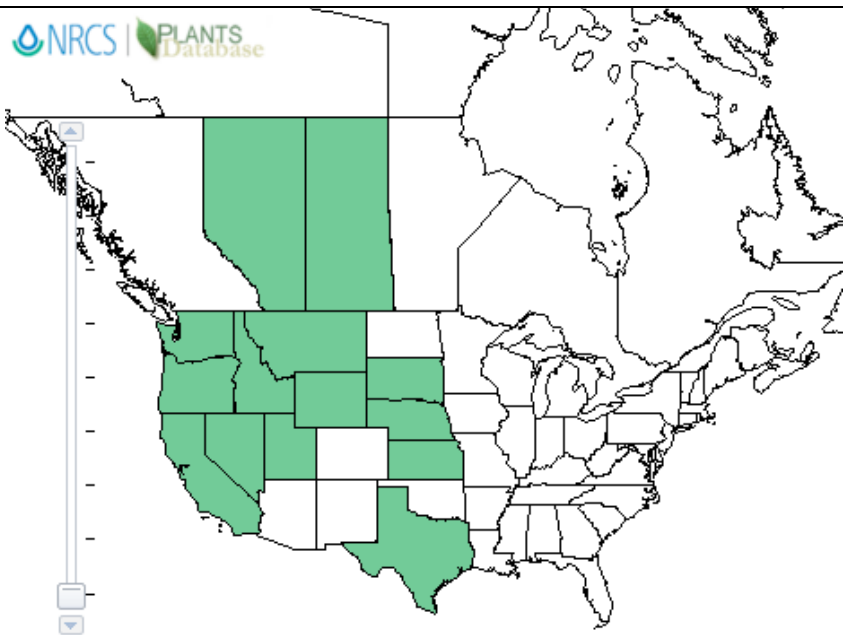
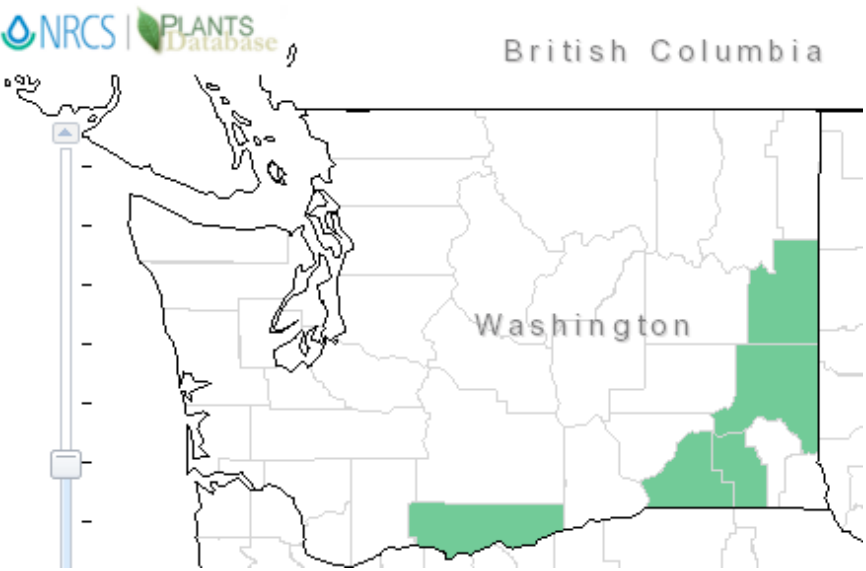


Plant Propagation Protocol for *Amaranthus californicus*

ESRM 412 – Native Plant Production

Protocol URL: <https://courses.washington.edu/esrm412/protocols/AMCA.pdf>

TAXONOMY	
Plant Family	
Scientific Name	Amaranthaceae
Common Name	Amaranth
Species Scientific Name	
Scientific Name	<i>Amaranthus californicus</i> (Moq.) S. Watson
Varieties	None
Sub-species	None
Cultivar	None
Common Synonym(s)	<i>Amaranthus albomarginatus</i> Uline & Bray <i>Amaranthus microphyllus</i> Shinnery
Common Name(s)	California amaranth California pigweed
Species Code (as per USDA Plants database)	AMCA
GENERAL INFORMATION	
Geographical range	 <p>North America</p>

