

**WRITTEN FINDINGS OF THE  
WASHINGTON STATE NOXIOUS WEED CONTROL BOARD  
Proposed for listing 2003**

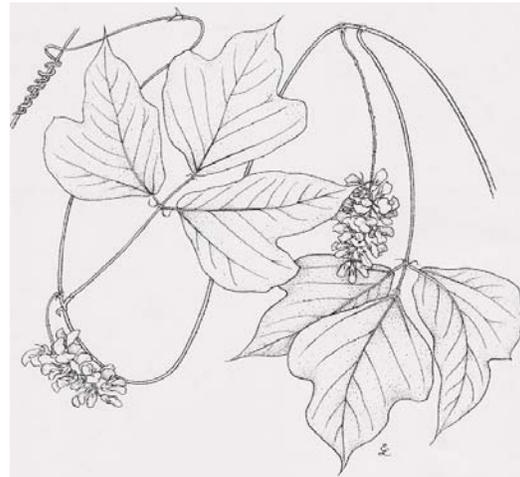
Scientific Name: *Pueraria lobata* (Willd.) Ohwi

Common Name: Kudzu

Family: Leguminosae (Fabaceae)

Legal Status: WSDA Quarantined Plant  
Proposed as a Class A Weed for Washington State's 2003 Noxious Weed list

Description and Variation: Kudzu is a perennial, trailing or climbing vine which may expand 60 feet or more in a year from root crowns which become enlarged with age. A single root crown may produce as many as 30 vines which become somewhat hairy and woody and expand out in all directions. Fleshy tap roots develop from the crown and may be up to 7" in diameter and 6 feet or more in length. Vines which develop from the root crown are also able to root at the nodes forming additional root crowns. Mature infestations of this aggressive member of the legume family may develop root crowns every one to two square feet from which new vines are rapidly produced (Moorhead and Johnson, 2000). Rhizomes are also produced and increase vegetative reproduction.



Kudzu is deciduous losing its leaves in the fall usually following a killing frost. Leaves are alternate and compound with three oval to nearly heart-shaped leaflets each three to four inches long. Leaflets are dark green and may be entire or slightly lobed. Leaves and stems are hairy. Dense stands of Kudzu are characterized by thousands of single-colored plants covering everything in their range.

Fragrant purple flowers are clustered in axillary racemes up to one foot long. Each floret is pea-like, ½ to ¾" and may be purple or purplish-red. The fragrance is described as grape-like. Flowers are rarely produced in open patches on flat ground but do form in mid-summer on vines draped over trees, fences or other objects. Kudzu fruits produced in the fall are hairy, flattened leguminous pods. Each pod bears only a few hard-coated seeds which may remain dormant and viable for several years before they germinate.

Economic Importance:

Beneficial: Since its original introduction into the United States in 1876 Kudzu has been used as an ornamental, for forage, and promoted by the Soil Conservation Service in the 1930's for control of soil erosion. Making light of more than 7 million infested acres in the eastern United States a small cottage industry has developed around this plant including the sale of kudzu baskets, novelties, and an annual Kudzu Festival in Blythewood, Georgia. Culinary and herbal uses exist from Japanese and Chinese tradition. Kudzu has been used for reducing hypertension and is being studied for alcoholism (reduces craving).

*Detrimental:* Kudzu is a highly aggressive invasive plant which is extremely difficult to control once established. According to researchers at Clemson University, lands infested with Kudzu are generally good for only one purpose – growing Kudzu. Kudzu is so aggressive it covers and smothers all other plants in its path resulting in solid single species stands eliminating native species and natural diversity. Trees may be covered with kudzu and damaged by the weight of the vegetation resulting in loss of limbs or tree death from insufficient light necessary for photosynthesis. Once established, Kudzu can render lands unusable for timber production or agriculture. The Congressional Office of Technology estimated the economic costs of Kudzu at \$50 million annually (Hoots and Stewart, 1997). Control costs are estimated to increase by \$6 million per year (Agricultural Research Service) as landowners struggle to contain this plant. The weight of the vines can bring down power lines and collapse buildings.

