Clovers

Integrated Pest Management for Home Gardeners and Landscape Professionals

Clover is a broad term that refers to plants in three genera: *Trifolium*, *Medicago*, and *Melilotus*. Each contains clover species that are troublesome in turfgrass and ornamental areas. They are in the legume family (Fabaceae) and have distinctive “pealike” flowers that are arranged in various types of heads.

Clover plants have a symbiotic relationship with a bacterium in the *Rhizobium* genus that allows them to fix atmospheric nitrogen and provide for their own nitrogen needs, 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 old clover plants as their roots die and decay.

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* leaves look similar to those of clovers, but lack a stipule and generally have a more pronounced indentation at the top of each leaflet. Once *Oxalis* matures it has small yellow flowers that have five regular petals that are readily distinguished from clover flowers. 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). Black medic and burclover 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 curls into a tight bur that is typically spiny. The burrs contain several seeds.
Sweetclovers. Sweetclovers, including white sweetclover (*Melilotus alba*) and yellow sweetclover (*Melilotus officinalis*), are erect annuals or biennials that are more problematic in ornamental areas than in turfgrass. They grow from 2 to 5 feet tall (Fig. 3) and have a trifoliate leaf arrangement with the leaf margins toothed more than half-way back from the tip (Fig. 4a). The flowers are small, yellow or white (depending on the species), and are produced in a many-flowered terminal and in leaf axils (Fig. 4b). 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 that roots at the nodes (joints in the stem), forming large clumps (Fig. 5). White clover leaves are trifoliate with \( \frac{1}{4} \)- to \( \frac{1}{2} \)-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 mostly form from the base of the stem with the leaflets longer and narrower than white clover. The pink flowers are borne in heads that are less showy than white clover.

**IMPACT**

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, the mature burs of burclover are a problem for people walking barefoot and when they become attached to clothing or pets.

**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. 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 reinestation. Insuring a thick stand of grass can help exclude clovers in turf. Fertilization can also influence clover growth. For instance, adjust the fertilizer program to include more nitrogen and less phosphorus in turfgrass. Mulches can be effective in excluding clovers and other weeds in landscapes.

**Landscaped Areas.** Annual clovers can be easily controlled by hand-pulling, hoeing, or cultivation. Mulching, depending on the size and depth of the mulch, can prevent seedling establish-
height, control with herbicides is more difficult. The top may be burned, but
the plants often regrow. 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 con-
trolled 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 ni-
trogen per 1,000 square feet of turfgrass
during each month of active turfgrass
growth (not to exceed 4 lb active ni-
trogen/1,000 sq ft/year). Also, high
phosphorus in the soil promotes the
invasion of clovers. However, nitrogen
applications should be carefully cal-
culated and applied to avoid runoff of
excess fertilizer to municipal drainage
systems. Clover in established turf-
grass cannot be controlled by fertil-
ization or mowing of the grass. Once
clover is established, the annual clo-
vers can be controlled by hand-pulling
before seeds are formed. Hand-pulling
will need to be repeated as new germi-
nation occurs and desirable turfgrass
is planted in weeded areas.

**Herbicide.** Both established annual and
perennial clovers can be controlled with
postemergent 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 triclopyr. Cool-
season turfgrasses will tolerate all of
the herbicides that control clover. The
herbicide 2,4-D is not effective for clo-
ver control; it will injure the plant but
does not control it.

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This Pest Note is available on the World Wide Web (www.ipm.ucdavis.edu)

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