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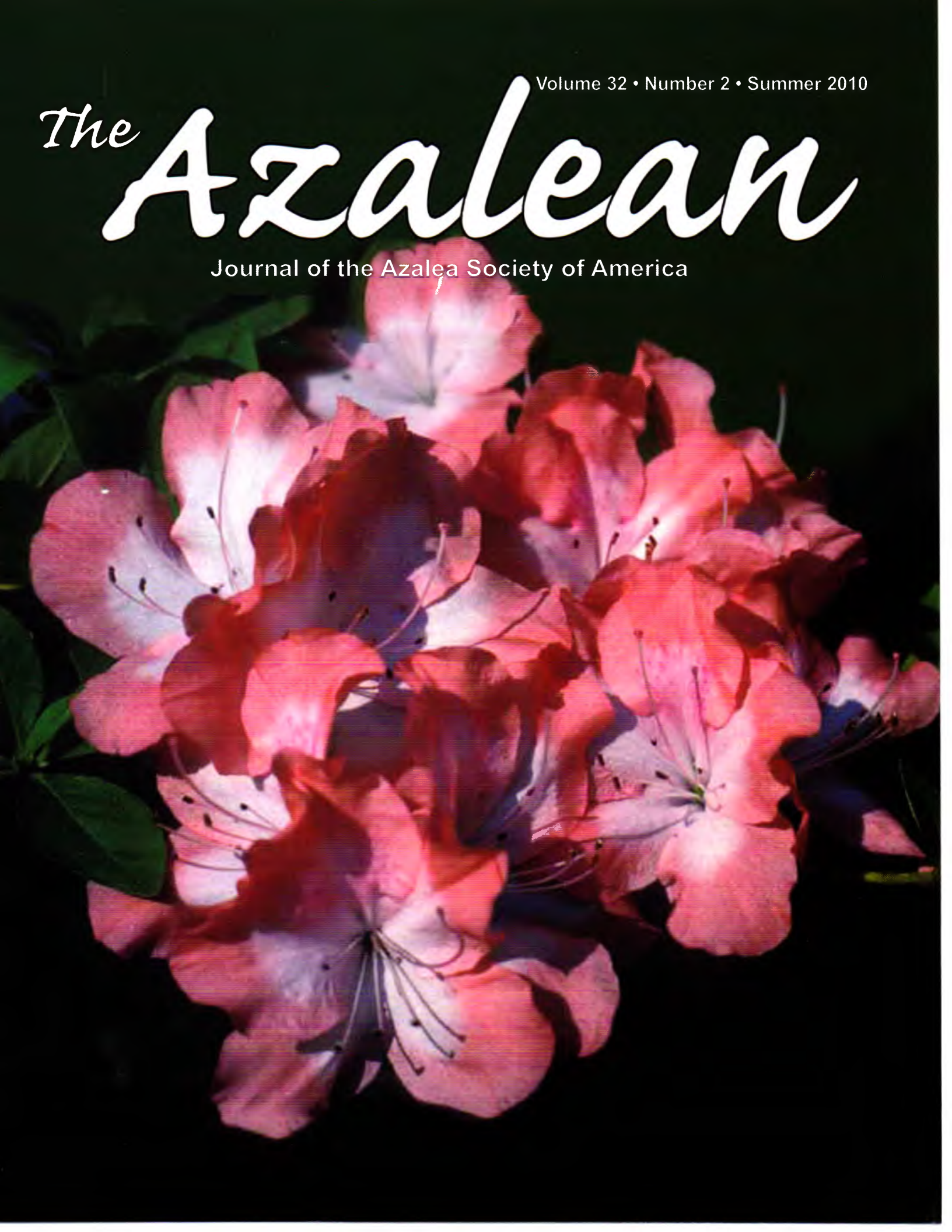
The Azalean

Journal of the Azalea Society of America



President's Letter

Aaron Cook — Valdese, North Carolina

I can't help but feel a little sad that the 2010 convention in New Orleans, Louisiana, is behind us. Once again, the bar has been set even higher by the host chapter of an ASA National Convention. The Louisiana Chapter did a fantastic job on this convention. The weather was great. The food was incredible, and the gardens were beautiful.

As always it was great to spend time with my azalea family and catch up with what is going on in everyone's life. As usual the convention came to an end much too soon for me, and I was forced to go back to my real world job.

Thanks again to the Louisiana Chapter members for another year's worth of great memories. I am already looking forward to 2011 in Evansville, Indiana.

As much as I would like it to be otherwise, one of the reasons for having a convention is to conduct Azalea Society business. As such, every convention begins and ends with a Board of Directors meeting. I would like to publicly thank the officers and board members for their service to the Society. They are listed here on this page, and if you get the chance, please thank them for volunteering their time and effort. We have a great group of individuals working hard on everyone's behalf.

The primary focus of the Board is to ensure that the Society remains active and financially stable. Toward that end, I am happy to report that the Board is moving forward with several new proposals. A new (and as the past membership committee chair, I think I can say improved) Membership Committee has been established. **Eve Harrison** from the Northern Virginia Chapter is the chairperson. The committee had its first meeting at the convention and is already hard at work on ideas to recruit and retain more ASA members.

Other business involved looking at the by-laws to determine if a change would be required to establish business and student membership categories. In order to establish a business membership category that would include a one-time complimentary ad in ***The Azalean,*** we needed to look at the ad sizes, ad costs, and layout. I am happy to report that **Pam Fitch** and **Bob Stelloh** have completed most of this work and these changes should go into effect in either the Fall 2010 issue or soon after.

It is an exciting time to be a part of the Azalea Society. On every level, from local chapters on up, enthusiasm and activity is at our highest point in years. Chapters are reorganizing and becoming more active, and there is talk of starting at least two more chapters. While other plant societies are struggling to host a convention and put out a journal, we have conventions scheduled through 2013, possibly through 2015, and our publication gets better with each issue. Keep writing and submitting those articles. One of the new items that I hope to include in future issues is a short column about some of our members who work or teach in the horticulture industry. If you fall into that category, please send me a short bio.

Next spring my term as President will end and **John Migas** from the Lake Michigan Chapter will assume this office. I am happy to report that he has nominated **J. Jackson** as his Vice President. I am confident that under their leadership we will continue to grow and develop as a Society.

The Azalea Society of America, organized December 9, 1977 and incorporated in the District of Columbia, is an educational and scientific non-profit association devoted to the culture, propagation, and appreciation of azaleas which are in the subgenera *Tsutsusi* and *Pentanthera* of the genus *Rhododendron* in the Heath family *(Ericaceae)*.

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Address editorial and business correspondence to:
Editor, ***The Azalean***
P.O. Box 632537
Nacogdoches, TX 75963
E-mail: theazalean@gmail.com

Society Web site: **www.azaleas.org**
Mail list: **azaleas@yahoogroups.com**

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On the Cover

'Margaret Douglas' was developed by Ben Morrison (1891-1966), one of the stalwarts of American horticulture during the middle years of the 20th century. During 1964 and 1965, Morrison registered and released 53 azalea hybrids from his garden in Pass Christian, Mississippi, calling them the Back Acres Hybrids.Please see related article on page 42.

Photo Don Hyatt

Rules of Engagement: Have Pollen—Will Travel

John and Sally Perkins—Salem, New Hampshire

The conventional wisdom, passed along in books, articles, and word-of-mouth, states "North American native deciduous azaleas, excluding *Rhododendron vaseyi* and *canadense*, interbreed freely"; however, the rules of engagement for these azaleas are far more complex when crossing diploid and tetraploid azalea species.

The Two Clades

The latest work by Benjamin Hall and Tom Ranney indicates that native deciduous azaleas break into two major clades that correspond to their ploidy levels. For those unfamiliar with the discussion of clades and ploidy we will digress and explain that when genetic material is used to try to determine how closely related species are, the term clade refers to species that have a common ancestor. The analysis done so far strongly suggests that there are two different clades when examining the North American deciduous azaleas. These two clades seem to separate according to their ploidy level. The ploidy level refers to the number of chromosomes. Most rhododendrons and azaleas have a base number of 13 chromosomes (x=13) which is the number found in pollen and unfertilized ovule. Diploid deciduous azaleas are classified as having 2x=26 chromosomes, triploid deciduous azaleas are classified as having 3x=39 chromosomes, and tetraploid deciduous azaleas are classified as having 4x=52 chromosomes. The tetraploids have twice as much genetic material as the diploids, but they do not, based on genetic studies from Hall, have simply a duplication of the genetic material alon;, and the tetraploids and diploids have not been freely exchanging genes with each other for a long time. Triploids often result as a result of a cross between a diploid and a tetraploid.

Photo Illustration John & Sally Perkins

▲ Figure 1 Species of Tetraploid Clade. Center: *Rhododendron calendulaceum*. Clockwise from top left: *R. colemanii, luteum, atlanticum*, an austrinum-like pink azalea, *austrinum*

The tetraploid clade includes *Rhododendron atlanticum*, *austrinum*, *calendulaceum*, *colemanii*, *luteum* (from Europe), and possibly, a pink-flowered azalea similar to *austrinum* (see Figure 1). The diploid clade includes *R. alabamense*, *arborescens*, *canescens*, *cumberlandense*, *eastmanii*, *flammeum*, *occidentale*, *periclymenoides*, *prinophyllum*, *prunifolium*, and *viscosum* (see Figure 2).