*Geographic Distribution:* Kudzu is native to Japan and was introduced into the United States in 1876. Distribution within the United States extends from Connecticut to Missouri and Oklahoma, south to Texas and Florida (USDA Plants Database, 2000). There are three confirmed sites in the Portland metropolitan area of Oregon (Butler, 2001) and one recently discovered site in Clark County, Washington (Hendrickson, 2001)

*Washington Site:* Four plants covering less than 1000 feet were discovered on private property in Vancouver, Washington (Clark County). Property is adjacent to a forested site owned by Bonneville Power Administration, Ross Complex (Hendrickson, 2001). Location details are with the Clark County Noxious Weed Control Board and the Washington State Noxious Weed Control Board.

*Habitat:* Kudzu grows best in well-drained degraded or eroded land or in disturbed, sandy, deep-loam soils in full sun. It will, however, invade well-drained acid-soil forests. It does not grow well or at all in wet bottomlands or in thin hard-pan soils. It will not establish healthy grass cover, but may spread into such areas by running vines. (U.S. Department of Agriculture Cooperative Extension, MS) Kudzu can persist on the floor of a closed canopy forest (Southeast Exotic Pest Plant Council, 2001).

*History:* Kudzu was introduced in 1876 at the Centennial Exposition in Philadelphia, Pennsylvania where it was used in a Japanese government display garden. It was planted widely as an ornamental vine for its abundant vegetation and sweet-smelling flowers. In the 1920's it was promoted as a forage plant and by the 1930's the Soil Conservation Service encouraged landowners to plant it for erosion control. The Civilian Conservation Corps planted it and farmers were paid as much as \$8.00 per acre to plant fields of the vine in the 1930's and 1940's. Kudzu Clubs were established during the 1940's to honor "the miracle vine". Not until the 1950's did the U.S. government cease advocating the use of this plant. In 1970 the USDA declared kudzu a noxious weed and in 1997 kudzu is made a federal noxious weed.

*Washington site history:* Kudzu infestation first brought to the attention of the Clark County Noxious Weed Control Board in September 2001. Four plants covering 1,000 feet were located. Vines were removed by hand and bagged. Four root crowns located were treated with Garlon 4 undiluted to each cut stem at the root crown. Treated root crowns were marked with stakes to aid in future location. Bagged vegetation was sent to a landfill. Adjacent property was surveyed for additional plants but none were found. (Additional details: Clark County and State Noxious Weed Control Board files)

*Growth and Development:* Kudzu is a perennial vine which may grow up to one foot a day. These vines may grow as long as 98 feet (Southeast Exotic Pest Plant Council, 2001). Vegetative growth

is from fleshy root crowns which produce vines and rhizomes which root at the nodes and form additional root crowns. Each root crown produces an extensive tap root that stores large reserves of starch which provides for the long-term survival of this plant. Flowers are produced mid to late-summer on upward climbing or draping vines but are not known to occur on prostrate ground-hugging vines (Moorhead and Johnson, 2000). Kudzu plants do not usually flower until the third year (Southeast Exotic Pest Plant Council, 2001). Seeds are produced in flattened hairy pods that contain only a few viable seeds. Viable seeds are thought to be responsible for most long-distance migration (Miller, 1997; Missouri Dept. Conservation Fact Sheet).

**Reproduction:** Reproduction by seed is believed to be minimal (Southeast Exotic Pest Plant Council, 2001). Burning scarifies the hard seed coat and will promote germination (Moorhead and Johnson, 2000). Most reproduction is asexual vegetative reproduction of vines which root at the nodes and rhizomes. The characteristic aggressive growth of vines which can root at every node results in extensive plant coverage within one year.

**Control Methods:** Control of well established kudzu stands can take up to 10 years. Persistent treatment of patches is they only true control measure.

**Response to Mechanical Control Methods:** Mechanical control methods require enormous persistence since the goal is to deplete the rootstocks of stored food and prevent replenishment through the photosynthesis of above ground vegetation. Any successful mechanical control method will require consistent and persistent removal of above ground vegetation. It may take as much as ten years to deplete the food reserves of the starchy rootstocks (Moorhead and Johnson, 2000).

**Grazing:** Kudzu is palatable and may be grazed. Sites must be fenced and livestock rotated. Repeated grazing over many successive years is required to adequately deplete starch reserves and kill the plant. Not recommended for new infestations.

