Cover Crops for Idaho Small Farms

Your Small Farm
2018 Webinar Series
February 20, 2018

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- Close all other programs running on your computer
- Check your sound – problems with clarity, speed, etc. switch to the phone
  - Call-in number provided in the welcome email
  - Mute computer sound when using phone
- **Type in questions** (or for help with viewing & sound) **into question box**
- Handouts are available to download on your computer

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Tonight's Presenter

Lauren Golden
Extension Educator
University of Idaho Extension
Blaine County

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Poll #1

How often do you use cover crops?

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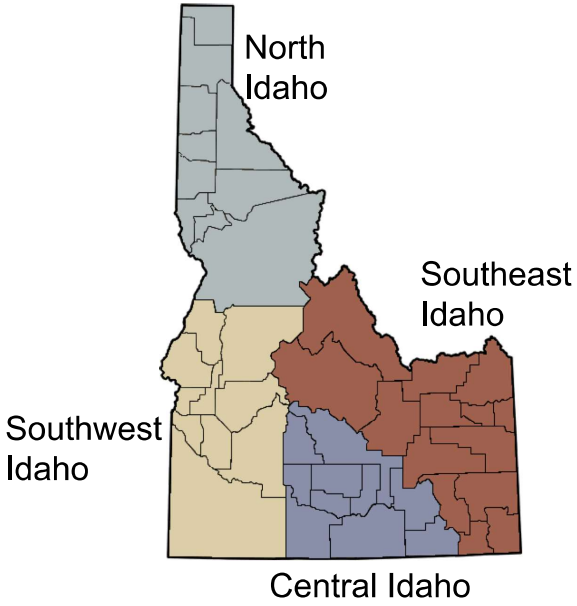
Poll #2

Where are you located?



ROAD MAP

- Why Cover Crops?
- Cover Crops 101
- Grazing Cover Crops
- Summary

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unlock the SECRETS IN THE SOIL

WHY COVER CROPS?

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WHY COVER CROPS?

- Reduce non-point source pollution
- Reduce sediment loss (top-soil)
- Improve Soil Health:
  - Increase Organic Matter
  - Provide organic source of fertilizer

Sources: Basche & Roesch-McNally, 2017; Dabney, Delgado & Reeves, 2001; Dabney, 1998; Sullivan, 2003

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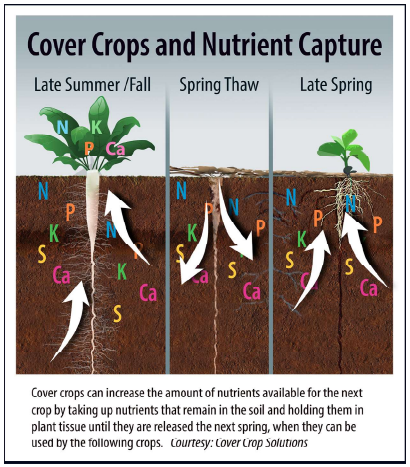
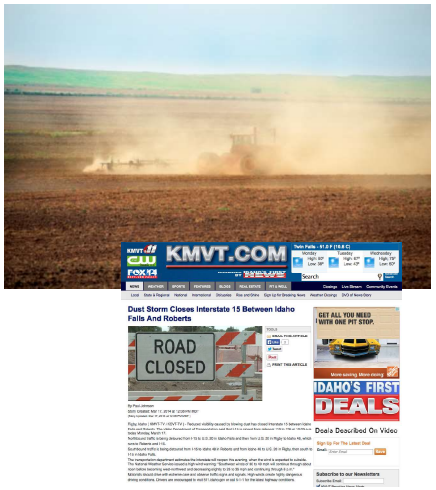
WHY COVER CROPS?





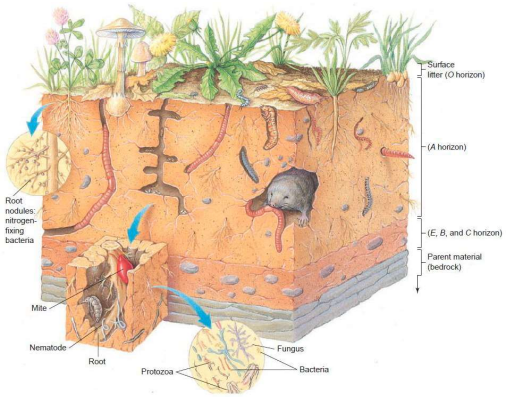
WHY COVER CROPS?

Soil Health

- N, P, K
- Organic Matter
- Glues

Sources: Sarrantonio, SARE, 2012; Sullivan, 2003

WHY COVER CROPS?

