SOIL HEALTH
WHERE ARE WE HEADING

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BUILDING **SOIL HEALTH** MAY SEEM LIKE AN IMPOSSIBLE TASK, BUT WE HAVE THE TOOLS TO DO IT.
AREAS OF FOCUS

• Consultation

• Promote the 5 Principles of Building Soil Health
5 PRINCIPLES TO IMPROVE SOIL HEALTH

1. Armor the Soil
2. Minimize Disturbance
3. Plant Diversity
4. Keep a Living Root Year Round
5. Livestock Integration
1 ARMOR THE SOIL

- Prevents Erosion
- Lowers Soil Temperatures
- Limits Water Loss from Evaporation
- Increases Water Infiltration
- Reduces Compaction
- Carbon to build OM
- Food for Microbes
- Fuels the Nutrient Cycle
Goal: Minimize Disturbance the Physical, Chemical, or Biological of the soil

Healthy soils have “good” structure, balanced fungal/bacteria pop., plentiful earthworms, and OM

* Example: Tillage destroys soil structure, creates plow pans, alters fungal/bacteria ratio, kills earthworms, and uses-up OM
  - Impairs Water & Nutrient Cycle
PLANT DIVERSITY

- Allows for a more diverse underground community
- Plants attract Microbiology with root exudate
  - Legumes/Rhizobium,
  - Big Bluestem/Mycorrhizae
- Each plant Species exude diff. root exudates
- Reduces risk from adverse weather – something in a mix should still do good

Safflower, Small Grain, Rape, Buckwheat, Turnips
Each part of the root exude different exudates. Different plants give off different exudates.

Diverse amounts of actively growing roots foster diverse Microbiology year round.

- As microbes grow and die they release nutrients.
- Therefore, the nutrient cycle is working year round!

Tap roots and fibrous roots each contribute to good soil structure in their own way.
Livestock Integration is the use of livestock (Horses, goats, sheep, hogs, chickens, ducks, turkeys, (Buffalo, llamas, and even cattle?)) to accomplish Specific Objectives.

- Assist with the Termination of a Cover Crop
- Stomp-in plant material
- Add Biological Diversity
- Manage Plant Communities
- Leave adequate residue amounts
- Plan to provide adequate recovery
AREAS OF FOCUS

• Consultation

• Workshops & Demonstrations
Seed Cost: $27/acre
Seed Mix:
Legumes - Cowpeas, soybeans (40%)
Grasses - protho millet, browntop millet, pearl millet, sorghum-sudan (60%)
DATA:

- Turned out 200 – 695 lb heifers on Aug. 1
- Rotated on 30 acres (7 paddocks) for 20 days
- Gained 2.45 lbs/hd/day with no supplement, implant, or fertilizer

**2.45 ADG in August with heifers!**

- Received 140 fresh 400-lb heifers in August
AREAS OF FOCUS

- Consultation
- Workshops & Demonstrations
- Applied Research
APPLIED RESEARCH

- No-Till
- Cover Crops
- Grazing
AREAS OF FOCUS

- Consultation
- Workshops & Demonstrations
- Applied Research
- Basic Discovery Research
BASIC DISCOVERY RESEARCH

- Dr. Kelly Craven
  - Relationship between plants and fungus (symbiotic relationships)
  - Symbiotic microbes – stress, weather, drought
AREAS OF FOCUS

- Consultation
- Workshops & Demonstrations
- Applied Research
- Basic Discovery Research
- Partnerships & Collaborations
PARTNERSHIPS & COLLABORATIONS

- **Producers**
  - NRCS
  - ARS
  - Green Cover Seed
  - GLCI
  - NCTC
  - Dixon Water Foundation
  - No-Till on the Plains
  - SARE
HOW ARE WE GOING TO MEASURE SUCCESS?

Questions ?

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