Chenopodiaceae—Goosefoot family

Sarcobatus vermiculatus (Hook.) Torr.

black greasewood

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Other common name. Greasewood

Growth habit, occurrence and use. Black greasewood—*Sarcobatus vermiculatus* (Hook.) Torr.—is an erect to spreading, multi-branched, brittle, spinescent, and deciduous shrub that grows up to 2.5 m tall. It reproduces by seeds and by sprouting from its root crown and widespread root system (Branson and others 1967; Eddleman 1977; Robertson 1983). Black greasewood is widespread throughout western North America from southern Alberta, Saskatchewan, and British Columbia to Texas, northern Mexico, and eastern California (Branson and others 1967; Munz 1973; Stephens 1973; Stubbendieck and others 1994). Rickard (1982) classified this species as a phreatophytic, halophyte-osmophyte. The shrub may grow on sandy soils in the northeastern part of its range (Stephens 1973), but it is most commonly associated with heavy textured soils of high salt content (0.05 to 1.6%) on flood plains that are either subject to periodic flooding or have a water table less than 10.5 m deep. Black greasewood frequently occurs in nearly pure stands in saline conditions. It also grows in nearly all the less-saline salt desert shrub types (Eddleman 1979; Robertson 1983; Romo and Eddleman 1985; Shantz and Piemeisal 1940). A narrow endemic form found in western Nevada—*S. vermiculatus* var. *Baileyi* (Cov.) Jep.—is recognized by Kartesz (1987) and Munz (1973), although it appears to integrate with the typical form.

Black greasewood is used as wood for fuel and the sharpened spines were used for painting by Native Americans (Stubbendieck and others 1994). Seeds, leaves, and new leaders are consumed by a variety of small mammals (Van Dersal 1938). It is an important browse plant and is rated from good to useless forage for cattle, sheep, and big game animals in the winter and provides good cover and food for small mammals and birds (Blauer and others 1976). Sheep have been poisoned by rapidly consuming large amounts of new leader growth, which contains high levels of soluble oxalate (Kingsbury 1964; Stubbendieck and others 1994).

Flowering and fruiting. Black greasewood is usually monoecious, with the staminate flowers borne as catkin-like axillary spikes. Solitary green pistillate flowers are borne in leaf axils below staminate catkins (Munz 1973; Welsh 1987). Flowering occurs as early as June and as late as August (Eddleman 1979; Munz 1973; Romo 1985). The perianth is persistent, forming a circular winged coriaceous utricle containing an achene (figure 1). Achenes are composed of a thin outer membranous pericarp surrounding a coiled embryo (figure 2). Mature utricles are tan to light brown. Not all fruits ripen at the same time. Earliest maturation may be in late September; all fruit reach maturity by late November. Fruit dispersal begins in late September and may extend over the winter with a few fruit remaining on the plant in early summer the following year (Eddleman 1977, 1979; Romo 1985).

Collection, extraction, and storage of fruits. Mature fruits can be knocked from the plant with a flail. The best time for harvest is late October through November. A flail or de-winger can be used to remove the wings from well-dried fruits, which when run through a fanning mill or seed blower can yield good-quality seedlots (Eddleman 1977; Romo 1985). Cleaned seeds number from 425 to 628/g (193,000 to 285,000/lb) (Blauer and others 1976; Eddleman 1977, 1979; Romo 1985).

Germination tests. Seeds germinate well at cooler temperatures and rates of germination are high (table 1). Laboratory tests have shown optimum germination temperatures range from 10 to 25 °C (Eddleman 1979; Robertson 1983; Romo and Eddleman 1985; Romo and Haferkamp 1987; Sabo and 1979). Seeds from New Mexico germinated poorly at temperatures above 19 °C; seeds from Montana germinated at temperatures ranging from 5 to 40 °C. In the latter case, high temperatures (especially those above 25 °C) reduced both germination rate and percentage germination and abnormal seedlings developed (Romo and Eddleman 1985). Seeds from an Oregon source germinated best at 20 °C (Romo and Haferkamp 1987).

Stratification does not appears to be necessary, but incubation at 4 °C for 30 or 60 days may improve percentage germination at warmer temperatures (Eddleman 1979). Seeds germinate well at 30 to 60 days following maturation. Long viability is possible: seeds stored in the laboratory for 4 years reached germination of 70% in 4 days (Eddleman 1982). Romo and Eddleman (1985) have made the distinction between viable embryos (that is, the imbibed radicle tip is white) from non-viable embryos (that is, the imbibed radicle tip is brown). It is uncertain whether removal of the bracts (wings) affects germination. These bracts contain high levels of sodium which is rapidly absorbed by the seedling, presumably as a means of adjusting its osmotic potential to cope with saline conditions during establishment (Eddleman and Romo 1987; Rickard 1982; Romo and Eddleman 1985).

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Figure 1— *Sarcobatus vermiculatus,* black greasewood: winged and de-winged utricles, × 4.

Figure 2— *Sarcobatus vermiculatus,* black greasewood: longitudinal section through utricle, bracts removed × 25.

Table 1—*Sarcobatus vermiculatus,* black greasewood: germination tests, conditions, and results

	Germination test conditions			Germination rate		Average %			
Seed source	Medium	Temp (°C)	Days	Amt (%)	Days	germination	Samples		
Montana	Kimpak	10	30	67	2	100	4		
Montana	Kimpak	10	30	91	10	98	4		
	9						5–25	30	—
New Mexico	Filter paper	11	25	—	—	100	—		
	—						11 26	66	4

Sources: Eddleman (1979), Romo and Eddleman (1985), Sabo and others (1979).