

**OBJECTIVES AND PARENT STOCK SELECTION IN
RHODODENDRON BREEDING**

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The breeding of rhododendrons is in many ways akin to H. L. Mencken's description of marriage; "it is", he said, "like reaching into a bag of snakes and hoping to come up with an eel". The breeding of rhododendrons for garden decoration began just 150 years ago when Michael Waterer at the famous Knap Hill Nursery in England crossed the N.C. Catawba Rhododendron with the Rosebay Rhododendron. Some years later there was introduced the scarlet flowered tree, *R. arboreum* which came from India. It created a sensation when it flowered in England for the first time and a hybridizing explosion began which has never ceased. Before long, the opulent *R. griffithianum*, another Asian species with 6 inch white flowers arrived on the scene; this too is a tree-like species and is very tender. To produce hybrids which were hardy enough for general cultivation in England the English breeders crossed the tender exotic rhododendrons with the American natives, with *R. ponticum*, a species from Asia Minor which grows about 15 ft tall and with *R. caucasicum*, a 3 ft shrub which grows at higher altitudes in the Caucasus Mountains. With this latter exception all of these species which figured in the rhododendrons of commerce were of large stature. The result of using these tall rhododendrons as parents was inevitable and if you go down to your local nursery and buy rhododendrons and set them out beside your house, before long the rhododendrons will strangle the building. What we need are semidwarf hybrids which will stay in scale with the modern house. What then can be done about this problem?

George Forrest began his plant exploration in Southeast Asia in 1904. When he died 30 years later in the course of his seventh expedition to China, he had found the incredible number of 260 species of *Rhododendron*. Among them was one from Tibet found at 13,000 ft, the scarlet-flowered, *R. forrestii*, which matures at about 8 inches. It is not hardy in the Northeast nor are its direct descendants able to endure our climate. However, Dietrich Hobbie in Germany crossed it with an old semihardy red hybrid called 'Prometheus' and obtained an intermediate which he called 'Gertrud Schale' but which was still far from hardy in our climate. In 1956 he kindly sent me pollen of this plant; I used it on one of my early red hybrids called 'Fanfare' which has an open, ungainly habit of growth. The result of this mating produced the clear scarlet 'Small Wonder', an intermediate hybrid which matures at about 4 ft and is hardy to about 20° F below zero. In

addition to being semi-dwarf it is compact and densely foliated. It is now being propagated for release in 1974.

Another species which contributes dwarfness is *R. williamsianum* discovered by Ernest Wilson in China in 1908. I made many crosses with this species and all were failures; the seedlings languished in the heat and aridity of our eastern summers and those that survived often took 10 or 12 years to bloom. Finally a European breeder crossed the Williams Rhododendron with an old Dutch hybrid called 'Adriaan Koster'. I crossed one of this progeny with the white form of our North Carolina Catawba Rhododendron and from this combination obtained 'Robin Leach' a semidwarf white which matures at about 4 ft and inherits its dwarf stature and dense foliage from its grandparent *R. williamsianum*. This hybrid is tolerant of summer heat, a characteristic frequently obtained from *R. catawbiense*.

R. yakusimanum has been known by rhododendron breeders only since 1947 when it was first shown at the great Chelsea flower show in London. It was found on an island south of Japan some years earlier but its ornamental value was not appreciated. Upon exhibition at the Chelsea Show this species became the sensation of the English horticultural world and a big demand arose for it both here and in Europe. The flowers are very beautiful pink and white and the species has almost a perfect habit of growth. My largest specimens are 2½ ft high by 5 ft wide, thick in foliage density because the leaves persist for 4 years. This is close to being the ideal garden rhododendron, hardy enough for most of the Northeast, but it has one fatal fault. It grows so slowly it is not a practical commercial rhododendron. I crossed a selection, which I call 'Pink Parasol', with the white form of the Catawba Rhododendron and obtained a hybrid which I named 'Spring Frolic'. It has a satisfactory rate of growth, and at the same time retains the compactness of its pollen parent, *R. yakusimanum*. This plant will be introduced in 1973. It matures at about 5 ft and has extraordinary foliage, with deep pink buds opening to pink flowers which age white.

