Cover Cropping and Weed Management: Considerations

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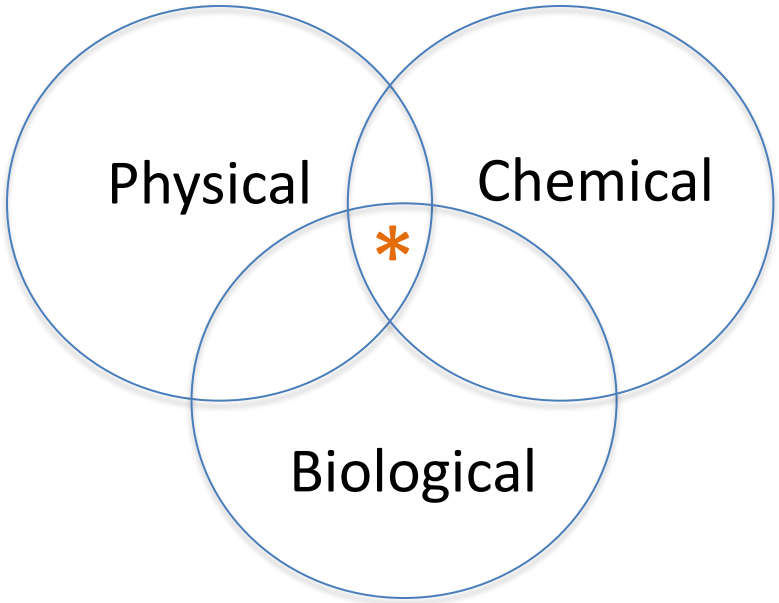


Soil health is the continued capacity of soil to <u>function</u> as a vital living ecosystem that sustains plants, animals, and humans..

Function: work or operate in a proper or particular way; be in working/running order, operate, perform, play the role of, do duty as…

For example, moving water rapidly during heavy rains

Cover crops are planted in ground that is otherwise fallow. Thus, cover crops can outcompete weeds that would grow in the same season in many situations.

However, cover crops have to establish well to be competitive. This can be hard in a drought.

Some benefits of cover cropping (water infiltration, reduced runoff, organic matter) can be achieved with "residual vegetation"

Of course, then you have a lot of weeds in your field.

Measuring Weed Suppression

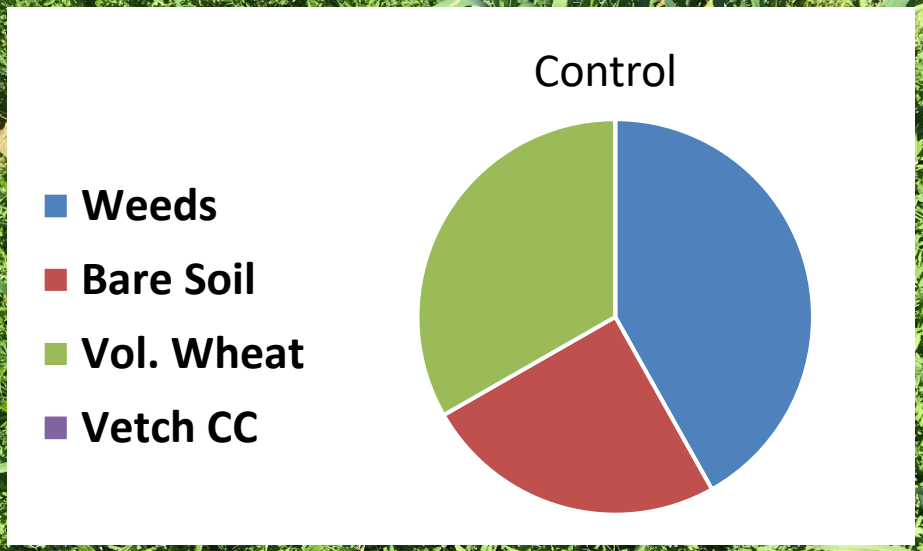
Planting before the first rain will increase competitiveness

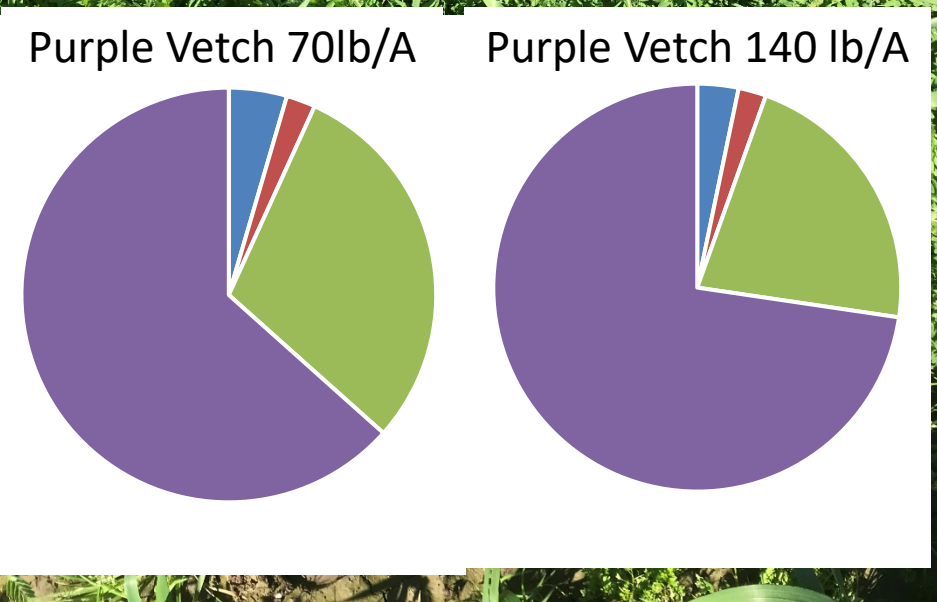
Left: planted 10/21/21 Right: planted 11/22/21

Cayuse Oats. Photos taken on 2/25/22

No apparent weed suppression of soil coverage benefit to increased seeding rate in either year

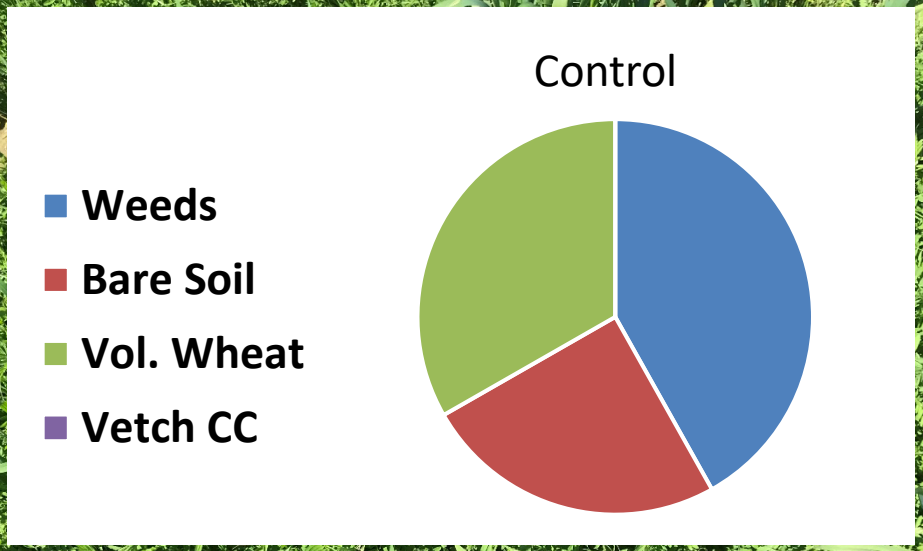
Nov-March rain 2018: 16”

