IMPROVEMENT OF OUR CULTIVATED TREES AND SHRUBS BY SELECTION

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Abstract. Research on trees and shrubs for use as ornamentals and for landscaping has been carried out since 1965 at the Research Center for Horticulture, Institute of Landscape Plants, Hornum, Denmark. On the base of the research it can be concluded that there are often cultivated, genetically very different clones under the same cultivar or species name Research has proved that through a systematic scheme of collecting plant material, followed by a trial and clone test, it is possible to select the best clones, and in that way improve the general standard of the cultivated plant material.

INTRODUCTION

The variation within the cultivated plants under a cultivar or a species name, includes all kinds of characteristics, such as hardiness, health of plants, flower abundance, and so on. The variation studies and trials have shown that hardiness and disease resistance are important characteristics that make good plant quality for the producer and the user of plants in the landscape. Also flower abundance, leaf density, habit, speed of growth and other characteristics can be used as a good base for selection.

To obtain results, which can be of value for both the producer and for the user of plants, it is necessary to test clones in comparative research, then select the best clones, and introduce those to the plant producer.

The selected clone at the Hornum Research Center is marked as DG (defined genetical) material. In some cases the selected clones can not be identified as an described cultivar. In such cases the selected clone is then given a new cultivar name, or an addition to the old name.

A selection research work has shown that identification of cultivars is often difficult, and that the safest method is to identify the material with its clone source. Nuclear stock plants of all the selected clones are kept permanently at the Research Institute. Research and clone selection is made in groups such as *Ligustrum, Ribes alpinum, Buxus, Aster,* and *Rhododendron*.

The selected clone is tested in our Research Center for serious diseases. If not free it may be treated to get a disease-free, nuclear stock called DP (defined patogene).

REVIEW OF LITERATURE

The first results from the test at the Danish Research Center for Ornamental Outdoor Plants were published in 1971 about *Ligustrum* (1). In 1975 results were published by Brander (4) about *Pyracantha* clone selection. Bjerkestrand (2) raised the same questions about *Philadelphus coronarius*. In 1970 Brander (3) described the method used in the clone selection research for ornamental outdoor plants at The Institute of Landscape Plants. In 1980 Humphrey (5) described similar results from the United Kingdom.

In 1982 Brander (6) published a detailed description in English about the methods used in the study of variation within clones and the reason to do this work.

MATERIALS AND METHODS

At the Research Center of Horticulture, Hornum, the materials used for the clone selection work are mainly supplied or collected in different Danish nurseries, from nurseries in other countries, and in collections from plants in private and botanic collections.

The collected plants are propagated from 1 single plant for comparative clonal research. Clones are tested for different growing characteristics—a genetic test. A clone which has the desired characteristics or is the best is selected to establish a nuclear stock plant. The nuclear stock plant is normally tested for serious diseases, such as viruses and different fungi, that are transferrable. If the tests shows the presence of disease it may be treated to get a disease-free plant, a DP plant, meaning defined patogene, which tells that we know something about the disease of the nuclear stock plant.

RESULTS AND DISCUSSION

Clone selection at the Institute of Landscape Plants. Research has shown that many of our cultivated trees and shrubs exist as many different clones with great difference in their characters. Examples from recent work at the Institute of Landscape Plants are shown in Tables 1, 2 and 3.

Table 1. *Aster dumosus* 'Herbstgruss von Bresserhof' results from test of clones

Clone	General fungi	Leaf impression	Flower abundance	General impression
7629	5 6[z]	5 0	7 4	6 0
7381	4 0	5 0	6 6	4 6
7333	4 8	3 8	5 8	4 4
7792	8 2	8 6	8 0	8 0

[z] Explanation of figures 10 = free of diseases, 1 = hard attack, For all other characteristics 10 means optimum (the desired stage) and 1, the lowest

Table 2. *Aster vimineus* 'Lovely' results from test of clones

Clone	General fungi	Flower abundance	Leaf appearance	Height of plants (cm)	Width of plants (cm)
7385	7.8[z]	7 0	8.0	65	70
7654	8 6	4 3	8 0	80	75
7342	8 0	7 8	8 5	80	85
7790	7 4	7 0	6 0	80	110

[z] See Table 1 for explanation

Table 3. *Ribes alpinum* results from test of clones (from Reference 7)

Clone/cultivar	Light 72-73-74	Shadow 72-73-74	Leafing 72-73-74	Leaf-fall 72-73-74	Winter hardiness 72-73-74	Number of days with leaves
'Dima'	8 5	9 6	5/4	31/10	9.5	209
'Hemus'	7 6	9 6	5/4	8/11	9 8	217
klon 6	2 6	9 6	13/4	17/9	7 8	157
klon 7	5 3	9 6	5/4	11/10	9 3	189
''Gul tysk''	5 3	9 6	5/4	18/10	9 8	196
''Gul tysk''	5 4	9.6	5/4	16/10	9 3	194
'Rudolf Smidt'	7 8	9 6	5/4	7/11	9 7	216
'Smidt's Type'	5 2	9.6	5/4	17/10	9 4	195
klon 18	3.2	9 6	5/4	21/9	8 7	169

Clone selection in nurseries. Not all plant groups have large variation problems but many do. Private nurseries could in many cases improve the plant material by selecting clones from their own mother plants. The selection should be made in the following way. Select clones which seem to comply with the desired characters. Select, for example, 5 clones, 4 good ones and 1 bad; rooting capability should be compared as part of the selection process. Then select the best clone for the base of new mother plants for production.

In such a project by private nurseries selection work has started in Denmark with *Rhododendron* 'Cunningham's White' and

different *Taxus* cultivars; in the U.S.A. *Pachysandra terminalis* and *Ajuga* reptans are being studied.

CONCLUSION

There seems no doubt that if we want to have good plant material for propagation we need to permanently keep the cultivars free of diseases and uniform, and the propagation maintained under high photosanitary conditions.

LITERATURE CITED

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BILL BARNES: If you take cuttings from a named cultivar and plant 10,000 of them in the field, and only one survives after a severe winter, is that a new plant and can we give it a name?

POUL BRANDER: Naming is a difficult question. Sometimes the variation is so large that you have to give it a new name. We sometimes give the plant a trademark to let people know that we have conducted the evaluation that I discussed. In some of the cultivars the variation is so huge that we have to do something about it, possibly give new cultivar names.