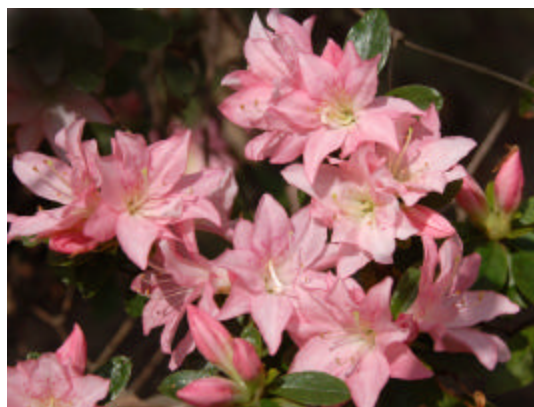


What's New in Evergreen Azaleas by Donald W. Hyatt

Abstract: Popular trends in evergreen azalea hybridizing are examined including improved winter hardiness, better foliage, dwarf plant habit, unusual flower forms and colors, and extended blooming seasons. Current approaches in breeding for the elusive yellow evergreen azalea are presented. Flower color inheritance and polyploidy issues are discussed in relation to underlying factors that can create obstacles when breeding for specific goals.

Introduction

The evergreen azaleas, members of the *Rhododendron* subgenus *Tsutsusi*, section *Tsutsusi*, are native to regions of western Asia including Japan, China, Korea, Burma, and Thailand. They are often referred to as Japanese azaleas, but this may not be an accurate characterization. The geographic center for this section is probably in China, and only 14 of approximately 60 species are Japanese. [4][14] However, evergreen azalea hybridizing and selection has been going on in Japan for centuries. The popular hybrid 'Azumakagami' ('Pink Pearl') is estimated to be at least 300 years old. [10]



'Pink Pearl' - 'Azumakagami'

The late Dr. August E. Kehr lamented that evergreen azaleas were not well known in most horticultural circles. He said evergreen azaleas were not appreciated, nor have they been well classified, and this has led to confusion about these wonderful plants. Furthermore, their potential has not been explored. Kehr estimated that 90% of the available evergreen azaleas came from just four species: *R. simsii*, *R. indicum*, *R. kiusianum*, and *R. kaempferi*. [14]

History

Confusion about evergreen azaleas probably started with the early Belgian Indian hybrids, also known as Belgian Indicas. Describing these florist azaleas as "Indicas" is really inappropriate since they are not hybrids of the Japanese species, *R. indicum*, but descendents of the tender Chinese species, *R. simsii*. Some early Belgian Indian azaleas imported to the southeastern United States led to the Southern Indian hybrids. Although generally hardier than their ancestors, neither group is suitable for colder climates.

Originally, many early evergreen azaleas were incorrectly identified as species including plants like 'Mucronatum' and 'Indicum Roseum.' Azaleas like 'Amoenum' were classified as forms of *R. obtusum*, but that species designation is not valid. Those azaleas are primarily hybrids of two other Japanese species, *R. kiusianum* and *R. kaempferi*. [10][14] In the Kirishima Mountains on Kyushu, Japan, the natural ranges for *kiusianum* and *kaempferi* are in close proximity, and researchers have documented hybridization and introgression between these two species. [15][16]

Early Kurume collections imported from Japan included the famed "Wilson 50" sent to the Arnold Arboretum by E. H. Wilson in 1917, and cultivars introduced by the Domoto Brothers after the Panama Pacific Exhibition in 1915. Many were the same plants. In 1929, R. Kent

Beattie at the U.S. Department of Agriculture imported another 127 Japanese azaleas including 60 Kurumes. Only 11 Beattie Kurumes were duplicates of the Wilson or Domoto azaleas. [10][17]



Beattie's 'Cherryblossom' - 'Ogi-kasane'

The Beattie Kurumes have generally been overlooked, and there has been some confusion about names, too. For instance, Wilson #11 ('Takasago') was the same plant marketed by the Domoto Brothers as 'Cherryblossom.' However, a Beattie introduction (PI #77086) was also called 'Cherryblossom' but it was the Japanese variety 'Ogi-kasane.' It is similar to Wilson #11, but the flowers are pale lavender pink rather than yellowish pink. 'Ogi-kasane' is one of this author's favorite evergreen azaleas, but rarely seen in the trade.