Although each is diploid, the two native deciduous azaleas *R. canadense* and *vaseyi*, as well as the Chinese and Japanese species of *R. molle*, do not belong to the diploid clade as described above. Benjamin Hall, Hans Eiberg, and K. A. Kron each found *R. vaseyi* to be only a distant relative of the other North American deciduous azaleas. Of the three, *R. molle* is the only one that has been used extensively to produce commercial hybrids involving the two clades described above. George Fraser and Harold Pellett each successfully crossed *R. canadense* x *R. molle*.

Rules of Engagement for Crossing Species in the Two Clades

Rule No. 0

The rules of engagement for deciduous azaleas within these two clades are highly generalized guidelines. The rules focus on the ability to successfully create seedpods. Exceptions to these rules will occur. The only way to know for certain is to do the cross and let nature take its course.

However, such exceptions are rare enough that hand crosses violating these rules are worthy of documentation, and attempts should be made to see if the same result is repeatable between the same parents and other members of the two clades.

Photo Illustration John & Sally Perkins

▲ Figure 2 Species of Diploid Clade. Center: *Rhododendron cumberlandense*. Clockwise from top left: *periclymenoides, prunifolium, prinophyllum, viscosum, flammeum*. Not shown: *R. alabamense, arborescens, canescens, eastmanii, occidentale*.

Rule No. 1

An individual plant in either the diploid clade or the tetraploid clade does not freely "self fertilize" to develop seeds. In those rare instances where selfing does occur, the offspring are seldom viable (if they germinate, they die at a young age).

Rule No. 2

Species within a given clade freely cross in both directions. The resulting offspring are normally viable and fertile. The offspring normally reflect characteristics that are intermediate between the two species involved.

Rule No. 3

Species in the diploid clade freely accept pollen from species in the tetraploid clade. The resulting offspring are often viable but usually sterile (bloom but do not produce seed) triploids. The offspring often reflect more characteristics of the tetraploid pollen parent. Offspring having pink- or salmon-colored flowers with a yellow blotch are not unusual. Deformed anthers, multiple petals, and color streaks in the corolla are also frequently seen.

Rule No. 4

Species in the tetraploid clade normally reject pollen from species in the diploid clade. Exceptions occur, but they are extremely rare.

Rule No. 5

Species in the diploid clade freely accept pollen from *R. molle*. The resulting offspring are often viable, but usually are sterile diploids.

Rule No. 6

Triploids resulting from interaction between the diploid and tetraploid clades are more likely to accept pollen from species in the tetraploid clade than from species in the diploid clade. This rule is much more preliminary than the others above.

Rule No. 7

There are no known instances of *R. vaseyi* successfully interacting in either direction with species in either clade.

Rule of Thumb

To maximize your opportunity for producing seed where you have the option of parents in either direction, always use the deciduous azalea of the lower ploidy or same ploidy as the seed parent.

These rules of engagement support Hall's finding that the two major clades of North American deciduous azaleas are divided such that species grouped in a given clade are much more closely related to other species in that clade than they are to species that are more similar in appearance in the other clade. In other words, *R. calendulaceum*, a tetraploid, is more closely related to the other tetraploid species *R. atlanticum*, *austrinum*, *colemanii*, *luteum*, and an austrinum-like pink azalea than to the similar- looking species *R. cumberlandense*, a diploid. The same is true for *R. colemanii*, a tetraploid, being closer to *R. calendulaceum*, *atlanticum*, *austrinum*, *luteum*, and an austrinum-like pink azalea than to the similar-looking species *R. alabamense*, a diploid. *R. atlanticum*, a tetraploid, is closer to other tetraploids than to the similar-looking *R. viscosum*, a diploid. The austrinum-like pink azalea, a tetraploid, is closer to other tetraploids than to the similar-looking *R. canescens*, a diploid.

The Evidence

Richard Jaynes showed that self-fertilized deciduous azaleas failed to produce seedpods in most instances and nonviable offspring resulted in those instances where seed was produced. We have failed in our attempts to self late-blooming deciduous azalea species.

Many of the late-blooming commercial hybrid azaleas produced by David Leach; George, Mary, and Jeff Beasley; Ed Mezitt; and Bob and Jan Carlson involve only species of the diploid clade combining *R. arbore-*

scens, *cumberlandense*, *prunifolium*, and *viscosum*. We have found that species in the diploid clade cross in both directions.

Tom Dodd, Earl Sommerville, and Gene Aromi produced several good-doer hybrid azaleas for the South involving primarily *R. calendulaceum* and *R. austrinum*, both tetraploids. Fred Galle produced 'Choice Cream' using *R. austrinum* x *R. atlanticum*, both tetraploids. Bob and Jan Carlson produced hybrids using *R. calendulaceum* x *R. luteum*, both tetraploids. Ian Donovan produced a cross of *R. atlanticum* x *R. calendulaceum*, both tetraploids. We found we could cross in both directions *R. calendulaceum* 'Cherokee', 'Marydel', and 'My Mary' with Donovan's *R. atlanticum* x *R. calendulaceum*. Both 'Marydel' and 'My Mary' were shown later to be tetraploids in the lab. Prior to the ploidy testing, many hybridizers were aware that *R. calendulaceum* accepted pollen more easily from *R. luteum*, *austrinum*, and *atlanticum* than from other deciduous azalea species.

Prior to the current information on the ploidy of North American azaleas, Frank Mossman, John Thornton, Anthony Waterer Sr., and the authors all noted that certain species crossed much more easily in one direction than the other. In retrospect, these hybridizers noticed that diploids normally accept pollen from tetraploids whereas tetraploids normally reject pollen from diploids.

In 1972, Frank Mossman wrote the following concerning his hybridization with *R. occidentale*, a diploid: "We have found that *Rhododendron occidentale* will cross with many other rhododendrons or azaleas if *Rhododendron occidentale* is the seed parent, but *R. occidentale* as a pollen parent produces few seed."

In 1974, Mossman added the following concerning his use of three diploid species as seed parents and *R. occidentale* as the pollen parent: "*Rhododendron prunifolium*, *cumberlandense*, or *viscosum* x *Rhododendron occidentale* will take."

Mossman stated concerning the work of Anthony Waterer, Sr.: "Anthony Waterer, Sr. of Knap Hill Nursery, England, was the first known hybridizer of *R. occidentale* in the 1860's and reportedly had little success for almost ten years. It is probable that he had pollen only, at first, and later had flower-producing plants to use for seed parents. His effort with the Ghent Azaleas plus *R. occidentale* was the beginning of the Knap Hill Azaleas and later the Exburys."

Photo John & Sally Perkins

▲ Figure 3 'Margaret Abbott' (Abbott).
Rule No. 3: *R. prinophyllum* (diploid) x *R. calendulaceum* (tetraploid)

In the 1990's, we found 'Marydel' and 'My Mary' rejected pollen from late -blooming deciduous azaleas such as *R. arborescens*, *cumberlandense*, *flammeum*, *prunifolium*, and *viscosum* but accepted pollen from each other and *R. calendulaceum*, a tetraploid.

John Thornton has found that *R. austrinum*, a tetraploid, normally rejects diploid pollen but, as a exception to Rule No. 4, was able to successfully cross *R. canescens* 'Crane Creek' onto *R. austrinum* on one occasion. The resulting seedlings were "sickly and sterile." *R. canescens* 'Crane Creek' is a lab-tested diploid.

Dick Cavender's cross of *R. calendulaceum* 'Colossus' x *occidentale* SM-30 and Jim Skonieczny's self-crossing of *R. calendulaceum* 'Colossus' x *occidentale* SM-189 are two possible additional exceptions of a tetraploid accepting pollen from a diploid. August Kehr was successful crossing an evergreen azalea onto *R. calendulaceum* 'Colossus'. Dick Jaynes in his work was only able to successfully cross evergreen azaleas onto diploids and not tetraploids. Carlson crossed *R. luteum*, a tetraploid, onto *R. calendulaceum* 'Colossus'. Britt Smith crossed *R. calendulaceum* 'Colossus' onto *R. occidentale*, a diploid, producing at least some fertile offspring. We have found no documentation of a member of the tetraploid clade accepting pollen from *R. calendulaceum* 'Colossus'. What is interesting to us is that *R. calendulaceum* 'Colossus', believed to be a *R. calendulaceum* by David Leach, August Kehr, and Clarence Towe, behaves, by the limited evidence above, as a member of the diploid clade. In other words, our rules suggest that *R. calendulaceum* 'Colossus' is more likely a *R. cumberlandense*. We have never used *R. calendulaceum* 'Colossus' in any of our crosses and are not personally familiar with the cultivar. We have shown that the cultivar 'Pumpkin', which is

