

7 Things I've Learned About Cover Crops




GREENCOVER

“As to methods there may be a million and then some, but principles are few. The man who grasps principles can successfully select his own methods. The man who tries methods, ignoring principles, is sure to have trouble.”

Ralph Waldo Emerson

**1. I've Learned That I Am
Not Smarter Than God!**

How did God create plant communities and ecosystems?

- **Great diversity of plants, roots and animals**



How did God create plant communities and ecosystems?

- The soil is always covered...



How did God create plant communities and ecosystems?

- **Something is always alive and/or growing...**



How did God create plant communities and ecosystems?

- **Plant cooperation, not competition**



2. Living Soil = Healthy Soil = Higher Yields

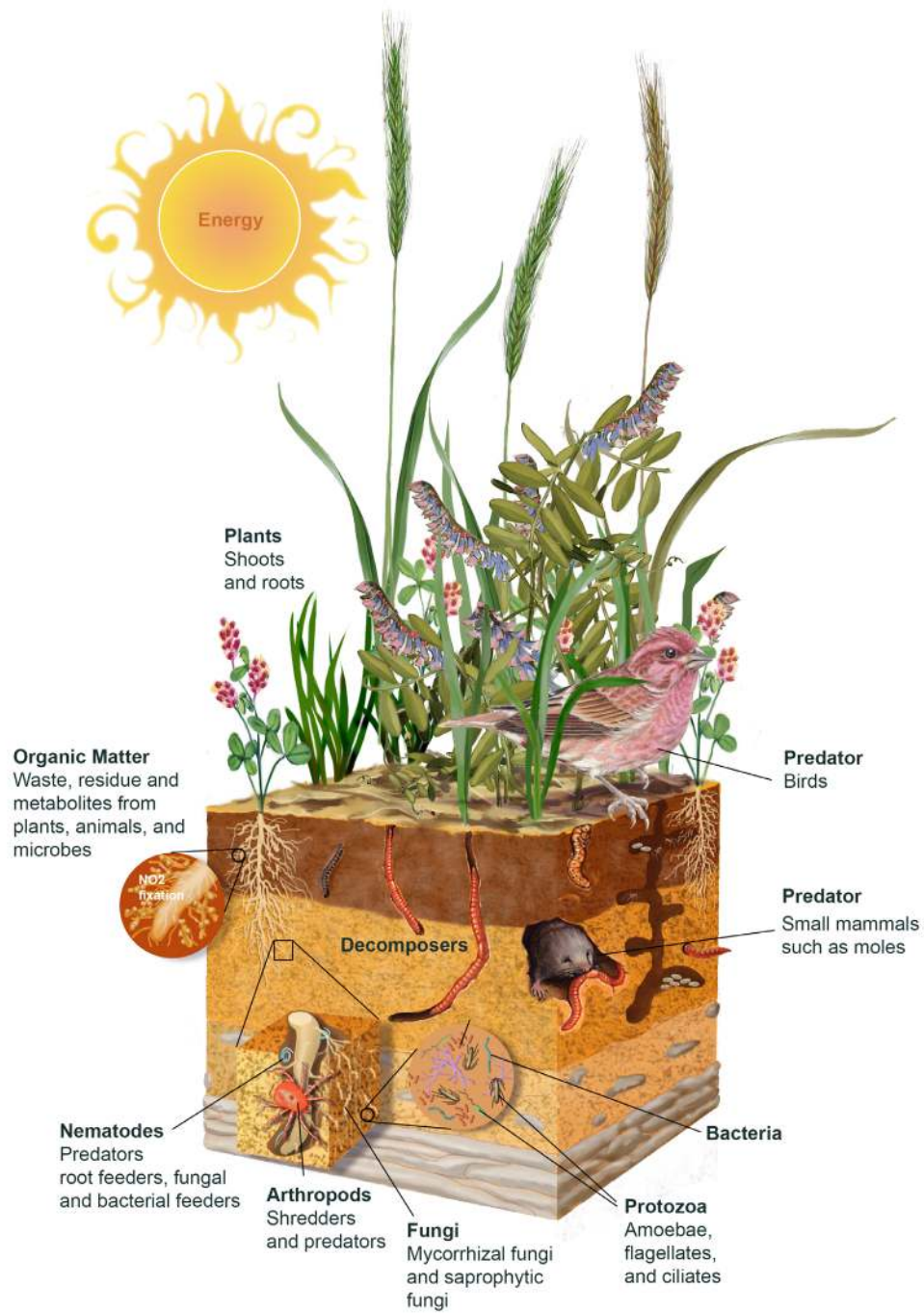
- Soil Biology is the key that is unlocking yield potential
- Cover Crops are one of the keys to better soil biological life and health
- Radishes planted with winter wheat
- Brendon Rockey potato production
- Miller-Coors Barley with intercrops
- SARE survey in corn and beans
- Does not mean that cover crops will always correlate to higher yields



