

Chillin' Up North with the Florida Azalea, *Rhododendron austrinum*

By Steve Krebs—Madison, Ohio

In 2004, a group of nine native azalea species were planted in field rows at the David G. Leach Research Station of The Holden Arboretum in northeast Ohio. The source of the plants was Natural Landscapes Nursery (West Grove, PA), which specializes in growing native plants from wild-collected seed. Although most of the azalea species were already represented by existing accessions at the Arboretum's main campus (Kirtland, OH) and at the Leach Station (Madison, OH), plants of *Rhododendron austrinum*, the Florida Azalea, were a new addition to Holden's botanical collections.

The original purpose of this material was to document the extent of azalea flower bud "dehardening" when exposed to warm temperatures during their dormant, cold-acclimated state in winter.¹ Once the research was completed, the azaleas were kept in the field so that their beautiful displays could be

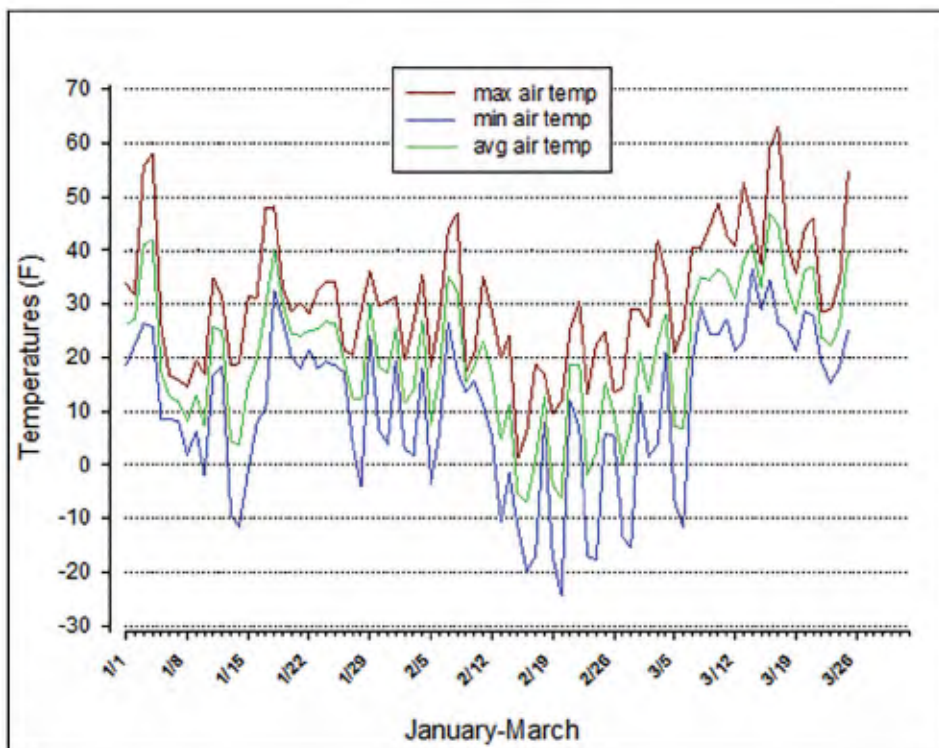
enjoyed by the staff and visitors. With time, the *R. austrinum* collection, a dozen plants in all, began to assert itself as one of the best native azalea performers at the Leach Station as well as one of the most attractive (Fig. 1). A few years later, we acquired several cultivars of *R. austrinum* hybrids and planted those in the field as well – *R.* 'Coleman's Sunshine' (possibly a *R. alabamense* x *R. austrinum* hybrid²), *R.* 'Earl's Gold' (*R. austrinum* seedling), *R.* 'Evening Sunset' (natural hybrid), and *R.* 'Millie Mac' (described as a species selection by Galle, 1985, but as a natural hybrid by Voss, 2000).^{3,4}

The native range of *R. austrinum* is fairly restricted, from northwest Florida into adjacent Georgia, Alabama, and southeast Mississippi. The species plants received from Natural Landscapes Nursery were grown from seed provided by Aaron Varnadoe, a grower of native azaleas who collected

▼ Figure 1— *R. austrinum* accessions in bloom at the Leach Station, spring 2015



Photo SK Holden



▲ Figure 2— Daily winter air temperatures 2015. Data were recorded by the OSU-OARDC phenology project weather station at Sunleaf Nursery, Madison, OH, approximately 2 miles from the Leach Station.

R. austrinum from the wild in southern Alabama. According to the USDA plant hardiness zone map, the species' range includes climates with average annual maximum low temperatures of 10° to 20° F/-12° to -7°C (hardiness zones 8a – 8b).

