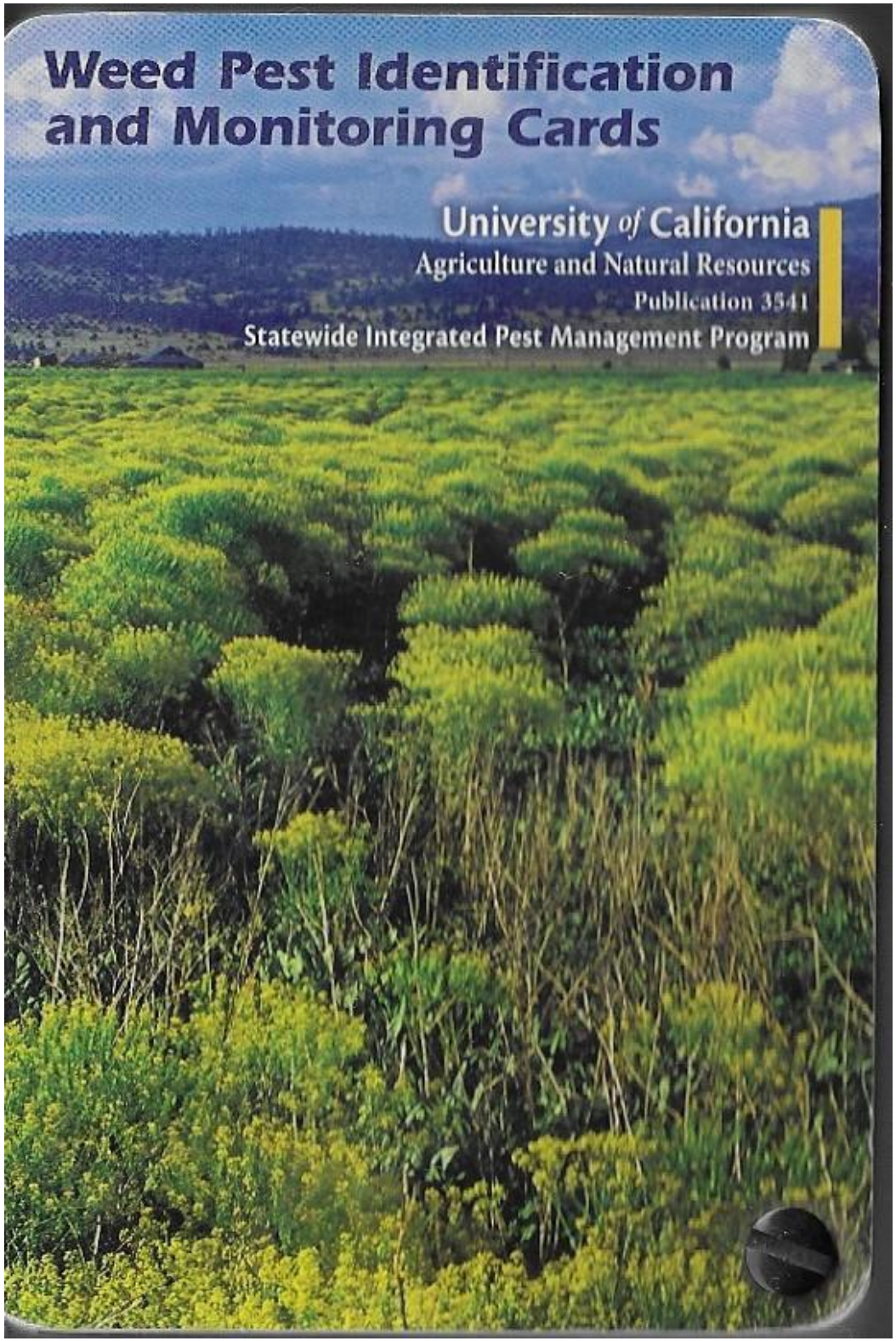


Weed Pest Identification and Monitoring Cards

Joseph M. DiTomaso
UC Cooperative Extension Weed Specialist
Department of Plant Sciences
University of California, Davis

These pocket cards are meant for in-field identification and monitoring of California weeds commonly found in crops, orchards, vineyards, nurseries, pastures, roadsides, parks, golf courses, gardens, lawns, urban sites, waste places, and other areas.

The identification and monitoring tips presented here are quick references. For additional photos and more detailed descriptions, see J. M. DiTomaso and E. A. Healy, *Weeds of California and Other Western States*, 2 vols. (UC ANR Publication 3488, 2007). Management information focuses on cultural control. For comprehensive current control information, see the UC IPM website, www.ipm.ucdavis.edu.

Cover photo: Joseph M. DiTomaso

Glossary

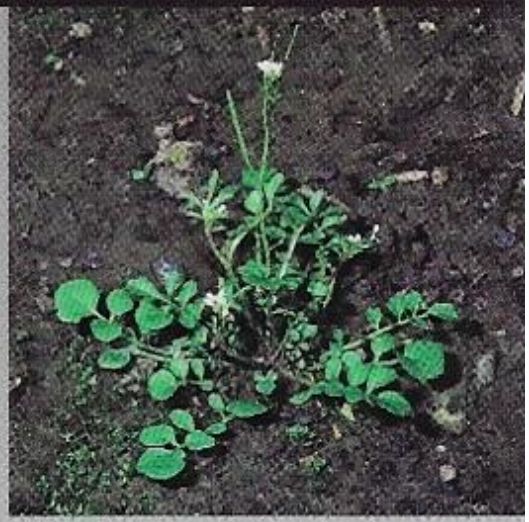
awn. Slender bristle attached to grass florets; glume or lemma.
dissected. Irregularly, sharply, or deeply cut but not compound.
glume. Sterile outer bract at the base of a grass spikelet.
lanceolate. Lance-shaped; much longer than wide and widest below the middle.
lemma. Fertile large outer bract of a grass spikelet.
monoecious. Separate male and female flowers on the same plant.
oblanceolate. Widest above the middle.
palmate. Shaped like the palm of a hand.
pappus. Bristly, feathery, or scaly structure at the top of a seed.
pinnate. Arranged on either side of an axis.
pubescent. Lightly or sparsely hairy.

UC IPM

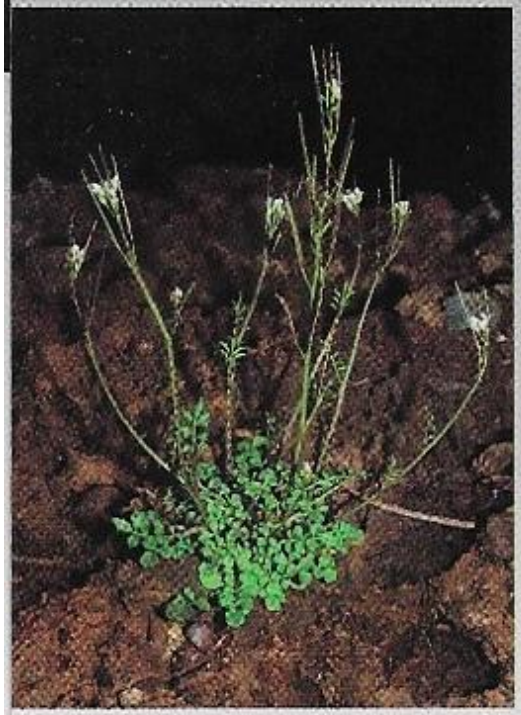
CONTENTS

1 BITTERCRESS

Hairy bittercress (*Cardamine hirsuta*) seedling. J. M. DiTomaso



Hairy bittercress (*Cardamine hirsuta*) plant. J. M. DiTomaso



Little bittercress (*Cardamine oligosperma*) plant. J. M. DiTomaso

Hairy bittercress (*Cardamine hirsuta*) flowering stem. J. M. DiTomaso

HAIRY BITTERCRESS
(Cardamine hirsuta)
LITTLE BITTERCRESS
(Cardamine oligosperma)

Mustard family

Winter or summer annuals, sometimes biennials, to 15 in. (38 cm) tall, with pinnate-compound leaves, tiny white flowers, and very slender, linear pods. Plants exist as rosettes of compound leaves until flowering stems develop at maturity.

Seedlings: Cotyledons oval to nearly round, tip indented, 0.1–0.2 in. (3–5 mm) long, hairy, on stalks mostly 0.1–0.2 in. (3–5 mm) long. Leaves alternate. First 1–3 leaves semicircular to kidney shaped, broader than long, 0.10–0.32 in. (3–8 mm) long, 0.18–0.35 in. (4.5–9 mm) wide, sparsely coarse hairy, on stalks as long or longer than blades.

Mature Plant: Stems simple or branched, erect, angled. Foliage hairy to sparsely coarse hairy. Hairs simple, straight. Leaves pinnate compound, 0.8–4 in. (2–10 cm) long. Stem leaves alternate. Rosette leaves usually present at flowering. Leaflets of lower leaves nearly round, kidney shaped to oval.

Roots: Taproot weak, slender, often inconspicuous, yellowish, usually highly branched.

Flowers: Hairy bittercress: January–June; little bittercress: March–July.

Fruits and Seeds: Pods linear, flattened, 0.47–1 in. (12–25 mm) long, ascending to erect. Beak at fruit tip inconspicuous, thick, to 0.02 in. (0.5 mm) long. Fruit valves spring open elastically from the bottom. Seeds in 1 row per chamber, orange brown, smooth except for 1 groove on each face.

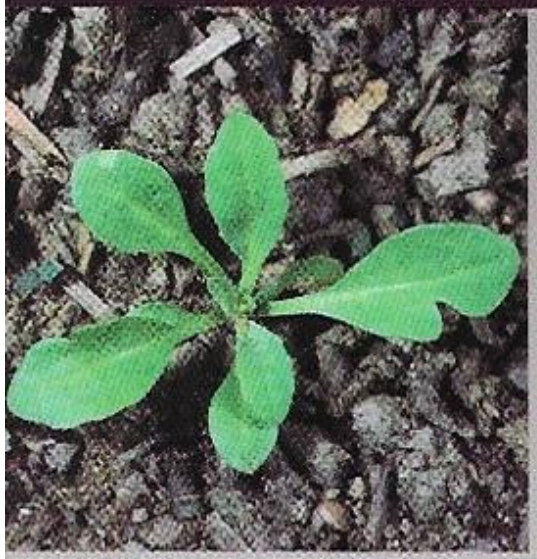
Habitat: Landscaped areas, yards, gardens, nurseries, container plants, greenhouses; occasionally turf, roadsides, orchards, vineyards, vegetable crops. Little bittercress: moist meadows, woodlands, creek bottoms, and other moist, shady places in natural areas.

Distribution: Hairy bittercress: Klamath Ranges, North Coast Ranges, San Francisco Bay region, Sacramento Valley, and probably elsewhere, to 2,600 ft (800 m). Little bittercress: Throughout California, except Great Basin and deserts, to 3,600 ft (1,100 m).

Propagation: By seed. Most seeds fall near the parent plant.

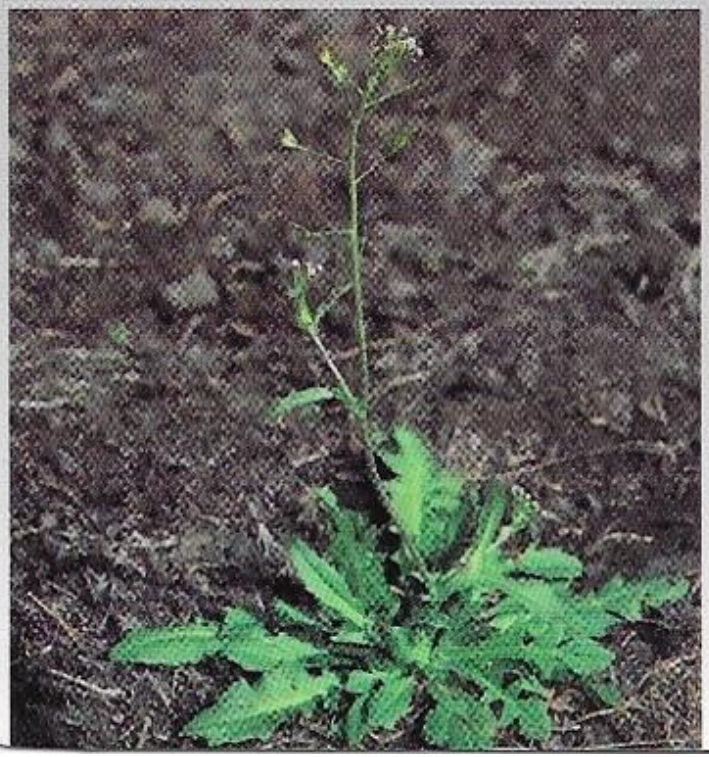
Management: Remove plants manually before seeds are produced. In nurseries, scrub containers before reuse; dispose, compost, or fumigate used potting media.

2 SHEPHERD'S-PURSE



Shepherd's-purse (*Capsella bursa-pastoris*) seedling. J. O'Brien

Shepherd's-purse (*Capsella bursa-pastoris*) inflorescence. J. M. DiTomaso



Shepherd's-purse (*Capsella bursa-pastoris*) plant. C. E. Elmore

SHEPHERD'S-PURSE
(Capsella bursa-pastoris)

Mustard family

Winter annual to 20 in. (0.5 m) tall, with small whitish flowers in a terminal raceme and flat, heart-shaped fruits. Plants exist as flat basal rosettes until flower stems develop at maturity. Petals 4, about 0.08 in. (2 mm) long.

Seedlings: Cotyledons oblong-elliptical, about 0.08–0.20 in. (2–5 mm) long. Leaves alternate, sparsely covered with simple and forked hairs. First and subsequent few leaves oblong-elliptical to egg shaped, 0.10–0.24 in. (3–6 mm) long, margins smooth to toothed. Later leaves often toothed to deeply pinnate lobed.

Mature Plant: Foliage highly variable, sparsely covered with simple and forked hairs. Rosette leaves nearly smooth margined to deeply pinnate lobed, 1.2–4 in. (3–10 cm) long. Stem leaves alternate, sparse, reduced in size, lacking a petiole, base lobed and clasping the stem, margins usually toothed or pinnate lobed.

Roots: Taproot slender, often branched, with fibrous lateral roots.

Flowers: Mostly late winter or spring, but sometimes year-round under favorable conditions.

Fruits and Seeds: Pods triangular to heart shaped, flattened, 0.16–0.32 in. (4–8 mm) long, 0.24 in. (6 mm) wide, in two chambers. Fruits taste peppery and open to release numerous seeds. Seeds oblong, 0.04 in. (1 mm) long, 0.02 in. (0.5 mm) wide, grooved on each side, otherwise smooth, dull reddish to yellowish brown.

Habitat: Agronomic and vegetable crops, nurseries, gardens, turf, landscaped areas, orchards, vineyards, roadsides, waste places, urban sites, other disturbed places.

Distribution: Common throughout California to 7,500 ft (2,300 m).

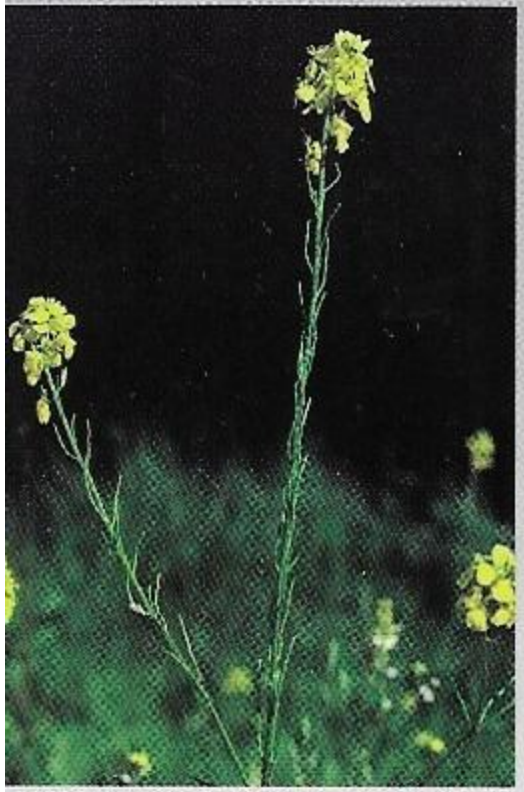
Propagation: Reproduction by seed. Most seeds fall near the parent plant and germinate fall through early spring. Buried seeds can survive up to 15 years or more.

Management: In crop fields, cultivate frequently to prevent seeds from maturing. In gardens and small areas, manually remove plants before seeds develop.

3 WILD MUSTARD

Wild mustard (*Sinapis arvensis*) seedling. J. K. Clark

Wild mustard (*Sinapis arvensis*) plant. J. M. DiTomaso



Wild mustard (*Sinapis arvensis*) inflorescence. J. M. DiTomaso

Wild mustard (*Sinapis arvensis*) fruit. J. M. DiTomaso

Wild mustard (*Sinapis arvensis*) young rosette. J. M. DiTomaso

WILD MUSTARD

(*Sinapis arvensis*; syn. = *Brassica kaber*)

Mustard family

Erect winter or summer annual with yellow flowers to 3.3 ft (1 m) tall. Sepals yellowish, spreading. Petals pale to bright yellow, 0.32–0.47 in. (8–12 mm) long. Racemes elongate in fruit.

Seedlings: Cotyledons kidney shaped, 0.2–0.4 in. (5–10 mm) long, slightly broader than long, lacking hairs, stalked. First and subsequent few leaves alternate, hairy, egg shaped, about 0.4–0.8 in. (10–20 mm) long, margins wavy or rounded toothed.

Mature Plant: Lower leaves egg shaped, irregularly pinnate lobed, toothed, about 2–8 in. (5–20 cm) long, terminal lobe larger than lateral lobes, on a long stalk. Leaf lobes rounded to pointed. Upper leaves lacking a petiole, reduced, lanceolate, not clasping the stem, margin irregularly toothed. Stem bases sparsely covered with short, stiff, down-directed hairs.

Roots: Slender taproot with fibrous lateral roots.

Flowers: February–May, occasionally to October.

Fruits and Seeds: Pods ascending, linear and cylindrical, 2-valved, with a persistent beak at the tip, on a stalk that is shorter than the pod. Fruits 0.8–1.4 in. (20–35 mm) long including beak, often slightly constricted between seeds. Seeds nearly spherical, 0.06–0.08 in. (1.5–2 mm) in diameter, dull reddish brown to nearly black.

Habitat: Disturbed places, roadsides, fields, pastures, agronomic crops, orchards, vineyards, ditch banks, dry washes.

Distribution: Throughout California, except deserts and Great Basin, to 1,650 ft (500 m).

Propagation: Reproduction by seed. Seeds fall near parent plants. Seed production can be high. Seeds can survive at least 11 years.

Management: Manually remove or cultivate before seeds develop, particularly during the seedling stage.

Wild radish (*Raphanus raphanistrum*) seedling. J. M. DiTomaso

Wild radish (*Raphanus raphanistrum*) plant. J. M. DiTomaso

Wild radish (*Raphanus raphanistrum*) inflorescence. J. M. DiTomaso

Wild radish (*Raphanus raphanistrum*) fruit. J. M. DiTomaso

Radish (*Raphanus sativus*) inflorescence. J. M. DiTomaso

WILD RADISH
(*Raphanus raphanistrum*)
RADISH (*Raphanus sativus*)

Mustard family

Erect winter or summer annuals to 4 ft (1.2 m) tall, with white, yellow, or pale purplish pink flowers with 4 petals, 0.6–1 in. (15–25 mm) long, dark, violet veins. Plants exist as rosettes until flower stems develop at maturity. Both species are widespread and hybridize.

Seedlings: Cotyledons lacking hairs, kidney shaped, 0.4–0.8 in. (1–2 cm) long, tip broadly notched. Leaves alternate, sparsely covered with stiff, flattened hairs. First few leaves elliptical-oblong, 0.4–1 in. (1–2.5 cm) long, margins irregularly round toothed, base tapered or deeply lobed once or twice, on long stalks.

Mature Plant: Foliage sparsely covered with stiff, flattened hairs, especially near the base. Lower leaves elliptical to oblanceolate, deeply pinnate lobed to compound, mostly 2.4–8 in. (6–20 cm) long. Lobe margins irregularly toothed. Upper stem leaves smaller, toothed, sometimes lobed, lacking a petiole or short stalked.

Roots: Taproot to 5 ft (1.5 m) deep, usually with numerous fibrous roots near soil surface.

Flowers: Wild radish: April–July; radish: February–July.

