

Building Soils with Cover Crops

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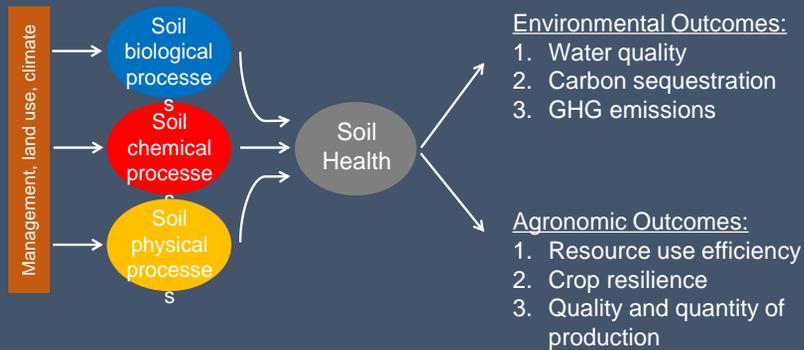
Pee Dee Research & Education Center

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Soil Health Research

Goal: Better understand the ecology of soil and hence to improve management of agroecosystems and their sustainability



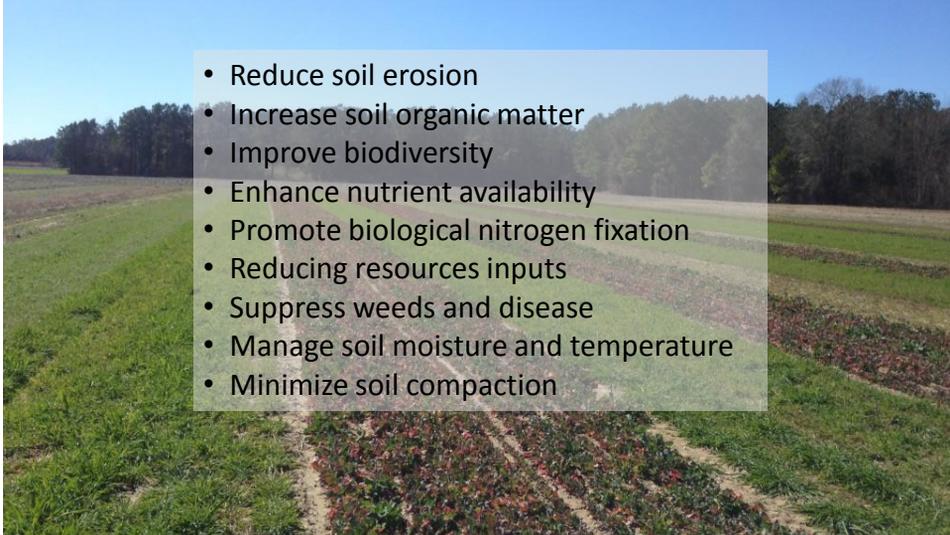
Many SC soils are highly degraded



USDA-NRCS

- Long-term cultivation and intensive tillage
- Hot and humid climate favor microbial decomposition
- Extensive clay mineral weathering and clay eluviation
- Degraded soil structure
- Low soil organic matter
- Poor water and nutrient holding capacity
- Meager soil fertility

Purposes of cover cropping



- Reduce soil erosion
- Increase soil organic matter
- Improve biodiversity
- Enhance nutrient availability
- Promote biological nitrogen fixation
- Reducing resources inputs
- Suppress weeds and disease
- Manage soil moisture and temperature
- Minimize soil compaction

Cover crops are different



e.g. growth, root structures, nutrient requirements

How the functional trait diversity of cover crops affects designed outcomes?

