

Plant health

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Plant pathology with a purpose

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The United Nations has declared 2020 as the International Year of Plant Health (IYPH). The year is a once in a lifetime opportunity to raise global awareness on how protecting plant health can help end hunger, reduce poverty, protect the environment and boost economic development (www.fao.org). Most importantly to you however, it is an opportunity to increase your awareness and knowledge of the commercial benefits of understanding plant diseases.

This newsletter will provide regular updates to horticultural producers in Ireland, providing support to you in the area of plant health. In my experience, commercial horticulturists are practical, innovative and want straightforward information to help their business thrive in a sector limited by many financial constraints, so let's get straight to the point.

It is estimated that up to 40% of food crops globally are lost to plant pests and diseases annually, with another 10-20% lost post-harvest, even with the use of chemical control. It is estimated in the USA that yield

benefits from fungicide use can be attributed from 19% in wheat to 86% for apple production. This highlights the importance of proper disease identification and control. It goes without saying that significant crop loss can be avoided by having knowledge of what these disease threats are and how they can be managed before they become full blown plant health emergencies leading to entire crops being lost. Prevention is always better than cure.

Unfortunately, the disease pressure on horticultural crops is growing due to increased travel and trade as well as climate change which has the potential to change disease behavior by the creation of new niches and opportunities. One instance that springs to mind is the devastating *Escallonia* disease which appeared in 2006, resulting in the virtual collapse of *Escallonia* sales in Ireland.

The department of Agriculture, Food and the Marine (DAFM) have recently launched their 'Don't Risk it' Campaign ([DAFM Don't risk it campaign information](#)), acknowledging this increased risk to our plant health and the role that travel plays in disease spread into Ireland. DAFM have also

introduced changes to plant trade legislation with the aim of:

- Focusing attention on high risk plants
- Developing a list of EU priority pests
- Expanding the range of plant operators registered with the competent authority
- Applying stricter Protected Zone requirements
- Requiring all plants for planting to be accompanied with a Plant Passport

Teagasc play a role in providing advice in the application of the new legislation through our research activities and by providing you with a plant disease diagnostic service. This service has been available to industry since Teagasc's inception and can be accessed through our Advisory Service ([Sample Submission Guidelines](#)).

We hope this newsletter will be of benefit and would be interested to hear your feedback and suggestions for the type of information that would be of use to your business.

Prevention vs Cure

Single measures such as fungicide or pesticide application are no longer used with the implementation of a more integrated disease management approach in Ireland. A multifaceted approach aims to break the chain with the focus being on anticipation of the problem to prevent a widespread

disease outbreak. Prevention involves application of basic crop management tactics such as:

- Utilization of resistant cultivars
- Good hygiene practices
- Crop walking and monitoring
- Soil testing
- Staff training

If a suspected problem is detected in your crop, the first step should be to identify the problem through disease diagnosis/pest identification. This gives you the crucial information to support your next course of action.

Your first steps in disease identification

Based on regular feedback from the industry, one of the biggest challenges to the grower is deciding what the problem actually is. We receive hundreds of samples for the plant clinic annually from all horticulture sectors. In 2019, 16% of samples received from industry with issues were found to be caused by something *other* than a pathogen (a disease causing organism) i.e. a non-living or environmental problem. We use the term 'abiotic' to describe these issues. The most common abiotic problems we commonly find are:

- Frost damage
- Spray damage
- Water stress
- Nutritional stress

This can lead to secondary issues as other organisms in the environment

quickly take advantage of plants which have become 'immunocompromised' or physically damaged and weakened. It can be challenging from a diagnostic perspective when a plant has become host to opportunist organisms, following initial environmental damage.

Knowing how to spot whether damage is abiotic is an important skill you should develop for your business. Below are some key observations you should make in order to help you make a decision:

Does the damage occur on different species of plant in the area?

Plant diseases tend to be specific to a particular Genus or Species of plant.

Has there been any notable weather events in the recent past?