Fruits and Seeds: Pods elongate, nearly straight. Beak about 0.4–1.2 in. (1–3 cm) long, tapers to a narrow apex. Pods break apart horizontally into 1-seeded segments. Seeds nearly round to oval, 0.08–0.20 in. (2–4 mm) long, 0.08 in. (2 mm) wide, brown to reddish or yellowish brown. Wild radish pods strongly constricted between seeds, 1.6–3.2 in. (4–8 cm) long, seeds mostly 4–12 per pod. Radish pods not or slightly constricted between seeds, 1.2–2.4 in. (3–6 cm) long, 1–5 per pod. Pods do not break apart horizontally.

Habitat: Roadsides, pastures, fields, crop fields, orchards, vineyards, gardens, parks, other disturbed places.

Distribution: Throughout much of California to 3,300 ft (1,000 m).

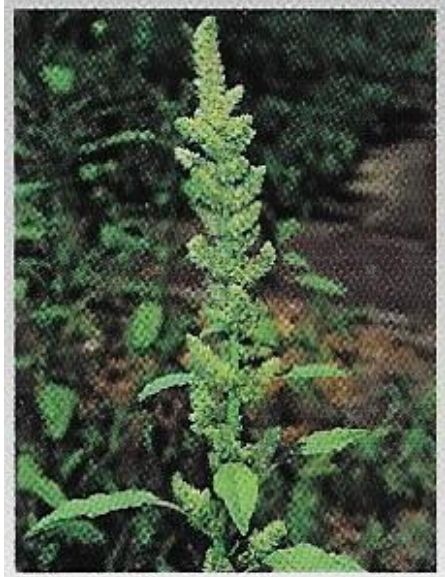
Propagation: Reproduction by seed. Fruits and seeds generally disperse close to parent plant. Buried seeds can survive 20–30 years.

Management: Cultivate to prevent seed production or manually remove plants before seeds are produced.

5 REDROOT PIGWEED

Redroot pigweed (*Amaranthus retroflexus*) root. J. K. CLARK

Redroot pigweed (*Amaranthus retroflexus*) seedling. J. M. DITOMASO



Redroot pigweed (*Amaranthus retroflexus*) flowering stem. J. M. DITOMASO

Redroot pigweed (*Amaranthus retroflexus*) plant. J. M. DITOMASO

REDROOT PIGWEED
(*Amaranthus retroflexus*)

Pigweed family

Erect summer annuals to 10 ft (3 m) tall, with dense terminal panicles of inconspicuous flowers. Panicles stiff, mostly 2–8 in. (5–20 cm) long, 0.8–2.4 in. (2–6 cm) wide, with ascending spikelike branches throughout. Flowers monoecious. Sepals usually 5. Bracts immediately below each flower pointed, often spine tipped.

Seedlings: Cotyledons lanceolate, mostly 0.10–0.47 in. (3–12 mm) long, 0.03–0.10 in. (0.75–3 mm) wide, lacking hairs, lower surface often reddish. Stalk below cotyledons reddish. Leaves alternate. First leaf egg shaped, tip slightly indented, lower surface and main veins often reddish. Leaf petioles usually hairy along the margins.

Mature Plant: Stems coarse. Upper stems pubescent to densely covered with contorted hairs. Lower stems often reddish. Leaves alternate, mostly 0.6–6.7 in. (1.5–17 cm) long, on stalks about 0.4–3.2 in. (1–8 cm) long. Lower leaves egg shaped to diamond shaped. Upper leaves lanceolate.

Roots: Taproots thick, often shallow, upper portion often reddish.

Flowers: June–November.

Fruits and Seeds: Capsules 0.06 in. (1.5 mm) long, open like a lid to release 1 seed. Seeds lens shaped, 0.04–0.06 in. (1–1.5 mm) in diameter, glossy, dark reddish brown to black.

Habitat: Cultivated fields, pastures, orchards, vineyards, gardens, landscaped areas, ditch banks, washes, roadsides, waste places, other disturbed places. Grows best on fertile soil and in open, sunny places.

Distribution: Most areas of California, to 7,900 ft (2,400 m).

6 PRICKLY LETTUCE

Prickly lettuce (*Lactuca serriola*) habit. J. K. CLARK

Prickly lettuce (*Lactuca serriola*) seedling. J. M. DITOMASO

Prickly lettuce (*Lactuca serriola*) type with deeply lobed leaves. J. M. DITOMASO

Prickly lettuce (*Lactuca serriola*) flower heads. J. K. CLARK

Prickly lettuce (*Lactuca serriola*) type without deeply lobed leaves. J. M. DITOMASO

PRICKLY LETTUCE
(*Lactuca serriola*)

Sunflower family

Erect winter or summer annual to 6.5 ft (2 m) tall, with milky sap and open panicles of pale yellow straplike flower heads. Leaves with a row of prickly bristles on the lower midvein. Plants exist as basal rosettes until flowering stems develop at maturity.

Seedlings: Cotyledons elliptical-oblong to egg shaped, mostly 0.2–0.4 in. (5–10 mm) long, 0.10–0.32 in. (3–8 mm) wide, often with tips slightly indented; bases abruptly taper into a short stalk, usually with a few fine gland-tipped hairs, especially on the margins. Leaves alternate. First few leaves oblanceolate to elliptical, glandular-hairy, tips rounded, bases gradually taper into a short stalk, margins weakly few toothed to smooth. Later rosette leaves have stiff bristles on the lower midvein.

Mature Plant: Stems lack hairs or are bristly-hairy in the lower portion. Stem leaves alternate, oblanceolate to egg shaped or elliptical, pinnate lobed with nearly rounded indentations or entire, margins prickly toothed, base clasping the stem. Lower midveins typically have a row of prickly bristles.

Roots: Taproot often deep (> 3.3 ft, or 1 m), with fibrous lateral roots.

Flowers: April–October.

Fruits and Seeds: Fruits light to dark brown, lanceolate, flattened, 5 or more ribs per side, body 0.10–0.16 in. (3–4 mm) long, with a long slender beak at the apex. Pappus bristles white, 0.16–0.20 in. (4–5 mm) long, detach separately.

Habitat: Disturbed sites, annual grasslands, roadsides, seasonal wetlands, waste places, ditch banks, fields, agronomic and vegetable crops, orchards, vineyards, landscaped areas, and urban places.

Distribution: Throughout California to 6,900 ft (2,000 m).

Propagation: Reproduction by seed. Seeds disperse with wind. Newly matured seeds generally remain dormant for several months; germination does not require light.

Management: Manually remove plants, cultivate, and mow flower stems before seeds mature.

7 SOWTHISTLE

Annual sowthistle (*Sonchus oleraceus*) immature plant. J. M. DiTomaso

Rosettes of spiny sowthistle (*Sonchus asper*) (right) and annual sowthistle (*Sonchus oleraceus*) (left). J. M. DiTomaso

Spiny sowthistle (*Sonchus asper*) flowering stem. J. M. DiTomaso

Annual sowthistle (*Sonchus oleraceus*) in an agricultural field. J. K. Clark

Clasping leaf of annual sowthistle (*Sonchus oleraceus*). J. K. Clark

SPINY SOWTHISTLE
(*Sonchus asper*)
ANNUAL SOWTHISTLE
(*Sonchus oleraceus*)

Sunflower family

Erect winter annuals to 4.6 ft (1.4 m) tall, with milky juice and yellow, straplike, dandelionlike flower heads, 0.6–1 in. (1.5–2.5 cm) in diameter. Plants exist as rosettes until flower stems develop in spring or summer.

Seedlings: Cotyledons egg shaped to elliptical-oblong, about 0.16–0.32 in. (4–8 mm) long, 0.06–0.28 in. (1.5–7 mm) wide, lacking hairs, short stalked. Leaves alternate. First leaf egg shaped, sparsely hairy, margin lined with backward-pointing teeth.

Mature Plant: Foliage lacking hairs, bluish in annual sowthistle. Leaves alternate, margins toothed. Lower leaves mostly 4–8 in. (10–20 cm) long, base tapered or winged, deeply pinnate lobed, lateral lobes lanceolate, terminal lobe deltoid. Upper leaves lacking a petiole, smaller than lower leaves, base lobed and clasping the stem. Leaf margin teeth prickly to touch in spiny sowthistle, soft to touch in annual sowthistle.

Roots: Both species have a short, thick, usually unbranched taproot with numerous fine lateral roots.

Flowers: Primarily spring and summer, year-round under favorable conditions.

Fruits and Seeds: Fruits strongly flattened, elliptical to oblanceolate, lack a beak, 0.08–0.16 in. (2–4 mm) long. Pappus bristles numerous, soft, fine, white. Pappus bristles 3 times the length of the fruit in spiny sowthistle and 2 times the length of the fruit in annual sowthistle.

Habitat: Roadsides, fields, pastures, riparian areas, ditches, yards, gardens, vegetable and agronomic crops, orchards, vineyards, urban waste areas, logged areas in forests, and other disturbed sites.

Distribution: Both species occur commonly throughout California to 6,300 ft (1,900 m).

Propagation: Reproduction by seed. Fruits disperse primarily with wind. Seeds germinate in fall and spring. Seeds are reported to survive 2–8 years under field conditions.

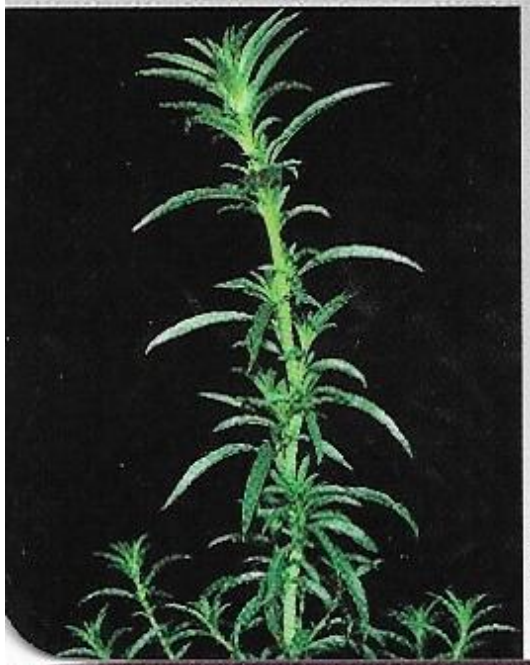
Management: Manually remove plants or cultivate as needed to prevent fruits from maturing.

8 TALL ANNUAL WILLOWHERB

Tall annual willowherb (*Epilobium brachycarpum*) flowers and fruit. J. M. DiTomaso

Tall annual willowherb (*Epilobium brachycarpum*) seedling. J. K. Clark

Tall annual willowherb (*Epilobium brachycarpum*) plant. J. M. DiTomaso



Tall annual willowherb (*Epilobium brachycarpum*) stem. J. M. DiTomaso

TALL ANNUAL WILLOWHERB
(Epilobium brachycarpum)

Evening Primrose family

Erect native summer annual to 6.5 ft (2 m) tall. Immature plants are much leafier than mature plants. Flowers 4 white to violet-pink petals, 0.08–0.60 in. (2–15 mm) long, with notched tips.

Seedlings: Cotyledons broadly egg shaped to nearly round, about 0.1–0.2 in. (3–5 mm) long and wide, tip slightly straight, lacking hairs. Leaves initially opposite, sometimes red tinged. First leaf pair oblong-elliptical, about 0.40–0.55 in. (10–14 mm) long, 0.1–0.2 in. (3–5 mm) wide, margins sometimes weakly toothed, lacking hairs.

Mature Plant: Main stem usually single, weakly woody and peeling at the base at maturity, branched in the upper portion. Branches ascending, nearly straight, lacking hairs except tips often slightly glandular-hairy. Leaves opposite near the base, usually alternate above, linear to narrow elliptical, sometimes tinged red, mostly 0.4–2 in. (1–5 cm) long, nearly hairless, often folded up along the midvein, early-deciduous, lacking a petiole or on short stalks, margins either smooth or with a few small teeth. Upper leaves often with clusters of smaller leaves in the axils.

Roots: Taproot simple or branched, weakly woody at maturity.

Flowers: May–September.

Fruits and Seeds: Capsules slender, straight, cylindrical, 0.6–1.4 in. (1.5–3.5 cm) long, lacking hairs or glandular-hairy, 4-chambered, open widely at the apex by 4 back-curved valves. Seeds egg shaped, flattened, 0.06–0.09 in. (1.5–2.5 mm) long, with a tuft of long, soft, nearly white deciduous hairs at the apex. Hairs fused at the base and separate from the seed as a unit.

Habitat: Dry, open, disturbed places in many plant communities, roadsides, waste places, fields, dry pastures, landscaped areas, nurseries, agronomic crops, orchards, vineyards, and forestry sites.

Distribution: Throughout California to 10,900 ft (3,300 m).

Propagation: Reproduction by seed. Seeds disperse primarily with wind.

Management: Manually remove plants or cultivate before seeds develop.

9 COMMON LAMBSQUARTERS

Swollen hairs on leaf of common lambsquarters (*Chenopodium album*).
J. K. Clark

Common lambsquarters (*Chenopodium album*) seedling.
J. M. DiTomaso

Common lambsquarters (*Chenopodium album*) plant.
J. K. Clark

Common lambsquarters (*Chenopodium album*) flowering stem.
J. M. DiTomaso

COMMON LAMBSQUARTERS
(*Chenopodium album*)

Goosefoot family

Erect summer annual to 5 ft (1.5 m) tall, with dull, pale gray-green foliage and at least a few triangular, egg-shaped leaves. Foliage, especially new growth, covered with a fine, white, powdery scurf. Inflorescences panicle-like, dense clusters of unstalked green flowers. Flowers 0.06 in. (1.5 mm) in diameter, lack petals, covered with a fine, white, powdery scurf.

Seedlings: Cotyledons narrow oblong to lanceolate, 0.16–0.60 in. (4–15 mm) long, 0.03–0.08 in. (0.75–2 mm) wide, dull green. Stalk below cotyledons often tinged purplish red. First leaves appear opposite. Subsequent leaves alternate, increasingly larger. Leaves oblong, egg shaped to triangular-oval, margins smooth to weakly wavy toothed, initially covered with glistening translucent granules that later become a powdery white scurf, especially on the lower surfaces.

Mature Plant: Stems angled, ridged, sometimes striated purplish red. Leaves triangular, egg shaped to lanceolate, on slender stalks about half as long as the blade. Leaves 0.4–2 in. (1–5 cm) long, dull, pale gray-green, covered with powdery white scurf; margins smooth to coarsely toothed or sometimes weakly 3-lobed.

Roots: Simple or branched taproot with fibrous lateral roots.

Flowers: May–November.

Fruits and Seeds: Fruits 0.04–0.06 in. (1–1.5 mm) in diameter, enclosed by sepals, contain 1 seed. Seeds disk shaped, 0.04–0.06 in. (1–1.5 mm) in diameter, glossy, black to dark brown.

Habitat: Roadsides, fields, pastures, agronomic and vegetable crops, gardens, orchards, vineyards, landscaped areas, waste places, and other disturbed sites.

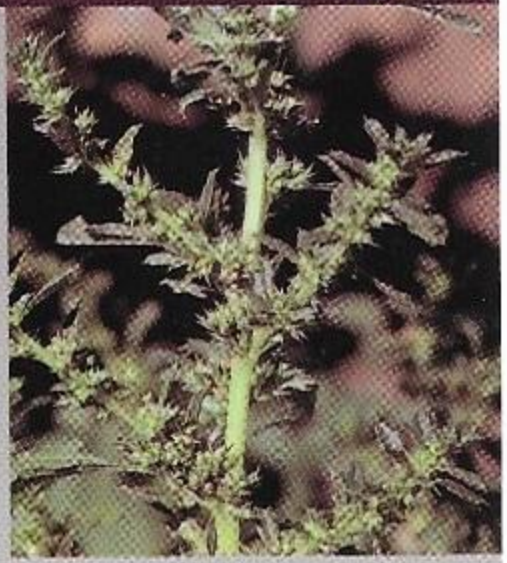
Distribution: Common throughout California to 5,900 ft (1,800 m).

Propagation: Reproduction by seed. Fruits fall near the parent plant or disperse as a crop seed contaminant. Most seeds germinate in spring. Buried seeds can survive up to 40 years or more.

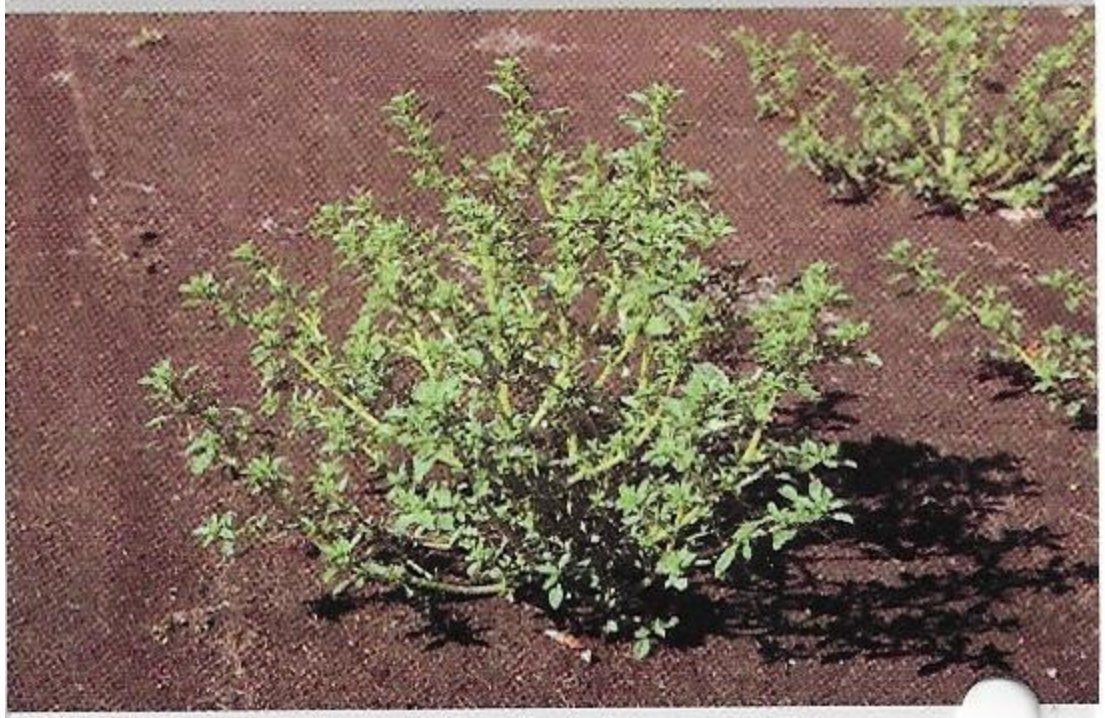
Management: Manually remove plants or cultivate before seeds develop.

10 TUMBLE PIGWEED

Tumble pigweed (*Amaranthus albus*) seedling. J. M. DiTomaso



Tumble pigweed (*Amaranthus albus*) flower clusters in leaf axils. J. K. Clark



Tumble pigweed (*Amaranthus albus*) plant. J. M. DiTomaso

TUMBLE PIGWEED
(Amaranthus albus)

Pigweed family

Bushy summer annual to about 2.5 ft (0.75 m) tall. Flowers axillary, inconspicuous, monoecious. Petals lacking.

Seedlings: Cotyledons lanceolate, tips slightly rounded, 0.10–0.35 in. (3–9 mm) long, often reddish below, lacking hairs. First leaves alternate, oval to egg shaped, tip indented, midvein and lower surface often reddish.

Mature Plant: Stems erect to ascending, highly branched with a bushy appearance, whitish to pale green. Foliage lacking hairs to sparsely covered with minute hairs. Leaves alternate, elliptical to egg shaped, mostly 0.4–2.8 in. (1–7 cm) long, light green, sometimes early-deciduous, veins conspicuous; margins often slightly wavy or ruffled. Lower surfaces sometimes reddish; axillary leaves smaller, persistent.

Roots: Taproot generally shallow. Lateral roots usually spreading.

Flowers: June–October.

Fruits and Seeds: Capsules 0.06–0.08 in. (1.5–2 mm) long, open like a lid. Fruits contain 1 glossy, lens-shaped seed, 0.04 in. (1 mm) in diameter, dark reddish brown.

Habitat: Disturbed places, roadsides, fields, gardens, landscaped areas, waste places, field and vegetable crops, orchards, vineyards, and urban sites.

Distribution: Common throughout California to 7,300 ft (2,200 m).

