

Asteraceae Aster family

Baccharis L.

baccharis

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Growth habit, occurrence, and use. The genus *Baccharis* is composed of more than 400 species native to tropical and subtropical America (Correl and Johnson 1970; Barkley 1986). Some species are used as ornamentals, some for erosion control, and some for medicinal purposes (Olson 1974). There are 21 species native to the United States (table 1); 14 of which are found in the Far West. *Baccharis* plants are of poor forage value and some are poisonous to livestock and can cause contact dermatitis in humans. On the positive side, *baccharis* species have metabolites that have antitumor, antimicrobial, and insecticidal properties (Kuti and others 1990). Coyotebrush has a special use in southern California as a fire protection plant (Olson 1974). Desertbroom has been found suitable for copper mine reclamation in Arizona (Day and Ludeke 1980). Eastern *baccharis* is reported to be an important flower for beekeepers in Queensland, Australia (Westman and others 1975). Many species have good salt tolerance, and saltwater falsewillow and eastern *baccharis* are known for good growth in soil conditions that range from pure sand to pure clay (Dirr and Heuser 1987).

Growth habit varies considerably among the different species; a few examples follow. Saltwater falsewillow is a small evergreen shrub to 2.4 m high; eastern *baccharis* is deciduous to 3.6 m in height; Rooseveltweed is also deciduous growing to 2.7 m or more; coyotebrush, is a low evergreen shrub, 15 to 30 cm high, spreading out as much as 3 m; mulefat *baccharis* is an evergreen shrub to 3.6 m (LHBH 1976). Desertbroom is a shrub to 3.6 m (Sundberg 1993).

Flowering and fruiting. The white or yellowish male and female flowers, borne separately on different plants, are in heads that occur in clusters. In eastern *baccharis*, the male flowers are yellow and the female are white (Westman and others 1975). The female flowers develop into compressed, usually 10-ribbed achenes, tipped by a pappus of bristly hairs 13 mm long or less (figures 1 and 2). Achenes are dispersed by wind soon after ripening (table 2). Seed crops are borne annually.

Quantities of seed produced on an individual plant can be very high in full sunlight. A single plant of eastern *baccharis* has been estimated to produce over 1 million seeds (Westman and others 1975). Dense shade (3% of full sunlight) reduced seed production dramatically but did not totally eliminate it (Westman and others 1975).

Collection of fruits; extraction and storage of seeds. The ripe fruits of *baccharis* are either collected by hand or brushed onto cloth or plastic sheets spread beneath the shrubs. The fruits should be spread out to dry in a warm well-ventilated room or in the sun, protected from the wind. When dried, the fruits may be rubbed between the hands or treated in bulk to remove the pappus. Alternatively, full inflorescences can be fed into a brush machine where the fruit is threshed from the stems and the pappus removed. The seeds can then be cleaned with air, screens, or other equipment described in the seed handling chapter. Sometimes the entire fruits are used without removing the pappus. The number of fruits per weight for coyotebrush is about 180,800/kg (82,000/lb) (one sample); for mulefat *baccharis*, about 110,250/kg (50,000/lb) (one sample) (Olson 1974). Cleaned seeds of *baccharis* species can be stored dry at 1.7 to 4.5 °C in airtight containers (McBride 1964). Data published by Westman and others (1975) indicate that seeds of eastern *baccharis* could be stored for 1 to 4 months at room temperature. After 4 months of room temperature storage, the final germination was actually slightly higher than with seeds stored for only 1 month. Panetta (1979) found that seeds stored in an atmosphere of 33% relative humidity maintained their germination of 98% for 12 months at 20 °C but their percentage germination had dropped to 67% by 24 months. For seeds stored in

the laboratory in a constant 70% relative humidity, germination began to drop at 6 months. By contrast, seeds buried in the soil in the field at a depth of 5 cm maintained their germination rate at 99% for 2 years. Numbers of cleaned seeds per weight (determined from 1 sample, except for coyotebrush, which was determined from 2) for 4 species are as follows (McBride 1964; Mirov and Kraebel 1939; Olson 1974; Panetta 1979):

Species	seeds/kg	seeds/lb
saltwater falsewillow	4,989,600	2,268,000
eastern baccharis	10,000,000	4,500,000
coyotebrush	8,316,000	3,780,000
mulefat baccharis	11,000,000	5,000,000

Germination tests. Tests have been completed in 15 to 30 days at diurnally alternating temperatures of 30/20 °C (table 3). When comparing germination at constant 10, 15, 20, 25, 30, and 35 °C, Westman and others (1975) found that eastern baccharis germinated most quickly above 20 °C but germinated at higher numbers between 15 and 20 °C. Light was necessary for germination of eastern baccharis and mulefat baccharis. Without light, no or minimal germination was obtained. In another experiment with eastern baccharis (Panetta 1979), alternating temperatures of 19/22 °C partially compensated for the lack of light. However, in this same experiment, it was shown that an 8-hour photoperiod produced twice as much germination as constant light. Alternating temperatures were used and the effective range was from 19/22 °C to 19/24 °C. The ratio of red to far red light was also examined by Panetta (1979), but it was found to be important only when constant light was used. Therefore, either incandescent or fluorescent light for 8 hours each day would give good germination results for eastern baccharis. No pregermination treatments are needed (Emery 1964; McBride 1964; Mirov and Kraebel 1939), although prechilling at 5 °C for 1 week gave higher germination than no prechilling or prechilling at 0 °C when eastern baccharis was germinated at 10, 15, or 20 °C with continuous light. In a greenhouse test of eastern baccharis, there was no apparent reduction in germination under 56.7, 23.6, or 17.4% of full sunlight (Panetta 1990). Embryo excision was found to speed embryo germination in both Encinitis falsewillow and eastern baccharis (Kuti and others 1990), demonstrating that there is some inhibitory effect from the seed coat.

