

The Quest for the Yellow Evergreen Azalea

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Editor's Note: This is the first in a series of articles based on Don Hyatt's presentation at the 2009 ASA Convention.

One unrealized goal in hybridizing is the quest for a yellow evergreen azalea. There are a number of evergreen azaleas with flowers of light cream to greenish yellow. Some are arguably as deep as the dwarf yellow *Rhododendron keiskei* but nothing has approached the yellows found in the deciduous azaleas.

Some yellowish evergreen azaleas include the Kurume 'Mizu-no-yamabuki', the Glenn Dale 'Puck', and Robin Hill azaleas 'Olga Niblett' and 'Bob White'. All of those except 'Puck' have hose-in-hose flowers so they are female sterile and do not set seed. Sadly, one often runs into sterility in hybridizing. I once paid dearly at an auction for a small plant of a light yellow evergreen azalea raised from seed of *R. kaempferi* f. album by Dr. Sandra McDonald. I wanted to use it in hybridizing but discovered that it is sterile in both directions. It is difficult to root, too.

The evergreen azalea with probably the strongest yellow color to date is 'Melba's Dream.' It is a most unusual plant. Reported to be a cross of an evergreen azalea called 'Lois' with a yellow Exbury azalea, it has small flowers of an unmistakable yellow hue. It is not an easy plant to grow, though. I am not aware of it being used in other crosses, so its use as a parent may be questionable. Perhaps it is sterile, too.

A very interesting side note about 'Melba's Dream' is that it seems to be immune to petal blight! Those small petals are unique in that they have obvious hairs on the margins, reminding one of a calyx or a leaf rather than a typical petal. Since petal blight does not attack the foliage of azaleas, perhaps these strange petals have some property akin to leaf tissue that makes them immune to the disease. Another azalea that seems to be immune to petal blight is the Satsuki variety, 'Chojuhu.' It has small, long lasting flowers of a coral red color and its petals have hairs on the edge, too. I am not aware of any other azaleas or rhododendrons immune to pet-



Photo Don Hyatt

▲ 'Mizu-no-yamabuki'



Photo Don Hyatt

▲ Yellow deciduous azalea *R. calendulaceum*

▼ The yellow evergreen azalea 'Melba's Dream' seems to be immune to petal blight.



Photo Don Hyatt

▼ Kehr hybrid ('Gyoten' x Pryor Yellow)



Photo Don Hyatt

al blight, but this might be an interesting feature to explore.

Dr. August Kehr ("Augie") was convinced it was possible to produce an evergreen azalea with strong yellow color. [1][5] Although he pursued that goal for many years, he passed away before achieving it. He has, however, left us a rich legacy. Not only do we have the remnants of his hybridizing program but also the knowledge he gained in his research that he willingly shared.

Among Augie Kehr's notable introductions was 'Cream Ruffles', which is a rather nice cream-colored hybrid in its own right. 'Kehr's Moonbeam', that came from the cross (578-8A x 'Green Glow'), was his last, and probably best, greenish yellow. Interestingly, the pollen parent in that cross, 'Green Glow', is a double greenish white introduced by Roslyn Nursery from seed I sent to the ARS Seed Exchange. The cross was (('Eri' x 'Glacier') x 'Anna Kehr').

Augie noted that the only yellowish pigments found in evergreen azaleas are pale ivory-colored compounds called flavonols. Hybrids that merely concentrate those pigments can never produce a flower deep enough to be called yellow. He felt it necessary to introduce the much stronger yellow pigments found in other flowers like marigolds, daffodils, dandelions, and many deciduous azaleas. Those yellow pigments are called carotenoids. [9] Evergreen azaleas do not have them so they must be introduced from some another source, likely the deciduous azaleas.

Robert L. Pryor at the U.S. Agricultural Research Service in Beltsville, Maryland, experimented with wide crosses between deciduous and evergreen azaleas for nearly 10 years. [7] He used diploid Mollis hybrids for one parent and various Kurume and *kaempferi* cultivars for the other. Pryor ended up with many albino seedlings that eventually died, but he raised hundreds of hybrids with varying degrees of persistent foliage, although none were strong yellow. An important point he did observe is that persistent foliage seemed linked to the maternal parent.

Work by Ureshino and others at Kyushu University had similar results. In the cross ((*R. kiusianum* x *R. eriocarpum*) x *R. japonicum* var. *flavum*), the resultant seedlings were albinos, presumably due to genetic incompatibilities. [10] Because seedlings get only half of their genes from each parent, in wide crosses such as these, perhaps some of the essential genes needed for growth were missing in the seedlings.

