Factsheet

Protected Cropping – Disease Management

Prevention of disease is always better than cure and in protected cropping the four main factors in disease prevention are:

- soil health
- plant resistance
- climate control
- crop hygiene

Soil and crop samples can be sent away for most disease identification; this is not usually too expensive and will assist in identifying resistant varieties and a prevention strategy.

Fungal

Fungal diseases are the most common in protected cropping mostly due to increased humidity in an enclosed space where capturing heat is often prioritised over sufficient airflow and disease can rapidly spread through closely spaced plants of the same variety.

Cultivated greenhouse soils also tend to have microbial communities dominated by bacteria and less fungal activity, so that the probiotic effect from beneficial organisms that would compete with diseases is reduced.

Disease	Crops affected	Treatment
Botrytis	affect most crops but especially fruit and pod bearing crops	hygiene, air flow and plant health are important
Powdery mildew	cucumber, courgette, tomato	• Resistant varieties • Correct watering
Downy mildew various	lettuce, spinach, parsley, brassicas	• Resistant varieties suitable for the season • Prevent overcrowding, Remove diseased material if possible
Sclerotinia sclerotiorum	Wide range of crops including strawberry, cucumber, celery	• Soil based so maintain biologically active soil • Remove any infected material
Verticillium/ Fusarium wilt	Wide range of crops	• Variety resistance, • clean compost • grafting • Avoid cutting plants with tools (remove fruit and sideshoots by tearing off) • mulch around roots

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Damping off diseases - *Alternaria, Pythium, Phytophthora, Rhizoctonia*	Wide range of crops at seedling stage	Prevent overwatering and good ventilation
Corky root Pyrenochaeta lycopersici	Cucurbit, pepper, tomato, lettuce, strawberry and solanaceous. Also host on some weeds such as nightshades and clover	Can survive for 5 years as microsclerotia. Usually a problem if planted early before soil fully warm. Disease development is optimal at 15.5° to 20°C
Tomato[1] (potato) blight Phytophthora infestans	Tomato Occurs late summer just when most fruit are ripening.	• Resistant varieties • Cultural control • Remove infected material at the first sign • Ensure leak free roof • Do not water from above • Ventilate well on dry days • Remove all unnecessary foliage to encourage ripening, but once you've seen it, it's unlikely to go away and a cool, dry spell is your best hope. • Copper as last resort.

Several biological agents are available to help control fungal diseases; they are sold under various brand names containing the following active ingredients.
Gliocladium catenulatum, Trichoderma asperellum, Ampelomyces quisqualis, Bacillus subtilis, Coniothyrium minitans. Not often particularly effective as a quick cure, they are most useful in preventing and limiting its establishment and spread.

Bacterial

Bacterial diseases cause a variety of symptoms and tend to be named accordingly such as 'spot' 'rot' and 'wilt'. They are rarely a problem in healthy systems with well-managed soils however a notable exception is;

Bacterial wilt of cucumbers. This common problem is usually seen where they are not well rotated; increase the time between return to a plot, use grafted plants and consider applying an inoculant or compost tea.

[1] Standard 4.11.11 outlines copper use and if you are thinking of using it, a detailed plan outlining why and under what circumstances can be submitted for approval.

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Most of the problematic bacteria belong to the groups *Erwina* and *Pseudomonus* and symptoms include soft rot, water soaking and necrotic spots. Open wounds made by picking, de-leafing or insect damage allow bacteria to enter and sitting water will further encourage infection. Remove infected plant material at first sign of infection

Viral

There are many types of plant virus and they tend to be spread by sap feeding insects. Tobacco, Tomato, Cucumber and Pepino Mosaic Virus are the commonest and growers should familiarize themselves with the symptoms and rigorously remove infected plants at first sight.
Solanacae and cucurbitacae are most prone and it is usually the ripening fruit that are worst hit.
If your site is known to have a history of viral disease, try to identify the strain and grow resistant varieties. Exercise good control of aphid, thrips, leafhopper and whitefly as well as weeds, which will harbor viruses once established on a site.
Other stress factors such as cold, lack of sunlight and poor, excessive or imbalanced nutrition seem to reduce plant resistance.

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