



## VEGETATION MANAGEMENT GUIDELINE

Kudzu [*Pueraria lobata* (Willd.) Ohwi]

### SPECIES CHARACTER

#### DESCRIPTION

Kudzu is a perennial, deciduous, woody vine that belongs to the Fabaceae or “bean” family. Leaves are alternate and trifoliolate. The leaflets are hairy beneath and on the margins, broadly ovate (10-15 cm) and often 2-3 lobed. First year vines are densely pubescent, growing from buds on a root crown at the soil surface. As the vine trails it can also root at individual nodes, enlarging into root crowns from which individual vines can develop. Many vines can grow from a large central root crown forming extensive monotypical patches. Older vines are woody and in Illinois have been recorded to have a diameter up to 7.5 cm with eight obvious growth rings. Flowers are reddish purple in dense axillary racemes and are fragrant with a distinctive grape aroma. The fruit is a dark brown legume covered with long spreading hairs which in Illinois can produce up to nine seeds (2-4 mm) with 90% viability (recorded from a population in southern Illinois). Viable seeds within a pod tend to be larger and mottled in appearance.

#### SIMILAR SPECIES

Kudzu may be confused with other rampantly growing vines that can form draping, uniform blankets of leaves such as racoon grape (*Ampelopsis cordata*) or species of wild grape (*Vitis spp.*). Upon closer examination, the presence of trifoliolate leaves will easily distinguish kudzu from any of these species of vines. Kudzu may also be confused with another trailing trifoliolate legume, round-leaved tick trefoil (*Desmodium rotundifolium*), especially when searching for seedlings or young kudzu plants. Round-leaved tick trefoil can be distinguished by the presence of persistent, ovate stipules and obovate, unlobed leaves. Kudzu can be distinguished from all other Illinois legumes by its densely golden pubescent young stems.

#### DISTRIBUTION

Kudzu is native to Japan, China, Thailand, India, Laos, Philippines, Myanmar, and Bhutan. It was introduced into the United States from Japan in 1876 as a display at the plant exhibition of the Philadelphia Centennial Exposition. Later, Kudzu was sold in the U.S. as an ornamental to shade porches and was often referred to as “porch vine.” By the 1930's Kudzu was planted extensively across the Southeast as a soil stabilizer and as an inexpensive fodder for livestock. Today, kudzu is estimated to cover 2.8 million hectares (seven million acres) of land in the U.S. with the heaviest infestations in the Southeast. However, kudzu is rapidly spreading north as far as Illinois, Ohio, and Pennsylvania, and in 1994 it was documented as part of Michigan’s flora.

In Illinois, kudzu is known from 23 counties. Ninety percent of the populations are located in the southernmost counties of Alexander,



Jackson, Johnson, Pope, Saline, and Union; however, populations are scattered in central Illinois and extend as far north as Rock Island. Fruit production was recorded from nearly every population.

#### HABITAT

Kudzu can grow in a wide range of environmental conditions and soil types. In Illinois optimal conditions appear to be in open sunlight on well drained neutral soils in the southernmost counties where winters are mild. However, kudzu can survive drought conditions, harsh winters and will persist on the floor of closed canopy forests. Kudzu is most often found in Illinois growing along roadsides, steep embankments, field borders, abandoned fields, strip-mine areas, and old home sites.

#### LIFE HISTORY

A kudzu patch is typically comprised of plants that range in age from one year up to probably as old as the first plant established in the area. Kudzu is extremely aggressive and has been recorded to have growth rates exceeding one foot per day. Surplus carbohydrates produced from large photosynthetic leaf areas characteristic of kudzu patches are stored in massive woody, tuberous roots. In optimal soil conditions, roots can grow to 12 feet deep and weigh up to several hundred pounds. Because of the nature of the root system **eradication by direct root removal is not practical**. Kudzu produces seeds with a hard coat. It is believed that these seeds can lie dormant for many years before they germinate. In Illinois, Kudzu resumes growth in late May for the southern counties and continues to grow until the first killing frost.

#### EFFECTS ON NATURAL AREAS

Kudzu kills or degrades other plants by suppressing them under a blanket of leaves, by girdling stems of trees, and by breaking branches or uprooting entire trees and shrubs through the sheer force of its weight. Kudzu can form extensive monotypical patches resulting in a large scale alteration of plant communities. Once established, kudzu is difficult to eradicate and requires a long-term commitment. Currently, no known populations exist within any high quality natural communities identified by the Illinois Natural Areas Inventory. If any population of kudzu is found in the vicinity of a high quality natural area, it should be targeted for eradication and annual surveillance should be conducted to prevent new invasions.

#### CONTROL RECOMMENDATIONS

As with most aggressive exotic species, eradication requires persistence in monitoring and thoroughness in treating patches during a multi-year program. Due to its large, starchy roots, its ability to develop roots at the leaf nodes, and its ability to produce thick mats of vines, kudzu can be difficult to control and eradicate. The continued germination of seeds present within the soil and the ability of the root systems of this plant to go dormant complicate control efforts. Eradication usually takes several years, but that is the only way to ensure complete control of the plant. It cannot be over emphasized that **total eradication of kudzu is necessary to prevent regrowth**. Therefore, follow-up treatments and monitoring for residual kudzu plants should be high

priority in any kudzu eradication strategy.