Developing Hardier Hybrids

The small flowered Kurumes were hardy and popular landscape plants. However, people wanted evergreen azaleas with larger blossoms like the Southern Indians that would succeed in colder climates.

In 1929, Benjamin Yoe Morrison began his monumental azalea hybridizing program while at the U.S. Plant Exploration and Introduction Station in Glenn Dale, Maryland. Morrison raised an amazing 75,000 evergreen azalea seedlings, and eventually selected 454 Glenn Dale hybrids. [17] As the first Director of the United States National Arboretum in Washington, D.C., Morrison began planting his best seedlings there on a 30-acre hillside called Mount Hamilton. Starting in 1947, he set out an estimated 15,000 plants representing approximately 1,200 selections including the named Glenn Dales. [3] Unnamed seedlings may be better than some named Glenn Dales and although unlikely will they ever be introduced, the germplasm is of great value to hybridizers.



Unnamed Cream Glenn Dale on Mt. Hamilton

The popular clone 'Ben Morrison' is often considered a Glenn Dale azalea. However, it was not named by Morrison, but by another Director of the Arboretum, Dr. John L. Creech. There has been much speculation about the origin of 'Ben Morrison.' [20] Some feel it is a sister of 'Surprise,' or perhaps an unnamed seedling. Others believe is a sport of a Glenn Dale, possibly 'Luna.' However, there is confusion about which plant is actually 'Luna.'

In 1926, Pennsylvania nurseryman Joe Gable also started hybridizing evergreen azaleas. He crossed hardy species like *R. kaempferi* and *R. poukhanense* (*R. yedoense* var. *poukhanense*) with available cultivars and created many hardy hybrids. Incidentally, the change from *poukhanense* to *yedoense* for the species name of this hardy Korean azalea seems unfortunate and confusing. *R. yedoense* var. *yedoense* is a double-flowered oddity unknown in the wild.

The late-blooming Satsuki azaleas were derived primarily from *R. indicum* [10]. B.Y. Morrison brought the first major collections of Satsuki azaleas to the U.S. from Japan, including 53 hybrids in 1938 and 1939. Additional Satsukis were introduced in subsequent years, including 387 clones released in 1978 and 1979 by Brookside Gardens in Maryland.

John Creech shared Morrison's admiration for evergreen azaleas, and from 1955 to 1980 made at least 5 collecting trips to Japan. In 1983, the U.S. National Arboretum released 33 of Creech's new Kurumes, but these are only now gaining popularity. The Creech introductions are exquisite. 'Fukihiko' and 'Tokoharu' have striped flowers, and 'Itten' is white with lavender border. There has also been some confusion about these plants. 'Wakaebisu' has delicate single white flowers brushed with red, but there was already a familiar hose-in-hose salmon Satsuki with the same name.



Creech's New Kurume: 'Wakaebisu'

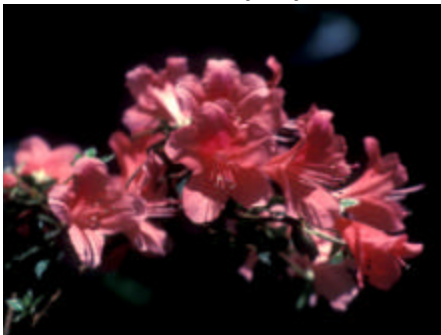
Although considerable hybridizing in the United States has been conducted at government facilities and commercial nurseries, significant contributions have been made by amateur hobbyists. Robert Gartrell, a chemist by profession, started hybridizing evergreen azaleas in the early 1940's and continued for nearly 30 years. One of his goals was to produce hardier Satsuki-type azaleas that could survive in northern New Jersey. He made nearly 1,500 crosses and raised approximately 25,000 azaleas, finally registering 69 Robin Hill hybrids. [26]

Scientific Considerations - Flower Color Inheritance

Before discussing current trends in hybridizing, it is important to consider some science behind flower color inheritance and sterility. Attaining a hybridizer's goal is not always easy, but by understanding the genetics involved, one can make informed decisions.