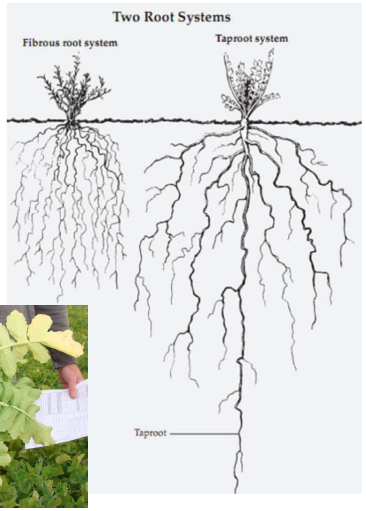


Sources: Brennan & Acosta-Martinez, 2017

WHY COVER CROPS?

- Provide habitat for beneficial insects
- Minimize weed competition
- Reduce water-use
- Reduce need for herbicides/pesticides
- Reduce soil compaction
- Forage potential

WHY COVER CROPS?



WHY COVER CROPS?

Poll #3

What cover crop benefits are you interested in?

COVER CROP 101

- Cover Crop Management Goals
- Species Selection
- How To Implement

MANAGEMENT GOALS

- Source of organic fertilizer (Nitrogen)
- Increase soil health
- Soil protection
- Moisture retention and weed control
- Basic forage
- Maximum forage
- Reverse soil compaction
- Pest management

SPECIES SELECTION

- Legumes
- Grasses
- Brassicas

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SPECIES SELECTION

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BENEFITS OF EACH

- **Legumes-** Nitrogen fixers, high protein, forage quality
- **Grasses-** Organic matter/soil health, soil compaction, forage yield
- **Brassicas-** Nutrient scavengers, soil compaction, pest control, weed control, forage quality

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University of Idaho Extension BULLETIN 889

Cover Crops for High-Desert Farming Systems in Idaho

Lauren Hunter, Christi Falen, and Amber Moore

Introduction

A cover crop is any crop grown to provide living ground cover. It can be planted with the main crop or in rotation with it.

Growing cover crops is a best management practice to help minimize soil erosion, prevent nutrient leaching, provide nitrogen (N) for subsequent cash crops, suppress weeds, sequester carbon, increase crop diversity, and provide beneficial insect habitats. In Idaho, cover crops can be planted in spring, summer, or fall and rotated with a variety of crops, including barley, alfalfa, potato, sugar beets, beans, and vegetables.

By planting cover crops, Idaho producers benefit from the following:

- Lower N fertilizer costs
- Higher soil organic matter contents
- Less wind erosion
- Scavenging and retention of soil nutrients
- Weed or insect control
- Production of a dual-purpose alternative forage

This guide features optimal cover crops for high-desert farming systems in the intermountain West under irrigated or low-moisture conditions. The specific species and varieties listed in this publication were tested under Idaho growing conditions through numerous on-farm research trials. The species were selected based on cold hardiness, biomass production, N fixing and scavenging abilities, and forage potential. For each species, information includes optimal planting dates, N contribution, biomass production, recommended cover crop mixtures, and estimated cost for cover crop seed.

The cover crop species are divided into three groups: (1) cereal and grass cover crops, (2) N-fixing cover crops, and (3) brassica cover crops (includes radish,

Triticale

Triticale is an annual cereal crop that produces a large amount of biomass in a relatively short period of time. Triticale works well on a variety of soil types and in a variety of cropping systems. This crop can grow under irrigated or limited-irrigation conditions and is considered a low-input crop. Triticale is beneficial for both animal forage and as a cover crop.

Biomass production: Medium to high dry matter yields depending on the N available in the soil. High dry matter yields when planted with a legume.

Cold hardiness: Winter varieties survive the winter; spring varieties do not.

Planting dates: Spring, summer, fall

Mixtures: Plant with a legume, a brassica, or a larger mix of species.

Seed cost: Low

Winter Barley

Barley is a high-yielding annual cereal crop commonly grown for forage and hay production. It matures early, making it beneficial for early grazing with sufficient time for regrowth as a cover crop.

Biomass production: Medium to high dry matter yields depending on N available in the soil. High dry matter yields when planted with a legume.

Cold hardiness: Winter varieties survive the winter; spring varieties do not.

Planting dates: Spring, summer, fall

Mixtures: Plant with a legume, a brassica, or a larger mix of species.

Seed cost: Low

Figure 6. Winter barley (left) and Willow Creek winter wheat

field conditions. However, for organic systems hairy vetch can become a weed problem; its persistent nature makes it difficult to kill with tillage alone.

Nitrogen contribution: High

Biomass production: Medium dry matter yields

Cold hardiness: One of the more cold-hardy legume cover crop species; it survives the winter.