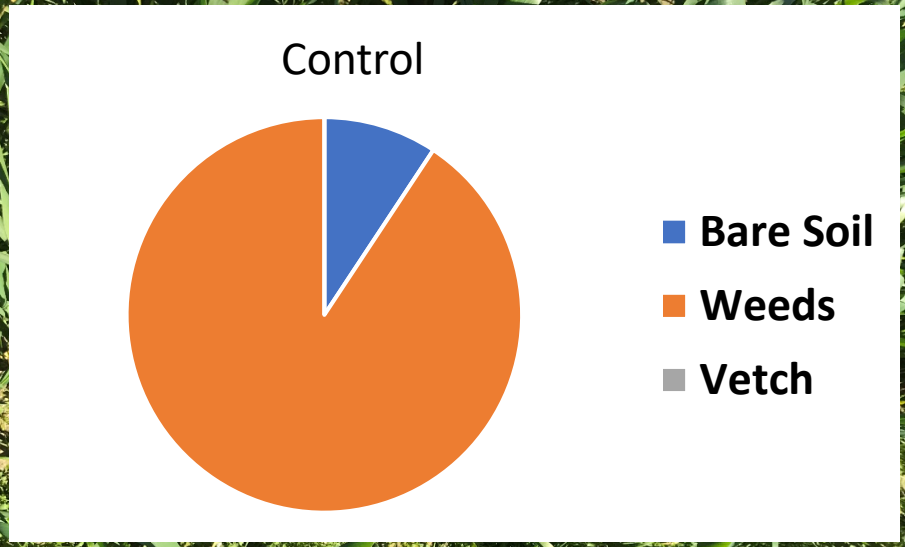


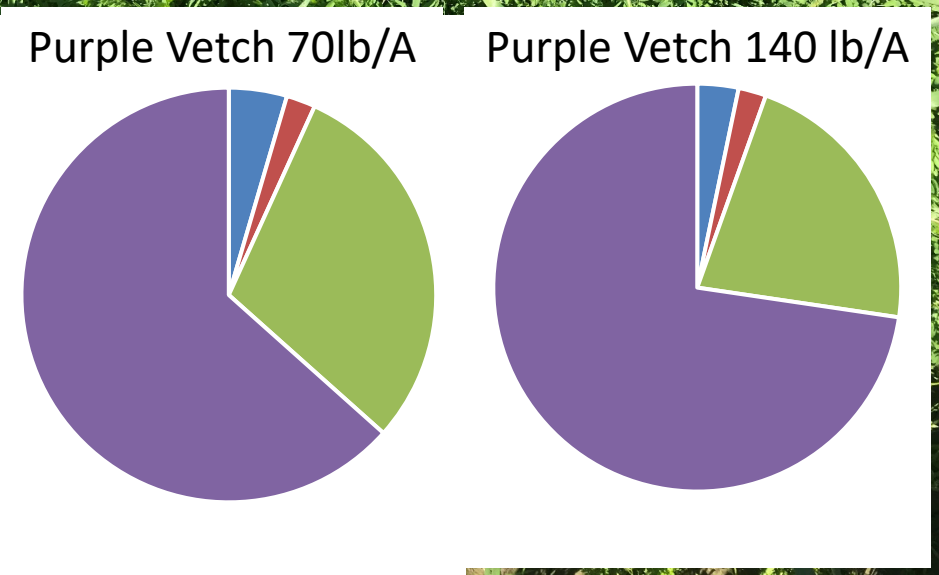


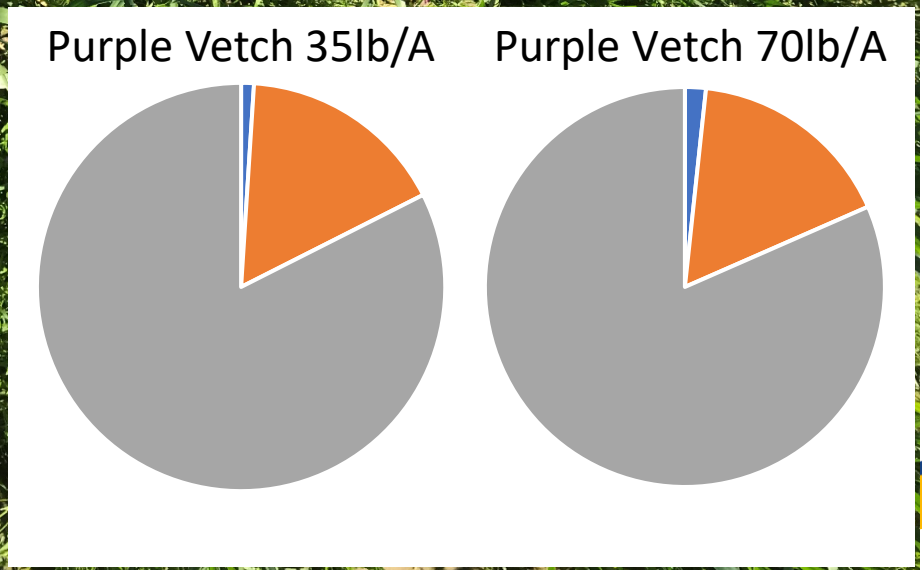
No apparent weed suppression of soil coverage benefit to increased seeding rate in either year