For instance, nearly 30 years ago this author crossed the orange-red species, *R. nakaharae*, with a white *R. kiusianum*. Expecting compact hybrids in shades of coral, pink, or white, he was shocked that every seedling was purple! Obviously, azalea flower color inheritance was more complicated than imagined. The dominance of purple color in azalea hybridizing is well documented. Joe Gable took 17 years to reach his goal, 'Rose Greely,' a hardy white azalea. [17]

Results of an Early Hyatt Cross:



R. nakaharae



R. kiusianum album



(*nakaharae* x *kiusianum album*)

The research by J. Heursel and W. Horn on evergreen azalea flower color inheritance is very helpful in understanding those results. [11] These researchers analyzed seedlings from thousands of crosses, establishing the existence of six gene pairs controlling flower color.

They identified the gene **W** (or **w**) that produces anthocyanin, but the pigment can take several forms depending upon the action of other genes. Plants homozygous (**WW**) or hereozygous (**Ww**) for the dominant trait produced anthocyanin. The recessive gene **w** is for no anthocyanin, so a plant homozygous (**ww**) will have white flowers.

The gene **O** (or **o**) controls oxidation of the anthocyanin molecule, and **P** (or **p**) controls methylation. Depending upon the actions of those genes, different anthocyanin pigments with different colors are possible:

Genotype	Anthocyanin Pigment	Color
WwOoPP or WwOoPp	malvidin	purple
WwOopp or WwOoPp	delphinidin	blue
WwOoPP or WwOoPp	peonidin	carmine
WwOopp or WwOoPp	cyanidin	geranium lake

The researchers identified two genes involved in the production of water soluble flavenols. These pigments can give an ivory or greenish yellow cast to certain flowers. Gene **Q** (or **q**) controls flavenol production, but there was a secondary gene **M** (or **m**) that controls methylation of the flavenol. The researchers also observed that flavenols seemed to intensify the purple color of anthocyanin pigments.

Flavenols are different from the water insoluble carotenoids, pigments responsible for the deep yellow colors in deciduous azaleas. Carotenoids are contained in specialized protoplasmic bodies (plastids), and not dissolved in the sap. [23]

The sixth gene pair, **G** (or **g**), controls the glycosidation of anthocyanin but it does not influence flower color.

These details helped explain why the cross (*R. nakaharae* x white *R. kiusianum*) produced nothing but purple flowered azaleas in the F1 generation. White *R. kiusianum* probably had the genotype **wwOOPP**. Homozygous for the recessive trait (**ww**), it is essentially a purple azalea that cannot produce pigment.

The orange-red *R. nakaharae* probably had the genotype **WwOopp**. Without the presence of either the dominant **O** or **P** genes, the color was not purple but light orange-red, cyanidin. When crossed with the white *kiusianum*, the seedlings now had the likely genotype **WwOoPp**. This causes production of the purple pigment, malvadin.

John Weagle of Nova Scotia made that same cross, but then wisely crossed his best siblings for an F2 generation. That reshuffled the genes, so he got a broad range of colors on dwarf plants. [27]

Flavenols could be responsible for some other unexpected hybridizing results. Joe Klimavicz crossed the tender bicolor ‘Leopold-Astrid’ with the hardy reddish purple, ‘Girard’s

Fuchsia.’ Instead of the hardy bicolor he sought, Joe got many buff-colored seedlings including ‘Sandy Dandy.’ The brilliant purple of ‘Girard’s Fuchsia’ could be caused by flavenols intensifying the anthocyanin. When the purple pigment was not expressed in certain seedlings such as ‘Sandy Dandy’, perhaps the yellowish flavenols became more noticeable to give the unusual coloration.



