



Plant Improvement Research at The University of Georgia and CANR

Michael A. Dirr
Dept. of Horticulture - Athens
The University of Georgia

We (Center researchers) have a *perpetual, never-ending* inning of bloop singles, crisp doubles, and towering home runs. The Center is embryonic, still in its infancy, asking and answering questions that serve the Georgia and southeastern nursery industries. Studies such as sweet potato cultivar trials, Dr. Midcap's wacky container combinations, hydrangea breeding, et al, make for a tapestry of thinking, conceptualizing, trial, error, successes and failures. No idea is considered too-far-afield, until proven so. The best ideas on paper do not necessarily translate to useable research data. Our track record at the Center is considerable. Hydrangeas, starting with *H. paniculata* in 1997, have been afforded more attention than any other woody genus. Fertilizer, herbicides, pruning, media, blueing, disease and breeding studies have contributed to new cultivars and improved production practices. In 2002, the first Hydrangea Conference was sponsored by the Center. Under Director Kay Bowman's guidance, the meeting was a resounding success. A second is planned for May 19-21, 2005 at the Center and on campus with tours and lectures.

I have seen many researchers ebb and flow at the Center because interest waned or the promise of "free" grant money never materialized. Jim Midcap, Jean Woodward-Williams, and myself have stayed in the boat since the idea was floated by Skeetter McCorkle in 1995. The McCorkle family and the three UGA faculty take great delight in welcoming visitors today and in the future.

On November 1, 2004, Dr. David Knauff joins the Horticulture Department. David and I became great friends over the years when he served as Associate Dean of Resident Instruction in the College. He would do anything to support and enhance undergraduate education. Our first quality time together was a Friday afternoon that extended to early evening. I invited David to tour my program and shared with him the bounty of woody plants. His excitement and passion were obvious from the get-go. A Honda full of plants inching its way out of the parking lot is a sight only plantspeople appreciate. Many subsequent plant expeditions solidified the bond between us. His expertise in plant breeding and genetics allowed me to pick his fluid brain. 'This is great' he exclaimed as the excitement over the breeding program appeared to engulf him. David bred commercial peanut cultivars at Florida with great success. We plan to work together on developing sterile cultivars to foster perpetual flowering in genetic dwarf *Lagerstroemia* as well as introducing sterility to potentially invasive ornamentals. David has submitted a grant proposal to UGARF to develop unique cultivars of *Indigofera*. With ~700 species, this is a genus ripe for innovative breeding strategies. It is exciting to have two breeders, mutually respectful of each other's idiosyncracies, planning, plotting, crossing and developing NEW woody cultivars.

My research technician, Vickie Waters-Oldham, has worked with me for ~17 years. She also has the plant breeding "fever" and is an integral part of the Program's successes. Vickie, along with Josh Kardos, PhD student, biologically engineered >5,500 hydrangea crosses during April-May, 2004.

Vickie monitors and directs all activities attendant to successful culture of the seedlings from the crosses. She works with me to evaluate and screen the 1000s of seedlings. She has the plantsperson's 6th sense for selecting the winners.

Plant breeding and improvement, especially in the ornamentals realm, is more an art than science though, together, opportunities for success are improved. For example, >3,000 seedlings of two pink-flowered *Hydrangea arborescens*, 'Eco Pink Puff' and 'Wesser Falls', yielded one keeper. A "population" of 2 seedlings from *H. macrophylla* 'Penny Mac' yielded one compact, remontant mophead we named 'Mini Penny' that is in the patent process. Over 1000 seedlings of *Callicarpa dichotoma* 'Issai' produced no variation. In fact, seedlings were so similar, they appeared to be vegetatively (cutting) propagated.

The most significant variation occurred in the *Lagerstroemia*, crapemyrtle, seedlings derived from 'Pocomoke' and others. From >2,000 seedlings, 100 selections were made in 2002 and 2003, the number now reduced to 31 in 2004. The first true red-flowered (almost) dwarf, 'Cherry Bomb', came from this population.

Feel free to call or email me, Dr. Knauff and Vickie if you have suggestions for plant improvement. We continue to work for the greater good of the Georgia nursery industry and value your input.

The Bounty from Our Program

Hydrangeas: The gardeners of the world have embraced this genus like never before. The story of 'Endless Summer' has been told and retold *but* the plant was *marketed* to the consumers and has captured their garden hearts and wallets. Approximately two million in 2004; 3 million projected in 2005. Bailey Nurseries is protecting the plant in Europe and Asia with one-half million sales estimated. The marketing was the best for a SINGLE woody plant that I have witnessed in my career.

We have used the *remontant* (reblooming) taxa, 'David Ramsey', 'Decatur Blue', 'Oak Hill', 'Penny Mac' and 'Endless Summer' in open-pollinated and controlled breeding with success. My fervent belief is that the *remontant* hybrids will dominate the market in future years assuming a range of flower types, colors, and improved foliage characteristics emerge.