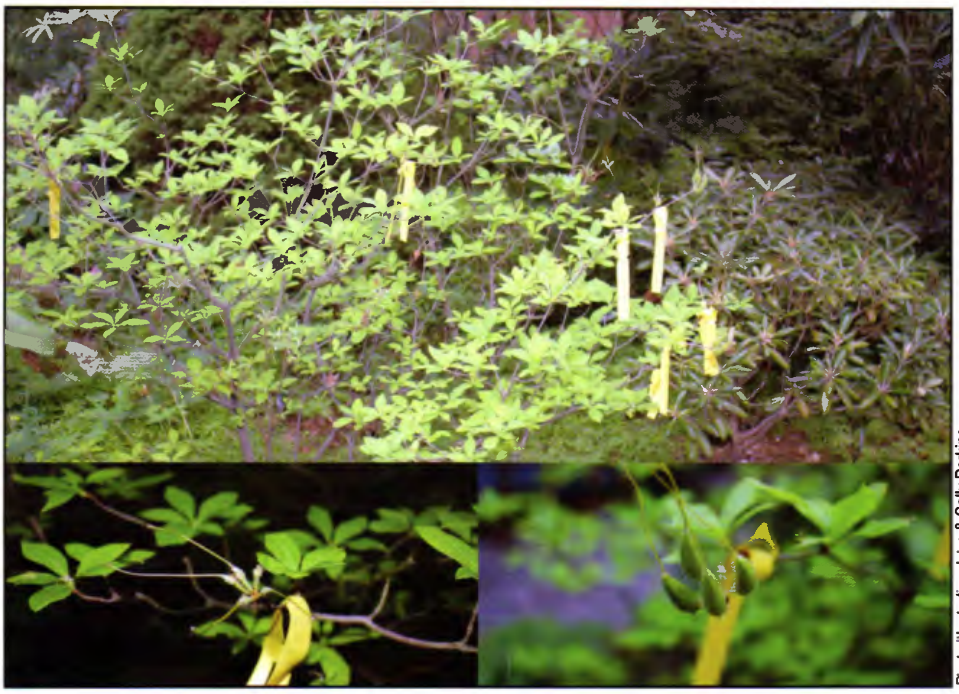

Photo Illustration John & Sally Perkins

▲ Figure 4 Crosses onto *R. calendulaceum* 'Cherokee', a tetraploid. Rule No. 4: Rejects pollen from diploids. Rule No. 2: Accepts pollen from other tetraploids.

a Carlson cross of *R. calendulaceum* 'Colossus' x *luteum*, accepts pollen from 'Snowbird', a lab-tested tetraploid.

Lab testing the ploidy of 'Colossus' would be informative; however, the more interesting question is how general is 'Colossus' in violating Rule No. 4 above. Are the crosses mentioned above repeatable? Does 'Colossus' accept pollen from most or all *R. occidentale*? This is doubtful, since Frank Mossman used 'Colossus' successfully only as the pollen parent in his hybridization program involving *R. occidentale*. Does 'Colossus' accept pollen from other diploid species besides *R. occidentale*? Does 'Colossus' accept pollen from tetraploids?

Frank Abbott of Saxtons River, Vermont, produced 'Margaret Abbott' using *R. prinophyllum*, a diploid, x *R. calendulaceum*, a tetraploid (see Figure 3). In a personal letter from Joseph Gable written in the 1940's, Frank was reminded to always put the seed parent first in listing the cross as this convention had not always been followed in the past and led to confusion.

Ron Rabideau of Rarefind Nursery grew two orange-flowered seedlings from seed he collected from a native *R. prinophyllum*, a diploid, on his parents' property in Ashburnham, Massachusetts. This *R. prinophyllum* was growing near an orange Exbury azalea, most likely R. 'Gibraltar', which is a lab-tested tetraploid. This interaction provides support for the possibility of diploid x tetraploid occurring in nature. Tom Ranney and Clarence Towe have documented natural occurring triploids. Ploidy testing of Ghent hybrids by T.G.R. Eeckhaut, L.W.H. Leus, A.C. De Raedt, and E.J. Van Bockstaele showed a mixture of triploids and tetraploids.

Research by Ernest Henry Wilson and Alfred Rehder indicates that three of the earliest (1830) English deciduous hybrids where the pollen parent is known were each diploid x tetraploid, namely *R. viscosum* x *R. luteum*, *R. flammeum* x *R. luteum*, and *R. periclymenoides* x *R. calendulaceum*. In this timeframe many native deciduous species were grouped under *Azalea viscosa* and *nudiflora* (R. periclymenoides).

An examination of ARS seed exchange lists from 1990 to 2008 indicates that for crosses involving an azalea from each of two clades, the crosses where the diploid is the seed parent far outnumber those where the seed parent is the tetraploid. Moreover, most of the interclade crosses where the tetraploid is the seed parent, *R. calendulaceum* is listed as the seed parent. It is interesting to point out that *Rhododendron cumberlandense*, a diploid, is often misidentified even by experts as *R. calendulaceum*, a tetraploid.

Jukka Kallijarvi wrote the following in an email conversation comparing azaleas to rose hybrids: "Rules No. 3 and 4 are, in fact, a rule of thumb in rose hybridization. Pollen from tetraploids works on diploids, but not vice versa. Also, tetraploid roses are generally much easier to hybridize than diploids."

In 2008 we performed 18 tests using *R. calendulaceum* 'Cherokee', a tetraploid, as a seed parent. In each instance, pollen from the five different tetraploids produced seedpods. In each instance, pollen from the 13 different diploids failed to produce seedpods (see Figure 4). In the same year, pollen from 12 of these diploids produced seedpods when applied to other diploids. In 2009 we placed pollen from *R. colemanii* and an *austrinum*-like pink azalea, both tetraploids, onto several tetraploids, producing seedpods in each instance. In total over the years, we have done 50 crosses placing diploid pollen onto tetraploids and all have failed to produce seedpods.

In 2009, we performed 42 tests placing tetraploid pollen on fertile diploids. Forty of these crosses produced seedpods. Our experience indicates that, for the same diploid seed parent, pollen from a tetraploid produces larger seedpods than pollen from a diploid (see Figure 5). In some cases, much larger seedpods result. Hans Eiberg states that the size of a seedpod is determined by the number of seeds and the amount of DNA in each seed, so for a fixed number of seeds the seedpod would increase in size depending on whether the resulting seed was diploid, triploid, or tetraploid.

In 2009 we placed *R. molle* pollen on eight diploids producing, seedpods in each instance. Frank Abbott produced 'Jane Abbott' using *R. prinophyllum* x 'Miss Louisa Hunnewell' where

'Miss Louisa Hunnewell' is a cross between the Japanese and Chinese forms of *molle*. Ed Mezitt and Harold Pellett produced hybrids using *R. prinophyllum* x *R. molle* hybrids. Felix and Dijkhuis produced hybrids using *R. viscosum* x *molle*.

There are no documented interspecies crosses involving *R. vaseyi*. All of our attempts at crossing other species onto *R. vaseyi* have failed.

Caution about Historical Documentation

Tetraploid x diploid crosses of deciduous azaleas are mentioned in the literature. The reader when reviewing such crosses has to be mindful of three things:

1. Many deciduous azaleas documented as "natural hybrids" of tetraploid x diploid species are selections found in the wild. The parentage is based on the conjecture of knowing both the physical characteristics and the distribution of the species in the immediate area. Which species is the seed parent is unknown.

2. The Botanical Code recommends placing the names in a hybrid formula in alphabetical order. However, it permits listing the seed parent first and pollen parent second.

3. Our native deciduous azaleas are often misidentified even by experts.

Labels at arboretums and display gardens can be wrong by neglect, malicious or benign label switching, and incorrect identification by the initial source. In fact, an examination of Galle's wonderful tome, *Azaleas,* shows that oncenatural hybrids are excluded and one discounts 'Galle's Choice' (documented as *R. calendulaceum* x *R. alabamense* but very likely *R. calendulaceum* x *R. colemanii*); there is not a single occurrence of a documented cross with tetraploid deciduous azalea species as the seed parent and a diploid native deciduous azalea species as the pollen parent.

Worthy of mention is that no matter how carefully one performs the multiple steps involved in producing a named hybrid, including accurate identification of parents; proper hybridization techniques; proper seed handling; and proper labeling of seed, seedlings, and transplants; one unintentional mistake may result in an inaccurate documentation of the parentage. We believe that reproducibility, using multiple crosses on the same parent and the same pollen across many different parents, and the distribution of seeds to the seed exchanges will address some of these issues.

Home Tests for Ploidy

Prepare unopened flower buds from known tetraploid and known diploid deciduous azaleas for hybridization by removing the corolla and immature stamens, then wait one to two days allowing their styles to straighten and stigmas

Photo Illustration John & Sally Perkins

▲ Figure 5 Bigger than normal diploid seedpod on *Rhododendron arborescens* var. *rubra*, a diploid blooming next to 'Marydel', a tetraploid.

to become receptive. For clarification, the use of the terms pollen and seed fertile are based on prior experience. "Pollen fertile" refers to a deciduous azalea's pollen that has been used previously to successfully produce seed from hand crosses. "Seed fertile" refers to a deciduous azalea that has produced seed from either hand crosses or is known to set open-pollinated seed freely.

