

Lola's Organic Farm

Southern Sustainable Agriculture Research and Education

Producer Grant

Annual Report 2015

Funded Producer Grant Project:

Mechanical and biological strategies to remove invasive, common Bermuda grass in preparation for organic vegetable production on raised beds

Southern Sustainable Agriculture Research and Education Producer Grant Program (SSARE)

Mechanical and biological strategies to
remove invasive common bermuda grass in
preparation for organic vegetable production
on raised beds

Two year project
April 2013- April 2015
\$9560

About the farm

- **We are small farmers,**
- **Certified USDA Organic,**
- **Grow delicious vegetables, fruits, and nuts,**
- **Crops grown in combination with a no-till, drill conservation practice using organic legumes and oats, etc.**
- **Extending the life of the family farm, profits, beneficial farm management, etc.**

- **Lola's Organic Farm is located in Glenwood, GA - middle Georgia, near Vidalia and Alamo.**
- **We are beginning farmers, in our 5th year farming using organic methods.**
- **We are the first USDA certified organic farm in Wheeler County.**

About the farm

- Years ago, Lola farmed this land as a sharecropper. She was a great small farmer with a second grade education.
- She produced all kinds of wonderful vegetables, peaches, pears, walnuts, pecans, and even turkeys, ducks, and a few dairy cows for her milk and butter.
- This is Lola's Organic Farm.

Statement of Problem

Identified our challenge/need:

- **We, like many other farmers, face serious challenges when trying to grow vegetables in soil infested with invasive weeds such as common bermuda grass.**
- **This challenge becomes more critical on organic farms, that have different tools in their organic toolkit than conventional farms.**

Generally, invasive weeds are managed by plowing and cultivation

- **Seasonal plowing, harrowing and cultivation fail to give adequate control.**
- **Excessive use of tillage can also burn up soil organic matter, degrade soil physical quality, increase erosion, and lower soil biological health.**

Building healthy soil

- **Because a healthy soil rich in organic matter provides the foundation for successful organic production,**
- **Organic producers need to develop practical, integrated strategies to manage stubborn weeds like bermuda grass while conserving and improving soil quality.**

We wanted to develop a project whose results would-

- Help all farmers in our area who were facing the challenge of controlling invasive weeds such as bermuda grass.
- The results would be important to organic farming systems and conventional farms.



We put together a Team of Project Cooperators

- Ron Gilmore, Organic Farmer
- Jerald Larson, Retired CEA with Fort Valley State University,
- Dr. Mark Schonbeck, Consultant, member Virginia Association for Biological Farming,
- Donn Cooper, Farmer Services/Georgia Organics,

Project Cooperators continued

- Dr. Carroll Johnson, USDA ARS, Tifton, GA.
- Ray Hicks, Screvan County UGA Extension Agent,
- Dan Moore, Farmer neighbor/Field Management,
- Jennifer Taylor, Administrator/farmer

Project Overview

- The project involves a field study of two non-chemical strategies for managing heavy common bermuda grass infestation to prepare for organic vegetable production.
 - A mechanized cultivation and hand tillage strategy and
 - Biological control strategy using correctly planted and managed cover crops to suppress and control the growth of common bermuda grass.

Mechanical Response

- Dr. Carroll Johnson and Dr. J.W. Davis conducted trials at Tifton, GA in 2008-2010 on a plowed, common bermuda hayfield.
- They used monthly summer and winter passes with a modified, two row, six foot wide, Kelly peanut digger.

- Each operation was followed by hand raking for weed residue removal. They obtained an 82% reduction in weed biomass (Carroll.Johnson@ars.usda.gov). This paper formed the foundation for our mechanical control strategy.
- After extensive searching we failed to locate a comparable machine for our trial. We began by using a 7 sweep, 2 row, crop cultivator, before locating a 9 shovel field cultivator. Significant loosening and lifting of grass residues were accomplished, followed by hand raking.

Biological Response

- Studies have shown that vigorous weeds can be suppressed by using integrated, intensive cover crop management strategies.
- Dr. Mark Schonbeck's work and research with cover crops provided us with the foundation for our biological control strategy.
(Mark@abundantdawn.org)

- Buckwheat was grown late April to early June, then harrowed under, and followed by a millet/cowpea mix until late October.
- All three cover crops were carefully managed to give optimum benefits for shade competition and allelopathic substances to control common bermuda grass and other weeds.

Plot size/history

- 1/10 acre, divided into two 1/20 acre subplots.
- Each subplot measures 32'x68' and contains twelve, 100 sq. ft. beds.
- Four years of poor crop response was due to bermuda grass pressure.

