

HYGIENE—THE FORGOTTEN TOOL

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When I was asked to prepare a paper for this conference I took no time at all to decide to speak on hygiene as an almost forgotten tool in many propagation houses one visits.

Chemical treatments have come in over the last few decades and in some ways have masked larger problems that lurk just behind this barrier. Dr. Ken Baker (1) in his book *The U. C. System for Producing Healthy Container Grown Plants* says, “*Emphasis in control is placed on clean soil, clean stock and sanitary procedures to keep them that way. Once the pathogen has penetrated into a plant it is not economically possible to eradicate it. Chemical treatments generally are ineffective. For this reason prevention is emphasised in plant disease control rather than cure as in medical procedures.*” Similarly, we can take an extract from James S. Wells book (2) *Plant Propagation Practices*—“*A good grower is not dirty and untidy especially in his greenhouse area. Is a trim appearance enough? No it is not! We need to go far beyond this if we are to ensure success.*”

What is hygiene? The principles of health which pervade our thinking in all we do in life. In propagation, hygiene must be taken to almost extreme lengths to achieve optimum results. I feel that many people are not too particular in their attitude to themselves and the way they live.

People with this attitude should not be employed in our nursery creches. Cuttings and seedlings are, by their very size, susceptible to infections and at this stage have very little resistance because of their tender, succulent tissues.

When one prepares a cutting, the wounded tissue immediately becomes an open channel into the tissues of the plant for disease to enter. When seedlings are disturbed, such as happens in pricking out and repotting, roots are damaged. This creates the same open door for pathogens to enter.

Up until the 1950s hygiene and specific nursery practices were the hallmark of a successful propagator. However, over the last 30 years we have become lax because of the development of chemical crutches. We are continually bombarded by chemical companies with all sorts of products that are, if one believes the publicity, the answer to all of our prayers. I am the first to acknowledge that many of these have become useful allies in our constant battle for higher strike rates, and better productivity. However, in the process,

many of our younger propagators have developed in an era when the first reaction taken to a problem is to drench it with an appropriate “witch’s brew”. In many cases this treatment can mask the cause. My purpose in putting together this paper is to encourage our propagators to open their minds to the needs of each plant and consider them as individuals, as one would different people.

The needs of plants are in many cases similar except for small and important differences. I am sure, with more investigation and research, many of these problem areas that surface ought to be solved by good nursery practice and intuitive investigation into such individual plant peculiarities.

I want to give a couple of examples to explain what I am getting at in these statements. These have occurred in our own nursery business in the propagation department, over the last 20 years. These examples, upon which I will soon expound, made the crops concerned uneconomic ones for us to grow and market, yet the demand was such that if we could unlock the keys to success, we knew they would become very profitable for us. In each and every case, nursery advisers told us to drench or spray with first one chemical or another to cover the particular problems we were encountering. In each and every case, we solved the problem through a change in nursery practice.

The first example I want to explain covers grevilleas, an Australian native plant, and, in particular the tropical species. In the early years through the work of amateur breeders, a number of grevillea hybrids began to appear on show benches and, on occasion, in public places. Great demand was evident, and as an industry, many growers and propagators began to try to produce these plants. At that time these plants were almost impossible to multiply.

Stock plants were grown in beds initially, but also in pots in nursery rows. All of these plants are fast growing in warmer weather, and it was hard to get mature or semi-mature wood to use that was clean of a sooty mould (*Cladochaete coronata*) which occurs on their stems in nature. At that time propagators were using wood for propagation that was maturing. This mature wood was almost always infected with this debilitating mould but often was not apparent to the eye on new cuttings.

A group of nurserymen, *W.O.N. PTY Ltd*, in which our company has a shareholding, put their efforts into this problem. The plant they worked with was *Grevillea* ‘Robyn Gordon’—a very desirable cultivar. After many trials, it was discovered that very young tip cuttings in full growth with a bit of trimming to the leaves were giving some promise. However, they had to be held too long on cutting benches, and, again were going down with the sooty mould before they were callused and rooted enough to be taken off mist.

Part of this problem was that the cuttings drooped over before they rooted. Dropping the cuttings, as they were harvested, into a bowl of chlorinated water plus added refined sugar was trialled. We used sugar at the rate of 1/2 cup to 2 gal. of water. After soaking for one or two min the cuttings were removed and then wrapped in wet newspaper to hold them. These were taken to our propagation area, prepared, and then rewrapped before sticking later the same day. This provided the final link. Success rose straightaway to 60/65%. Over the years since, this percentage has improved until now virtually 100% rooting is achieved.

In this case, extreme care to keep cuttings turgid and clean, together with strict control of cleanliness of water for misting and watering is essential. Planting in a clean medium of perlite and peat and making sure the area surrounding the cuttings in the mist benches is clean at all times are necessary. Practices, not chemicals, or drenches or sprays, solved our problems.

