

# Effects of plastic and hay mulches on soil temperature and moisture in organic heirloom tomato pron

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# Introduction - Mulch

## Why mulch?

- Weed management
- Moisture retention
- Soil temperature modification
- Add organic matter

## What mulch?

- Inorganic
  - gravel, stone, black plastic, landscape fabric
- Organic
  - wood chips, shredded bark, chopped leaves, straw, grass clippings, compost, sawdust, pine needles, paper

# Organic Mulch

- 4"-6" to completely discourage weeds
- Mulch next to stems invites slugs, rodents
- Slows warming in spring
- Adds organic matter

# Plastic Mulch

- Warms soil, radiates heat at night
- Protects fruit from rotting
- Conserves moisture
- Non-renewable, non-biodegradable
- Organic standards require complete removal each year

# Heirloom Tomatoes

- Passed down in a family / region through several generations
- Open pollinated
- Often associated with small family farms
- Often have distinctive flavor / appearance
- Strong demand at regional farmers' markets



# Tomato Production

- Tomatoes commonly grown with black plastic mulch
- Non-renewable resource, no organic matter addition
- Allowed on organic farms, but many organic farms seek an alternative

# Objectives

1. Compare organic and inorganic mulches suitable for use in heirloom tomato production on organic farms in Kentucky
2. Compare popular heirloom tomato varieties with potential for organic production in Kentucky

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- Eighteen raised beds, 6' x 36'
  - Five mulch treatments in four replicate blocks:
    - Bare control
    - Black Plastic
    - Silver Plastic
    - Black Landscape Fabric (2 reps only)
    - Hay

# Varieties tested

- Six heirloom varieties randomly assigned to six 6' sub-plots in each bed
  - Green Zebra
  - Pruden's Purple
  - Red Pear
  - Rose de Berne
  - Yellow Pear
  - Yellow Perfection
- Transplanted at 6 weeks on June 22, 2011
- Plants spaced 18" apart