Nursery practice. Seeds may be sown in the fall or early spring in flats or seedbeds using a sandy soil mixture, or one of the vermiculite, perlite, or sphagnum moss seeding media (Everett 1957). Seeds usually germinate within 7 to 15 days. Plants large enough for 10-cm (4-in) pots can be taken from outside seedbeds within 4 months (Everett 1957) (figure 3). Rooseveltweed seeds sown in 15-cm-deep (6-in-deep) pots germinated slowly, requiring 1 month to establish seedlings (Van Auken and Bush 1990).

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Table 1 *Baccharis*, baccharis: nomenclature and occurrence

Scientific name & synonym	Common name	Occurrence
<i>B. angustifolia</i> Michx.	saltwater falsewillow, narrowleaf baccharis	Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, & South Carolina
<i>B. bigelovii</i> Gray	Bigelow's falsewillow	Arizona, New Mexico, & Texas
<i>B. brachyphylla</i> Gray	shortleaf baccharis	Arizona, California, Nevada, New Mexico, & Texas
<i>B. dioica</i> Vahl	broombush falsewillow	Florida, Puerto Rico, & the Virgin Islands
<i>B. douglasii</i> DC	saltmarsh baccharis	California & Oregon
<i>B. emoryi</i> Gray	Emory's baccharis	Arizona, California, Nevada, Texas, & Utah
<i>B. glomeruliflora</i> Pers.	silverling	Florida, Georgia, Mississippi, North Carolina, & South Carolina
<i>B. halimifolia</i> L. <i>B. halimifolia</i> var. <i>angustior</i> DC.	eastern baccharis	Alabama, Arkansas, Connecticut, Delaware, Florida, Georgia, Louisiana, Maryland, Massachusetts, Mississippi, New Jersey, New York, & North Carolina
<i>B. havardii</i> Gray	Harvard's falsewillow	Texas
<i>B. myrsinites</i> (Lam.) Pers.	Santo Domingo falsewillow	Puerto Rico
<i>B. neglecta</i> Britt.	Rooseveltweed	Arizona, New Mexico, & Oregon
<i>B. pilularis</i> DC. <i>Baccharis pilularis</i> ssp. <i>consanguinea</i> (DC.) C.B. Wolf <i>Baccharis pilularis</i> var. <i>consanguinea</i> (DC.) Kuntze	coyotebrush, kidneywort baccharis	California, New Mexico, & Oregon
<i>B. plummerae</i> Gray	Plummer's baccharis	California
<i>B. pteronioides</i> DC.	yerba de pasmo	Arizona, New Mexico, & Texas
<i>B. salicifolia</i> (Ruiz & Pavon) Pers. <i>Baccharis viminea</i> DC. <i>Molina salicifolia</i> Ruiz & Pavon <i>Baccharis glutiosa</i> Pers.	mulefat baccharis	Arizona, California, Nevada, New Mexico, Texas, & Utah
<i>B. sarothroides</i> Gray <i>B. sergiioides</i> Gray	desertbroom squaw waterweed baccharis	Arizona, California, Nevada, & Utah Arizona, California, Nevada, & Utah

<i>B. texana</i> (Torr. & Gray) Gray <i>Linosyris texana</i> Torr. & Gray	prairie falsewillow	New Mexico, Oklahoma, & Texas
<i>B. thesioides</i> Kunth	Arizona baccharis	Arizona & New Mexico
<i>B. vanessae</i> Beauchamp <i>B. glutinosa</i>	Encinitis falsewillow	California
<i>B. wrightii</i> Gray	Wright's baccharis	Arizona, Colorado, Kansas, New Mexico, Oklahoma, Texas, & Utah

Source: BONAP (1996), Olson (1974).

Table 2 *Baccharis*, baccharis: phenology of flowering and fruiting

Species	Flowering dates	Fruit ripening dates	Seed dispersal dates
<i>B. angustifolia</i>	SeptBOct	SeptBOct	Oct
<i>B. pilularis</i>	JulyBOct	SeptBDec	Fall
<i>B. salicifolia</i>	MayBJuly	MayBJuly	MayBJuly

Sources: McBride (1964), Mirov and Kraebel (1939), Olson (1974), Radford and others (1964).

Table 3 *Baccharis, baccharis*: germination test conditions and resulting germination

Species	Medium	Germination test conditions			Germination	
		Temp. (°C)		Duration (days)	Average %	Samples
		Day	Night			
<i>B. angustifolia</i>	Kimpak	15.6	15.6	55	21	2
<i>B. halimifolia</i>	C	23	19	10	92	1
<i>B. pilularis</i>	Moist paper	22B24	19	10	93	1
		30	17.3	15B30	92	1
		15B25	7.2B25	30	40B54	28
<i>B. salicifolia</i>	C	30	20	15B30	75B82	3

Sources: McBride (1964, 1969), Mirov and Kraebel (1939), Olson (1974), Panetta (1979).