‘Sandy Dandy’ Photo by Klimavicz

Flower Sterility

Certain structural problems in evergreen azalea flowers can cause sterility, which is often frustrating when trying to breed for specific goals. Some azaleas are sterile because flowers lack essential reproductive parts, such as anthers or pistils. Doubles like ‘Balsaminiflorum’ and *R. yedoense* var. *yedoense* have neither pollen nor pistil, and are of little use in hybridizing.

Some double flowers have occasional stamens tucked among the petals, or stray anthers with viable pollen attached to petals. Many doubles will not accept pollen, but others have normal pistils and will set seed.

Flowers that are hose-in-hose, or having the appearance of a corolla nested within another corolla, are usually female sterile. Occasionally, a hose-in-hose plant will produce a chance seedpod. One such pod from ‘H. H. Hume’ produced ‘Ring’s True.’

Ploidy Concerns

Most evergreen azaleas are naturally diploid ($2n = 26$), although there are some naturally occurring tetraploid evergreen azaleas like ‘Banka’ and ‘Taihei’. Other azaleas have been artificially converted to polyploids using various scientific methods. [9][12][13]

Tetraploids are promising in certain breeding efforts, but can also cause difficulties. For instance, a tetraploid crossed with a diploid produces triploids which are sterile. The tender azalea ‘Redwings’ is triploid, which explains why it has not been crossed with hardier forms. [12]

Tetraploid azaleas are usually solid colors which could cause problems when breeding for bicolors. Bicolor flowers like ‘Leopold-Astrid’ have two tissue types: the white center is diploid but the contrasting red edge is tetraploid. [8]



‘Leopold-Astrid’ (Red edge is 4n)

Hybridizing Goals –Hardiness

A major hybridizing goal has been to improve hardiness of evergreen azaleas, but achieving that goal is not always straightforward. The two hardiest species known to date are *R. yedoense* var. *poukhanense* and *R. kiusianum*. Both can withstand significant cold but they have sparse winter foliage and their dominant purple color can be a hybridizing problem. Perhaps the

hadiest hybrid to date is Orlando Pride's 'Pale Lilac' (*kaempferi* x *poukhanense*) which has bloomed reliably after winter temperatures of -37° C (-31° F) in Orono, Ontario. [27]

One popular parent is the semi-double lavender, 'Elsie Lee' ('Desiree' x 'Gable's Rosebud') by Shammarello. It is hardy with good foliage, and the flowers are fertile in both directions. Obviously heterozygous for anthocyanin pigment, other colors can appear in primary crosses. Schroeder's blush pink, 'Eliza Hyatt,' is ('Elsie Lee' x 'Robin Hill Frosty'). The cross ('Elsie Lee' x *R. kiusianum*) produced a very hardy pale pink, 'Al's Picotee.'

Foliage Retention and Leaf Color

Since the flowering season lasts but a short time, people are interested in the year-round landscape effect of garden plants. There are many different leaf types in evergreen azaleas, and this offers many options for developing unusual foliage forms.



Foliage of Hachmann's 'Marushka'

Azaleas with persistent, glossy evergreen winter foliage like 'Glacier' and 'Dreamsicle' are preferred to plants with sparse winter foliage like 'Corsage.' 'Johanna' has burgundy winter foliage, and one of its descendents, Hachmann's 'Marushka,' now holds the standard for foliage quality. In addition, some azaleas can provide a brilliant autumn display if the leaves that are shed prior to winter turn bright red or gold.

There are azaleas with variegated leaves like 'Red Lustre' and 'Girard's Silver Sword,' but that characteristic may not be passed to their hybrids. *R. stenopetalum* var. *linearifolium* with its long, narrow leaves does offer potential as a parent for new leaf forms.

Another interesting but very tender azalea is 'Little John', a sport of 'Formosum'. 'Little John' has striking reddish purple foliage throughout the year, but has not passed that characteristic to any progeny so far. Perhaps it is a chimera.

Dwarf and Compact Plant Habits

Some evergreen azaleas like 'Dream' and 'Corsage' become huge, so they are unsuitable for small gardens. Plants of modest stature that do not require constant pruning are preferred by most homeowners. The surprisingly hardy Back Acres hybrid, 'Bouffant' ('Dream' x 'Gunrei'), is a compact plant with large flowers of soft pink. George Ring's 'Fairfax' is another excellent compact hybrid with huge flowers of pale pink and white.

