

Soils CRIS Project

*Enhancing soil - water - nutrient processes
in Southern Piedmont pasture and crop systems*

USDA–Agricultural Research Service

J. Phil Campbell Sr. Natural Resources Conservation Center

11630
Air
Emissions
from
Animal
Production
Systems

12000
Enhancing
Soil-Water-
Nutrient
Processes
in Southern
Piedmont
Pasture
and Crop
Systems

13610
Developing
Sustainable
Crop and
Animal
Production
Systems
Suitable for
the
Southeast

32000
Preventing
Pathogen
Transport to
Southern
Piedmont
Landscapes
from Poultry
Production
Systems

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Linkages to ARS National Programs

- 202 Soil Resource Management
- 205 Rangeland, Pasture and Forages

Components of project also contribute to other NP...

- 201 Water quality and management
- 204 Global change
- 206 Manure and byproduct utilization
- 207 Integrated agricultural systems

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What are National Programs?

- National Programs are a coordinated effort to focus agricultural research activities from many locations on high-priority issues in the USA
- National Programs bring coordination, communication and empowerment to the more than 1200 research projects carried out by ARS.
- National Programs focus on relevance, impact, and quality of ARS research.

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ARS National Programs

Animal Production, Product Value, and Safety

- 101. Food animal production
- 103. Animal health
- 104. Veterinary, medical, &
urban entomology
- 105. Animal well-being &
stress control systems
- 106. Aquaculture
- 107. Human nutrition
- 108. Food safety

Natural Resources and Sustainable Agric. Systems

- 201. Water quality & mgt
- 202. Soil resource mgt
- 203. Air quality
- 204. Global change
- 205. Rangeland, pasture, &
forages
- 206. Manure & byproduct
utilization
- 207. Integrated agricultural
systems

Crop Production, Product Value, and Safety

- 301. Plant, microbial, & insect
genetic resources,
genomics, & genetic
improvement
- 302. Plant biological &
molecular processes
- 303. Plant diseases
- 304. Crop protection &
quarantine
- 305. Crop production
- 306. Quality & utilization of
agricultural products
- 307. Bioenergy & energy
alternatives
- 308. Methyl bromide
alternatives

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How does our Soils CRIS project contribute to National Programs?

An
example
from the
agency's
perspective

Deliver
products

Seek stakeholder input



Create a
project plan

Conduct research

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How does our Soils CRIS project contribute to National Programs?

An
example
from the
scientist's
perspective

Conclusions

Introduction



Materials
and
Methods

Results and Discussion

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How does our Soils CRIS project contribute to National Programs?

An example
from the
technician's
perspective

Administer
field days



Maintain equipment
and
order supplies

Take measurements

Take training

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To which goals in the Soil Resource Mngmt
National Program does our CRIS project
contribute?

Component I. Soil conservation and restoration

- Develop basic understanding of the effects of natural forces and management practices on physical properties of compacted surface soils.

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To which goals in the Soil Resource Mngmt National Program does our CRIS project contribute?

Component II. Nutrient management

- Improve understanding of the effects of management practices and their interaction on nutrient availability from organic and inorganic nutrient sources.
- Identify and develop management practices that maintain or increase organic matter in residue and soil.

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To which goals in the Soil Resource Mngmt National Program does our CRIS project contribute?

Component III. Soil water

- Improve understanding of soil properties and develop new and improved soil management technologies for intercepting, infiltrating, and utilizing precipitation.

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To which goals in the Soil Resource Mngmt National Program does our CRIS project contribute?

Component IV. Soil biology

- Develop improved methods to identify and characterize soil biological populations and their activities.
- Determine short- and long-term effects of agricultural management practices on soil biological community populations, biodiversity, functioning, and resilience.

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To which goals in the Soil Resource Mngmt National Program does our CRIS project contribute?

Component V. Productive and sustainable soil management systems

- Identify appropriate soil physical, chemical, and biological indicators of soil quality, reliable assessment and monitoring tools and techniques, and the spatial and temporal variability associated with each.

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How are the NP goals being achieved?

- On-station field experiments
 - ✓ Water quality plots
 - ✓ P-watersheds
 - ✓ Cover crop plots
 - ✓ Salem Road grazing study
 - ✓ Dawson Field grazing study
 - ✓ Tall fescue paddocks
 - ✓ P runoff plots

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How are the NP goals being achieved?