To increase confidence, perform both the pollen and the seed home tests for multiple parents of known ploidy. For conclusive knowledge, send the azalea to a lab for testing.

Rarely does a deciduous azalea that accepts pollen from both diploids and tetraploids also have the capacity to produce pollen that takes on both diploids and tetraploids. There is speculation that a fertile triploid might act similarly to a tetraploid.

Pollen Parent Test

One can test the likely ploidy of a "pollen fertile" deciduous azalea as follows. Place the pollen of the deciduous azalea of unknown ploidy onto stigmas of known tetraploid and known diploid from the two clades mentioned above. If the known tetraploid(s) x unknown ploidy produces seedpods, then the unknown ploidy is very likely a tetraploid. If the known tetraploid(s) x unknown ploidy fails to produce seedpods but the known diploid(s) x unknown ploidy produces seedpods, then the unknown ploidy is very likely a diploid.

If no seedpods are produced from either known set of seed parents, then no conclusion is reached.

Seed Parent Test

One can test the likely ploidy of a "seed fertile" deciduous azalea as follows. Place the pollen of known tetraploids and known diploids from the two clades mentioned above onto different flowers of the deciduous azalea of unknown ploidy. If the unknown ploidy x known diploid(s) produces

seedpods, then the unknown ploidy is very likely a diploid. If the unknown ploidy x known diploid(s) fails to produce seedpods but the unknown x tetraploid(s) produces seedpods, then the unknown ploidy is very likely a tetraploid. If no seedpod is produced for either known set of pollen parents, then no conclusion is reached.

Conclusion

Hall's clade work and Ranney's ploidy work divides the deciduous azaleas into a six-species tetraploid clade and an 11-species diploid clade where *R. canadense*, *molle*, and *vaseyi* are excluded. Their work caused a paradigm shift in how we think about our deciduous azaleas and how we approach doing hand crosses involving these azaleas. The rules of engagement address this shift in our thinking and have dramatically increased our ability to predict the possibility of producing seedpods.

Our evidence suggests that the ability to produce seedpods is clade dependent but is not species dependent with respect to the two clades. In other words, in general, species within a clade behave similarly with respect to accepting pollen from within the clade and between the two clades. All species within a given clade accept pollen from one another. All species in the tetraploid clade reject pollen from all the species in the diploid clade. All species in the diploid clade accept pollen from all the species in the tetraploid clade.

It is highly likely that individual plants exist, such as *R. calendulaceum* 'Colossus' and *R. canescens* 'Crane Creek', that fall outside these rules of engagement (especially Rule No. 4 above). The questions are as follows:

- Are the exceptions repeatable? Were viable offspring produced? Were fertile offspring produced?
- Are there more such plants? How do such plants get identified and documented?
- Are such plants associated with certain species?
- What is the actual lab-tested ploidy of these plants? Are most such plants diploids, tetraploids, or possibly triploids?
- Do such plants fall outside Rule No. 4 when crossed with only a few plants in the other clade, or for an entire species in the other clade, or for several or all the species in the other clade?

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John and Sally Perkins *garden on Canobie Lake in Salem, New Hampshire, and are active members of the Azalea Society of America and American Rhododendron Society. John, a software programmer, and Sally, a healthcare researcher, work for the Department of Veterans Affairs in Boston. They enjoy seeing natives in the wild, hybridizing, and learning more about these wonderful deciduous azaleas. Their e-mail address is sjperk@comcast.net.*

Why Nutrition Is Important in Rooting Native Azaleas—Part 2

Aaron Cook—Valdese, North Carolina

Editor's Note: Part one of this article appeared in the Spring 2008 issue of **The Azalean**.

As we continue our discussion of factors affecting rooting success with native azaleas, I think it is important to consider several aspects. In native azaleas, adventitious roots can be defined as roots that develop from shoots and stems. Rooting is a key step in the vegetative propagation of unique varieties of native azaleas, and difficulty with rooting often results in commercial nurseries having to use more costly propagation methods such as tissue culture. It is clear from our current research that adventitious root formation is a complex process known to be affected by factors such as plant hormones, enzyme co-factors, phenolic compounds, light, carbohydrate accumulation, nutrients, and other environmental conditions. I would ask that we also consider another factor—genetics.

While there has been considerable work completed on the physiology of adventitious root formation, the genetic and molecular aspects involved have not been adequately addressed and are poorly understood. In the first installment of this paper we addressed the possible role of phenolic compounds and their role in adventitious rooting. Now we will examine some of the other factors affecting rooting. We will leave light, genetics, and environment for a later essay and focus on hormones, co-factors, carbohydrate accumulation, and nutrients.

We will begin with a quick review of plant hormones. Plant hormones are chemicals that regulate and affect all aspects of plant growth and development. Plant hormones can be produced and act locally or be transported throughout the plant using the vascular tissue and diffusion.

Just like with human cells, not all plant cells respond to hormones; the cell must have a receptor for the hormone in order for it to respond. Plant cells typically respond at specifically defined points in their growth cycle. Plants require the hormones at certain locations within the plant during these times to control growth and development. Because of this, plants tend to produce and sequester hormones at sites of active cell division. The two most active sites of cell division in plants are within shoot and root apical meristems (SAMs and RAMs).

The amount of hormone required for plant responses tends to be extremely low, sometimes just a few parts per million per liter can have the desired effect. Due to the low concentrations needed, studying plant hormones, their effects, and interactions has been extremely difficult. Only since the late 1970's and early 1980's have plant physiologists begun to piece together their overall effects and relationships. What is clear is that plant hormones have a significant effect on gene expression and transcription on many levels, controlling cell division and growth.

While there are some lesser known plant hormones, it is generally accepted that there are five major classes of plant hormones. Each class can be grouped together based on their chemical structure and similar effect. There are a few other plant growth regulators which can't be placed into one of the five hormone classes. These exist naturally and include chemicals that can inhibit plant growth or interrupt physiological processes within plants. Within each hormone class there are chemicals that stimulate and inhibit functions. Many of these hormones have complex interactions with each other. A few of the interactions fall into permissiveness of synergism, while others are clearly antagonistic. The five major classes are:

Abscisic Acid or ABA

This class is composed of one chemical compound typically produced in plant leaves when the plants are under stress. In general, it acts as an inhibitory compound that affects bud growth as well as seed and bud dormancy. It causes bud dormancy and influences the last set of leaves to form into protective bud covers. It also accumulates within seeds preventing them from germinating before winter.

ABA is broken down by cold temperatures, and is one of the chemicals responsible for dormancy in seeds. Scientists are still working out the complex interactions between ABA and other plant hormones. It is not known if ABA has any effect on the production of adventitious root formation.

Auxins

Auxins are a class composed of compounds that stimulate cell enlargement, bud formation, and root initiation. Auxins also interact with other hormones and together with cytokinins, control the growth of stems, roots, flowers, and fruits. They were the first class of growth regulators discovered.

Auxin levels decrease in light and increase in dark. They stimulate cambium cells to divide and inhibit bud growth affecting apical dominance. In this paper we are primarily concerned with their ability to promote lateral and adventitious root formation. Auxins, especially 1-Naphthaleneacetic acid (NAA) and Indole-3-butyric acid (IBA), are commonly used in the horticulture industry to stimulate root growth in cuttings. The most common auxin found occurring naturally in plants is indoleacetic acid or IAA. It is not clear if IBA is converted to IAA in the plant. Some natural IBA has been detected in a few plant species. If IBA is not converted, then

it may stimulate the conversion of some pre-cursor molecule into IAA.

Cytokinins or CKs

CKs ae a group of chemicals that influence cell division and shoot formation. They were called kinins when first isolated from yeast cells. They help delay senescence or the aging of tissues, are responsible for mediating auxin transport throughout the plant, and affect internodal length and leaf growth. They have a highly-synergistic effect with auxins, and the ratios of these two plant hormones affect most major growth periods during a plant's lifetime. Cytokinins counter the apical dominance induced by auxins; and in, conjunction with ethylene, promote abscission of leaves, flowers, and fruits.

Ethylene

Ethylene is a gas that forms from the breakdown of methionine, which is in all cells. Ethylene is virtually insoluble in water and therefore usually does not accumulate within the cell. As a plant hormone its effectiveness depends on its rate of production versus its rate of escaping into the atmosphere. Ethylene is produced at a faster rate in rapidly-growing and dividing cells, especially in darkness. New growth and newly germinated seedlings produce more ethylene than can escape the plant, which leads to elevated amounts of ethylene, inhibiting leaf expansion. As the new shoot is exposed to light, reactions by photochrome in the plant's cells produce signals causing ethylene production to decrease, allowing leaf expansion.

While the effects on fruit ripening in response to ethylene are well known, its other effects are less well known. Studies seem to indicate that ethylene affects stem diameter and plant height. When plants are subjected to lateral stress, greater ethylene production occurs, resulting in thicker stems. Ethylene also has been shown to regulate other hormones, especially abscisic acid.