Frost, Hail, High Winds, Drought

Has the crop been recently sprayed?

Check spray records to ensure the operator was properly trained and the right concentration has been applied.

Are there obvious signs of disease present?

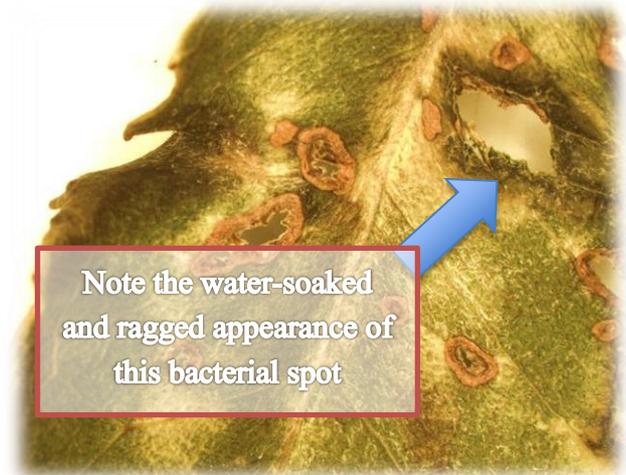
Do spots have structure and a regular appearance? Do they change over a period of time?

Fungal or Bacterial?

A hand lens (20x is fine), is essential for any basic field pathology work, particularly for the identification of fungal issues. Foliar fungal diseases produce characteristic signs such as spores and fruiting bodies. Based on the samples we regularly received to

the plant clinic in Ashtown, one of the most common pathogens that causes problems for many Irish horticultural producers is *Alternaria* (See *Alternaria* in Focus below).

Bacterial spots tend to be water soaked with a 'halo' or zone of discoloration surrounding the lesions. Lesions tend to develop to holes which have a ragged brown appearance.



Some bacterial pathogens such as *Xanthomonas campestris* produce characteristic V-shaped lesions at the leaf margins.



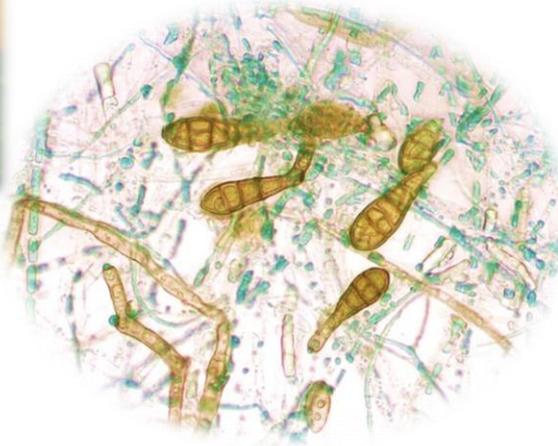
***Alternaria* in focus**



- *Alternaria* causes disease in 380 species of plant.
- Spores are brown, club shaped, in chains and are visible with a hand lens.
- Moisture in the form of high humidity, rain or dew for a period of 9-18hrs promotes spore production.



Alternaria solani
causes a 'bullseye'
type spot on Tomato
Fruit

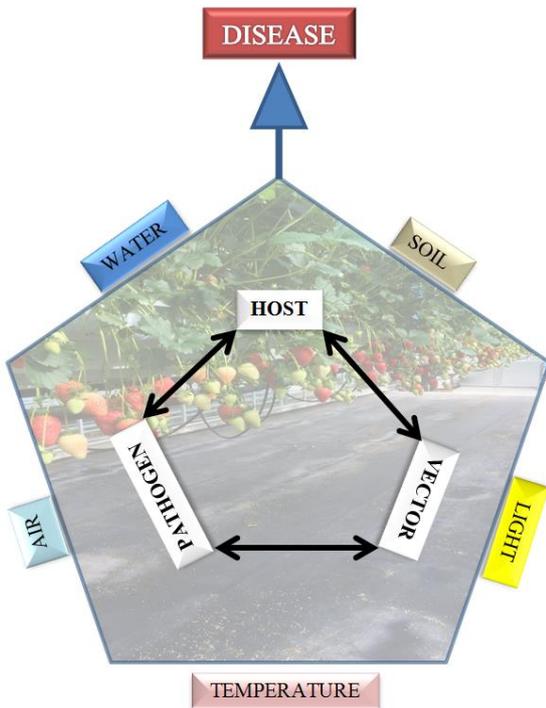


Alternaria brassicae
Causes dark spots with
concentric rings on
leaves of Brassicas