3. If You Grow It... They will come

- Cover Crops stimulate and increase soil biological life





Mycorrhizal Fungi run the Largest Mining Operation in the World

Up to 85% of plants depend on fungi to survive. Plants and fungi depend on each other for nutrient cycling and water absorption

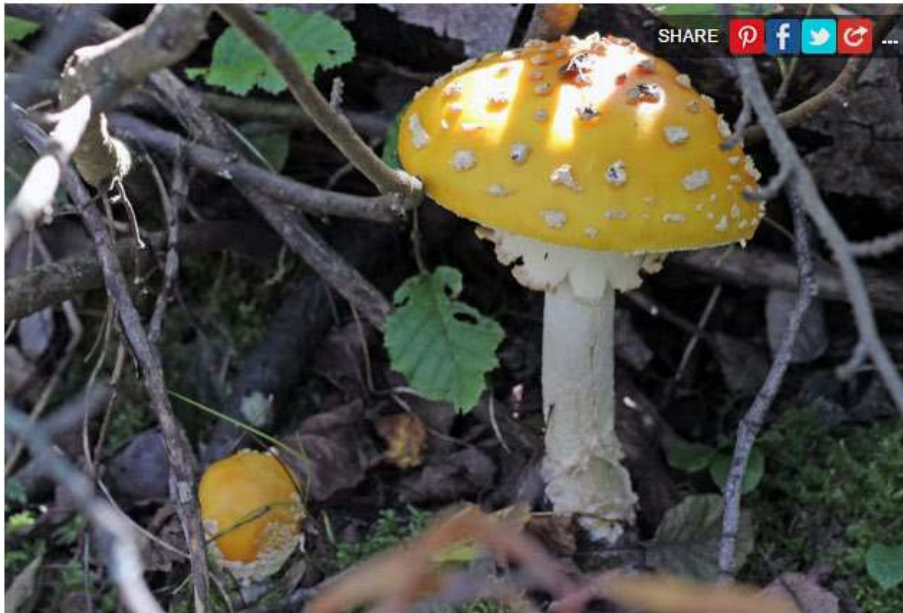


Photo: *Amanita gemmata* by Courtney Celley: US Fish & Wildlife Service

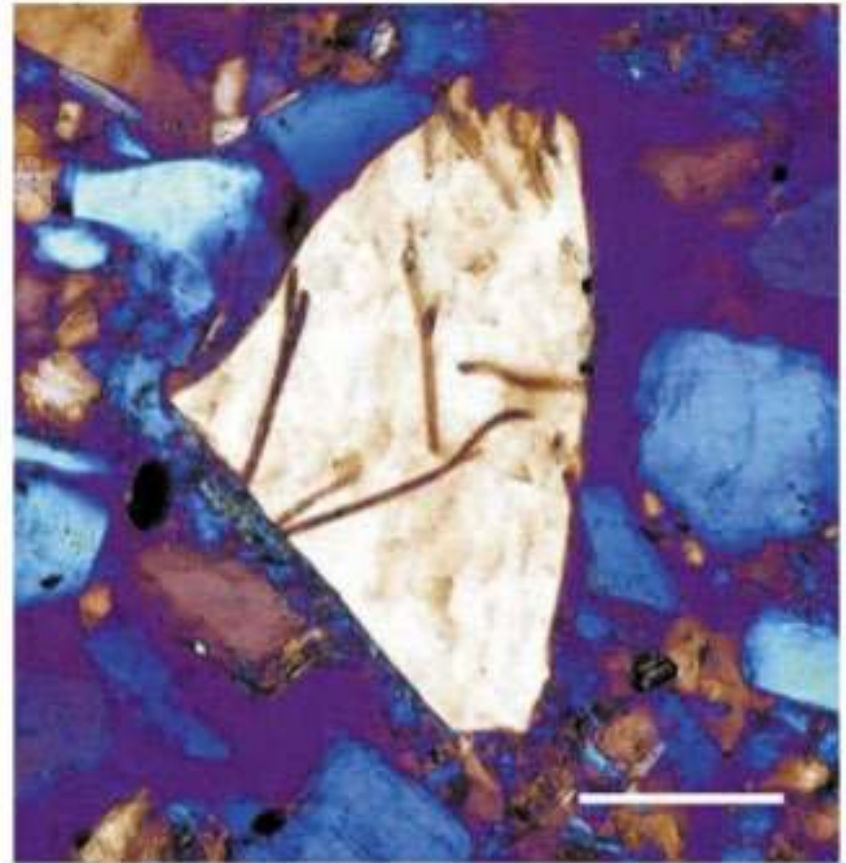


Image: Landeveert 2001

Thin-section micrograph of a tunneled feldspar
Scale bar = 100 micrometers



Arbuscular Mycorrhizal Fungi

3. If You Grow It... They will come

- Cover Crops stimulate and increase soil biological life



Mineral Resources

- Mycorrhizal fungi mine the soils not only for the basic food nutrients for plants we are familiar with like nitrogen, phosphorus, etc, but also those hard to come by trace elements (Zinc, Copper, Manganese, etc) which plants need for strong immune system health and survival against a potentially hostile world of pathogens. Oddly enough many soils are rich in important nutrients, but they are often locked up in a physical form which makes them unavailable to most plants.
- *(Source: Scientific American & Jennifer Frazer)*