Gibberellins or GAs

Gibberellins include a large range of chemicals that are produced naturally within plants and by fungi. They were first discovered when Japanese researchers noticed a chemical produced by a fungus called *Gibberella fujikuroi* that produced abnormal growth in rice plants. They play a major role in seed germination, producing an enzyme that affects food production for new cell growth. They promote flowering, cellular division, and growth after germination. Gibberellins also reverse the inhibition of shoot growth and dormancy induced by ABA.

Other identified plant growth regulators include:

- Brassinolides—plant steroids chemically similar to animal steroid hormones. First isolated from pollen of the mustard family and extensively studied in *Arabidopsis*. They promote cell elongation and cell division, differentiation of xylem tissues, and inhibit leaf abscission. Plants found deficient in brassinolides suffer from dwarfism.

Element	Form Available to Plants
Macronutrients	
Carbon	CO_2
Oxygen	CO_2
Hydrogen	H_2O
Nitrogen	NO_3^-, NH_4^+
Sulfur	SO_4^{2-}
Phosphorus	$H_2PO_4^-$, HPO_4^{2-}
Potassium	K^+
Calcium	Ca^{2+}
Magnesium	Mg^{2+}
Micronutrients	
Chlorine	Cl^-
Iron	Fe^{3+}, Fe^{2+}
Boron	$H_2BO_3^-$
Manganese	Mn^{2+}
Zinc	Zn^{2+}
Copper	Cu^+, Cu^{2+}
Molybdenum	MoO_4^{2-}
Nickel	Ni^{2+}

▲ Figure 1

- Salicylic acid—activates genes that assist in the defense against pathogenic invaders.

- Jasmonates—produced from fatty acids and seem to promote the production of defense proteins that are used to fend off invading organisms. They are believed to also have a role in seed germination, the storage of protein in seeds, and seem to affect root growth.

- Signalling peptides

- Systemin

When it comes to carbohydrate accumulation in plant stems and its role in rooting, there seems to be some disagreement. Nevertheless, it has been generally observed that stock plants that have a high-carbohydrate-to-low-nitrogen ratio root with greater success.

There are several methods used to produce the high carbohydrate/low nitrogen balance in stock plants. One method is to withhold nitrogen fertilizer while growing stock plants in full sunlight. Root pruning and girdling shoots with rubber bands to block downward translocation are also effective.

One of the newest methods involves the use of chemical growth retardants such as Cycocel, CEPA, or a combination of both. Such pre-treatments cause plant growth to cease and carbohydrate accumulation to increase.

Our research indicates that shoot selection is also important. Lateral shoots in which growth has stopped and carbohydrates have been accumulating are better than rapidly growing terminal shoots. We collect our cuttings from shoots toward the base and middle of the plant, using only the basal portion of the shoot, as opposed to the terminal. The basal and middle portions of the shoot contain more carbohydrates and less nitrogen than the stem tip.

Lastly, we come to nutrients and co-factors. In Figure 1 I have listed the essential mineral nutrients and the forms in which they are available to the plant. A nutrient is considered to be essential if its absence prevents a plant from completing its life cycle or it has a clear physiological role. They are divided into macro- and micro-nutrients depending on whether they are required in relatively large or small amounts. Pay particular attention to the last three elements listed under macronutrients: potassium, calcium, and magnesium. They are all positively charged ions and are known to serve as co-factors in energy-producing cellular pathways.

Potassium is a co-factor for more than 40 enzymes. It is the major cation for establishing plant cell turgor pressure and instrumental in controlling cell membrane potential. Calcium contributes to cell wall and cell membrane structure and acts in signal transduction. Magnesium is a co-factor in enzymes required for phosphate transfers (energy production) and a component of chlorophyll.

Beginning in the spring of 2007, rooting experiments were performed using pre-soak solutions of four different salts and water. Thirty-six cuttings were used in each treatment. All cuttings were taken from May 10 to May 15 from clones of a *Rhododendron austrinum* selection. The terminal sections and all but two or three leaves were removed from each 4- to 6-inch cutting. The basal stems were wounded using a sharp potato peeler. Each group was placed in a one gallon zip-lock bag and subjected to a refrigerated 12-hour presoak in one of the solutions. After pretreatment each cutting was quick dipped in a solution of 3000 PPM KIBA, 1000 PPM NA and 1% DMSO. All cuttings were stuck in 606 trays filled with a mix of 50 percent aged pine bark and 50 percent coarse perlite. All five trays were placed on a 70 degree heat mat under mist that came on for five seconds every 20 minutes between 9 a.m. and 4 p.m.

The results from this experiment are given in the table below:

Pre-Treatment	No. Stuck	No. Rooted	Percentage
0.05M MgCl	36	36	100
0.05M CaCl	36	30	83.3
0.05M KCl	36	28	77.7
0.05M NaCl	36	25	69.4
Distilled H20	36	27	75.0

In 2008 a similar experiment was conducted using pre-treatments of MgCl and distilled water on four different species. *R. calendulaceum*, *R. arborescens*, *R. periclymenoides*, and *R. atlanticum*. In every case, the plants pre-treated with MgCl rooted in higher percentages, with the *R. arborescens* and *R. atlanticum* rooting better than 90 percent. Unfortunately the aftercare of these plants was overlooked and all 288 plants perished when the cooling system for the greenhouse failed and they went un-watered for six days.

Discussion

If you have a system that works for you, I would encourage you to try pre-treating your cuttings with a soak in a cold solution of MgCl. Then use your normal protocol and see if you have better success.

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Aaron Cook *is a biology and landscape gardening instructor at Caldwell Community College in Hudson, North Carolina. He earned a Bachelor of Science degree in Biology and a Master of Arts degree in Biology Education at Appalachian State University in Boone, North Carolina. He is an active member in the North Carolina Nature Conservancy, Sierra Club, American Rhododendron Society, Azalea Society of America, and International Plant Propagators Society. He currently serves as ASA President.*

A Recollection of John Creech and Glenn Dale

John M. Keshishian, M.D.—Mc Lean, Virginia

I was saddened to learn of the passing on Dr. John Creech. But then, that's the way of life — as he well knew. I recently saw a photo of him at his retirement hidey-hole in North Carolina. He'd still been messing around with azaleas—his only true love outside of his wife. He still had that sly, roguish Irish look about him. His pipe was not in the photo.

It reminded me of my first encounter with this man who was responsible for a profound change in my life and my appreciation of nature. That made me happier, brought a smile and happy memories.

It goes like this: Many years ago (I'm now an octogenarian) I was seconded to the Glenn Dale Tuberculosis Sanitarium in Glenn Dale, Maryland. It was early spring. This was part of my specialization program under the Department of Surgery at the George Washington University School of Medicine. Glenn Dale was a hospital where tuberculars were remanded by the Health Department for treatment. Tuberculosis was considered a dangerous, contagious disease and if you had it, you had to be put away, so to speak.

As part of my training in thoracic surgery, I had to become proficient in the surgical treatment of tuberculosis and its effects on lung tissues. This involved long hours in the hospital performing bronchoscopy, lung biopsies, and removal of diseased portions of lung. It made for a long, busy day in the operating rooms and the wards. These areas stank—that's right, downright stank—of iodine, sterilizing solutions, ether, and sometimes just plain rotten air. I looked forward to the day's end when I could get outside and breathe clean, fresh air of what was then countryside.

On some occasions, the aroma of some exotic flower or plant would waft across the gardens and fields surrounding the hospital. It made me very curious. What and where could that plant be? It was not honeysuckle, but close.

I asked my colleague, Dr. Cheng, and he told me the smell came from a government place located across the way. He advised me to be careful; it was a secret establishment and if I was caught there it would go hard for me. He said this with a straight face. He was sincere.

I decided to find out for myself. I trotted over there on a back road and saw the sign: U.S. Department of Agriculture Glenn Dale Plant Introduction Center. What the hell did that mean?

I walked into the nearest building. There were no guards. The doors opened freely. No one was around. I just kept wandering around. Finally, I saw a chap working on some sprangly plant. He was transplanting it. I walked in and said "hi."

The man grunted. I introduced myself. He looked me up and down—I was wearing clean scrubs.

Photo William C. Miller III

▲ On May 6, 2005, Dr. John Keshishian (right) had an opportunity to revisit the Glenn Dale Plant Introduction Station where he had first met Dr. John Creech in the mid 1950's. Sue Bentz, a horticulturist with the U.S. National Arboretum, provided a brief tour of the now closed facility.

"Seaton's the name," he said, and then kept working.

"Whatcha doing?" I asked.

"Transplanting some damn hybrid that's too tender to live outdoors. It's got that tender Japanese blood in its line, it should be burned."

I was nonplussed. "Can I watch for a while?"

No answer. So I watched. After ten minutes or so he spoke again. "Whatcha doing in here? Whatcha want?"

I told him about the delicate odor, the exotic aroma that drifted to the hospital area and how my curiosity was aroused so I thought I'd see if I could locate it.

"Oh that...them's them Ghents in the back forty," he said.