Hydrangea macrophylla - all will be protected through the University Research Foundation

- Nigra-02-02 - lacecap, pink, dries green; lustrous dark green leaves; purple-black thickish stems; high mildew resistance; possible name 'Midnight Lace'
- White Wave-05-02 - mophead, pure white, dries green; lustrous dark green leaves, leathery texture; mildew immune to date
- Veitchii-63-01 - lacecap, white aging pink; will be light blue in acid soils; lustrous dark green leaves, largest on any *Hydrangea macrophylla*; strong stems; mildew immune to date
- 'Mini Penny' - one of two seedlings from 'Penny Mac', mophead, remontant flowering, pink or blue; lustrous dark green foliage; more compact habit than 'Endless Summer'; high mildew resistance

Other hydrangeas with significant garden promise:

Hydrangea macrophylla and *H. serrata*

- 'Blushing Bride' ('Veitchii' × Endless Summer-03-01) (remontant) - mophead; white to pink/blue; mildew-free
- Veitchii-61-01 - mophead; white to pink/blue; mildew-free
- Veitchii-05-02 - mophead; pink/blue; mildew-free
- Grayswood-03-02 - lacecap; pink/blue
- 'Painter's Palette' (*H. acuminata*-01-03) - lacecap; bicolor green and white
- Preziosa-01-02 - mophead; knockout neon rose-red/blue-purple; unfortunately contracts mildew; might be good in northern markets
- Lilacina-10-02 - lacecap; pink/blue; superior foliage; mildew-free
- Lilacina-16-02 - lacecap; pink/blue; superior foliage; mildew-free

The above selections resulted from ~20,000 seedlings since 1998. Screening and selection are more difficult than making crosses and growing the plants. Our current *modus operandi* is primarily controlled crossing using the *remontant* types and the best of the named cultivars like 'Lilacina', 'Veitchii', 'White Wave'. We have also incorporated our *NEW* selections into the breeding program. For example, 'Blushing Bride' (remontant) resulted from a controlled cross between 'Veitchii' (maternal) × 'Endless Summer' (paternal). Half the genes are from the *remontant* 'Endless Summer'. To increase the potential for remontant types, 'Blushing Bride' was crossed with 'David Ramsey' which means the next generation of seedlings has 75% *remontant* genes. If these seedlings are back-crossed the 'David Ramsey', the *remontant* genes in the next generation increase to 87.5%. The results to date have been exceptional with seedling populations exhibiting superior flowering traits.

Hydrangea paniculata - breeding for compactness, strong stems, full flowers, dark green foliage, and flowers that mature to pink; from over 400 seedlings have *three* worthy introductions

- Brussels Lace-17-01 - large white flowers age burgundy-rose; strong stems
- Pink Diamond-01-01 - large white flowers age to green; most compact; leathery dark green leaves
- ??-14-01 - (personal favorite) - lacy white flowers in full inflorescences age to pink; sepals become cupped with age and appear lacy, frilly; compact habit

Hydrangea arborescens - attempting to produce a pink 'Annabelle' type. Also, developing stronger stems and smaller mophead inflorescences akin to 'Annabelle'. 'Annabelle' flops, particularly in production. Growers want a showy plant with strong stems. Have a worthy pink-sepaled selection, Wesser Falls-03-03.

Hydrangea quercifolia - have grown numerous seedlings of 'Alice' and 'Amethyst' with nothing better than the parents. Most cultivars were found in the wild or in cultivation. Sandy Reed is breeding for compactness. Our program introduced 'Alice', 'Alison' and 'Amethyst'. Josh Kardos, PhD candidate, found a beautiful rose-pink sepaled form.

Other Plants from the Program:

Crapemyrtles - selected for compactness; all less than 4 feet at maturity; range of flower colors;

colorful, disease free foliage; can be cut back after initial flowers are spent and will rebloom (profusely); no names as yet certified.

- 35-97/98 - pink, profuse flowering
- 35-6-98 - white, bronze-green foliage
- Pocomoke-11-99 - pink, lustrous reddish-purple foliage, shy flowering
- ??Red (2002) - off-red, lustrous dark green wavy leaves
- 'Cherry Bomb' (2002) - red, superior to any dwarf crape

Gardenia augusta

Shooting Star-01-03 - Rounded; lustrous dark green leaves; unbelievable flower quantity; >1,200 flowers in 2004; orange fruits

Shooting Star-05-03 - Upright; lustrous dark green leaves; unbelievable flower quantity; >700 flowers in 2004; orange fruits

Abelia × *grandiflora*

Still looking for PERFECT compact form. Not there yet but have exciting new seedlings of #25, 'Canyon Creek' and 'Rose Creek' that are promising. Have targeted 5 selections from these seedlings including #25-03-03, #25-05-03, #31-01-03, Canyon Creek-01-03, and Rose Creek-01-04

Buddleia

Still trying to produce the perfect butterfly bush. Have three complex hybrids with excellent mite resistance - Violet Eyes-01-03 (pink), Violet Eyes-02-03 (purple), and Violet Eyes-03-03 (white). A separate handout will be available for anyone interested.

Rhaphiolepis

Rather handsome assortment of seedlings from John Barbour's 'Snowcap'; all compact, most with bronze-purple winter leaf color.

Viburnum

Slow . . . but then seed take 2 to 3 years to germinate. Have 2-year-old open-pollinated seedlings of *V. ×burkwoodii*, *V. 'Chesapeake'*, 'Eskimo', and 'Mohawk' in the field. Many have set flower buds for 2005. Foliage and growth habits are unique. Also, single seedling (extremely vigorous) of *V. utile* × *V. macrocephalum* f. *keteleeri* with beautiful foliage. Have seed of several controlled crosses in greenhouse waiting for germination. Seedlings of 'Park Farm Hybrid' × f. *keteleeri* have germinated.

Nandina domestica

Three compact seedlings of Gulfstream™ that are beautiful. Also have populations of 'Leucocarpa', 'Moonbay' and Gulfstream™ that are currently being evaluated at the Center.

Others: Also assessing seedling populations of *Callicarpa americana* 'Welch's Pink', *Ilex verticillata* 'La Harve', and *Pittosporum tobira* (seed source was a cold hardy selection now 8 feet high at the JC Raulston Arboretum, Raleigh, NC).