

Amaranthus albus L. (Amaranthaceae)
Tumbleweed, Tumble Pigweed

Description. Plants monoecious, annual, round in outline, from deep taproots. Stems 20-80 (120) cm tall, central one erect, breaking at base in fruit, the branches many, spreading to ascending, glabrous to villous, pale green to whitish. Leaves alternate, lower and cauline 1.5-6 cm long, elliptic or lanceolate to oblanceolate or obovate, often deciduous in fruit, petiolate to tapered at base, margins entire, apices obtuse; upper leaves 0.5-3 cm long, elliptic to obovate, generally persistent, apices mucronate to obtuse. Flowers unisexual, in axillary clusters or spikes. Each flower subtended by 3 bracts, bracts 2-4 mm long, green, rigid, often spreading, onlong-lanceolate; sepals 3, unequal, shorter than bracts, staminate sepals oblong, pistillate ones oblong to linear; petals absent; stamens 3; styles 3. Fruit a utricle, circumscissile near the middle, surface rough at maturity. Seed one, 0.6-1 mm in diameter, lenticular, reddish brown to black, shiny. In California, flowering from May to November. (Abrams 1944, Aellen 1964, Clapham et al. 1962, Fernald 1950, McGregor 1986, Henrickson 1993, Munz 1959).

Note: A related species, *A. deflexus*, is similar in appearance and habitat to tumbleweed, but differs by its low, mounded habit, flowers with 2-3 sepals, and indehiscent, hardwalled, and somewhat inflated fruits (Henrickson 1993, Munz 1959).

Geographic distribution. Tumbleweed is considered originally native to North America and perhaps South America. Widely introduced into Europe but considered a waif in New Zealand, and South Africa (Aellen 1964, Arnold and de Wet 1993, Webb et al. 1988). The related species, *A. deflexus*, also occurs sporadically in Australia, New Zealand, and South Africa (Aellen 1964, Arnold and de Wet 1993, Webb et al. 1988).

Amaranthus albus was first reported from California in 1876 (Brewer et al. 1876), where it was considered common and native. Robbins (1940), who considered it introduced in southern California, listed records dating back to the period 1893-1913. Populations occur on Anacapa, Santa Cruz, and Santa Rosa islands (Junak et al. 1997), and have been reported from most counties in the state (Anonymous 1998).

Ecological distribution. Throughout its geographic range, both native and naturalized, *Amaranthus albus* occurs on open sites in abandoned fields, waste areas, and roadsides (Aellen 1964, Fernald 1950, Great Plains Flora Association 1986, Munz 1959, Robbins 1940).

Reproductive and vegetative biology. Although the pollination biology of tumbleweed has apparently not been studied, other monoecious species of *Amaranthus* are self-compatible, but generally wind-pollinated (Proctor et al. 1996). No specific literature was found pertaining to seed biology and establishment. Other species of *Amaranthus* considered to be noxious weeds (e.g., *A. hybridus*, *A. retroflexus*, and *A. spinosus*) produce large numbers of seeds that germinate readily after initial winter and spring rains in Mediterranean and temperate climates respectively (Holm et al. 1977). *Amaranthus albus*, like other congeners, possesses a C4 photosynthetic system (Black et al. 1969, Black 1971) and is thus capable of competing well in warm temperate and subtropical climates. Experimental studies of germination and growth rates in soybean fields suggest that tumbleweed competes well under high light intensities, with performance varying with respect to plant cover and density (Stoller and Myers 1989).

Weed status. *Amaranthus albus* is not considered a serious noxious weed in agricultural or horticultural practice, at least at a global level (not listed by Holm et al. 1977), nor is it considered a noxious weed by the State Dept. of Food and Agriculture (Anonymous 1996). It is considered a waif in New Zealand (Webb et al. 1988) and only a garden weed in South Africa (Arnold and de Wet 1993). Lorenzi and Jeffery (1987) listed it as a weed in the United States.

Microbial pathogens. *Aposphaeria amaranthi* has been reported to infest tumbleweed, (Mintz et al. 1992). Kaiser and Hannan (1983) reported tumbleweed to be a host of tobacco mosaic virus in bean crops.

Herbicide control. Lorenzi and Jeffery (1987) indicate that most *Amaranthus* species respond similarly to herbicides. They recommended a broad array, including aciflourfen, alachlor, ametryn, atrazine, chlorsulfuron, metolachlor, oxyflourfen, 2,4-d, and dicamba, among others, for field and cropland conditions. Successful control in crop fields has been reported, using rimsulfuron (Eberlein et al. 1994), combinations of acifluorfen, lactofen, chlorimuron and imazaquin (Mayo et al. 1995), clomazone (Wicks et al. 1996), and simazine (Saavedra and Pastor 1996).

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