



Conservation Agriculture for Insect and Pathogen Management in Green Onion Agroecosystem



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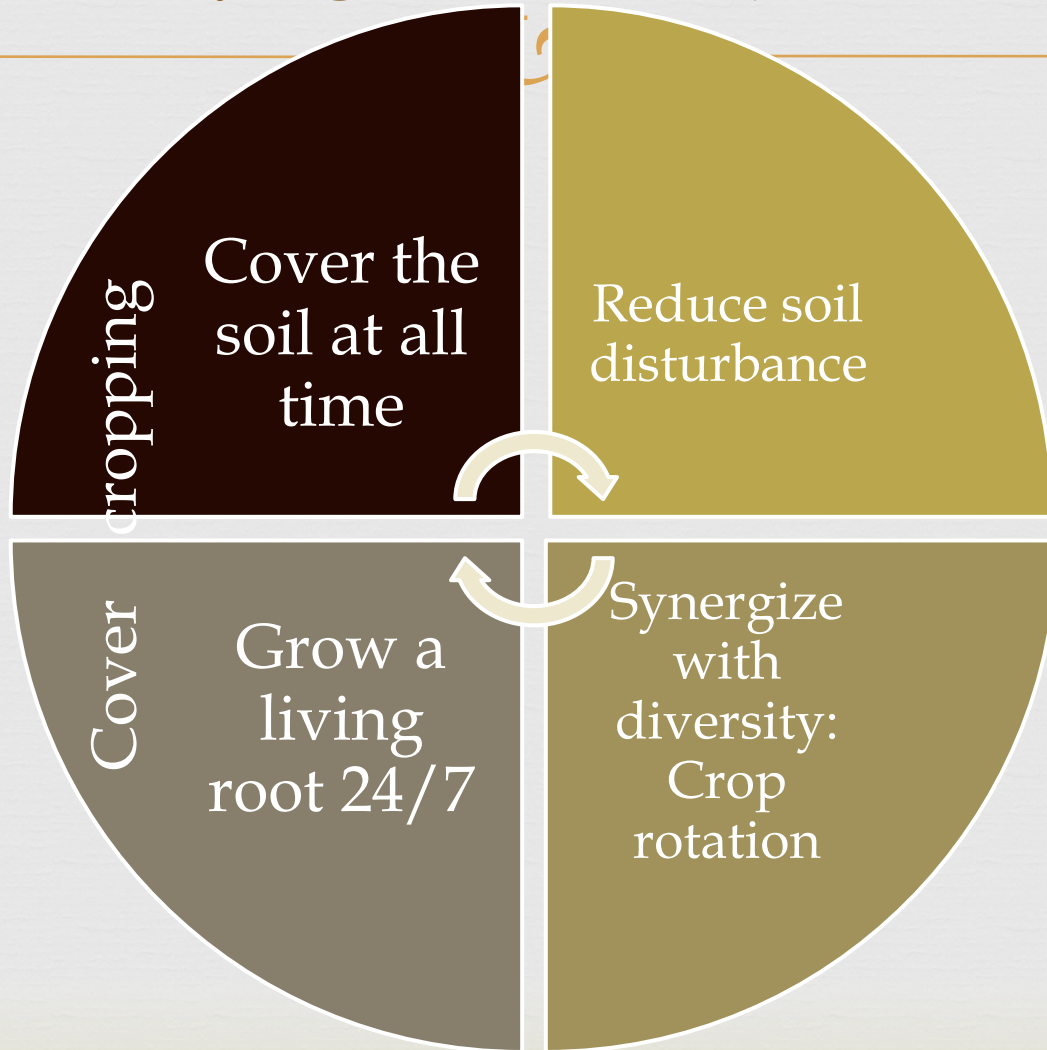


Conservation Agriculture is not only to protect soil health but also enhance natural suppression of agricultural pests



2015

International
Year of Soils



unlock the
SECRETS
IN THE
SOIL

Conservation Biological Control



☞ Stewardship of existing natural enemies populations; increase naturally existing biocontrol agents by providing good habitat.



Why a need for using non-chemical based IPM?



- ❧ Environmental hazard
(bees, aquatic invertebrates)
- ❧ Low biodiversity
- ❧ Pesticide treadmill
- ❧ NOP Sunset list



National Organic Program – Sunset list



Several organic insecticides such as sulfur, horticultural oil, insecticidal soap, and even insect pheromone and sticky traps for insect management are on the National Organic Program (NOP) Sunset list due on 27 Jun, 2017.



