

Plant Diagnostics Can Save Money In The Propagation Nursery®

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The process of propagation in a nursery is an expensive one. Plant losses at this stage cost the nursery more than just the money initially invested in the propagation process. When unplanned losses occur, the extra cost of re-propagation effectively doubles the propagation cost of that plant.

Part of a good propagator's job is to get to know the common problems that affect the plants they grow, to be able to identify and recognise their symptoms, to control them if necessary, and most importantly of all to eliminate the cause. Some of the most common problems found in the propagation house are shown in Table 1.

These problems probably cause the vast majority of plant losses in the propagation area. There are many more pests and diseases that infest stock and should be considered, but unless procedures are carried out to minimise these then plant losses will continue.

Table 1. The most common problems that affect plants during propagation, their common symptoms, and most common causes.

Problem	Common symptoms	Most common causes
<i>Botrytis</i> spp. grey mould	Grey coloured mycelium usually on the tips and soft tissue.	Too cool environment, light levels too low, poor ventilation.
<i>Pythium</i> spp. damping off	Patches of dead, brown seedlings in trays. Early morning white mycelium may be noticed on the stems near the soil.	Poor hygiene practices.
<i>Rhizoctonia</i> spp. damping off	Similar to <i>Pythium</i> but soil tends to stick to the stems because of the mycelium, reddish brown mycelium may be observed on the stems and soil surface.	Poor hygiene practices.
Powdery mildew	White mycelium growing on the surface of the leaves in patches.	Warm humid conditions, low ventilation. Contaminated stock plants.
Fungus gnat	Larvae feeds on soft roots and stems, wilting and root death. Adult is a small fly.	Wet soil conditions. Soils high in organic matter.
Nematodes	Microscopic eel worms that infest roots, stems and leaves of plants, wilting and root death.	Poor hygiene practices, particularly contaminated media or stock.

Salting and leaf burn	Marginal leaf burn of larger plants like cuttings, seedlings burn and wilt.	Too much fertiliser used in propagation trays (a common but debatable practice). Over use of pesticides, contaminated water or media.
Nutrient disorder	Deficiency symptoms - most common are nitrogen overall yellowing and iron interveinal chlorosis only because they are easily identified, but most other are likely.	Old or poorly grown mother stock for cuttings, unusual in seedlings unless left in the seedling trays too long.
Lack of watering/over-watering	Wilting of terminal shoots and decline of plant vigour.	Poor watering practice. Lack of observation. Poor training of plant maintenance staff.
Sun scorch	Leaf scorch, yellowing particularly indoor and sensitive plants.	Poor hardening off practice, inappropriate shade or sun protection for species.
Etiolation	Seedlings and new shoots on cuttings drawn and thin usually light green to yellow.	Low light levels, shade cloth/white wash left on too long in autumn, dirty greenhouse covers, wrong selection of shade cloth.

THE DIAGNOSTIC CYCLE

The process of diagnostics is rather simple:

- 1) Get to know your plant well, and the common pests and diseases to which they are prone.
- 2) Develop good observation skills.
- 3) Use sound deductive reasoning.
- 4) Check with others where you may be in doubt.

Most plants have a list of possible pathogens and pests just waiting to move in to your growing territory. You need to be aware of the most likely problems or at the very least a good reference library to help you identify a problem early.

Symptoms for many of these problems can be similar. From the list of problems above each of these pairs have similar symptoms, salt burn and sun scorch, *Pythium* and *Rhizoctonia*, nematodes and poor watering. It is necessary for someone in the organisation to develop the diagnostic skills to narrow them down.

OBSERVATION SKILLS

Is there an obvious problem? It is the symptoms or signs that indicate a problem. Like a cough in a human, yellowing is a symptom of a problem in a plant. Get to recognise the various symptoms for problems affecting each species.

If you can see the pest or disease, or recognise a watering problem then there is no problem — just fix it. Remember chemical controls may provide a brief resolution to

a problem but the “fix” may also require additional investment, such as training to ensure that it doesn’t happen again, implementation of better practices, or a change in growing environment.

If the problem is less obvious? You have three options here:

Option 1. Guess and risk your stock — a common practice in our game and a costly one. Wasted chemicals, time, stock, and host of other problems stem from this practice.

Option 2. Seek professional assistance — contact your industry officer, government diagnostics centre, or consulting service. May result in high costs for some pretty basic diagnoses, but solutions are often quick and reliable.

Option 3. Develop some basic skills and do the initial diagnosis yourself—it is not a difficult task but it does take some deductive reasoning and a little investment.

DIAGNOSIS

So you have observed a problem with your plants, now is the time to put some of your knowledge into practice. If you selected Option 3 you now need to spend some money! Yes, you do need resources.

As a bare minimum you will require:

- Reference books and someone who can use them properly (ie. has good research and problem solving skills). As many pest and disease books as you can get, and a couple of good soils and potting media books.
- pH test kit or pH meter (preferable as it is more accurate).
- EC meter (for measuring soluble salts).
- Hand lens at least 15X (preferable to have a binocular dissecting microscope).
- Some jars, bottles, and/or petri dishes for observation of specimens.
- Plastic bags to transport specimens from the field to your office without cross contamination.
- A dissecting kit with forceps, scalpels, and other pointed objects for poking around the specimens.
- Time and someone with the skills who you can afford to do the work.
- Most common problems can be identified through the process of elimination.

Is it Environmental? Too much light, too dark, too hot, too cold, too wet, too dry. All pretty obvious questions but important in the scheme of things. Don’t forget to ask what changes have been made, as these may contribute to the problem. If you have a camera with a light meter you can check light level by simple comparison with more successful houses.

Is it Nutritional? What fertilisers have been used or have not been used; test the water, test the soil/media, for both pH and soluble salts, compare these to the norm. (Use references or develop your own standards from plants you successfully grow). Specific nutritional disorders are often difficult to identify and will need outside assistance, e.g., soil and leaf analysis.

Is it Fungal? Close examination may reveal indicator symptoms. Rust pustules, mildew, spots, and blemishes. Place specimens in sealed plastic bags overnight and