

Asteraceae C Aster family

## *Ambrosia dumosa* (Gray) Payne

bursage

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**Synonyms.** *Franseria dumosa* Gray

**Other common names.** white bursage, white burrobush, burrobush, burroweed, sandbur

**Growth habit, occurrence, and use.** Bursage is a low, intricately branched, rounded shrub abundant on well-drained soils through much of the Southwest. It is significant component in creosote bush scrub and Joshua tree woodland communities of the Mojave and Colorado Deserts of California, south and east to Utah, Arizona, Mexico, and lower California (Kay 1977). Bursage, like creosote, has a rhizomatous growth habit and is thus an extremely long-lived shrub (Muller 1953).

**Flowering and fruiting.** Bursage flowers are inconspicuous, with staminate and pistillate heads intermixed in the terminal and lateral spikes of the panicle (Bainbridge and Virginia 1989). Blooming occurs primarily from February to June, and occasionally during the fall or after rain (Kay 1977). Seeds resemble cockleburs and mature 3 to 4 months after flowering.

**Collection, extraction, and storage.** Seeds can be hand-stripped from the plants; collecting burs from the ground beneath the plants is impractical because the light burs are rapidly blown away (Bainbridge and Virginia 1989). Seed cleaning is difficult and rarely done due to the spiny burs. In long-term storage trials by Kay and others (1988), seeds were stored at room temperature, 4 °C, - 15 °C, and in warehouse conditions, with germination rates tested annually over a 14-year period. The results indicated that seed quality had been poor, even though collected numerous times, and sporadic germination under a variety of conditions reflected this. Kay recommended that seeding guidelines should specify seeding rates in seed weight of pure live seed required for sowing an area (that is, kilograms per hectare or pounds per acre), and providing extra seed be planted to compensate for the low quality.

**Pregermination treatments.** After overnight leach/soak, seeds begin germinating during the first and second weeks in moist paper towels or directly into a 50% vermiculite:50% soil mixture (CALR 1989B:1995). Optimal germination temperatures appear to be between 15 to 25 °C (table 1), as colder temperatures tend to inhibit germination (Kay 1975).

**Germination tests.** Tests using activated carbon and scarification both resulted in a slightly improved early germination rate (Graves and others 1975). Germination tests at Joshua Tree National Park (JTNP) Native Plants Nursery include: (1) direct sowing to blotter paper, (2)

overnight cold water soaking, and (3) initial cold water soaking followed by overnight leaching. All of these methods had moderate success, indicating that no treatment is necessary when sowing directly to moist toweling; average germination ranges from 30 to 50% (CALR 1995). Other trials by Kay and others (1988) refer to initial germination of seeds using 4 replications of 100 seeds in damp paper toweling placed in a growth chamber at 15 °C. Test conditions were maintained for 28 days, with germination percentages recorded every 7 days; initial germination rate for bursage was 5%. Germination tests, conducted annually to test the effects of storage, were then averaged to a "best germination" of 9%. These annual tests consisted of 4 replications of 50 seeds using the same initial testing methods. Also tested were the effects of temperature on germination rates (table 1).

**Nursery practice.** Mature specimens have been transplanted with greater than 90 % survival (Ruffner and others 1985). Graves (1976) transplanted 2-month-old stock in February 1973, with a survival rate 2 years later of 44 and 48% for 2 separate sites. Flowering occurred in 25% of the plants during first year's growth at one site, with no flowering or seed at other site. Initial mortality was due to cold transplanting temperatures. Spot seeding, in comparison, was poor, with 18 burs/spot resulting in 16% germination and 0 to 4% stocking at the same sites. A one-time irrigation treatment did not improve results of either transplanting or spot seeding. Seed germination may be induced from September-October rains (Went 1979).

At JTNP, 12-month-old plants grown from seed have been successfully outplanted using a 30-inch tube "tall pot" with a 6-inch diameter (CALR 1995). Other outplantings of bursage in the park include a restoration project at an abandoned surface mine. Three types of containers were used: 3.8-, 6.8-, and 9.2-liter (1-, 1.8-, and 2.6-gal) pots with an elongated design 35 to 43 cm (14 to 17 in) in height. Latest monitoring noted an overall survival rate of 80% (CALR 1995). Prior to outplanting, smaller containers were between 4 and 5 months old and the larger containers between 6 and 7 months.

**Seedling care.** Seedlings grow quickly in greenhouse conditions, and new growth can be pruned back frequently to strengthen the sensitive root collar (CALR 1995). Both Graves (1976) and the JTNP Native Plants Nursery have noted seedling sensitivity to hardening-off in sub-freezing temperatures. Using plant bands, Graves (1976) recorded 80% mortality at 10 to -7 °C, with better survival after restarting and hardening off at day-night temperatures of 14 and 4 °C. Stem pieces root easily from the field or greenhouse by dipping in rooting hormone powder and placing cuttings in vermiculite in a mist house until rooted (Wieland and others 1971).

### Literature Cited

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**Table 1** *Ambrosia dumosa*, bursage: effect of temperature on germination

Temperature (°C)	2	5	10	15	20	25	30
Germination (%)	0	0	4	26	21	18	10

**Source:** Kay and others (1988).