A Novel Intersectional Buddleja Hybrid

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Abstract. Buddleja indica Lam. is encountered frequently as a houseplant or a conservatory specimen and is attractive ornamentally for its oak-shaped foliage. Buddleja indica, a tetraploid African species, 2n = 76, was crossed to the Asiatic tetraploid species B. davidii Franch. The F1 generation was intermediate in foliage character between the two parents. Flowers of the F1 were either white or light lavender in color and the number of flowers per inflorescence was intermediate between the parents. The F1, plants were fertile. These hybrids might be suitable for greenhouse or container culture due to their attractive foliage and floral display.

The genus Buddleja L. (syn. Buddleia L. of the Loganiaceae C. Mart. (syn. Buddlejaceae Wilhelm)) consists of ~100 species found in Asia, Africa, and North and South America (Leeuwenberg, 1979; Norman, 2000). Historically, taxonomists have disagreed about the use of an ‘j versus a ‘j when spelling the generic name. The American Society of Horticultural Science recently adopted Griffiths (1994) as the modern source for scientific names. Griffiths (1994) and two recent taxonomic treatments of the genus (Leeuwenberg, 1979; Norman, 2000) all cite the genus as Buddleja, the name used herein. Leeuwenberg (1979) separated the genus into four sections: Buddleja, Chilanthus (Burch.) Leeuw., Neemda Benth., and Nicodemia (Tenore) Leeuw. Norman (2000) recognized two sections in Buddleja: Nicodemia and Buddleja. She considered Chilanthus Burch. to be a separate genus and combined sect. Neemda and Buddleja of Leeuwenberg (1979) into sect. Buddleja.

Most cultivated species of Buddleja are Asiatic in origin and in sect. Buddleja, Buddleja davidii Franch., the butterfly bush, native to China and Japan, is the most commonly grown species with many cultivars and is assigned to Buddleja sect. Buddleja. Section Nicodemia encompass species that have a berry as a fruit, rather than a capsule. Two members of this section are cultivated. Buddleja indica Lam. is known as the parlor oak and is native to the Comoros and Mascarene Islands and Madagascar (Leeuwenberg, 1979). It is cultivated as a houseplant for its attractive, glossy, dark green, oak-shaped foliage. The other member of the section found in cultivation is B. madagascariensis Lam. It is a large-growing plant with panicles of orange, not orange (in some clones) flowers that open in winter and continue through spring. The hybrid B. ×lewissiana Everett (Maunder, 1987) had been described between the latter species and B. asiatica.Opens habe been described between the latter species and B. asiatica.

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Materials and Methods

Plant material. Plants of B. indica were obtained in October 2000 from Black Pines Bonsai Nursery, Baltimore, Md. This particular genotype produces a four to seven-flowered cyme of greenish-yellow flowers from the axil of the leaf. Buddleja davidii ‘White Bouquet’ was obtained in October 1999 from Forestfarm, Williams, Ore. Both parents were maintained under greenhouse conditions. Controlled crosses between the two species were made in early fall (October 2000) with B. indica as the male parent. One day after anthesis, the corolla and stamens were removed from B. indica.

Fig. 1. Flowers, foliage, fruit, and seed from the progeny and parents of the Buddleja davidii × B. indica cross. In each, B. indica is on the left, the F1 progeny in the center, and B. davidii on the right. (top) Flowers and foliage, (middle) fruit, (bottom) seeds, bar = 1 mm.

tetraploid Buddleia species native to Africa (Keenan, 1969). The other cultivated member of the section Nicodemia, B. madagascariensis, is a diploid (2n = 38) (Moore, 1947).
Buddleja davidii. Two days after emasculation, pollen from *B. indica* was applied to the stigmatic surface of *B. davidii* ‘White Bouquet’. Seeds from capsules of *B. davidii* ‘White Bouquet’ were harvested and sown in mid winter (Feb. 2001, -4 months after the cross was made).

**Characterization of F1 hybrids.** Morphological measurements (in florescence length, number of flowers per inflorescence, corolla width, flower color, leaf length, and leaf width) of the F1 progeny and parents were taken during the following fall and winter from plants growing in the greenhouse. The flower color and measurements for each of the characters listed were taken and the mean and standard deviation were calculated.

**Results and Discussion**

Eighteen putative F1 seedlings were obtained from the cross of *B. davidii* ‘White Bouquet’ × *B. indica*. Although the reciprocal cross was made, no fruit were produced on *B. indica*. Progeny began to flower 7 months after sowing (September 2001) and the last F1 plant flowered for the first time 16 months after sowing. Plants were maintained in the greenhouse, and flowering times coincided with those of *B. davidii* and *B. indica*. Appearance of flowers, foliage, and fruit for both parents and two examples of F1 progeny are shown in Table 1. Three plants died before flowering due to cultural mishaps. In general, F1 plants were intermediate in appearance between the two parents. Flower color was either white or light lavender. The intensity of the lavender color varied due to ambient temperature and color was more intense in the fall with cooler night temperatures. Fragrance was noted in the flowers of F1 plants.

Number of flowers per inflorescence of the F1 was intermediate between the two parents (Table 1). The clone of *B. indica* used in this cross averaged six flowers per cyme. Floral display in the F1 hybrid was sparse as compared to *B. davidii* cultivars. This problem needs to be addressed in future breeding. Other clones of *B. indica* have a terminal inflorescence like that found in *B. davidii*; however, these genotypes may not be in cultivation (Leeuwenberg, 1979). F1 progeny of the *B. davidii* ‘White Bouquet’ × *B. indica* cross were fertile. These progeny have been backcrossed successfully to both parents and have been sib-crossed (data not presented). Then, progeny could be selected for both high flower numbers and attractive oak-shaped leaves.

The fruit that developed on the F1 hybrid are unique for *Buddleja* spp. (Fig. 1B). It was intermediate between the two parents, but unlike *B. davidii*, the fruit did not dehisce upon maturity. Fruit on plants grown in the field do not develop the fleshy or juicy character observed in *B. indica*. However, in greenhouse-grown material, the fruit developed a juicy character -5 months after pollination.

Also, seed from F1 plants are intermediate between the parents both in size and in the presence of the wing observed on *B. davidii* (Fig. 1C). It is unlikely, given the size of the wing compared to the size of the seed, that seeds of the F1 would be disseminated far by wind, as occurs in most *Buddleja* spp., including *B. davidii* (Norman, 2000). Presumably, because of its long-winged seeds, this species has become weedy in many places (Anisko and Im, 2001). Incorporating seed characteristics of *B. indica* into hybrids with *B. davidii* may reduce the invasive ability found currently with this species.

Plants of the F1 hybrid were planted outdoors in full sun in Fayetteville, Ark. As with greenhouse plants, they flowered heavily in late summer and early fall. Due to the tropical nature of *B. indica*, it is unlikely that this hybrid will survive winters in USDA Cold Hardiness Zone 6b. However, they may be suitable for warmer regions. Also, It would be worthwhile to investigate the suitability of this hybrid for container or greenhouse culture since some genotypes exhibit a restrained growth habit and attractive foliage. These hybrids were easy to propagate from cuttings taken in summer, following procedures cited for *B. davidii* (Dirr and Heusser, 1987).

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