3. If You Grow It... They will come

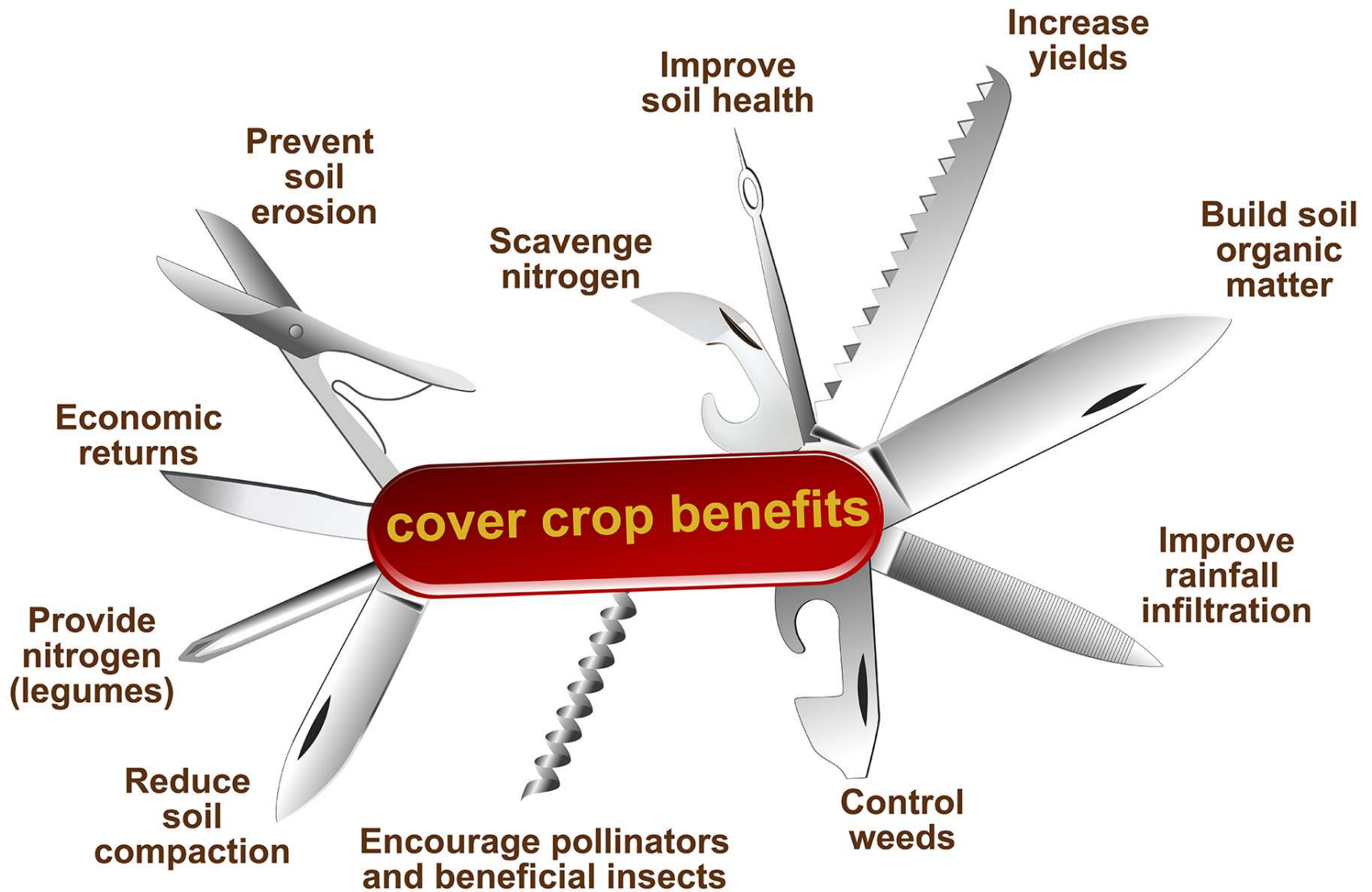
- The importance of soil biological life to the health of the soil and the productivity of the system cannot be overstated.
- Just because we can't always see Biology and just because we do not always understand Biology, does not mean that Biology is not vitally important.



4. You Need To Mix It Up!

- Cover Crops grow better in a mix than in a monoculture
- There is great power in diversity and to get diversity, you have to plant diversity.





There Is Great Power In Diversity!

- Natural systems have huge diversity
- Most of our cropping systems do not
- Cover crops should have as much diversity as practical



**Weeds and diseases are
nature's way of adding
diversity to a system
which lacks diversity.**



Dr. Dwayne Beck

Nature's efforts to add diversity can be countered by adding beneficial diversity to the system.

Dr. Dwayne Beck



**Most farmers will find it difficult to
get enough diversity in their “cash
crop” rotation....**

Corn, Corn, Corn

Corn, Beans

Corn, Beans, Wheat

_____, _____, _____

So one of the best ways to introduce more diversity is through cover crop mixes....

Cover Crops are the perfect opportunity to have great plant diversity (above ground and below ground) without needing specialized equipment, knowledge, or markets.