Augie Kehr decided that it was necessary to use a tetraploid evergreen azalea as one parent, preferably a hybrid that did not have any tendency for purple color. He converted several evergreen azaleas to tetraploids using colchicines so he could better pursue his hybridizing goal. [3] 'Cream Ruffles Tetra' is one such example. He then crossed those with a tetraploid yellow deciduous azalea. The resulting plants would be allotetraploids and would have a full complement of genes from each parent and thus should be more vigorous. He recommended avoiding orange deciduous azaleas since they could introduce anthocyanin pigments that might interfere with flower color expression. [6]

Augie chose *R. calendulaceum* as the deciduous parent since it was known to be tetraploid. Dr. Tom Ranney has

found other tetraploid yellow deciduous azaleas including the fragrant plants like *R. austrinum*, *R. luteum*, and 'Admiral Semmes'. [2] Fragrant yellows would be very nice!

Augie made several crosses with one of Pryor's seedlings, (75-305). He called it Pryor Yellow. It is not likely that the plant is still in existence, since Augie lamented that it was a sickly plant that seemed to defy propagation attempts. Pryor Yellow had light yellow flowers, and it was apparently fertile. Augie's plant eventually died, but some seedlings from his hybridizing program still exist. I have observed eight clones that have strong cream to light yellow color. Although many did not have tags, I found two, ('Banka' x "Pryor Yellow") and ('Gunka' x Pryor Yellow), that were excellent and they may be useful parents, especially if they are fertile tetraploids.

Santamour and Dumuth experimented with backcrossing evergreen and deciduous azalea hybrids for multiple generations. [9] They did find evidence of carotenes in several of the "yellow" seedlings, but they noted that the heaviest concentrations were in the blotch regions. This made me think that azaleas with expanded blotch areas might be extremely useful in this project. With a larger blotch region, it might be easier to concentrate the stronger yellow pigments. Carotenoids are not dissolved in the sap, but must be carried in plastid bodies found in the blotch areas.

I am now looking for azaleas that have large blotches since they might be useful in this breeding project. Naturally, white-flowered varieties would be preferable but one plant that caught my eye is Marshy Point's 'Pam Corkran.' It has a blotch that can extend to at least 75% of the corolla. Unfortunately, this plant is probably not useful in its present form, but it could be valuable in the future. The first problem is that it is not white, so it carries an anthocyanin pigment that will complicate the yellow color expression in its seedlings. At least it is not purple! Second, the fact that the flowers have a colored border implies that the azalea is a diploid. Azaleas with bordered flowers have been shown to be diploid plants except for the colored flower edge, which is actually tetraploid tissue. To use the plant in breeding, it will be necessary to convert the whole plant to tetraploid in order to cross successfully with a deciduous azalea.

It is clear that the quest for a yellow evergreen azalea is not going to be easy, but it is an admirable goal. Now that I am beginning to understand Augie Kehr's approach, I see a possible path to success, but it will take several stages. First, it will be helpful to convert other evergreen azaleas to tetraploid forms, selecting for creamy whites with no evidence of purple pigment. It would also be great if they have large, heavy blotch regions and superb foliage. The next stage will be to cross yellow deciduous azaleas onto those plants to produce an F1 generation. It is not likely that those will have the persistent foliage and deep yellow flower color we desire, so it will then be necessary to cross those with siblings and other promising parents to produce additional generations. Hopefully, we can concentrate that yellow color while

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from the Royal Horticultural Society of London, England, for one of her tropical day bloomers 'Helen Nash'. Today, she is semi-retired and lives at Cedar Mountain, NC.

Other works from Connelly include a series of hybrid water iris called 'Fallen Heroes'. Each iris in this series is named for a police officer killed in the line of duty. Photos of her *Nymphaea* 'Blue Anemone', *N.* 'Joseph Baynard Shearouse', and *N.* 'Stormy Weather' are available online at www.internationalwaterlilycollection.com.

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selecting for vigor and superior evergreen foliage.

I call on all azalea hybridizers in the ASA to join in the hunt for the yellow evergreen azalea. It will take time, experimentation, collaboration, and plenty of luck, but I am certain we can do it! Of course, when we eventually get that race of perfect yellow evergreen azaleas, rock-hardy plants with glossy dark green foliage and strongly fragrant, large ruffled flowers in shades of light lemon to deep gold that also resist petal blight, then we can start working on our next goal, a blue azalea. Hey... we can dream, can't we?

Don Hyatt has been an avid hybridizer of azaleas and rhododendrons for more than 30 years, with a particular interest in deciduous azaleas.

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