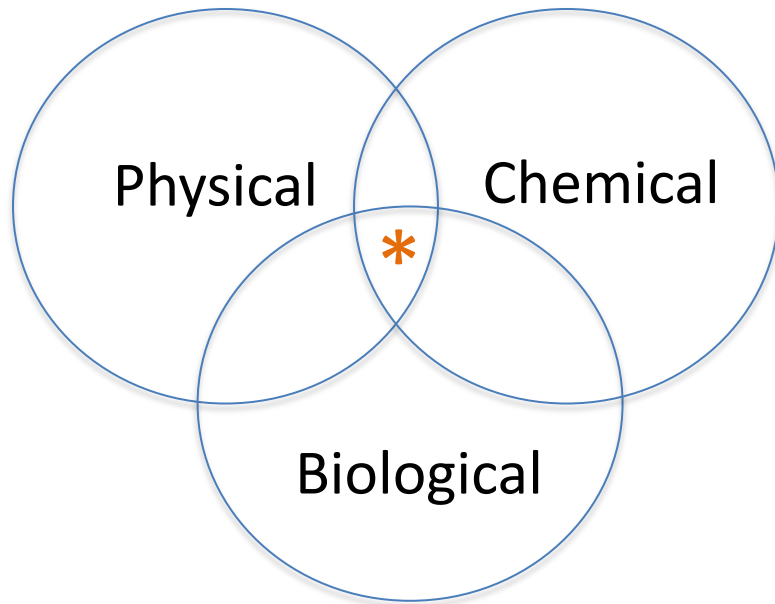


Cover Cropping and Weed Management: Considerations

Sarah Light

Agronomy Farm Advisor
UCCE Sutter-Yuba & Colusa
selight@ucanr.edu



Soil health is the continued capacity of soil to function 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.

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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

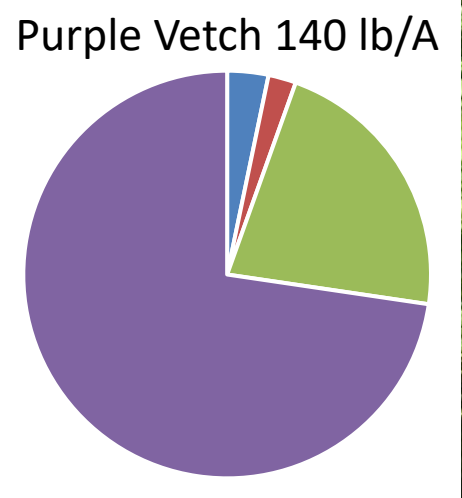
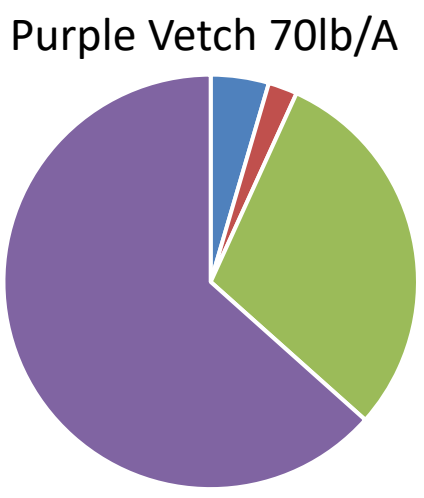
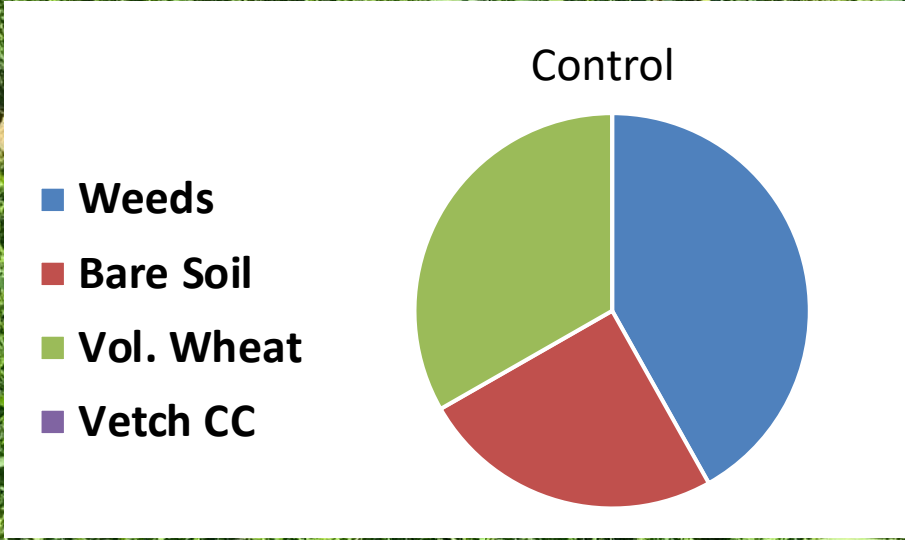
Right: planted 11/22/21