Nov-March rain 2018: 16” 2019: 6” but 4.7” in Nov and Dec





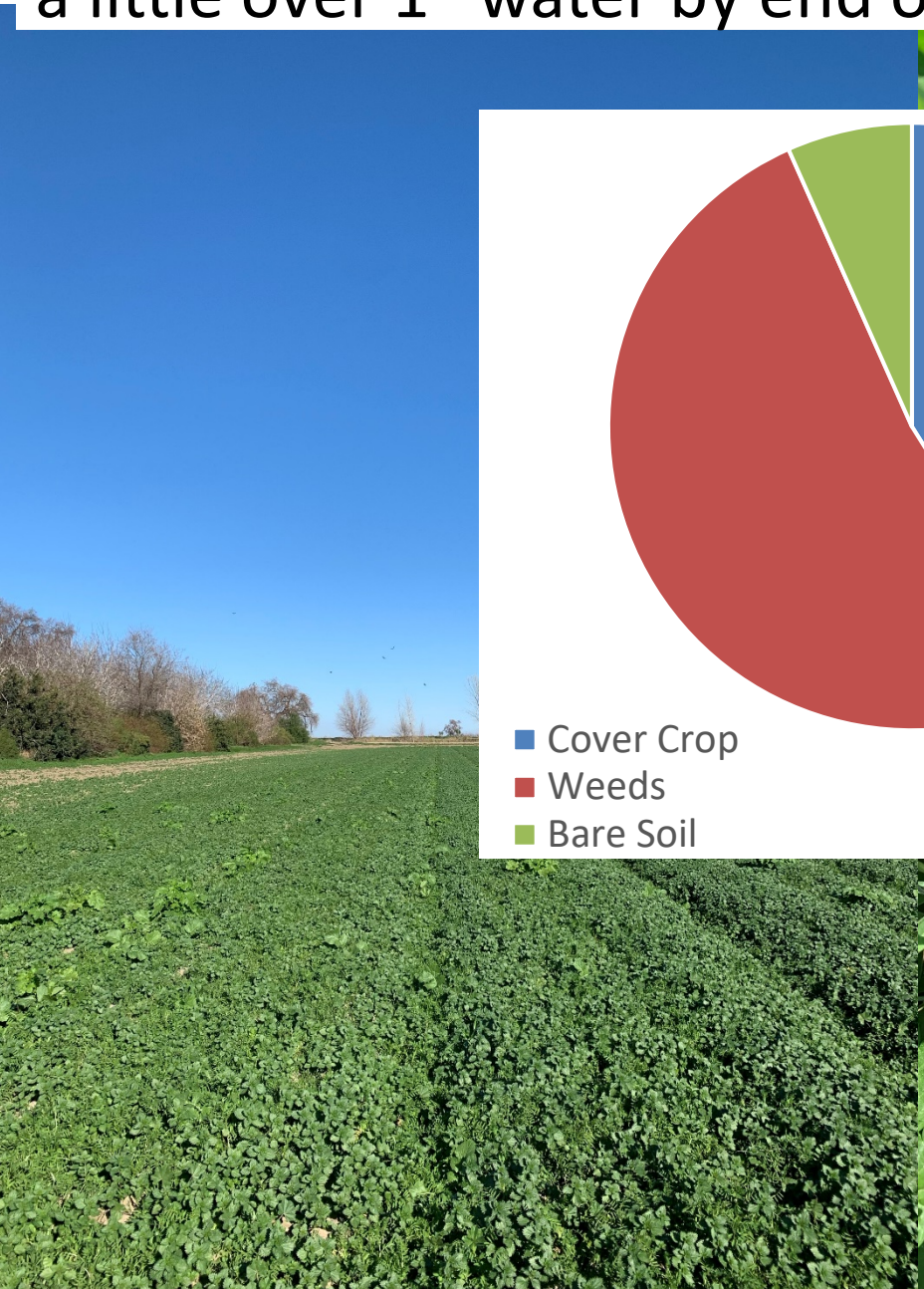


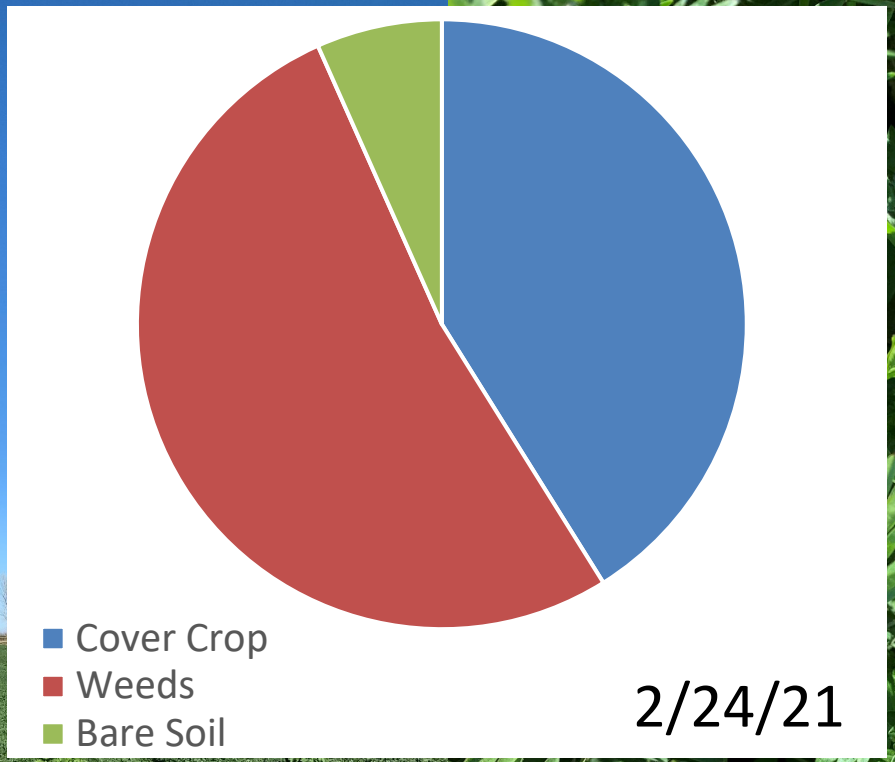


March 18th

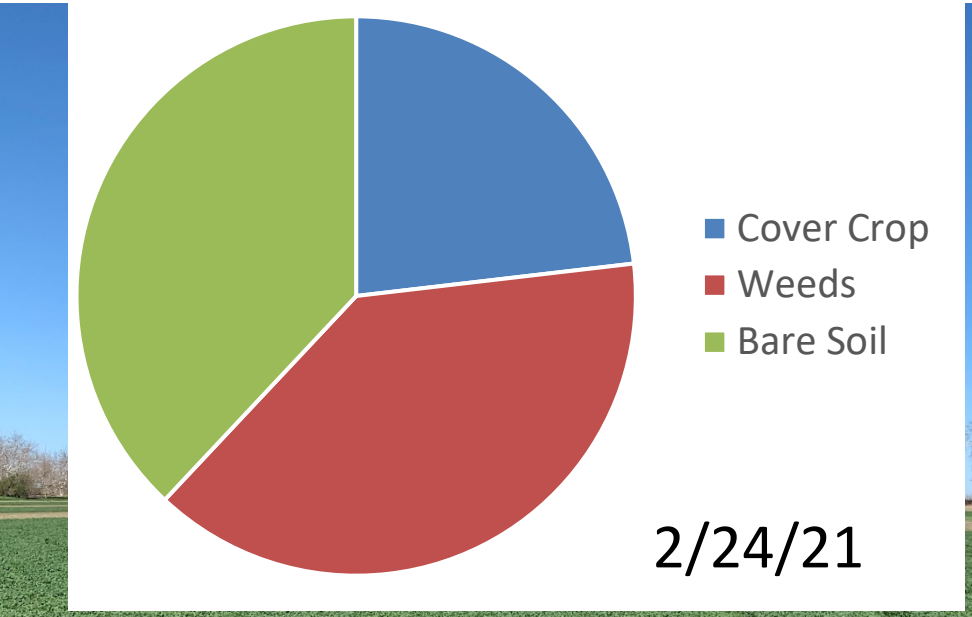
April 11th

Purple Vetch (50 lb/A) had very poor weed suppression with a little over 1” water by end of year