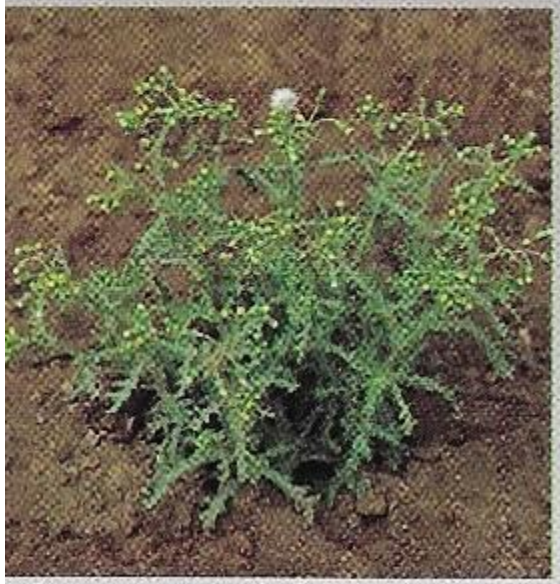
Propagation: Reproduction by seed. Seeds germinate in spring as the temperature warms. At maturity, main stems become brittle and detach at ground level under windy conditions. Most seeds disperse as the dried bushes tumble with the wind. Exposure to light increases seed dormancy.

Management: Manually remove plants or cultivate before seeds develop.

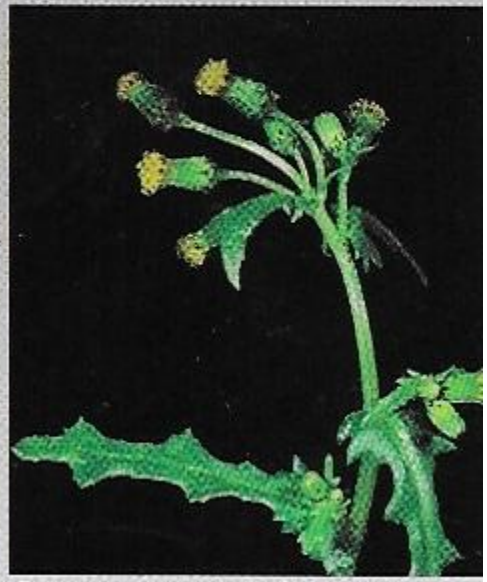
11 COMMON GROUNDSEL

Common groundsel (*Senecio vulgaris*) seedling. J. K. CLARK

Common groundsel (*Senecio vulgaris*) fruiting head. J. M. DITOMASO



Common groundsel (*Senecio vulgaris*) plant. J. K. CLARK



Common groundsel (*Senecio vulgaris*) flowering stem. J. M. DITOMASO

COMMON GROUNDSEL
(*Senecio vulgaris*)

Sunflower family

Very common erect winter or summer annual to 2 ft (0.6 m) tall, with alternate, pinnate lobed leaves. Yellow flower heads often nodding, few to several initially in dense clusters, later in loose clusters as the stalks elongate. Heads consist of numerous disk flowers, usually lack ray flowers.

Seedlings: Cotyledons narrowly elliptical to oblong, 0.10–0.45 (3–11 mm) long, tip rounded-pointed, base tapered and sheathing, lacking hairs or scurfy, often purplish below. First leaves alternate, egg shaped, 0.32–0.47 in. (8–12 mm) long, tip broadly pointed, margin coarsely shallow toothed to deeply pinnate lobed, lacking hairs or with a few hairs.

Mature Plant: Stems single or branched from the crown, sometimes rooting at the lower nodes. Leaves deeply pinnate lobed, 0.8–4 in. (2–10 cm) long, margin toothed. Foliage lacking hairs to lightly covered with long wavy to cottony hairs, especially on the midveins, lower leaf surfaces, and new growth.

Roots: Taproot small, sometimes not evident. Secondary fibrous roots shallow.

Flowers: Nearly year-round.

Fruits and Seeds: Fruits cylindrical, 0.06–0.10 in. (1.5–3 mm) long, shallow ribbed, light brown, sparsely pubescent between ribs. Pappus bristles deciduous, numerous, soft, white, about twice the length of the fruit.

Habitat: Disturbed sites, waste places, roadsides, fields, vegetable and agronomic crop fields, gardens, nurseries, orchards, vineyards, landscaped areas, and yards. Grows best on moist, fertile soil.

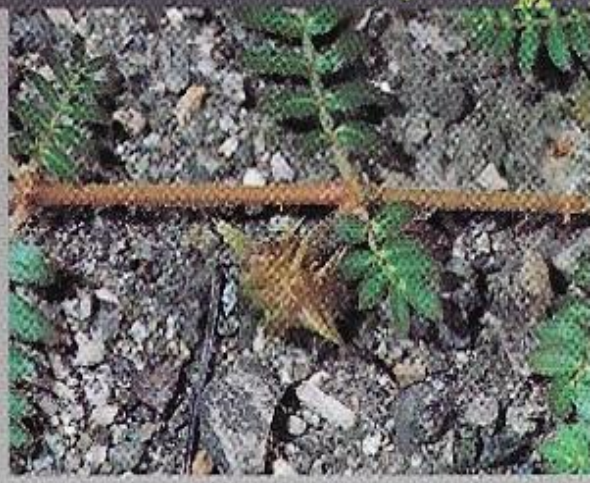
Distribution: Throughout California, except deserts, to 4,950 ft (1,500 m).

Propagation: Reproduction by seed. Fruits disperse with wind. Seeds typically germinate in early spring through late fall but can germinate year-round in mild-climate areas.

Management: Manually remove plants or cultivate before seeds develop.

12 PUNCTUREVINE

Puncturevine (*Tribulus terrestris*) seedling. J. K. Clark



Puncturevine (*Tribulus terrestris*) fruit. J. M. DiTomaso

Puncturevine (*Tribulus terrestris*) plant. J. M. DiTomaso

Puncturevine (*Tribulus terrestris*) flowers and fruit. J. M. DiTomaso

PUNCTUREVINE (*Tribulus terrestris*)

Caltrop family

Prostrate summer annual with stems to 3.3 ft (1 m) long. Plants have compound leaves, and small, solitary, bright yellow flowers, 0.2–0.6 in. (5–15 mm) in diameter, with 5 petals.

Seedlings: Cotyledons oblong, 0.16–0.60 in. (4–15 mm) long, thick, creased down the center, tip slightly indented. First and subsequent leaves resemble those of mature plants.

Mature Plant: Stems highly branched, green to reddish brown, prostrate, radially spreading from the crown on open ground to nearly erect when shaded or competing with other plants. Foliage lacking hairs to moderately covered with silky or bristly silver hairs. Leaves opposite, even-pinnate compound, mostly 1.2–2 in. (3–5 cm) long, with 3–7 pairs of leaflets per leaf. Leaflets oblong, 0.2–0.6 in. (5–15 mm) long, base slightly oblique.

Roots: Taproot slender, somewhat woody and deep to 8.5 ft (2.6 m), with a network of many fine rootlets. Roots can associate with nitrogen-fixing bacteria and develop nodules.

Flowers: March–October.

Fruits and Seeds: Burs woody, 5-lobed, 0.2–0.4 in. (5–10 mm) in diameter, round, gray to yellowish tan, hairy, eventually separate into 5 wedge-shaped nutlets, each with 2 stout spines 0.16–0.28 in. (4–7 mm) long and several short prickles.

Habitat: Disturbed places, roadsides, railways, cultivated fields, orchards, vineyards, waste places, and walkways. Prevalent in areas with a hot summer. Grows best on dry, sandy soils. Killed by freezing temperatures.

Distribution: Throughout California to 3,300 ft (1,000 m).

Propagation: Reproduction by seed. Individual spiny nutlets disperse by adhering to vehicle tires, shoes and clothing, and animals. Germination requires warm temperatures. Buried seeds usually remain viable for several years. Seedlings emerge early spring through summer.

Management: Remove plants before burs mature and cultivate repeatedly to prevent new burs from maturing; plant competitive vegetation.

Prostrate pigweed (*Amaranthus blitoides*) seedling. J. M. DiTomaso

Prostrate pigweed (*Amaranthus blitoides*) flowering stem. J. M. DiTomaso

Prostrate pigweed (*Amaranthus blitoides*) plant. J. M. DiTomaso

PROSTRATE PIGWEED
(Amaranthus blitoides)

Pigweed family

Prostrate summer annual with stems to about 2.5 ft (0.75 m) long. Flowers monoecious, axillary, inconspicuous, petals lacking.

Seedlings: Cotyledons lanceolate to linear-oblong, tips rounded, 0.16–0.40 in. (4–10 mm) long, lacking hairs. First leaf oval to egg shaped, tip indented, upper surface glossy, midvein and lower surface often reddish. Fifth and later leaf margins translucent.

Mature Plant: Stems mostly prostrate, highly branched and spreading, often pink or red tinged. Leaves alternate, elliptical to egg shaped, lacking hairs, 0.2–1.6 in. (0.5–4 cm) long, often crowded, dark glossy green, sometimes early-deciduous, veins conspicuous; margins often slightly wavy, white lined.

Roots: Taproot often deep.

Flowers: July–November.

Fruits and Seeds: Capsules 0.08–0.10 in. (2–3 mm) long, open like a lid. Fruits contain 1 glossy seed. Seeds lens shaped, 0.04–0.08 in. (1–2 mm) in diameter, margin pointed, glossy black.

Habitat: Disturbed places, roadsides, fields, gardens, landscaped areas, waste places, field and vegetable crops, orchards, vineyards, turf, and urban sites.

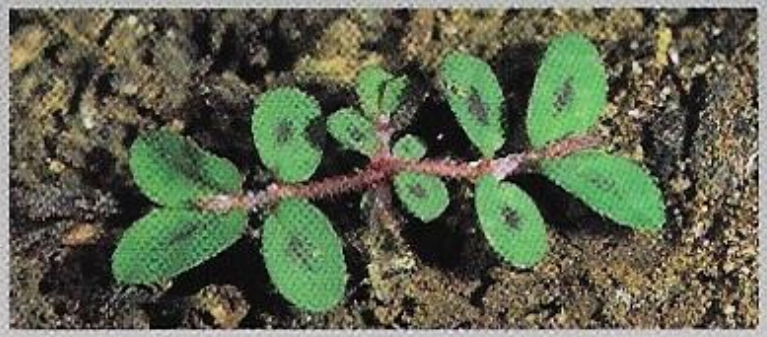
Distribution: Throughout California, except the Great Basin (Lassen and Modoc Counties), to 7,300 ft (2,200 m).

Propagation: Reproduction by seed. Most seeds fall near the parent plant. Seeds germinate in spring as the temperature warms.

Management: Manually remove plants or cultivate before seeds develop.

Red form of spotted spurge (*Euphorbia maculata*) seedling. J. K. Clark

Ground spurge (*Euphorbia prostrata*) plant. J. M. DiTomaso



Green form of spotted spurge (*Euphorbia maculata*) seedling. C. E. Elmore

Spotted spurge (*Euphorbia maculata*) (bottom) and creeping spurge (*E. serpens*) (top). C. E. Elmore

Ground spurge (*Euphorbia prostrata*) fruiting stem. J. M. DiTomaso

SPOTTED SPURGE (Euphorbia maculata)
GROUND SPURGE (Euphorbia prostrata)
CREEPING SPURGE (Euphorbia serpens)

Spurge family

Summer annuals, with prostrate stems to about 1.5 ft (0.5 m) long; opposite leaves and milky sap. Flowers monoecious. What appears as a single flower is a specialized cluster of reduced unisexual flowers.

Seedlings: Cotyledons oval to oblong, tip rounded to slightly straight, 0.04–0.10 in. (1–3 mm) long, lacking hairs. First leaf pair opposite, egg shaped to nearly round, tip rounded. Subsequent leaves resemble mature leaves with obliquely asymmetric bases.

Mature Plant: Stem branches alternate and prostrate. Leaves opposite, base usually obliquely asymmetric, on a short stalk. Leaves oblong to elliptical, 0.08–0.45 in. (2–11 mm) long. Stems and leaves reddish to maroon or with a maroon central spot in spotted spurge. Spotted spurge and ground spurge with hairy foliage; creeping spurge foliage lacking hairs.

Roots: Taproots slender, fibrous.

Flowers: Spotted and creeping spurge: May–October; ground spurge: August–October.

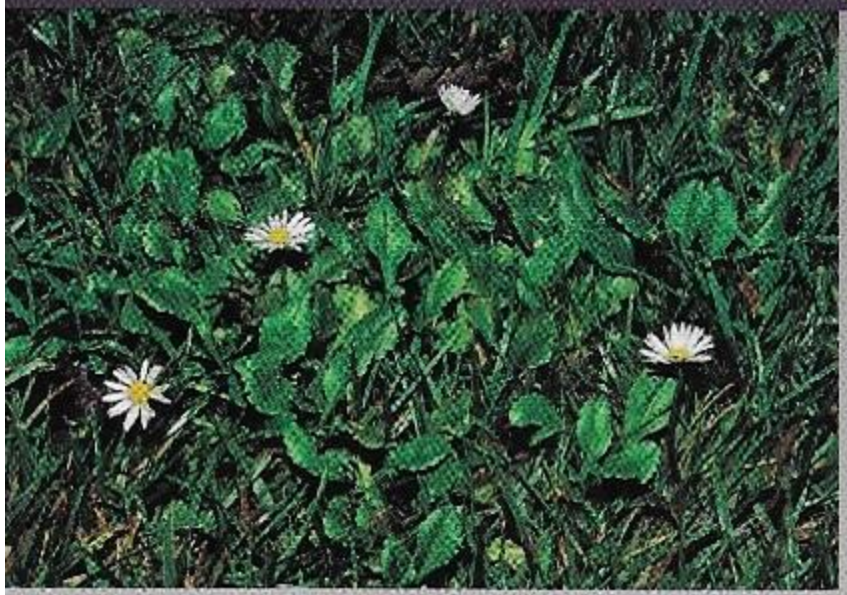
Fruits and Seeds: Capsules 3-lobed, 3-chambered, 0.04–0.06 in. (1–1.5 mm) long, with 1 seed per chamber. Capsules evenly hairy in spotted spurge, mostly hairy on the ridge of each lobe in ground spurge, lacking hairs in creeping spurge.

Habitat: Yards, landscaped areas, walkways, roadsides, gardens, turf, waste places, vacant lots, orchards, vineyards, agronomic and vegetable crops, nursery grounds and containers, and other disturbed places.

Distribution: At least one of the spurges is distributed throughout California to 800 ft (250 m).

Propagation: Reproduction by seed. Most seeds fall near the parent plant. Plants typically produce abundant long-lived seeds.

Management: Difficult to manage using cultural control once a large seedbank is established. Cultivate frequently or manually remove plants before seeds develop.



English daisy (*Bellis perennis*) in turf. J. M. DiTomaso

English daisy (*Bellis perennis*) flower heads. J. M. DiTomaso

ENGLISH DAISY
(*Bellis perennis*)

Sunflower family

Prostrate perennial to about 8 in. (20 cm) tall, with basal rosettes of leaves and white daisylike flower heads on leafless stalks. Under certain conditions, plants form clonal mats from short rhizomes. Flower heads mostly 0.8–1.2 in. (2–3 cm) wide, solitary, on leafless stalks covered with stiff to soft hairs; yellow disk flowers and about 30–80 white ray flowers.

Seedlings: Cotyledons oval to nearly round, about 0.08–0.10 in. (2–3 mm) long, lacking hairs, on stalks that elongate over time. Leaves alternate. First and subsequent few leaves spoon shaped, about 0.16–0.60 in. (4–15 mm) long, lacking hairs, margins smooth to finely scalloped or toothed.

Mature Plant: Leaves alternate in basal rosettes, spoon shaped, 0.8–4 in. (2–10 cm) long, 0.3–0.8 in. (7–20 mm) wide, tip rounded, base tapered to a winged stalk, surfaces sparse to moderately covered with soft hairs, especially stalks; margins smooth to finely scalloped or toothed.

Roots: Rhizomes short, with shallow fibrous roots.

Flowers: March–September.

Fruits and Seeds: Fruits lanceolate, 0.04–0.06 (1–1.5 mm) long, flattened, yellowish brown, lacking hairs, longitudinally lined, margins thickened. Pappus lacking.

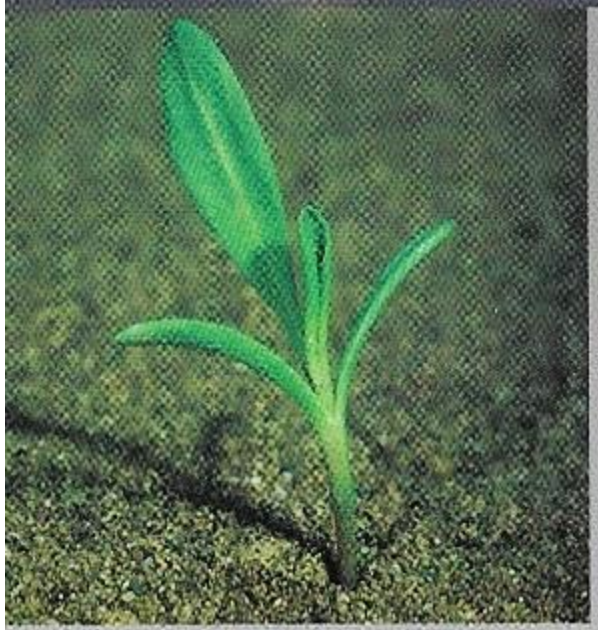
Habitat: Primarily found in turf, but occasionally in moist grassy places, landscaped areas, gardens, and pastures. Often grows on moist, heavy soil.

Distribution: Most of California, particularly the northwestern, central-western, and southwestern regions, to 660 ft (200 m).

Propagation: Reproduces vegetatively from rhizomes and by seed. Fruits fall near the parent plant. Germinates from spring through fall when conditions are favorable. Seeds generally appear to be short-lived under field conditions.

Management: Avoid disturbing bare patches in moist, grassy areas. Do not mow turf closely. Manually remove plants in turf.

16 COMMON KNOTWEED



Common knotweed (*Polygonum arenastrum*) seedling. J. K. CLARK

Common knotweed (*Polygonum arenastrum*) flowering stem. J. M. DITOMASO

Common knotweed (*Polygonum arenastrum*) flower. J. K. CLARK

Common knotweed (*Polygonum arenastrum*) plant. J. M. DITOMASO

COMMON KNOTWEED

(*Polygonum arenastrum*;
syn. = *Polygonum aviculare* ssp. *depressum*)

Buckwheat family

Prostrate to spreading, occasionally erect, annual or short-lived perennial with wiry stems to 4 ft (1.2 m) long. Leaves alternate with a membranous appendage at base of leaf at each node. Flowers inconspicuous, 0.08–0.10 in. (2–3 mm) long, green with white or pink margins, 2–8 per axil, with 5 persistent sepals or petals that are fused in the lower portion.

Seedlings: Cotyledons linear, 0.16–0.60 in. (4–15 mm) long, bluish green with a whitish bloom, especially on the lower surface. First leaf alternate, lacking a petiole, oblanceolate to oblong, 0.2–0.8 in. (5–20 mm) long, tip rounded, bases tapered and fused to a sheathing membranous appendage at base of leaf that typically tears as the leaf expands.

Mature Plant: Stems usually prostrate to spreading, often slightly swollen at the nodes, sometimes weakly woody at the base. Leaves alternate, lacking a petiole, linear to oblong-elliptical, 0.2–0.8 in. (0.5–2 cm) long, attached to the stipule sheath. Foliage generally lacking hairs.

Roots: Taproot tough, fibrous, simple or sparsely branched, with few to numerous fibrous lateral roots.

Flowers: May–November.

Fruits and Seeds: Fruits mostly 0.08–0.10 in. (2–3 mm) long, oval, 3-sided, enclosed by the persistent fused sepals and petals, usually with one side narrower than the other two, dull or slightly glossy, dark brown.

Habitat: Roadsides, fields, agronomic crops, vegetable crops, orchards, vineyards, waste places, yards, turf, gardens, landscaped areas, nursery grounds, paths, and walkways, and other disturbed sites. Often in compacted soils; tolerates trampling.

Distribution: Common throughout California to 8,250 ft (2,500 m).

Propagation: Reproduction by seed. Fruits fall near the parent plant. Seeds germinate in fall or spring. Buried seeds probably long-lived.

Management: For small populations, manually remove plants or cultivate before seeds develop.

