The New Biological Farmer: 15 Years of Learning

Cover Crops
- Nitrogen building
- Nutrient storing
- Nutrient Time release (depending on digestibility)
- Erosion protection (building soil structure)
- Carbon sequestering (building organic matter)

Cover Crops
- Insect control
- Disease prevention
- Build soil resilience
- Increase water holding capacity
- Weed Control

Digestibility
- Mature Crop
- Young Green Crop
- Nitrogen Credits
- Feeding Bacteria
The Soil Food Web

Food - the feeding frenzy:

Carbon : Nitrogen Ratio

- Bacteria: 5 : 1
- Fungi: 20 : 1
- Protozoa: 30 : 1
- Nematodes: 100 : 1
- Humans: 30 : 1
- Lettuce: 30 : 1
- Wood: 500 : 1

Digestibility

Green Carbon

Brown Carbon

Black Carbon
NRCS Principles for High Functioning Soils

- Minimize disturbance
- Maximize soil cover
- Maximize biodiversity
- Maximize presence of living roots
Are you familiar with the fence post principle?

**FENCE POST**

Zone of maximum biological activity and rapid residue decay

**SOIL LINE**

Deeper burial does not optimize decay but sends weed seeds to the surface where they germinate slowly.

---

**THE BIOLOGICAL SUPPLEMENTATION OF CO₂**

The more vigorous the root structure and the larger the number and diversity of aerobic microorganisms living in and around those roots, the higher the production of CO₂ for photosynthesis.
Who eats this?

Green Manure
- large amounts of organic matter
- amino sugars
- proteins and amino acids
- Nitrate and ammonium N

During 2003 began flail mowing Sorghum x Sudan and allowing to regrow 3x per year to improve OM & soil health
Sheet Composting
Capturing Nutrients
Feeding Soil Life
Moisture: 16.5%
Dry Matter: 83.5%
Crude Protein: 22.09%
Nitrogen: 3.53%
N:S ratio: 3:1
Starch: 0.64%
Sugar: 6.47%

Moisture: 16.5%
Dry Matter: 83.5%
Crude Protein: 22.09%
Nitrogen: 3.53%
N:S ratio: 3:1
Starch: 0.64%
Sugar: 6.47%

T.D.N.: 65.79%
N.E.L.: 0.67%

ADF: 32.54%
NDF: 37.99%
Lignin: 6.49%
Calcium: 1.54%
Phosphorous: 0.56%
Magnesium: 0.26%
Potassium: 3.52%
Sulfur: 1.01%
Sodium: 0.13%
Boron: 42 ppm
Manganese: 51 ppm
Zinc: 34 ppm
Copper: 9 ppm
Iron: 124 ppm
Aluminum: 65 ppm
Molybdenum: 0.42 ppm