use fern production may become a very rewarding part of general nursery practice.

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NURSERY HYGIENE

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Successful propagation involves the integration of many interrelated factors such as the correct time and method of taking cuttings with the right temperature, light and water supply. However what a pointless exercise if, after gaining the knowledge and expertise of taking cuttings, we lose them to diseases and pests. The industry has become more and more specialised with larger quantities of the same plant being grown at any one time. In this way we have created very suitable environments for the disease organisms and pests which can cause such dramatic losses in cuttings and defeat the purpose of our work. We must take great care to prevent the spread of these organisms.

Hygiene is the most important factor we have to contend with. We must be certain our clothes, shoes, hands and even fingernails are clean and sterile in a hygienically controlled propagation system. Everything we use must be clean and free of infection, from the trolleys we use for transport, to the benches where we pot our stock. All tools used in the preparation of cuttings must be sterilized and kept in a spotless condition, whether they be a knife, a pair of secateurs, or whatever we use. If a number of cuttings are to be taken off one plant, it is preferable to disinfect the instruments before going on to the next plant. Of course the sharper the instrument the cleaner the cut, and the less chance the infection has of becoming established. A small bowl of disinfectant should be adjacent to the operator so that he can regularly dip his utensils. By this means disease, if present, is restricted and more easily contained. However, as happens in the best of establishments, an infected cutting can slip through, so that the regular disinfection of fingers, benches and instruments is first priority. How often have we been in the position of working on our cutting propagation

bench, when another staff member may stop to say a few words, and place his infected hands or container on your sterile bench, whilst he has a smoke. This simple example shows how our system of sanitation can break down and ruin our otherwise healthy cuttings. The working bench should be scrubbed every afternoon with a mild disinfectant solution, and any discarded plant material should not be allowed to accumulate.

Clean stock material is of the first importance. It can be obtained from a known clean source, either from another grower or from one's own plants that have been cleaned of contamination. One should never presume when buying new plants, that they are clean. It is always preferable to isolate them from the other stock for sufficient time for any disease or pest to manifest itself.

There are two main sources of vegetative propagation material, both being used in most nurseries, yet each requiring different treatment. One is the use of mother-stock plants, which are usually located away from the general production area. The main advantage with this is that it is easier to maintain a higher standard of stock health and cleanliness for a few plants in a limited area. The main disadvantage, however, is that the stock plants end up in odd corners all over the nursery and, as a result, do not receive proper care to maintain healthy, disease-free plants.

The second source is young plants under production in the nursery where a replacement cutting is taken before the parent plant is sold. With this system the mother plants receive the general nursery preventative spray programme. A common failing with this system though is that, if a crop does not give sufficient propagation material, we are forced to go to older plants which may not be in such a good state of health.

Thorough and consistent weed control should be practised as an essential part of the programme as many weeds act as excellent hosts for many diseases and pests that trouble our commercial plants. It may be beneficial to drench mother stock with a fungicidal solution a few days before taking cuttings. Plants such as poinsettias seem to respond to this extra treatment.

Cuttings on the preparation bench are often covered with a cloth to prevent them drying out, but did we insure that the cover was properly disinfected before and between each batch? Having made sure of this, the cuttings should now be stuck in the propagation medium which has, of course, been fumigated or steam-air treated, and moved as quickly as possible into the propagating structure and onto a bench that has been disinfected with a drench. This bench should have been prepared by removing all debris, hosing down and scrubbing. Even the mist

nozzles in the propagation unit should be scrubbed and disinfected. An essential part of the sanitation of the propagation structure is the maintenance of clean ceilings and grooves. Infection can be transmitted by air or by condensation on walls and floors. Footwear can carry infected soil particles. Watering nozzles must be kept off the ground at all times, splashing eliminated, and smoking prohibited with some crops. Immediate isolation and and preferably destruction of infected plants as they appear, should be a daily chore. We must make sure our properly sterilized containers are not put on infected ground or trolleys, or that we do not use a non-sterilized shovel to move the mix, or leave the mix open to airborne spores and seeds or adjacent to surface water. These are essential considerations if we are to be serious about disease prevention.

For advice on the use of pesticides we should look to our Government Departments and when we find a suitable system we should adhere strictly to it to maintain our success rate. The most rewarding and comprehensive books on this subject is, "The U.C. System for Producing Healthy Container-Grown Plants" (1). It should be read and re-read by all who hope for 100% success rate.

Preventative control is the most successful method for containing diseases and pests in propagation. It is essential that all staff understand this and are trained to maintain the standard of hygiene.

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PROPAGATION OF SOME SOUTH AFRICAN PLANT SPECIES

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Most of the nurseries in Southern Africa propagate a range of plants similar to that grown here in Western Australia. The best of the nurseries are probably not as sophisticated as the best in this country mainly because, in general, Southern African labour is not brought up in technological surroundings, and nursery hygiene is a new subject, difficult to get across. But that does not mean that every nursery owner himself is behind the times. On the contrary several nursery owners have done a lot of trial work into crops which have an export potential. Cut