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## VEGETATION MANAGEMENT GUIDELINE

### White and Yellow Sweet Clover (*Melilotus officinalis*)



Photo by Kenneth R. Robertson, INHS

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## SPECIES CHARACTER

### Description

White and yellow sweet clover are biennial herbs that are somewhat easy to identify, especially when in flower. Flowers are crowded densely on the top 4 inches (10 cm) of an elongated stem, with younger flowers emerging nearest the tip, or apex. Each tiny flower is attached to the stem by a minute stalk. The small pea-like flowers are white or yellow and each produces one or two seeds during the second growing season.

The leaves of sweet clover are alternate and trifoliate. Leaflets are finely-toothed and oblong. Mature plants (second-year) may appear bushy. These aromatic plants are members of the pea (legume) family, but they are not true clovers.

### Similar Species

White and yellow sweet clover are distinguished from other members of the pea family by the following combination of characteristics. The leaves of yellow and white sweet clover are divided into three leaflets that are finely toothed, the middle leaflet occurs on a distinct stalk, and the flowers occur in a long narrow inflorescence. No other member of the pea family has this combination of characteristics. Sweet clover should be accurately identified before attempting any control measures. If identification of the species is in doubt, the plant's identity should be confirmed by a knowledgeable individual and/or by consulting appropriate books.

### Distribution

Sweet clover is native to Europe and Asia. It can be found in all 50 United States. The earliest records of its occurrence in North America date to 1664. More recently, around the turn of the century, sweet

clover was cultivated as a forage crop and soil builder. Today it also is used as a wildlife cover crop and in production of honey. Each species of sweet clover has been recorded from every county in Illinois, and adventive populations occur in disturbed habitats throughout most of the state. Since this exotic is considered economically important, and thus will continue to be planted, it will remain a problem for land managers well into the future.

### **Habitat**

Sweet clover has adapted to a variety of conditions, withstanding both hot and cold climates. It grows well in direct sunlight and in partial shade. Sweet clover, however, cannot tolerate dense shade. Even the thick growth of a second-year sweet clover produces enough shade to cause its own lower leaves to fall. Sweet clover seems to prefer calcareous or loamy soils with a pH level of 6.5 or greater. Areas most likely to contain sweet clover include roadsides, abandoned fields, railroad ballasts, pastures and any unflooded, open natural community such as a prairie.

### **Life History**

Sweet clover is an obligate biennial, which means that the plant always puts its energy into developing a healthy root system during the first season, and during the second season, it flowers, sets seed and dies. In the first growing season, sweet clover is entirely vegetative. A small, branched stem with clover-like leaves is visible. In late summer, the root continues to develop. By the second year sweet clover has a strong taproot and root crown from which new shoots emerge. The plants flower May-September, producing hardy little seeds that may remain viable in the soil for years (up to 30 years or more). After setting seed the plant dies. Because sweet clover dies after the second year, seed production is critical for its continued existence, and is the key to controlling it. If the flowering stage of sweet clover is halted, so is the spreading of the plant - as long as management procedures continue long enough to deplete viable seeds remaining in the soil.

### **Effects Upon Natural Areas**

These clovers readily invade open habitats and already have successfully exploited many Midwestern native prairies and open, unflooded communities.

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## **CONTROL RECOMMENDATIONS**

### **RECOMMENDED PRACTICES IN NATURAL COMMUNITIES OF HIGH QUALITY**

Hand-pulling is effective if done when the ground is moist and most of the root can be removed. The best times to hand-pull sweet clover are in the late fall, after the first- year plant root-crown buds have developed, or anytime early in spring, before second year plants develop flower buds. Fall weeding is recommended because: 1) the bright green sweet clover is easily spotted within the yellowing prairie, 2) moist fall conditions and an immature first year root may make pulling easier, and 3) fall weeding is less stressful to native vegetation. However, sweet clover is easily located in the spring also, because it becomes green before native prairie vegetation. Hand-pulling in summer can be effective if done when the ground is moist. Hand-pulling is labor-intensive and must be done consistently. This treatment is feasible for light and moderate infestations, but may be too time consuming in heavy infestations.

In large, dense colonies of sweet clover, cutting first and second year stems close to the ground with a hand-held scythe is effective if done after leaves on the lower stems have died (before flowering occurs) and up to early stages of flowering (before seeds form). Sweet clover usually does not resprout when the stems are cut close to the ground during this time.

Prescribed burning can control sweet clover. A combination of an April burn in the first year, followed by a May burn the following year is most successful in eradicating an even-aged stand of sweet clover.

A hot, complete, first-year April burn scarifies sweet clover seeds, stimulating them to grow (a late fall burn will also have this effect). A hot, complete, second-year May burn kills the emerging shoots before they can go to seed. Heavily infested stands are best controlled with the above sequence twice, separated by 2 years without burning. Problems with this method may arise if the burn is patchy, leaving viable seeds or second-year shoots unscathed.

In an uneven-aged stand of sweet clover, second-year clover may escape the harmful effects of the early first-year burn because their shoots were not fully emerged. These plants would live to set seed. In this case, a combination of other procedures can be used: 1) spring burns could be later (after shoots emerge, but before second-year plants set seed) in a sequence of 3-5 years, or 2) follow up the early burn with hand-pulling, if practical.

In an even-aged stand of sweet clover, fall mowing can speed up the 2 year burn program: burn in April; mow first-year plants in August, leaving the stems behind to dry; and burn again in mid-late September.

### **RECOMMENDED PRACTICES ON BUFFER AND SEVERELY DISTURBED SITES**

Same as given above for high quality areas, with the following addition: Herbicide can be useful in controlling large sweet clover populations in degraded areas. Following a fall burn, hand spray individual seedlings with an amine formulation of 2,4-D according to label instructions in spring, before native prairie vegetation emerges. This treatment also is effective when plants are in the cotyledon stage (i.e. when the first leaves appear in the development of the seedling). To reduce vapor drift, use an amine formulation of 2,4-D rather than an ester formulation. A 1% solution of Mecamine (2,4-D plus Dicamba) applied to the foliage as a spray is very effective. The herbicide 2,4-D amine is selective for broadleaf plants.

When applying either herbicide described above, spot application should be done such that coverage is uniform with the entire leaf being wet. Precautions should be taken to avoid contacting non-target plants with the solution. **Do not spray so heavily that herbicide drips off the target species.** By law, herbicides may only be applied according to label instructions and by licensed herbicide applicators or operators when working on public properties.

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### **FAILED OR INEFFECTIVE PRACTICES**

No effective biological controls that are currently feasible in natural areas are known.

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### **REFERENCES**

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## PERSONAL COMMUNICATION

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