Cayuse Oats. Photos taken on 2/25/22

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

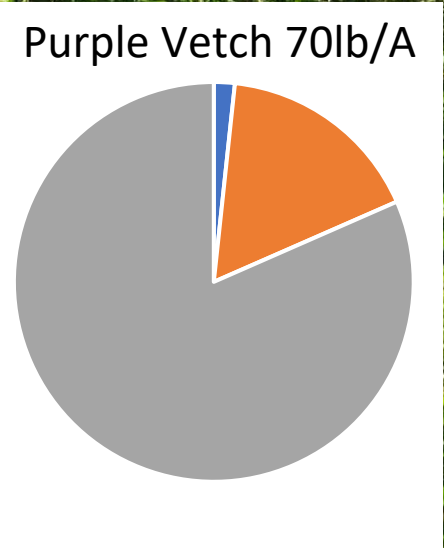
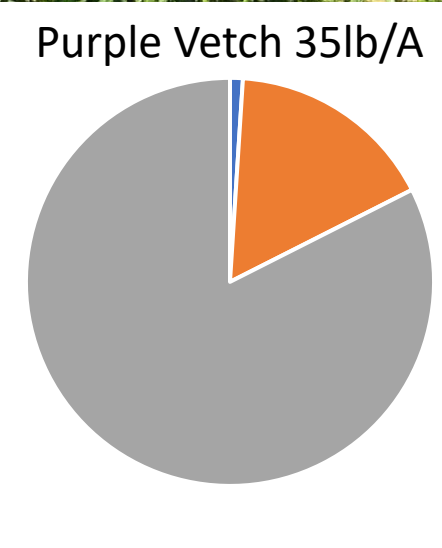
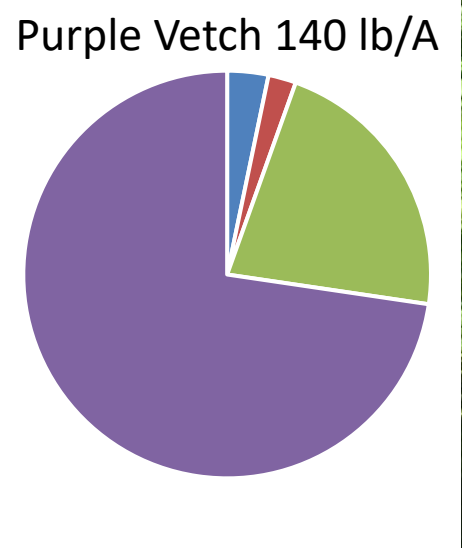
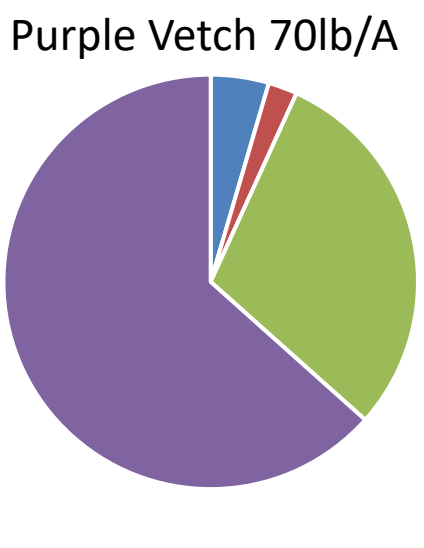
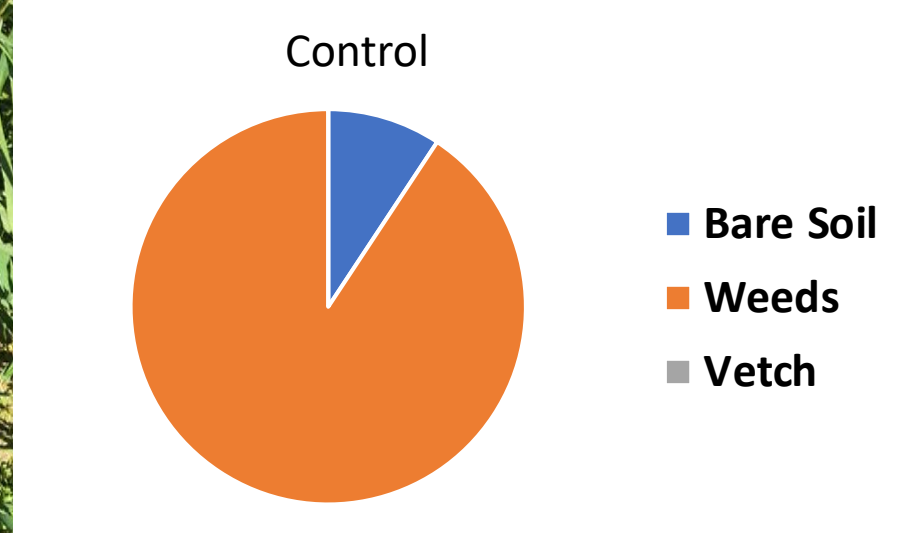
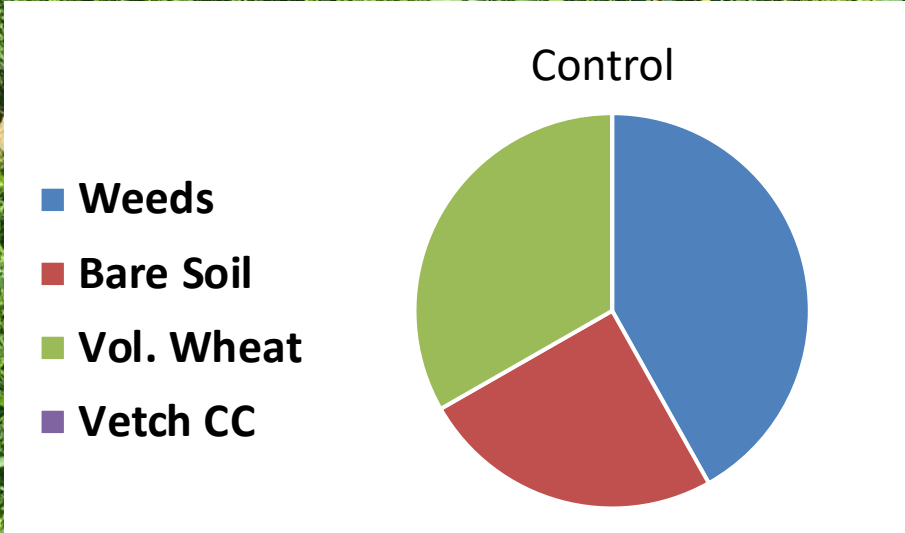
Nov-March rain 2018: 16"



