CROP & SOIL SAMPLING FOR NEMATODES

May 2021

Why test for nematodes?

- Nematodes are microscopic worms found in soil. While some are harmless, plant-parasitic nematodes feed on plants, reducing crop growth and yields.
- Nematodes generally attack plant roots, creating symptoms similar to root insufficiency: poor growth, yellowing of leaves, wilting etc
- Different crops and different varieties of crops may be more susceptible or more resilient to nematodes.
- Different types of nematodes impact different crops however all horticultural crops are at risk of attack by one or more nematodes.

- Plant-parasitic nematodes can have significant economic impact on your crop through reduced plant health, poor growth and lower yield overall.

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When to sample?

- Ideally, soil samples should be taken regularly so nematode populations can be tracked over time to monitor the effectiveness of any pest management programs in place.
- **Before planting and at harvest** are particularly important times to test.
- Nematodes are often found in their highest numbers in the root zone in late summer to mid-winter or towards the end of the growing season.
- Serial samples are best collected at an equivalent stage in the irrigation cycle or when the soil moisture levels are similar.
- See over page for details of sampling for ongoing maintenance versus for troubleshooting or diagnosis of a problem.

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Sampling for a Maintenance Program

- Sample after cultivation but allow 2 – 4 weeks before you are due to plant to have time to test the samples and arrange your treatment program.
- Re-sample 3-5 weeks after treating nematodes to check the effectiveness of the treatment.
- Further sampling at mid-season may also be appropriate to determine the treatment is effective, depending on the length of your growing season and the extent of the problem.
- Sample again at harvest or at the end of the growing season to determine any likely carry-over into your next crop. This will allow you to plan your treatment program for the following season.

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Sampling for Troubleshooting

- If you suspect you have a nematode problem (e.g. you are seeing poor growth, yellowing of leaves or wilting of plants), samples may be collected at any point throughout the season.
- It is easier to detect nematodes while the crop is still in the ground as the populations decline in dry, fallow soil.
- Collect samples from near the edge of areas where plants are declining, avoiding plants that have already died as nematode populations are likely to have declined in these areas.
- If possible, also collect samples from healthy areas to test separately. This will provide a comparison point.

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How to Sample

- Nematode populations are usually distributed unevenly within a field. To get a representative sample, your sampling methodology should be carefully planned to account for this.
- Very low or patchy populations are difficult to detect.
- Preferably use a **soil tube or auger** to collect sub-samples (cores) and clean between collecting samples from different areas.
- The most abundant nematode populations will be in the root zone with very few present in the first few centimetres of dry, sun-exposed soil so this top layer can be excluded.
- For **shallow rooted crops**, samples should be taken approximately 20 cm deep while for **deep rooted crops** a depth of 20-40 cm is needed.
- If a deep-rooted crop was previously grown in the soil, samples from 20-40 cm deep will be useful prior to planting a shallow rooted crop.
- In **grapevines**, some species reach the highest populations at 30 to 60 cm deep so including some deeper samples is recommended.
- In established crops, sample in the row, near the plant line or inside the drip line.

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Creating a Sample from Representative Cores

- A sample is made up of a number of cores (see below), representative of the area to be tested (see previous page), which are gently mixed together.
- Small cores are better to provide a more representative sample.
- Once the cores are mixed, a **sample of 500g** is taken from the mixed soil.
- For plots up to 100 square metres, **20-30 cores** are required to make a sample.
- For uniform areas up to 1 ha, **at least 50 cores** are required to make a sample.

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Choosing Where to Sample

- See previous page for how many cores to take to create a representative sample.
- Each plot sampled should be no more than 1 ha – larger fields should be divided into smaller plots using either a grid method or similar
- Various sampling methods may be appropriate – see following page.
- Separate samples should be taken from areas with –
    - Different cropping histories
    - Different soil types
    - Variations in crop health
    - Areas showing low yield
    - Areas indicating poor plant health