Cereal Rye



Crimson Clover

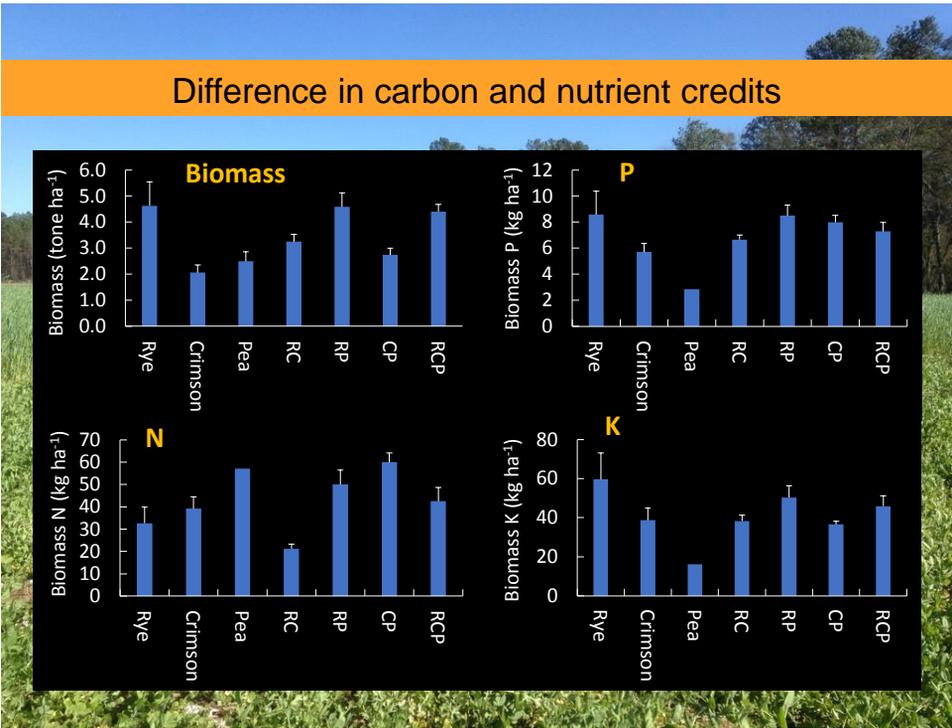
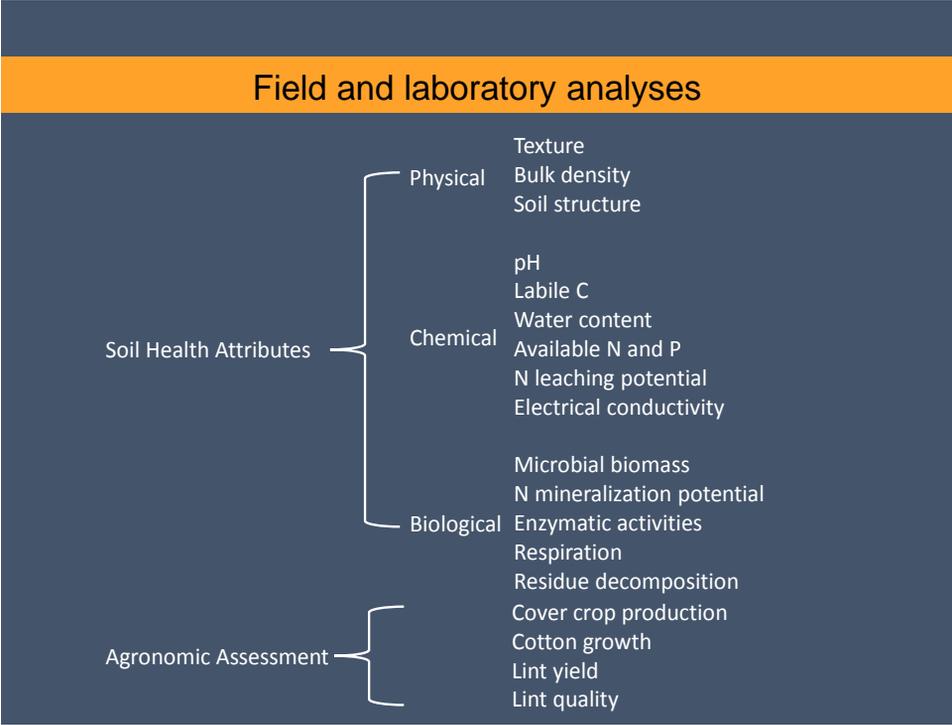


