Effect of Mulches on the Establishment of Organically Grown Blueberries in Georgia, U.S.

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Note

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In Tribute to Dr. Tom Brightwell and Dr. Ruperto Hepp

Gentlemen and Scholars—Gone but Not Forgotten
Organic Produce in the U.S.

- Now about a 15 billion $US industry
- Growing about 7% per year
- Even regular groceries stores now offering organic produce.
Organic Blueberries in Georgia

- About 160 ha of organic transition or organic production.
- Farm gate prices are often 50% higher than conventional.
- Major marketers are involved in the Georgia organic deal.
Primary problems in Georgia organic blueberry production

- Insect control
- Disease control
- Weed control
- Our objective in this study was to study both the short term and long term effects of mulching
2002 Organic Blueberry Establishment Study at UGA Alapaha Station

- Brightwell cultivar
- Four feet apart with four reps. of five plants each
- Treatments
- Control (organic burn down herbicides or hand hoeing)
- Pine straw-10 cm after settling
- Pine bark-10 cm
- Plastic woven ground cover—locally made, low cost $0.39 per meter
Limited hand labor was used
Weed control program

• Extensive use of organic burn down compounds in years 1-4 (some have come and gone)
• Mostly hand weeding in years 5-7
• Typically 3-4 times per year
Fertilizers used

- Organic cotton seed meal-N
- Blood meal-N
- Bone meal-P
- Mined potassium sulfate-K plus S
- Perdue chicken litter-NPK
- Nature Safe 8-5-5---NPK
- Mined potassium sulfate-K plus S
- Champion copper-Cu
Set July 2002: 2004 yield-kg / bush

- Control: 0.37 c
- Ground cover: 0.75 b
- Pine straw: 0.97 a
- Pine bark: 0.63 b

- Less apparent nitrogen tie up occurred with pine straw
- Extrapolate pine straw yield was 1744 kg / ha.
Organic Plots after 36 Months
Summer 2005

Pinestraw

Control

Ground cover
2005 Yield-machine harvested kg per plant

- Control 0.66 c
- Ground cover 1.03 b
- Pine straw 1.38 a
- Pine bark 1.38 a
- Extrapolated pine straw and pine bark yield was 2579 kg / ha
2006 appearance

- Pine bark and pine straw mulched plant were thriving
- Ground cover mulched plants were doing fairly well.
- Hand hoeing requirements on the control were considerable.
2006 Yields
Machine harvested- kg per plant
Fourth leaf

- Control: 1.98 c
- Ground cover: 3.01 bc
- Pine straw: 4.01 ab
- Pine bark: 4.14 a
- Pine bark yield was 6065 kg /ha
2007
Fifth Leaf Yield Data
kg per plant

• Control 2.40 b
• Ground cover 3.36 a
• Pine straw 3.81 a
• Pine bark 4.07 a
• Freeze reduce yield
• Extrapolated machine harvested pine bark yield per acre at 1.2 m in row spacing was 7566 kg / ha.
Organic 'Brightwell' Blueberry plant growth

Age (months)
Plant growth index (cm³)

- Control
- Pine bark
- Pine straw
- Ground cover
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<th>Yield (kg/plant)</th>
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**Organic 'Brightwell' blueberry yield**

- Control
- Pine bark
- Pine straw
- Ground cover
Mulch longevity after seven years

- Pine bark - two applications
- Pine straw - four applications
- Ground cover - intact, but no longer providing good weed control
Hand weed control maintenance
Mean time per weeding per ha

- Control- 44 hours
- Ground cover-14
- Pine straw- 6.7
- Pine bark-12.4
- Increase in Bermuda grass has been dramatic in recent years.
Effect on soil pH

• Starting pH was about 4.8, but drip irrigation water pH was about 7.8

• Soil pH after six years
  • Control: 5.6
  • Ground cover: 5.4
  • Pine straw: 4.5
  • Pine bark: 4.1
Summary

Mulch is your first line of defense

- Pine bark and pine straw performed better than ground cover and control (bare ground)
- Expect weed competition to change
- Try to keep perennial weeds out
Some other Organic Research Projects in Georgia

Cooperative projects with Georgia Organics, Univ. of Chillan, Univ. of Florida and Univ. of Arkansas
Organic Fungicides for Leaf Spot Control

- Omega Grow and Neptune’s Harvest fish extracts have been effective for reducing Septoria leaf spot
Blueberry leaf beetle control

- Black plastic has a higher level of blueberry leaf beetle feeding than white on black plastic (Scott NeSmith’s discovery)
- Entrust and DE have worked well.
2007 Expanded Mulching Study

- Seven mulches under trial
- Wheat straw, pine bark, pine straw, plastic ground cover and white on black plastic produced the largest plants in year one.
- Peanut shells produced a good growth rate and are “free”
Shoulder management experiment

• Hill side cultivator used to till sides of the bed.
• Cost is about $US 2600
• Only a small strip then has to be hand weeded.
Fertility Studies

- Organic phosphorus test on virgin soil
- Organic nitrogen test on young and old plants
- 90 pounds per acre of organic nitrogen is giving a good response on mature rabbiteye blueberries
Organic High Tunnel Research

- Provides about 2 degree F of frost protection without heat.
- Worked well for freeze protection with minimal heat (23 degrees F)
- Early-mid Feb. covering advanced ripening by about 1 week.
Growers’ Systems

Solid ground cover with injected fish products or hybrid system with combination of dry and liquid fertilizers
White on Black Plastic

• Mulch life is about three years under Georgia conditions
• Combination of dry organic fertilizer and fish products injected.
Wheat Straw

Cost effective if you grow your own or can obtain from a local farmer.

A 15 cm layer only lasts two years.
Modified Silage Wagon Results
Georgia Organic Blueberry Research and Extension is Expanding

• Special thanks to:
  • UGA and Ft. Valley State County Agents
  • Georgia Organics and Ms. Relinda Walker
  • Organic Growers in Georgia
  • USDA, UFL, Univ. of Chillan, and Univ. of Ark.
Questions?