Redstem filaree (*Erodium cicutarium*) seedling. J. K. CLARK

Whitestem filaree (*Erodium moschatum*) rosette. J. M. DITOMASO

Redstem filaree (*Erodium cicutarium*) plant. J. M. DITOMASO

Whitestem filaree (*Erodium moschatum*) leaf and fruiting stem. J. M. DITOMASO

Redstem filaree (*Erodium cicutarium*) flowering and fruiting stems. J. M. DITOMASO

WHITESTEM FILAREE (*Erodium moschatum*); REDSTEM FILAREE (*Erodium cicutarium*)

Geranium family

Common winter annuals, from 2–3.3 ft (0.6–1 m) tall, with pinnate-lobed or pinnate-compound leaves, pink to reddish lavender flowers, elongate fruits reminiscent of a stork's head and beak. Petals 5, pink to reddish lavender, separate. Redstem filaree has 2–10 flowers arising from a common point, each flower 0.1–0.2 in. (3–5 mm) long; whitestem filaree has 6–13 per cluster, each 0.4–0.6 in. (10–15 mm) long.

Seedlings: Cotyledons and leaves long stalked. Cotyledons of redstem filaree asymmetrically 3–4-lobed; cotyledons of whitestem filaree deeply asymmetrically 5-lobed. Both about 0.20–0.47 in. (5–12 mm) long.

Mature Plant: Leaves alternate, foliage short-hairy. Rosette leaves prostrate to spreading on open ground. Redstem filaree has smaller segments on pinnate-compound leaves compared to whitestem filaree. Stems and leaf stalks of redstem filaree often reddish, whereas whitestem filaree stems are pale green.

Roots: Taproot shallow, simple or with few branches.

Flowers: February–May for both species.

Fruits and Seeds: Immature fruits with 5 fused fruit compartments and 5 elongated styles, 0.8–2 in. (2–5 cm) long, united to form a style column or beak. Style coiled; coils tighten under dry conditions and loosen under humid conditions to help drill seeds into the soil.

Habitat: Roadsides, pastures, fields, grassland, rangeland, waste places, agronomic and vegetable crops, orchards, vineyards, landscaped areas, and other open disturbed sites.

Distribution: Throughout California to 6,600 ft (2,000 m).

Propagation: Reproduction by seed. Seeds usually separate explosively and are propelled a short distance from the parent plant. Most seeds germinate in fall after the first significant rainfall.

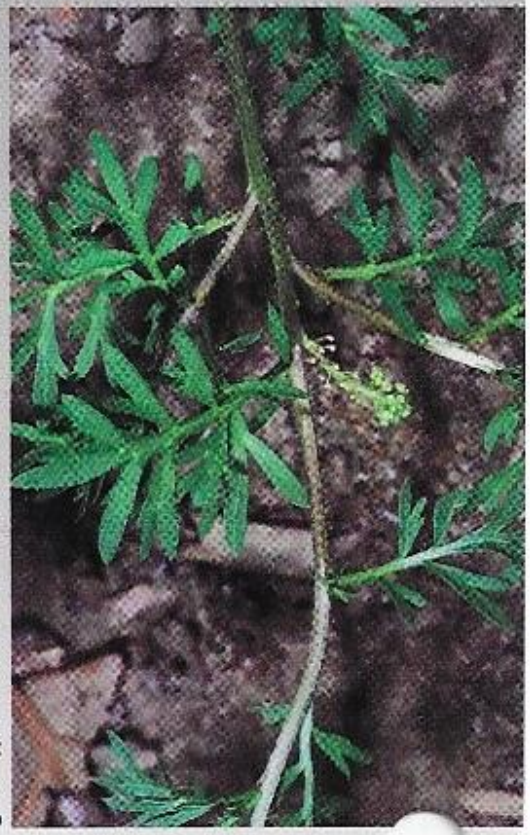
Management: Manually remove plants or cultivate before fruits develop. Spring and summer burns can increase filaree the following year.

18 LESSER SWINECRESS

Lesser swinecress (*Coronopus didymus*) seedlings. J. M. DiTomaso

Lesser swinecress (*Coronopus didymus*) flowering and fruiting stem. C. E. Elmore

Lesser swinecress (*Coronopus didymus*) rosette. J. M. DiTomaso



Lesser swinecress (*Coronopus didymus*) flowering stem. J. M. DiTomaso

LESSER SWINECRESS

(*Coronopus didymus*; syn. = *Lepidium didymum*)

Mustard family

Prostrate or low-growing winter annual, stems to 1.5 ft (0.5 m) long, with deeply pinnate-lobed to pinnate-dissected leaves and small 2-lobed fruits. Exists as a rosette until flower stems develop at maturity. Foliage has an unpleasant skunklike scent. Raceme of flowers dense, mostly axillary, about 0.4–1.6 in. (1–4 cm) long. Petals 4, linear, and inconspicuous. Stamens 2 or 4.

Seedlings: Cotyledons narrowly oblanceolate, about 0.20–0.47 in. (5–12 mm) long, tip rounded, base long tapered, lacking hairs. First and subsequent few leaves alternate and resemble cotyledons, except margins often with 1 or more rounded, coarse teeth and tips often have a few short hairs. Later leaves have margins toothed to pinnate lobed.

Mature Plant: Stems prostrate or with tips pointed up, usually highly branched. Leaves alternate, deeply pinnate lobed 1–2 times or dissected, 0.6–2.8 in. (1.5–7 cm) long. Foliage lacking hairs to pubescent with simple hairs. Lower leaves stalked.

Roots: Taproots slender, simple, or branched, with few fibrous roots.

Flowers: February–October.

Fruits and Seeds: Pods 2-chambered, conspicuously 2-lobed, broader than long, 0.06 in. (1.5 mm) long, 0.08–0.10 (2–3 mm) wide. Seeds 1 per chamber, oblong to kidney shaped, remain enclosed within the hardened fruit chambers at maturity but eventually separate.

Habitat: Fields, roadsides, gardens, nurseries, vegetable crops, turf, alfalfa pastures, orchards, ditch banks, and other disturbed places.

Distribution: Throughout California to 6,600 ft (2,000 m).

Propagation: Reproduction by seed. Fruits fall near the parent plant.

Management: Manually remove, till, or cut plants below the crown before fruits mature. Difficult to control by mowing.

19 COMMON PURSLANE

Common purslane *(Portulaca oleracea)* seedling. J. M. DiTomaso

Common purslane *(Portulaca oleracea)* flower. J. K. Clark

Common purslane *(Portulaca oleracea)* flowering stems. J. M. DiTomaso

Common purslane *(Portulaca oleracea)* plant. J. M. DiTomaso

COMMON PURSLANE
(Portulaca oleracea)

Purslane family

Succulent summer annual, with prostrate to spreading stems to nearly 3.3 ft (1 m) long and small yellow flowers. Flowers single or in clusters of 2–5 at the stem tips, generally open for 1 day from midmorning to early afternoon on bright, hot days. Petals 5, 0.1–0.2 in. (3–5 mm) long.

Seedlings: Cotyledons egg shaped to oblong, about 0.08–0.20 in. (2–5 mm) long, 0.04–0.06 in. (1–1.5 mm) wide, lacking hairs, succulent, sometimes tinged red. Leaves opposite, nearly completely lacking a petiole.

Mature Plant: Stems prostrate to spreading, often reddish. Leaves alternate or opposite, nearly or completely lacking a petiole, lacking hairs, succulent, egg shaped to spatula shaped, 0.2–1.2 in. (5–30 mm) long.

Roots: Taproot thick, simple, or branched. Fibrous lateral roots mostly near the soil surface.

Flowers: May–September.

Fruits and Seeds: Capsule nearly round to oval, apex pointed, mostly 0.16–0.32 in. (4–8 mm) long, 0.10–0.32 in. (3–8 mm) wide, opens around the middle like a lid to release numerous seeds. Seeds circular or egg shaped, flattened, covered with minute papillae, slightly glossy, brown to black, with a white point of attachment.

Habitat: Common in crop fields, gardens. Also orchards, vineyards, landscaped areas, roadsides, waste places, and other disturbed sites. Thrives on fertile soil. Tolerates drought.

Distribution: Throughout California to 4,600 ft (1,400 m).

Propagation: Reproduction by seed and sometimes vegetatively by stem fragments older than 4 weeks under favorable conditions. Uprooted plants or segments tolerate dry conditions and re-root after irrigation or rainfall. Most seeds fall near the parent plant. Plants with immature capsules can produce viable seeds.

Germinates from spring through summer. Buried seeds survive up to 40 years.

Management: Manually remove or cultivate seedlings.

Thymeleaf speedwell (*Veronica serpyllifolia* ssp. *humifusa*) fruiting stem. J. M. DiTomaso

Thymeleaf speedwell (*Veronica serpyllifolia* ssp. *humifusa*) flowering stem. J. M. DiTomaso

Corn speedwell (*Veronica arvensis*) flowering stems. J. M. DiTomaso

Persian speedwell (*Veronica persica*) flowering stems. J. M. DiTomaso

Persian speedwell (*Veronica persica*) plant. J. M. DiTomaso

CORN SPEEDWELL (Veronica arvensis)
PERSIAN SPEEDWELL (Veronica persica)
THYMELEAF SPEEDWELL (Veronica serpyllifolia)

Figwort family

Corn and Persian speedwell are winter annuals; thymeleaf speedwell is a perennial with stolons. All species have prostrate to erect stems, 1–2 ft (0.3–0.6 m) long, that root at the nodes. Flowers blue to white, with 4 petal lobes and 2 stamens in terminal spikes or racemes. Fruits conspicuously heart shaped.

Seedlings: Cotyledons triangular or egg shaped, first leaves opposite, lacking hairs in Persian and thymeleaf speedwell, hairy in corn speedwell. Subsequent leaves resemble first leaves, except sometimes larger.

Mature Plant: Lower leaves opposite on nonflowering stems. Upper leaves alternate in flowering stems. Corn and Persian speedwell with hairy foliage, leaves egg shaped; margins coarse toothed in corn speedwell and shallow toothed in Persian speedwell. Thymeleaf speedwell with no hairs on the leaves, oval to elliptical, weakly toothed on margins.

Roots: Annual species have a slender taproot, but root system becomes primarily fibrous when plants develop numerous adventitious roots from the upper root and stem base.

Flowers: February–July.

Fruits and Seeds: Capsules heart shaped, 2-chambered, open at top to release several seeds. Sepals persistent. Corn and thymeleaf speedwell with nearly unstalked capsules, Persian speedwell with stalks 0.6–1.2 in. (15–30 mm) long.

Habitat: Turf, gardens, landscaped areas, orchards, vineyards, crop fields, fields, roadsides, and other disturbed places.

Distribution: Throughout California to 5,000 ft (1,500 m).

Propagation: Reproduction by seed (and stolons in thymeleaf speedwell). Seeds fall near the parent plant. Seeds germinate sporadically in fall and early spring. Buried seeds can survive for up to 30 years.

Management: Mow closely and frequently, cultivate, or manually remove plants before fruits develop. Apply a thick layer of mulch in landscaped areas.

Cutleaf geranium (*Geranium dissectum*) seedling. J. M. DiTomaso

Cutleaf geranium (*Geranium dissectum*) flowering and fruiting stem. J. M. DiTomaso

Cutleaf geranium (*Geranium dissectum*) leaves. J. M. DiTomaso

Cutleaf geranium (*Geranium dissectum*) plant. J. M. DiTomaso

CUTLEAF GERANIUM
(*Geranium dissectum*)

Geranium family

Annual to less than 3.3 ft (1 m) tall, with palmate lobes or dissected, violet-pink flowers, and elongate fruits. Plants exist as rosettes of long-stalked leaves until flower stems develop in spring. Flowers 2 per cluster on stalks 0.08–0.40 in. (2–10 mm) long. Petals 5, 0.16–0.32 in. (4–8 mm) long, tip notched or rounded, violet-pink. Flower stem hairs glandular, spreading.

Seedlings: Cotyledons slightly asymmetrical, base slightly lobed, 0.20–0.32 in. (5–8 mm) long, 0.24–0.47 in. (6–12 mm) wide. First leaf alternate, palmate lobed, nearly round, short-hairy, often glandular, blades 0.32–0.80 in. (0.8–2 cm) long, 0.4–0.8 in. (1–2 cm) wide. Second and subsequent leaves resemble the first leaf, except each primary lobe has a smaller lobe on each side.

Mature Plant: Stems prostrate to erect, 2.6 ft (0.8 m) tall, usually forked, glandular in the upper portion. Foliage hairy. Stem leaves alternate or opposite, highly dissected into narrow segments. Rosette leaves nearly round in outline, on long stalks.

Roots: Taproots slender, with fibrous lateral roots.

Flowers: March–October.

Fruits and Seeds: Immature fruits consist of 5 fused fruit compartments and 5 elongated styles, 0.5–0.6 in. (1.2–1.5 cm) long, united to form a style column or beak, the entire unit resembling a stork's head and beak. At maturity, each compartment separates at the base by elastically rolling up. Compartments simultaneously split open along the inner face to eject the seeds.

Habitat: Roadsides, fields, pastures, orchards, vineyards, landscaped areas, waste places, turf, disturbed open woodlands, shrublands, and occasionally crop fields.

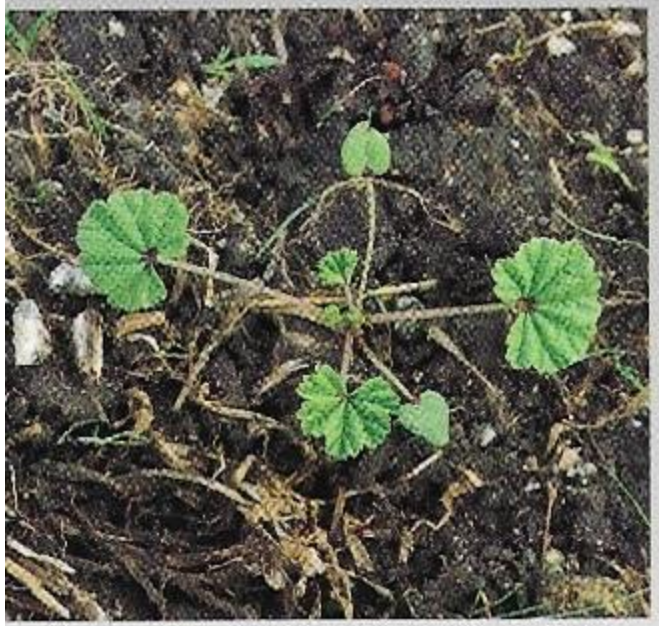
Distribution: Throughout California to 4,000 ft (1,200 m).

Propagation: Reproduction by seed. Most seeds are propelled a short distance from the parent plant. Seeds germinate in fall after the first significant rain and/or early spring.

Management: Manually remove plants or cultivate before seeds develop.

Little mallow (*Malva parviflora*) flowering and fruiting stem. J. M. DiTomaso

Little mallow (*Malva parviflora*) flower and fruit. J. M. DiTomaso



Bull mallow (*Malva nicaeensis*) seedling. J. M. DiTomaso

Bull mallow (*Malva nicaeensis*) plant. J. M. DiTomaso

BULL MALLOW (Malva nicaeensis)
LITTLE MALLOW
(Malva parviflora)

Mallow family

Both species are typically annuals to 2.6 ft (0.8 m) tall, with shallow, palmate leaf lobes. Flowers of both species are single or in small clusters in the leaf axils. Petals 5, fused at the base along with the stamen filaments. Stamens numerous, filaments fused into a tube. Flowers about 0.4–0.6 in. (1–1.5 cm) in diameter. Petals pale pink to lavender in bull mallow and white to pale pink in little mallow.

Seedlings: Cotyledons heart shaped, 0.10–0.47 in. (3–12 mm) long, tip rounded, base lobed, 3-veined from the base, lacking hairs, on long stalks. First leaves nearly round, alternate, hairs simple and/or star shaped, margins irregularly round toothed.

Mature Plant: Foliage variably hairy, with both simple and sometimes star-shaped hairs. Leaves alternate, usually shallow palmate lobed, lobes mostly 5–7, margins generally round toothed.

Roots: Taproots short to long, simple or branched, fibrous, with fibrous lateral roots.

Flowers: Bull mallow: March–September; little mallow: nearly year-round.

Fruits and Seeds: Fruits consist of a disk of wedge-shaped sections that eventually break apart after maturity. Sections contain 1 seed and do not open. Seeds rounded, kidney shaped, mostly 0.06–0.08 in. (1.5–2 mm) long, reddish brown. Bull mallow with 7–9 sections per disk; little mallow, 8–12 sections per disk.

Habitat: Roadsides, fields, orchards, vineyards, agronomic and vegetable crops, gardens, waste places (including those in urban areas), and other disturbed sites.

Distribution: Throughout California: bull mallow to 1,300 ft (400 m); little mallow to 5,000 ft (1,500 m).

Propagation: Reproduction by seed. Fruit segments generally fall near the parent plant. Seeds germinate in fall and spring. Stems and nodes can develop roots and new shoots in moist conditions.

Management: Manually remove plants or cultivate before seeds develop. Avoid tillage in moist conditions.

23 BLACK MEDIC AND BURCLOVER

California burclover (*Medicago polymorpha*) seedling. J. K. Clark

California burclover (*Medicago polymorpha*) stipules and fruit. J. M. DiTomaso

California burclover (*Medicago polymorpha*) flowering stem. J. M. DiTomaso

Black medic (*Medicago lupulina*) flowering stem. J. M. DiTomaso

BLACK MEDIC
(*Medicago lupulina*)
CALIFORNIA BURCLOVER
(*Medicago polymorpha*)

Pea family

Low-growing winter or summer annuals to about 1.5 ft (0.4 m) tall, with headlike racemes of yellow flowers and compound leaves with 3 leaflets. Black medic flowers spikelike, 10–20 per cluster, with each flower 0.06–0.16 in. (1.5–4 mm) long. California burclover flower clusters headlike, 2–5 per cluster, with flowers usually 0.14–0.24 in. (3.5–6 mm) long.

Seedlings: Cotyledons oblong, lacking hairs. First leaf simple, oval, broader than long, about 0.16–0.32 (4–8 mm) long. Subsequent leaves compound with 3 leaflets.

Mature Plant: Stems prostrate or with tips ascending. Leaves alternate. Leaflets oblanceolate or heart shaped, about 0.4–0.8 in. (1–2 cm) long, apex often tipped with a minute slender tooth. Black medic foliage hairy, especially stems; foliage of California burclover nearly hairless.

Roots: Taproots slender. Roots associate with nitrogen-fixing bacteria.

Flowers: Black medic: April–July; California burclover: March–June.

Fruits and Seeds: Pods of both species do not open to release seeds. Black medic pods kidney shaped, 0.08–0.10 in. (2–3 mm) long, lacking hairs, black at maturity, contain 1 seed. California burclover pods tightly coiled, 0.16–0.24 in. (4–6 mm) in diameter, smooth or with 2–3 rows of prickles on the outer face, contain only a few seeds.

Habitat: Common in turf, roadsides, fields, grassland, pastures, alfalfa, vegetable crops, orchards, vineyards, gardens, and other disturbed places.

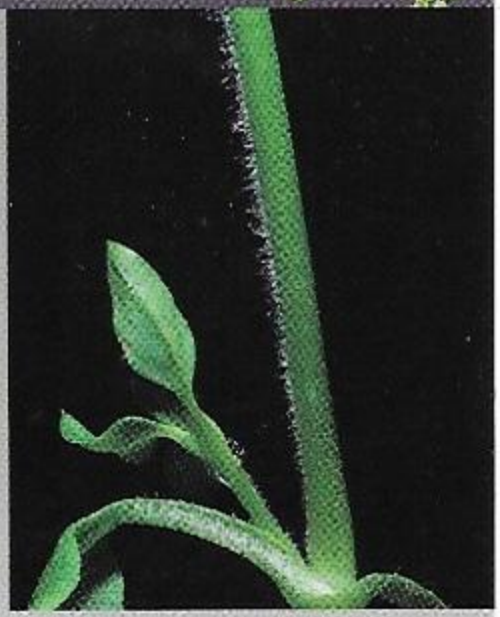
Distribution: Throughout California: black medic to 8,250 ft (2,500 m); California burclover to 5,000 ft (1,500 m).

Propagation: Reproduction by seed. Flowers and fruits develop throughout the growing season. Fruits of both plants fall below parent plants, but California burclover seeds also disperse by clinging to fur of animals or clothes of people. Seeds are hard coated and can survive many years under field conditions.

Management: Cultivate or manually remove plants. Both species tolerate frequent mowing.