■ Off-station field investigations

- ✓ Central Savannah River Area Conservation Tillage Demonstration Farm near Waynesboro GA
- ✓ Silage cropping intensity study near Harmony NC
- ✓ Phosphorus runoff investigations
- ✓ Land management comparisons in Piedmont and Coastal Plain regions in AL, GA, SC, NC, VA

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How are the NP goals being achieved?

■ Lab/greenhouse investigations

- ✓ Infiltration study to assess disturbance and stratification of organic matter
- ✓ Endophyte-alkaloid study to assess decomposition dynamics of tall fescue
- ✓ Tall fescue pot study to assess endophyte effects on soil organic matter and biological diversity
- ✓ Transport of ergot alkaloids across ruminal tissues

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How is this Soils CRIS project funded?

- ARS is funded yearly with appropriations from Congress
 - ✓ FY2004 annual resource management plan has \$1009K allocated to project (86% salaries)
- External funds are acquired from other sources as well
 - ✓ USDA–National Research Initiative (PCR, \$72K/yr)
 - ✓ US–Dept Energy (DF, \$60K/yr)
 - ✓ NASA through Univ GA (Mali, \$70K/yr)
 - ✓ USDA–Nation. Res. Initiative (P from manure, \$50K/yr)

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What are the objectives of the project?

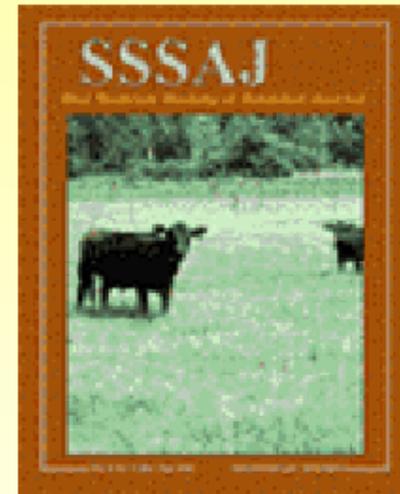
- Refine cropping strategies to enhance nutrient cycling, soil-water-air quality, and plant water availability
- Refine cattle management strategies to increase productivity, nutrient cycling, and soil-water quality
- Improve recommendations for poultry litter application as a nutrient source by understanding agronomic productivity, animal health, nutrient cycling, and soil-water quality
- Develop strategies to optimize soil C sequestration
- Develop strategies to limit P loss from soils

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Example of on-going research: Salem Road

- Study initiated in 1994
- Experimental design to assess nutrient source and forage utilization treatments
- Response variables include:
 - ✓ Yearling steer production
 - ✓ Forage production and pasture composition
 - ✓ Soil physical, chemical, and biological properties
 - ✓ Water runoff quality



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Example of on-going research: Salem Road



■ Surface-soil properties reported in recent publications

Bermudagrass management in the Southern Piedmont USA.

- I. Soil and surface residue C and S
- II. Soil P
- III. Particulate & biologically active soil C
- IV. Soil-surface N pools
- VIII. Soil pH and nutrient cations
- IX. Trace elements in soil with broiler litter

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Example of on-going research: Salem Road



- Deep soil-profile characteristics reported in

Bermudagrass management in the Southern Piedmont USA.

VI. Soil-profile inorganic N

VIII. Soil-profile organic C and total N



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Example of on-going research: Salem Road



- Forage production and pasture composition reported in

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- X. Coastal productivity and persistence in response to fertilization and defoliation regime



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Example of on-going research: Salem Road



- Symposium held at the 2002 Southern Pasture and Forage Crop Improvement Conference

The Salem Road study: Restoration of degraded land with pasture.

- Experimental layout and animal responses (Stuedemann et al.)
- Soil quality and carbon sequestration (Franzluebbers et al.)
- The concept of parasite-free pastures (Kaplan et al.)
- Water quality and overland flow (Franklin et al.)

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When is the project finished?

- CRIS projects are written for 5-year periods
 - ✓ Current project started 28 April 2001 and will end on 27 April 2006
 - ✓ Assessment of whether goals of current NP Action Plan have been achieved in October 2004
 - ✓ New project plan due in October 2005 following
 - participation in a NP Planning Workshop in Jan 2005
 - development of a new NP Action Plan in Mar 2005
 - submission of a Project Prospectus

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To view the current Soils CRIS project plan:

Network Neighborhood

Conferer

Cris-soils

Watkinsville 202 CRIS-OSQR.wpd

Questions?

¿Las preguntas?

Les questions?

Fragen?

Le domande?

Vragen?

As perguntas?

Spørsmål?