NEW ZEALAND PEAT-SAND MIXES, INCLUDING THE USE OF ZINC

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Though our nursery business is small compared to many others in New Zealand, I feel that we have gained a great deal from joining the New Zealand Chapter of I.P.P.S. and it is now my endeavour to make a contribution to the Society. The following thoughts and observations are personal opinions and conclusions reached from practical experience.

The "container-grown" nursery business in New Zealand is not so many years old. I well remember when the most widely used container was the clay pot. Potting composts contained soil, along with other components ranging from turf, straw, animal manure, charcoal, scoria, leaf mould etc., as well as fertilisers such as were commonly used in the field. Often a different "recipe" was produced for each crop.

Today we require large volumes of a consistent "mix" which must be acceptable to a wide range of plant species and cultivars. I do not subscribe to the concept that a nursery should use only one mix. I fail to see any possibility of one mix being acceptable to the wide range of plants produced in most New Zealand nurseries.

My requirements for a suitable container mix are:

1. Controlled growth, minimising the need of supplementary fertilizers.
2. The mix should not become waterlogged in wet weather, nor dry out quickly.
3. The cost must be reasonable.
4. The mix must provide anchorage and sufficient aeration for healthy roots and be heavy enough to provide stability in average weather conditions.
5. Our mix must suit machine potting and bagging of our plants. (A more recent requirement)

The U.C. peat-sand mix comes nearer to these criteria than others we have used. We started using soil mixes as recently as 1971. Our reason for being slow to adapt to the U. C. mix was the availability of good volcanic soil at very low cost.

We were, however, becoming more concerned with cultivars that we considered unsuitable for container growing. Some nurserymen using the U.C. Mix were successfully growing some of the plants which we could not. We decided to experiment using

"Osmocote" fertiliser which had recently arrived in New Zealand. Pumice sand, with particle sizes of 1 mm to 6 mm, and peat in equal parts by volume formed the ingredients of our first mixes. Two objections were noted; firstly, it was very expensive for large scale operations in our area. Secondly, the mix was light and loose and caused problems with plants blowing over and requiring much more watering.

We discussed our problems with another nurseryman who had used a U.C.Mix for some time. He asked us why we had chosen to use expensive pumice sand whereas the University of California Manual 23 (page 12) states "fine sand, particle size 0.5 mm to 0.05 mm." We found a suitable source of beach sand as used in the building trades.

The combination of 50% fine sand and 50% peat became our first U.C. Mix used in quantity. Results were reasonably good over a wide range of cultivars but we felt that the mix retained moisture rather too well, and it was undesirably heavy when wet. Four cubic feet of perlite was added to each cubic yard of mix with some desirable lightening of texture and weight. Subsequently this portion was replaced with the pumice sand as used previously. We now had a stable mix which did not waterlog easily nor dry out too quickly. It was and still is rather expensive but we have not been able to overcome this aspect any further as yet.

We now had our "Javo" potting machine and found that the mix suited the machine very well. Holes bored with the machine do not collapse as would a coarse light mix.

Our attention now turned to deficiency symptoms with several species. Species of *Acacia, Banksia, Boronia, Eriostemon* and *Proteaceae* were among those noted. "Sporumix" trace element fertiliser was added to the mix but deficiency symptoms were unaffected in most cases.

About this time we were becoming involved with the growing of *Pinus radiata* and exchanged visits with N.Z. Forest Service Nursery Officers at the Sweetwater Nursery north of Kaitaia. This nursery is established on a large area which was previously a peat swamp. A Senior Officer asked if we had had any experience with zinc deficiency. The Sweetwater nursery initially had a major problem due to copper and zinc deficiencies. Areas where thick fibrous moss peat was encountered did not respond to copper alone but only when zinc was added.

We set up tests and found that the one containing zinc sulphate was outstanding among the others. A base fertiliser was made up consisting of:

Dolomite lime	**super-phosphate**	**Uramite**	**potassium nitrate**	**iron sulphate**	**zinc sulphate**	**Sporomix**
60kg	30kg	9kg	3kg	1kg	1kg	1kg

Five kgs of the above was added to each cubic meter, plus 2.5 kgs of Osmocote 18-26-10.

A wide variety of nursery stock has been successfully grown using the above fertiliser, but we did not find it suitable for "fertiliser tender" plants, particularly those in the *Proteaceae*. I believe that these plants must have a different fertiliser mix. We have obtained some interesting results since omitting the superphosphate from the above mix, and reducing the dolomite by half. We then used 1.5 kg of this special base fertiliser together with 1.5 kg of Osmocote 18-26-10 per cubic meter. When "Sporomix" was not immediately obtainable we continued without it, and have not noted any deficiency symptoms in the plants concerned.

Fritted Trace Elements (F. T. E. 36) have now taken our attention, but we feel that their adequacy as a total source of zinc may still be doubtful. The composition of F. T. E. 36 is:

Cu	Mn	Fe	Zn	B	Mo	K_2O
2.3	2.4	9.0	2.2	0.4	0.5	31.2

Zinc is an essential element for plant growth. Deficiencies were first observed in Florida in 1927 on crops growing in peat soils. Sandy soils are also recorded as usually having a very low zinc content. The application of lime is known to reduce the availability of zinc. It therefore follows that when we use a mixture of peat and sand to which we have added a liberal quantity of dolomite lime we are likely to create a deficiency of zinc.

Zinc deficiency is usually more obvious in summer and on the sunny side of the plant. Zinc is not easily translocated in established plant tissue. For this reason application of dry zinc sulphate may be ineffective or very slow. Zinc sulphate as a foliar spray is quickly effective. We used 50 gms in 10 litres of water in our experiments.

REFERENCES

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