(<http://www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELPRDC5096045>)

Natural Enemies Commonly Found in Agroecosystems

Wasps nesting
block attract
Keyhole wasp



Aphids parasitoids



Trichogramma wasp



Hoverfly eggs
among aphids



Hoverfly larvae
eating aphids

Insectary plants selection



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Author: Moore Number of views: 1010

Providing science-based information to serve Hawaii

Hānai 'Ai

The Food Provider

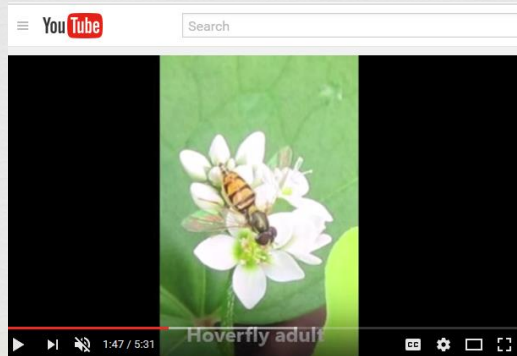


**Sustainable and Organic
Agriculture Program**

College of Tropical Agriculture and Human Resources

Insectary Videos

- Part I:
https://www.youtube.com/watch?v=BsN_3lC35wg&feature=youtu.be
- Part II:
<https://www.youtube.com/watch?v=1stOru5I-a0&feature=youtu.be>



Conservation Agriculture on Green Onion



(2013-2014)



Cowpea & buckwheat
border

SH mulch



Sunn hemp (SH) for 9 weeks,
no till with flail mower





Solarization (Sol), SH+Sol

SH grown for 7 wks, soil tilled +
Solarization for 1 month, planted with
insectary borders



Till & Solarized for 11
weeks (1 μm thick, UV
protected clear plastic)



Green onion
planted into cut
solarization
mulch



Bare Ground + Organic Insecticides



Tilled prior to planting +
Organic sprays for thrips:

- ☞ Entrust (spinosad)
- ☞ Pyganic (pyrethrum)
- ☞ Trilogy (neem)