Dieffenbachias are a crop that changed in presentation and growth characteristics about 1975 with the introduction of superior cultivars to the industry. However, these newer cultivars, because of their dense clumping growth habit, were tremendous disease spreaders. The most devastating of these diseases was an *Erwinia* species, a soft rot that found a good home in the tight foliage. All research papers we could find recommended spraying and drenching. I recall one treatment was with streptomycin. We decided not to go this way, but to try to eliminate the disease by changing the traditional way we grew the plants.

Our first move was to grow on elevated wire mesh benches, some 4 ft (120 cm) from the ground so that we could water the plants but have the media drain and the foliage dry as fast as possible. Wire mesh benches gave us good air movement around the plants. Even this move cut the incidence of disease. However, there were still many times when 100% of the cuttings in our propagation benches collapsed and had to be destroyed. Our next attack was time consuming and therefore costly.

We decided to sterilize our cutting knives after each and every cutting was severed by dipping the knives in a solution of household bleach in water. Cuttings were isolated so that each stock plant did not touch the leaves from any other. Our propagators washed down arms and hands, if by chance they cut into a diseased plant before seeing the disease as it often was hidden by the thickness of the plant. Almost overnight the problem disappeared. Today we never see it in our crop at all. The above method of cutting has now been dropped. We now cut and collect all cuttings needed and plant them under mist on bottom heat. The crop is good and highly profitable. Again practice of hygiene, not chemical crutches conquered it.

The last example I will give concerns *Mandevilla splendens* [syn. *Dipladenia sanderi*], a truly spectacular flower crop for containers. After introduction to us we had to find out how to grow it. Different types of cuttings were trialled, and all showed the same problems. Large patches of grey appeared on our propagation benches, and our lovely green cuttings disappeared. We were puzzled on how to tackle this, and for quite some time the only success we had was in using a drench of Ridomil at monthly intervals on our stock plants. We were growing these under 50 to 70% shade. We began to try many things and eventually discovered a solution. A small batch was put down in full sun on a well drained bed of stone, some 3 in. (75 mm) thick. They flourished and looked so good we decided to harvest cuttings and try them. Imagine our delight when the problem we had with us up to that time vanished.

Now our whole crop is grown outside on well drained beds. Our cuttings are harvested from these and planted in our usual mixes under mist on bottom heat. The only time we have problems now is after dull, cloudy or wet weather. Again, nursery practice is the solution. I could give other examples.

There is one other area in which we are doing special treatment of all plants whether stock plants, in propagation areas, or in our growing-on and selling areas. This is in chlorinating all water being used in irrigation on our properties. We use both well water and above ground water stored behind dams. The water from our reservoir is filtered through a sand filter and then chlorinated. Our well water is chlorinated but does not require filtering.

We use an injection method of treatment where liquid sodium hypochlorate (4% active chlorine) is injected into the water as it is pumped into storage. We aim for a residual of 3 to 4 parts per million of chlorine going onto the crop. (Easily monitored with a pool test kit.) This treatment eliminates *Phytophthora* and *Pythium* and suppresses most bacterial problems in the nursery. We would never irrigate unless water is treated. This treatment is common practice in Australia. Plants grow so much better that it is apparent to the eye in most cases. The foliage looks cleaner and greener and crops turn over quicker.

Whilst there are probably some crops that need drenching to root and survive, I am quite sure that most crops we handle have specific needs, and if we find these keys to growing, we cannot only achieve better quality, higher propagation results, and cheaper running costs, but we can also be more in tune with the environment in which we live. Our fragile planet can take all the help we can give it. I hope I have challenged you to open your minds to problems, to change and adapt to suit each problem you encounter.

As propagators we are challenged to continue supplying more and more plants to make our cities and surroundings pleasant places

to live. By careful monitoring and observation, we can do our work and, in many cases, not have to resort to the many chemical helpers that are given to us. After all is said and done, if we can achieve the results we need by understanding our work better, we are not only building our own success in the business of plant propagation and growing, but we are helping the very world on which we all depend.

LITERATURE CITED

- 1 Baker, K. F , ed 1957 *The U.C. System for Producing Healthy Container-Grown Plants*. Univ of Calif. Div of Agr. Sci Berkeley, California.
2. Wells, J S. 1985 *Plant Propagation Practices*. Amer. Nurs. Publ Co , Chicago, Illinois.

Tuesday Afternoon, December 11, 1990

The afternoon session was convened at 2:15 p.m. with David Beattie serving as Moderator.

The Luncheon honoring Charter Members was held in the Grand Ballroom with Peter Orum, President I.P.P.S.—Eastern Region presiding. International Board members present were introduced.

Roger G. Coggeshall, member since 1952, introduced the Charter Members in attendance: David Dugan, Richard Fenicchia, and James S. Wells. Each Charter Member made a short presentation. Charter Member L. C. Chadwick sent his greetings on a tape that was played at the luncheon.

Elton Smith, President I.P.P.S., presented the 1989 International Award of Honor to James Wells.

Ralph Shugert, Historian, I.P.P.S., made the following presentation.