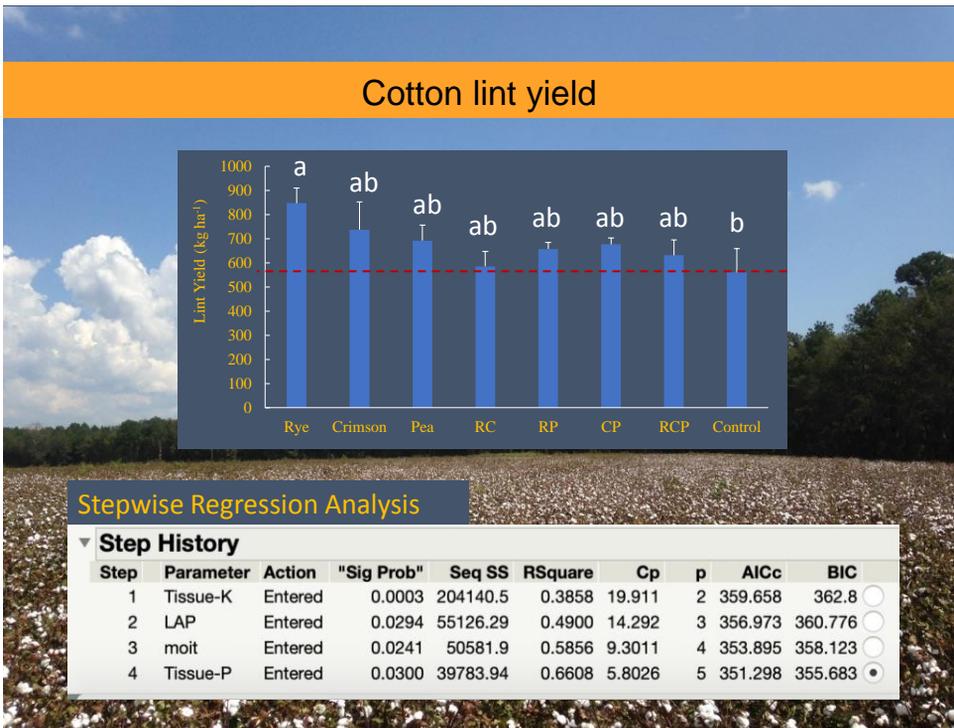
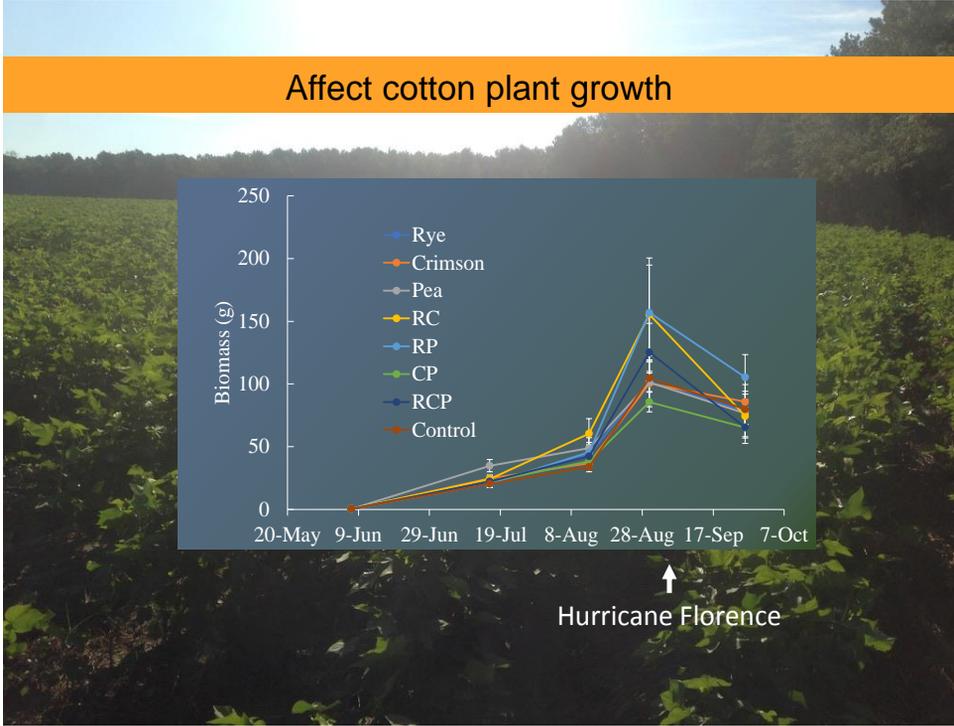
Winter Pea