24 COMMON CHICKWEED

Common chickweed (*Stellaria media*) seedling. J. K. CLARK



Common chickweed (*Stellaria media*) hairs along one side of stem. J. M. DITOMASO

Common chickweed (*Stellaria media*) plants. J. M. DITOMASO

Common chickweed (*Stellaria media*) flowering stem. J. M. DITOMASO

COMMON CHICKWEED
(*Stellaria media*)

Pink family

Common chickweed is generally a winter but sometimes a summer annual, to 1.5 ft (0.5 m) tall. Hairs on the stems aligned in 2 longitudinal rows. Plants with opposite leaves, sometimes matlike, with prostrate stems that root at the nodes. Flowers small, white, with 5 petals that are deeply 2-lobed.

Seedlings: Cotyledons lanceolate to elliptical, 0.08–0.47 in. (2–12 mm) long, 0.01–0.06 in. (0.25–1.5 mm) wide, tip pointed, lacking hairs, on a short, sparsely hairy stalk.

Mature Plant: Stems mostly forked. Leaves opposite, oval-elliptical, with long hairs aligned in a longitudinal row on each side. Lower leaves mostly 0.1–1 in. (3–25 mm) long, lacking a petiole. Upper leaves to 1.8 in. (4.5 cm) long, on a stalk.

Roots: Initial taproot slender. Roots from nodes fibrous, shallow.

Flowers: Mostly February–September, but flowering can occur year-round under favorable conditions.

Fruits and Seeds: Capsules 0.16–0.32 in. (4–8 mm) long, contain numerous seeds. Seeds small, circular, pale tan to pale reddish brown.

Habitat: Especially common in urban areas. Grows best on moist, fertile soil with some shade.

Distribution: Throughout most of California, except Mojave Desert, to 4,300 ft (1,300 m).

Propagation: Reproduction by seed. Most seeds fall within a short distance of the parent plant. Most seeds germinate in fall after the first rains, but some can germinate in spring and when conditions are favorable. Buried seeds of common chickweed can survive at least 10 years and are reported to survive for up to 30 years or more.

Management: Mow closely, cultivate, and manually remove plants.

Mouseear chickweed (*Cerastium fontanum* ssp. *vulgare*) seedling. J. K. CLARK

Sticky chickweed (*Cerastium glomeratum*) flowering stem.
J. M. DITOMASO

Sticky chickweed (*Cerastium glomeratum*) plant. J. M. DITOMASO

Mouseear chickweed (*Cerastium fontanum* ssp. *vulgare*) flower.
J. M. DITOMASO

Mouseear chickweed (*Cerastium fontanum* ssp. *vulgare*) plant.
J. M. DITOMASO

MOUSEEAR CHICKWEED
(*Cerastium fontanum* ssp. *vulgare*)
STICKY CHICKWEED
(*Cerastium glomeratum*)

Pink family

Mouseear chickweed is a hairy perennial and sticky chickweed is typically a winter annual. Both grow to 1.5 ft (0.5 m) tall. Leaves opposite; flowers small, white, with 5 deeply 2-lobed petals. Sticky chickweed foliage often glandular-hairy and slightly sticky to the touch.

Seedlings: Mouseear chickweed cotyledons oval-elliptical, tip rounded to pointed, 0.08–0.28 in. (2–7 mm) long; sticky chickweed cotyledons 0.04–0.10 in. (1–3 mm) long. First and subsequent few leaf pairs oval to elliptical, long-hairy, tip abruptly pinched into a small point.

Mature Plant: Leaves of both species opposite, with petiole short or absent. Mouseear chickweed foliage covered with nonglandular hairs; sticky chickweed foliage moderately to densely covered with nonglandular and glandular hairs.

Roots: Taproot slender. Roots from nodes fibrous, shallow.

Flowers: Mouseear chickweed: March–August; sticky chickweed: February–June.

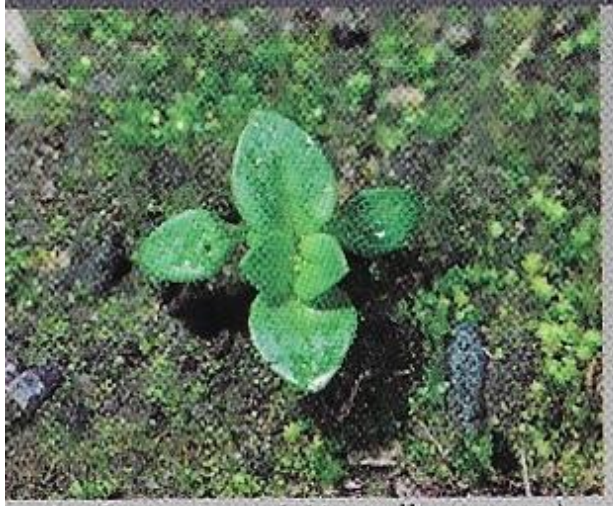
Fruits and Seeds: Capsules cylindrical, open by 10 teeth, contain numerous small, reddish brown seeds. Mouseear chickweed capsules are 0.25–0.45 in. (6.5–11 mm) long; sticky chickweed capsules slightly curved, 0.14–0.35 in. (3.5–9 mm) long.

Habitat: Yards, turf, gardens, landscaped areas, agronomic and vegetable crops, orchards, vineyards, grasslands, managed forests, nurseries, roadsides, urban sites, and other disturbed places.

Distribution: Mouseear chickweed: northwestern region of California, Cascade Range, and Sierra Nevada to 7,250 ft (2,200 m). Sticky chickweed: throughout most of California to 5,300 ft (1,600 m).

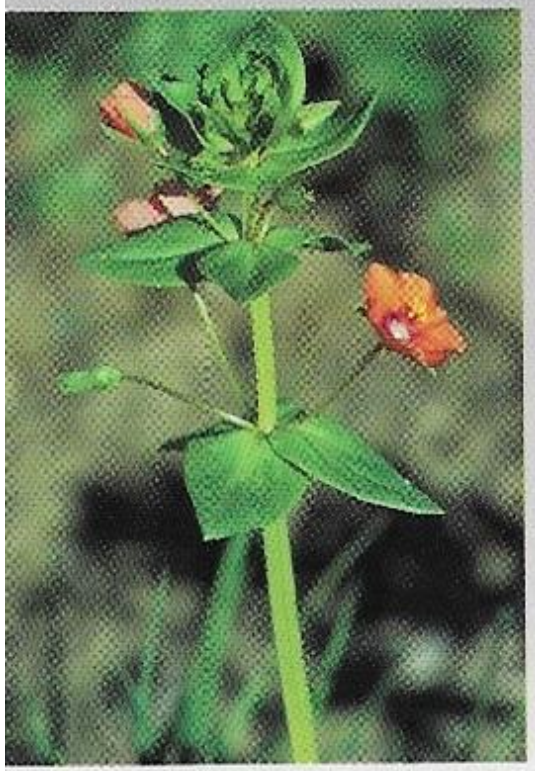
Propagation: Both species reproduce by seed; mouseear chickweed also roots at the nodes. Most seeds fall within a short distance of the parent plant. Buried mouseear chickweed seeds can survive over 50 years.

Management: Mow closely, cultivate, and manually remove plants.



Scarlet pimpernel (*Anagallis arvensis*) seedling. J. M. DiTomaso

Scarlet pimpernel (*Anagallis arvensis*) flower. J. M. DiTomaso



Scarlet pimpernel (*Anagallis arvensis*) flowering stem. J. M. DiTomaso

Scarlet pimpernel (*Anagallis arvensis*) plant. J. M. DiTomaso

SCARLET PIMPERNEL
(*Anagallis arvensis*)

Primrose family

Low winter or summer annual to 1.3 ft (0.4 m) tall, with opposite leaves and small salmon-orange flowers. Flowers 0.28–0.45 in. (7–11 mm) in diameter, single in leaf axils, with 5 petals. Stamens 5, often purple, with hairy filaments.

Seedlings: Cotyledons lanceolate or elliptical to egg shaped, 0.04–0.24 in. (1–6 mm) long, lacking hairs, become leaflike. Leaves opposite, egg shaped to elliptical, sometimes dotted with dark embedded glands on the lower surface. First leaf pair equal to or slightly larger than the cotyledons, central vein conspicuous.

Mature Plant: Foliage sparsely glandular to nearly hairless. Stems 4-angled. Leaves opposite, lacking a petiole, egg shaped to elliptical, 0.2–0.8 in. (5–20 mm) long, sometimes dotted with dark or purplish embedded glands on the lower surface.

Roots: Taproot slender, simple, or branched, sometimes weakly woody near the crown in large plants, with fibrous lateral roots.

Flowers: March–July.

Fruits and Seeds: Capsules spherical, 0.10–0.16 in. (3–4 mm) in diameter, smooth, on down-curved stalks, open like a lid around the top to release several black or brown seeds.

Habitat: Roadsides, pastures, turf, gardens, landscaped areas, orchards, vineyards, vegetable crops, urban sites, waste places, grassland, vernal pool margins and swales, margins of streams and marshes, coastal terraces, ocean beaches, and other disturbed sites.

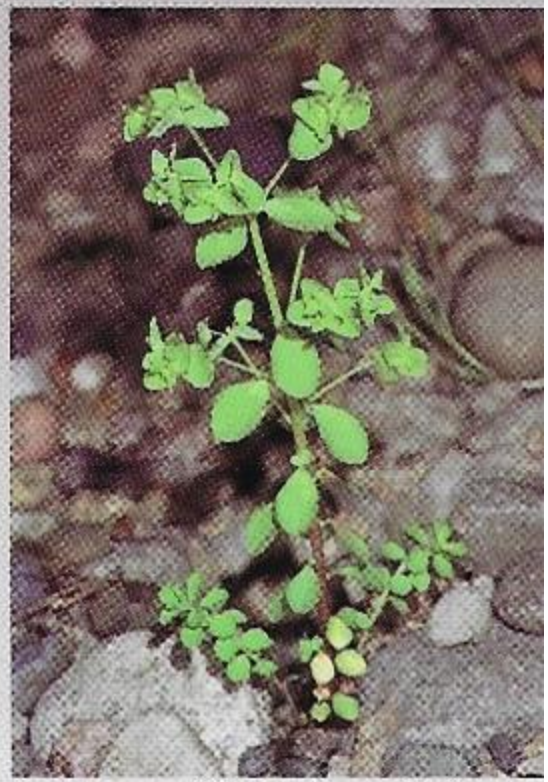
Distribution: Throughout California, except deserts and possibly Great Basin, to 3,300 ft (1,000 m). Common, especially in coastal areas.

Propagation: Reproduction by seed. Seeds fall near the parent plant. Germinates year-round under favorable conditions. Typically a summer annual in cool-climate regions and a winter annual in warm-climate regions. Buried seeds are reported to survive for over 50 years.

Management: Manually remove plants before seeds develop. Cultivate repeatedly on agricultural land.

Petty spurge (*Euphorbia peplus*) seedling. J. M. DiTomaso

Petty spurge (*Euphorbia peplus*) flowering stem. J. M. DiTomaso



Petty spurge (*Euphorbia peplus*) plant. J. M. DiTomaso

PETTY SPURGE
(Euphorbia peplus)

Spurge family

Erect winter or summer annual to 1.5 ft (0.5 m) tall. Milky sap, hairless foliage, forked upper stems, and opposite leaflike bracts below the characteristic flower clusters. Flowers monoecious. Flower clusters arise from a common point at the stem tips, with the central clusters maturing first. What appears to be one flower is actually a specialized cluster of reduced unisexual flowers that is unique to the spurge family.

Seedlings: Cotyledons oval, lacking hairs, 0.16–0.28 in. (4–7 mm) long, on a short stalk. First leaf pair opposite or alternate. First leaves egg shaped, mostly 0.16–0.28 in. (4–7 mm) long, also on a short stalk.

Mature Plant: Foliage lacking hairs, light green. Main stems slender, erect, simple or branched, lower branches opposite or alternate, upper stems forked. Lower leaves alternate to nearly opposite, egg shaped, 0.4–1.4 in. (1–3.5 cm) long, tip rounded to slightly indented, on a short stalk. Inflorescence bracts of upper stems leaflike, opposite.

Roots: Taproot slender, generally with few fibrous lateral roots.

Flowers: February–August.

Fruits and Seeds: Capsules lacking hairs; smooth, nearly spherical, 0.06–0.10 in. (1.5–3 mm) in diameter, 3-lobed, lobes longitudinally 2-ridged. Capsules with 3 oblong seeds, white to gray, minutely pitted.

Habitat: Landscaped areas, gardens, yards, urban areas, waste places, crop fields. Often grows on fertile soils or in moist, partly shaded places.

Distribution: Throughout California, except deserts and Great Basin, to 1,000 ft (300 m).

Propagation: Reproduction by seed. Capsules burst open and eject seeds up to several yards from the parent plant.

Management: Cultivate repeatedly, especially before seeds mature.

Southern brassbuttons (*Cotula australis*) plant. J. M. DiTomaso

Southern brassbuttons (*Cotula australis*) stem. J. M. DiTomaso

SOUTHERN BRASSBUTTONS
(*Cotula australis*)

Sunflower family

Low, spreading annual to 8 in. (0.2 m) tall. Foliage aromatic. Flowers buttonlike, pale yellow to white, 0.10–0.24 in. (3–6 mm) in diameter. Flower heads solitary on long stalks, appear to consist only of disk flowers but actually consist of bisexual disk flowers at the center and female flowers without corollas around the margin. Flowers lack a pappus.

Seedlings: Cotyledons linear. First leaves appear opposite, pinnate dissected into 3 linear lobes.

Mature Plant: Leaves alternate. Foliage sparsely covered with soft, spreading hairs. Stems slender, spreading. Leaves pinnate dissected 2–3 times, 0.8–2.4 in. (2–6 cm) long, stalked or lacking a petiole above.

Roots: Plants often with a weak taproot and numerous fibrous roots, but under certain conditions, especially in turf, lower stems may root at nodes.

Flowers: January–May.

Fruits and Seeds: Fruits flattened, of 2 types. Fruits from outer female flowers egg shaped, broadly winged, stalked. Fruits from interior disk flowers barely winged, nearly stalkless.

Habitat: Turf, landscaped areas, gardens, yards, orchards, vineyards, annual crops, and waste places, especially in coastal areas.

Distribution: Mainly the coastal regions of California but also in the Central Valley to 800 ft (250 m).

Propagation: Reproduction by seed. Seeds fall near the parent plant. Most seeds germinate after the first fall rains through winter. Seeds survive about 1–2 years under field conditions.

Management: Cultivate repeatedly, especially before seeds mature.

29 CATCHWEED BEDSTRAW

Catchweed bedstraw (*Galium aparine*) stems. J. M. DiTomaso

Catchweed bedstraw (*Galium aparine*) flowers and fruit. J. M. DiTomaso

Catchweed bedstraw (*Galium aparine*) seedling. J. M. DiTomaso

CATCHWEED BEDSTRAW
(Galium aparine)

Madder family

Weak climbing or sprawling winter annual with square stems to 3 ft (1 m) long. Leaves whorled; foliage covered with tiny curved prickles. Flower greenish to white or yellowish, 4 lobed, in open clusters, usually 2–9 flowers that develop in the upper axils on short branchlets. Flowers mostly 0.04–0.08 in. (1–2 mm) in diameter, on long, spreading stalks. Fruit densely covered with stiff hooks, 2-lobed, separating into 2 nutlets at maturity.

Seedlings: Cotyledons lacking hairs, egg shaped to oblong, about 0.3–1.2 in. (8–30 mm) long, including elongated stalk. Tip slightly notched. First leaf set consists of 2 slightly unequal pairs.

Mature Plant: Stems weak, square in cross-section, especially near the tips, with tiny down-curved prickles. Leaves 6–8 per whorl, nearly or completely lacking a petiole, oblanceolate, mostly 0.5–1.4 in. (14–35 mm) long, bristle tipped, with tiny curved prickles on the margins and midveins.

Roots: Taproots slender, simple or branched, with fibrous lateral roots.

Flowers: March–July.

Fruits and Seeds: Fruits 2-lobed; eventually separate into 2 nutlets. Fruits broader than long, 0.08–0.20 in. (2–5 mm) wide, densely covered with stiff, hook-tipped hairs or sometimes lacking hairs.

Habitat: Yards, gardens, landscaped areas, orchards, vineyards, agronomic and vegetable crops, roadsides, waste places, grassland, woodlands, riparian areas, and many plant communities. Often in moist shady places. Grows best on fertile soil.

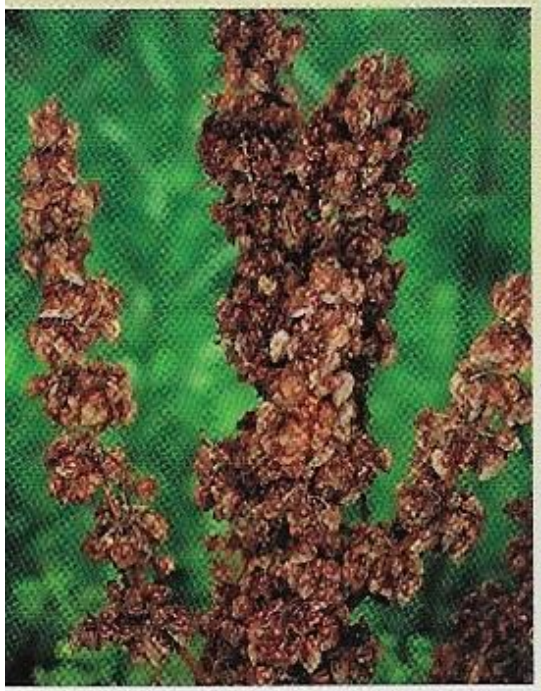
Distribution: Throughout California, except deserts and Great Basin, to 5,000 ft (1,500 m).

Propagation: Reproduction by seed. Fruits generally disperse by clinging to the shoes and clothing of humans and to animals. Germinates erratically over a long period. Seeds generally survive about 2–3 years and can survive ingestion by many mammals and birds.

Management: Manually remove or cultivate before plants develop fruits.

Leaves of broadleaf dock (*Rumex obtusifolius*) (left) and curly dock (*R. crispus*) (right). R. UVA

Curly dock (*Rumex crispus*) basal rosette. J. K. CLARK



Curly dock (*Rumex crispus*) fruiting inflorescence. J. M. DITOMASO

Curly dock (*Rumex crispus*) along river floodplain. J. M. DITOMASO

Broadleaf dock (*Rumex obtusifolius*) plant. J. M. DITOMASO

CURLY DOCK
(*Rumex crispus*)
BROADLEAF DOCK
(*Rumex obtusifolius*)

Buckwheat family

Erect perennials to 5 ft (1.5 m) tall, with alternate, long leaves, small greenish flowers in dense whorled clusters, and small fruits each enclosed by 3 distinctively winged sepals or petals.

Seedlings: Cotyledons lanceolate to oblong, 0.16–0.55 in. (4–14 mm) long, tip rounded, base tapered to a short stalk. Seedling leaves alternate, stalked, and form a rosette.

Mature Plant: Stems thick and foliage lacking hairs. Stems often unbranched below the inflorescence, nodes slightly swollen, usually reddish brown in fruit. Leaves alternate; in curly dock, lanceolate and wavy, 1.5 ft (0.5 m) long; in broadleaf dock, broader, 2.5 ft (0.75 m) long. Lower leaves long stalked. Membranous sheath at base of leaves.

Roots: Taproot thick, often branched, to 6.5–10 ft (2–3 m) deep.

Flowers: Curly dock: nearly year-round; broadleaf dock: June–December.

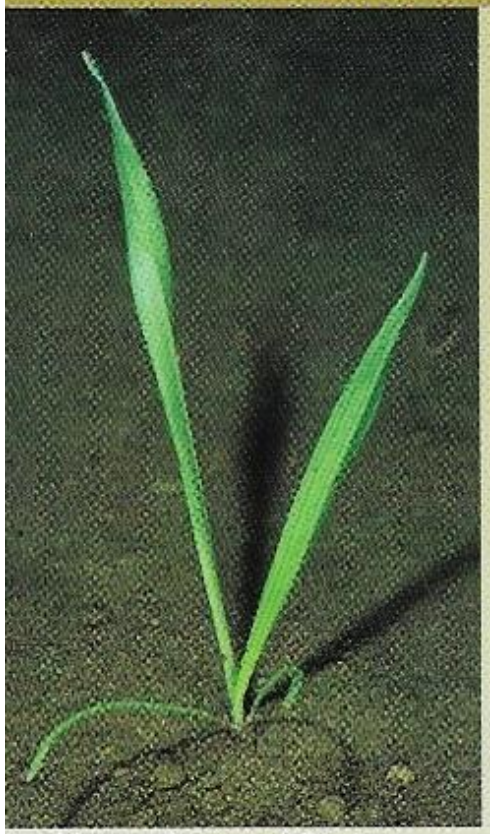
Fruits and Seeds: Fruits with 3 wings, with 1 or 3 corky, wartlike tubercles at the center. Seeds 1 per fruit, enclosed by the fruit wings, triangular in cross-section, smooth, glossy, reddish brown.