Dwarf azaleas are useful in hybridizing, but commercial nurseries rarely grow many due to the time required to produce a marketable plant. Ring's dwarf *R. kiusianum* was only 20cm tall (8in) after 25 years. Other slow growing azaleas include the Beltsville Dwarfs, 'Leprechaun' and 'White Elf', and many Satsukis including 'Kazan' ('Rukizon').

"Witches brooms", or extreme dwarf sports of larger growing azaleas, can result from different causes including fungal infection and mutation. 'Stiletto' is a witches broom of 'Silver

Sword,' and 'Young Dorothy' a diminutive of 'Dorothy Layman.' Unless the dwarf character is a genetic mutation, such plants may not be useful to hybridizers.

R. nakaharae and *R. kiusianum* are popular parents for reducing the stature of modern hybrids. Glendoick's 'Panda' is a primary *kiusianum* hybrid. 'Squirrel' is a primary hybrid of *R. nakaharae*. Crosses using these are producing some excellent compact hybrids. [6]

Double Flower Forms

There are many flower forms in evergreen azaleas, but doubles are extremely popular. 'Anna Kehr', 'Secret Wish', and 'Sandra's Green Ice' are all known for very high petal counts. 'Caitlin Marie' is a deep pink double from ('Elsie Lee' x 'Satellite').

Hybridizers are seeking a hardy azalea that looks like 'Leopold-Astrid' or 'Cabaret,' but those are far too tender. Bob Stewart's 'Ashley Ruth' has semi-double white flowers shading to a rose pink at the edge. Harry Weiskittel's 'Marshy Point Fancy Pants' has blush-white flowers bordered in purplish-red, and it has glossy dark green leaves.



'Secret Wish'

Petaloid and Spider forms

An azalea flower form becoming popular in the United States is the strap-petal, or "spider" type, where the corolla is separated into distinct petals. The popular lavender spider, 'Koromo-shikibu,' has been used frequently in hybridizing.



Hyatt introduction: 'Wagner's White Spider'

A hybrid of 'Koromo-shikibu' developed by Dave Wagner was introduced by this author as 'Wagner's White Spider.' It has airy, delicate blossoms of pure white. 'Tina's Whorled' is a slightly deeper, reddish purple version of 'Koromo-shikibu'. 'Walter's Pinwheel' (*R. nakaharae* 'Mt. Seven Star' x 'Koromo-shikibu') has strap-like petals in pinkish lavender on a compact, mounding habit. Other spider types include the reddish-orange 'Polypetalum,' and several Satsukis including 'Shiryu-no-homare,' a purple with unusual curled foliage.

An interesting note about 'Koromo-shikibu' is that the plant collected in Japan and introduced as 'Koromo Shikibu' by R. Kent Beatty in 1928 (PI #77142) was described as a Kurume with "white corolla tipped with purple." [10][17] That is certainly not what we grow today under that name. The familiar 'Koromo-shikibu' is considered a selection of *R. stenopetalum* (*macrosepalum*).

Strap-petal hybrids can arise when neither parent shows that tendency. The author's cross (*R. nakaharae* x 'Anna Kehr') produced the desired compact double pink, 'Ginny Grina.' It also produced a plant with red petaloid flowers, 'Cardinal's Crest.'



Hyatt hybrid: 'Cardinal's Crest'

Striped and Bordered Flowers

Some evergreen azaleas have flowers with stripes or sectors of contrasting color that can add significant horticultural interest. This tendency is common among many Glenn Dale hybrids, especially those having 'Vittatum' as a parent. The trait is common among many Satsukis.

The Glenn Dale 'Cinderella' ('Vittatum' x Louise') has white flowers striped with red. 'Satrap' is a different sport from the same plant, but has light red flowers with an irregular white border. Neither form is stable. One can revert to the other, or throw a solid color red as well.

