



Development of Ovule Culture Techniques for Breeding Interspecific Hybrids among *Abelia* Species

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Nature of Work: Flowering evergreen shrubs that are compact and resistant to pests are in great demand in the nursery and landscape industries. The genus *Abelia* contains 30 species that vary in many traits including flower color, growth habit, and cold hardiness. Interspecific hybridization among species of *Abelia* offer the potential for new cultivars. Interspecific hybridization can be difficult or impossible due to a number of factors such as failure of endosperm development or failure of viable seeds to germinate. To circumvent such problems, embryo rescue can be employed. Furthermore, ovule culture can promote faster breeding cycles that ultimately lead to earlier releases of new cultivars by eliminating the time associated with seed maturation and germination.

Controlled interspecific crosses were made among the following species: *A. ×grandiflora* 'Francis Mason', 'Edward Goucher' (*A. ×grandiflora* × *A. schumanii*), *A. chinensis*, *A. floribunda*, *A. engleriana*, *A. serrata*, *A. schumanii*, and *A. zanderi*. Five weeks after pollination, ovules were collected and disinfected in ethanol and bleach. Using sterile technique, ovules were dissected from the fruiting structure and were placed in petri plates containing sterile medium. The culture medium used was Woody Plant basal salts (WPM), with Linsmaier and Skoog (LS) vitamins, coconut water, sucrose and agar for gelling. The petri plates were maintained at 75E F, and lighted with wide-spectrum fluorescent bulbs. After roots began to form, embryos were transplanted from in vitro culture to a 1:1 sphagnum peat:perlite mixture. To harden off the embryos, the transplanted seedlings were placed under intermittent mist in a greenhouse. Seedlings were removed from the mist when new growth was observed.

Results and Discussion: Plants were recovered from most of the crosses and hardened off to greenhouse conditions. The most successful cross was 'Francis Mason' by *A. schumanii*, with 115 hybrids recovered. In addition, the time required to go from pollination to greenhouse seedling was reduced by at least 6 months, as seed ripening time and germination time were greatly shortened. However, the percentage of plants recovered of the total pollinations performed was very low for most crosses, and some of the hybrids failed to thrive, and eventually died. For example, 74 crosses of *A. chinensis* to *A. serrata* were performed, but only 5 plants survived to hardening off stage in the greenhouse. None of the hundreds of crosses with *A. floribunda* were successful. The number of plants obtained via ovule culture from the crosses is shown in the table. Many of the recovered hybrids are currently growing in pots in the greenhouse, though some have been established in a field plot in Griffin, GA.

Number of plants surviving to the greenhouse from ovule culture of *Abelia* interspecific hybrids.

| Interspecific Cross | Plants Recovered |
|--------------------------------------------------------------------------|-------------------------|
| <i>A. chinensis</i> × <i>A. engleriana</i> | 30 |
| <i>A. chinensis</i> × <i>A. serrata</i> | 5 |
| <i>A. chinensis</i> × <i>A. spathulata</i> | 2 |
| ‘ <i>Edward Goucher</i> ’ × <i>A. engleriana</i> | 19 |
| ‘ <i>Edward Goucher</i> ’ × <i>A. schumanii</i> (<i>A. parvifolia</i>) | 19 |
| ‘ <i>Francis Mason</i> ’ × <i>A. engleriana</i> | 13 |
| ‘ <i>Francis Mason</i> ’ × <i>A. schumanii</i> (<i>A. parvifolia</i>) | 115 |
| ‘ <i>Francis Mason</i> ’ × <i>A. zanderi</i> | 8 |

Significance to Industry: *This project has yielded new Abelia hybrids, which show promise of better growth habits, compact form, and new flower and foliage colors. Already, some of the ‘Francis Mason’ × A. schumanii hybrids are very exciting, combining bluish purple flowers and yellow foliage, as well as some compact forms. These plants are currently being evaluated for cold hardiness.*