

## *Symphoricarpos* Duham.

snowberry

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**Growth habit, occurrence, and use.** Species of the genus *Symphoricarpos* occur in North America from Alaska to Mexico (with 1 additional species native to China). There are over a dozen species and varieties (Evans 1974; SCS 1982); 7 are presented here (table 1). Common names include buckbrush, wolfberry, and other vernacular names. The white-berried species are most commonly known as snowberries and the red-berried species as coralberries or Indian currant (Evans 1974; Grimm 1957; Shiell 1992). Snowberry species are usually 40 to 150 cm tall, erect to spreading, densely opposite-branched, thicket-forming, deciduous shrubs. Leaves are 1 to 8 cm long by 0.3 to 4 cm wide, oval or ovate to roundish, opposite, simple, with entire leaf margins (Welsh and others 1987; Grimm 1957). Snowberry species form distinct colonies by underground rhizomes, except for Parish snowberry, which layers by rooting at aboveground stem nodes that touch the ground (Mozingo 1987). This dense colony stand pattern results in grazing resistance and fire tolerance, making them suitable for stabilizing disturbed lands. Western snowberry and Indian currant have been used to some extent for erosion control (Evans 1974). Snowberry can be quite adaptable to site conditions and can grow on a variety of soil types from sandy to heavy clays and on both alkaline and acidic soils (Plummer 1968; Thames 1977). Most species within the genus are generally quite drought tolerant (Shiell 1992).

The snowberries have considerable value for wildlife, for they produce high-quality forage and good cover for game birds and small animals. The foliage provides considerable forage for big game and livestock, and the berries are used by birds and black bear (*Ursus americanus*) (Auger 1994; Banister 1991; Evans 1974; Mozingo 1987). Indian currant, common snowberry, and garden snowberry make desirable ornamental plantings because of their attractive fruits (Evans 1974; Shiell 1992).

**Flowering and fruiting.** Flowers of Indian currant are inconspicuous green and purple, whereas the flowers of other species of snowberry are pinkish to yellowish white. All are bell-shaped with 5 rounded lobes, perfect, and borne in dense axillary or terminal clusters (table 2). The fruit is a 2-seeded berrylike drupe that is 5 to 10 mm long (Mozingo 1987; Shiell 1992; Vories 1981; Welsh and others 1987). Fruit color is white in the snowberry species but dark red, pink, or bluish black in Indian currant. Fruits mature mid- to late summer or early fall (mid-June through September) (Evans 1974; Link 1993; Shaw 1984; Shiell 1992; Vories 1981). Each fruit contains 2 nutlets (pyrenes). These are flattened on 1 side and are composed of a tough, bony endocarp, a seedcoat, a fleshy endosperm, and a small embryo (figures 1 and 2). The nutlets are used as seeds. They are dispersed from late fall to the following spring, largely by birds and

mammals. Normally, a good seedcrop is produced each year (Evans 1974).

**Collection of fruits.** Fruits persist on the plants until the following spring, except for those consumed by birds and mammals, making collection of fruit relatively easy (Evans 1974; Link 1993). Collection is done by stripping or flailing the fruit into a hopper or container, or the fruits may be picked by hand. Those collected in early fall contain considerable moisture and therefore require careful handling to prevent heating (Evans 1974; Vories 1981). Weight of fruits per volume for western snowberry (fresh weight) are 75 kg/liter (58 lb/bu) and for Indian-currant (dry weight) are 16.7 kg/liter (13 lb/bu) (Evans 1974).

**Extraction and storage of seeds.** Twigs, leaves, and other non-fruit debris should first be screened out. Seeds can then be readily extracted by running the fruit through a macerator with water, floating off pulp and empty seeds. Dried fruits should be soaked for several hours before maceration. Remaining seeds and pulp should be dried and then cleaned on an air-screen cleaner (Evans 1974; Link 1993; Shaw 1984; Vories 1981; Wasser 1982). After being dried and cleaned, the seeds are ready for storage. Numbers of cleaned seeds per weight are listed in table 3.

Stored snowberry seeds have been reported to retain good viability when stored dry at low temperature near 5 EC (Vories 1981; Evans 1974). Seeds of Indian currant are reported by Vories (1981) to maintain good viability for over 5 years. Mountain snowberry germinated to 80% after 7 years, 44% after 10 years, and 8% after 25 years of dry storage in an open warehouse (Stevens and Jorgensen 1994). Dried seedlots of common snowberry stored in a sealed container at 5 °C yielded 45% germination after 2 years, with an additional 35% still sound at the conclusion of the test (Evans 1974). Acceptable purity is 95%, with 80% germination (Shaw 1984).

