Although plants can be killed by removing only the root crown, for this study we were interested in the weight of roots produced after one and two years growth on the farm.

A one-meter diameter hole was dug around the root crown and all root material was harvested and brought to the laboratory.
Biology: Root Nodules

Because plants were inoculated with nitrogen-fixing *Rhizobium*, we were not surprised to find root nodules, even on adventitious roots from stem nodes.
Biology: Roots

In the laboratory, harvested root material was washed clean, measured and weighed after drying. This image represents root material from a plant grown for one season.
Biology: Roots

Plants grown for two seasons produced more root biomass. The root crown has been circled in red to highlight that cutting below this area can kill the plant.
Some Results

In our experiments we observed that heavy defoliation could suppress kudzu growth. Damaged plants produced less above- and belowground biomass and shorter vines, making kudzu less able to compete with other plants in natural areas. Repeated defoliation as a way of controlling kudzu has been attempted by mowing (cutting) and grazing by goats.

Control

75% Leaf Cutting

Frye & Hough-Goldstein 2013
Can it be stopped? YES!

Both on the University of Delaware Farm, where 35 plants were grown for two years and allowed to root at nodes, and at my parents home (with the help of fellow kudzu researcher Heather Coiner, PhD), kudzu has been eradicated by removing root crowns. Importantly, areas where kudzu has been eliminated and soil has been disturbed are subject to invasion by other aggressive or alien species. Integrated weed management practices that combine physical removal, judicious herbicide applications and revegetation techniques can be used to restore native plant communities (Lake et al. 2013).
A note about plant age

Unlike trees, kudzu vines do not add a layer of xylem and phloem each year. Therefore, several authors have concluded that growth “rings” cannot reliably be used to determine the age of kudzu vines.
A note on kudzu biological control

In addition to research on the growth of kudzu in response to damage treatments, the Hough-Goldstein Lab also investigated two potential biological control agents from China (Frye et al. 2007). Despite voracious appetites for kudzu stems (*O. trifidus*) and leaves (*G. tredecimmaculata*), both insects were able to reproduce on soybean in quarantine trials and were subsequently **rejected** as potential biological control agents.

*Ornatalcides (Mesalcidodes) trifidus*
(Coleoptera: Curculionidae)

*Gonioctena tredecimmaculata*
(Coleoptera: Chrysomelidae)
New Bug in Town

In October 2009, a new structure-invading bug was reported in large numbers from Northeast Georgia. Insect specimens were sent to the University of Georgia Diagnostics Laboratory and were identified as the kudzu bug, *Megacopta cribraria* (Fabricus) (Hemiptera: Plataspidae). Native to Asia, the kudzu bug is an invasive insect that is rapidly expanding its range (see www.kudzubug.org for current distribution). This insect is a nuisance pest that invades structures in the fall, has the potential to feed on several important legumes, and is known to reduce soybean yield. Kudzu is a reservoir and breeding host of this insect, but feeding by bugs can reduce kudzu biomass.

For more on the kudzu bug, see: Eger et al. 2010, Suiter et al. 2010, Zhang et al. 2012, Ruberson et al. 2013, Seiter et al. 2013

Like other overwintering pests, kudzu bugs invade structures in the fall. Homeowners can keep kudzu bugs out by sealing cracks and crevices around windows, doors, utility chases, vents and fascia; replace damaged screens, and remove window air conditioning units in the fall.

Photo by Dan Suiter, University of Georgia, Bugwood.org
Thoughts on Range Expansion and Conclusions

Kudzu is a rather well known example of an invasive species, particularly in the Southeastern United States. Some old (Sasek & Strain 1988) and some new (Hickman & Lerdau 2013) literature about kudzu suggest that global climate change will affect the distribution of this plant, including a northward spread. However, it is the opinion of this kudzu researcher that such an expansion will not be realized. While relatively little is known about kudzu seed dispersal, we do know that germination rates are low under natural conditions (Susko et al. 2001). Anecdotally, most kudzu patches observed today were planted at one time, and, kudzu has not spread beyond those existing patches except by climbing vines. Therefore, we consider kudzu to be primarily human dispersed and consider it to be a suitable target for mechanical control. Although labor intensive, removal of root crowns is sufficient to eliminate plants. Using an integrated pest management approach that combines several control tactics can lead to restoration of native ecosystems.
References

References


References


University of Delaware Biological Control of Invasive Plants Research:
http://ag.udel.edu/enwc/research/biocontrol/index.htm