Target Pests



Thrips



Thrips and leaf miners

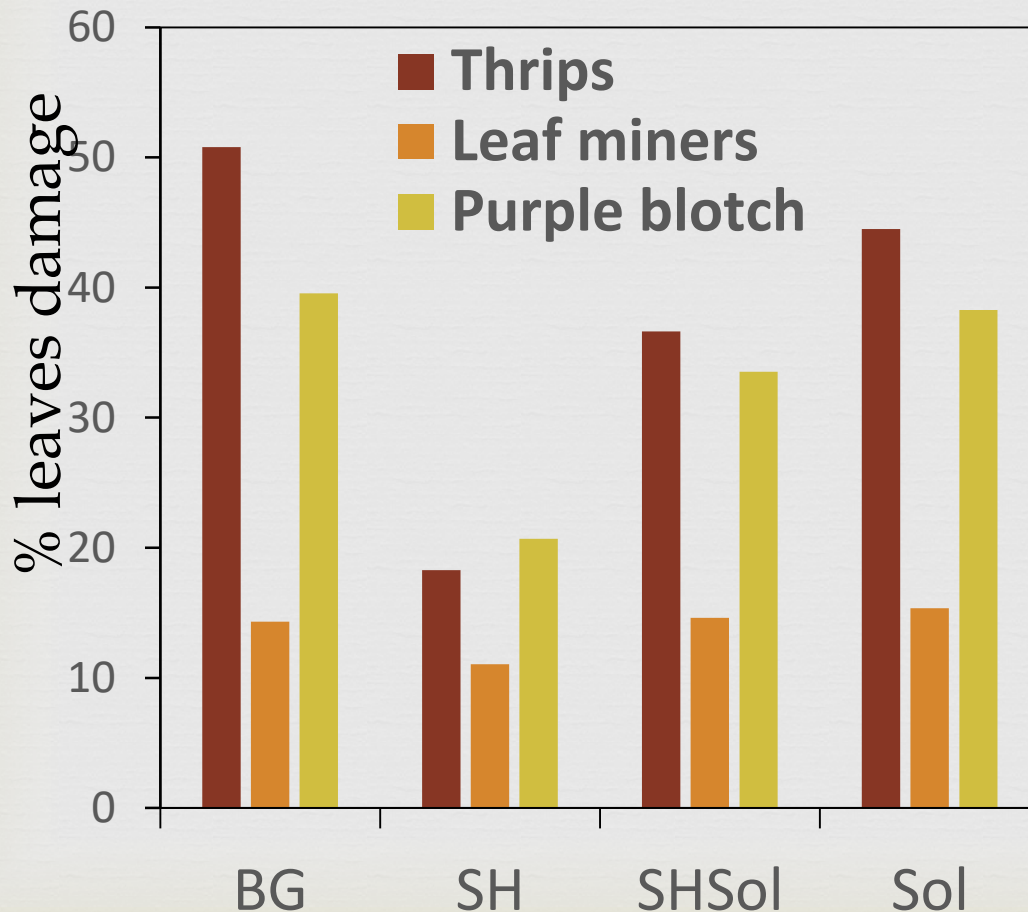


Purple blotch

SH with no-till practice suppressed all the three target pests most efficiently



2014



Thrips damage

Contrast	F value
SH vs no SH	31.8**
Sol vs no Sol	2.8