**Burning:** Prescribed burning is used on old extensive infestations to remove vegetative cover, usually in preparation for treatment of the root crowns. Prescribed burning will also promote seed germination for removal or treatment.

**Mowing and/or Cutting:** Repeated mowing can weaken and ultimately control Kudzu but persistence is essential.

**Response to Herbicides:** There are multiple methods for chemical control of Kudzu. Persistent eradication of all roots is the key to controlling kudzu systemic herbicides will give the best effects. Miller et al. studied the effects of numerous chemicals over an eight-year period. Out of twenty five herbicides, Tordon 101 Mixture (2,4-D +picloram) and Tordon K(picloram liquid) were the most cost-effective treatments.

**Cut Stump Method:** Use this method in areas where vines are established within or around non-target plants or where vines have grown into the canopy. Cut the stem 5 cm (2 in) above ground level. Immediately apply a 25% solution of triclopyr or glyphosate and water to the cross-section of the stem. This procedure remains effective at low temperatures as long as the ground is not frozen. A subsequent foliar application may be necessary to control new seedlings.

**Foliar Spray Method:** This method could be used to control large populations. It may be necessary to precede foliar applications with stump treatments to reduce the risk of damaging non-target species. After the stems and leaves have been brought under control (i.e.,

all above ground portions of the plants have been effectively treated) further treatment should follow the Root Crown Method. Apply a 2% concentration of triclopyr or glyphosate and water to thoroughly wet all foliage. Do not apply so heavily that herbicide will drip off leaves. A 0.5% concentration of a non-ionic surfactant is recommended in order to penetrate leaf cuticle. Ambient air temperature should be above 65°F.

**Root Crown Method:** Follow the young or resprouting stem of the plant to the root. Dig and cut into the root crown using a pulaski or similar tool. Apply a 50% glyphosate solution or 50% triclopyr solution to the main root crown and any below ground runners.

**Make Sure to Read all Labels before using any pesticides.**

Trade Name	Active Ingredient	Time of Application	Remarks
#Transline	Clopyrald	When actively growing	Spray to wet leaves
#Banvel 4L	Dicamba	When actively growing before bloom	Add 2 qt/100 gal non-ionic surfactant
#Crossbow	2,4-D + Triclopyr	When actively growing	Spray to wet leaves
*Lontrel	Clopyrald	When actively growing	Spray to wet leaves
Garlon 3 A	Triclopyr	Spray in mid-season	Spray to wet leaves
Accord	Glyphosate	When actively growing after bloom stage	Can be used in & around H2O
Round-up 4L	Glyphosate	when actively growing after bloom stage	Spray to wet leaves
Oust 75 DF	Sulfometuron methyl	When actively growing	Add 1 qt/100 gal non-ionic surfactant plus a drift control agent
Escort	metsulfuron	When actively growing	Add 1 qt/100 gal non-ionic surfactant plus a drift control agent

#Transline, Banvel and Crossbow are labeled for kudzu control in pasture.

**Biocontrol Potentials:** Researchers at the ARS Southern Weed Science Research Unit in Stoneville, Mississippi have found a fungus from the sicklepod plant found in the southeastern United States controls kudzu. In greenhouse and field studies Kudzu was 100 percent killed by *Myrothecium verrucaria*. Researchers plan to pursue a patent on this use. Scientific contact: C. Douglas Boyette. ARS Southern Weed Science Research Unit, Stoneville, MS. 601-686-5217, [dboyette@ag.gov](mailto:dboyette@ag.gov) (Weaver-Missick, 2000)

**Grazing:** Kudzu can produce forage which is noted to be palatable to livestock. The carrying capacity of kudzu is thought to be about 1 cow per acre. Studies found that goats might offer a viable alternative chemical control of kudzu.

Web sites of interest:

Kudzu in Alabama, History, Uses, and Control

<http://www.aces.edu/dept/extcomm/publications/anr/ANR-65/anr-65.html>

Controlling Kudzu in Western North Carolina

<http://swain.ces.state.nc.us/newsletters/nursery/kudzu.html>

Bibliography:

Albert, W.B. 1958. Control of kudzu. Pest Control Notes. Clemson College, Agricultural Experiment Station, Extension Service, Clemson, SC No. 53.

