

Monitoring Crops for Pest and Disease

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- Each year, growers get caught out by pest and disease infestations
- Consistent and effective monitoring and testing, to correctly identify the extent and cause of infection or infestation, are key to minimising loss and reducing spread

How often and when to sample?

The best time to start sampling is before planting. Check soil and water sources, and scout for nearby hosts of common pests and diseases. Ensure that any cover crops are not a host for a disease issue you experienced the previous year – for example, researchers at VSICA have found that sorghum is a host for charcoal rot, making it an unsuitable option for areas prone to the disease.

All new plant material should be checked on arrival. If you have suspicions that new material is infected, and it must be planted before testing can be done, send a sample off to be tested rather than taking a ‘wait and see’ approach. Once planted, pathogens that may have arrived on planting material cannot be separated from pathogens that have colonised in the field environment, so any investigations will be inconclusive. It is recommended that records are kept detailing which varieties, batches and suppliers are planted in each row.

Once the crop is in the ground, consider doing at least two health checks each week - more in periods of poor weather and during critical stages of development.

It can be useful to check plants in a ‘W’ or ‘X’ Shape in a square field and ‘Zig Zag’ or ‘Z’ in long narrow fields (Figure 1). And there is much to be said for keeping an eye on known problem spots, and simply standing back and looking for signs of ill health such as small plants, discolouration, or signs of damage.

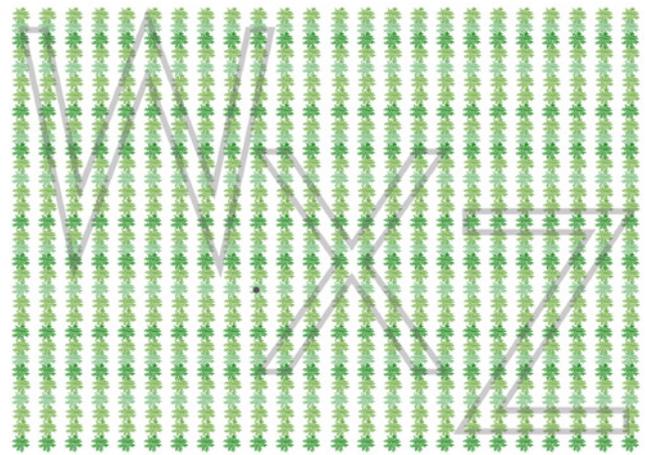


Figure 1. Sampling patterns that may be useful to follow to give representative coverage of issues

There are a range of monitoring tools available to assist growers, from hand lenses, to pheromone lures and sticky traps. Weather forecasts can also assist in helping growers be on the lookout for problems. Advances in technology, such as remote sensing, data analytics, and modelling have also improved the accuracy of disease forecasting. These tools allow for real-time monitoring and more precise predictions.

If you know there is a problem but can't identify the source or cause, testing is imperative. Insects should be identified, at a minimum, to Order, and preferably down to Species. Many plants suffering from one fungal infection will also have secondary infections that need to be treated. Correct identification not only helps target the primary cause/s of the problem but prevents incorrect use of chemical treatments which may lead to resistance issues.

Sampling Procedures

Your agronomist or testing centre will have specific advice you should follow, however there are a few key points:

- Collect samples before applying fungicides. Fungicides inhibit fungal growth, making detection more difficult
- Don't send dead plants – they are full of bacteria and fungi feeding on the decaying matter, which can make it difficult to isolate a primary pathogen
- Choose suitable samples – send healthy and unhealthy plants, as well as plants that are somewhere between the two
- Samples should be appropriately packaged and protected from extremes of hot and cold weather
- When sending samples by mail, do not post late in the week and, where possible, send via express post

When to Treat

Start by assessing the economic injury level – the pest population at which control measures need to be taken to prevent unacceptable economic loss. Pest and disease growth generally follows a pattern, starting slowly, with low numbers of plant pests or diseases, then rapidly increasing when conditions are favourable.

Consider what treatment options are available and when these need to be applied to provide control. Some products are only effective as preventatives, or when pests are at a larval stage. Careful reading of product labels is strongly encouraged to limit the impact on beneficials, ensure the weather and other conditions are right, and to ensure you are treating the pest or disease at the right stage.

Keeping an eye on the upcoming weather and the stage of the plant's life is also important. For example, you may have a small fungal issue, but if wet weather is on the horizon and fruiting has commenced, which puts the plant under stress, a preventative fungicide may pay off.

If your pest or disease has no suitable control option, and there is a risk of the problem spreading, you may need to remove affected plants. If there is a control method, it can pay dividends to talk to your neighbours. If everyone is experiencing the same pest issue, coordinating treatment can prevent the pest spreading from untreated properties.

Lastly, as always, engage good farm hygiene practices. This includes working clean patches first and affected patches last, providing good training and cleaning materials for staff, and sterilising farm equipment with 70% alcohol or 10% bleach before moving it to any 'clean' area.

Recordkeeping and Regression Analysis

Careful recordkeeping to maintain a history of trends in plant material sources, weather, pest populations, damage levels, beneficial populations, and the response to treatment or control methods, will assist with identifying causes and managing further outbreaks.

If your pest or disease issue has no suitable control methods, we highly recommend you continue to take photographs and careful records as these can be instrumental in future applications for chemical permits.

Good recordkeeping also allows you to conduct regression analysis to identify why a particular pest or disease was a problem this season, and not in previous seasons.

High quality crop monitoring is an essential part of Integrated Pest Management, as it allows for appropriate use and timing of control methods.

If you are experiencing a pest or disease issue that you cannot control, whose source you cannot identify, or has affected a significant portion of your crop, please mention it when you speak to your Industry Development Officer.

We can use this information to identify larger patterns of pest and disease within the industry, and to educate growers on management and control methods. Where there is no control method available and crop losses are significant, we can raise this at higher levels with the aim of finding a solution.

Further reading:

To properly scout for pests, you must know where they live, what they look like, and how to find and count them. This online resource is a useful guide:
www.alberta.ca/field-scouting

Overview of Monitoring and Identification Techniques for Insect Pests by Geoff Zehnder, Clemson University
eorganic.org/node/2721

Monitoring tools for crop protection by Ausveg:
ausveg.com.au/biosecurity-agrichemical/crop-protection/monitoring-tools-crop-protection