Rhododendron 'Blue Jay' (Fig. 1)

High pH Tolerant Rootstocks for Rhododendrons and Azaleas

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Horticulturists in areas with high pH soils or water have long been frustrated by their inability to grow many beautiful shrubs and trees that are native to acid or low-nutrient soils and intolerant of high pH conditions. Such plants include the proteas, grevilleas, camellias, Ericas, and, perhaps most notably, the rhododendrons (Fig. 1) and azaleas. We have been examining the possibility of introducing these plants to a wider range of garden conditions by grafting sensitive cultivars, using as rootstocks species that thrive under adverse conditions. Other researchers have attempted to breed or select for rhododendron and azalea cultivars that are tolerant of high Ca concentrations (Mordhorst *et al*, 1993; Preil and Ebbinghaus, 1994). Although they were successful, the selected lines proved intolerant of the high pH conditions that usually accompany high Ca content of soils and/or irrigation water (Chaanin and Preil, 1994).

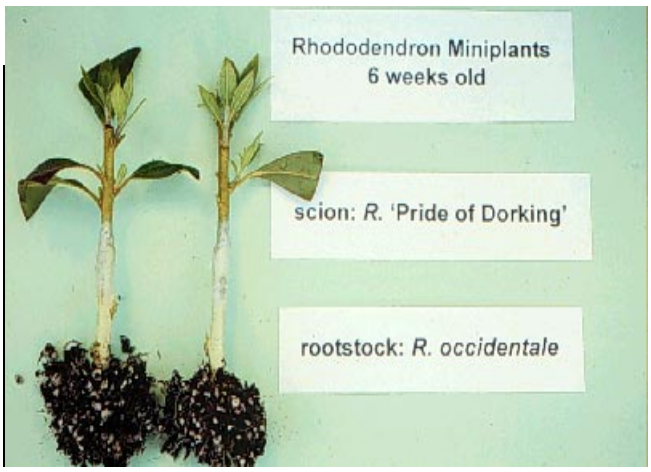
Our approach to developing high pH-tolerant rhododendrons and azaleas involves using an ecotype of the western azalea (*Rhododendron. occidentale*), collected by Professor A. Leiser from a serpentine soil location, as the rootstock for grafting sensitive cultivars. A specimen from Dr. Leiser's original collection has performed very well in a Davis garden under conditions where commercial azaleas have done poorly (Fig.2). In our preliminary studies, we were primarily concerned with developing strategies for propagating these materials, and had moderate success in producing grafted plants using a 'mini-plant' or 'stenting' procedure (Eichelser, 1967). Scion material was wedge grafted to rootstock cuttings. The cuttings were treated with Hormodin #3, and the grafted mini-plant was then rooted in the mist bench (Fig. 3).

In the past two years, we have produced a substantial number of grafted plants. We found that time of year had a striking effect on propagation success – rooting of the scion, and successful union of the graft were both much more apt to be successful in the winter and early spring than at other times of the year. In addition, we found that there was a very strong rootstock/scion interaction; we obtained numerous grafted plants of some cultivars and none of others (Table I). Even with the best cultivars, however, less than one quarter of the grafted mini-plants were successfully propagated.

Current Work

A number of grafted plants were planted in the landscape during 1997. The two locations are high in pH and we are currently monitoring the performance of the plants, and comparing it with own-rooted control plants. One location is the 'Ericaceae' section of the UC Davis Arboretum where grafted plants of the rhododendron cultivars 'Dora Amateis', 'Radium' and 'Blue Jay' are growing alongside plants of *R. occidentale*. The second location is a raised and shaded ground bed in the Environmental Horticulture field area. The soil pH at this location ranges from 7.5 to 7.9 and the irrigation water has a pH of 7.8. Here both grafted plants and cutting-derived plants of several cultivars are being evaluated. After the first summer we noted differences between cultivars and most plants bloomed in the spring of 1998, but it will take some time to evaluate the relative success of the grafted and control plants. We will continue to monitor the plants in order to determine the effects of rootstock on the performance of different cultivars. In the coming year we propose to continue to produce grafted rhododendrons and azaleas for planting in the landscape, and to extend the plantings to other locations, including the

***Rhododendron occidentale* thriving in a Davis garden alongside a chlorotic commercial azalea cultivar (Fig. 2)**



Rooted rhododendron mini-plants or stentings. (Fig. 3)

San Jose Research and Extension Center.

In order to improve propagation success, experiments were conducted to evaluate the effects of various media on rooting of *R. occidentale* cuttings. The previous medium of choice for mini-plant propagation was a 1:1 mixture of UC Mix (equal parts sand, peat and redwood compost) and perlite. Of the several media tested, a 1:1 mixture of coconut fiber (coir) and perlite allowed for substantially better rooting (Table 2). The physical properties of the various media will be analyzed to perhaps explain the difference in rooting performance. The coir and perlite rooting medium will be used for grafted mini-plants to increase rooting success.

We have begun to examine the usefulness of additional *Rhododendron* species as rootstocks for the production of mini-plants. These include two species native to China that we have obtained from Quarryhill Botanical Garden (Glen Ellen, CA) and are currently propagating. *R. yunnanensis* and *R. davidsonianum* are found on gravelly loam soils of high pH in the Sichuan region of China. These species may prove more compatible with commercial cultivars for grafting.

Project Value to the Nursery Industry

The primary outcome of the successful completion of our multi-year project will be a set of strategies for the nursery industry to provide gardeners with an increased range of showy plant materials that can be grown under a wide range of environmental conditions. This will not only benefit home gardeners and professional landscape horticulturists, but also will increase the range of plant materials that can be produced and sold by the State's important nursery industry.

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Rhododendron Cultivar	Grafting Success %
Anah Kruschke	11.4
Blue Jay	8.2
Cannon's Double	0
Dora Amateis	23.8
Happy Days	5.0
L.J. Bobbink	7.4
Madonna	0
Matthew's Memory	0
Pride of Dorking	17.0
Radium	2.9

Grafting success of *Rhododendron* scion cultivars with *R. occidentale* rootstock (Table 1)

Rooting Medium	Rooting % at Six Weeks
UC Mix and Perlite (1:1)	43
Perlite and Vermiculite (1:1)	29
Coconut fiber (coir)	29
Coconut fiber and Perlite (1:1)	64
Sphagnum Pea	t21
Sphagnum Peat and Perlite (1:1)	14
Ca saturated Sphagnum Peat	14
Ca saturated Sphagnum Peat/Perlite (1:1)	21

Rooting success of *Rhododendron occidentale* cuttings in several types of propagation media. (n=14) (Table 2)

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