Alternaria alternata
causes brown spots
with concentric rings on
Geranium sp.

Crop in focus – Strawberries (*Fragaria x ananassa* Duchesne)



Disease development requires several interconnected factors to favour growth of a pathogen. In the cultivated strawberry, genetically different clones and cultivars vary greatly in their reactions to many pathogens.

Main diseases associated with strawberry plants tested in the Ashtown Clinic

Botrytis cinerea (Grey Mold)



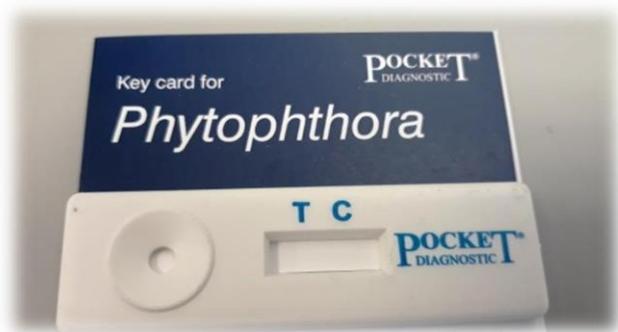
Grey mold remains the no.1 destructive fungal pathogen in strawberry production (and other soft fruits) worldwide. It sometimes appears in crop prior to harvest if there is persistent moisture present but is mainly associated with picked fruit. It can also be associated with blossom blight and can infect strawberry leaves and petioles. The chief source of this disease is from plant debris allowed to remain in the vicinity of the crop, making hygiene the first issue that should be dealt with. The smallest amount of *B.cinerea*

can survive for months on leaf residue. Spores when produced at an optimum temperature of 17-18°C are chiefly dispersed by air movement and water splash.

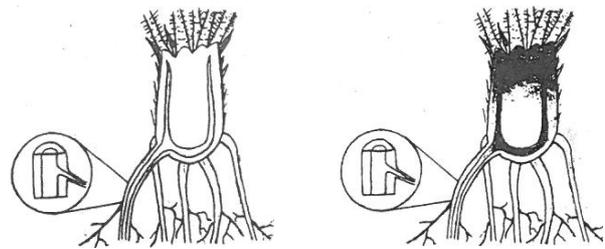
High nitrogen content of feed is associated with increased occurrence of Grey Mold, so close monitoring of feed concentrations should be a priority.

Phytophthora cactorum (Crown Rot)

If your plants have become infected by *Phytophthora cactorum* the most obvious sign is plant collapse. This can occur at any point in the growing season. The initial symptoms are wilting of young leaves and stunting of plants. When sectioned, the crown will have a distinctive reddish brown discolouration, usually in the top half. *Phytophthora* can be confirmed using a Lateral Flow Device ([Use of Lateral Flow devices video](#)).



A Lateral Flow Device (L.F.D.)



Healthy Crown
in section

P.cactorum
in section

Sphaerotheca macularis (Powdery mildew)

Temperature and air moisture levels are the primary driver of powdery mildew. Air movement is the main cause of spore spread. It is mainly associated with leaves but can occasionally cause a fruit rot.

Sparse white patches on the lower and upper surfaces of the leaves are the first sign of the disease. The leaves develop reddish patch and curl at the edges. A white powdery layer may form on the fruit. The optimum time to be on the lookout for this disease is in July-August during warm humid weather.

Carefully remove infected leaves and reduce the airflow to minimize spread.

