# Caring for a Continuous No-Till Cover-Crop System

Terry N. Taylor
Geff, IL

January 13, 2012

A FORMER GOLDENGATE BOY, George McKibben, (second from left) who has become an accomplished agronomist, was presented a plaque in recognition of his accomplishments during the No-Till Tour last week. Shown left to right are David Talbert, the Wayne County Extension Council chairman; McKibben; Terry Taylor, presenting the plaque, and Walt Townsend.

# TERRY N TAYLOR

# Geff, IL

2000 ACRES CONTINUOUS NO-TILL

1600 ACRES CORN

400 ACRES SOYBEANS

# COVER CROPS

- REDUCE EROSION

# Cost Effectiveness of BMP's

| BMP | $/Ton of Sediment | BMP | $/Ton of Sediment |
|---|---|---|---|
| Cover Crops | $1.99 | Diversions | $18.10 |
| No-till | $2.99 | Sediment Retention | $50.21 |
| Permanent Cover | $6.95 | CRP Program | $22.95 |
| Wind break | $12.10 | | |
| Sod water way | $13.50 | Average Cost | $8.71 |

# COVER CROPS

- REDUCE EROSION
- BIO-TILLAGE

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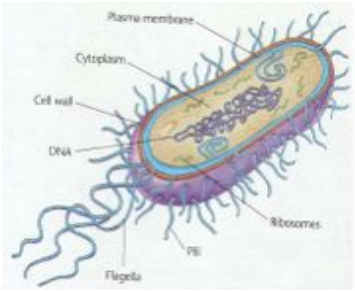
- BUILD SOIL ORGANIC MATTER

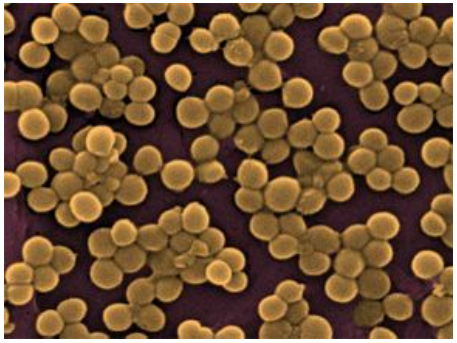
# DR. KRIS NICHOLS

- NO-TILL ON THE PLAINS WEBSITE

# Bacteria

- Five nonillion ($5\times10^{30}$) bacteria on Earth
- Total number of individual bacteria in a gram of soil ranges from millions to billions depending soil health
- Over 11,000 species per gram of soil.
- Contribute to soil stability
- Decompose pesticides
- Feed on organic matter that is easy to breakdown
- Store and cycle nitrogen
  - Asymbiotic and symbiotic systems fix ~100-175 million metric tons



# Nematodes

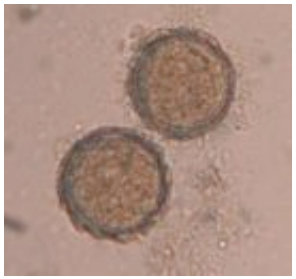
- Fungal feeders, bacteria feeders, root feeders, predators and omnivores
- Most are non-pathogenic
- An important part of the nitrogen cycle
- About 10-20 individuals/gram of soil
- Affected by management: pesticides, soil organic matter, tillage

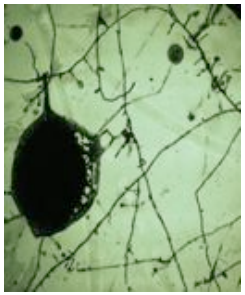
# Protozoa

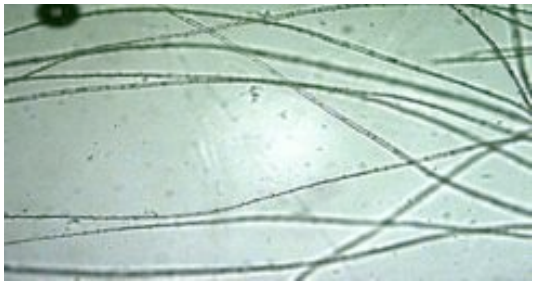
- Protozoa include: amoebae, ciliates, flagellates
- Consume bacteria, fungi, and algae
- Are an important part of the nitrogen cycle
- Number in the thousands per g soil

# Fungi

- Up to 3,000 species in cultivated soil
- Three main types: parasites, saprophytes and mutualists
- Saprophytes feed on organic matter that is difficult to breakdown, such as crop residue
- Parasites attack foliar and root plant material, other fungi, nematodes and micro and macroarthropods
- Store nitrogen in hyphal bodies and release nitrogen by decomposition







# Microarthropods

- Mites, collembola (or springtails)
- Widths range from 0.1-2 mm
- Number from about 5-20 per gram of soil
- Decompose & shred organic matter
- Tillage and pesticides are harmful
- An important part of the nitrogen cycle

# Earthworms

- Poor soils contain 250,000 earthworms per acre while good soils contain 1,750,000 per acre
- Good for nutrient cycling and stability functions
- Burrowing through lubricated tunnels forces air in and out of soil
- Earthworm casts contain 11% of the humus and 7X the nitrogen, 11X the phosphorus, and 9X the potash than surrounding soil