What the hell was he talking about? What was a Ghent? He ignored me and kept working, mumbling and cursing at the same time about the non-sensical idea that this plant could live outside. This was some of Creech's experiments, he said. It was some cross by Morrison. He did this with a dozen small plants, and kept looking over his shoulder to see if I was still there.

"Any chance I could go to the back forty and see those Ghents?" I asked.

"You gotta ask Dr. Creech," he said. "That's secret territory."

"Okay, how do I find this guy?" I asked. He directed me to Dr. Creech's office. I knocked on the door—it was open,

but knocking seemed the right thing to do.

"Dr.Creech?"

"Yeah."

I introduced myself, explaining who and what I was and what I'd smelled. Then I asked to see those plants; those blooms.

He put down his pipe, which put off a nice tobacco aroma, and invited me in. "Sit down," he said, clearing off a chair. "Tell me about yourself."

What's to tell, I thought. So I did.

"You know what azaleas are?" he asked. I'd seen some hideous Hino reds so I hesitatingly told him that I'd seen some reds, but not much beyond that. He grinned.

"Tell you what, I'm gonna send you to watch Seaton," he said. (I think it might have been Gerald Seaton, but my memory fails me at times.) He led me to Seaton and instructed him to teach me about azaleas. After I had learned, I was to come back and he'd take me to the Ghents hideout. In the meatime, I was invited to stop by anytime I felt like it to chat. He grinned hugely and scooted away.

Seaton started by showing me everything about azaleas, starting with seeds then on to cuttings, layers, and grafts. He told me about a Dutchman who was a genius at grafting at one of the other greenhouses. I think his name was Sauerbrye. They all worked for Creech and he gave them their marching orders.

I met the squinty eyed Dutchman who pretended I didn't exist for weeks, then finally snuffled a greeting. We got along too. He could do grafts like I did surgery. He was slick and fast. I learned from him too, and he knew I was watching and learning. Seaton and the Dutchman had sort of adopted me. Creech, as I look back on it, already had, but he was always watching out of the corner of his eye. I must have passed his muster because he gave me the run of the place. I had everything except an ID card.

Oh, there was more than just azaleas there, but none of the other stuff interested me at the time. I learned the art of propagating and even the intricacies of crossing plants and then growing their seed. Heady stuff for a guy learning tuberculosis surgery.

After a decent interval with occasional visits to Creech's office, I told him I'd like to get some of those Ghents in the back forty.

"Huh?" he asked.

I explained that I'd taken a fancy to the yellow and orange varieties. He grinned and asked how would I propose doing that if I could not have the plant itself. He said this quite firmly, as I recall.

I think he was waiting to see how much I'd learned. So I told him I had no way of rooting them, and that would be tough anyway—trying to root a deciduous azalea. I'd learned that much, he knew. Then he waited patiently again. Of course I could layer one or two. That was the magic information he'd wanted.

He grinned again and said that would be a good exercise. He asked if I knew how to layer. I told him I had learned from Seaton.

"Okay," he said. "Go to it."

As I was leaving, he tossed me a small bag.

"Here," he said. "Grow these if you can. They're Fortunei hybrids. These seeds were given to me by those folks at the Sun Yat Sen Garden in China."

I made the air layer. Several of them took a year to get good roots in that plastic bag. Then I transplanted them at my home. I raised a flock of the Fortunei hybrids from those seeds which eventually soared some eight feet high and produced the most fragrant, lingerie pink blooms—huge ones—I'd ever seen. Alas, they were too big to move when I moved on. They're still in place at my old house. I have dreams of sneaking in at night and having them dug up and moved, but those are just delusional thoughts.

I puttered around Glenn Dale for the rest of my time there—three more months. Creech showed me the crosses made by Morrison and the others, including the ones released and those to be destroyed. He warned me not to swipe any cuttings (I was getting good at that) because it would mess up collectors on the outside. I agreed, but Seaton sneaked a few to me and they may still be around.

When my term at Glenn Dale had ended, I had to move on. I'd made my goodbyes to all, and Creech said light heartedly to keep in touch.

My next contact with Creech came when he'd been made Director of the U.S. National Arboretum. I had finished my training and become a specialist, and I had kept on with my azalea fascination. I tried to contact Creech at Glenn Dale and was told he was now "Mr. Big" at the arboretum. I went down there looking for him. He was overseas, but a Sylvester March would be happy to meet with me. Thus, began a long friendship with Skip March, who was the Chief Horticulturalist. Skip told me he was an Italian from New Jersey whose family grew vegetables. I was never sure whether he was putting me on, so I didn't pursue it.

He told me Creech was in Japan, stealing plants to introduce here. They would propagate copies of them as soon as they arrived. I told him I'd been at Glenn Dale, and how I'd met Creech. He grinned, a huge toothy smile, and welcomed me to the arboretum, declaring me a collaborator at zero salary on the spot. Creech later agreed, and in fact chortled, when Skip called me a collaborator.

I continued visiting Skip and Creech; mostly social visits bringing them up to date on what I was doing, both surgically and azalea-wise. Imagine their surprise when I produced, named, and published a Mollis type azalea, a photo of which was on the cover of the *Journal of the American Rhododendron Society*, July 1973.

From that moment on, I rose to a different level of appreciation with Creech. I told him by way of passing, that he'd made me the monster I was. He could have tossed me out at Glenn Dale, but instead he encouraged me. Now look what I'd done.

There's so much more, but this is about Creech and not me. Skip and I remained friends until he left the arboretum.

I raised azaleas and still do. I show when I can. At the last show, my granddaughter and I garnered several blue ribbons (much to my surprise and many others, too).

"Where did you get those blooms?" someone asked.

"I swiped them from my neighbor's yard," I retorted.

Creech was one of the most unpretentious and kindest men I've ever known. I think he recognized a craving in me for doing something besides surgery. He knew I wanted to create things and had decided to do it with these lovely ericaceous plants. And so, like a teacher should, he encouraged it, without my being conscious of it. When friends and others ask how I, a surgeon with the IQ of an oak tree, got into this hobby, I smile and say: John Creech. I'll miss him, but a person lives on when he's remembered, and I shall never forget him.

John Keshishian *is a semi-retired academic surgeon who specialized in cardiothoracic and vascular surgery. He has been a professor of surgery, chief of his division, and chief of his medical staff at the Washington Hospital Center in Washington, D.C. Over a span of fifty years, he has been involved in medical research, teaching, photography, writing, and archeology. He has served as consultant to many organizations including the National Geographic Society, NASA, the State Department, and the FDA to name a few.*

In the mid 1950's, he discovered the Glenn Dale Plant Introduction Station and met John Creech, which led to a new appreciation for azaleas and rhododendrons. In 1973, he introduced 'Henry Allanson', an open pollinated mollis seedling--- a picture of which is featured on the cover of the ARS Quarterly Bulletin, *Vol. 27, No. 3, July 1973.*

He and his wife Nancy Lee live in Northern Virginia.

In Memory

William F. Steele, Jr.

By William C. Miller III, Bethesda, Maryland

It is my sad duty to report the passing of Bill Steele, 81, on February 21, 2010, after a valiant battle with cancer. Born on January 9, 1929, he was the son of William F. and Frances Sharpless Steele.

He began his career working at Steele's Chevrolet in Clifton Heights, just west of Philadelphia, Pennsylvannia. He attended and completed the Dealership Program at the General Motors Institute (now Kettering University) in Flint, Michigan, and went on to become part owner of the dealership.

During the Korean War, he served as an artillery officer. A 1947 graduate of West Chester High School, he went on to receive his Bachelor of Science and Master of Science degrees from West Chester State Teachers College and West Chester University. He began his educational career teaching mathematics at Springfield Junior-Senior High School in Delaware County, and later at Brandywine School where he established the Ski Club. Skiing was to become a lifelong activity which brought him almost as much pleasure as gardening.

Bill and his wife, "Mich," operated a small specialty nursery geared toward the azalea and lepidote collector. They joined the ASA around 1984 and affiliated with the Brookside Gardens Chapter. One of the early signs of spring for me was the arrival of Bill's annual azalea sale advertisement which listed the many (2,600+) azaleas and small-leafed rhododendrons that he had available. In a somewhat unique approach, they limited sales to three weekends a year: the last weekend of April and the first two weekends of May—although they unofficially welcomed visitors at other times. Bill's list of plants was six or seven pages in four columns. It was so extensive and current that it served as a useful quick reference.

Bill had an inquiring mind and he enjoyed taking on little research projects. As an example, in 1998, he began to hear reports of "spotting" on azalea leaves from friends and colleagues on Long Island, in northern New Jersey, the mainline area of Philadelphia, and one isolated case in central New Jersey. To make a long story short, he pursued the mystery, contacting many state and federal experts, until it was solved. The cause was the maple mealy bug, *Phenacoccus acericola*. For the complete story, see *What Are Those Spots*, ***The Azalean***, Vol. 22, No. 1, March 2000.