Double Crop Sunflowers with Cover Companions

Goal: Cash Crop, Soil Health, Grazing, Erosion Prevention

Timing: Immediately after Cereal Harvest Late June – Late July

Species: Hybrid Sunflowers (20-30K), mung beans, chick peas, vetch, lentils, crimson clover, peas, mustard, cabbage, buckwheat, flax

Cost: Flowers: \$1 per 1,000 seeds

Covers: \$15 - \$25/acre

Concerns: Growing season length, adequate moisture in dryland, marketing





CROP DIVERSITY DRIVES SOIL BIOLOGY DIVERSITY



SOIL BIOLOGY DIVERSITY DRIVES THE SYSTEM



**WE NOT ONLY HAVE PLANT DIVERSITY.....
WE ALSO HAVE INSECT DIVERSITY**





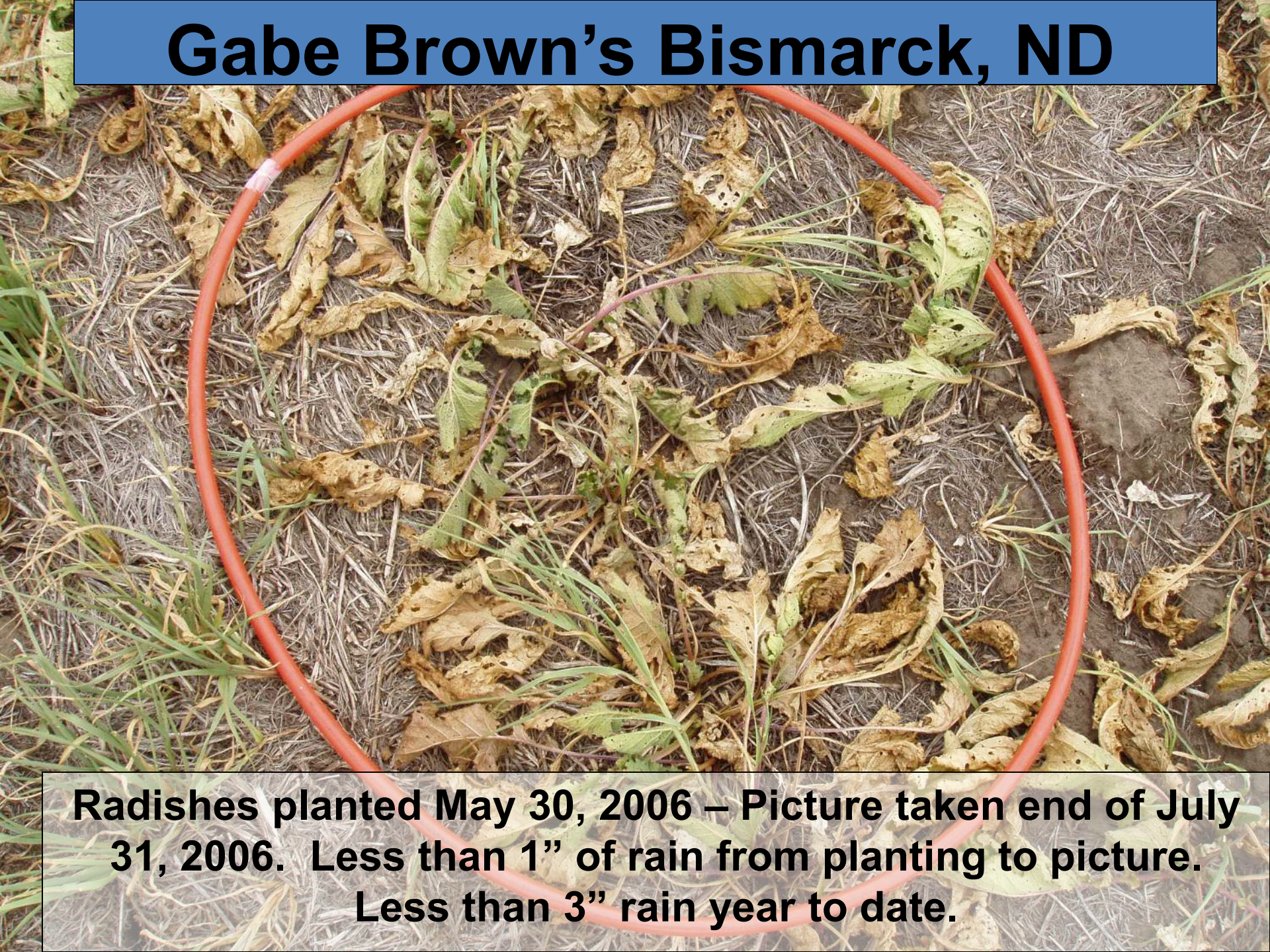


Gabe Brown's Bismarck, ND



Turnips— planted May 30, 2006 – Picture taken end of July 31, 2006. Less than 1" of rain from planting to picture. Less than 3" rain year to date.

Gabe Brown's Bismarck, ND



Radishes planted May 30, 2006 – Picture taken end of July 31, 2006. Less than 1" of rain from planting to picture. Less than 3" rain year to date.

Gabe Brown's Bismarck, ND



Cover crop mix – planted May 30, 2006 – Picture taken end of July 31, 2006. Less than 1" of rain from planting to picture. Less than 3" rain year to date.

5. “Cover-Ups” and Competition are good things...

- Residue covering the ground makes the whole system work





Almost all advantages of the No-tillage system come from the permanent cover of the soil, and only few from not tilling the soil.

We should always aim at full soil cover.

(Derpsch, 2008)





Irrigated corn planted into cover crop