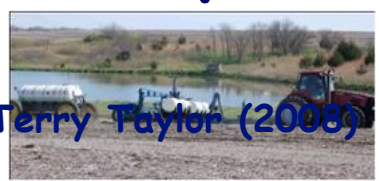
# Value of Soil Organic Matter

Assumptions: 2,000,000 pounds soil in top 6 inches
1% organic matter = 20,000#

Nutrients:

| | | | |
|---|---|---|---|
| Nitrogen: | 1200# * $.60/#N | = | $720 |
| Phosphorous: | 116# * $.72/#P | = | $ 84 |
| Potassium: | 105# * $.44/#K | = | $ 46 |
| Sulfur: | 145# * $.46/#S | = | $ 67 |
| Carbon: 12,000# or 6 ton | * $4/Ton | = | $ 24 |

## Value of 1% SOM Nutrients/Acre = $941



# 20th Annual National No-Tillage Conference

**St. Louis, Missouri * Jan. 11-14, 2012**

# THE PLAN

- GOALS

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# THE PLAN

- GOALS
- COVER CROP SELECTION

# INFORMATION:

- TRUTHFUL IN THE BEST INTEREST OF THE TELLER
- TRUTHFUL WITH LIMITED EXPERIENCE
- OUTRIGHT FABRICATION
- SOLID FROM WIDE KNOWLEDGE BASE

# THE PLAN

- GOALS
- COVER CROP SELECTION
- PLANTING GRAIN CROP

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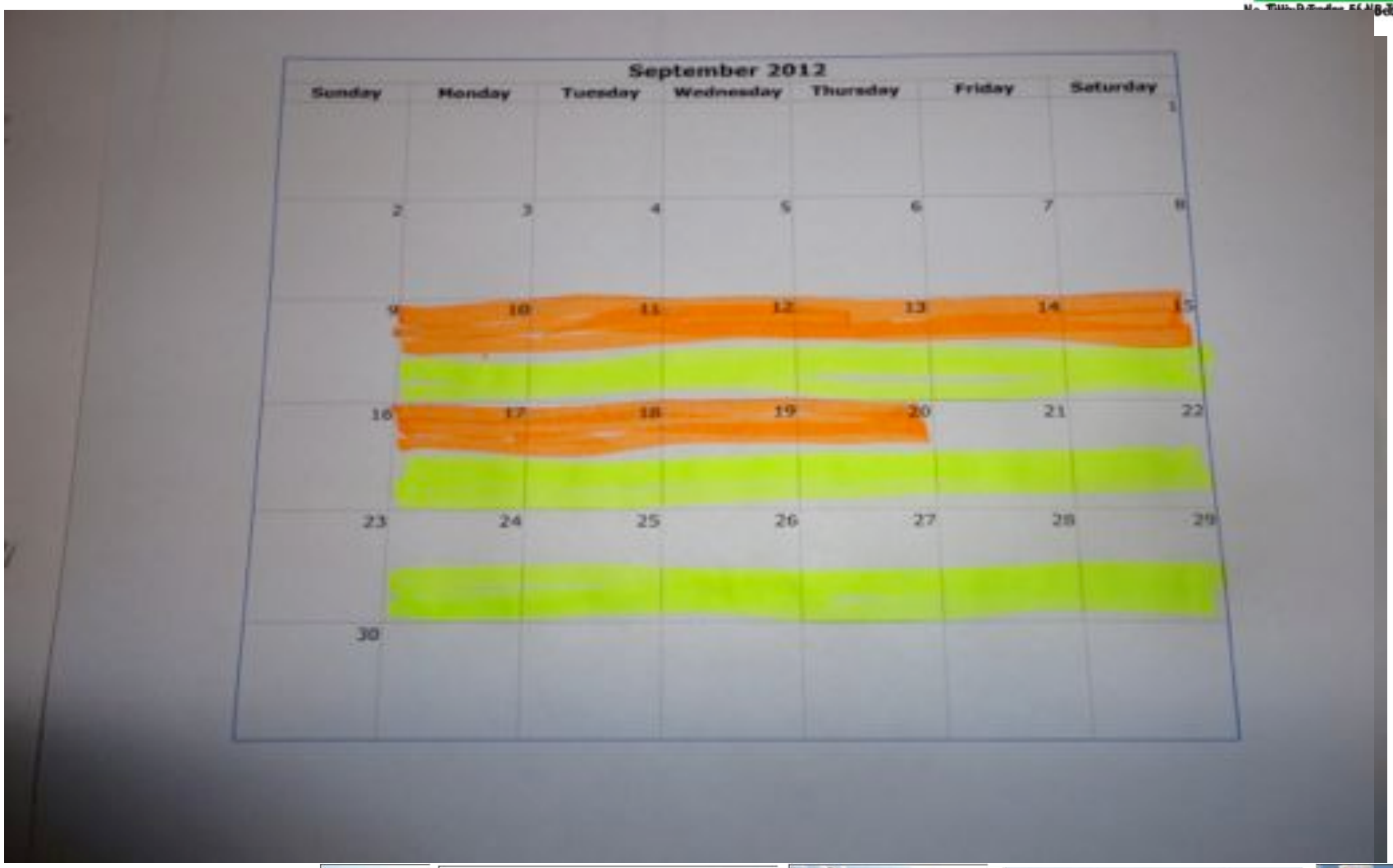
September 2012
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday

# THE PLAN

- GOALS
- COVER CROP SELECTION
- PLANTING GRAIN CROP
- PLANTING COVER CROP
- EVALUATE YOUR PROGRAM