Rhododendron chrysanthum has been known by botanists since 1776, but not by horticulturists because it is so hard to grow, coming from Siberia and Hokkaido. A 30 year old plant may only be 6 or 8 inches tall and it seemed a natural to impart dwarfness. I tried for years to obtain a form which could be cultivated in this country. After many importations of both seeds and plants a variant was finally found in the southern limit of its distribution which could be grown to flowering maturity. I crossed this variant with one of Tony Shamarello's hybrids called 'Belle Heller', which is a very vigorous grower, and obtained a large flowered dwarf white with very dense foliage which matures at a

height of about 30 inches. The problem here was different. In rhododendron breeding it's usually a problem of capturing the desirable qualities of the tender Asian species by crossing them with the hardy American natives; in this case *R. chrysanthum* was hardy enough but it lacked adaptability. By crossing it with a very complex hybrid of exceptional vigor, a hybrid was obtained which combined dwarfness, foliage density, large flowers and the ability to thrive in our hot, dry summers.

Another goal of the rhododendron breeder is the production of hardy hybrids with the exotic flower colors which have been obtained by hybridizers in the mild climates of southern England and the West coast. 'Crest' is one of the more famous of the tender yellow rhododendrons but combining yellow flower color with hardiness proved to be a very difficult goal. Lionel de Rothschild who produced 'Crest' at his famous Exbury estate in Southampton also crossed *R. wardii* from Yunnan province in China with the semihardy *R. fortunei* from the lower elevations of eastern China. This mating produced a pale yellow which he called 'Prelude' and it is not at all satisfactory for the eastern United States but inasmuch as it had the semihardy *R. fortunei* in its parentage, it was crossed with *R. catawbiense* var. *album* which produced a pale yellow with a full, firm truss and exceptionally large flowers which was called 'Limelight'. It's completely hardy anywhere, is unlike any hybrid now in commerce but was not as yellow as I hoped nor quite as vigorous as I would have liked.

There were indications at this time that red rhododendrons carry a recessive gene for yellow. So the red form of the Catawba Rhododendron was crossed with the *R. wardii* which was used to produce 'Prelude'. This crossing yielded the yellowest, fully hardy hybrid that I have yet seen. I think the result of this cross is important for anyone who wants to breed yellow rhododendrons that can survive in the Northeast. If you are technically minded, the hypothesis is that rhododendron flower color is controlled by five genes plus a diluting gene, with two genes epistatic.

It probably would have been impossible to produce hardy rhododendrons with pastel flower colors of any degree of purity or clear scarlets had not a white form of the native *R. catawbiense* been found in Virginia a few years ago. Until 1937 the only successful parent to impart hardiness was the typical *R. catawbiense* which blankets the elevations of the Blue Ridge Mountains. It appears to possess a gene for magenta in the dominant homozygous condition. With this situation, breeders for a hundred years produced pinks and reds which were badly flawed with blue. 'Roseum Elegans', the most widely grown of the hardy hybrids, is an example, as are 'Parsons Grandiflorum', 'Mrs. C. S. Sargent' and 'Henrietta Sargent'.

It might be interesting to trace the parentage of some of the newer hybrids. (Editor's note: At this point Mr. Leach showed slides and traced the derivation of several hybrids which he has developed using the white form of *R. catawbiense* var. *album*. Some of these are in the trade and others are slated for release in the future. 'Duet', 'Peach Parfait' and 'Virginia Leach' were among those discussed.)

Breeders should have all sorts of diverse goals to meet the demands of the commercial grower and the gardening public. There is

a need for rhododendrons of compact habit which are precocious about blooming and are particularly adapted for growing in containers 'Flamenco' is one which meets these criteria; plants 6 inches tall may have flower buds on every terminal. It can be grown in a small container at minimal cost and after use for indoor decoration can be planted out of doors by the consumer and will make a hardy dooryard plant which will mature at about 3 feet.