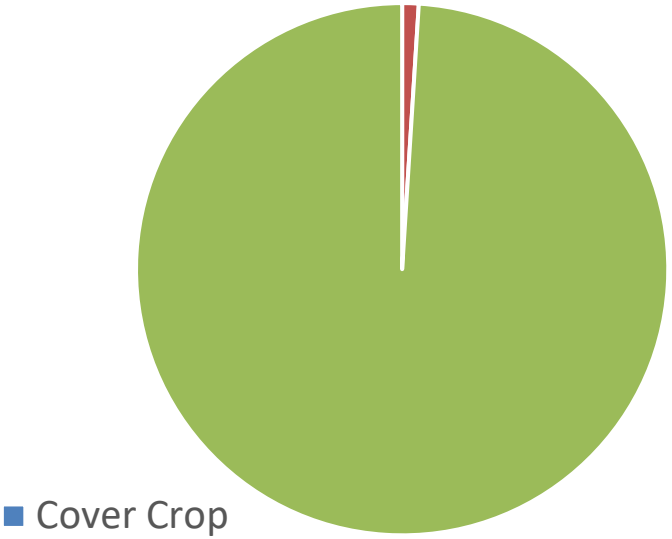




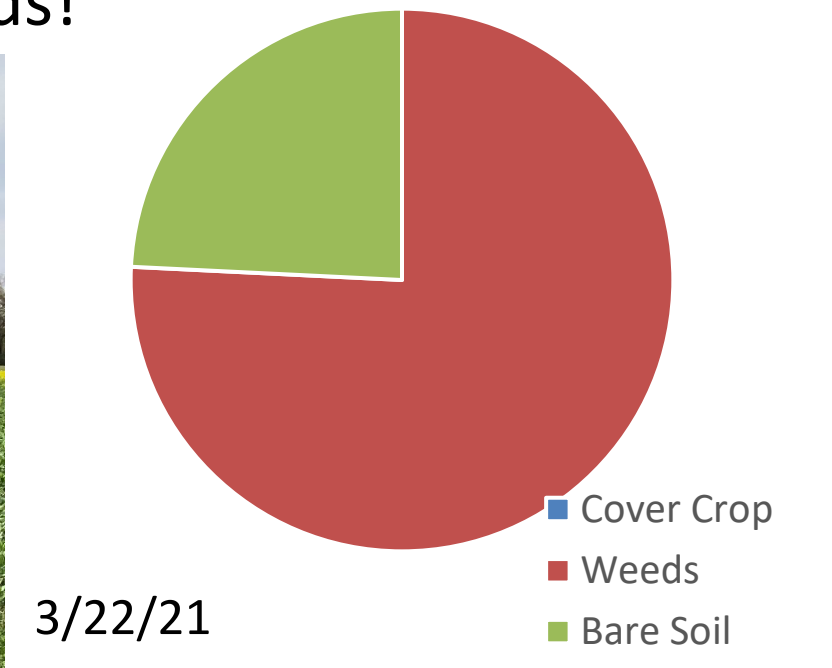
Purple Vetch and Cereal Rye (50 lb/a) combined also failed to suppress weeds in a very dry fall

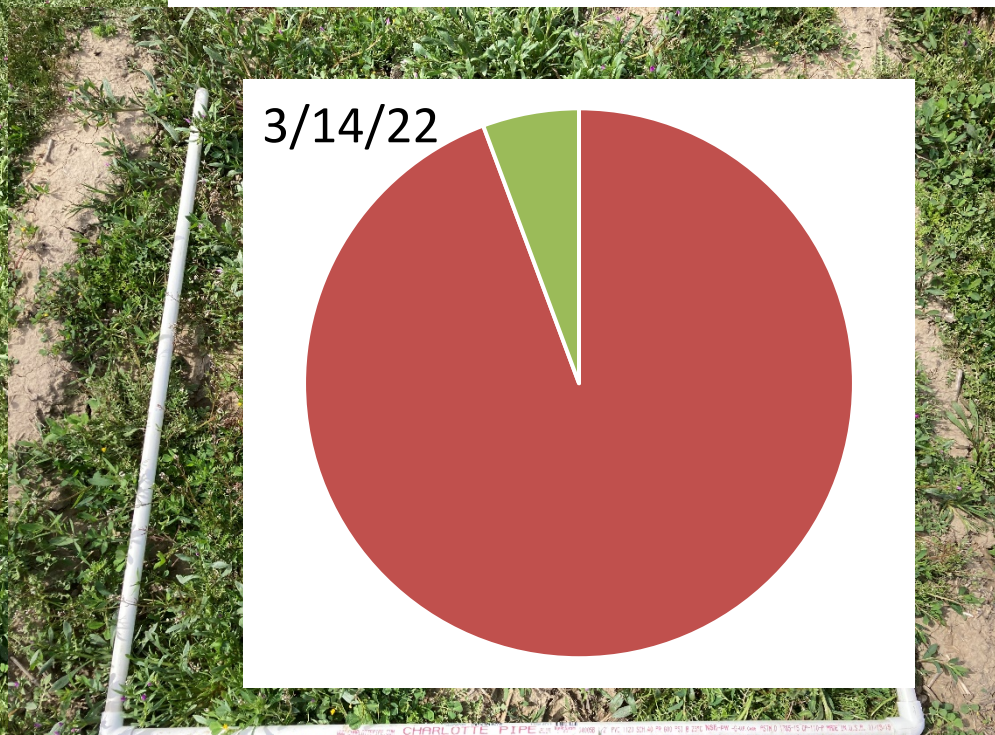


Control plots- sprayed Feb 10th – no weeds!

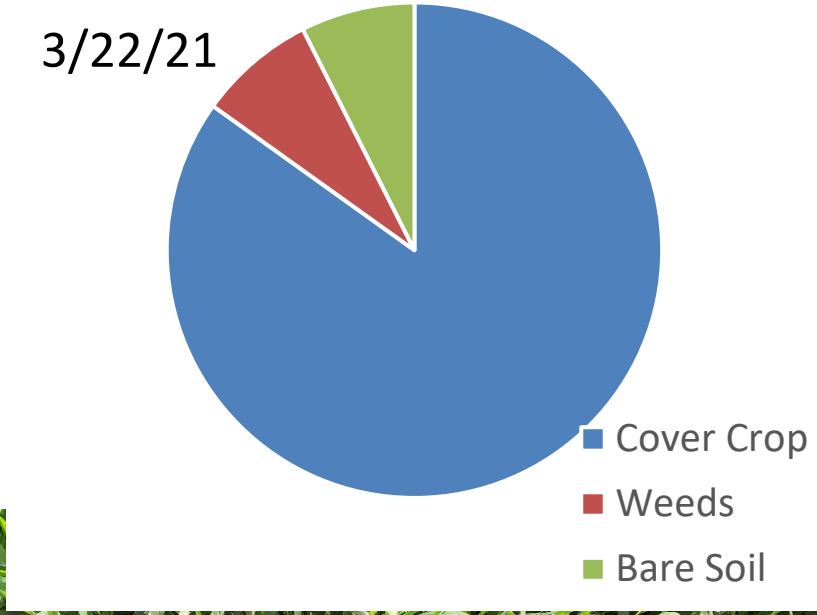


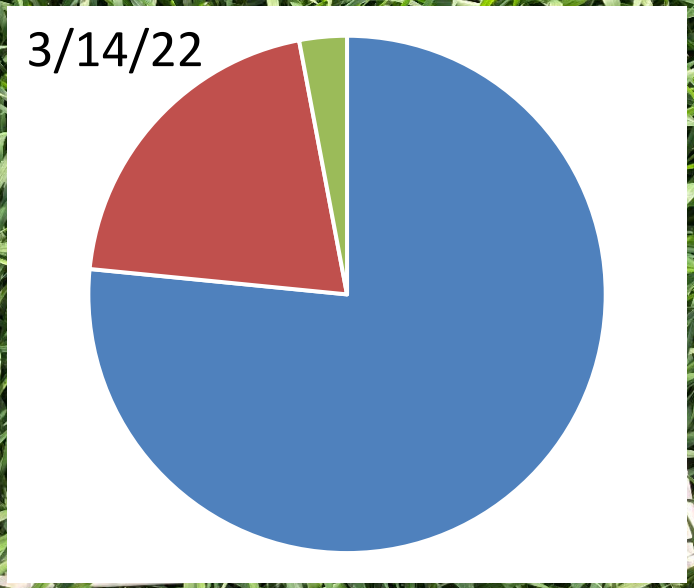
Control plots – no spray-many weeds!