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



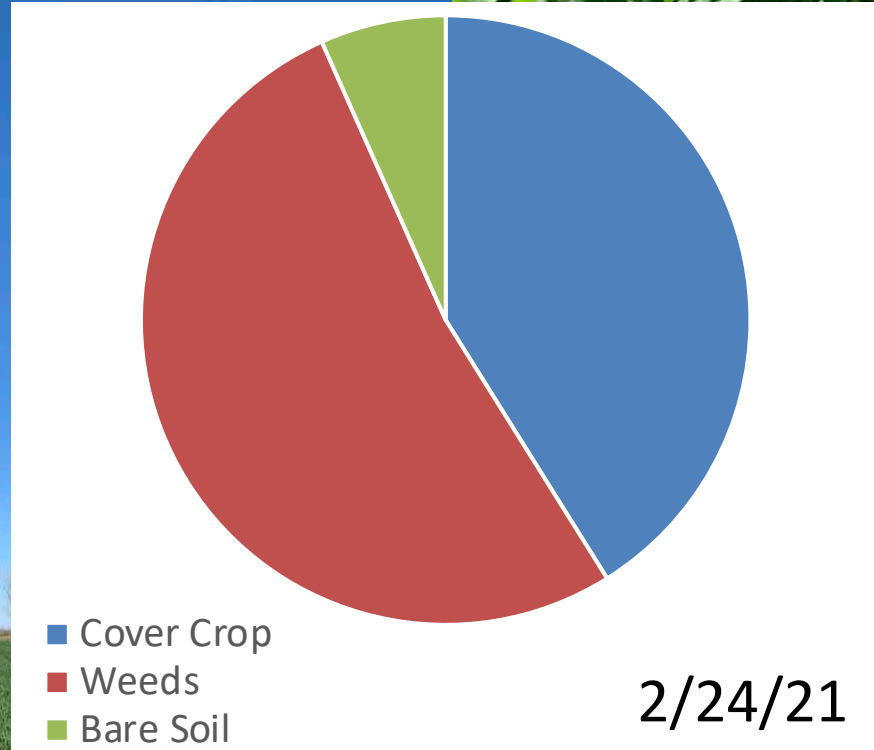


March 18th

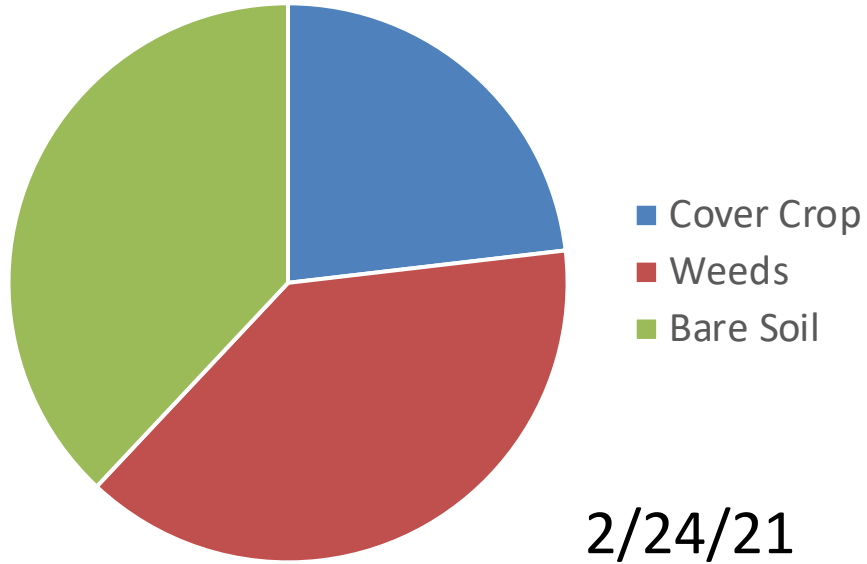


April 11th

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



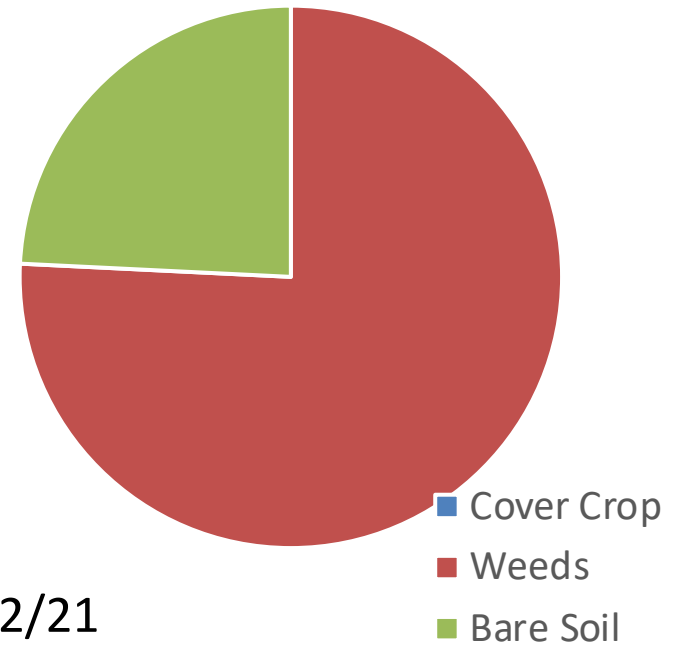
