Evaluation of *Abelia* Taxa for Cold Hardiness Potential

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Nature of Work

The genus *Abelia* contains 30 species that vary in many traits including flower color, growth habit, and hardiness. Interspecific hybridization among various taxa of *Abelia* R. Br. offer the potential for new cultivars with improved flower size, compactness, and adaption to environmental stresses. Breeders are particularly concerned with the acclimation of woody plants to freezing stress because cold, more than any other environmental factor, limits the northern distribution range. Cold hardiness evaluations are needed for selection of superior parental germplasm and insurance of improved hardiness among progeny.

The taxa evaluated include *A. chinensis* R. Br., *A. zanderi* (Graebn.) Rehd., *A.H grandiflora* (AndrÁ) Rehd., eight cultivars of *A. H grandiflora*, and the interspecific hybrid ›Edward Goucher=. The taxa were sampled monthly and subjected to progressively lower temperature intervals under laboratory conditions. A strong correlation has been found between cold hardiness observed in the field and laboratory tests for accessions evaluated at the same location. Stem and leaf samples were visually evaluated for injury and lowest survival temperatures (LSTs) determined.

Results and Discussion

Results of laboratory evaluations conducted monthly from October, 1999 through March, 2000 indicate some general patterns. Comparisons among the stems of the species, *A. chinensis*, *A. H grandiflora*, and *A. zanderi*, revealed no significant differences among the species in December 1999 and February 2000 (Table 1). The only significant difference observed was between *A. chinensis* and *A. H grandiflora* in January 2000. All three species reached at least -25EC(-13EC) during the three month period of December to February.

However, *A. chinensis* and *A. zanderi* were significantly hardier than *A. H grandiflora* in November and significantly less hardy than *A. H grandiflora* in March. The data suggest that *A. chinensis* and *A. zanderi* acclimate and deacclimate faster than *A. H grandiflora*. Timing of acclimation is in the Southeastern United States because of the wide temperature fluctuations that often occur in early fall and spring.

Among the cultivars examined, ›Edward Goucher=, ›Golden Glow=, and ›Prostrata= had the least hardy stems, surviving to only -17EC(1EF). ›John Creech= was the most consistent for midwinter hardiness

with LSTs ranging from -20EC(-4EF) to -23EC(-9EF). Minimal differences were observed for LSTs of leaves in midwinter for all taxa except ›Confetti= (Table 2). The lowest survival temperatures ranged from -13EC(9EF) to -16EC(3EF), but ›Confetti= only survived to -5EC(23EC) in February 2000. In March 2000, the leaves of ›John Creech= were significantly hardier than all other taxa surviving to -12EC(10EF). In addition, the stems of ›John Creech= were significantly hardier than all taxa except ›Confetti= and ›Edward Goucher= and survived to -7EC(19EF). The data suggests that ›John Creech= deacclimates at a slower rate than the other *Abelia* taxa examined.

Table 1. Lowest survival temperatures (LST EC " SE) for stems of 12 *Abelia* taxa.

Taxa	Oct 99	Nov 99	Dec 99	Jan 00	Feb 00	Mar 00
A. chinensis	0	-13"1	-26"1	-23"1	-24	0
A. H grandiflora	-2"1	-10"1	-23"1	-19"1	-25"1	-4"1
A. zanderi	0	-16"1	-25"1	-20"1	-26"1	-0"1
›Compacta=	0	-11"1	-20"1	-18	-23"1	-3
›Confetti=	0	-4"1	-20"1	-21"1	-20"1	-5"1
›Edward Goucher=	0	-2"1	-8"1	-17"1	-16"1	-4"1
›Francis Mason=	-2"1	-4"1	-15	-13"1	-23"1	-2"1
›Golden Glow=	-1"1	-5"1	-14"1	-17"1	-16"1	-2"1
›John Creech=	0	-5"1	-20"1	-22"1	-23"1	-7"1
›Little Richard=	0	-10"1	-17"1	-23"1	-23"1	-2"1
›Prostrata=	0	-13"1	-17"1	-17"1	-17"1	-3
›Sherwoodii=	0	-7"1	-16"1	-17"1	-20"1	-2"1

Table 2. Lowest survival temperatures (LST EC " SE) for leaves of 12 *Abelia* taxa.

Taxa	Oct 99	Nov 99	Dec 99	Jan 00	Feb 00	Mar 00
A. chinensis	0	-5"1	-8"1	-14"1	---	---
A. H grandiflora	0	-8"1	-13"1	-10"1	-10"1	-3
A. zanderi	0	0	-7"1	-13"1	---	---
›Compacta=	-1"1	0	-11"1	-11"1	-16"1	-1"1
›Confetti=	0	-2"1	-4"1	-5"1	0	0
›Edward Goucher=	0	0	-4"1	-10"1	-14"1	-4"1
›Francis Mason=	0	0	-13"1	-10"1	-14"1	-2"1
›Golden Glow=	-1"1	0	-10"1	-14"1	-13"1	-2"1
›John Creech=	-1"1	-5"1	-10"1	-14"1	-14"1	-12"1
›Little Richard=	0	-1"1	-1"1	-12"1	-16"1	-2"1
›Prostrata=	-1"1	0	-9	-10"1	-12	-2"1
›Sherwoodii=	0	-2"1	-8"1	-13"1	-11"1	0

Significance to the Industry

Abelia, as well as many woody plants, are limited in their range of adaptability due more to cold than any other environmental factor. The northern distribution of *Abelia* is limited by both stem and leaf hardiness. *Abelia H grandiflora,* Glossy Abelia, is appealing in the landscape due to its dark, lustrous, evergreen foliage, however, it becomes semi-evergreen in more northern climates.

Evaluations of 12 *Abelia* taxa for stem and leaf in the southeastern United States found the greatest stem hardiness among the three species examined. *Abelia chinensis* and *A. H grandiflora* survived to at least -25EC(-13EC) in December 1999 and February 2000, respectively. *Abelia zanderi* survived to at least -25EC(-13EC) in both December 1999 and February 2000. ›Edward Goucher=, ›Golden Glow=, and ›Prostrata= had the least hardy stems, surviving to only -17EC(1EF). Lowest survival temperatures of leaves ranged from -13EC to -16EC for all taxa except ›Confetti= which only survived to -5EC in February 2000. Finally, ›John Creech= had stem and leaf LSTs of -7EC(19EF) and -12EC(10EF) in March 2000, respectively, suggesting a slower deacclimation rate. Since freeze damage is of major economic importance even in subtropical regions, the information

provided is useful to growers concerned about the cold adaptation of *Abelia* and to hybridizers for selection of cold hardy parental germplasm.