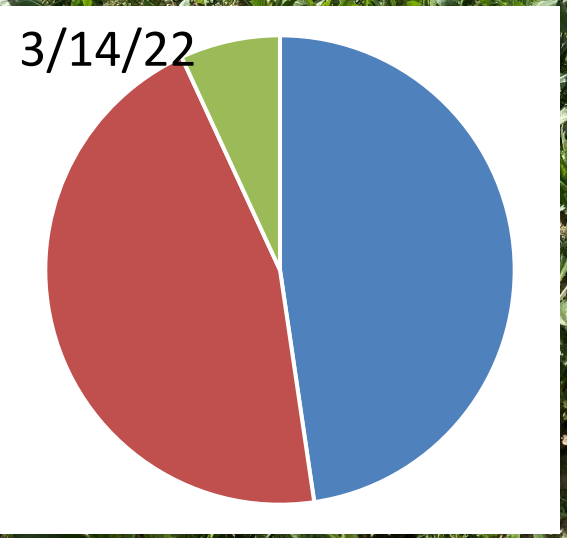


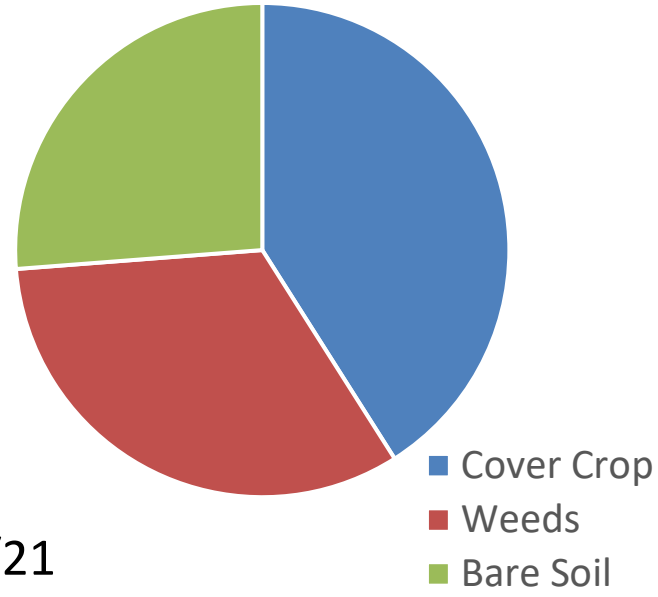
Triticale: 100 lb/A. little over 1” water by end of year for fall 2020 planting. 2021 was a wet fall. Triticale was competitive both years.