## RECOMMENDED PRACTICES IN HIGH QUALITY NATURAL COMMUNITIES, BUFFER, AND SEVERELY DISTURBED SITES

### Chemical Control

#### *Open Patches*

For control, it is recommended that patches of kudzu be treated initially with a foliar application of 0.08% active ingredient solution Transline herbicide during the period August 15 through October 15. A non-ionic surfactant should be added to the mixture to help penetrate the leaf cuticle. Transline is a systemic herbicide that is absorbed by the leaves and is then translocated throughout the plant. Transline is targeted to three plant families: legumes (Fabaceae), smartweeds (Polygonaceae), and composites (Asteraceae). Most non-legume broadleaf trees are tolerant of Transline and will not be affected by direct or indirect application. Transline should be mixed according to label instructions for foliar application and applied as a foliar spray. Complete coverage of the patch is important and should result in approximately 90-95% mortality. Brown-up should occur within 2-3 weeks. A second foliar application of Transline can be applied to residual plants within the same year as long as it occurs within the recommended time frame.

As with most aggressive exotic pest plants, eradication of kudzu will require multi-year monitoring and one to several follow-up spot treatment applications of herbicide. In the early summer as young plants emerge, young stems and leaves can be spot treated with Garlon 3A or Tahoe 3A mixed as a 0.9 % active ingredient solution. Young kudzu plants should be accurately identified before attempting early summer control measures. The target area should be monitored again in late summer and if residual plants are located they should be spot treated with Transline. If follow-up treatments are not exercised, kudzu will quickly reclaim an area.

#### *Draping Vines on Older Patches*

On older patches use basal bark or cut stem treatments with 15.0% active ingredient solution Garlon 4 or Tahoe 4E with mineral or plant-based oil, preferably Penevator, and dye to treat large, high climbing vines. Cut stump and basal bark applications can be done at any time of the year except when snow or water prevents treatment.

#### *Patches Near Water*

Veteran 720 a formulation of 2,4D and dicamba, is recommended for sites near water, although it should not be sprayed directly onto water. Veteran 720 is a dicot-specific herbicide used as a foliar spray. Application rate is 0.4% active ingredient solution for younger patches and 0.6% active ingredient solution for infestations over ten years old. August or September are the recommended months for application.

Rodeo is a formulation of glyphosate. Rodeo is a biodegradable, non-selective, foliar-applied herbicide which is licensed for use over water. Tests show that glyphosates provide only 64% control after annual treatment for two years. Rodeo is not as effective on kudzu as Veteran 720 but is still the safest herbicide for sites near water. A 1.0%

active ingredient solution is recommended. Many years of persistent treatment will be necessary to achieve eradication.

By law, herbicides may only be applied according to label instructions and by licensed applicators or operators when working on public properties. All appropriate safety precautions should be used when applying any pesticide. Herbicides should be applied while backing out of an infestation to minimize applicators exposure to the chemicals.

#### Fire Management Considerations

Most fire events result in a top-kill but have little effect on the roots and root crown. After fire, kudzu will generally sprout from surviving root crowns. Fire alone is not considered an effective tool for controlling kudzu but can be used to reduce cover for more efficient application of herbicides. Burning may also promote seed germination by breaking the hard seed coat allowing the development of young plants which can be controlled by subsequent treatments. Extreme caution should be applied when burning kudzu patches due to the quantity of fuels per acre and the potential for fire being spread upward into the sub-canopy and canopy by draping kudzu vines.

Before commencing any prescribed burns, open burning permits must be obtained from the Illinois Environmental Protection Agency and often the appropriate local agencies too. Burns should be administered by persons trained or experienced in conducting prescribed burns, and proper safety precautions should be followed.

#### Mechanical Methods

Utility companies commonly use mechanical methods to remove kudzu from poles and wires. However, large scale cutting is often not practical because of the production of thick mats of vines by this plant. Stem cutting along with herbicide application are appropriate as follow-up treatments, or in treatments of small populations of this plant. Mowing can be helpful in reducing the height of plants so that herbicide treatments can be more effective as the plants begin to sprout. In larger patches, mowing can provide access lanes for equipment to improve overall coverage. Caution should be taken when mowing because kudzu patches can conceal holes, ditches, poles, or other hazards that could pose a danger for the operator of the mower. In situations such as these, prescribed fire may be helpful in revealing the presence of these obstacles.

It should be noted that kudzu could be spread from one location to another by mowing. Portions of a vine may be carried by the mower to another site where it could root and form a new plant.