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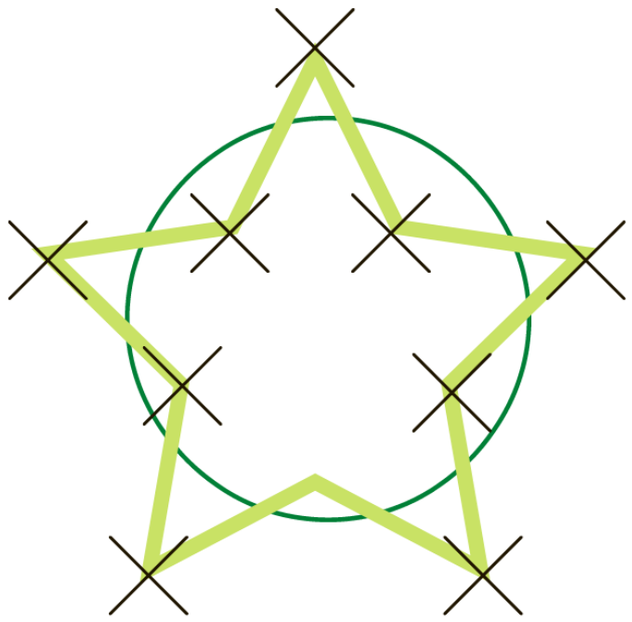
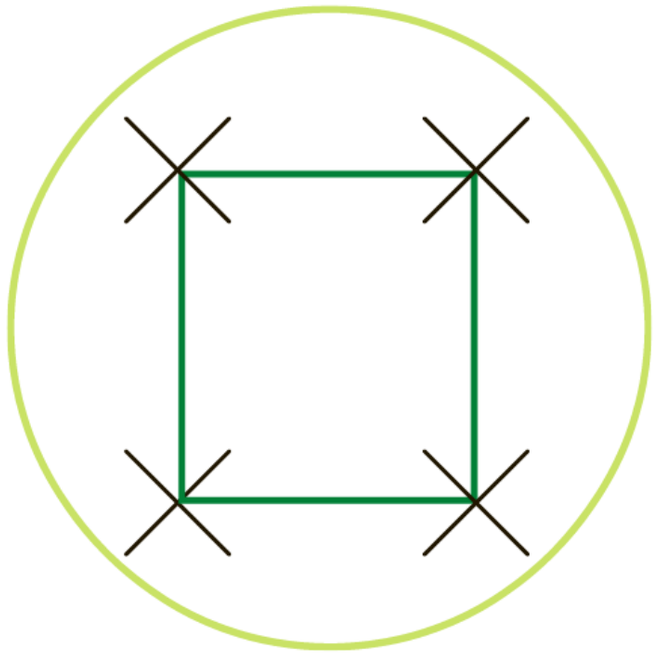
Choosing Where to Sample

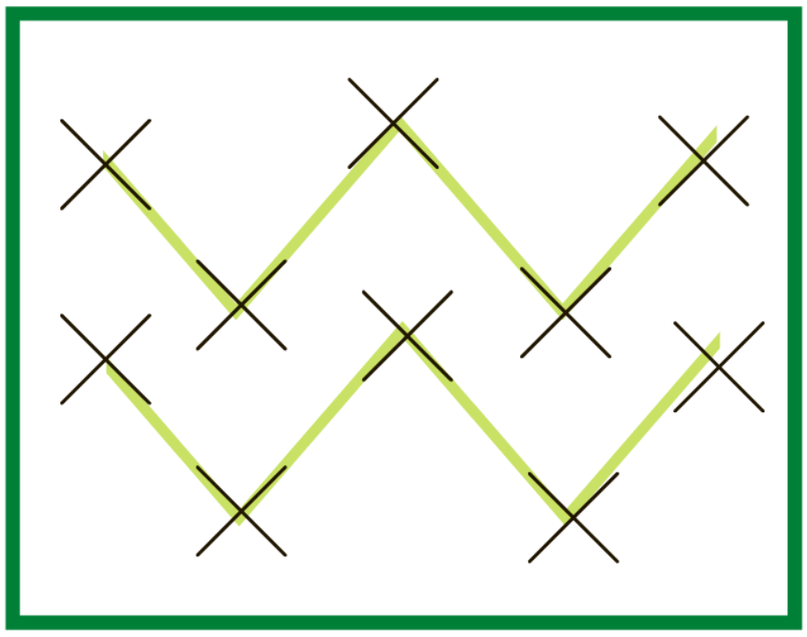
Sampling Pattern – X marks the location of the core or sub-sample



Star Pattern: for sampling from a damaged area.



Square Pattern: for sampling a tree in an orchard.



Zig Zag Pattern: for sampling a field with uniform soil and growth.

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Handling and Transporting a Sample

- Place your sample into a clean, zip-lock plastic bag (such as a sandwich bag).
- Seal the bag to prevent the sample from drying out. The fresher the sample the better.
- Do not place anything else in the bag with the sample.
- Write the sample details on the outside of the bag.
- Soil does not need to be refrigerated but it must be protected against high temperatures. As such, refrigeration may be required in some instances.
- Collect samples close to the start of the week and despatch as soon as possible after sampling.
- If sample is likely to be exposed to high temperatures during transit, package accordingly – for example place in a foam container or include ice blocks (however do not place ice blocks directly against the soil sample).

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Submitting Samples

- Complete your Analysis Request Form online at:
  au.agpro.technology

- Post your sample to:
  Novum Lifesciences Pty Ltd
  Locked Bag 3901
  Bundaberg, QLD 4670

- Samples to be received by midday Thursday.

- Results take 1 – 2 weeks.

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