Till vs no-till	38.5**

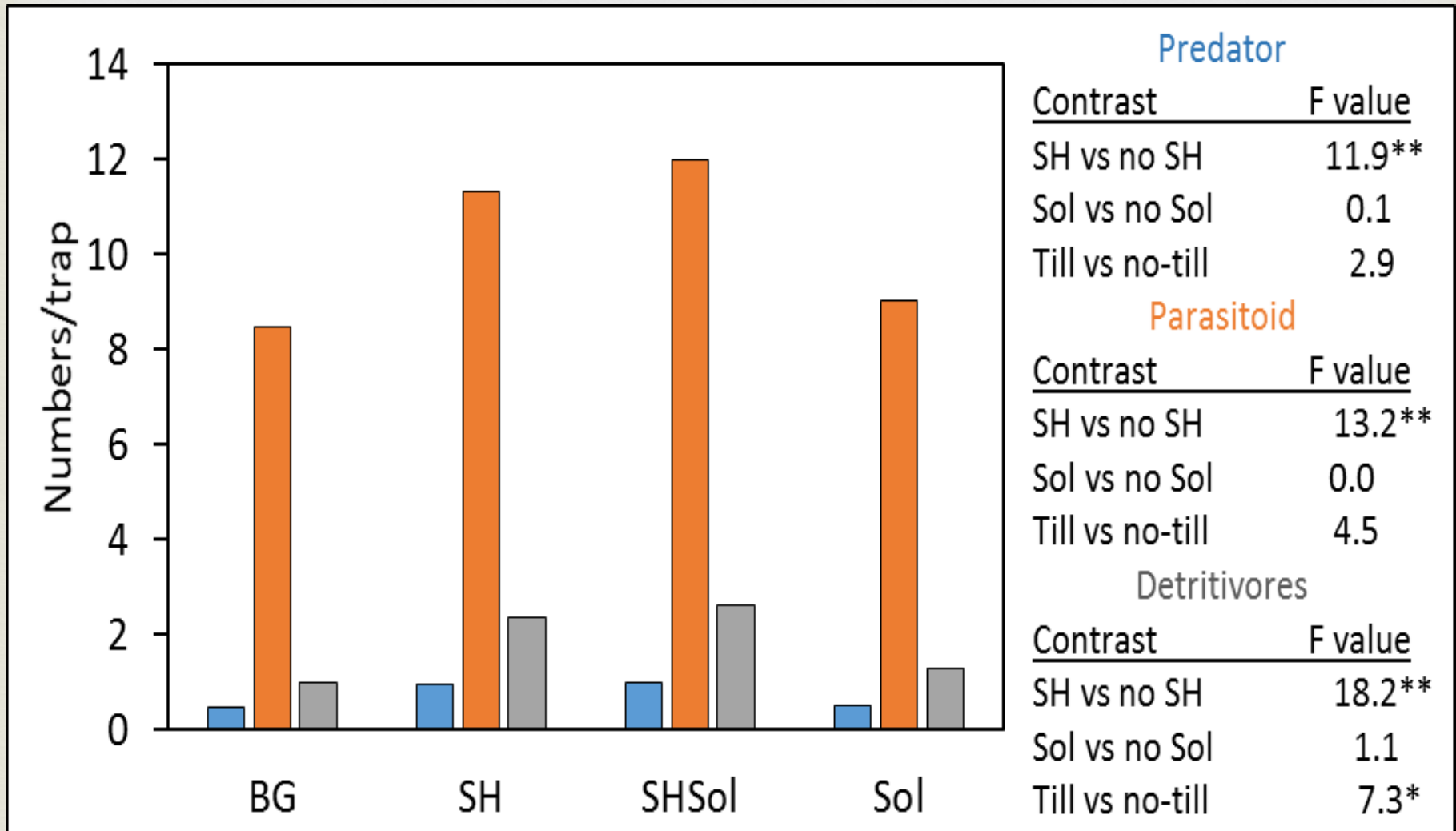
Leaf miners damage

Contrast	F value
SH vs no SH	2.7
Sol vs no Sol	3.4
Till vs no-till	6.2 *

Purple blotch

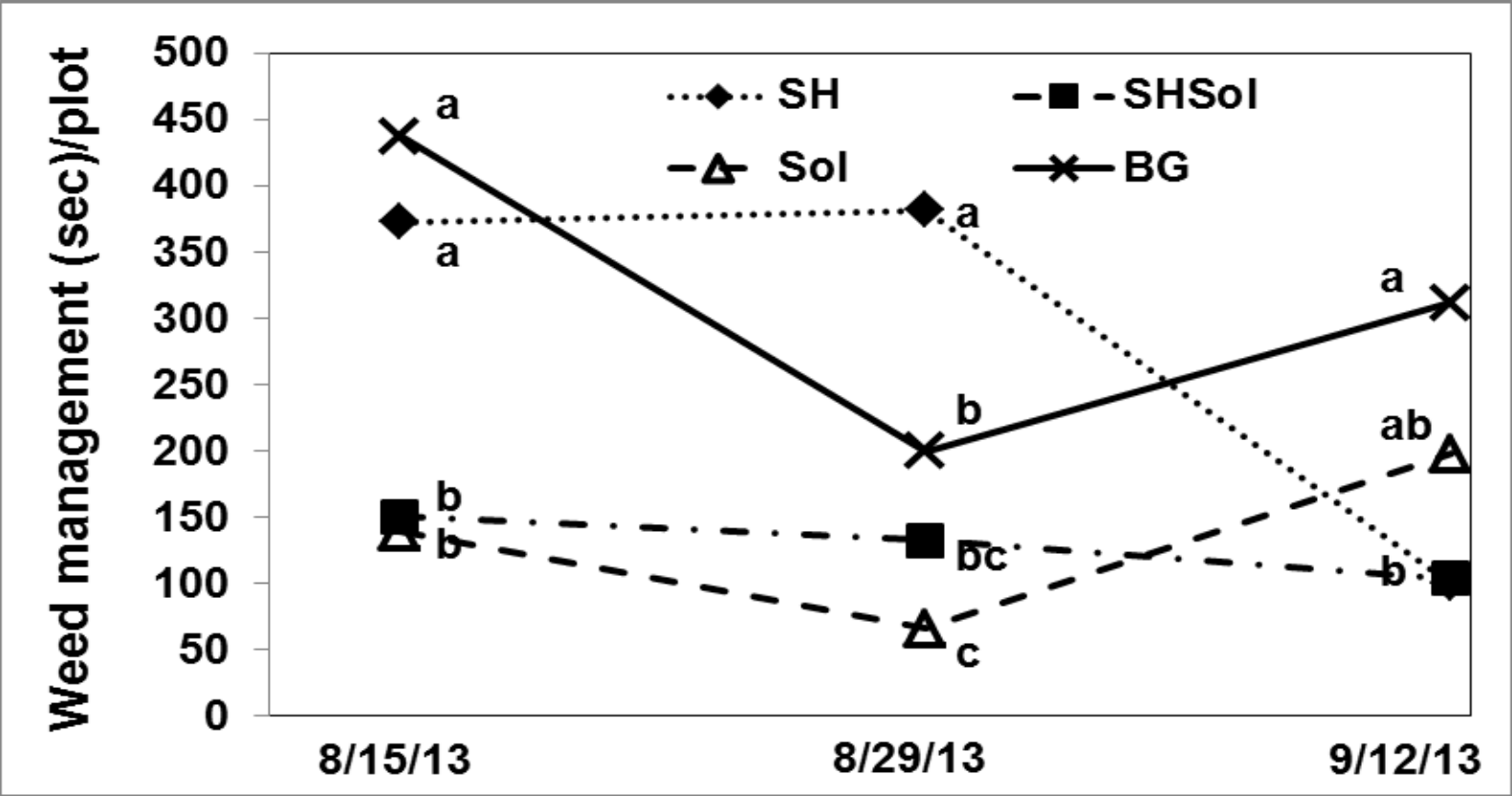
Contrast	F value
SH vs no SH	6.5*
Sol vs no Sol	1.6
Till vs no-till	9.4 *