Purple Vetch and Cereal Rye (50 lb/a) combined also failed to suppress weeds in a very dry fall



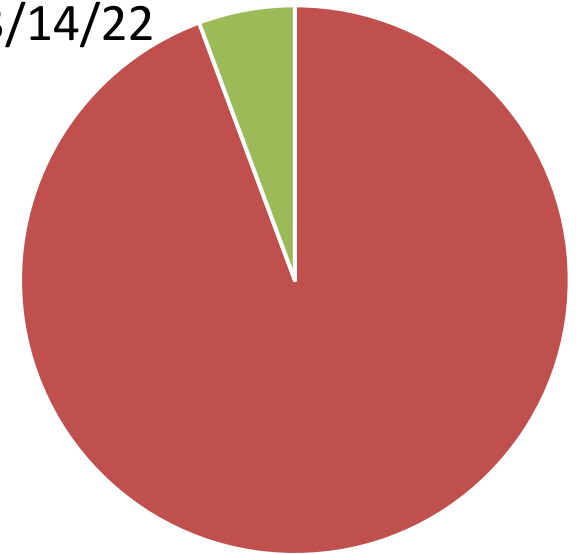
Control plots – no spray-many weeds!



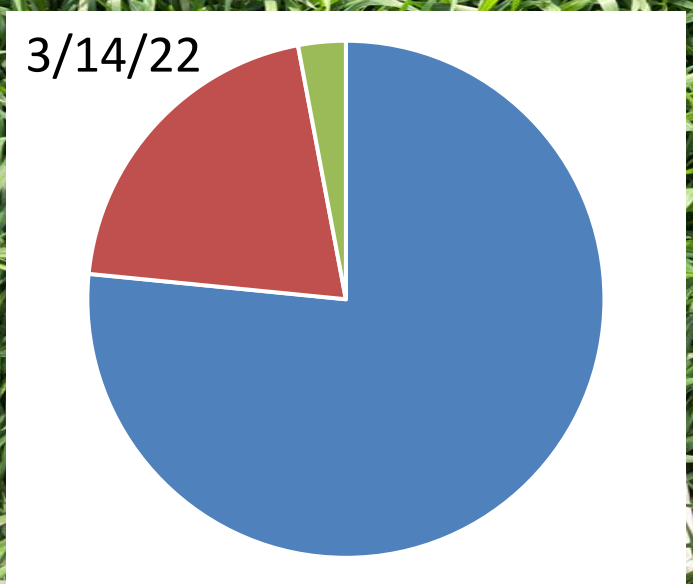
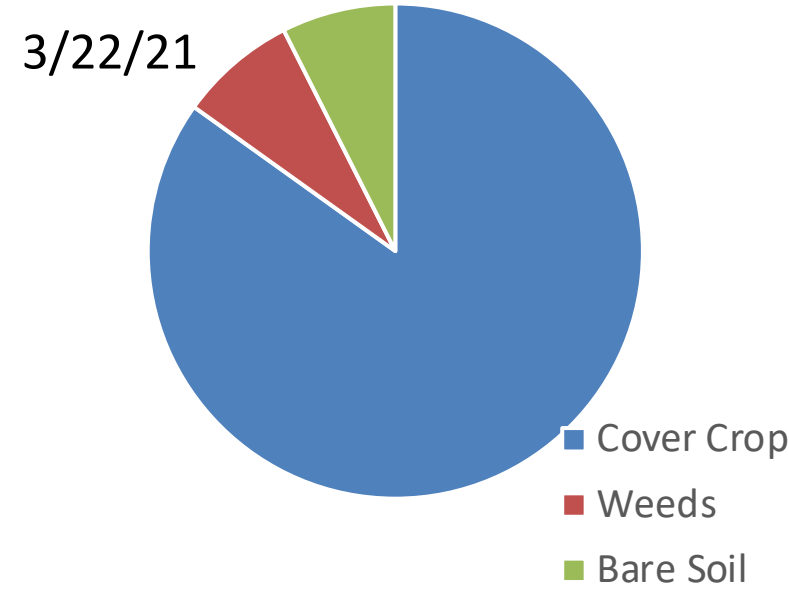
3/22/21