Planting dates: Spring, summer, fall

Mixtures: Blending hairy vetch with a cereal or grass allows the vetch to climb the cereal stems, optimizing photosynthesis and helping to lift and detangle the vetch vine for better mechanical control during incorporation.

Seed cost: One of the more expensive legumes

Brassica Cover Crops

Optimal brassica species for high-desert cropping systems include canola or rapeseed, daikon radish, oilseed radish, mustards, and turnips. The large taproot and/or horizontal roots on these cover crops allow them to scavenge nutrients deep in the soil profile. When planted in the fall, the taproots help to capture residual soil nutrients such as N and phosphorus. Rapid spring decomposition release these nutrients back into the soil for the succeeding crop.

The taproot also penetrates deep into the soil, helping to mitigate subsoil compaction. Research in northern Idaho shows that the taproots of canola, oriental mustard, and yellow mustard improve soil structure and water-holding capacity and reduce nitrate leaching.

Livestock favor brassicas as a forage crop, but producers should be aware that their nutrient scavenging abilities can contribute to nitrate accumulation in plant tissue.

Brassicas grow rapidly in the fall and spring, providing excellent soil coverage for weed control. In potato systems, brassicas are used to manage pests. The cover crops release chemical compounds that are toxic to some soilborne pathogens and pests such as fungi, nematodes, and some weeds. Mustards typically have a higher concentration of these chemicals.

This publication includes only canola and daikon radish, but turnips and mustards are equally suitable and perform well under Idaho growing conditions. Brassica cover crops work well planted alone or in a cover crop mix.

Canola

Canola, an annual, is a trademarked cultivar of rapeseed (figure 13). As a cover crop, canola is used for controlling erosion, suppressing weeds, controlling soilborne pests, alleviating soil compaction, and scavenging nutrients. Under Idaho conditions, canola needs adequate N in the soil for good survival and biomass production. A fall planting of canola with a fall application of compost or manure will capture excess N and phosphorus and release them the following spring through decomposition.

Cold hardiness: Survives the winter if given sufficient time in the fall for biomass production

Planting dates: Summer, fall

Mixtures: Plant with any cereal cover crop or legume or in a mix of three or more species.

Seed cost: Medium

Figure 12. A high-yielding hairy vetch crop contributes N and organic matter and provides good weed control. May-planted crop in August at a high-elevation farm, Picabo, Idaho.

Figure 13. A canola and triticale mix.

Figure 7. Large root nodules on Austrian winter peas fix

7

LEGUMES

- Austrian winter peas/forage peas
- Chickling vetch
- Hairy vetch
- Clover
- Arvika peas

GRASSES

- Wheat/barley
- Triticale
- Sorghum Sudangrass
- Pearl millet

BRASSICAS

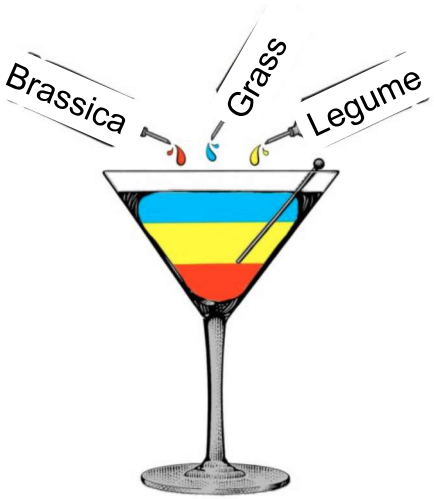
- Daikon radish/oilseed radish
- Turnip
- Canola
- Mustards

Cover Crop Chart

GROWTH CYCLE	RELATIVE WATER USE	PLANT ARCHITECTURE
A = Annual	= Low	= Upright
B = Biennial	= Medium	= Upright-Spreading
P = Perennial	= High	= Prostrate

Cool Season							Warm Season	
Grass		Broadleaf						Grass
A Barley								A Pearl millet
A Oat	A Phacelia						A Amaranth	A Foxtail millet
A/P Ryegrass	A Flax			Legumes			A Buckwheat	A Proso millet
A Wheat	A Spinach	B Turnip	A Field pea	A Berseem clover	A/P Medic	A Chickpea	A Sunflower	A Sudan grass
A Cereal rye	A Kale	A Radish	A Lentil	B/P Red clover	P Birdsfoot trefoil	A Cowpea	A Safflower	A Teff
A Triticale	A/B Canola	B Beet	A Lupin	P White clover	P Sainfoin	A Soybean	A Squash	A Grain sorghum
A Annual fescue	A/P Mustard	A/B Carrot	A/B Vetch	A/B Sweetclover	P Alfalfa	A Mung bean	P Chicory	A Corn

COVER CROP MIXES



COVER CROP MIXES

- Grasses and Brassicas are going to germinate quickly
- Grasses and Brassicas good if you get a late start to planting in spring or fall, after harvest