	 <p style="text-align: center;">Washington State</p>
Ecological distribution	Mainly found in wetlands and riparian areas, although occasionally found in non-wetlands. ¹
Climate and elevation range	Tolerant of 20 to 36 C, and 14 to 2090 m elevation. Does best with a wet season of 3 to 8 months, with 36 to 165 cm annual precipitation. Occupies hardiness zones 6b to 10b. ²
Local habitat and abundance	Most abundant in California, southern Oregon, and western Nevada, and apparently secure in its abundance. Rare in all other parts of its range. ^{1,3} Found along lake margins, seasonally moist flats, and disturbed areas. ⁴ Known to host the Common Sootywing butterfly (<i>Pholisora catallus</i>). ²
Plant strategy type / successional stage	Early successional colonizer. ³ Shade intolerant. ¹
Plant characteristics	A prostrate green forb with red flowers, conspicuous red seeds, and fine foliage. Mat-forming, with multiple stems. Reaches 1 foot tall at mature height. ¹ Blooms from June to August. ² Produces circumscissile fruit, 1 to 1.2 mm in size and spheric to ovoid in shape, smooth or wrinkled near the tip. ⁴ Short lifespan; annual. ²
PROPAGATION DETAILS	
Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Seed
Product Type	N/A
Stock Type	N/A
Time to Grow	When grown in a greenhouse, non-grain amaranth seedlings generally take 10 to 11 days after planting before they can be transplanted into a field, although there is no literature specifically about <i>A. californicus</i> on this topic. ¹⁰ Non-grain amaranths can also

	be direct-seeded. ⁸
Target Specifications	N/A
Propagule Collection Instructions	Seeds are produced in the summertime, and can then be collected from the plant's fruit. ¹
Propagule Processing/Propagule Characteristics	900,000 seeds per pound. Rapid seed spread rate and high seedling vigor. ¹ <i>Amaranthus</i> seeds are generally long-lived, and have been found to germinate even after being outside of the plant for 20 years. ¹¹
Pre-Planting Propagule Treatments	Use blotter paper or sand to germinate the seeds. ⁷ Unlike many other <i>Amaranthus</i> types, seed stratification is not needed for germination. ¹ Take care that whatever the seeds are stored in is well-sealed, as the seeds are very small and can slip through cracks easily. ⁵
Growing Area Preparation	Seeds should be planted in fertile, loamy, well-draining soil. ⁶ A mixture of 66% peat moss and 34% coarse vermiculite is ideal. ¹² Soil should be fine to medium textured, with a pH between 5.5 and 7.5. ¹ When using cells, the cells should be 3 to 4 cm wide and deep. ¹² When direct seeding, till your soil to break down clods and residue and to firm up the seedbed. ⁵
Establishment Phase Details	Soil temperature should be between 20 and 40 C ⁹ , and two to three seeds should be planted between 0.5 to 1.0 cm deep. ¹² Keep seedbed evenly moist to maintain germination rate. ⁶ Seeds can also be transplanted with tweezers after germinating on moist blotter paper. ⁸ When direct seeding, seeds can be broadcast or sown in rows. To make it easier to broadcast the seeds uniformly (since they are very small), broadcast a mixture of 1 g seed to 100 g sand. When sowing the seeds in rows, space the rows 10 cm apart and dig the furrows 0.5 to 1.0 cm deep, 5 cm apart from each other. ¹²
Length of Establishment Phase	Generally, <i>Amaranthus</i> seedlings establish quickly and emerge from the soil within 3 to 4 days. ⁵
Active Growth Phase	Spring to Fall. ¹
Hardening Phase	Unknown
Length of Hardening Phase	Unknown, but grain amaranth seedlings typically take 5 days to harden. ¹²
Harvesting, Storage and Shipping	Unknown
Length of Storage	Unknown
Guidelines for Outplanting / Performance on Typical Sites	Plant seedling transplants 20 cm apart in 30 to 35 cm deep holes. Irrigate immediately. ¹² Flowers should begin to bloom around July. ⁴ Since <i>A. californicus</i> is a weedy species, it will likely establish itself readily.
Other Comments	Because of the weedy status of <i>A. californicus</i> , there is almost no literature devoted to its propagation. The propagation protocol here has been adapted from those of other <i>Amaranthus</i> species, with attention given to non-grain types.

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