Infection of Kudzu by Soybean Rust *Phakopsora pachyrhizi* in Florida

David Wright[1], Jim Marois[1], Dario Narvaez[1], Tristan Mueller[2], Kelly O'Brien[1], Phil Harmon[3], Wayne Jurick[3], Carrie Harmon[3]

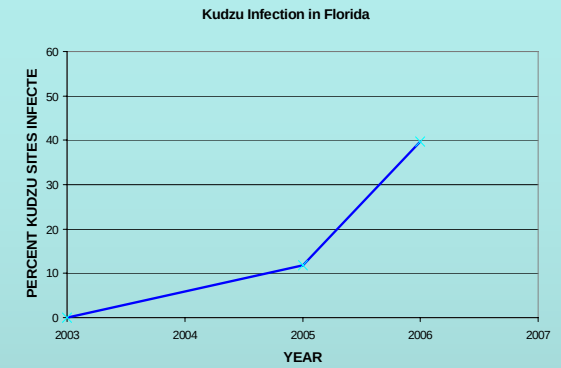
[1]University of Florida (North Florida Research and Education Center), Quincy, FL 32351, [2]Dept. of Crop Sciences, University of Illinois, Urbana, IL 61820, [3]University of Florida, Gainesville, FL 32611

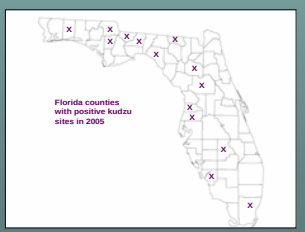
Introduction

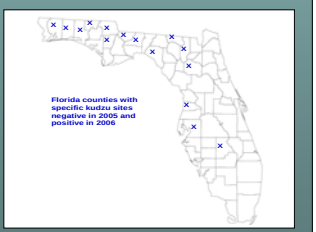
Florida has played a central role in "the vine that strangled the South" in the U.S. Kudzu, *Pueraria montana* var. *lobata,* is a fast – growing leguminous vine that was introduced into the U.S. in 1876 at the Centennial Exposition in Philadelphia, Pennsylvania from Japan. Kudzu is the main overwintering host of soybean rust in the U.S. to date. It was promoted as a forage crop in Florida in the 1920s by nursery owners Charles and Lille Pleas from which it was widely distributed. Chipley, Florida has a historic marker denoting their efforts in the spread of the plant at the County Extension office. The Soil Conservation Service (SCS) promoted kudzu for erosion control during the 1930s on highly eroded areas and hundreds of young men planted kudzu through the Civilian Conservation Corp during the Depression era. Farmers were paid an incentive to plant fields of the legume during the 1940s. Because of its vigorous growth and ability to take over forests, the SCS stopped promoting kudzu in the early 1950s. During the first 50 years that kudzu was in Florida and the Southeast, few or no herbicides were available to control it. Livestock will keep kudzu under control and can kill it if it is over grazed for extended periods of time.

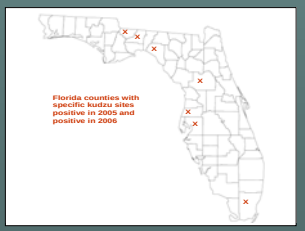
It has been estimated that there are over 7 million acres of kudzu in the Deep South with the average size of the plot being ¼ acre in size. This means that there may be 30 million sites in the South. Kudzu vines are known to grow 1' per day and often grow more than 60' during the season. Livestock numbers have declined since the 1940s and 50's and kudzu patches have expanded rapidly and taken over fences and roadways. Patches in towns are especially hard to control with herbicides. This work was undertaken to understand the spread of rust in known kudzu sites in Florida.

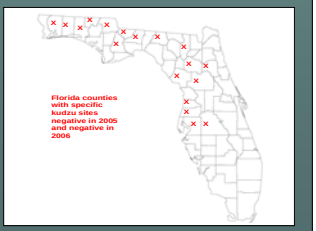
Kudzu sites can vary from single plants to several acres. Kudzu can dominate large acreages of trees and shrubs. The tuber or food storage capacity of the kudzu plant allows it to come back after removing the top growth by mowing or herbicide application. Several years of grazing or herbicide applications are needed to eradicate kudzu from a location.











Methods

Specific kudzu sites were monitored in 2005 and 2006 for presence of soybean rust. Monitoring was done mainly by the Department of Plant Industry in 2005 and by the University of Florida soybean rust team in 2006. We wanted to monitor the same sites as well as new sites both years to determine if rust was spreading and if we could detect higher levels of infection. We assumed rust would be limited to southern Florida during the winter months but could move north quickly as the weather warmed since spore dispersal is primarily by wind borne means and needs living tissue to survive.

Results and Discussion

83 specific kudzu sites were monitored for soybean rust in 2005 and 2006. 10% of the monitored sites were positive in 2005, and an additional 30% were positive in 2006. In general, weather conditions were not as conducive to spread in 2006 as in 2005 until late in the season when rainfall levels were higher and temperatures lower.

Infection Status	Number of Sites
Negative 2005, Negative 2006	47
Negative 2005, Positive 2006	24
Positive 2005, Positive 2006	9
Positive 2005, Negative 2006	3

Soybean rust on kudzu is able to over-winter further north than expected due to plants being sheltered from harsh temperature conditions around houses, in culverts or other sheltered places that have favorable localized environmental conditions. Surveys done in Florida in 2005 and 2006 indicate that soybean rust is becoming more widespread in kudzu sites that have been monitored for 2 years. It is expected that more sites will become infected in the future, especially in the coastal and south Florida areas. This may lead to a greater chance of rust spreading into the Midwest on storms that occur early in the season. There are no fungicides registered for controlling rust on kudzu.

Infected kudzu leaves are often found in shady areas out of direct sunlight early in the season. However, infection increases rapidly late in the season when days get shorter and temperatures are cooler, and infected plants may be found in many different areas including areas that are exposed to extended periods of sunlight.