RESEARCH AND DEVELOPMENT OF UNKNOWN NEW POT PLANTS

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Abstract

Plants without any previous genetic, physiological and cultural knowledge are mainly collected in botanical gardens. Before they can be evaluated as potential new pot plants, they have to be established. This may cause some problems and take some time because nothing is known about the plants. In the establishing period problems become apparent, which have to be solved before the plant can be introduced as a new pot plant. The problems are then systemized and priority is made, before trials are carried out. The research results and experience in growing the plants are the basis for developing a growing procedure, which together with the plant material is introduced to the growers.

Introduction

The intention of this paper is to describe in a systematical way the development and introduction of new pot plants. The description is based on 6 years experience working with numerous plants.

This paper deals exclusively with plants which to our knowledge have not been grown before and no information is accessible about the plants genetic, physiological reactions and growing technique.

In most cases the plant material comes from botanical gardens or other plant collections. It is a great advantage to have this vast amount of plants on a limited space to draw from. To get the maximum benefit out of the botanical gardens it is necessary to visit various gardens and visit them several times a year.

The collected plant material

The plant material in a botanical garden is often one genotype. This is due to that the plants often come from one collection. If the plant material vary from one botanical garden to the next we usually only require plant material from one botanical garden or keep the plant material separate as clones.

Aeschynanthus hildebrandii was introduced as a pot plant to the Danish growers by Karlsen and Klougart in 1976. Plant material came from only one source, the Royal Botanic Garden, Edinburgh.

When Paludan (1985) wanted to free the Danish plant material from virus, virus was detected in plant material from the Royal Veterinary and Agricultural University, Copenhagen, the Royal Botanic Gardens, Kew, London, England, and the Royal Botanic Garden, Edinburgh, Scotland.

The first introduction from our institute took place in 1981 with Chrysothemis pulchella 'Sunset'. The plant material was collected by the Danish grower Bent Halby Pedersen. The same species was earlier

introduced in the Netherlands of plant material collected by J. van Doesburg, Aalsmeer. The introduction only became a success in Denmark. The plant material from the two collections varied a great deal. The most spectacular difference is that the corolla is brighter red and the single flower longer in the Danish material than in the Dutch. The growth habit varied also a great deal.

In botanical gardens the plants do not grow under optimum conditions. With all the different plant species a garden have it is not possible to create conditions which are optimum for every single one. Besides they have only one or very few plants of each species in the collection.

When we first saw Porphyrocoma pohliana in Glasgow Botanic Gardens, Scotland, in 1981 we saw only few plants in a very poor condition. Later when we introduced the plant in 1982 the quality had improved a great deal.

In most cases when receiving plant material from botanical gardens you do not know anything about the plants genetic, physiological reaction and growing technique. In addition you get only few cuttings or plants in sub-optimum conditions.

In most cases we prefer to receive plants or cuttings, but if we receive seeds it is possible to have genetically variable plants.

Seed of Burchellia bubalina was sown in 1985. After growth in our greenhouses for 12 months the plants flowered. They showed great variability in growth habit, time of flowering and colour and amount of flowers produced.

After receiving the plant material you have to establish plants with normal growth, then to multiply the plants and produce a saleable product for the evaluation. At this time it is also important to check the keeping qualities. This also requires a certain number of plants. To come that far often takes one to two years.

We received Centradenia inaequilateralis in February 1983 and the experiment concerning keeping qualities was not carried out until December 1984.

Evaluation

The first evaluation of the plant takes place at the visit of the botanical garden. In your mind you have a general evaluation criterion, which could be expressed as: a beautiful plant with flowers of a bright colour, preferably red, which flower year round or preferably in the winter and spring months with good keeping qualities. The height may not exceed 25 cm and the width should be about 20 cm. The plant must be grown without too many difficulties in a 10-11 cm pot.

When you have a particular plant you make the evaluation criteria for that particular plant, which of course varies from the general one.

The greatest deviation from the general criteria is, when you evaluate a foliage plant. Such an example is Ficus pumila var. minima, which has been introduced in 1986. Even with its slow growth it has an interest among the Danish growers because it is very suitable as a mini pot plant. This is an example of a product, which can only be produced as a mini type and not in 10-11 cm pot because of the slow growth.

At the time of evaluation the key question is keeping qualities (post production performance). Many plants have been rejected on account of poor keeping qualities.

We have for example rejected Solanum aviculare, Jatropha panduri-folia, Jacobinia suberecta, species of Barleria, Goldfussia iso-phylla, Beloperone plumbaginifolia, and many more.

The rejection of the plants can be due to the fact that we have tested the wrong genotype.

Reinwardtia indica has been in our collection as a potential new pot plant for 2-3 years. We were just going to do some trials to control flowering, when we discovered that a Danish grower had the same species and was also working towards the introduction of Reinwardtia as a new pot plant. His plant material was collected in U.S.A. and ours in Botanical Garden, of the University of Copenhagen, Denmark.

The grower's plant material is superior to ours because of better colour of the flower and the foliage.

The plants, which we evaluate at this time, is not necessarily the final product. It is a product which shows the viewer that this plant looks so much like a saleable product that it has a great potential as a new pot plant with good keeping qualities.

We introduced Coprosma kirkii variegata in 1983 as a small foliage plant 10-15 cm in height. Later Coprosma has successfully been sold as tied to one or two archs.

Solving the problems

Problems which have to be solved appear in the period up to and during the evaluation .

