Why Plant Cover Crops?
Outline

– What is a cover crop?
– Why plant cover crops
  • Soil health
  • Beneficial insects/pollinators
  • Organic matter
– Diversified cover crop systems mimic natural systems
What is a cover crop?

A crop to cover the soil when it would otherwise sit fallow

*Not planted to be harvested and sold*

Are planted for the effects they have on:

– The next cash crop
– Improving soil health which results in healthier cash crops
Soil Health

A soil is not considered "healthy" if it is managed for short term productivity at the expense of future degradation (Doran et al., 1994).
Cover Crop Services

Above Ground

- Habitat for beneficial insects
- Suppress weeds
- Protect soil from erosion
- Reduce nutrient leaching
- Increase soil organic matter
- Improved habitat for soil microorganisms and earthworms
- Increase soil Nitrogen
- Nematode suppression
- Mine deep layers of the soil for nutrients

Below Ground

Soil Surface
Cover crops provide soil cover

20-30 billion tons of soil is eroded due to water erosion and 2 billion or more tons due to wind erosion worldwide each year \(^1\)

It takes 500-1,000 years to form 1 inch of topsoil

*Soil is a non-renewable resource in our lifetimes*

✓ Soil cover helps reduce soil erosion caused by water \(^1\)
Cover Crops Can Suppress Weeds

Weed suppression can be accomplished:

• in the season the cover crop is planted
• in the following season if the cover crop residue is used as a weed mat or if the cover crop has allelopathic properties.

No cover crop/bare ground

100 lbs. cowpea &
10 lbs. pearl millet
cover crop
Cover crops can reduce pest pressure

• Use cover crops to diversify crop rotations
  – Legume cash crop + grass cover crop
• Rotating to cover crops that are non-hosts can reduce nematode populations
• Brassica cover crops
  – biological fumigant crops
Cover crops can affect soil temperature

- Cover crop residue on soil surface: 85°F
- Bare soil: 92°F
Cover crops can increase water infiltration and break up hard pans.

Research has shown cover crops can increase water infiltration by 8% to 528%.²
Cover crops can increase soil nitrogen

**Biological Nitrogen Fixation**

Rhizobia bacteria live inside the roots of legumes
Cover crops can reduce nutrient losses

Research has shown 1% to 89% less Nitrogen and 15% to 92% less Phosphorus in runoff samples collected from cover cropped ground.
Cover crops can support beneficial soil microorganisms

Example:

**Arbuscular mycorrhizal fungi (AMF)** live inside the roots of >80% of plant species.

- They help plants through increased nutrient uptake, and increase resistance to stresses (drought, root pathogens)
- They require a plant host to survive.
- Cover crops can help increase AMF populations in the soil \(^6,7\)

*Strawberry root colonized by arbuscular mycorrhizal fungi (AMF) (stained blue)*
Cover crops can provide habitat for beneficial insects

Early Spring

Mid Fall
Cover crops add organic matter to the soil

Soil Properties:
- Biological
- Physical
- Chemical

All three must be in balance for soil health to be achieved.

Photo credit: Building Soils for Better Crops, SARE
Take home message

• Cover crops can contribute to subsequent cash crops management, fertility and crop health.

• Cover crop provide multiple benefits that promote healthy function soils

• Organic matter additions from cover crops are key to improving the physical, biological and chemical properties of the soil.
Authors and Acknowledgements

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Resources and Sources

1 Status of the World’s Soil Resources http://www.fao.org/3/a-bc595e.pdf
2 Cover Crops at Work: Increasing Infiltration. Cover Crop Resource Series, SARE. https://www.sare.org/content/download/80109/1406598/Cover_Crops_at_Work_-_Increasing_Infiltration.pdf?inlinedownload=1
4 Ten Ways Cover Crops Enhance Soil Health. Soil Health and Cover Crop factsheets. SARE. https://www.sare.org/content/download/80998/1422252/10_ways_cover_crops_enhance_soil_health.pdf?inlinedownload=1