Anonymous. 2001. Kudzu Fact Sheet. Southeast Exotic Pest Plant Council. The Bugwood Network. College of Agricultural and Environmental Sciences. Warnell School of Forest Resources. University of Georgia.

Anonymous. 2000. *Pueraria lobata*. Fact Sheet. Pacific Island Ecosystems at Risk.

Anonymous. 2000. Vegetation management guideline for Kudzu. Missouri Department of Conservation. pp 1-11.

Anonymous. 1963. Identification of crop and weed seeds. USDA. Agricultural Handbook 219. p 84-85.

Bailey, L.H. 1976. Hortus Third. MacMillan Publishing Company. New York. p. 927

Chappell, W.E. and M. L. Link. 1977. Kudzu control on Virginia highways. Proceedings of the 30<sup>th</sup> Annual Meeting Southern Weed Science Society.

Cronk, Quentin C. B. and Janice L. Fuller. 1995. Plant invaders. Chapman and Hall. London. P. 188.

Dickens, R. and G. Buchanan. 1971. Influence of time of herbicide application on control of kudzu. Weed Science 19(6):669-671.

Edwards, M.B.A. 1982. A herbicide test for Kudzu *Pueraria lobata* control in central Georgia. Georgia Journal of Science 40(12):10.

Fernald, M.L. 1950. Gray's manual of botany. American Book Company, New York. p. 940.

Godfrey, Robert. 1988. Trees, shrubs and woody vines of Northern Florida and adjacent Georgia and Alaban. University of Georgia Press. Athens, GA. p 433-437.

Hoots, Diane and Mart Allen Stewart. 1997. Cultivating Kudzu: the Soil Conservation Service and the Kudzu distribution program. The Georgia Historical Quarterly. p. 154.

Kinbacher, Kurt E. 2000. The tangled story of Kudzu. Vulcan Historical Review 4.

Luginbuhl, J-M.; Green, J.T.; Poore, M.H.; Mueller, J.P. 1996. Use of Goats as Biological Agents for the Control of Unwanted Vegetation. N.C. State University, Raleigh. 5 p.

Michael, J.L.O. 1982. Some new possibilities to control kudzu. Proceedings of the Southern Weed Science Society 35:237-240.

Miller, J.H. 1988. Kudzu eradication trials with new herbicides. Proceedings of the Southern Weed Science Society. 41:220-225.

Miller, J.H. 1986. Kudzu eradication trials testing fifteen herbicides. Proceedings of the Southern Weed Science Society 39:276-281.

Miller, J.H. and E. Boyd. 1983. Kudzu: where did it come from and how can we stop it? Southern Journal of applied forestry 7(3):165-169.

Miller, J.H. and E. Boyd. 1983. Hazards of applying kudzu control herbicides. USDA Southeastern Experiment Station.

Moorhead, David J. and Kevin D. Johnson. 2000. Controlling Kudzu in CRP stands. Warnell School of Forest Resources. University of Georgia. pp 1-4.

Nelson, Larry R. 1997. Kudzu eradication guidelines. Clemson Cooperative Extension Publication. pp. 1-3.

Romm, H.J. 1953. The development and structure of the vegetative and reproductive organs of kudzu. Iowa State College Journal of Science 27(3):407-419.

Rosen, A. 1982. Feasibility study: eradication of kudzu with herbicides and revegetation with native tree species in two national parks. NPS. Research/Resources Report SER-59.

Shurtleff, W. and A. Aoyagi. 1977. The book of kudzu. Autumn Press. Brookline, MA.

Smith, A. E. 1990. Kudzu control in nonforested areas with herbicides. Resources Bulletin of the University of Georgia Agricultural Experiment Station. Athens, GA 591:8.

USDA, NRCS. 2001. The PLANTS Database, Version 3.1. (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490. USA

Weaver-Missick. 2000. Fungus could KO Kudzu. ARS News and Information. Agricultural Research Service. USDA. \*

#### Personal Communications:

Hendrickson, Ron. 2001. Letter and report on Clark County Kudzu site.

Butler, Tim. 2001. Oregon Department of Agriculture via Ron Hendrickson report.