COVER CROP MIXES

- Legumes ($)
- Legumes are slower to germinate
- Adjust seeding rates based on germination and goals

MANAGEMENT GOALS

- Source of organic fertilizer (Nitrogen)
- Increase soil health
- Soil protection
- Moisture retention and weed control
- Basic forage
- Maximum forage
- Reverse soil compaction
- Pest management

Sequence Options

1. **Summer of Fallow** - Plant cover crops as a main full season crop. This provides a full season for optimum growth and nitrogen contribution.
2. **Companion Crop** – Intercrop cover crops in between rows. Provides weed control and a slow build-up of organic matter and nitrogen.
3. **Winter Cover Crop** – Plant cover crops following harvest to protect soils and hold nutrients. Build-up organic matter and nitrogen.

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COVER CROPS + COMPOST/MANURE

Cherr, C.M., Scholberg, J.M.S., and McSorley, R. 2006. Green manure approaches to crop production: A synthesis. Agronomy Journal. 98:302-319.
Clark, A. (Ed.). 2007. Managing cover crops profitably. 3rd Edition. Sustainable Agriculture Network, Beltsville, MD.

Poll #4

What cover crops have you tried?

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CREATING A COVER CROP PLAN

- **Species Selection**: Obtain seed early!
- **Planting Date**: August
- **Planting Method**: (no-till)
- **Spring Management**: (no-till), till, graze

SEED SOURCES

- Green Cover Seed
- Wheatland Seed
- Rainier Seed
- Frontier Seed in Moscow
- Anders Seed in Ontario

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PRODUCER NOTES

- “In my fall planting, I had the wheat and barley outcompete the broadleaf's. Next time I won’t plant any grasses.”
- “My turnips came back strong in the spring, even after disking.”
- “I sold off all of my tillage equipment. I am using the tillage radish to do the job.”

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PRODUCER NOTES

- “My fall planted turnips and radishes did great with low moisture. The vetch and clover also did really well with the low moisture conditions.”
- “Peas did good until the water ran-out. Luckily the grass in the mix kept growth going.”
- “Sudan grass is very drought tolerant. Does worse when overwatered.”

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PRODUCER NOTES

- “Weather each year will play a role in how a grower decides to plant and manage the cover crops.”
- “In the spring, I saw higher moisture levels in the cover crop field compared to the fallow field.”

GRAZING COVER CROPS

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GABE BROWN

- Has been using cover crops for over 10 years.
- He does not use chemical fertilizer.
- He does not till.
- Diversified operation.

Source: brownsranch.us

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SEED MIXES

Winter triticale
Flex forage pea
4010 forage pea
Austrian winter pea
Windham winter pea
Hairy vetch
Starfire red clover
Purple top turnip
Daikon "soilbuster" radish

Forage Mix- Seed at a heavier rate
Price: 148 lbs/acre = $86/acre

Cover Crop Mix- Seed at a lower rate
Price: 40 lbs/acre = $43/acre

SEED MIXES

Winter triticale
Flex forage pea
Austrian winter pea
Purple top turnip
Daikon "soilbuster" radish

Make it even simpler (and cheaper):

Forage Mix- Seed at a heavier rate
Price: 60 lbs/acre = $42/acre

Cover Crop Mix- Seed at a lower rate
Price: 40 lbs/acre = $28/acre

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Grazing Considerations

- Warm season verse cool season plants
- Re-growth potential
- MIG
- Optimal timing of feed
- Number of available animals

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SUMMARY

- Start small with a 3-5 species mix
- Keep costs low
- Plant early
- Take soil samples and monitor

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Monday, February 12th, 2018 from 6:00 PM - 7:30 PM PST/7:00 PM - 8:30 PM MST

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Introduction to Idaho Farm Link
Monday, February 26th, 2018 from 6:00 PM - 7:30 PM PST/7:00 PM - 8:30 PM MST

Farmer Mentor Training
Monday, March 5th, 2018 from 6:00 PM - 7:30 PM PST/7:00 PM - 8:00 PM MST

Selling to Retail Grocers and Restaurants in Idaho
Monday, March 12th, 2018 from 6:00 PM - 7:30 PM PST/7:00 PM - 8:30 PM MST

Direct Marketing in a New Food Reality: how understanding the way we eat now creates opportunities for local food-based entrepreneurship
Monday, March 26th, 2018 from 6:00 PM - 7:30 PM PST/7:00 PM - 8:30 PM MST

Are you Making $$$? Tracking Sales and Other Record-Keeping Basics
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Next webinar:

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Monday, February 26th
6:00-7:30pm PST/7:00-8:30pm MST

Colette DePhelps
University of Idaho Extension

Please take the post-webinar survey!

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