Bill's many contributions to the azalea and rhododendron community did not go unappreciated or unrecognized. In 1992, he and Mich were awarded a Bronze Medal by the Valley Forge Chapter of the ARS, the highest honor a chapter can bestow. On the national level, he served as National Chairman of the Azalea Committee of the ARS. In 2000, in recognition of his many contributions to the azalea community, Bill was awarded the Frederic P. Lee Commendation by the Brookside Gardens Chapter of the ASA. See the Web page at: http://www.azaleas.org/images/FPLeeSteele.jpg

Memorial contributions in his name may be made to: Neighborhood Hospice, 400 East Marshall Street, West Chester, PA 19380; Jenkins Arboretum, 631 Berwyn Baptist Road, Devon, PA 19333; or Chester County Hematology Oncology Services, 440 E. Marshall Street, West Chester 19380.

Call for Articles

The Azalean needs articles about azaleas, their care, and their use in the landscape. Articles should be submitted as Microsoft Word documents. Illustrations are highly encouraged.

Submit articles to: Pam Fitch; Editor, ***The Azalean***; P.O. Box 632537; Nacogdoches, TX 75963 or e-mail:theazalean@gmail.com.

Society News

Azalea Research: Matching Gifts

By Jim Thornton, ARF Chairman

We want to keep you apprised and aware of the activities of the Azalea Research Foundation (ARF), including ways to help you best make a donation and become a part of making this new endeavor successful. The last few issues of ***The Azalean*** featured a message on how you can contribute to the research fund and, well, here's another method. But before I get ahead of myself, let me for the sake of new members reiterate the history and purpose of the ARF.

It all started when some azaleaphiles had the hair-brained idea to start a "society" because they believed the "Royalty of the Garden" should be among the much cherished plants of the horticultural world. Thus, in 1977, the Azalea Society of America was incorporated and became a non-profit organization devoted to the culture, propagation, and appreciation of the azalea!

In part, our objectives include the contribution to scientific advancement in this area of horticulture. For years, we had members with the "lofty" vision of a foundation that would help fund azalea research. But it wasn't until the 2009 convention that the Azalea Research Foundation was officially approved and became a standing committee.

You too can become a visionary member of the Society by making a contribution to the ARF, and here's one way to do it—make your money multiply!

Many companies offer "Matching Gift" programs for both active and retired employees. Simply put, it's a program that companies make available to employees who support viable non-profit organizations, such as ours. Options vary from company to company. Some will double your donation amount while other may even triple it. With $25 to $1000's available in matching contributions, it's something to look into when you decide to donate to this "lofty" cause.

If you go online and search for "matching gifts," you'll see lists of companies that have such programs. Or call your company's human resource or payroll department to inquire about the availability of such a program. Participating companies will provide you with a form to complete and submit to the ASA. We'll do the rest!

New Members

At Large
Jacob & Maria Adriana Liebe
Rodovia Raposo Tavares km 255
cp 436 cep 18725 000
Holambra 2 SP BRAZIL

Alabamense
Azalea Acres RV Park
Burt & Gaye Appelman
27450 Glass Rd
Robertsdale, AL 36567

Bill Garrett
108 Brookshire Lane
Pelham, AL 35124

Carlton & Brenda Lemond
167 River Oaks Dr.
Helena, AL 35080

H. R. Schmittou
756 Lee Rd. 395
Auburn, AL 36830

J. Carlton Smith
1236 Branchwater Lane
Birmingham, AL 35216

Sandra Smith
5352 7th Ct. S.
Birmingham, AL 35212

Patrick Thompson
101 Rouse LSB
Auburn University, AL 36849

Northern Virginia
Liza Anderson
113 4th St. N.E.
Washington, DC 20002-5931

Luci Kent
3360 Marsden Point
Keswick, VA 22947

David & Patsy Meadows
9651 South Pines Road
Warrenton, VA 20186

Elyse Sanchez
5631 Sutherland Ct.
Burke, VA 22015

Jeanne White
6206 Homespun Lane
Falls Church, VA 22044-1012

Ellora Young
6775 Wildon Grove Rd.
Gordonsville, VA 22942

Oconee
Janelle Corey
2588 Klondike Rd. S.W.
Conyers, GA 30094

John Harison
202 Wages Rd
Auburn, GA 30011

Jeanie & Russ Pope
75 Townley Road
Oxford, GA 30054

Mike Pope
92 Rocky Point Rd.
Covington, GA 30014

Benjamin Ramirez
50 Cannonade Ct.
Covington, GA 30016

Mike Sikes
117 Erica's Pointe Dr.
Winder, GA 30680

Susan Stark
5720 Chestnut Trace
Hoover, AL 35244

Tri-State
Frank & Nancy Emert
2119 Wheeler Road
Vincennes, IN 47591

The Holden Arboretum
Viki Ferreniea
9500 Sperry Road
Kirtland, OH 44094-5172

Ervin & June Neyhouse.
4095 E Carithers Rd
Princeton, IN 47670

Vaseyi
Caroline Briggs
129 Margo Trail
Boone, NC 28607

Ronald and Elaine Cox
Vale Dagan Nursery
7891 Old Hwy 16
Crumpler, NC 28617

Chapter News

Brookside Gardens

William C. Miller III, President

A funny thing happened on the way to the February chapter meeting—it snowed 42 inches. Due to the publication deadline for the Spring issue of ***The Azalean***, the February chapter meeting was reported on before it happened. As it turned out, however, we were obliged to cancel the February meeting in the face of what the weathermen were characterizing as the "Snowstorm of the Century."

In retrospect, that record setting snowstorm is now the standard against which all future snowstorms will be measured. Though we are still assessing the extensive damage to our gardens, we are pleased that we were able to reschedule Jim Dronenburg such that we will have February in October. Adapt.... Improvise....Overcome.

Lake Michigan

John Migas, Treasurer

The Lake Michigan Chapter, along with the Tri-State Chapter, will be meeting in late April in preparation for the 2011 national convention which will be held in Evansville, Indiana.

A chapter plant sale will take place on Mother's Day weekend, and a chapter meeting is scheduled at the home of **John Migas** later in May.

Northern Virginia

Leslie Nanney, Secretary

The chapter meeting scheduled for February was postponed until March because of a record-breaking snowfall. Members had from two to four feet of snow, more than seen in the past 100 years! Every garden sustained broken azalea limbs as well as significant tree damage. Amazingly, when spring finally arrived in northern Virginia many azaleas that were buried under snow recovered and are again standing upright.

The March 7 chapter meeting featured **Bill Johnson**, horticulturist at Hillwood. This magnificent 25-acre estate was the home of Marjorie Merriweather Post. She bequeathed it to the public as a museum and gardens upon her death in 1973. Bill's presentation, *Hillwood Through the Seasons*, showed the gardens throughout the year, including spring flowering trees underplanted with masses of azaleas, rhododendrons, and camellias.

During the business portion of the meeting, members received copies of the 2010 chapter schedule and budget that were approved by the Executive Committee in January. The chapter also is considering several changes to the by-laws to better align it with the ASA national by-laws. Members voted to send $2,000 from proceeds of the 2009 national convention to the ASA and $2,000 to the Friends of the U. S. National Arboretum to support a summer intern to work with the azalea and rhododendron collections.

Eighteen chapter members journeyed to New Orleans in March to attend the 2010 ASA National Convention. While the unusually cold winter resulted in fewer blooming azaleas than typically occur, the beautiful weather and hospitality shown by the Louisiana Chapter ensured we all had a good time.

Oconee Chapter

Jim Thornton, President

The Oconee Chapter met March 7 to discuss its future. It was decided, along with prior comments from members via e-mail and letters, that the chapter should strive to become the viable C=chapter it has been over the years.

Jim Thornton volunteered to serve as President, and **Don** and **Barbara Bloodworth** volunteered to serve as Co-Vice Presidents. **John Callaway** offered to develop a Special Projects Committee. **Fred Vick**, who has been the Treasurer since the formation of the chapter, remains in that position. Members will be asked to approve these positions via e-mail and by letter. The position of Secretary remains open.

Several projects were discussed for the immediate future with emphasis on recruitment and reviving interest of existing members. In addition, the 2013 convention to be hosted by the Oconee Chapter was placed in jeopardy!

The next meeting will be scheduled for early April with the Executive Committee meeting April 2.

Texas Chapter

Pam Fitch, Chapter Member

The Texas Chapter co-sponsored a symposium on March 13 during the annual Nacogdoches Azalea Trail. Dr. William Welch of the Texas A&M Horticulture Department spoke to attendees about using colorful camellias as accents in azalea gardens. He also offered tips on pruning camellias and propagating azaleas. **Barbara Stump** led attendees on a guided tour of the Stephen F. Austin State University Ruby M. Mize Azalea Garden.

▼ Dr. William Welch speaks at the Nacogdoches Azalea Trail Symposium.

Photo Greg Grant

A Garden Grows in Pineville:

Establishing the Morrison Back Acres Collection

Sylvia McLaurin—Pass Christian, Mississippi

Highway 90 skirts the wide sand beach along the Mississippi Gulf Coast from Biloxi to Pass Christian, passing by stately homes, some originally built before the Civil War now restored or totally reconstructed after Hurricane Katrina. Centuries-old live oaks stand, gnarled and twisted by wind and sand, some destined for death, others defiantly producing "water sprouts" and "witches' brooms," the flush of new growth in clumps along their heavy limbs. Here and there remain large Indica azaleas that, with camellias and sasanquas, are synonymous with the Deep South, so much so that they are almost taken for granted.