rye. pic taken 5/11/12



Irrigated corn planted into cover crop rye killed out 10 days before planting. pic taken 5/11/12



Irrigated corn planted into cover crop rye killed out 3 weeks after planting. pic taken 5/11/12



Irrigated corn planted into cover crop
rye. pic taken 6/1/12



Irrigated corn planted into cover crop rye killed out 3 weeks after planting. pic taken 8/13/12



Irrigated corn planted into cover crop
rye. pic taken 5/11/12

Cereal rye


- **Contains benzoxazinone**
- **Very high nitrogen uptake and very slow nitrogen release**

Cover Crop Impact on Following Spring Rotation to Soybeans





Spring Planted Oat Based Mix
Fallow Ground - Tribune, KS



Elbon Rye planted 9/20/15 Grazed early spring
Soybeans drilled May 20th



Elbon Rye planted 9/20/15 Grazed early spring
Soybeans drilled May 20th



Elbon Rye planted 9/20/15 Not grazed
Soybeans drilled May 20th





Elbon Rye planted 9/20/15 Not grazed
Soybeans drilled May 20th Picture from 8/17



Elbon Rye planted 9/20/15 Not grazed
Soybeans drilled May 20th Picture from 8/17



Same field – end rows

6. Cattle Love The Salad Bar!

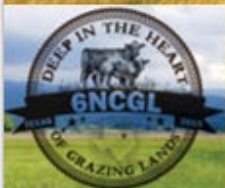
- Properly managed livestock are a great way to extend the benefits of cover crops
- They are a great tool for improving the soil more quickly – but only if they are properly managed



Case Studies of Grazing Annual Forage Cover Crops



Grazing is an art – using the same tools and supplies but getting different results because of the creativity and the intuition of the artist.