Habitat: Ditches, roadsides, wetlands, pastures, agronomic crops, orchards, waste places, and other disturbed moist places. Both species are wetland indicator species in California.

Distribution: Throughout California; curly dock to 8,250 ft (2,500 m), broadleaf dock to 5,000 ft (1,500 m).

Propagation: Reproduction primarily by seed. Seeds fall near the parent plant or disperse to greater distances with water. Fruit wing tubercles help fruits float. Seedlings exist as rosettes while their root systems develop. Plants develop flowering stems during their first or second spring. Buried seeds can remain viable for 20 years or more. Seeds survive ingestion by cattle and small birds but not by chickens.

Management: Cut plants off below the portion of the root that is able to resprout.



Buckhorn plantain *(Plantago lanceolata)* seedling.
J. K. CLARK

Buckhorn plantain *(Plantago lanceolata)* flowering stem.
J. M. DITOMASO

Buckhorn plantain *(Plantago lanceolata)* foliage.
J. M. DITOMASO

BUCKHORN PLANTAIN
(*Plantago lanceolata*)

Plantain family

Perennial with a basal rosette of leaves and leafless spikes of flowers. Leaves narrowly elliptical, with leafless cylindrical spikes to about 2.6 ft (0.8 m) tall. Flowers inconspicuous, each with a small bract at the base. Petals 4, fused in the lower portion, membranous, colorless.

Seedlings: Cotyledons linear, about 0.04–0.32 in. (1–8 mm) long, fused at the base, lacking hairs. First and subsequent few leaves narrow-oblong to lanceolate, about 0.8–1.6 in. (2–4 cm) long, base gradually tapered to a winged stalk, 3-veined from the base, short-hairy, especially at the base.

Mature Plant: Foliage usually short-hairy, occasionally with long hairs, highly variable. Leaves narrowly elliptical or lanceolate, mostly 2–10 in. (5–25 cm) long, base gradually tapered to a winged stalk, 3–7-veined from the base, margins smooth or finely toothed.

Roots: Taproot simple or branched, sometimes weakly developed.

Flowers: April–August.

Fruits and Seeds: Capsules about 0.16 in. (4 mm) long, open horizontally around the middle like a lid. Seeds usually 1–2 per capsule. Back of the seed rounded and glossy, with a pale brown stripe.

Habitat: Roadsides, railway rights-of-way, waste places, landscaped areas, gardens, turf, footpaths, urban sites, crop fields, orchards, vineyards, pastures, and other disturbed places.

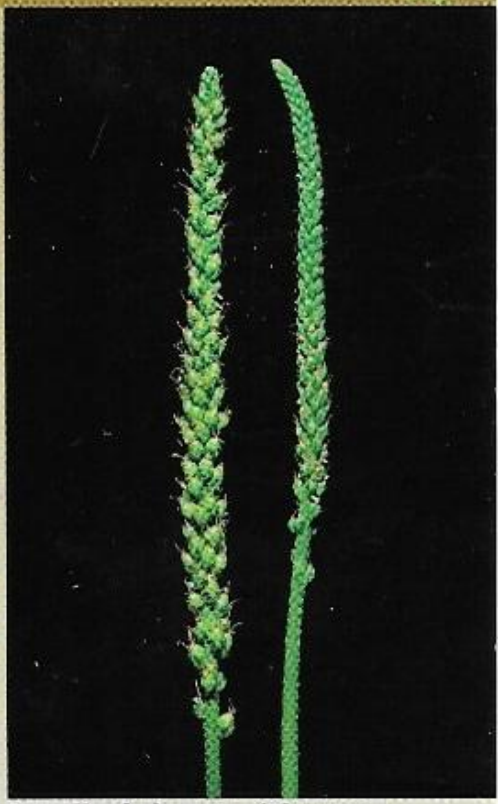
Distribution: Throughout California, except deserts and Great Basin, to 5,300 ft (1,600 m).

Propagation: Reproduction by seed. Seeds become sticky with mucilage when moistened. Seeds fall near the parent plant and germinate in fall or spring. Some buried seeds survive for up to 20 years, and individual plants can live for up to 12 years or more.

Management: Manually remove plants before seeds develop. Cultivate problematic infestations. Maintain a healthy, vigorous turf. Occasional mowing favors survival.

Broadleaf plantain *(Plantago major)* seedlings. J. M. DiTomaso

Broadleaf plantain *(Plantago major)* rosette. J. M. DiTomaso



Broadleaf plantain *(Plantago major)* flowering stems. J. M. DiTomaso

Broadleaf plantain *(Plantago major)* plant. J. M. DiTomaso

ENGLISH OR BROADLEAF PLANTAIN
(Plantago major)

Plantain family

Perennial with a basal rosette of leaves and leafless slender spikes of flowers. Leaves broadly lanceolate to egg shaped, with leafless cylindrical spikes to about 2 ft (0.6 m) tall. Flowers inconspicuous, each with a small bract at the base. Petals 4, fused in the lower portion, membranous, colorless.

Seedlings: Cotyledons oblong, about 0.08–0.40 in. (2–10 mm) long, base abruptly narrowed to a winged stalk, lacking hairs. First and subsequent few leaves elliptical, mostly 0.28–0.80 in. (7–20 mm) long, base abruptly tapered to a stalk, lacking hairs or with a few hairs.

Mature Plant: Foliage lacking hairs or sparsely short-hairy, highly variable. Leaves broadly elliptical to egg shaped, mostly 2–7 in. (5–18 cm) long, base abruptly tapered to weakly lobed, mostly 5–7-veined from the base, margins smooth to finely toothed, stalk winged.

Roots: Dense cluster of fibrous roots. Taproot lacking.

Flowers: April–September.

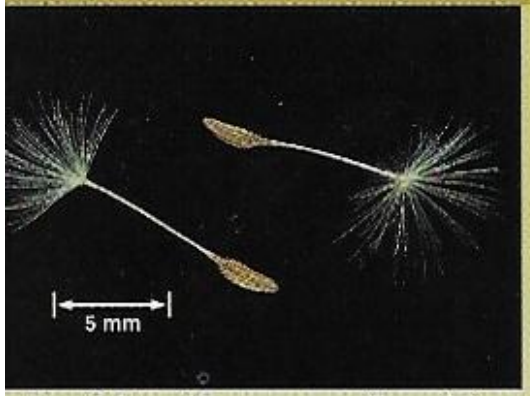
Fruits and Seeds: Capsules about 0.1–0.2 in. (3–5 mm) long, open horizontally around the middle like a lid. Seeds usually 5–16 per capsule, orange-brown to black, dull, surface finely textured, margins rounded.

Habitat: Roadsides, railway rights-of-way, waste places, landscaped areas, gardens, turf, footpaths, urban sites, crop fields, orchards, vineyards, pastures, and other disturbed places.

Distribution: Throughout California, except Sierra Nevada and deserts, to 7,300 ft (2,200 m).

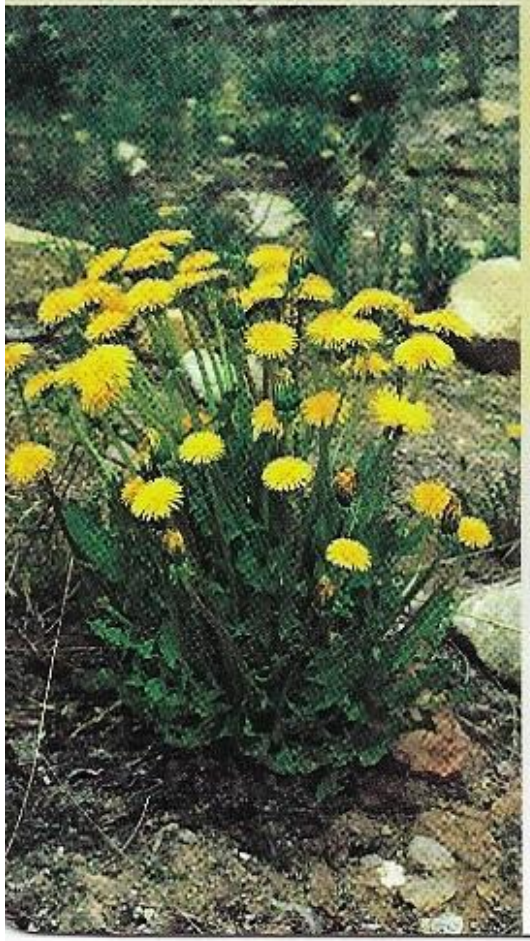
Propagation: Reproduction by seed. Seeds become sticky with mucilage when moistened. Seeds fall near the parent plant and germinate in fall or spring. Some buried seeds can survive for up to 40 years.

Management: Manually remove plants before seeds develop; cultivate problematic infestations; maintain a healthy, vigorous turf. Occasional mowing favors survival.



Dandelion (*Taraxacum officinale*) seeds. J. O'Brien

Dandelion (*Taraxacum officinale*) seedlings. J. M. DiTomaso



Dandelion (*Taraxacum officinale*) fruiting plants. J. M. DiTomaso

Dandelion (*Taraxacum officinale*) plant. J. M. DiTomaso

DANDELION
(*Taraxacum officinale*)

Sunflower family

Perennial rosette, with milky juice and yellow straplike flower heads on leafless stalks usually to about 1.2 ft (0.3 m) tall. Flower heads develop singly on a hollow leafless stalk, mostly 0.8–1.4 in. (2–3.5 cm) in diameter.

Seedlings: Cotyledons oval, mostly 0.16–0.40 in. (4–10 mm) long, lacking hairs. Leaves alternate.

Mature Plant: Leaves oblong, mostly 3–10 in. (7–25 cm) long, lacking hairs to sparsely hairy, especially lower midveins. Margins variably pinnate lobed or toothed, but usually pinnate lobed about halfway or more to the midvein. Lateral lobes point toward the leaf base, terminal lobe often larger than lateral lobes.

Roots: Taproots simple or branched, thick, can grow to more than 6.5 ft (2 m) deep but are usually up to about 1.5 ft (0.5 m) deep.

Flowers: Nearly year-round in mild climates.

Fruits and Seeds: Fruiting heads fuzzy, gray-white, spherical. Fruits flattened, body mostly 0.1–0.2 in. (3–5 mm) long. Pappus bristles fine, minutely barbed, white to pale gray, mostly 0.24–0.32 (6–8 mm) long, persistent.

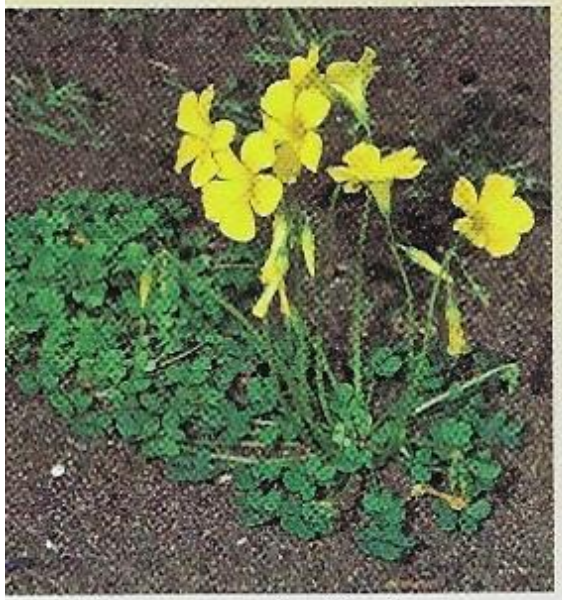
Habitat: Turf, orchards, vineyards, perennial crops such as alfalfa, nursery crops, pastures, fields, and roadsides. Often grows in moist places, especially those that receive some water year-round.

Distribution: Throughout California, except deserts, to 11,000 ft (3,300 m).

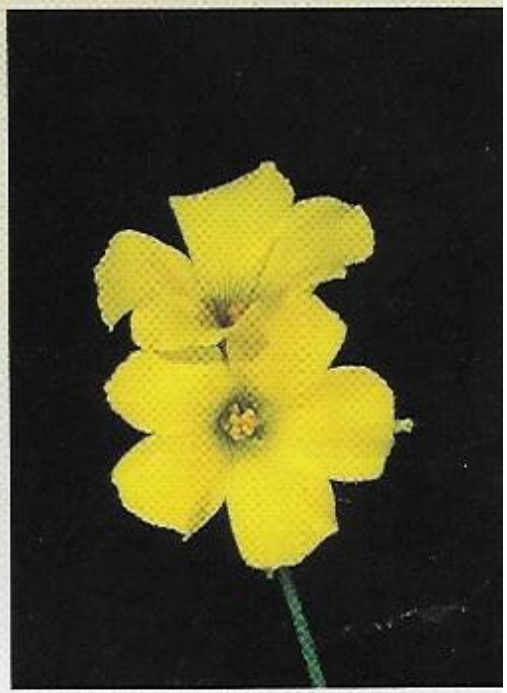
Propagation: Reproduction by seed and occasionally vegetatively from root fragments. Seeds disperse primarily with wind. Plants often produce thousands of seeds per plant. Seeds generally survive up to 3–4 years under field conditions. Root fragments only a few millimeters long can develop new shoots and roots under favorable conditions, especially in summer.

Management: Manually remove the entire root; cultivate regularly. Tolerates mowing.

Buttercup oxalis (*Oxalis pes-caprae*) bulbs and bulblets. J. M. DiTomaso



Buttercup oxalis (*Oxalis pes-caprae*) plant. J. M. DiTomaso



Buttercup oxalis (*Oxalis pes-caprae*) flowers. J. M. DiTomaso

BUTTERCUP OXALIS

(*Oxalis pes-caprae*)

Woodsorrel family

Low-growing perennial with cloverlike leaves and yellow flowers. A loose basal rosette of leaves to 14 in. (35 cm) tall grows from bulbs. Flowers 20 per cluster arising from a common point. Flowers 0.6–1 in. (15–25 mm) long, consisting of 5 bright yellow fused petals at the end of leafless stalks.

Seedlings: Not encountered in California.

Mature Plant: Foliage lacking hairs to sparsely pubescent. Leaflets 3 per leaf, broadly heart shaped, often pubescent below, typically folded down at midday and at night. Leaf stalks to 5 in. (12 cm) long.

Roots: Bulbs oval, scaly, pale brown, to 1 in. (2.5 cm) long. A slender white rhizome to 4 in. (10 cm) long with true roots grows up from the mature bulb apex. Leaves and flowers develop from the top of the rhizome. A threadlike rhizome grows down from the mature bulb base and produces a tuberous contractile root with many fibrous roots below. Small bulblets develop in the leaf scale axils along the length of the threadlike rhizome. Bulbs and bulblets readily detach from rhizomes.

Flowers: November–April.

Fruits and Seeds: None produced.

Habitat: Yards, gardens, turf, landscaped areas, urban places, orchards, vineyards, fields, grasslands, and agricultural crops, particularly artichokes.

Distribution: Coastal areas of California and the Sacramento Valley to 1,700 ft (500 m).

Propagation: No seeds are produced in California. Plants reproduce vegetatively from bulbs. Bulbs and bulblets disperse with cultivation, soil movement, intentional planting, and disposal of garden refuse and nursery soil. Bulbs germinate in fall, typically after the first rain.

Management: Difficult to manage using cultural control. Cultivate just as plants begin to flower.

Creeping woodsorrel (*Oxalis corniculata*) seedling. J. M. DiTomaso

Creeping woodsorrel (*Oxalis corniculata*) with reddish foliage. J. K. Clark

Creeping woodsorrel (*Oxalis corniculata*) plant. J. M. DiTomaso

Creeping woodsorrel (*Oxalis corniculata*) fruit with seeds (brown) and arils (white). J. M. DiTomaso

CREEPING WOODSORREL
(*Oxalis corniculata*)

Woodsorrel family

Low-growing perennial with creeping stems to 1 ft (30 cm) long that root at the nodes. Leaves cloverlike. Flowers 2–5, yellow, arising from a common point and originating from the leaf axils. Petals 5, 0.16–0.32 in. (4–8 mm) long.

Seedlings: Cotyledons oval to egg shaped, 0.08–0.20 in. (2–5 mm) long, lacking hairs except for minute hairs along the margins that point up. Leaves alternate. First leaf compound with 3 leaflets. Leaflets broadly heart shaped, about 0.10–0.16 in. (3–4 mm) long, creased down along the midvein.

Mature Plant: Foliage lacking hairs to sparsely pubescent. Leaflets 3 per leaf, broadly heart shaped, often pubescent below, typically folded down at midday and at night. Leaf stalks to 2.8 in. (7 cm) long. Leaflets green to dark purple tinged.

Roots: Taproot usually slightly fleshy. Creeping stems root at the nodes.

Flowers: Nearly year-round.

Fruits and Seeds: Capsules cylindrical, weakly 5-lobed or angled, 0.2–1.1 in. (6–28 mm) long, on erect or down-curved stalks. Seeds few to numerous per capsule, brown. Seed is attached to a white structure that coils and uncoils with changes in humidity. When the fruit ruptures at maturity, the aril ejects the seeds through a slit in the capsule. The ruptured arils remain in the empty capsules and are often mistaken for seeds.

Habitat: Yards, gardens, turf, landscaped areas, urban places, orchards, vineyards, fields, agricultural crops, and container plants of nurseries and greenhouses.

Distribution: Throughout California to 8,250 ft (2,500 m).

Propagation: Reproduction by seed and vegetatively from creeping stems that root at the nodes. Capsules open explosively to eject seeds to short distances (3–6 ft, or 0.9–1.8 m). Seeds germinate throughout most of the year.

Management: Remove seedlings before seeds develop. Avoid cultivation.

Strawberry clover (*Trifolium fragiferum*) patch in turf. J. M. DiTomaso

Strawberry clover (*Trifolium fragiferum*) fruiting cluster. J. M. DiTomaso

White clover (*Trifolium repens*) leaf. J. M. DiTomaso

White clover (*Trifolium repens*) flower and fruit head. J. M. DiTomaso

White clover (*Trifolium repens*) plant. J. M. DiTomaso

WHITE CLOVER (Trifolium repens)
STRAWBERRY CLOVER (Trifolium fragiferum)

Pea family

Low-growing perennial legumes with dense, round flower heads and compound leaves of 3 leaflets. Both species with hairy creeping stems to 1 ft (30 cm) that root at the nodes. Strawberry clover flowers fuzzy pink heads; white clover flowers spherical white to pale pink heads.

Seedlings: Cotyledons oval-oblong, lacking hairs, stalked. Leaves alternate. First leaf simple. Subsequent leaves resemble mature leaves except smaller.

Mature Plant: Leaves are alternate and with nearly hairless leaflets. White clover often with a white crescent near the central leaflet lacking a petiole.

Roots: Plants from seed initially with slender, branched taproot and lateral roots; later root system entirely fibrous. Roots associate with nitrogen-fixing bacteria.

Flowers: Strawberry clover: May–November; white clover: March–December.

Fruits and Seeds: Fruiting heads spherical. Pods roundish and remain within the dried flower parts. Strawberry clover with inflated calyx.

Habitat: Turf, fields, urban areas, roadsides, saline sites, and other disturbed, usually moist places. White clover also found in agricultural lands, riparian areas, and floodplains.

Distribution: Strawberry clover: North Coast Ranges, Sacramento Valley, Modoc Plateau, South Coast Ranges, southwestern region. White clover: throughout California. Both species grow to 5,000 ft (1,500 m).

Propagation: Both species reproduce by seed and also vegetatively from creeping stems that root at the nodes. In turf, vegetative reproduction often more important than seed reproduction. Fruits fall near parent plants. Seeds are hard coated and can survive for up to 30 years.

Management: In turf and gardens, manually remove plants before seeds develop. Improve turfgrass health and nitrogen fertilization.

