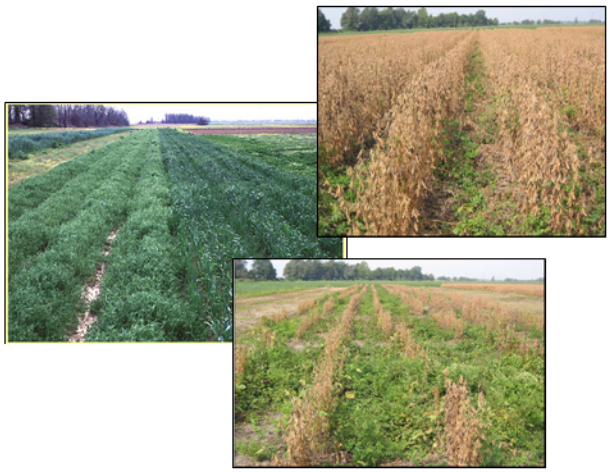
Integrated Weed Management

Develop systems that reduce herbicide and other inputs while maintaining farmer profitability and environmental quality. Inputs such as crop rotations, cover crops, reduced tillage, narrow row spacing, and transgenic crops are being studied to determine optimal combinations of practices to maximize yield potential and weed control.

Understanding weed ecology, patterns of weed herbicide resistance, and seed bank dynamics is critical. Risk assessment of herbicide resistant transgenic cropping systems is also being studied.



Scientific Personnel

Dr. Robert M. Zablotowicz, Research Leader
Soil Microbiologist
662-686-5272 Robert.Zablotowicz@ars.usda.gov

Dr. C. Douglas Boyette, Plant Pathologist
662-686-5217 Doug.Boyette@ars.usda.gov

Dr. Charles T. Bryson, Botanist
662-686-5259 Charles.Bryson@ars.usda.gov

Dr. Robert E. Hoagland, Research Chemist
662-686-5210 Bob.Hoagland@ars.usda.gov

Dr. L. Jason Krutz, Soil Scientist
662-686-5260 Jason.Krutz@ars.usda.gov

Ms. Lynn M. Libous-Bailey, Biologist (Cat 3)
662-686-5263 Lynn.LibousBailey@ars.usda.gov

Dr. William T. Molin, Plant Physiologist
662-686-5245 William.Molin@ars.usda.gov

Dr. Krishna N. Reddy, Plant Physiologist
662-686-5298 Krishna.Reddy@ars.usda.gov

Mr. Kenneth Stetina, Plant Pathologist (Cat 3)
662-686-5253 Kenneth.Stetina@ars.usda.gov

Dr. Kevin C. Vaughn, Plant Physiologist
662-686-5211 Kevin.Vaughn@ars.usda.gov

Dr. Mark A. Weaver, Plant Pathologist
662-686-5236 Mark.Weaver@ars.usda.gov

Southern Weed Science Research Unit
141 Experiment Station Road
P.O. Box 350
Stoneville, MS 38776 USA

Phone: 662-686-5272
FAX: 662-686-5422

www.ars.usda.gov/msa/jwdsrc/swsru

Southern Weed Science Research Unit

USDA-ARS
Stoneville, MS

Mission

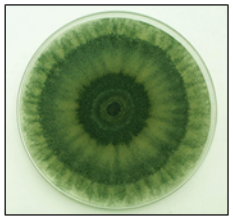
Control of weeds is a crucial component of any farm management system. Weed competition in crops results in costly reductions in the quantity and quality of food and fiber.

Scientists at the Southern Weed Science Research Unit are developing sustainable, safe, efficient, and economical approaches to weed management.

Objectives

- Develop sustainable integrated weed management systems for agronomic crops.
- Discover plant pathogens useful as bioherbicides and develop sustainable methods for weed biocontrol.
- Evaluate biochemical, genetic, and ecological effects of natural and synthetic herbicides and develop strategies to reduce adverse effects.
- Assess impacts of herbicide use and alternative weed management practices on the environmental health of sustainable agricultural systems.
- Evaluate potential problems with exotic, invasive weeds and develop methods for their control.

Biological Weed Control



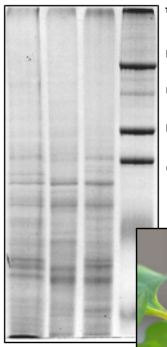
Develop alternatives for synthetic herbicides by discovering pathogens and natural products that can be used to control weeds.

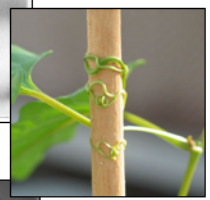
Fungi that control hemp sesbania, sicklepod, and common cocklebur in soybean, rice and cotton, and several vining weeds such as kudzu, trumpet creeper and redvine have been discovered.

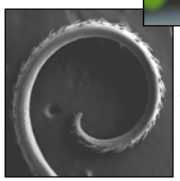
Use of this technology requires innovative approaches for production and formulation. Techniques for mass producing fungal spores for biocontrol of several weeds has been achieved.

Weed Biology

The long-term effects of herbicides on weed biochemical and genetic characteristics are being evaluated. Modern cell biology and proteomic techniques are being used to identify herbicide resistance in weeds and the mechanisms by which weeds become resistant.



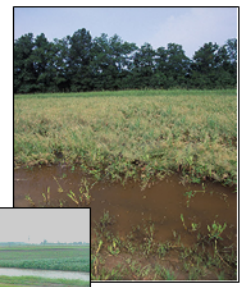
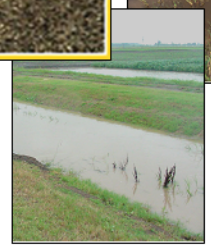




Vining weeds, such as morningglory, redvine and trumpetcreeper, are becoming more prevalent under current cropping systems. Research is being conducted to determine why some weeds become vining. Best management strategies are being developed to control those vining weeds.

Soil & Water Quality

Preserving soil sustainability is key to long-term agricultural productivity. Thus, the effects of weed management practices on soil biological, chemical, and physical properties and processes are being evaluated.

Minimizing the risk of contamination of surface water by herbicides and sediment related to weed control strategies is a major emphasis of this program.

The environmental fate of major herbicides used in Mid-South agriculture is being assessed in soil and water. The impact of conservation management and edge-of-field practices on off-site herbicide movement is being addressed.