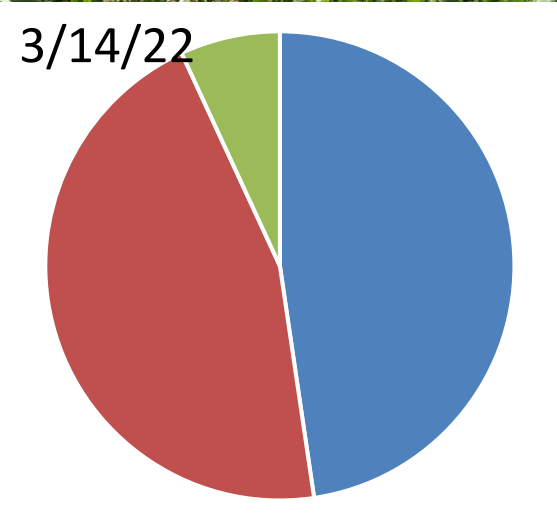
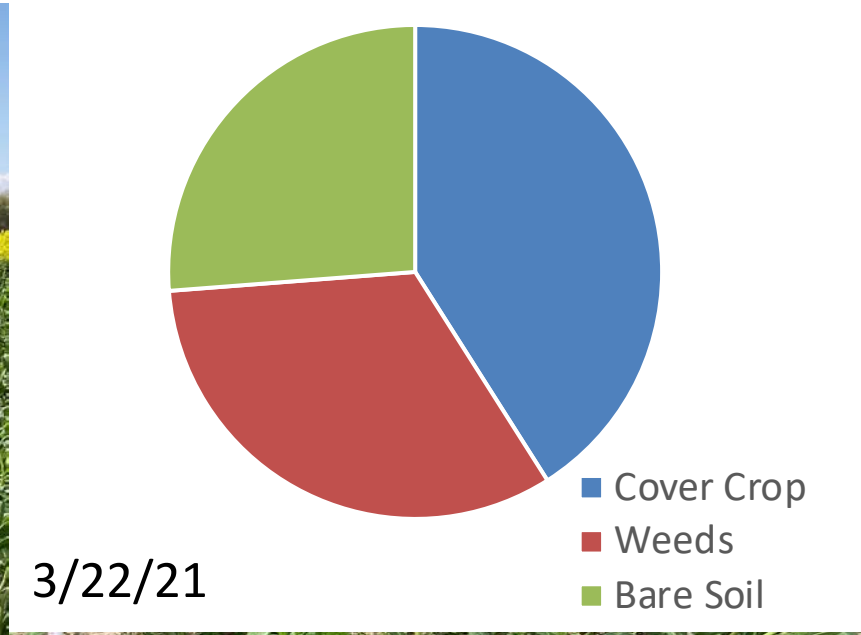
3/14/22



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.

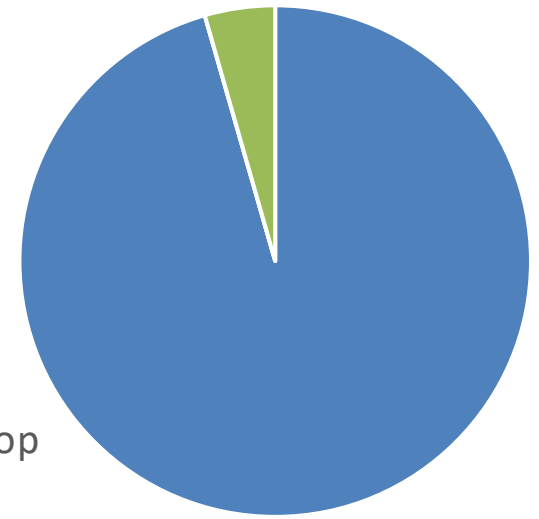


Safflower: 30 lb/A





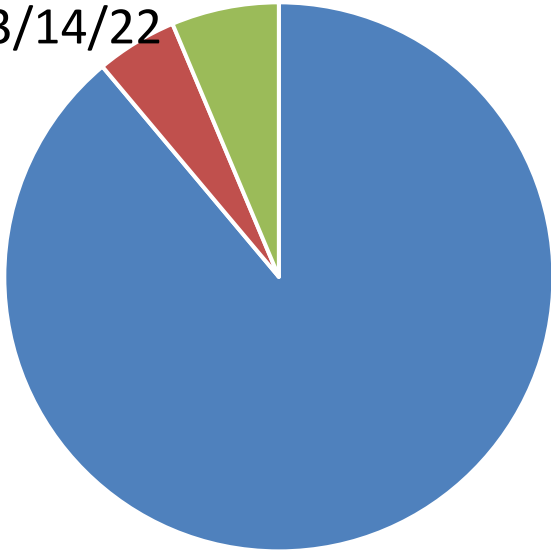
Margentina White Mustard: 10 lb/A is very competitive with weeds