37 FIELD BINDWEED

Field bindweed (*Convolvulus arvensis*) seedling. J. M. DiTomaso

Field bindweed (*Convolvulus arvensis*) white flower form. J. M. DiTomaso

Field bindweed (*Convolvulus arvensis*) pink flower form. J. M. DiTomaso

Field bindweed (*Convolvulus arvensis*) foliage. J. M. DiTomaso

Field bindweed (*Convolvulus arvensis*) in field. J. K. Clark

FIELD BINDWEED
(Convolvulus arvensis)

Morningglory family

Perennial, with vinelike stems and an extensive system of deep, creeping roots. Flowers axillary, generally solitary. Corolla white or pinkish, funnel shaped, 0.6–1.2 in. (1.5–3 cm) long, pleated in bud.

Seedlings: Cotyledons unequal, generally rectangular to kidney shaped, indented at the tip, about 0.32–0.80 in. (8–20 mm) long, lacking hairs, with whitish veins. First leaves arrowhead shaped, blunt at the tip, similar in size to the cotyledons.

Mature Plant: Stems twine around and over other plants or trail along the ground. Leaves alternate, short stalked, arrowhead shaped, typically 0.8–1.6 in. (2–4 cm) long, tip rounded, basal lobes pointed and often flared out, surface lacking hairs, sometimes covered with a whitish powdery bloom.

Roots: Root systems an extensive network of primary and secondary taproots, numerous short-lived lateral feeder roots, and long-lived horizontal creeping roots that develop vertical rhizomes from buds. Rhizomes grow to the soil surface to produce new shoots. Roots penetrate soil to a depth of 10 ft (3 m), depending on the availability of soil moisture.

Flowers: April–October or until the first frost.

Fruits and Seeds: Capsules spherical, 0.32 in. (8 mm) in diameter. Seeds few per capsule, dull dark gray brown.

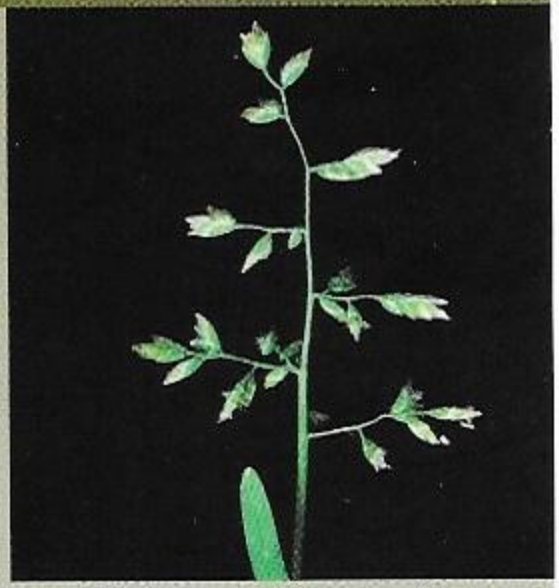
Habitat: Cultivated fields, orchards, vineyards, gardens, pastures, abandoned fields, roadsides, and waste places. Grows best on moist, fertile soils.

Distribution: Abundant throughout California to 5,000 ft (1,500 m).

Propagation: Reproduction by seed and vegetatively from deep creeping roots and rhizomes. Most seeds fall near the parent plant. Seeds are hard coated and can survive ingestion by birds and other animals. Seeds germinate throughout the growing season, but peak germination is in mid-spring through early summer. Buried seeds can survive for 15–20 years or more.

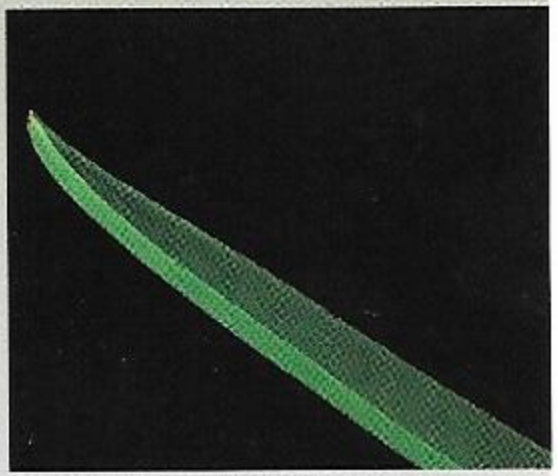
Management: Cultivate to a depth of at least 4 in. (10 cm) within 3 weeks of emergence.

Annual bluegrass (*Poa annua*) seedling. J. K. CLARK



Annual bluegrass (*Poa annua*) inflorescence. J. M. DITOMASO

Annual bluegrass (*Poa annua*) plant. J. M. DITOMASO



Annual bluegrass (*Poa annua*) boat-shaped blade tip. J. K. CLARK

ANNUAL BLUEGRASS

(*Poa annua*)

Grass family

Cool-season annual, biennial, or perennial, to 8 in. (20 cm) tall with open panicles. Panicles triangular in outline, 0.4–4 in. (1–10 cm) long. One of the most abundant weeds in California.

Mature Plant: Foliage lacking hairs, often yellowish green. Leaves keeled at base, folded in bud, tips shaped like the prow of a boat. Leaves often crinkled when young. Ligules membranous, 0.04–0.10 in. (1–3 mm) long, tip rounded or straight, often slightly jagged.

Roots: Root system fibrous, often with numerous fine roots.

Flowers: Mostly December–July, but nearly year-round in some areas.

Spikelets and Florets: Spikelets pale, 0.10–0.32 in. (3–8 mm) long. Florets 3–8 per spikelet. Lemma 0.09–0.16 in. (2.5–4 mm) long, keeled, 5-veined, veins usually sparse to densely pubescent below the middle, upper margin membranous. Glumes slightly unequal, keeled, lacking hairs.

Habitat: Turf, gardens, landscaped areas, paths, roadsides, pastures, field and vegetable crops, orchards, vineyards, managed forest systems, waste places, and urban and other disturbed sites. Grows best on fertile soil under cool, moist conditions.

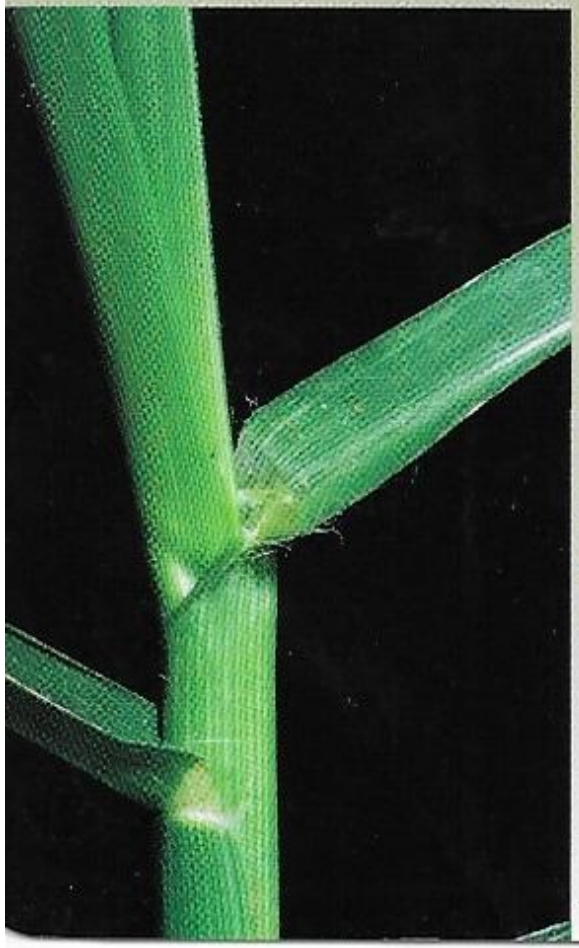
Distribution: Throughout California, especially coastal regions, to 6,600 ft (2,000 m).

Propagation: Reproduction by seed. Annual types are often prolific seed producers. Florets fall near the parent plant. In low-elevation areas of California, germinates rapidly in fall when sufficient moisture is available. Seeds reported to survive more than 30 years under certain conditions.

Management: Difficult to manage using cultural control.

Goosegrass (*Eleusine indica*) seedling.
J. K. Clark

Goosegrass (*Eleusine indica*) inflorescence. C. E. Elmore



Goosegrass (*Eleusine indica*) plant in an erect form.
J. M. DiTomaso

Goosegrass (*Eleusine indica*) collar and sheath.
J. M. DiTomaso

GOOSEGRASS
(*Eleusine indica*)

Grass family

Spreading to erect, tufted summer annual (occasionally perennial) to 1.5 ft (0.5 m) tall, with inflorescences arising from a common point. Inflorescences with 2–6 spikelike ascending branches attached at the same point at the apex of the inflorescence stalk, 1.6–6 in. (4–15 cm) long, 0.1–0.2 in. (3–5 mm) wide.

Mature Plant: Foliage often nearly hairless except for long hairs on the blade bases, collars, or upper sheath margins. Stems spreading from a central point at the base, flattened in cross-section, somewhat fleshy at the base. Leaves keeled along the midvein near the base, mostly 2–10 in. (5–25 cm) long, 0.10–0.32 in. (3–8 mm) wide. Sheaths flattened, strongly keeled, whitish near the base and around the collar. Ligules membranous, 0.02–0.04 in. (0.5–1 mm) long, top jagged, usually cleft in the center.

Roots: Root system fibrous.

Flowers: July–October.

Spikelets and Florets: Spikelets with no stalk, lack awns, lanceolate to elliptical, 0.20–0.32 in. (5–8 mm) long, flattened, in 2 overlapping rows on one side of the branch axis. Florets mostly 4–9 per spikelet. Glumes unequal, lanceolate, keeled. Lemma lanceolate, 0.09–0.16 in. (2.5–4 mm) long, pointed, keeled, margins broadly membranous. Seed striated, reddish brown at maturity.

Habitat: Turf, landscaped areas, gardens, crop fields, orchards, roadsides, and other disturbed places, especially those that receive some summer water. Does not survive frost.

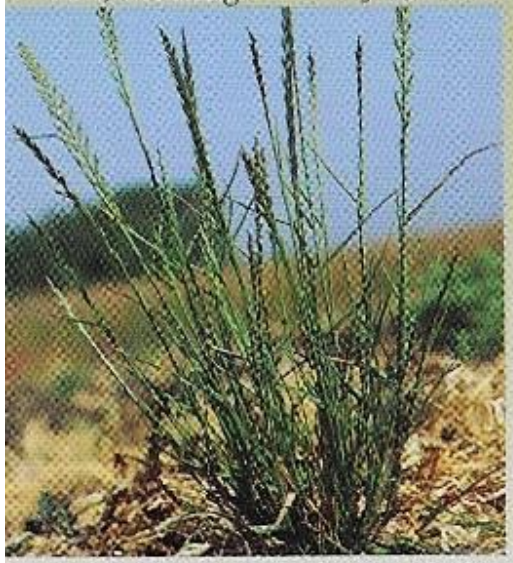
Distribution: Throughout California, except nonirrigated desert regions, to 660 ft (200 m) or possibly higher.

Propagation: Reproduction by seed. Plants can produce large numbers of seeds. Seeds fall near the parent plant. Germinates in spring.

Management: Manually remove plants before seeds mature.

Italian ryegrass (*Lolium multiflorum*) seedling. J. K. CLARK

Italian ryegrass (*Lolium multiflorum*) ligule and collar. J. K. CLARK



Italian ryegrass (*Lolium multiflorum*) plant. J. M. DITOMASO

Italian ryegrass (*Lolium multiflorum*) inflorescence. J. K. CLARK

Perennial ryegrass (*Lolium perenne*) spikelets. J. M. DITOMASO

ITALIAN RYEGRASS
(*Lolium multiflorum*)
PERENNIAL RYEGRASS
(*Lolium perenne*)

Grass family

Both species to 3 ft (1 m) tall with spikelike inflorescences. Italian ryegrass is a winter annual and usually distinguished from perennial ryegrass, a short-lived perennial, by having awns on lemma. Both species readily hybridize with each other. Inflorescences 3.2–12 in. (8–30 cm) long.

Mature Plant: Stems simple or tufted, erect, round to slightly flattened in cross-section. Leaves lacking hairs, flat, 2.4–10 in. (6–25 cm) long, glossy. Ligules membranous, 0.02–0.10 in. (0.5–3 mm) long. Auricles usually well developed, to 0.08 in. (2 mm) long, sometimes lacking.

Roots: Root system fibrous.

Flowers: April–September.

Spikelets and Florets: Spikelets with no stalk, 0.4–0.6 in. (10–15 mm) long. Only the glume is present at the base of the spikelet, 0.2–0.4 in. (5–10 mm) long. Italian ryegrass florets 10–20 per spikelet; perennial ryegrass, 5–10. Lemma mostly 0.20–0.28 in. (5–7 mm) long, with 0.10–0.32 in. (3–8 mm) awns in Italian ryegrass; awns lacking or less than 0.10 in. (3 mm) in perennial ryegrass.

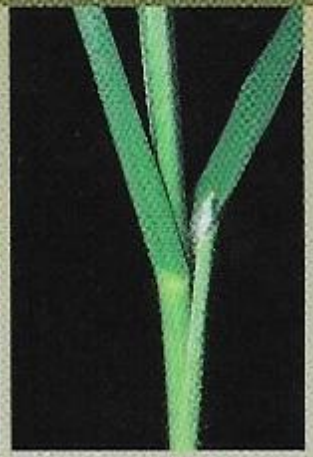
Habitat: Roadsides, fields, pastures, agronomic crops, orchards, and vineyards. Grow best in fertile, well-drained soil. Tolerates saturated soil and does not thrive during periods of drought.

Distribution: Both species occur throughout California, except deserts and Great Basin, to 3,300 ft (1,000 m).

Propagation: Reproduction by abundant seeds. Most florets fall near the parent plant. Seeds can germinate nearly year-round under optimal moisture conditions. Seedbank appears to be short-lived, although seeds have been reported to survive for many years under certain conditions. Plants grow most vigorously in fall and spring.

Management: Encourage the growth of other grasses. If possible, limit soil fertility.

Rescuegrass (*Bromus catharticus*) spikelet. J. M. DiTomaso



Rescuegrass (*Bromus catharticus*) collar and sheath. J. M. DiTomaso

Rescuegrass (*Bromus catharticus*) plant. J. M. DiTomaso

Rescuegrass (*Bromus catharticus*) inflorescence. J. M. DiTomaso

RESCUEGRASS
(*Bromus catharticus*)

Grass family

Tufted annual or short-lived perennial to 3 ft (1 m) tall, with open panicles of strongly flattened spikelets. Panicles mostly open, 4–12 in. (10–30 cm) long, with branches to about 6 in. (15 cm) long. Upper branches usually ascending, lower branches spreading to drooping.

Mature Plant: Stems erect to spreading, flattened in cross-section. Blades flat, rolled in bud, mostly 0.16–0.47 in. (4–12 mm) wide, more than 4 in. (10 cm) long, lacking hairs to hairy. Ligule membranous, 0.04–0.08 in. (1–2 mm) long, tip usually jagged. Collar usually yellowish, margin often wavy.

Roots: Roots fibrous.

Flowers: April–November.

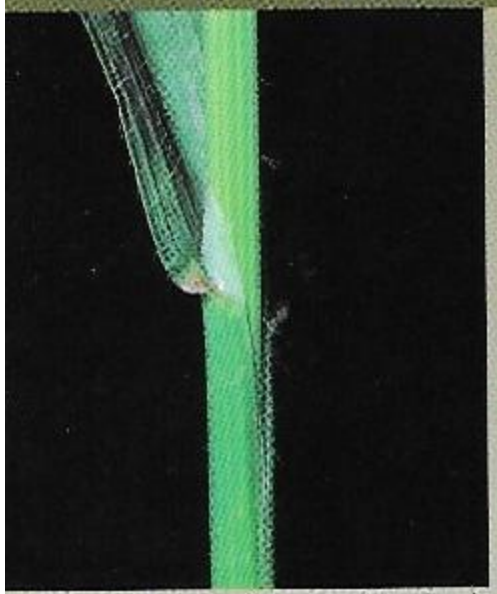
Spikelets and Florets: Spikelets strongly flattened, mostly 0.8–1.2 in. (2–3 cm) long, lacking hairs or minutely scabrous. Florets 5–13 per spikelet. Lemma keeled, 0.35–0.47 in. (9–12 mm) long, tip pointed or tapered to an awn about 0.09 in. (2.5 mm) long, lacking hairs or with short rough hairs, 7–13-veined. Glumes keeled, 5–9-veined, tip pointed, unequal, 0.28–0.5 in. (7–13 mm) long.

Habitat: Disturbed places, gardens, agronomic and vegetable crops, orchards, fields, roadsides, turf, and managed forestry sites. Especially troublesome in warm-season turf during fall and winter.

Distribution: Throughout California to 5,000 ft (1,500 m).

Propagation: Reproduction by seed. Most seeds disperse within the vicinity of the parent plant. Seeds can germinate upon maturation or remain dormant for several months, depending on the population and environmental conditions. Seedlings compete poorly with established vegetation.

Management: Difficult to manage using cultural control, especially in colder climates.



Ripgut brome (*Bromus diandrus*) collar and sheath. J. M. DiTomaso

Ripgut brome (*Bromus diandrus*) in an agricultural field. J. K. Clark

Ripgut brome (*Bromus diandrus*) inflorescence. J. M. DiTomaso

RIPGUT BROME
(*Bromus diandrus*)

Grass family

Cool-season annual with sharp florets and straight awns. Mature panicles open, loose, 2.4–10 in. (6–25 cm) long, lower branches drooping, upper branches spreading to ascending or drooping.

Mature Plant: Plants tufted, with stems to 3 ft (1 m) tall. Blades flat, rolled in bud, with a row of ciliate hairs on the margin and short soft hairs elsewhere on the plant. Ligule membranous, 0.08–0.24 in. (2–6 mm) long, tip minutely jagged.

Roots: Fibrous roots are concentrated in the top 6 in. (15 cm) of soil.

Flowers: February–July.

Spikelets and Florets: Spikelets slightly flattened. Floret bases sharp. Awn of lemma straight, scabrous, 1.2–2.6 in. (3–6.5 cm) long. Glumes shorter than lemmas. Lemma body 0.7–1.4 in. (18–35 mm) long with teeth 0.10–0.28 in. (3–7 mm) long.

Habitat: Open disturbed areas, roadsides, fields, rangelands, agronomic crops, orchards, forestry sites, and many natural plant communities. Also common in urban waste places; grows in most soil types.

Distribution: Throughout California to 6,600 ft (2,000 m). Most abundant in the central and southern half of the state.

Propagation: Reproduction by seed. Florets disperse by clinging to animals and to the shoes and clothing of humans. Seeds disperse soon after maturation, and most germinate the following fall after the first significant rain. Seeds appear to survive about 2–3 years under field conditions.

Management: Mow within 1 week after flower initiation. Cultivate shallowly shortly after the main flush of germination and again a little later.

Large crabgrass (*Digitaria sanguinalis*) seedling. J. K. Clark

Large crabgrass (*Digitaria sanguinalis*) plant. J. M. DiTomaso

Smooth crabgrass (*Digitaria ischaemum*) inflorescence. J. M. DiTomaso

Smooth crabgrass (*Digitaria ischaemum*) collar and sheath. J. M. DiTomaso

Smooth crabgrass (*Digitaria ischaemum*) plant. J. M. DiTomaso

SMOOTH CRABGRASS
(*Digitaria ischaemum*)
LARGE CRABGRASS
(*Digitaria sanguinalis*)

Grass family

Tufted summer annuals with inflorescences that have spikelike branches in 1 or, more often, 2 whorls at the stem tip. Smooth crabgrass foliage nearly hairless, stems to 1.5 ft (0.5 m) tall; large crabgrass foliage hairy, stems purplish, to about 2.6 ft (0.8 m) tall.

Mature Plant: Stems usually branched at the base, mostly ascending to prostrate, flattened in cross-section. Leaves flat, rolled in bud, midvein prominent. Ligules membranous, 0.04–0.10 in. (1–3 mm) long.

Roots: Root system fibrous, sometimes extensively deep and spreading. Lower stems can root at the nodes.

Flowers: Smooth crabgrass: September–November; large crabgrass: June–November.

Spikelets and Florets: Spikelets nearly stalkless and short stalked. Smooth crabgrass spikelets usually 3 per node, large crabgrass 2 per node. Spikelets alternate in 2 rows along one side of the branch, often purplish in fruit.

Habitat: Crop fields, orchards, vineyards, gardens, landscaped areas, turf, nurseries, pastures, roadsides, ditches, and other disturbed places. In California, smooth crabgrass is more often found in turf and large crabgrass in garden or landscape areas.

Distribution: Smooth crabgrass mainly from central to southern California to about 2,600 ft (800 m); large crabgrass throughout most of California to 4,000 ft (1,200 m).