Cotton



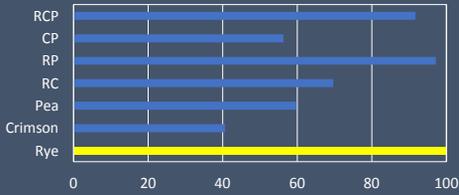




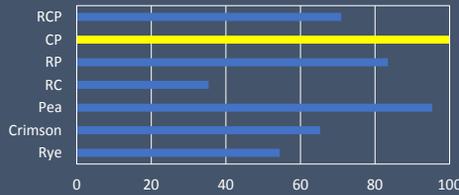
Trade-offs

- Mixtures not necessary better
- Management goal matters

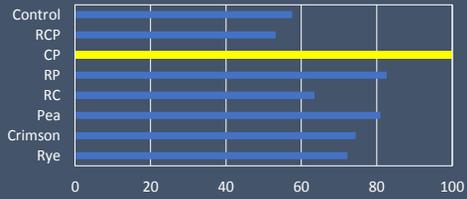
1. C sequestration potential



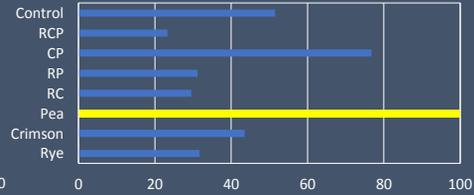
2. N provision capacity



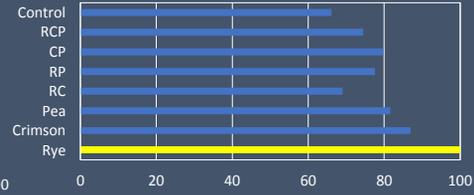
3. N Leaching potential



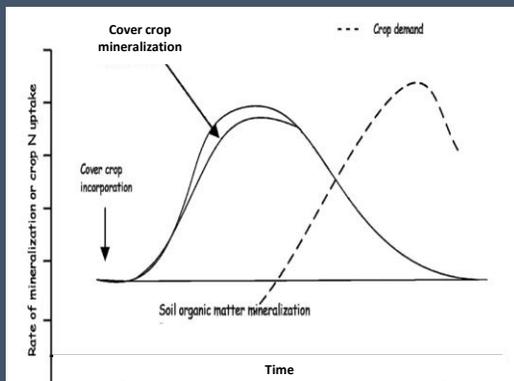
4. Soil N availability



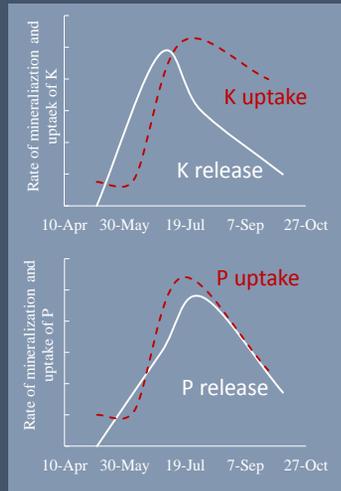
5. Yield



Synchronization of nutrient releases and crop uptakes



Termination timing?





Demonstrating the influence of cover crop
termination time on nutrient provision and yield
of cash crops (2018-2021)

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