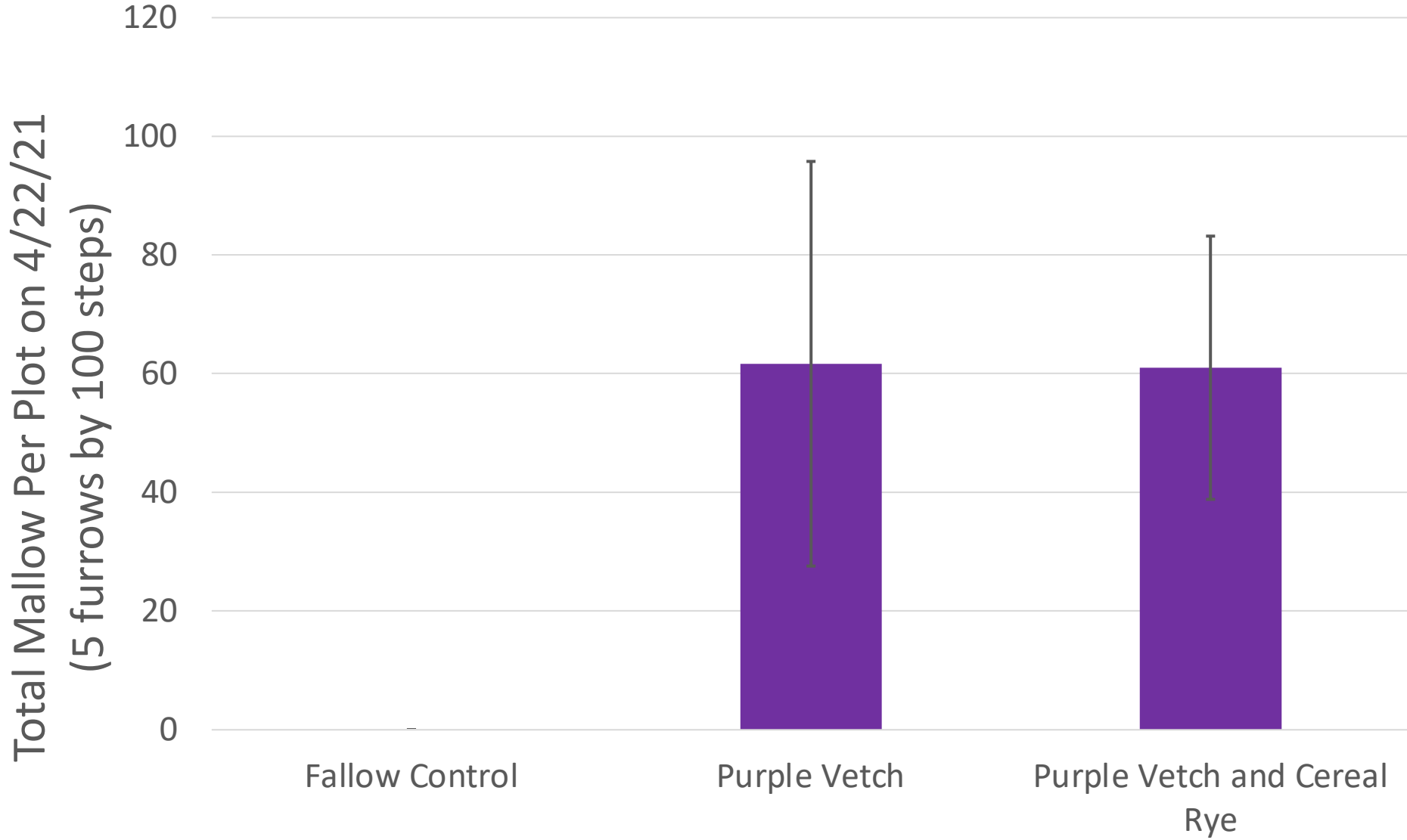
- Cover Crop
- Weeds
- Bare Soil

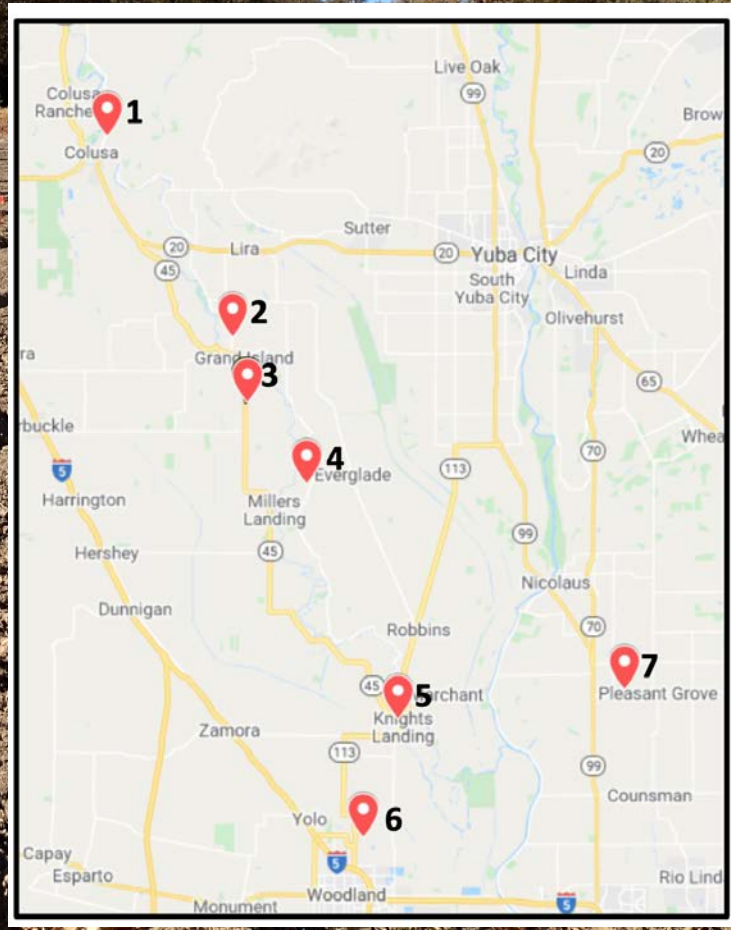
3/22/21

3/14/22