Another need is for rhododendrons which will respond to the sophisticated growing techniques which are becoming more popular. With the aid of artificial light, early season heat, and the precise prescription of nutrients, it is now feasible to produce 18 to 24 inch heavily budded rhododendrons by the end of their second growing season. 'Lodestar' and 'Pink Flourish' are two which are responsive to this type of treatment.

Another goal in which I personally believe, but for which I have no support from professional nurserymen, is the extension of the flowering season into late spring and early summer. We Americans have become a nation of suburban patio dwellers and it would seem to me that the public would welcome shrubs which would flower and decorate their garden and terraces when they can enjoy them most. 'Summer Snow' produces flowers 4 inches across about the first of July. It has immense leaves and makes up into a tree of exotic appearance, but it has been greeted by such a display of under-enthusiasm that I no longer expect it to blossom from a wallflower to the belle-of-the-ball.

Most of the crosses which I have been discussing are relatively simple, whereas the best results are always obtained in a second or more advanced generation. Hoping to improve both the plant habit and the color purity of the reds now in commerce, I crossed 'Mars' with the red form of the Catawba Rhododendron and the result was 'Blaze'. I felt that 'Blaze' was not equal to the potential of 'Mars' as a parent and so I backcrossed 'Blaze' onto 'Mars' and obtained a vivid scarlet. To my surprise the inconspicuous blotch in the center of 'Mars' was transformed into a white center which I can only describe as "undeserved". To further illustrate the returns to be found in advanced generations, the tender English hybrid, 'Mrs. Furnival' which is heavily blotched in the flower, was crossed with *R. catawbiense* var. *album* and the result was a delicate pink flowered plant which flowered after withstanding 35° F below zero weather in 1963 and is now being propagated for introduction. Though this plant is very beautiful to me, I had still failed to obtain the striking contrasting blotch which I sought and so I backcrossed this hybrid onto 'Mrs. Furnival' and obtained a boldly blotched hybrid pale pink which blooms heavily at an early age.

In closing, I would like to point out that I have described only my successes. If I were to discuss my failures with you, you would still be sitting here next week sound asleep.

MODERATOR FLEMER: Thank you very much for a very professional and informed talk on a rather complicated subject. We will have time for a couple of questions.

CASE HOOGENDOORN: All of the yellow rhododendrons you showed were rather pale. The best yellow I have seen is 'Goldsworth Yellow'. What do you see wrong with it?

DAVE LEACH: For one thing, it is difficult to root and for another, some people would disagree with you that it is yellow. I agree that the slides I showed of the yellows do appear pale, but mostly the insufficiencies of the color film are responsible for that. Breeding yellow rhododendrons is extremely difficult; in fact, it is far more difficult than any other thing I have tried to do.

CARMINE RAGANESE: Would you say that 'Full Moon' is the most desirable yellow?

DAVE LEACH: No, I would not. Disregarding hardiness there is one on the West Coast called 'Hotei' and I think it is the yellowest rhododendron in the world today. It's a new hybrid and is pollen sterile so I am using it as a seed parent by growing it in a container and protecting it in the winter time. It is a butter yellow and nearly unbelievable; it was a great triumph for the hybridizer to have produced a yellow with that pigment intensity.

MODERATOR FLEMER: Thank you once again, Dave. While we are on the subject of breeding ericaceous plants we are fortunate in having with us a man known as "Mr. Kalmia" in the Eastern United States today and that is Dick Jaynes from the Connecticut Agricultural Experiment Station. He has been doing some wonderful things in breeding mountain laurel to expand its color range, rootability, and other potentials which have never received much scientific attention until Dick Jaynes began doing this work. He is a skilled hybridist and is going to address us this afternoon on "Selection and Propagation of Improved *Kalmia latifolia* Cultivars."

SELECTION AND PROPAGATION OF IMPROVED KALMIA LATIFOLIA CULTIVARS

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Abstract Mountain laurel occurs in many forms and superior selections are available for propagation. Red-budded and white-flowered laurels come true from seed if both the seed and pollen parents are of similar kind. Seed sown in a greenhouse in November will produce plants of sufficient size by the following June to transplant into outdoor beds. Although of limited commercial value, grafting on forced stock in early spring or on unforced stock in June is suc-