

## *Clethra* L.

sweet pepperbush or summer-sweet

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**Growth habit, occurrence, and uses.** The genus *Clethra* L. is composed of about 30 species native to eastern Asia, eastern North America, and Madeira (Huxley 1992; LHBH 1976). Of those, cinnamonbark clethra and sweet pepperbush are native to eastern North America, occurring from southern Maine to Florida and west to Texas (LHBH 1976). Some taxonomists consider woolly summersweet to be a separate species in this same range, but others consider it to be a variety of sweet pepperbush (Huxley 1992; Kartesz 1994; Radford and others 1968). Japanese clethra, a native of Japan, is commonly cultivated in North America (Koller 1974). Specific geographic regions of occurrence differ among these species (table 1).

North American species of summer-sweet are deciduous shrubs or small trees with heights ranging from 3 to 10 m in their natural settings (Krüssmann 1984). Species generally grow as rounded, multi-stemmed plants that can be shaped easily into attractive small trees (Bir 1992b).

Valued for fragrant, late summer blooms and exfoliating, cinnamon-colored bark, cinnamonbark clethra can be useful in the landscape as a specimen plant (Bir 1992b; Koller 1974) or as a hedge (Huxley 1992). Plants also fit nicely into shrub borders and are effective particularly along the edge of water (Dirr 1994). Adaptability to unfavorable environments make summer-sweets ideal selections for adverse planting sites. The species discussed herein perform well in both full sun and dense shade, while tolerating soil conditions ranging from drought-prone (once established) to saturated (Bir 1992b). Sweet pepperbush also has been cultivated successfully in coastal regions where it tolerates salt mist (but not salt spray), which frequently damages other plants (Bir 1993).

**Geographic races and hybrids.** Naturally occurring summer-sweets are quite variable. Although the exfoliating bark of cinnamonbark clethra is typically cinnamon-red in color, variations of pink, chartreuse, gold, and mahogany have been observed (Bir 1992b). The majority of named selections have originated from sweet pepperbush. Inflorescences of this species normally form erect racemes (LHBH 1976). However, inflorescences occur occasionally as branched panicles (Everett 1981), in which case the plants are often classified as *C. alnifolia* var. *paniculata* (Ait.) Rehd. or *C. paniculata* Ait. (Everett 1981; Huxley 1992; LHBH 1976). Dirr (1994) cited many cultivars in detail. Some of the more outstanding selections include *C. alnifolia* 'Compacta', a compact, 1.0- to 1.2-m-tall selection with lustrous, dark green foliage; 'Creel' 'Calico', the only variegated selection; 'Fern Valley Late Sweet', a late-flowering, almost columnar selection; and 'Hummingbird', unquestionably the most popular selection, which grows to a height of 0.8 to 1.0 m, with lustrous, dark green foliage that is covered by fragrant white flowers in mid to late summer. Of the pink-

flowering forms, ›Pink Spires‹ and ›Rosea‹ are most common (Dirr 1994). These cultivars frequently are indistinguishable and may in fact be the same clone. ›Ruby Spice‹ occurred as a bud sport on ›Rosea‹ and is distinguished by deeper pink flowers that do not fade in late season. Another pink selection, ›Fern Valley Pink‹, produces inflorescences that can reach lengths of 20 to 25 cm for a spectacular floral display.

**Flowering and fruiting.** Fragrant white flowers, about 1 cm in diameter, are borne on upright or horizontally held terminal racemes or panicles, to 15 cm long (Huxley 1992), arising from the axils of leaves (Everett 1981). Flowering begins in July (with the exception of woolly summersweet, which flowers in August) and lasts to September (Krüssmann 1984), making summer-sweets excellent selections for late summer color. Pollination of perfect flowers most likely occurs by bees, which can be a nuisance if plants are located near walks or sitting areas (Bir 1992b; Dirr 1994; Koller 1974). Fruits are subglobose, 3-valved capsules, ranging from 2.5 to 5.0 mm in length with a persisting style and calyx (figure 1) (Huxley 1992). Upon maturation, capsules split to release many seeds. Seeds are quite small and irregularly angled, and dispersal is presumably by wind (figures 2 and 3) (Sleumer 1967). Sweet pepperbush in New Jersey averaged 6 to 17 seeds/capsule from 3 collection sites, with total seed production per plant ranging from 1,348 to 7,920 (Jordan and Hartman 1995).