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



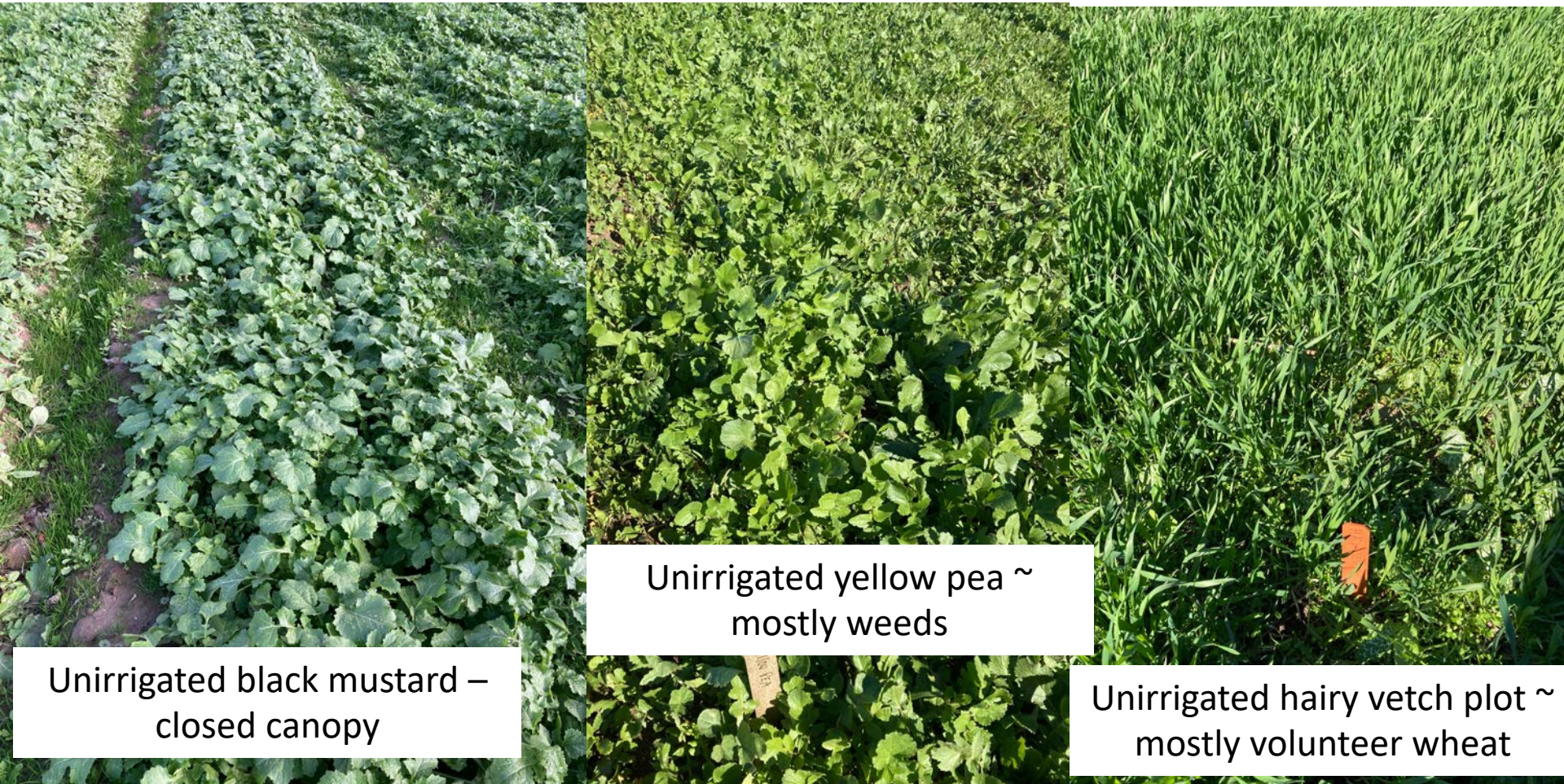


Midseason observations (mid to late February):

