fumigant nematicides

These nematicides do not rely on the chemical volatilising in the soil spaces. The non-systemic nematicides in this group usually require the soil profile to be moist, but not waterlogged. This allows the chemical to contact plant-parasitic nematodes in the water held in the soil pores. As the chemical contacts the nematodes it kills, immobilises or restricts their feeding.

Some nematicides may also have a systemic action where the chemical is absorbed through the plant roots and then kills any plant-parasitic nematodes which feed on the plant.

Using nematicides

Nematicides are expensive, can be harmful to soil health and overuse can lead to a loss of effectiveness. Nematode monitoring by soil sampling and analysis can help identify fields where nematicide use is advisable. Previous crop performance/damage in a block can also be a good guide.

The characteristics of nematicides differ greatly, so it is important to carefully read the product label before use. The label describes how the nematicide may be applied, any critical issues that may affect the chemical performance, and safety information. Consideration must also be given to crops that may follow the treated crop, as the nematicide may have a long plant-back period.

Using nematicides, *continued*

Nematicides should be used as part of an Integrated Pest Management (IPM) program. Other cultural methods to assist in nematode management include; controlling volunteers and host weeds, rotation with non-susceptible crops, fallows, the use of soil amendments and only taking cuttings above soil level.

Currently registered nematicides for sweetpotato*

Fumigants

1. Metham Sodium Salt (Poison schedule 6) - has a general registration for control of nematodes pests, pathogens and weeds in vegetable crops. Rates vary according to application method and soil type.
2. 1,3-Dichloropropene (Poison schedule 7) - has a general registration for control of nematodes in vegetable crops. It is available in pure form as a nematicide or in mixtures with chloropicrin which controls fungal pathogens and other pests.

Non-Fumigants

1. Oxamyl (e.g. Vydate) (Poison schedule 7, 1A insecticide) - acts on the nematodes nervous system causing paralysis and stopping egg hatch. Some nematodes will recover as the chemical degrades, so it is most effective early in the crop cycle. Initial application at transplanting (18L/ha) is followed by 4 applications (2L/ha) 14 days apart.
2. Fluensulfone (e.g. Nimitz) (Poison schedule 6) - low toxicity to non-target insects and mammals. Applied at 4-8L/ha depending on crop susceptibility and nematode population. Applied as broadcast or banded spray 7 days before planting then mechanically incorporated to 15-20cm and irrigated within 3-5 days.
3. Fluazaindolizine (e.g. Salibro) (Poison schedule 5) - low toxicity to non-target insects and mammals. May be applied by various means (drip, trickle, soil application) at rates up to 4L/ha, from 3 days prior to planting until 21 days post-planting.
4. Abamectin (e.g. Tervigo) (Poison schedule 6) - attacks the nervous system causing paralysis. Applied via trickle irrigation no later than 3 days after planting (120 mL/100 m row), followed by up to 4 applications (60-120 mL/100 row) at 14 day intervals.
5. Garlic Extract (e.g. Eco-Nemguard Organic Nematicide) - Organic approved with general registration for vegetable crops. These products have not been fully evaluated for all crops and pests and their effectiveness in sweetpotato is currently unknown.

**This list may be incomplete as new products are regularly registered. New nematicides containing different active ingredients (e.g. cyclobutrifluram, fluopyram) may be marketed in the future.*

References:

Australian Pesticides and Veterinary Medicines Authority (APVMA) PubCRIS database

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Queensland Government

Hort innovation Strategic levy investment | SWEETPOTATO FUND

This project has been funded by Hort Innovation using the sweetpotato research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

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