Much of the landscaping now is less old-home-place and more off-the-design-board. Yet in spring unnamed narcissus may again push their way through the soil, in summer an old rose bush offers its fragrant blooms, and returning lycoris line a few flower borders late in the season. Discounting the heat and humidity of the summer months and problems with inadequate drainage, the Gulf Coast is blessed with a climate nearly ideal for growing plants—plentiful rainfall, moderate temperatures, and usually fertile, though sandy, soil. Moreover, it has a long history of garden enthusiasts who for generations have contributed pass-along plants and advice to each successive generation.

Benjamin Yoe Morrison, well-known developer of the Glenn Dale azaleas and former head of the U.S. National Arboretum, retired to Pass Christian, Mississippi, in March, 1952. He began development of another line of azaleas which he named Back Acres after his Pass Christian home on Montebella Road. Approximately 90 crosses were selected, 53 of which are named and registered, the remaining carrying hybridizing numbers. Mrs. Sarah Groves in a 1969 *JARS* article describes his hybridization program, quoting Morrison's 1964 correspondence with Mrs. William Murrah: "I now have a huge collection…that are not only splendid, but quite unique….This little paragraph tells precisely my aims—doubles that will be cold-hardy and kinds with white or nearly white centers and colored margins." [1]

Benjamin Morrison had another interest in the Pass Christian area. In the Pineville community, he was a member and pianist for the Pineville Presbyterian Church. In fact, he donated his baby grand piano to the church; it is still in the sanctuary, kept tuned, and played every Sunday for services. In an article published in ***The Azalean***, William C. Miller quotes Morrison: "I love to sing….It [my singing] was much more wonderful when I was twenty years younger….the church people know only that they like it." [2]

During Hurricane Katrina the Pineville church sustained damage to the roof and fellowship hall. However, the sanctuary remained intact and served as a dormitory for some of the thousands of volunteers who came to help repair the coast. Morrison's piano was unscathed.

Photo W. McLaurin

▲ Pineville Presbyterian Church

▼ Ben Morrison playing his grand piano in the sanctuary of the church.

Photo Pineville Presbyterian Church archives

Following the storm, the elders and members of the church had first to clear the downed trees around the church. In the aftermath of Katrina's devastation, it was decided to beautify the grounds to provide an appropriate setting for the 130-year-old church. **Wayne** and **Sylvia McLaurin**, church members and members of the ASA's Louisiana Chapter, suggested that the church design and plant a Back Acres azalea garden in tribute to the accomplishments of Benjamin Morrison and to provide a repository of Back Acres cultivars that would be as complete as possible. In fall of 2007, the church Session agreed and set aside about one and one half acres for the garden and general landscaping.

Photo W. McLaurin

▲ Margie Jenkins growing the Back Acres cuttings collected by ASA members.

Photo W. McLaurin

▲ Church member Sylvia McLaurin watering the newly planted Back Acres.

▼ Church members building three azalea beds in the fall of 2009.

Photo W. McLaurin

▼ A future azalea bed

Photo W. McLaurin

The first step was design. Though the church building was near the corner of Menge Avenue and Dale Street, its property extended for several acres to the rear of the church through what had once been a pecan grove. Using ideas from church members who gardened and expertise from professionals in engineering, horticulture, and landscape design, the general landscaping plan for the grounds and garden was drawn up and approved.

At this point **Bob McWhorter**, past president of the Ben Morrison Chapter of the ASA, offered his help. In correspondence with the **McLaurins**, he developed a spreadsheet on the Back Acres cultivars and began methodically soliciting cuttings from ASA membership. In July of 2008 he packaged and sent cuttings for 60 cultivars to the **McLaurins**, who planted them right away in misted seedling beds in an open greenhouse under **Dr. McLaurin's** supervision. However, in late fall, repeated high winds, as well as power failures, delayed the insulating and disrupted the heating of the greenhouse. As a result, almost all of the cuttings perished. However, **McWhorter** once again took out the spreadsheet and contacted ASA members, who generously consented to take cuttings for the garden. In July, 2009, **McWhorter** sent cuttings to **Margie Jenkins** in Louisiana, who had agreed graciously, at the **McLaurin's** request, to grow out the cuttings at her nursery. These cuttings should be ready for planting in late 2010 or early 2011.

Azaleas benefit from some shade, but the proposed garden area behind the church was exposed to the hot summer sun. The next step, then, was to plant trees. In the spring of 2009 a private nursery donated more than thirty 15 to 30 gallon shade trees, including magnolias, red maples, and crape myrtles, which were planted by church members on the eastern and western edges of the planned beds. Church members also laid irrigation pipes through the beds, connected them to the church well, and tied the low emission sprinkler system to a timer to help ensure consistent irrigation to the trees. In the next year they will be repositioned to water the beds themselves.

In the fall of 2009 the church purchased topsoil and members formed three of the eventual seven azalea beds. In them were planted two plants each of 27 Back Acres cultivars derived from cuttings from Auburn University's Camp Hill azalea collection. With these were also planted companion plants, such as *Hydrangea paniculata* 'Limelight' and *Ilex verticillata*, from Margie Jenkins' nursery to serve as interest plants when the Back Acres are not in bloom.

Photo Bob McWhorter

▲ Charles and Wanda Hanners donated cuttings to the Back Acres garden.

Photo Ed. McWhorter

▲ Ted Munter, on left, presented Bob McWhorter with cuttings for the Back Acres garden.

▼ Rosa McWhorter donated cuttings to the Back Acres garden.

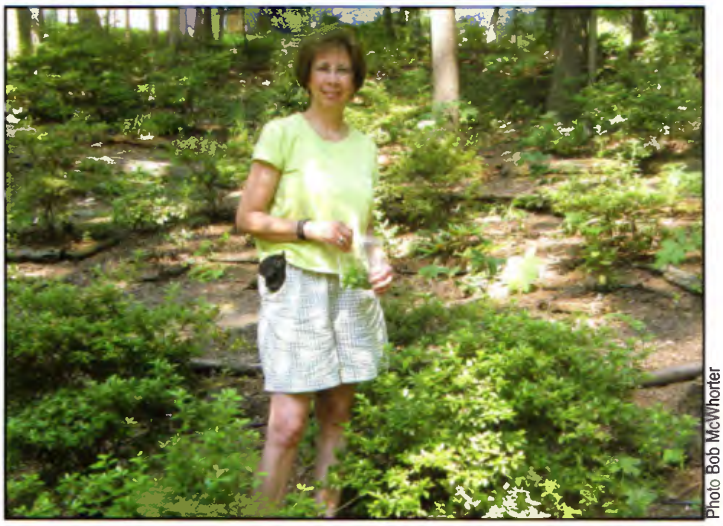

Photo Bob McWhorter

▼ Wanda Hanners, on right, provided cuttings to Bob McWhorter.

Photo Ed. McWhorter

Future plans for the garden target fall-winter of 2010 for planting additional Back Acres cultivars. Also in the tentative plans are walkways, seating, a low fence defining the garden area, and signage identifying the garden and the individual plants. Moreover, the search will continue for any missing cultivars and efforts will be made to propagate and plant them in the garden.

Adjacent to the Bay of St. Louis and facing the Gulf of Mexico from which has come its ambience and its nemeses in the form of two recent devastating hurricanes, Pass Christian is a extraordinary place, known for its scenery, its charm, its food, its characters, and, most of all, the talented and notable people who have lived and are living there. None have been more remarkable than Benjamin Morrison. It is good to know that thanks to the ASA and the Pineville Presbyterian Church, his legacy will live through a small garden in Pass Christian, where he spent his last years doing the research he loved.

A special word of gratitude is extended to ASA members who have contributed time, effort, advice, and cuttings to the project, especially the following (in alphabetical order): **Dr. Joe Coleman, Charles** and **Wanda Hanners, Margie Jenkins, Margie Ann Jenkins, Phil** and **Frances Louer, Bob** and **Rosa McWhorter,** and **Ted Munter.**

Information about the following named cultivars would be greatly appreciated: 'Armstrong's White', 'B. Y. Morrison', 'Crescendo', 'Fire Magic', 'Helen Hill', 'Lost Chord', 'Maude Jacobs', 'Moresca', and 'Nils Hansen'. Please contact sylvia.mclaurin@mgccc.edu or wjm97@msstate.edu.

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[1] Groves, S. (1969, July 15). *Oxford Rare Plant Garden. Quarterly Bulletin of the ARS.* Retrieved Jan 12, 2009, from http://scholar.lib.vt.edu/ejournals/JARS/v23n3-groves.htm

[2] Miller, W. (2008, spring), *A Letter to Corinne Murrah about the Glenn Dale Hybrids—Part II.* ***The Azalean***, 30, 17-20.

Sylvia McLaurin *is retired faculty from the University of Georgia. She and her husband Wayne are members of the Louisiana Chapter of ASA and work on numerous public gardening projects on the Mississippi Gulf Coast.*