SH with insectary borders (SH, SHSol) increased beneficial arthropods



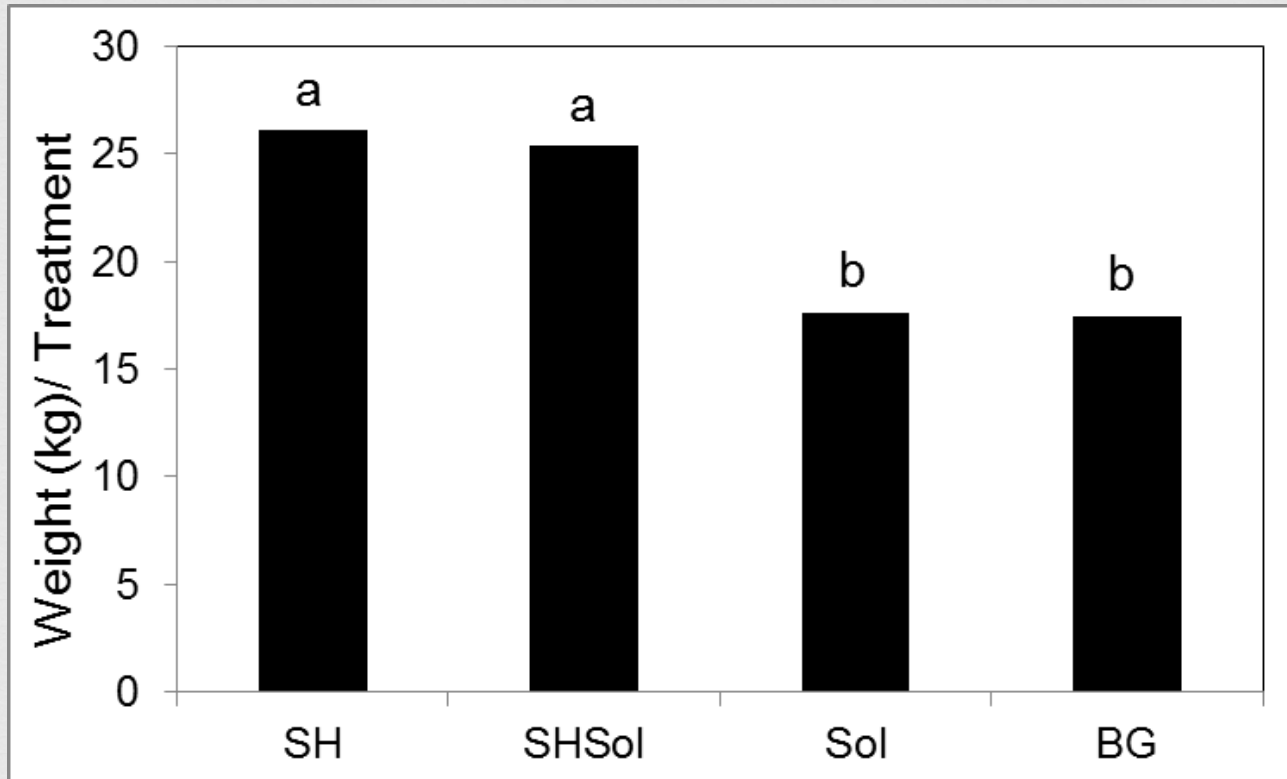


Weed Densities



Solarization (Sol or SHSol) suppressed weeds most efficiently.

Onion yield was heighest in both SH treatments



Sunn hemp cover crop increased onion yield.

Summary



- ☞ Conservation agriculture practices e.g. planting of SH followed by no-till practice to generate surface organic mulch, provided a favorable habitat for different natural enemies against thrips, leaf miners, and purple blotch.
- ☞ Soil solarization suppressed weeds most efficiently but it suppressed beneficial soil organisms which lead to more severe pest damages on green onion.
- ☞ None-the-less, green onion responded to the green manure effects of growing SH significantly.

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