The nature of the problems can be either morphological (colour of the flower, growth habit, leaf size) or physiological (day length to flower initiation, rooting, keeping qualities etc.).

Solving the problems genetically requires collection of a great variability of genotypes and may result in breeding.

At one time we worked towards introduction of Euphorbia leucoce-phala as a pot plant, but in the plant material we had the roots were very sensitive and the rooting ability low. To solve this problem we produced some seedlings. Testing the material we found that there was a correlation between strong roots and green bracts, and weak roots and white bracts. However, at the same time we judged that Euphorbia leucocephala only had a small potential as a new pot plant and we terminated our work. Later our colleague N. Bredmose, has worked with the same plant as a potential new cut flower and has now plant material with strong roots and beautiful white bracts.

Some problems can be solved by traditional environmental means (temperature for growth and development, day length to flower initiation and development, etc.).

Centradenia inaequilateralis 'Cascade' was introduced on the market at the beginning of 1986. Before coming so far two major problems had to be solved. At the beginning rooting caused us some difficulties but after experiments we found that the optimum temperature during propagation is 23-26°C (Friis, 1986).

Flowering takes place without any treatment in early spring, but it was essential to broaden the flowering period. Experiments showed that optimum for flower initiation is 4 weeks at 15°C (Friis, 1986).

Cultural technique and management can solve the third kind of problems, f.ex. type and number of cuttings, use of growth retardants, soft or hard pinching, number of plants per square meter to obtain good quality plants, etc.

Some problems have priority over others. For example if you have a rooting per cent of only 50 it is important to solve this problem before proceeding to the next one. The use of growth retardance may also have first priority, if the plant is too tall and flowering is no problem.

Before Lavandula can be made into a pot plant, it is important that the flower stalk can be shortened. Our preliminary results show that spraying the plants with Alar can solve the problem.

Modern pot plant production requires uniform plants. Therefore, the plant material, which is introduced, has to be genetically uniform, and the recommended treatments should result in uniform plants.

Our work has included Pachystachys coccinea, but until now it has not been possible to control either the height or the flowering uniformly. Flowering takes place over a 3 months period and the height varies too much. Plants propagated in week 39 varied from 24 to 69 cm in height with an average of 36 cm, while plants propagated 3 or 6 weeks later were from 5 to 17 cm high with an average of 11 cm. All plants were treated with 0.5% CCC-extra.

The final questions then arise, is it possible to produce the new plant year round and how long is the production time from propagation to sale and how much bench area do the plants occupy in the various stages. All this information is neccessary in production planning.

The saleable product

Now the saleable product has to be described. What should the new pot plant look like: height, width, number of flowers and buds, pot size, number of plants per pot, etc., etc.?

When all research has been performed it is possible to create a growing procedure and it is time to introduce the new pot plant to the growers.

Introduction

The growers, who are going to cultivate the new plant, do not have any experience with that particular plant. Therefore, it is very important that the research results and experiences are transmitted to the growers, so no mistakes occur. You have to bear in mind that problems, you have not seen, will not be dealt with in your research. Transmission of research results in a traditional crop is built on top of cultural practice, but in this case the grower does not have any experience.

Upon introduction we supply 800-1,000 plants, together with a detailed growing procedure to each of 5-10 growers. This creates a situation where the growers are able to produce saleable plants within 6 months. This has in fact been the intention, but has also created problems.

Plant material and growing procedure for Centradenia inaequilateralis 'Cascade' was handled over to the growers in July 1985 and the first plant was on the market January 1986.

Marketing

At the time of marketing it is important that the growers make a combined effort together with the sales organizations. The minimum requirement is that the first plants on the market have a high quality, that the right amount of plants are sold at the right speed, at the right time of year.

When Porphyrocoma pohliana 'Karneval' was introduced too many growers introduced too many plants at the same time of a too poor quality. The plant also had to be sold before opening of the single flowers, otherwise it would look untidy after few days in the shops. On the other hand an unknown pot plant has to be in full flower when sold. The result was that this plant was on the market only for a few months.

Changes in the working procedure

Introduction of the new pot plants has been the most difficult phase in our previous work, and has led to some changes. In the future introduction to the growers will therefore take place at an earlier stage in creating the new pot plant. After a positive evaluation and key research, we now introduce the plants to the growers on a trial basis. This means that the growers have longer time to learn to grow the plant, but also that they have to participate in the problem solving. Our idea is that the growers are going to solve the main part of the cultural technique, together with the year round production and production planning, while the institute does the physiological research.

At the moment we have Otacanthus coeruleus and Salvia involucrata on trial.

Of course the two parties have to work close together but the results should be that we make less mistakes and we may introduce more pot plants with the same effort.

References

Friis, K., 1986. Rodning af Centradenia inaequilateralis 'Cascade'. Effekt af temperatur i rodningsmediet samt fungicidbehandling af moderplanter. Tidsskrift for Plantsavl (in press).

Friis, K., 1986. Effect of temperature and daylength on flowering of Centradenia inaequilateralis 'Cascade'. XXII International Horticultural Congress.

Karlsen, P. and Klougart, A., 1976. Aeschynanthus 'Ildebrand' en ny potteplante. Gartner Tidende 92: 224-226.

Paludan, N., 1985. Inactivation of tobacco mosaic virus in Aeschynanthus hildebrandii by means of heat treatment, chemotherapy and meristem-tip culture. *Danish Journal of Plant and Soil Science* 89: 273-278.