Azaleas flowers where the corolla has a contrasting border color are very popular. These can arise from crosses using parents with that tendency. The Satsuki 'Shinnyo-no-tsuki' was used frequently to produce some bordered Glenn Dales like 'Martha Hitchcock' and 'Luna.' Bordered flowers can arise as sports from other forms, especially among azaleas with stripes or colored sectors. Bordered flowers are common among Satsukis, such as 'Kingetsu' and 'Meicho.'

Flower Color

Some nurserymen are still looking for the perfect red azalea, one with compact habit, large flowers, superb foliage, and rock hardiness. 'Ward's Ruby' and 'Redwings' are too tender for colder gardens. 'Stewartstonian' and 'Girard's Hot Shot' have too much orange in the red. 'Hino-crimson' and 'Hershey's Red' are the most popular reds in the U.S., but 'Vuyk's Scarlet' and 'Johanna' are gaining in popularity. Some very deep reds being used in breeding today include 'Midnight Flare' and 'Karafune'.

In the landscape, some people prefer more delicate shades rather than intense colors. Both 'Nancy of Robinhill' and 'Betty Anne Voss' are excellent pale pinks. Dr. Sandra McDonald has released several blush pinks including 'Pink Cherub', 'Blushing Angel', and 'Venus's Baby.'

The Quest for the Yellow Evergreen Azalea

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 pale greenish yellow. Some are arguably as deep as *R. keiskei*, although nothing has approached the yellows found in deciduous azaleas. Some yellowish evergreen azaleas include the Kurume 'Mizu-no-yamabuki' and Robin Hills, 'Olga Niblett' and 'Bob White.'



'Mizu-no-yamabuki'



'Melba's Dream'

The evergreen azalea with probably the strongest yellow color to date is 'Melba's Dream'. Supposedly a cross of 'Lois' with a yellow Exbury azalea, it has small flowers of an unmistakable yellow hue. The long-lasting blossoms are strange in that the petals have hairs on the edges, similar to sepals. It is not an easy grower, though, and its use as a parent is questionable.

Dr. August Kehr ("Augie") was convinced it was possible to produce an evergreen azalea with strong yellow color. [1][19] Although he pursued that goal for many years, he passed away before achieving his goal. He has, however, left us a rich legacy. Kehr's 'Cream Ruffles' was an early cream, but 'Kehr's Moonbeam' (578-8A x 'Green Glow') was his last, and probably best, greenish yellow. Waldman's 'Green Glow' (('Eri' x 'Glacier') x 'Anna Kehr') is a double greenish white. It came from seed this author sent to the ARS Exchange.

Kehr acknowledged that since evergreen azaleas contain only flavonols, hybrids that merely concentrate those pigments will never be deep enough to be called yellow. He felt it necessary to introduce the stronger yellow carotenoid pigments from another source, such as wide crosses between yellow deciduous azaleas and evergreen azaleas.

Dr. Robert L. Pryor at the U.S. Agricultural Research Service in Beltsville, Maryland, experimented with such deciduous and evergreen azalea crosses for nearly 10 years. [22] 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. He did observe that persistent foliage seemed linked to the maternal parent.



"Pryor Yellow" Photo by Miller

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. [25] In another experiment, Kobayashi and others observed that crosses of evergreen azaleas onto *japonicum* did not develop properly because pollen tubes encountered structural problems and never reached the ovaries. Crosses in the other direction, however, appeared to be successful. [16]

Augie Kehr maintained 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, and cross that with a tetraploid yellow deciduous azalea. The resulting plants would be allotetraploids. With a full complement of genes from each parent, plants should be more vigorous. He recommended avoiding orange deciduous azaleas since that could introduce anthocyanin pigments. [19]

Kehr used yellow *R. calendulaceum* for the deciduous parent since it was tetraploid. We now know there are many other tetraploid yellow deciduous azaleas including *R. austrinum* and *R. luteum*. [12] Kehr converted several evergreen azaleas to tetraploids so he could pursue his hybridizing goal. 'Cream Ruffles-Tetra' is one example.