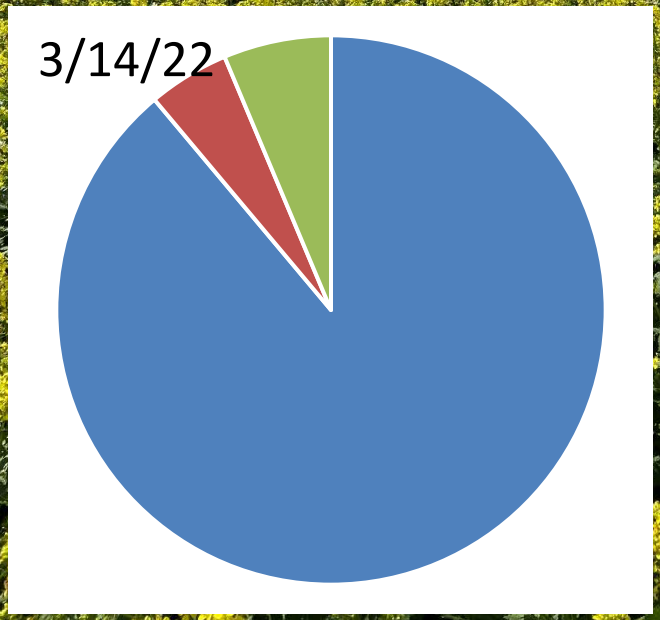
Safflower: 30 lb/A

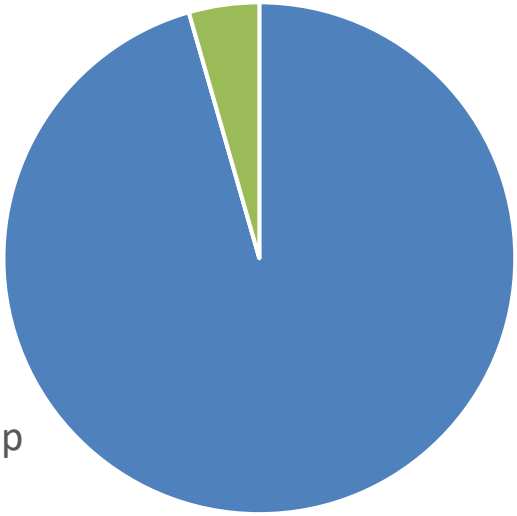




3/22/21

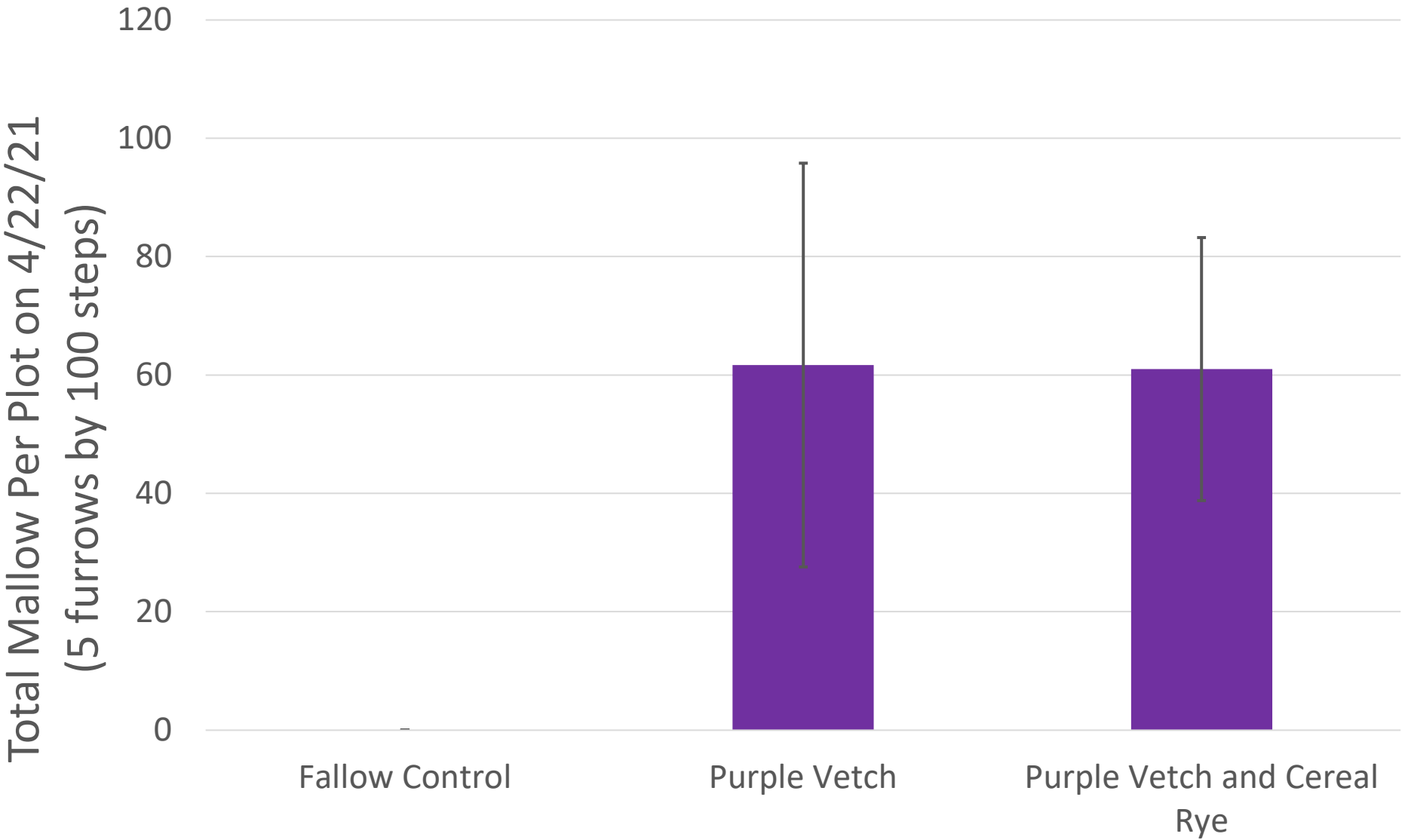
Margentina White Mustard: 10 lb/A is very competitive with weeds





3/22/21

Glyphosate termination of cover crop failed to kill mallow. Sunflowers planted end of March required hand weeding. Cost ~ $80/Acre in CC plots.

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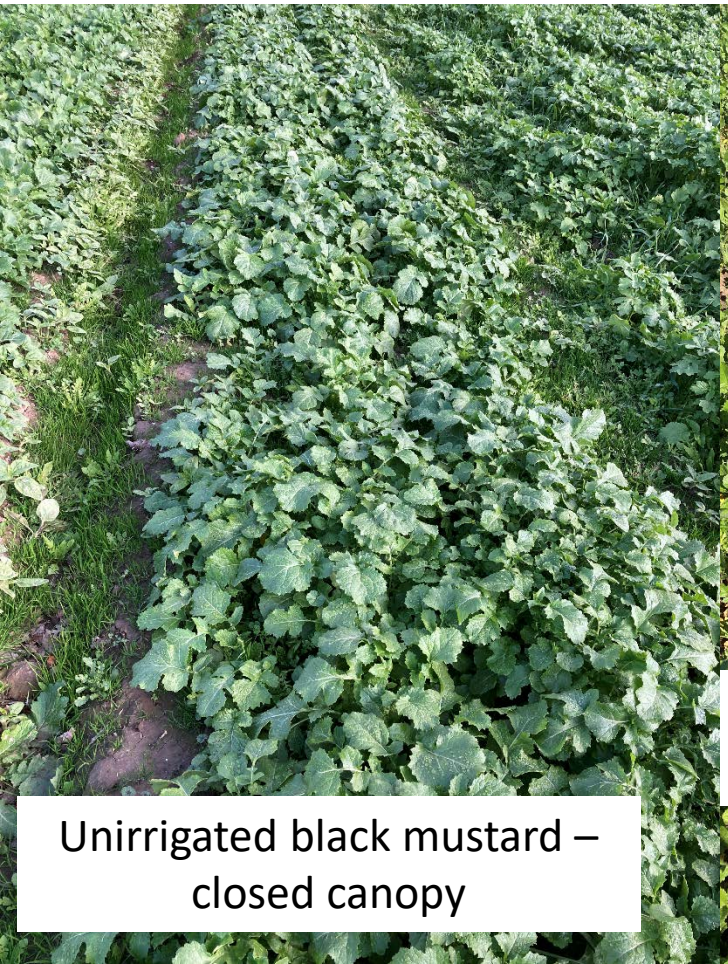
Live Oak
Colusa
Colusa Ranche
Sutter
Lira
Yuba City
South Yuba City
Linda
Olivehurst
Grand Island
Harrington
Millers Landing
Everglade
Hershey
Dunnigan
Robbins
Nicolaus
Pleasant Grove
Knights Landing
Zamora
Yolo
Counsman
Capay
Esparto
Woodland
Monument
Rio Lind

Midseason observations (mid to late February):

Unirrigated plots had poor emergence for many species

- Brassicas and grasses mixed emergence (poor to good)
- Legumes generally poor emergence

Brassicas > grasses>>>legumes for competing with weeds



Unirrigated black mustard – closed canopy

Unirrigated yellow pea ~ mostly weeds

Unirrigated hairy vetch plot ~ mostly volunteer wheat

Winter Cover Crop Performance in the Sacramento Valley

Sarah Light and Amber Vinchesi-Vahl

University of California
Agriculture and Natural Resources | Cooperative Extension

Winter cover crop species were planted into dry soil (4 rows/60" bed) on 10/24/2019 in Meridian, CA and irrigated by rainfall. On 3/17/2020, the following data were collected from each plot: cover crop height at 3 points in the plot; percent cover (proportion of cover crops, weeds, and bare soil) in three 20x20 cm quadrats; and biomass in three 20x20 cm quadrats. Biomass in the sampling area (including cover crop and weeds) was analyzed for total carbon (C) and nitrogen (N). All data are calculated on a per acre basis.

Percent Cover Key (averages of three quadrats): Gray=Cover Crop. Orange=Weeds. Blue=Bare Soil

