

Organic disease control – a look at cultural methods and available fungicides

One of the most difficult areas of organic gardening can be the effective control of pests and diseases. Improving soil fertility using natural methods is easy and weed management is mainly down to vigilance and elbow grease but what are the options for managing pests and diseases in an organic system?

Plant diseases are predominantly caused by pathogenic fungi (pathogenic meaning disease-causing). Not *all* fungi are pathogenic, some indeed are beneficial to plants and form symbiotic relationships with plants (where both parties benefit from the relationship) but many types of fungi will attack living plant tissue and can cause damage to plants, lower productivity and in some cases will kill the host plant. When we are growing food crops this can be especially problematic as they will harm the crop, lowering yields or even destroying the whole crop.

Common fungal diseases include Botrytis (grey mould) which tends to attack soft fruits such as strawberries and vegetable fruits such as courgettes and tomatoes, Powdery mildew often seen as a white powdery coating on the leaves of plants in autumn and sometimes spring, the dreaded potato blight which can destroy a potato crop in mid-summer and other serious diseases that attack woody plants such as honey fungus and canker. To look at individual diseases would be far too in depth for this article but there are some general strategies for preventing and controlling diseases which I will explore.

The main symptoms of a fungal disease are powdery deposits on leaves, these may be white but are often rust coloured, sometimes orange grey or brown, these may be accompanied by circular patches of discolouration on the leaves and sunken areas on the stem and/or fruits. The main problem is that by the time that you see these symptoms what you are seeing is the fruiting bodies of the fungi – or ‘spores’ – which are their means of spreading to other plants and what is worse, they have already been working away, growing their microscopic fibres and structures inside the plant tissues and destroying the living plant tissues from the inside before going into their reproductive phase where they push their spore cases out onto the surface of the leaf, stem or fruit to distribute their spores far and wide. These spores can remain dormant in the soil and in leaf litter for several years waiting for conditions to be right to germinate and start the cycle again. In other words, by the time that you see the symptoms on the outside of the plant, the damage has already been done.

There is no miracle cure for these diseases, all we can really do is to try and prevent them from occurring in the first place. There are several cultural things that can be done to physically help to prevent the spread of fungal diseases listed below. We will then look at what fungicides are available.

- **Good hygiene** is very important, always clear up any dead leaves and plant debris, if you suspect that they are diseased then do not compost them, burn them – the bonfire ash can then be added to your compost heap.
- **Crop rotation** – many fungi will attack a specific type of crop, rotating them will help to prevent the build-up of viable spores

- **Correct plant spacing** – fungi develops and spreads easily in crowded conditions, don't be tempted to plant crops too close together. Ventilation is really important in greenhouse-grown plants
- **Correct watering**; over watering will create conditions where fungi will germinate and spread quickly, most of all **avoid watering from above** – sprinkling water onto the leaves of plants will aid the germination of any microscopic fungal spores on the leaves, the leaves will also shield the roots from the water leaving plants dry at the roots, this water stress will lower the plants resistance to disease. Use a seep hose to water the soil in the root zone directly (these can be attached to a semi-automated system and run off a water butt or mains) or direct your hose or watering can at the roots only.
- **Select resistant cultivars**; for example, 'Sarpo Mira' is a blight resistant potato. It is especially important to choose resistant varieties if you have had problems in the past.
- Select plants that **tolerate your soil and site conditions**, this will create healthier plants that are less susceptible to disease.
- **'Grow them hard'** do not pamper your plants and try not to be tempted to start things too early in the greenhouse, this can lead to soft, sappy, leggy plants that pests and diseases will attack easily.
- Take **care when handling** plants; wounds and bruising can cause entry points for disease.

In short, fungal diseases thrive in humid, warm conditions where there is a lack of air flow and adequate distance between plants. If spores are present, they will quickly grow so it is imperative to avoid creating environments where fungi will be happy.

Looking at the array of 'Bio' fungicides on the shelves of the garden centres and Brico stores there seems to be a wide choice. However, many fungicides are not suitable for use on edible crops and some of the 'natural' ingredients can still have a negative effect on the environment and can build up in our food.

Always check the information about active ingredients on the packet, in France there is a heavy reliance on copper sulphate (Cuivre or Bordelaise/Bordeaux mix). Being a naturally occurring substance this is considered to be accepted in 'Bio' production, however it builds up in the environment and the Soil Association who regulate organic farming in the UK will only allow this to be used in extreme circumstances and it is strictly regulated. Sulphur ('Soufre' or the trade name Microthiol) is another common ingredient, less persistent in the environment but still used in high concentrations as a fungicide. Fungicides containing bicarbonate of soda have the least impact on the wider environment but are not 100% effective. It is important to remember that these are mainly affective as preventatives – before any symptoms occur, so may not be necessary unless you have had serious problems in previous years – and that the main reason for many of us being organic gardeners is to avoid having chemicals in our food, so unless it is absolutely necessary – for example if you are making a living from your crops and cannot afford failure, then it is worth avoiding their use even when labelled as biological.