#### Grazing

Kudzu does produce high quality forage which is palatable to livestock, including sheep, goats, hogs, and cattle. Continued defoliation by grazing can weaken and sometimes eliminate kudzu plants depending upon the amount of starch reserves in the roots. Eradication of kudzu by this method generally requires a multi-year, heavy grazing rotation. Patches must be fenced, preferably with an electric fence which can be easily installed and removed, in order to concentrate the grazing on the kudzu plants. Most patches of kudzu are not well suited to grazing due to size, terrain or their location. This method would not be appropriate for high quality natural areas. However, grazing is

one control alternative within an integrated pest management control program.

### **BIOLOGICAL CONTROL**

The standard definition of biological control is the use of natural enemies (i.e. parasites, predators, or pathogens) to reduce populations of a target species and thereby reduce their damage to tolerable levels. No biological control agents are currently available in the United States for kudzu control. Efforts are currently underway to determine the feasibility of biological control for kudzu. Before applying a biological control agent, comprehensive research in many branches of biology are required to evaluate the environmental risks. Such review often requires years of research and testing. Within this time frame, the populations of kudzu in Illinois will increase in size, and new populations are likely to develop. Thus, biological control of kudzu is not considered a viable part of an integrated pest management program to control kudzu in Illinois at this time.

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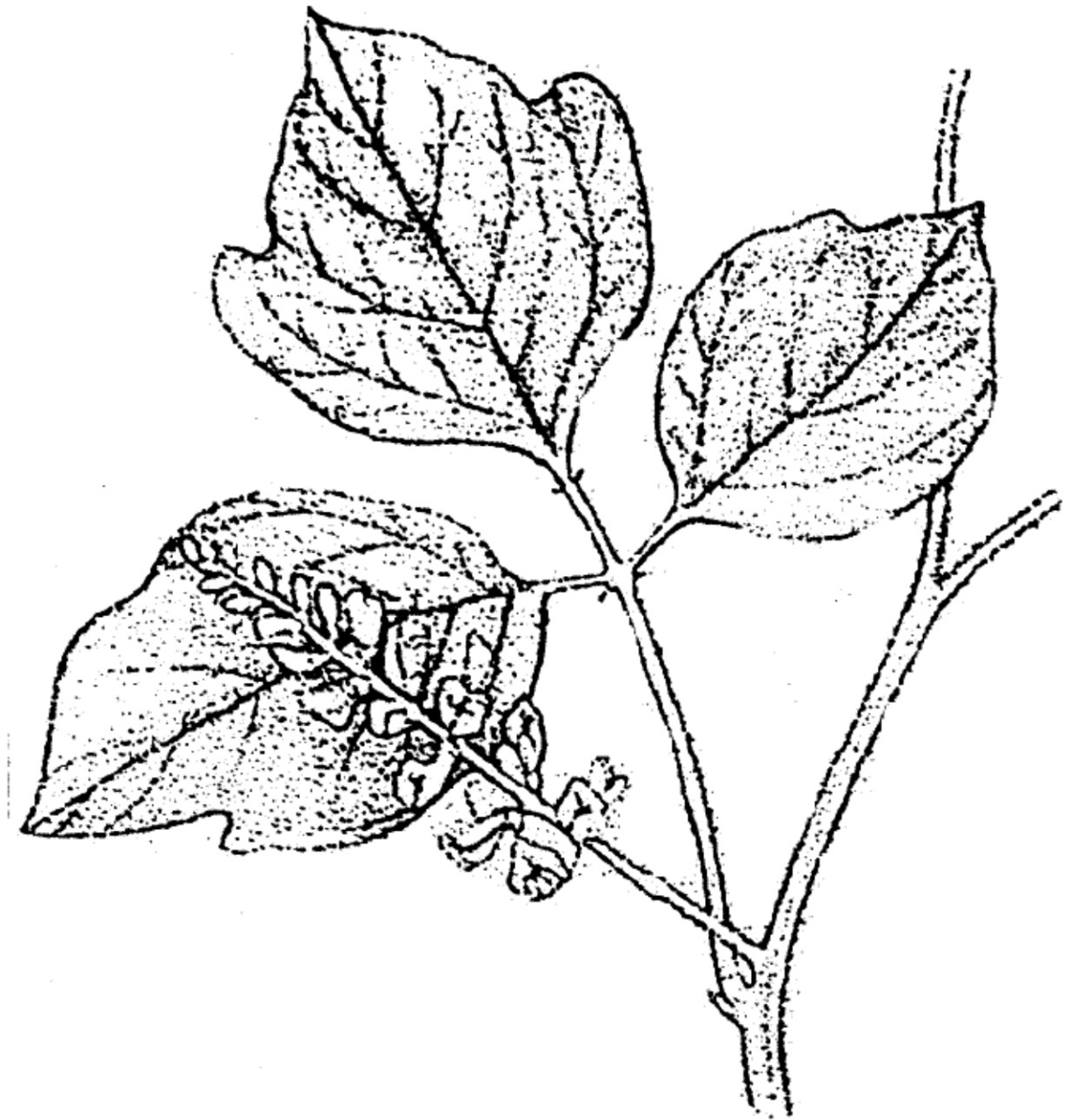
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