Grasses: Merced Ryegrain

Pounds C: 4,715
Pounds N: 162

ge Height: 48 in

Grasses: OK Ryegrain

Pounds C: 2,411
Pounds N: 143

Average Height: 27 in

Grasses: UC 937 Barley

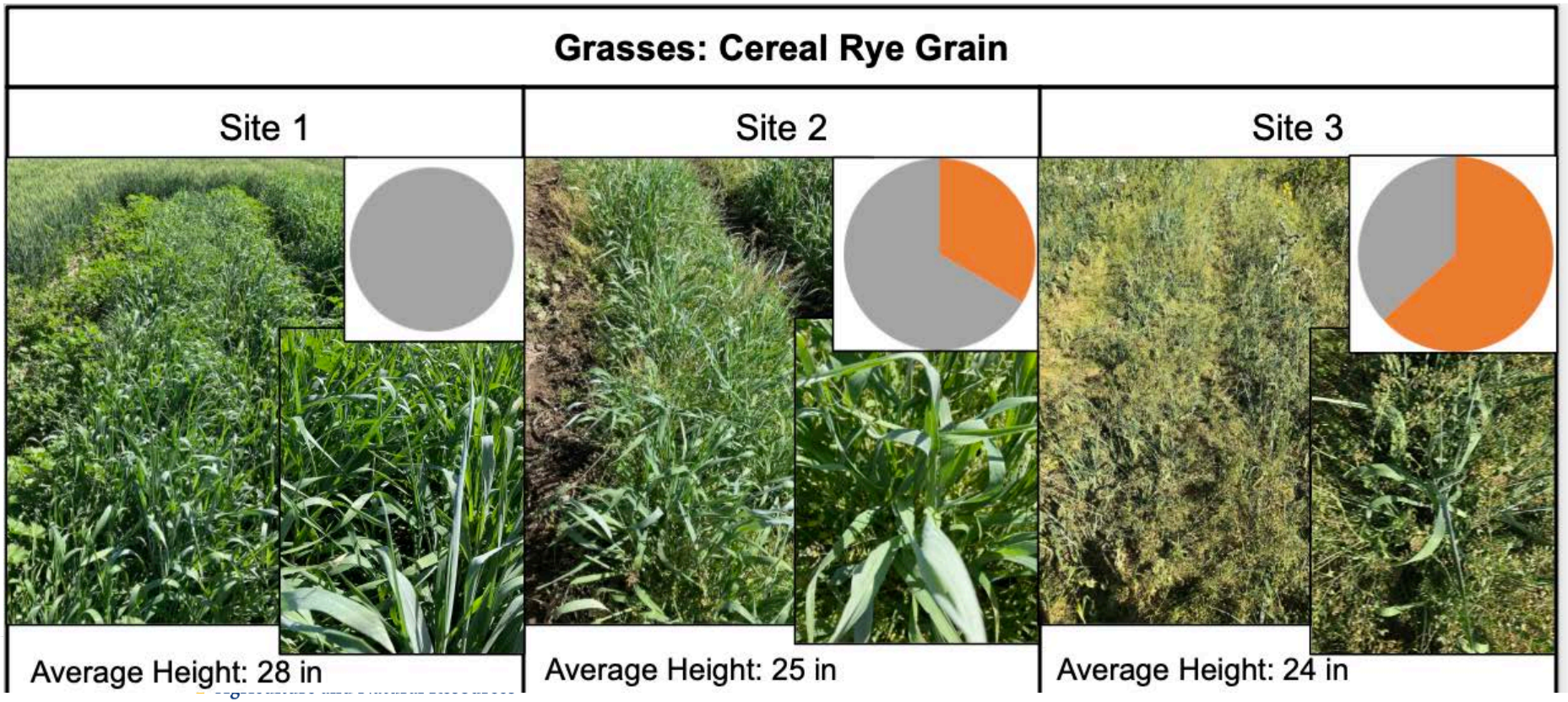
Pounds C: 2,407
Pounds N: 114

Grasses: 2700 Triticale

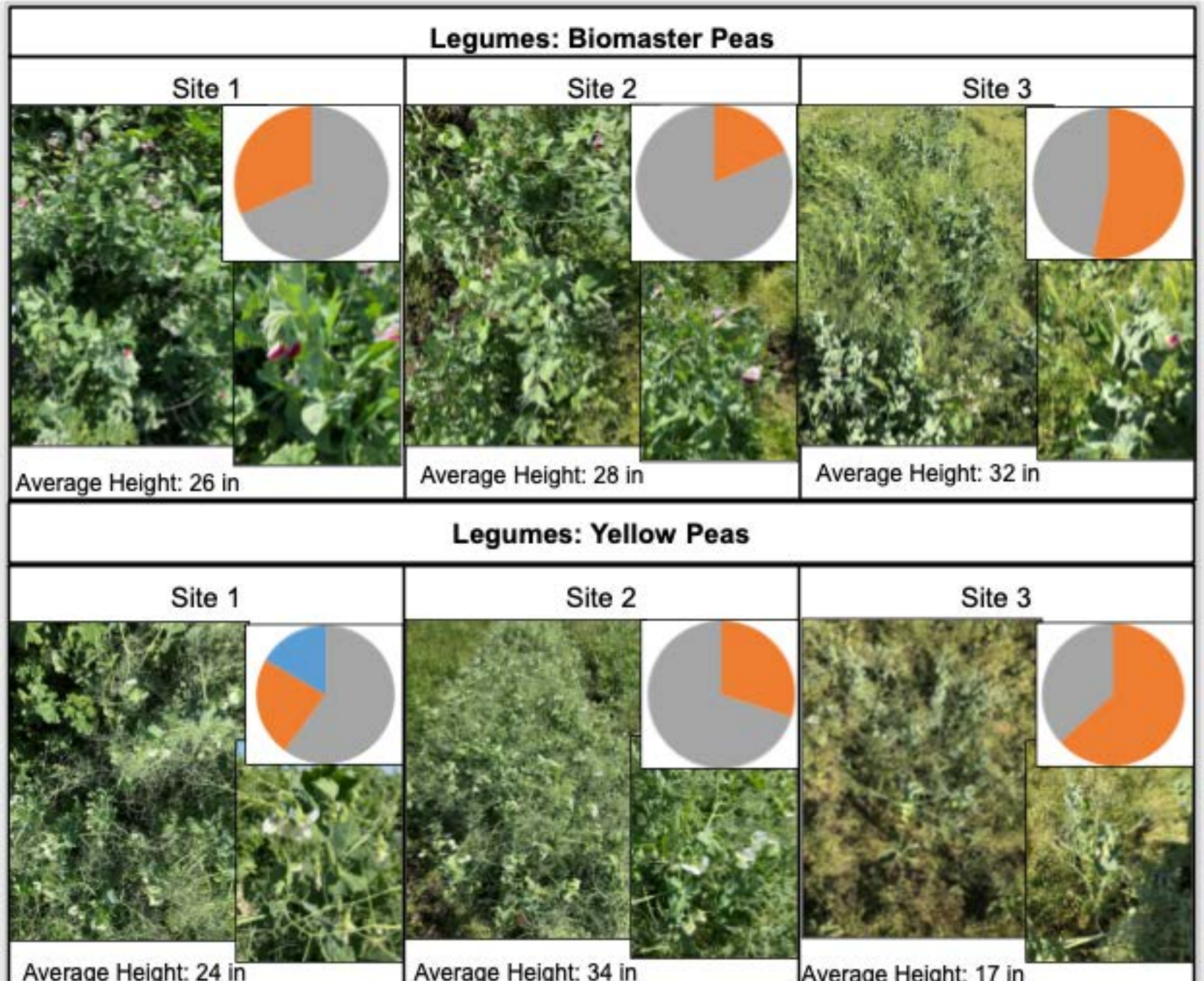
Pounds C: 2,970
Pounds N: 178

3 site comparison (2 irrigated, 1 not irrigated):

-Species with no stand in non-irrigated site: 5 clovers, hairy vetch and common vetch. If emerged, clover fills in later.
-Site 3 not irrigated. Grey=CC, orange=weeds, blue=bare soil