Despite its southern origins, the Florida Azalea is a highly ornamental plant that is often grown in gardens further north. A search of literature (Table 1) indicates a consensus that the northern limit for successful growth and flowering is hardiness zones 6a-6b, where the maximum low temperatures during winter average 0° to -10°F/-18° to -23°C. The Azalea Society of America assigns their list of *R. austrinum* cultivars hardiness ratings of 5B, meaning that flower buds can tolerate winter frosts in the -10° to -15°F/-23° to -26°C range. Another authority, the father-son team of Peter and Kenneth Cox based in Scotland, places a warmer limit on northern culture of *R. austrinum* (H3-H4, equivalent to zone 7 in the USDA ranking system) and state that this species “performs poorly in cooler and more northerly climates where it will not ripen its young growth or flower

freely...”⁵

Recent events suggest that *R. austrinum* exceeds current estimates of its cold hardiness. In 2015, winter temperatures logged near the Leach Station reached record lows in February, with a minimum of -24°F/-31°C on February 20 (Fig. 2). For the Jan – March period, a total of 13 daily minimums at or below -10°F/-23°C were recorded, and average daily temperatures were at or below 0°F/-18°C for five days over a nine-day period in February. The cold was severe enough to damage blooms on some of the rhododendrons in the collection that had been selected by David Leach (his cutoff criteria for bud hardiness was a minimum of -15°F/-26°C). A collection of rhododendron hybrids derived from *R. hyperythrum*, a zone 6 species useful for disease resistance and heat tolerance breeding, were more severely damaged, with frost injury occurring in both flower buds and woody stem tissue.

Surprisingly, the collection of *R. austrinum* plants sailed through the winter of 2015 unscathed, as seen in photos of individuals taken the following spring (Fig. 1). Both

the wild-collected *R. austrinum* accessions (from Natural Landscapes Nursery) and the *R. austrinum*-derived cultivated forms appeared equally cold hardy. Although no close inspection for injured flower buds was made, an abundant floral display throughout the collection suggests that these azaleas experienced zero to near-zero bud damage at temperatures much lower than prior estimates of their cold hardiness. Plants that are bud hardy to -24°F/-31°C are classified as suitable for USDA hardiness zone 4b, which could place them in gardens in upper Michigan or lower Minnesota. It should be noted that factors other than minimum temperatures, such as the duration of cold spells or dehydration stress due to frozen soils, could prevent success with *R. austrinum* further north. Nonetheless, the 2015 experience of the Florida Azalea in northeast Ohio suggests that freezing injury to flower buds occurs well below -24°F/-31°C. The actual limit won't be known until the species is tested in a controlled freezing experiment or in additional garden trials at colder locations.

Considering its wide range of temperature adaptations in USDA hardiness zones 9 to 5 (and possibly colder), *R. austrinum* joins the ranks of other southern taxa notable for being grown well north of their native ranges. One famous example is the Franklin tree, *Franklinia alata*, which is suitable for a zone 5 climate even though it was originally collected by William Bartram from the only known population in southeast Georgia (zone 8) where it is now extinct. The bald cypress, *Taxodium distichum*, is another warm climate species that can be grown far north of its native range—an extreme example is the Central Experimental Farm Arboretum in Ottawa (zone 4), where it occasionally experiences some damage to new growth following very cold winters. Other examples of cold adaptable southeastern natives include the mountain magnolia, *Magnolia fraseri* (hardy to zone 4); the fringe tree, *Chionanthus virginicus*, which is considered suitable for zone 3 climates; and the bottlebrush buckeye, *Aesculus parviflora*, an Alabama and Georgia native that can be grown in hardiness zone 5a climates.

Source	Northernmost USDA Hardiness Zone Rating
University of Florida IFAS Extension*	6b
Missouri Botanical Garden*	6
American Rhododendron Society*	6b
Azalea Society of America*	5b
Cox and Cox ⁵	7a (H3-H4)
Dirr ⁶	6
Galle ³	6b

*website

▲ Table 1— Published plant hardiness ratings for *R. austrinum*.

The origin of high freezing tolerance in southern species is a matter of some speculation, although it is often attributed to Pleistocene Ice Age events that pushed former northern-distributed species south to refugia from which they never returned after the climate warmed. Although the cold hardiness trait may not have contributed significantly towards adaptation to the new, warmer environment, it may have remained as a “cryptic” trait that did not negatively affect overall plant fitness and therefore was never eliminated by natural selection. Moved to colder climates and receiving the appropriate environmental cues, these cold hardiness genes could once again be expressed.

Whatever its source, the deep frost tolerance of the Florida Azalea is a boon to horticulturists who can now enjoy this beautiful plant in many regions of North America. Furthermore, while *R. austrinum* has been a foundation species for many deciduous azalea hybridizers in the South (Aromi, Dodd,

Lee), it should also be considered a valuable resource for developing colorful and fragrant hybrids for the far north.

References

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Steve Krebs, Director of the David G. Leach Research Station of The Holden Arboretum, continues the rhododendron breeding and research project started by David Leach and now operated by The Holden Arboretum. While the traditional focus on ornamental plants with USDA hardiness zone 5 cold tolerance is still in place, a more recent emphasis has been placed on selection for rhododendrons with root rot disease resistance, heat tolerance (for the Gulf South), compact growth habit, and improved foliage. A research project is also underway to test the abilities of grafted rootstocks to provide high pH tolerance (proprietary INKARHO rootstock) and/or root rot disease resistance (experimental rootstocks) in southern and northern field trials.



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