Subplot 1

Six months of cover crop management

- 4/23/2013 bottom plowed, harrowed, sowed to buckwheat, and watered for emergence.
- 6/4 buckwheat harrowed under, amendments applied, millet/cowpea sown.
- 9/1 millet/cowpea first mowing.



Subplot 1

Six months of cover crop management



Subplot 1

Using cover crops to suppress weeds



Subplot 1

10/20 Millet/cowpeas re-growth and second mowing.



10/24 Millet/cowpeas deep harrowed to incorporate.



Subplot 2

Eight soil cultivations over six months

- 4/23 Bottom plowed.
- Three, '2 row cultivator', tillages from 6/5 to 7/23.
- This equipment had four front, 6" sweeps and three rear, 12" sweeps, on a six foot frame.
- Each cultivation was followed by 8-10 hours of weed raking and removal.

Subplot 2

- The area was tilled 6-8” deep, in both north to south and east to west directions.
- Some hand raking helped prevent excessive clumping by weed residues.

Subplot 2



Subplot 2

Weed removal after each of the 8 cultivations utilized a 5 tine, 7" hand cultivator and a hand rake.



Major weeds encountered were common bermuda grass, crabgrass, and nutsedge





Subplot 2

- Five, 'field cultivator', tillages from August 27 to November 4. This equipment has 9 shovels, uniformly spaced 10" apart, on a 7' frame.
- It worked at an 8" depth and gave less weed clumping.
- The shovels measure 2 ½" wide. Tillage was done both north to south and east to west.



Kale and onion transplants grown from seed during
October and November 2013 for Subplots 1 and 2.

- Worm compost gave excellent results for germination.



Subplot, raised bed preparations

November-December 2013

Dan plowing to form beds



Each subplot was planted to 6 beds of kale and 6 beds of onions



**Kale planted at 66 plants/bed
(12 inches x 18 inches spacing)**



**Onions planted at 234/bed
(5 inches x 10 inches spacing)**



Comparative Measurements

- Measurements for the two weed management strategies
- Soil: pH, mineral analysis, organic matter, microbial activity.
- Dr. Mark Schonbeck provided soil recommendations.
- Weed counts & weights (June 2013 and 2014).
- Vegetable yields and quality (three seasons, includes kale & onions, red peppers & eggplants, and onions & broccoli).

Weed Measurements 2013

Soil with weeds removed



Weed Management 2014

Subplot 1



Subplot 2



Weed Management 2014

Subplot 2



Subplot 2: Eight inch depth



Weeds counted and weighed



Amendments

OMRI approved:

April 23, 2013

- High calcium lime

November/December 2013

- Worm compost
- Feather meal
- Potassium sulfate
- boron

What we learned 2014



What we learned:

- It is important to have cover crop borders.
- Make sure the producer is included in grant and not just recipient of grant.
- Before you write your proposal make good selection of key partners and identify local resources.

What we learned:

- Cover crop strategy seems to build healthy soil while suppressing weeds AND increase cash crop yields.
- Mechanical strategy seems to remove weeds but reduce soil health benefits AND decreases cash crop yields.

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SSARE Project-sharing our results

We participated and have provided the SSARE project results during organic and sustainable ag conferences, interview with NSAC- national impact, and with farmers and consumers:

- **(2014) Georgia Organics Conference, Jekyll Island, GA.**
- **(2014) SE GA Growing Local & Sustainable Conference
Tattnall County High School, Reidsville, Georgia**
- **We continually discuss project benefits with farmers and farming communities; during our learning FIELD DAYS:**
 - **Lola's Organic Farm hands-on Field Day (June 2014),**
 - **SSARE hands-on field day (June 2015), and etc.**
- **(2015) National Sustainable Agriculture Coalition (NSAC) blog interview**
http://sustainableagriculture.net/blog/sare_feature_2/
- **(2016) Lola's Organic Farm has been asked to participate and report project results/learning during the upcoming 2016 SSAWG Conference, Lexington, KY.**

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SSARE Organic Field Day

What the producers learned

As we examined the on-going SSARE project:

- We, small sustainable ag organic producers, learned that there may be a need to integrate both a strong/intensive biological method with light tillage and manual weeding for best effectiveness in controlling serious perennial invasive weeds/Bermuda grass weeds.
- Do not let the invasive weeds grow back. Each year the sustainable ag farmer needs to extend the cover cropping area around the cash crops to manage invasive weed growth successfully.
- Consider growing intensive cover crops as cash crops for the added benefit of also improving soil function and reducing weed pressure, etc.
- Examination of research and methods that assist sustainable conventional and organic farmers increase important farm resources- microbial activity & food web activity/soil life, healthy soil & crops, etc. while managing soil benefits and controlling invasive weed pressure.

Thank you SSARE
and the
Organic and Sustainable Agriculture
Farming Communities.

Lola's Organic Farm and our Cooperators

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