Nematodes

New Nematicides - The Way Ahead

The search for new classes for nematicides that are both effective and safe, as well as easy to apply, has been a long one. After more than 20 years without any major developments - in which time food production standards rose and many of the older products were withdrawn - the nematicides market was in urgent need of innovation.

At the top of the wish-list were active ingredients which met the stringent environmental, safety and financial criteria so important to the fruit and vegetable industries, while also offering an effective and lasting nematode solution.

Fluensulfone

The first approval of fluensulfone, Adama's novel non-fumigant active ingredient, in 2014, came just in time. Offering the much-needed improvements in efficacy, safety and ease of application, it is hardly surprising that this breakthrough has already started to revolutionise the market.

Launched under the brand name of Nimitz, it offered a combination of operator and environmental safety, with good efficacy against nematodes, giving growers an opportunity to change the way that they manage nematode populations.

NIMITZ

According to Danny Karmon, global project leader for Nimitz at Adama, work started on the active ingredient in 2006, after it showed potential as a replacement for carbamates and organo-phosphates – both of which are under regulatory threat.

"After considerable investment in its development, we were able to bring Nimitz to market," he says. "Initially, it contains the new active ingredient in a liquid formulation, so it had immediate application advantages."

Peppers - with and without Nimitz.
Lewis Taylor Farms. Tifton, GA 2014.

Application

Simply sprayed on the ground before being incorporated ahead of planting, or applied through drip irrigation equipment, Nimitz eliminated the need for specialist application equipment and handling procedures.

It also did away with lengthy harvest intervals, simplifying its use and offering huge advantages over fumigants. Distributed through the soil by water movement, there was no detrimental effect on non-target and beneficial species from its use.

Mode of Action

“Nimitz works in a different way to other nematicides too,” adds Mr Karmon. “Most non-fumigants paralyse the nematodes rather than killing them, so they tend to recover once the chemical has moved through the soil profile.”

That means they do not have a significant effect on nematode numbers in the soil, but simply give crops the chance to escape the effects of nematode feeding for a while.

“However, that’s not the case with Nimitz,” he stresses. “It’s a contact product, and the target nematodes stop feeding after one hour and are killed within 24-72 hours. It’s also active on all the life stages of nematodes.”

This means that eggs do not develop, egg laying and hatching is reduced, treated nematodes lay non-viable eggs and the hatched juveniles do not survive.

Tabacco plants: with Nimitz on the right and untreated on the left.
University of Georgia, Bowen Farm Experimental Station, Tifton GA 2014

Trials

The first Nimitz registrations were for the control of root knot and lesion nematodes. Since then, a granular formulation has been launched for the turf market in the USA, with both sting and lance nematodes added to the label.

Trials work is on-going in other target countries, on crops that are important to their economies, confirms Mr Karmon. “So beyond the wide range of fruit and vegetable crops that it is already cleared for use on, we are testing its efficacy on coffee, sugar cane, cotton, ginseng, citrus and many others.”

Sting nematode damage to strawberry plant second on the left.
Favorite Farms, Plant City FL, 2016

Nimitz Features

- Non-fumigant
- Effective from a single application
- New chemistry and mode of action
- True nematicidal activity, not temporary paralysis
- Active on multiple life stages of nematodes
- Superior environmental and safety profile
- Easy to apply
- Unaffected by accelerated soil degradation

Susceptible Species

Current

- Root knot nematodes
- Lesion nematodes
- Potato cyst nematodes
- Cyst nematodes
- Sting nematodes
- Stubby root nematodes
- Citrus nematodes

Data being developed

- Dagger nematodes
- Spiral nematodes
- Stem nematodes
- Ring nematodes

Root Knot and lesion nematode damage to carrots.
Karnemaat Farms, Lakeview MI, 2016

Images: Copyright Adama