**Pregermination treatments.** The nutlet-like seeds of snowberries have a hard endocarp and an undeveloped embryo (Evans 1974; Plummer 1968). Hidayati and others (2001) reported that the endocarp and seedcoat of Indian currant are permeable to water; thus the seeds do not have physical dormancy. Warm stratification at room temperature between 22 to 30 EC for 3 to 4 months has been used to soften the endocarp and is reported to be an adequate treatment for fall-planting where cold stratification will occur naturally (Wasser 1982; Evans 1974). For spring-planting or situations where natural stratification will not occur, a subsequent period of cold stratification at 5 EC for 4 to 6 months is necessary to induce full development of the embryo. Sulfuric acid scarification (soaking for 30 to 60 minutes) can be used in place of warm stratification to soften the endocarp. However, warm stratification has been shown to be more effective than the acid treatment, possibly because it is necessary for embryo maturation (Evans 1974; Shaw 1984).

In seedlots collected from the Book Cliffs of northeastern Utah, 72.5% of viable seeds germinated after 20 weeks of wet chill at 2 EC; 5 weeks of warm stratification at 10/30 EC did not increase germination substantially. Scarification in the form of passage through a black bear's digestive system actually lowered germination to 51.6% (Auger 1994).

**Germination.** Results of germination tests of non-stratified seedlots showed 0 to 46% germination at 4 EC for over 12 months, and 55% after 24 months. Under moist warehouse storage conditions, germination ranged from 0% after 1 year to 37% after 24 months, for mountain snowberry (GBRC 1985). Once seedlots have been adequately pretreated, they can be germinated at diurnally alternating temperatures of 20 and 30 EC for 30 days in the light (Akagi

1996; Evans 1974). Germination could be expected to be between 40 to 90% in 28 days (Akagi 1996; Evans 1974). Germination is epigeal (figure 3). Weber and Wiesner (1980) showed that, for common snowberry, tetrazolium chloride (TZ) testing did not distinguish between dormant and non-dormant seeds, but was adequate for viability evaluation.

**Nursery practice.** Effective propagation from seeds is possible if they are properly treated and given sufficient cold stratification. Desired seedling density in nursery beds is about 325/m<sup>2</sup> (30 seedlings/ft<sup>2</sup>). Seeds should be covered with about 6 mm (¼ in) of soil and 2 cm (¾ in) of mulch. Early shade has been beneficial for seedlings of Indian currant (Evans 1974).

Cuttings and transplanting of pulled-up wildlings and pieces of stem with roots can be especially successful when planted in early spring (Plummer 1968; Vories 1981; Wasser 1982). Expected transplanting establishment success is nearly 90% when proper transplanting techniques are used for both bareroot and container stock (Stevens 1994). Cuttings should be irrigated when set out and as needed afterward until they are well established. Mountain snowberry has been shown to do poorly when planted as 1+0 stock but to perform much better when planted as 2+0 or larger stock (Monsen 1984). Plant competition needs to be reduced to a minimum during the first season. When seeding in rangeland conditions, species should be mixed with other adapted browse and forage plants and preferably planted in rows, strips, or blocks separate from grasses (Wasser 1982).

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**Table 1**—*Symphoricarpos*, snowberry: nomenclature and occurrence

Scientific name & synonyms	Common names	Natural occurrence*	
<b><i>S. albus</i> var. <i>albus</i> (L.) Blake</b> <i>S. racemosus</i> Michx.	<b>common snowberry</b>	Hudson Bay to Alaska, S to California, & E to North Carolina	
<b><i>S. albus</i> var. <i>laevigatus</i></b> <b>(Fern.) Blake</b> <i>S. albus</i> ssp. <i>laevigatus</i> (Fern.) Hulten <i>S. rivularis</i> Suksdorf	<b>garden snowberry,</b> Columbia snowberry	S Alaska, S to California, Montana, & Colorado	
<b><i>S. occidentalis</i> Hook.</b>	<b>western snowberry,</b>	Saskatchewan to British Columbia, to Minnesota, Missouri, & Illinois	wolfberry, buckbr
<b><i>S. orbiculatus</i> Moench</b>	<b>Indian currant,</b>	New York to North Dakota, S to E Texas	snowberry, coralb
<b><i>S. oreophilus</i> var.</b> <b><i>oreophilus</i> Gray</b>	<b>mountain snowberry</b>	Southeast variety, Colorado, Arizona, New Mexico, N Sonora, occasionally in Utah	
<b><i>S. oreophilus</i> var. <i>utahensis</i></b> <b>(Rydb.) A. Nels.</b> <i>S. utahensis</i> Rydb. <i>S. vaccinoides</i> Rydb.	<b>Utah snowberry</b>	Northern variety, British Columbia to Montana, S to California, central Nevada, Utah, & Colorado	
<b><i>S. rotundifolia</i> var. <i>parishii</i></b> <b>(Rydb.) Dempster</b> <i>S. parishii</i> Rydb.	<b>Parish snowberry</b>	Southern variety, from S California to Arizona & central Nevada, & barely entering the W edge of Utah	