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



Average 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

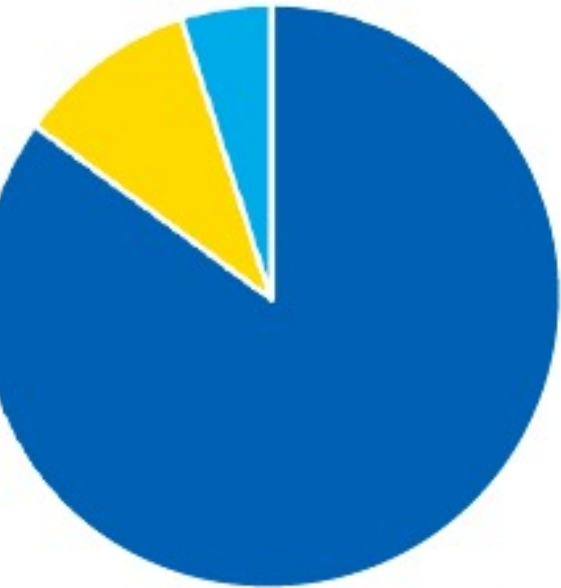




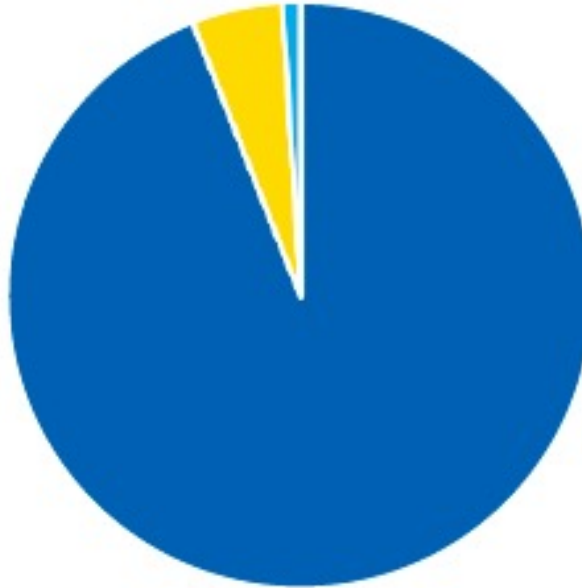


Planted 10/24/22

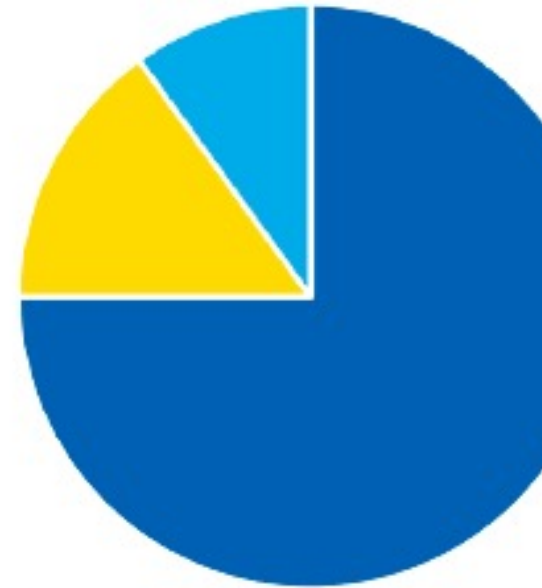
Purple Top Turnip
Height: 18 inches



Daikon Radish
Height: 27 inches



Black Mustard
Height: 20 inches



Cover Crop=dark blue, Percent Bare Soil=yellow, Percent Weeds=light blue



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





August 25th





September 16th





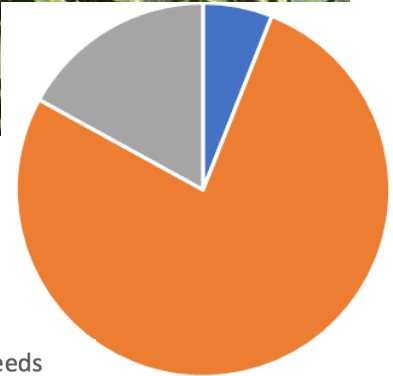
Septen

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



■ % Weeds
■ % Cover Crop
■ % Bare Soil

Grasses Were Most Effective at Suppressing Weeds

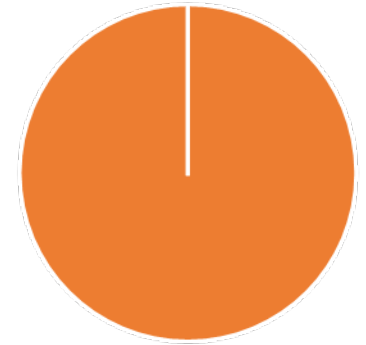
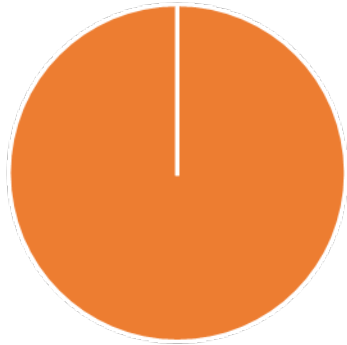
Piper Sudangrass

Height: 86 in



Sorghum x Sudangrass

Height: 84 in



- % Weeds
- % Cover Crop
- % Bare Soil

Also effective: Japanese Millet, Grain Sorghum, Teff Grass

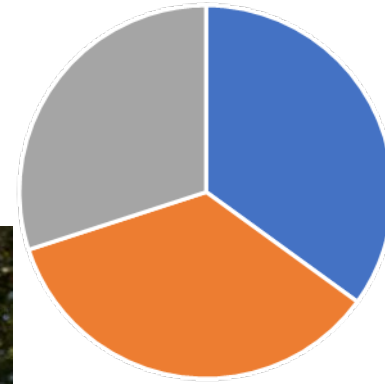


Legumes and Forbs were not as competitive with weeds when planted alone

Buckwheat
Height: 44 in



Sunn Hemp
Height: 57in



- % Weeds
- % Cover Crop
- % Bare Soil

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.

Total cost per acre: \$156



Thank you!
UCCE Colleagues
Colusa RCD
Richter Ag
Park Farming Organics
Erdman Farms
River Garden Farms
CDFA
Clair Akin

UCCE Sutter-Yuba Field Crops – Project Summaries



Healthy Soils Program

CDFA OFFICE OF ENVIRONMENTAL FARMING & INNOVATION