Subtropical Soil Health Initiative

Introducing Cover Crops and Reduced Tillage to the Rio Grande Valley of Texas

Mike Morris, Ph.D., National Center for Appropriate Technology (mikem@ncat.org)
Alexis Racelis, Ph.D., University of Texas Rio Grande Valley (alexis.racelis@utrgv.edu)

NCAT NATIONAL CENTER FOR APPROPRIATE TECHNOLOGY WWW.NCAT.ORG

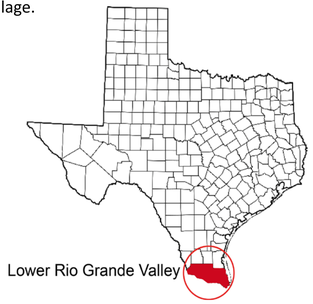
The University of Texas Rio Grande Valley

UTRGV AGROECOLOGY

Intense heat, wind, and miles of bare soil...

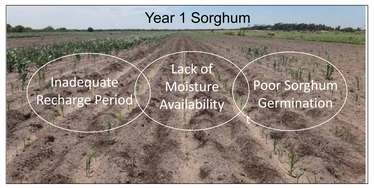
- One of America's great agricultural regions: citrus, winter vegetables, sorghum, and many other crops.
- Soils are often left bare in summer months, causing extensive wind and water erosion.
- Little locally-relevant research on cover crops and reduced tillage.
- Adoption rates are extremely low.

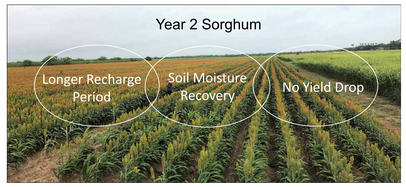
Heat + wind + bare soil = erosion



Are cover crops the answer?

- Which ones can take the heat?
- How do you grow them (planting dates, seeding rates, etc.)?
- How are you going to terminate them? (No winter kill or freezing temperatures!)
- Can you afford them in growing cotton, sorghum or other low-value crops?
- How long will it take to see soil benefits that justify the investment?
- Will they "steal soil moisture," putting cash crops at risk?





Our participatory approach

- Field demonstrations and variety trials: filling knowledge gaps.
- Controlled studies measuring biomass, weed suppression, organic matter, soil respiration, soil moisture.
- Working with NRCS to improve practice standards.
- Field days, videos, and tipsheets (in English and Spanish) to raise awareness and encourage adoption.
- Raising awareness of certified organic farming through our farm partners.

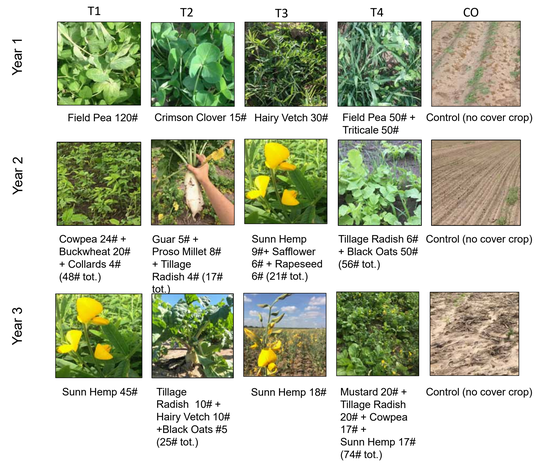
HILLTOP GARDENS

PPC FARMS ORGANICS

USDA ORGANIC

Field trials (2017-19): 40 cover crops and 16 mixtures

Pigeon peas: a winner in our trials



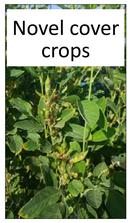
Field days and outreach

Student research

Findings

- Winners: Pigeon Pea, Sunn Hemp, Sorghum Sudangrass, Iron & Clay Cowpea, Black Oats, Cereal Rye.
- Many cover crops have provided excellent weed suppression.
- Organic matter burns off quickly in high heat and humidity, slowing soil improvement.
- After three years, most plots with cover crops show lower soil moisture than control plots.
- Termination by disking and bedding buries residue and disturbs soil, increasing soil moisture losses.
- Organic no-till termination is challenging. Crimper-rollers and mowing have issues with regrowth.
- Short-term costs and risk of losing soil moisture make cover crops difficult for many farmers to justify.

In progress & coming soon



For more information

- YouTube Playlist: https://www.youtube.com/playlist?list=PLDu0ElBiEy9zxqmB0ZsZmd8jUXfGIb8Hh
- Project website: https://www.utrgv.edu/agroecology/research/subtropical-soil-health/index.htm
- *Cover Crop Options for Hot and Humid Areas,* by Justin Duncan
  - Publication: https://attra.ncat.org/product/cover-crop-options-for-hot-and-humid-areas/
  - Video: https://www.youtube.com/watch?v=_ERXyjX0rHI
- NCAT's ATTRA information service: https://www.attra.ncat.org

NCAT ATTRA NATIONAL SUSTAINABLE AGRICULTURE INFORMATION SERVICE

Acknowledgment

This work is supported by the Conservation Innovation Grants program at USDA's Natural Resources Conservation Service.

NRCS Natural Resources Conservation Service