
CLOVERS

Integrated Pest Management for Landscape Professionals and Home Gardeners

Clover is a broad term that refers to plants in three genera: *Trifolium*, *Medicago*, and *Melilotus*. Each of these plant genera contains clover species that are troublesome in turfgrass and ornamental areas.

Clover plants have a symbiotic relationship with a bacterium in the *Rhizobium* genus that allows them to fix atmospheric nitrogen and store it in root nodules, which is why clover can maintain a dark green color even under low nitrogen fertility. Turfgrass growing in soil that is low in nitrogen may receive supplemental nitrogen from clover plants as old clover roots die and decay or if the root system is injured.

PROBLEM

Clover can be a concern in turfgrass or landscaped areas for at least three reasons. First, during the flowering period bees are attracted to the clover blooms and people playing or using the turfgrass may be stung. Second, clovers reduce the uniformity of the turfgrass because its texture, color, and growth rate are different from that of grasses. And third, burclover has soft, spiny fruit that are objectionable when the burs mature; the burs are also a problem when they become attached to the fur of pets.

IDENTIFICATION AND BIOLOGY

Depending on the species, clovers may have an annual or perennial life cycle. Both annual and perennial clovers begin to germinate in fall when soil temperatures are in the 50° to 60°F range. Germination continues throughout the winter and early spring

months. Winter rainfall will sustain the annual clovers, but irrigation is required for survival of the perennial species during the dry summer months. A weed commonly confused with clovers is *Oxalis*. *Oxalis* has small yellow flowers and does not have the ability to fix nitrogen. For more information on *Oxalis* species, see *Pest Notes: Creeping Woodsorrel and Bermuda Buttercup* listed in "References."

Annual Clovers. Annual clovers that typically cause problems in turfgrass include black medic (*Medicago lupulina*) and California burclover (*Medicago polymorpha*). Another of the annual clovers, little hop clover or shamrock clover (*Trifolium dubium*), is sometimes planted as part of a turfgrass mixture.

Annual clovers grow mostly in a prostrate manner, even without mowing (Fig. 1). Burclover and black medic have trailing stems that branch from the base and radiate out from a single taproot. The compound leaves have three oval-shaped leaflets that are finely toothed with prominent veins (Fig. 2). The central leaflet has a short stem whereas the other two are almost stemless. Flowers are small, bright yellow, and borne in clusters at the end of a stem. In black medic, a single seed is produced in a smooth, small brown to black pod. The burclover seedpod is light brown and either spiny or smooth, but it is curved and contains several seeds.

Sweetclovers. Sweetclovers, including white sweetclover (*Melilotus alba*) and yellow sweetclover (*Melilotus officinalis*), are typically more of a problem in ornamental areas than in turfgrass.

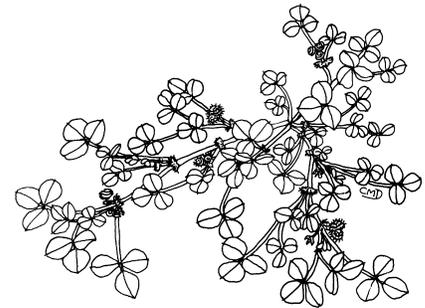


Figure 1. California burclover.

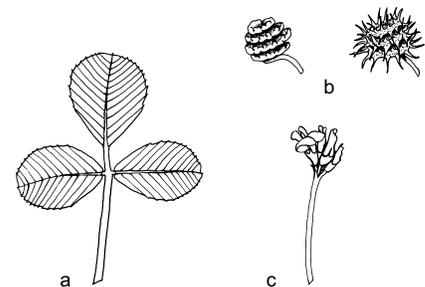


Figure 2. Leaf (a), seedpods (b), and flowers (c) of California burclover.

Sweetclovers are winter annuals or biennials that normally grow from 2 to 5 feet tall (Fig. 3). They have a trifoliate leaf with the leaf margins toothed more than halfway back from the tip (Fig. 4). The flowers are small, yellow or white (depending on the species) and are produced in a many-flowered terminal and in leaf axils. The small pods have one seed.

Perennial Clovers. The perennial white clover, *Trifolium repens*, is most often found as a turfgrass weed, but it

and strawberry clover, *Trifolium fragiferum*, are sometimes planted in a mixed stand with turfgrass to reduce the need for nitrogen fertilizer application.

White and strawberry clovers have a creeping stem system (Fig. 5) that roots at the nodes (joints in the stem), forming large clumps. White clover leaves are trifoliate with ¼- to ½-inch-long leaflets (Fig. 6). The flowers of white clover are formed in heads that are white to pale pinkish. Strawberry clover is a more robust plant than white clover and thus more aggressive. The leaves are mostly basal with the leaflets longer and narrower than white clover. The pink flowers are borne in heads that are less showy than white clover.

MANAGEMENT

Clovers are relatively easy to control in the home garden by hand-pulling, cultivation, and the application of mulch. In large, landscaped areas herbicides may also be necessary. Because clover seed has a hard seed coat that is very heat tolerant, composting and solarization are not as effective in reducing clover's seed viability as they are with other weed species. (However, seeds of black medic and burclover are more sensitive to heat than seeds of sweetclovers.) The hard seed coat also allows the seeds to survive longer in the soil than many other weed seeds; clover seeds can germinate over many years, making the control of these plants an ongoing effort.