**Sources:** Conquist and others (1984), Evans (1974).

\* Distribution of *Symphoricarpos* species used in cultivation can vary.

**Table 2**—*Symphoricarpos*, snowberry: phenology of flowering and fruiting.

Species	Location	Flowering dates	Fruit ripening dates*
<i>S. albus</i> var. <i>albus</i>	Michigan	June 1–July 31 May 1–Sept 30	Sept 1–Oct 31 Aug 1–Oct 31
	Idaho 700 m	June 5–Aug 5	Aug 1– Sept 5
var. <i>laevigatus</i>	Missoula Co., MT		
	1,000 m	June 20–Aug 15	Aug 15–Sept 30
	1,300 m	July 1–July 30	Aug 25–Sept 20
	1,650 m	July 15–Aug 30	Sept 10–Oct 5
	2,000 m	July 25–Sept 5	Sept 25–Oct 25
<i>S. occidentalis</i>	Pennington Co., SD 750 m	June 1–July 31	Sept 1–Oct 31
<i>S. orbiculatus</i>	—	July 1–Aug 31	Sept 1–heavy frost
<i>S. oreophilus</i>	Wasatch Plateau, UT		
	2,230 m	June 17–June 26	Aug 20–Sept 18
	2,576 m	June 22–June 30	Aug 17–Sept 12
	2,698 m	July 2–July 8	Aug 21–Sept 26
	Northern Utah 2,080 m	June 5–June 10	July 15–Aug 3

**Sources:** Billington (1943), Costello and others (1939), Evans (1974), Willard (1971)..

**Table 3**—*Symphoricarpos*, snowberry: seed yield data

Species	Seed wt/ fresh fruit wt	Thousands of seeds/weight				Samples
		Range		Average		
		/kg	/lb	/kg	/lb	
<i>S. albus</i>						
var. <i>albus</i> *	3	119-250	54-113	167.5	76	10
var. <i>laevigatus</i>	—	86-144	39-65.2	122	55.4	5+
<i>S. occidentalis</i>	5-10	114-217	52-98.7	164	74.4	6+
<i>S. orbiculatus</i> †	7	298-317	135-144	308	140	2
<i>S. oreophilus</i>						
var. <i>oreophilus</i>	—	117-165	53-75	141	53.9	1

**Source:** Evans (1974).

\* Number of dried fruits per weight was 39,600/kg (18,000/lb).

† Seed yield per weight of dried fruit was 18 to 33 kg/100 kg (18 to 33lb/100lb).

**Table 4**—*Symphoricarpos*, snowberry: effect of pregermination treatments on germination percentage

Species	Immersion in H <sub>2</sub> SO <sub>4</sub> (min)	Stratification (days)		Germination (%)
		Warm*	Cold†	
<i>S. albus</i>	60	60	180	35
	75	20	180	74
<i>var. laevigatus</i>	20	0	60	1
	0	112	182	45
	60	84	168	69
	0	91	182	87
	60	0	140	32
<i>S. orbiculatus</i>	0	120	120	72
	30	20	120	58
	30	120	180	81

**Sources:** Evans (1974), Flemion (1934), Flemion and Parker (1942).

\* Room temperature.

† 5 to 10 EC.

**Figure 1**— *Symphoricarpos*, snowberry: nutlets, H8.

**Figure 2**— *Symphoricarpos albus* var. *albus*, common snowberry: longitudinal section through a nutlet, H20.

**Figure 3**— *Symphoricarpos, albus* var. *albus*, common snowberry: seedling development at 5, 7, 13, and 20 days after germination.