Kehr made several crosses with one of Pryor's seedlings, (75-305). He called it "Pryor Yellow." Although a sickly plant that defied propagation attempts, Pryor Yellow had light yellow flowers and was fertile. The plant eventually died, but some of Kehr's seedlings still exist. Eight have strong cream to light yellow color. Although many have lost tags, ('Banka' x Pryor Yellow) and ('Gunka' x Pryor Yellow) are excellent and may be useful parents.

Santamour and Dumuth backcrossed evergreen and deciduous azalea hybrids for multiple generations. [19] There was evidence of carotenes in several of the "yellowest" seedlings, with heaviest concentrations in the blotch region. This could imply that breeders should seek azaleas with expanded blotch areas in their quest for yellow. Marshy Point's 'Pam Corckran' has a blotch that extends to at least 75% of the corolla. It may prove useful in developing azaleas with expanded blotch areas, ones that could help concentrate those carotenoid pigments for yellow color.



'Pam Corckran' – Expanded Blotch Area

Kehr "Yellow" Hybrids



('Banka x "Pryor Yellow"')



('Gunka x "Pryor Yellow"')

Extending the Season of Bloom

Perhaps one of the most prominent successes for any amateur hybridizer is the story of Robert E. ("Buddy") Lee, the Louisiana hybridizer who developed the Encore® azaleas. William R. Brown at the Louisiana Agricultural Experiment Station had experimented with everblooming azaleas using *R. oldhamii* and other fall blooming azaleas. [2] Pursuing that same line, Buddy Lee has now succeeded in creating a race of everblooming azaleas for southern gardens.

Buddy used *R. oldhamii* 'Fourth of July,' which tends to throw off-season flowers, and crossed that with other azaleas to produce his Encore® hybrids. They are reliable rebloomers in climates where summers are warm and the growing season is long, and very popular throughout the southern United States. Unfortunately, they do not generally re-bloom in northern gardens with

shorter growing seasons. Encore® Autumn Rouge ('Conlea'), a deep rose pink with double flowers, is one of the better performers in the suburbs of Washington, D.C.

There are other azaleas that rebloom in northern gardens, like 'Opal' and *R. kaempferi* 'Indian Summer.' Northern hybridizers might try these as parents for repeat bloom.

There is another very interesting plant derived from 'Mucronatum' by the late Dr. Marion B. Matlack of Virginia but introduced after his death by Norman and Jean Beaudry of Bethesda, Maryland. This azalea blooms on the new wood, as soon as the flower buds are formed and is among the best summer and fall bloomers in the Washington, D.C., region. Its large white blossoms start opening in August and continue until terminated by a freeze, hence the name, 'August to Frost.' The plant is hardy, but unopened buds are usually killed during the winter so there is no spring bloom. 'August to Frost' has thrown several sports including a purple selection and a white with red blotch similar to 'Sekidera'.



'August to Frost' – Plant



'August to Frost' – Sport

Solving Problems

One serious problem that needs to be addressed is petal blight (*Ovulinia*). Finding a way to stop this destructive disease is important, not just for evergreen azaleas but for all members of the genus. Early blooming and late blooming varieties may miss the worst of the petal blight season, but losing any flowers to petal blight is of serious concern.

Sprays are successful to an extent but there are a few plants that seem immune to the disease. One plant is the previously mentioned yellow evergreen azalea, 'Melba's Dream.' Its small petals are unique with the obvious hairs on the margins, reminding one of a calyx or a leaf. Since petal blight does not attack foliage or sepals of azaleas, perhaps these strange petals have some property akin to leaf tissue that makes them immune. Another plant immune to petal blight is 'Cojuho.' It similarly has hairs on the edge of its narrow petals.

Conclusion

Although evergreen azaleas are probably the most commercially successful members of the genus *Rhododendron*, they still have much unrealized potential. It should be possible to develop new varieties with greater hardiness, better plant habits, distinctive foliage, and flowers with new forms and different colors. It is also important to find ways to preserve existing species and cultivars so they are more readily available to researchers, hybridizers, and gardeners. The author feels that the United States National Arboretum is probably the best repository of such genetic diversity in evergreen azaleas anywhere in the world and he hopes that it will remain so.

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