Once clovers are controlled, change cultural practices in the landscape and turfgrass to reduce the chance of rein-

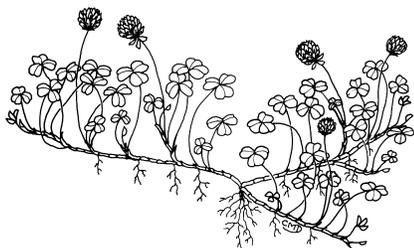


Figure 5. White clover.

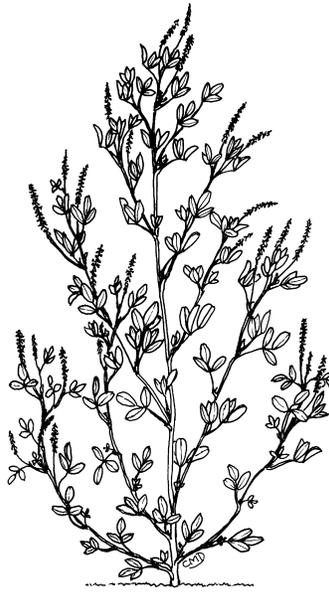


Figure 3. Yellow sweetclover.

festation. For instance, adjust the fertilizer program to include more nitrogen and less phosphorus in turfgrass or use mulch in landscapes.

Landscaped Areas. Annual clovers can be easily controlled by hand-pulling, hoeing, or cultivation. Mulching, depending upon the size and depth of the mulch, can prevent seedling establishment. Before seeds germinate, apply the mulch 2 to 4 inches deep, depending on the size of the particles (smaller particles, less depth). Mulch can also

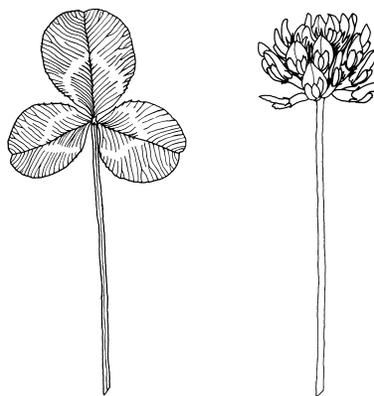


Figure 6. Leaf and flowers of white clover.

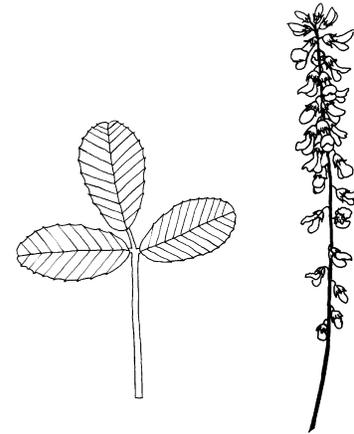


Figure 4. Leaf and flowers of yellow sweetclover.

be applied after the seedlings have germinated but must be applied more thickly (4–6 inches) and must cover the plants completely to block out all light. Larger plants are more difficult to control with mulching, but they can be hand-pulled or hoed.

Preemergent herbicides available for landscape use are effective but generally unnecessary in the home landscape where annual clovers are easily controlled by the methods mentioned. For landscape professionals, herbicide formulations that contain isoxaben are effective for controlling annual clovers and can be used around many woody shrubs and trees. Most established annual flowers tolerate this herbicide. Herbicide formulations containing oryzalin, trifluralin, or pendimethalin will control most grass species and some broadleaf weeds, such as annual clovers, but will miss many other broadleaf species (mustard, aster, legume, and cheeseweed families).

Postemergent control of clover is difficult. If the seedlings are small, glyphosate can be used in open areas provided desirable plants are not sprayed. Once annual clover plants get to 3 to 4 inches in height, control with herbicides is more difficult. The top may be burned, but the plant often regrows. None of the herbicides used

in turfgrass for clover control is safe to use in ornamental plantings because they can damage desirable plants.

Perennial clovers can also be controlled with glyphosate when the plants are seedlings, but once the clover is established, it cannot be controlled except by digging it out. Glyphosate at high rates will suppress some clovers.

Turfgrass Areas. Yellow turf and green clover is a good indication of low nitrogen fertility. The invasion of clover into turfgrass can be reduced by using levels of nitrogen fertilizer that will promote grass growth but not the growth of clover; this can be achieved by applying 1 pound of active nitrogen per 1,000 square feet of turfgrass during each month of active turfgrass growth (not to exceed 6 lb active nitrogen/1,000 sq ft/year). Also, high phosphorus in the soil promotes the

invasion of clovers. Clover in established turfgrass can not be controlled by fertilization or mowing of the grass. Once clover is established, the annual clovers can be controlled by hand-pulling before seeds are formed. Hand-pulling will need to be repeated as new germination occurs and desirable turfgrass planted in weeded areas.

Both established annual and perennial clovers can be controlled with post-emergent herbicides. The best herbicide to use depends upon the species of turfgrass. Warm-season turfgrasses such as bermudagrass, zoysiagrass, and kikuyugrass will tolerate products containing mecoprop and dicamba but not tricopyr. Cool-season turfgrasses will tolerate all of the herbicides that control clover. The herbicide 2,4-D is not effective for clover control; it will injure the plant but does control it.

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Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

Do not place containers containing pesticide in the trash nor pour pesticides down sink or toilet. Either use the pesticide according to the label or take unwanted pesticides to a Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Household Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

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