Propagation: Reproduction by seed. Florets disperse primarily with activities such as landscape maintenance. Both species typically have an initial germination flush as the soil temperature warms. Seeds reported to be long-lived.

Management: Manually remove plants or cultivate before seeds develop. Do not mow turf closely. Mow turf higher or fertilize in fall to increase vigor.

Wild oat (*Avena fatua*) immature plant. J. M. DiTomaso

Wild oat (*Avena fatua*) inflorescence. J. M. DiTomaso

Wild oat (*Avena fatua*) ligule and collar. J. K. Clark

Wild oat (*Avena fatua*) spikelet. J. K. Clark

WILD OAT (Avena fatua)

Grass family

Erect, cool-season annual to 4 ft (1.2 m) tall, with open, lax panicles of large, pendant spikelets.

Mature Plant: Stems round in cross-section, few or no hairs. Leaves flat, rolled in bud, often twisted counterclockwise, to 8 in. (20 cm) long. Ligule membranous, 0.08–0.24 in. (2–6 mm) long, tip rounded and jagged.

Roots: Root system fibrous, often extensive.

Flowers: Mostly March–June.

Spikelets and Florets: Florets 3 per spikelet. Glumes unequal, 0.7–1 in. (18–25 mm) long, membranous, longer than floret bodies, lack awns. Lemma 0.55–0.80 in. (14–20 mm) long, usually soft-hairy on the lower third and lacking hairs above. Lemmas awned from the back at or slightly below the middle, 5–7-veined, hard except for the 2-lobed tip at maturity. Awns 0.8–1.6 in. (20–40 mm) long, bent once, twisted below bend.

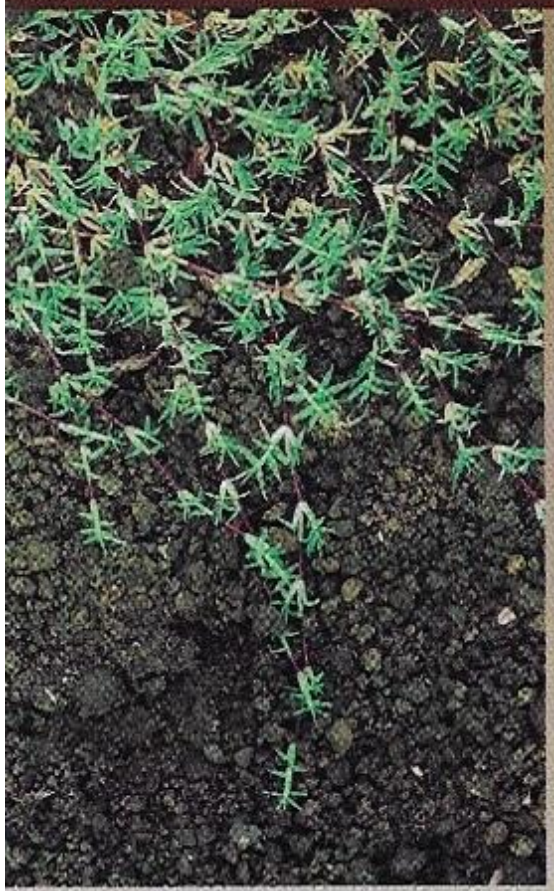
Habitat: Grassland, oak savannah, fields, roadsides, pastures, crop fields, previously cultivated fields, orchards, vineyards, gardens, and other disturbed places.

Distribution: Occurs throughout California, except the Sonoran Desert, to about 4,000 ft (1,200 m).

Propagation: Reproduction by seed. Fruits fall near the parent plant. Lemma awns twist and untwist in response to moisture levels, helping to drill the floret into the soil. In California, seeds typically germinate in late fall or early winter after first significant rain. Seeds can remain dormant for 1 or more years or up to 10 years for cold-climate biotypes.

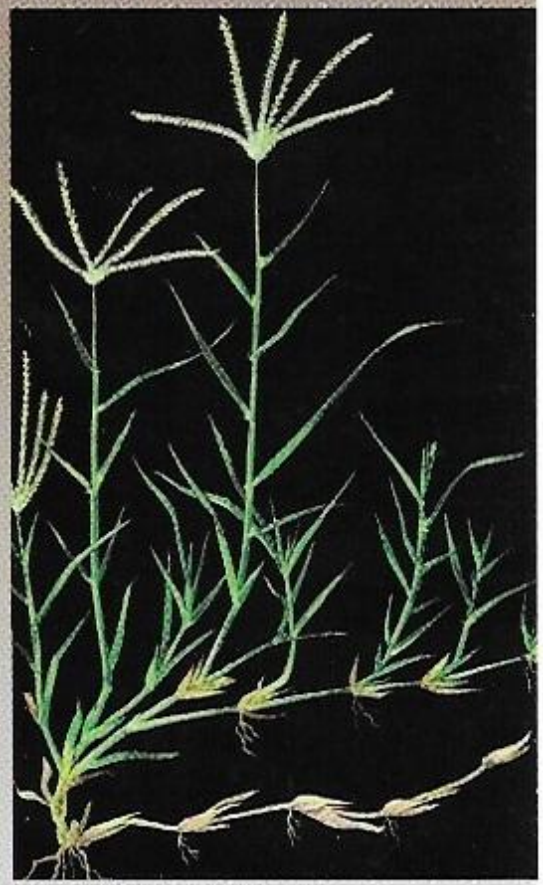
Management: Apply a thick layer of mulch. Avoid cultivation and other forms of soil disturbance that stimulate germination.

45 BERMUDAGRASS



Bermudagrass (*Cynodon dactylon*) stolons. J. K. Clark

Bermudagrass (*Cynodon dactylon*) ligule and collar. J. K. Clark



Bermudagrass (*Cynodon dactylon*) stolons, foliage, and inflorescence. UC ANR

Bermudagrass (*Cynodon dactylon*) plant. J. M. DiTomaso

BERMUDAGRASS
(*Cynodon dactylon*)

Grass family

Variable warm-climate perennial with an extensive system of creeping rhizomes and stolons, to 1.3 ft (0.4 m) tall. Inflorescences arising from a common point, with 4–8 spikelike branches 1.2–2.8 in. (3–7 cm) long.

Mature Plant: Stems erect, slightly flattened in cross-section. Blades flat, folded or loosely rolled in bud, usually less than 2.4 in. (6 cm) long, lacking hairs to sparsely covered with long, soft, straight hairs. Ligules 0.02 in. (0.5 mm) long, consist of a fringe of white hairs. Usually, long hairs around the collar, particularly at the margins.

Roots: Rhizomes and stolons slender, tough, wiry, branched, scaly, extensively creeping; produce fibrous roots at nodes.

Flowers: June–September.

Spikelets and Florets: Spikelets stalkless, pressed to branch, strongly flattened, 0.08 in. (2 mm) long, arranged in 2 overlapping rows along one side of each branch. Florets 1 or 2 per spikelet. Glumes often purplish. Lemma boat shaped, 0.08 in. (2 mm) long, lined with hairs on the margins and keel, purplish brown.

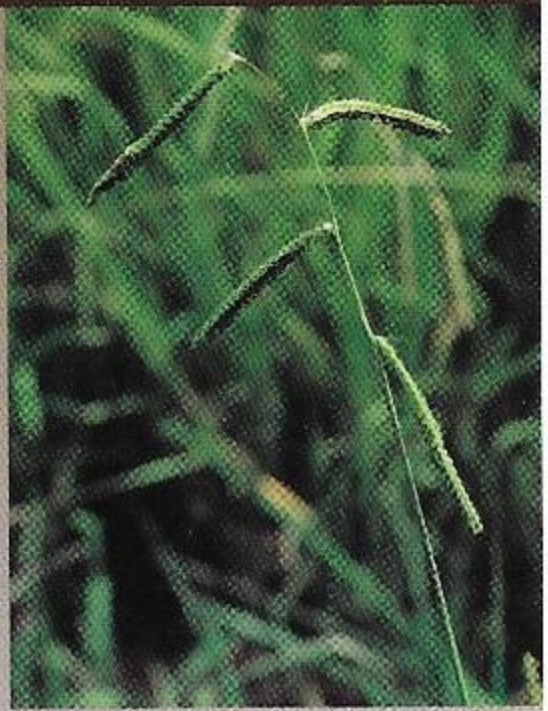
Habitat: Disturbed sites, gardens, agronomic crops, orchards, turf, and landscaped and forestry areas. Grows on most soil types in areas that are irrigated or receive warm-season moisture.

Distribution: Throughout California, except the northeast region, to 3,000 ft (900 m).

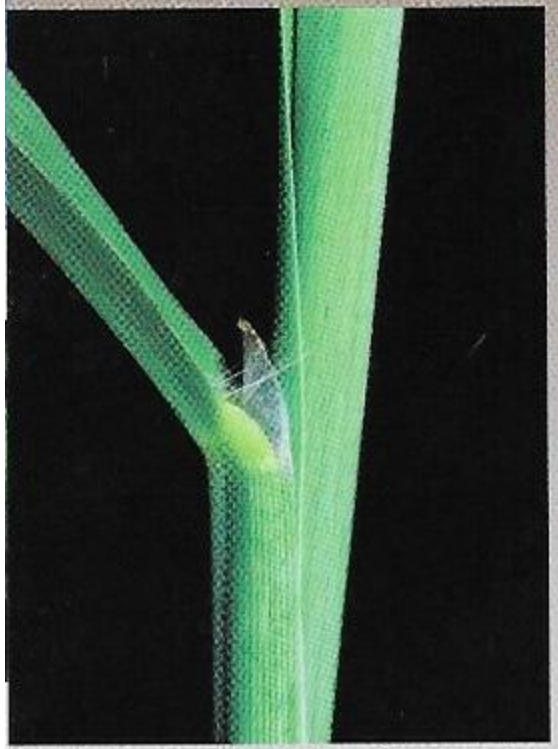
Propagation: Reproduces vegetatively from creeping rhizomes and stolons and by seed. Seeds, rhizome, and stolon fragments disperse with soil movement and landscape maintenance. Seeds germinate spring through fall. Some seeds survive about 3–4 years, but most germinate within 2 years.

Management: Manually remove rhizomes and stolons frequently. Till or disk to expose rhizomes to sun drying or freezing temperatures; solarize in summer for 6 weeks.

Dallisgrass (*Paspalum dilatatum*) habit. J. M. DiTomaso



Dallisgrass (*Paspalum dilatatum*) inflorescence. J. M. DiTomaso



Dallisgrass (*Paspalum dilatatum*) collar and sheath. J. M. DiTomaso

Dallisgrass (*Paspalum dilatatum*) inflorescence. J. K. Clark

DALLISGRASS
(*Paspalum dilatatum*)

Grass family

Tufted warm-season perennial to 5 ft (1.5 m) tall, with short rhizomes. Inflorescence axis 1.2–8 in. (3–20 cm) long, with 3–6 spike-like spreading to ascending branches, 1.5–5 in. (4–13 cm) long, and nearly stalkless spikelets in 2 rows on the lower side of each branch.

Mature Plant: Stems erect or low to ground with tips pointed up. Leaves rolled in bud, flat, often keeled at the base, lacking hairs except for a few long hairs on the collar margin. Leaves mostly 3.5–14 in. (9–35 cm) long. Sheaths slightly flattened, usually sparsely long-hairy. Ligules membranous, 0.08–0.32 in. (2–8 mm) long.

Roots: Rhizomes short, develop fibrous roots at the nodes to gradually enlarge tufts.

Flowers: May–November.

Spikelets and Florets: Spikelets slightly flattened, mostly 0.09–0.16 in. (2.5–4 mm) long, 0.08–0.09 in. (2–2.5 mm) wide, pale green to purplish, with 1 hard, millet-like, fertile floret.

Habitat: Irrigation and drainage ditches, canals, pond and reservoir margins, stream banks, moist waste places, roadsides, turf, rice fields, irrigated perennial crops, orchards, and vineyards.

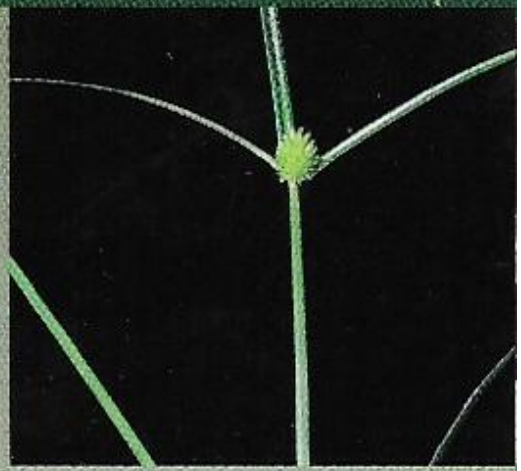
Distribution: Throughout California, except the Great Basin and Sonoran Desert, to 1,300 ft (400 m).

Propagation: Reproduction by seed. Seeds disperse with water, soil disturbance, and human activities. Most seeds germinate from mid-spring through early summer. Dug-out mature plants can regrow if rhizomes are left behind.

Management: Manage clumps by digging before they form rhizomes or set seed. Mow at optimal height to help turf resist invasion.

47 GREEN KYLLINGA

Green kyllinga (*Kyllinga brevifolia*) rhizomes. J. K. CLARK



Green kyllinga (*Kyllinga brevifolia*) flowering stem. J. M. DITOMASO

Green kyllinga (*Kyllinga brevifolia*) flower cluster. J. M. DITOMASO

Green kyllinga (*Kyllinga brevifolia*) infestation in turf. J. K. CLARK

GREEN KYLLINGA
(*Kyllinga brevifolia*)

Sedge family

Warm-season perennial with creeping rhizomes, sometimes to 1.5 ft (0.5 m) tall. Leaves grasslike and glossy. Inflorescence heads dense, oval, 0.16–0.28 in. (4–7 mm) long, with 3–4 leaflike bracts just below the numerous stalkless spikelets.

Mature Plant: Foliage lacking hairs. Leaves usually 1–3, glossy, flat, 2.4–6 in. (6–15 cm) long; margins and lower midvein sparsely minute barbed and rough to touch, especially near the tip. Flower stems erect, triangular.

Roots: Rhizomes 1.2–4.7 in. (3–12 cm) long, slender, covered with reddish brown scales, with fibrous roots and usually a shoot at each node; can grow more than 1 in. (2.5 cm) per day in the warm season.

Flowers: May–November, sometimes earlier in warm locations.

Spikelets and Florets: Spikelets flat, lanceolate, 0.09–0.10 in. (2.5–3 mm) long; consist of 3–4 two-ranked, membranous, pale brownish to greenish scales and 1 or 2 flowers. Fruits flattened, 2-sided, light to medium brown.

Habitat: Turf, ditches, landscaped areas, and ornamental plantings. Often grows on overwatered or poorly drained sites.

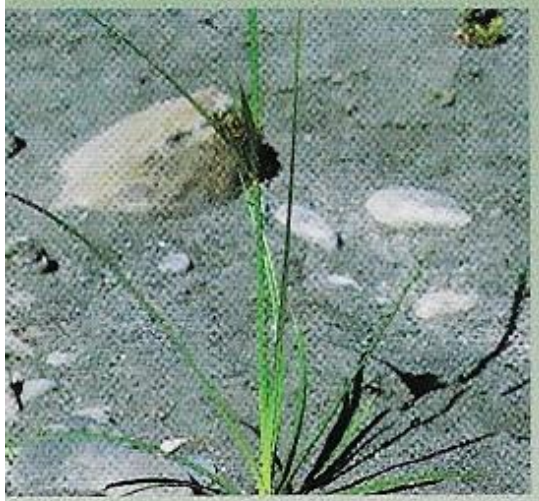
Distribution: Central Valley south of Sacramento, but most common in southern California and in coastal regions as far north as southeastern San Francisco Bay, to 1,000 ft (300 m).

Propagation: Reproduction by seed and vegetatively from rhizomes. Plants often produce large quantities of seeds. Seeds disperse with water, soil movement, and equipment. New plants can establish from short rhizome fragments with at least 1 node.

Management: Apply nitrogen to poor turf and manually remove small patches, including all rhizomes. If possible, mow turf closer than 1 in. (2.5 cm).

Yellow nutsedge (*Cyperus esculentus*) tubers. J. M. DiTomaso

Yellow nutsedge (*Cyperus esculentus*) inflorescence. J. M. DiTomaso



Yellow nutsedge (*Cyperus esculentus*) plant. J. M. DiTomaso

Purple nutsedge (*Cyperus rotundus*) inflorescence. J. M. DiTomaso

Purple nutsedge (*Cyperus rotundus*) plant. J. M. DiTomaso

YELLOW NUTSEDGE (Cyperus esculentus)

PURPLE NUTSEDGE (Cyperus rotundus)

Sedge family

Perennials with grasslike leaves, triangular stems, and slender rhizomes with small tubers attached. Inflorescences loose, arising from a common point, with leaflike bracts at the base.

Mature Plant: Stems erect, lacking hairs, triangular in cross-section. Leaves 3-ranked, mostly basal, glossy, lacking hairs. Leaves lack ligules. Yellow nutsedge stems to 3 ft (1 m) tall and leaves 0.16–0.35 in. (4–9 mm) wide; purple nutsedge stems generally shorter than 1.3 ft (0.4 m), with narrower leaves of 0.10–0.24 in. (3–6 mm).

Roots: Extensive system of rhizomes, tubers, and roots. Rhizomes slender, covered with scales, develop tubers that bear aerial shoots. Yellow nutsedge tubers round and at ends of rhizomes. Purple nutsedge tubers more irregular in shape, in chains of up to 15 tubers along the rhizome.

Flowers: Yellow nutsedge: June–October; purple nutsedge: July–November.

Spikelets and Florets: Spikelets with several to 40 florets; straw colored to gold-brown in yellow nutsedge and reddish to purplish brown in purple nutsedge, which rarely produces viable seeds.

Habitat: Disturbed areas, crop fields, irrigation ditches, orchards, vineyards, gardens, turf, and landscaped areas. Both species often grow where moisture is plentiful.

Distribution: Yellow nutsedge: throughout California to 3,300 ft (1,000 m); purple nutsedge: Central Valley to southern California to 800 ft (250 m).

Propagation: Vegetative reproduction from tubers in both species and by seed in yellow nutsedge. Tubers and seeds disperse with agricultural and nursery activities and soil movement. Tubers typically survive 3–4 years.

Management: Remove small plants every 2–3 weeks in summer. Shade or solarize populations. Cultivation must be frequent enough to exhaust tuber reserves and prevent new tuber formation.

Ordering Information

To order or obtain ANR publications and other products, visit the ANR Communication Services online catalog at http://anrcatalog.ucanr.edu/ or phone 1-800-994-8849. You can also place orders by mail or FAX, or request a printed catalog of our products from

University of California
Agriculture and Natural Resources
Communication Services
1301 S. 46th Street
Building 478 – MC 3580
Richmond, CA 94804-4600
Telephone 1-800-994-8849 or 510-665-2195
FAX 510-665-3427
E-mail: anrcatalog@ucanr.edu

Publication 3541

ISBN-13: 978-1-60107-847-6
Cover photo: J. M. DiTomaso. Photo credits are given in the captions.
Design by Celeste A. Rusconi

The University of California Division of Agriculture & Natural Resources (ANR) prohibits discrimination against or harassment of any person participating in any of ANR's programs or activities on the basis of race, color, national origin, religion, sex, gender identity, pregnancy (which includes pregnancy, childbirth, and medical conditions related to pregnancy or childbirth), physical or mental disability, medical condition (cancer-related or genetic characteristics), genetic information (including family medical history), ancestry, marital status, age, sexual orientation, citizenship, or service in the uniformed services (as defined by the Uniformed Services Employment and Reemployment Rights Act of 1994: service in the uniformed services includes membership, application for membership, performance of service, application for service, or obligation for service in the uniformed services) or any person in any of its programs or activities.

University policy also prohibits retaliation against any employee or person participating in any of ANR's programs or activities for bringing a complaint of discrimination or harassment pursuant to this policy. This policy is intended to be consistent with the provisions of applicable State and Federal laws.

Inquiries regarding the University's equal employment opportunity policies may be directed to Linda Marie Manton, Affirmative Action Contact, University of California, Davis, Agriculture and Natural Resources, One Shields Avenue, Davis, CA 95616, 530-752-0495. For information about ordering this publication, telephone 1-800-994-8849.

UC PEER REVIEWED

This publication has been anonymously peer reviewed for technical accuracy by University of California scientists and other qualified professionals. This review process was managed by ANR Associate Editor Chair Mary Louise Flint.

Printed in the United States on recycled, acid-free paper

5m-pr-9/13/SB/CR