7. Remember to focus on your most important crop...



A Tale Of Two Fields



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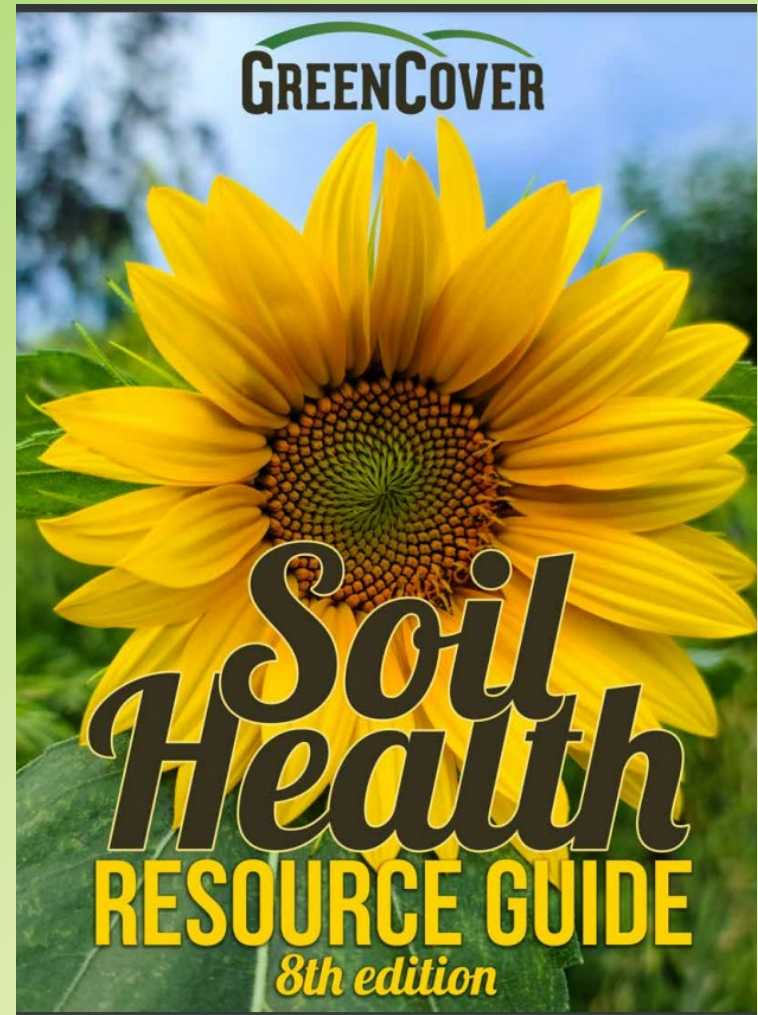
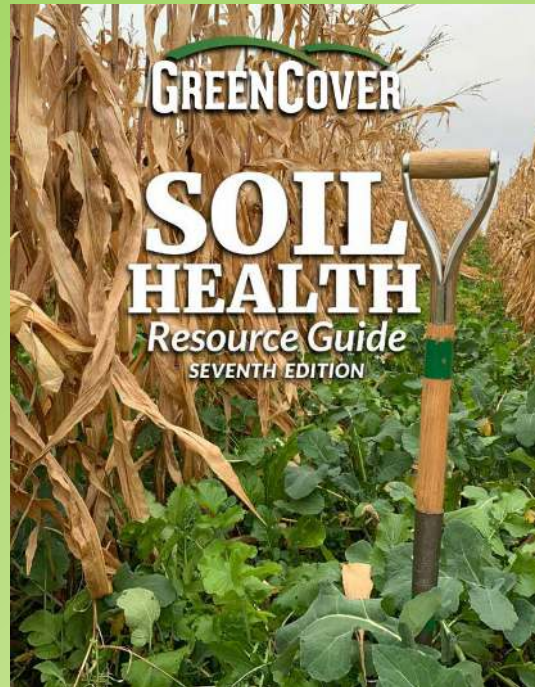
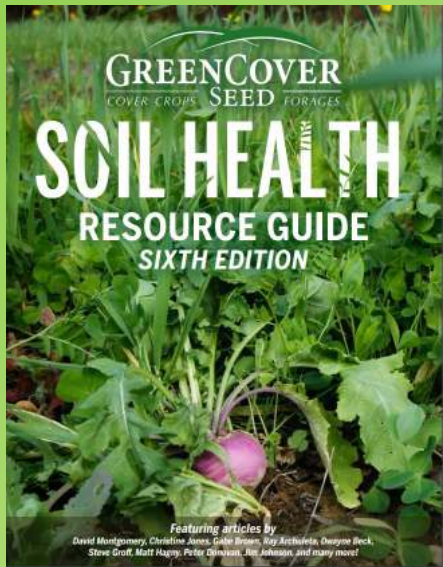


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keith@greencoverseed.com