**Collection of fruits, seed extraction, cleaning, and storage.** It appears that seeds do not mature until long after leaf abscission, November in North Carolina (Bir 1992a). Thus, collecting and sowing seeds before maturation may result in poor or no germination. Once seeds have matured, capsules can be collected before they open and allowed to dry until they split. Seeds can then be shaken from the capsules and cleaned (Dirr 1994; Dirr and Heuser 1987). There are no reports of long-term storage, but seeds can be stored successfully for short periods at low temperatures (5 °C) and moisture contents (Bir 1992a; Dirr and Heuser 1987). The seeds are therefore apparently orthodox in storage behavior.

**Pregermination treatments and germination testing.** Jordan and Hartman (1995) reported up to 58% germination with New Jersey sources of sweet pepperbush after 5 months of stratification at 0 to 2 °C in the dark. Their germination regime was 16 hours of light at 30 °C and 8 hours in the dark at 15°C. Other reports, however, suggest that no pretreatments are required and that germination occurs readily if seeds are sown immediately following collection (Bir 1992a; Dirr and Heuser 1987).

For successful germination, seeds should be treated similar to those of azalea (*Rhododendron* L.) (Bir 1992a, b; Dirr and Heuser 1987). In general, when mature seeds are sown on the surface of a germinating medium and placed under mist at 24 °C, germination occurs within 2 weeks and is complete within 1 month (Bir 1992b).

**Nursery practice.** When seedlings are grown in a typical azalea growing medium of 3 parts of pine bark to 1 part of peat (vol/vol) amended with 4.2 kg/m<sup>3</sup> (7.0 lb/yd<sup>3</sup>) dolomitic limestone and fertilized following recommendations for azaleas, seedlings grow well, filling a 3.8-L (1-gal) pot by the end of a growing season (Bir 1992b). Although naturally occurring as an understory species, seedlings of cinnamonbark clethra show no symptoms of stress when grown in full sun and are visually no different than seedlings maintained under 50% shade (Bir 1992b). The species is well adapted to dry soils once established. However, if seedlings are exposed to drought conditions before a sufficient root system has developed, high mortality can be expected (Bir 1992b).

Asexual propagation of species of summer-sweet is very easy and is widely used for propagation of particular cultivars. Species listed in table 1 are propagated readily by stem cuttings taken during the summer, as well as by root cuttings taken during December and January (Dirr and Heuser 1987).

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**Table 1C** *Clethra*, summersweet: nomenclature and occurrence of species cultivated in North America

Scientific name & synonym(s)	Common name	Occurrence
<i>C. acuminata</i> Michx.	<b>cinnamonbark clethra</b> , mountain sweetpepperbush	Cliffs & mountain woods of SE Appalachian Plateau & inner Piedmont
<i>C. alnifolia</i> L. <i>C. alnifolia</i> var. <i>paniculata</i> (Ait.) Rehd. <i>C. paniculata</i> Ait., <i>C. tomentosa</i> Lam. <i>C. alnifolia</i> var. <i>pubescens</i> Ait. <i>C. alnifolia</i> var. <i>tomentosa</i> (Lam.) Michx.	<b>sweet pepperbush</b> , summer-sweet, coastal sweetpepperbush	North American Coastal Plain, Maine to Texas, with extensions into the Carolina Piedmont; acid swamps & low moist woods
<i>C. barbinervis</i> Sieb. & Zucc. <i>C. canescens</i> Forbes & Hemsl. <i>C. kawadana</i> Yanagita <i>C. barbinervis</i> var. <i>kawadana</i> (Yanagita) Hara <i>C. repens</i> Nakai	<b>Japanese clethra</b> Asiatic sweet pepperbush	Hills & mountains of Japan & Korea
<i>C. tomentosa</i> Lam. <i>C. alnifolia</i> var. <i>pubescens</i> Ait. <i>C. alnifolia</i> var. <i>tomentosa</i> (Lam.) Michx.	<b>woolly summersweet</b>	Swamps & coastal plain of North Carolina to N Florida & Alabama

**Sources:** Huxley (1992), Ohwi (1984), Sleumer (1967), Small (1933).