Site 3 not irrigated. Grey=CC, orange=weeds, blue=bare soil



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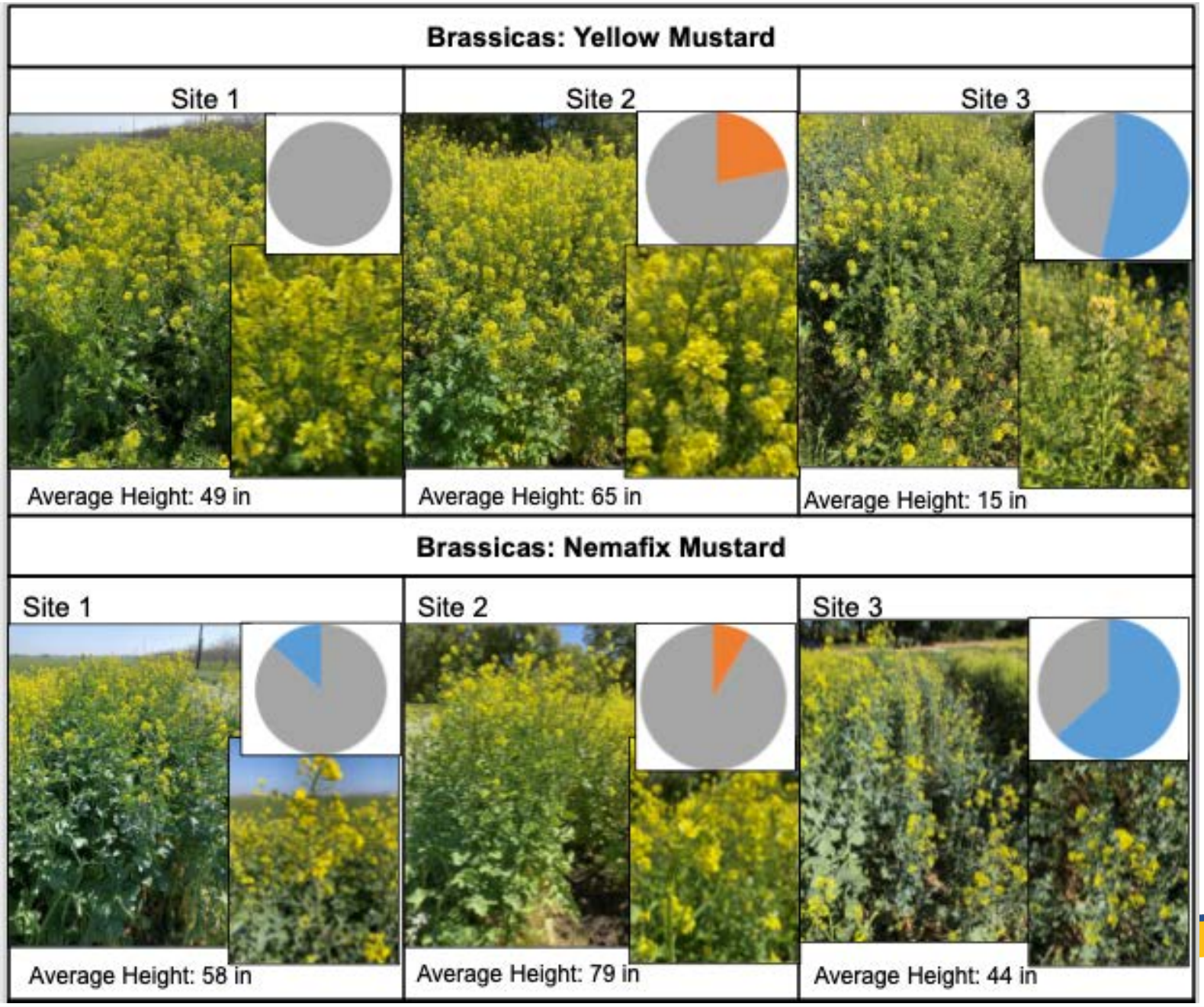


Considerations:

- Field history (weed pressure)
- Successful stand establishment
- Plant family or mix selection
- Avoid new weed seeds
- Experiment

Herbicide Resistant Annual Ryegrass

- Cover crops can suppress herbicide resistant winter weeds
- Up to 97% control
- Reduce weed seeds
- Most successful: cereal rye, black oat, feral radish, common vetch

Summer cover crops:

-water limited

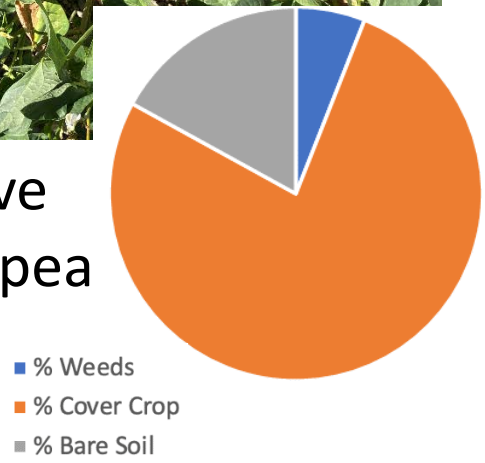
-opportunities exist

-terminated in fall

Summer Cover Crop Trial Summary

- Planted June 27th
- 7” total water applied for season (3.5” at planting).
- Water shut off on August 5th
- Data and photos from August 24th

Most competitive legume: Red Cowpea
Height: 25 in



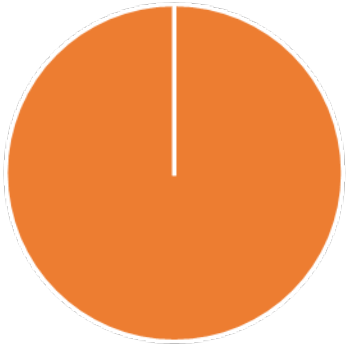
Grasses Were Most Effective at Suppressing Weeds

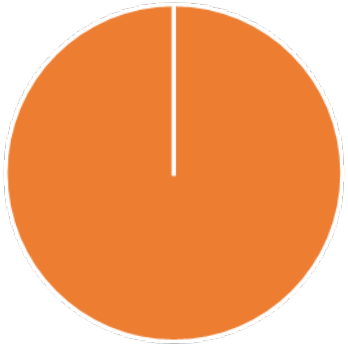
Piper Sudangrass

Height: 86 in

Sorghum x Sudangrass

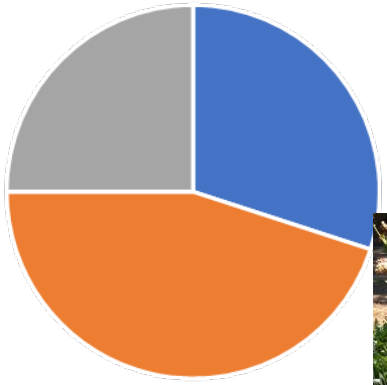
Height: 84 in





Also effective: Japanese Millet, Grain Sorghum, Teff Grass

Legumes and Forbes were not as competitive with weeds when planted alone



Buckwheat

Height: 44 in

Sunn Hemp

Height: 57in

Other poor suppression: safflower and lima bean.

Medium suppression: blackeye pea and garbanzo

Economics

New Cover Crop Cost Study:
https://coststudies.ucdavis.edu/en/current/

Weed suppression benefits may lead to savings to up to $65/acre including materials, fuel, and labor.

Thank you!

UCCE Colleagues

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Healthy Soils Program

CDFA OFFICE OF ENVIRONMENTAL FARMING & INNOVATION