SOME ASPECTS OF RHODODENDRON AND AZALEA CULTIVATION

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Of all hardy plant crops grown in this country, probably few would argue that the genus *Rhododendron* must be one of the most valuable. In fact, some may even contend that it is the most valuable. In view of it's economic importance to the nursery industry of this country, one must comment in presenting this paper that as yet very little research work has been done on this unique genus of plants. One can only hope that this situation will be rectified before long. One of the few, to my knowledge, to have done any research work into rhododendrons was the late Dr. Henry Tod. He looked at three aspects: 1) chlorosis, 2) forms of calcium nutrients and 3) forms of nitrogen nutrients.

Chlorosis in the foliage was usually considered to be due to a deficiency of iron in the soil, induced by alkaline conditions. Dr. Tod collected many specimens from around the country of chlorotic foliage together with a sample of the soil in which the plant was growing. A high percentage were obtained from acid conditions ruling out lime-induced chlorosis as far as he was concerned. Analysis showed that in many of the samples magnesium was found to be deficient, the majority of which were from acid soils. In some very acid soils calcium was also found to be deficient.

In solving this problem, by growing plants at nil, medium and high calcium rates, severe chlorotic effects appeared at both nil and at high calcium rates. Root formation was also poor; only at the medium calcium rates was growth normal. These rates were the equivalent of the levels in soils where plants failed and grew. He thought the most important deficiency to be magnesium, corrected in alkaline conditions by sequestrene, in acid conditions by magnesium sulphate (as epsom salts), and in extremely acid conditions (below pH 4) by light lime dressings.

Regarding the form of calcium, Dr. Tod found that when the soil pH was raised by adding magnesium carbonate instead of calcium carbonate, that growth was unaffected at neutral or alkaline conditions, when compared with acid conditions.

When comparing nitrogen forms, he found that when nitrate nitrogen was used seedlings failed to establish and died quickly, while larger plants showed a marked chlorosis. When ammonia nitrogen was used seedlings were established readily and the larger plants grew well and remained a good dark green colour.

We have used this advice in open ground cultivation for some years, top dressing with a balanced fertiliser with the nitrogen in ammonia form, in spring before growth begins and again in autumn before the onset of winter. Magnesium sulphate has been added at the same time.

These facts were even more important when we began to container-grow rhododendrons and azaleas. The nursery grew little else but rhododendrons and azaleas from it's beginning in the late 1820's until the American authorities introduced the embargo on plants, plus soil rootball, in 1920. Only then was a wider range of crops grown. It is feasible that the top soil went with the plants in the first fifty years, the better subsoil in the second half century leaving us now with the lower subsoil. Container growing seemed at that time the obvious solution to this problem

We had been growing some plants in containers solely for summer sales for some years. We were then using a 75% medium peat, 25% sand, plus fertiliser and lime. The first problem encountered with the first crop of pot-grown rhododendron cuttings was that after many weeks they had failed to produce any roots at the sides of the pot. It was suggested that the mix had become too compacted and that it might be of interest to depot some of them and repot in the coarse material that remained in a ¼" mesh sieve. Roots were evident within 10-12 days.

At about the same time we were somewhat perturbed at the cause of the yellowness of the rhododendrons then grown with a slow-release fertiliser. On analysis the compost was found to be deficient in nitrogen within three months. It was, therefore, decided to conduct our 1972 trials to decide, in our conditions, which slow-release fertiliser gave the best results, and also to compare peat/sand and peat-only composts. All the then-available slow-release fertilisers were used in 75% medium peat, 25% mixes, and one of these in the coarse peat mix.

A wide range of plants were potted in April, heights recorded, compost samples for analysis taken, and plants randomised on both sand and shingle bases for further comparison. In August, compost samples were taken together with foliage for further analysis. By this time it was quite evident that only the two composts based on Osmocote retained, particularly with evergreens, any good foliage colour. In most cases, particularly with plants with a long growing period, much improved growth rates were achieved. By this time compost analysis registered between 12ppm and 20ppm nitrogen, while the Osmocote composts still registered 60 ppm to 90 ppm. Growth rates were evaluated at the end of the year and these figures confirmed what was visible — that, in the majority of cases, Osmocote had given the best results. When the shingle and sand standing bases were compared, the coarse peat compost with Osmocote, without question in our situation, gave the best results.

It is, nevertheless, difficult in such circumstances to give the plants on each standing base similar conditions, especially with regard to water. The sand base naturally acts as a reservoir retaining a high water content, whereas with a shingle base the availability ceases the moment the tap is turned off. If you judge water requirements on the needs of the sand bed, you desiccate the shingle-based plants, and, conversely, if you water for the shingle beds, the sand-based plant will be vastly overwatered. Here a compromise was necessary in order to keep both composts moist. In nursery conditions this matter would be much simpler, water requirements would be based on one of these two methods.

We had already decided on shingle as the standing base as a precaution against the presence of soil-borne disease, since this material was preferable in separating surface water and pot base and also providing adequate drainage from the pot. During the winter period, a wet sand base can keep the compost far too wet, there being little natural drainage.

Previously that year, we had potted some 'Rose Iceberg' in both coarse peat and peat-sand composts. Both were placed together on a shingle base. By July there was such a marked difference between them that samples were analysed. The plants in coarse peat looked infinitely superior. It transpired on analysis that the plants growing in the peat/sand base showed severe phosphate and potash deficiences. Watering to maintain the moisture level for coarse peat had leached out nutrients from the peat/sand mix.

In summarising the compost evaluation, we decided on using coarse Irish peat, plus Osmocote 18:6:12, supplemented with extra phosphate, fritted trace elements No. 253A, and with dolomite lime. We then had five composts, two for first potting, one to use with Aldrin as a precaution against vine weevil, (for the plants that could tolerate this material); these were with low Osmocote rates. One more compost for plants with low nitrogen requirements, and the two remaining for final potting of ericaceous and non-ericaceous plants.

Two other effects were noted. One was with regard to bud count of rhododendrons. Those growing on sand produced 38 flower buds, this is from 50 plants, while on shingle 94 flower buds were formed. It is right to mention that azelea 'Brilliant Red' produced an equal amount of flower buds on both sand and shingle; practically every shoot had a flower bud. The other effect was noted 12 months after potting. When azalea 'Palestrina' and 'Hatsugiri' flowered, the size of the individual bloom between Osmocote-based compost and Brand X was very notable. Growth rates of azalea 'Hatsugiri' were much improved with Osmocote. I often wonder if we really know how well a plant could grow if it were provided with optimum fertiliser rates.

In 1973 we compared three rates of Osmocote: 3 oz, 5 oz, and 7 oz per bushel of coarse peat, again with a wide selection of plant material. In most cases, the top rate of fertiliser gave little or no improvement on the medium rate. On the sand base and high rate Osmocote a late flush of growth was produced on rhododendrons, which is unsightly and is also at the expense of flower buds. At the low rates, poorer growth resulted and much paler foliage was also a characteristic feature. The medium rate gave, in our conditions, optimum results. In the rhododendrons a good set of lower buds occurred on both sand and shingle-based plants. It would be wrong to recommend a complete acceptance of these rates as each nursery situation is different. Compost ingredients certainly vary, watering arrangements and systems suit each individual situation. The standing base also has a very notable contribution to the resultant growth.

I consider it important for all ingredients required for at least one year to be put into the container at potting time. This can be supplemented by overhead feeding if necessary. The one exception is — if one could provide trickle irrigation to each pot — that it could well be preferable to supply all the nutrients in liquid form.

What other facts have we noted? Evergreen azaleas can be grown using overhead irrigation and regular supplementary feed. Hard water inevitably raises the pH. This item we are checking at the moment, watching to see to just what extent pH rises with varying rates of dolomite lime with alkaline water, and when different rates of Osmocote are also used. The question of pH does seem to cause a deal of controversy. What are optimum pH rates and when is acidity of compost damaging? What of the future, in particular with regard to this crop? Cuttings are traditionally taken in the autumn; is this the best time? How can better "takes" of cuttings be achieved and what is the best rate of hormone application.

Stock plants — what is the optimum nutrition for these to produce the best rooting potential? In plant growth, what conditions are necessary to obtain the optimum growth; will polythene or glass be involved (Without a doubt a man-made substrate will be available).

More selectivity in cultivars is needed to give ease of propagation and production, compactness of habit, and ability to set flower buds regularly. More scented introductions are needed. All these questions look to varying times in the future when answers may be available.

DISCUSSION

Peter Howarth enquired as to whether cuttings were taken from stock plants or saleable crops, the reply indicated that stock plants were to be preferred but at present propagation was multisource, i.e. saleable crop, garden plants, etc.; provided the plants were actively and normally growing, source was not significant. The problem of leaf galls in relation to stock plants was also highlighted by the same questioner, two systems of control emerging, *viz:* picking off and the use of conventional systemics which also controlled rhododendron bug.

Mrs. Carter spotlighted the current problem of vine weevil control; Mike Clift indicated that he was using a Diazitol drench with DDT dusting of the houses to control the adults at regular intervals. Several speakers commented on the value of DDT, especially in relation to the alleged defoliation of camellias. Arthur Carter pointed out the change in breeding season of the pest and emphasised that most successful control was achieved by incorporating dust (chiefly BHC) in the compost at the mixing stage.

PRODUCTION OF RHODODENDRONS AT REUTHE'S NURSERIES

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At Reuthe's we propagate rhododendrons by seed, cuttings, layering and grafting. Grafting is possibly still the most important method and I would, therefore, like to concentrate on this aspect of our production. However, by way of an introduction I will briefly mention the other methods used.

Seed Seed is considered an essential method of propagation for some of the more difficult species and plants are self-pollinated under controlled conditions for this purpose.

Cuttings As many cultivars as possible are propagated by cuttings, especially *R. griersonianum* hybrids, *R. repens* hybrids, dwarf species, deciduous species, etc. Cuttings are rooted under conventional mist with soil-warming cables and in cold frames. Plants particularly difficult to propagate by this method seem to be *R. campylocarpum*, *R wardii*, *R. thomsonii* and their various hybrids.