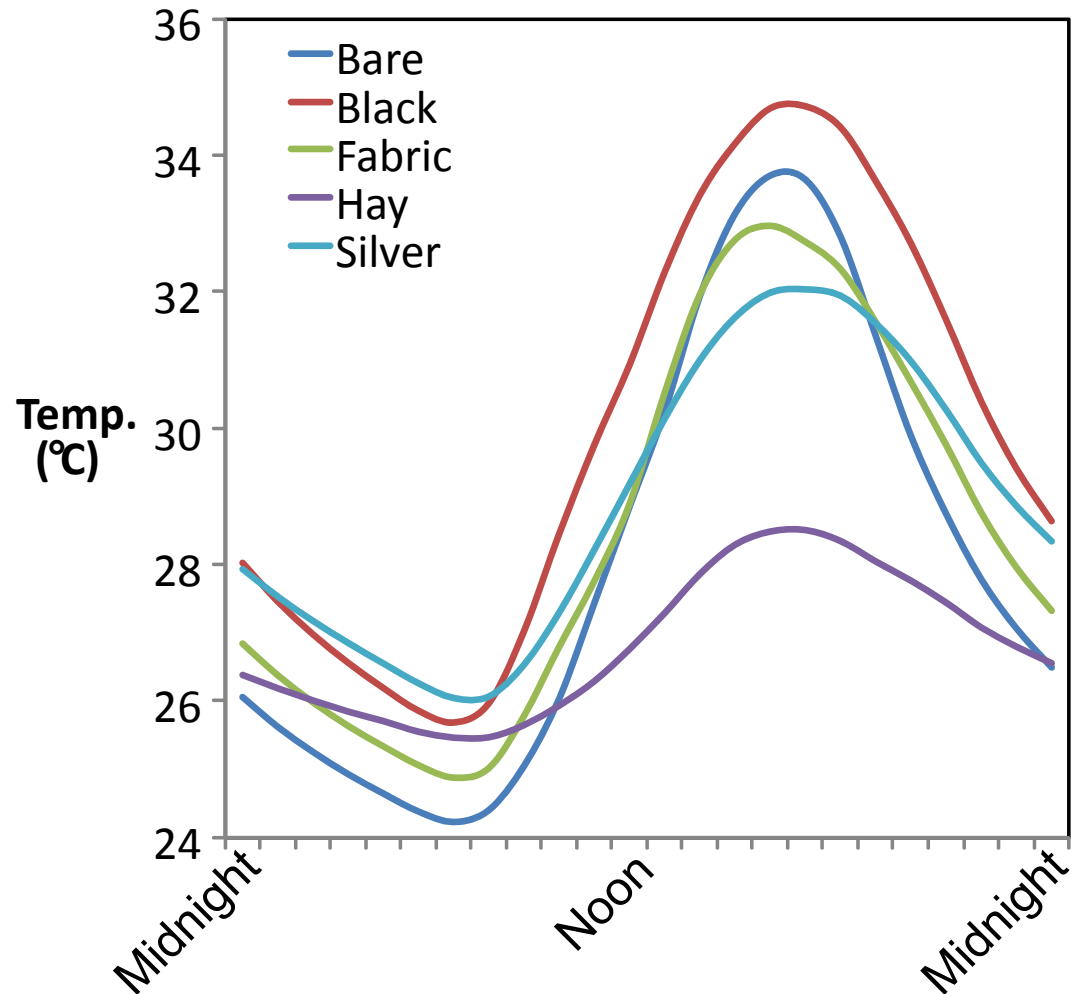
# Monitoring

- Soil moisture
  - June 22 – Sept. 29
  - Field Scout TDR-300
- Soil temperature
  - June 30 – Aug. 10
  - Temp. recorded hourly 2 cm below soil surface
  - Probes attached to CR-1000 datalogger
- Yield
  - All fruit harvested Sept. 16 and Sept. 29
  - Counted, graded & weighed



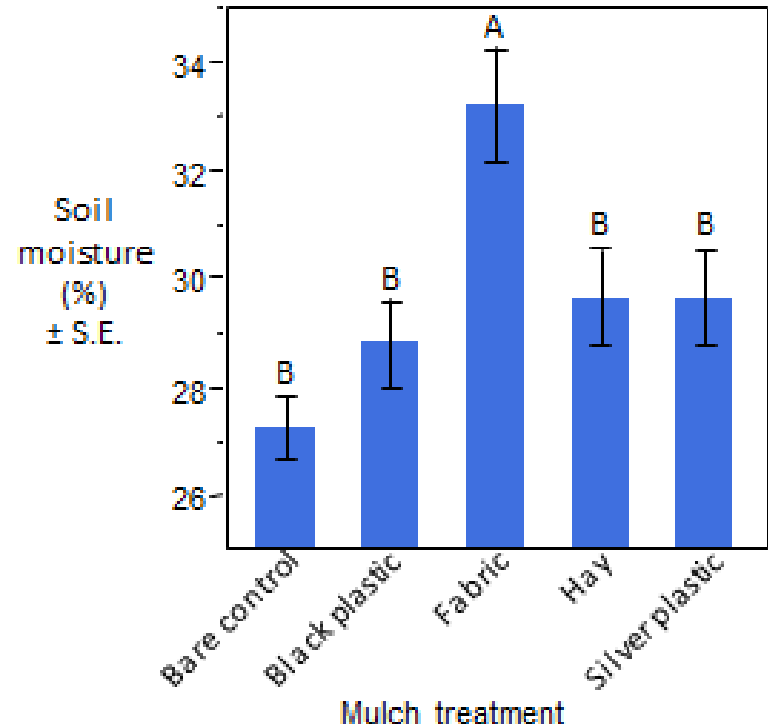
# Results – Soil Temperature

- Temperature lowest at sunrise; highest mid-afternoon
- Hay moderates daily temperature flux
- Black plastic maintains warmer temperature throughout day



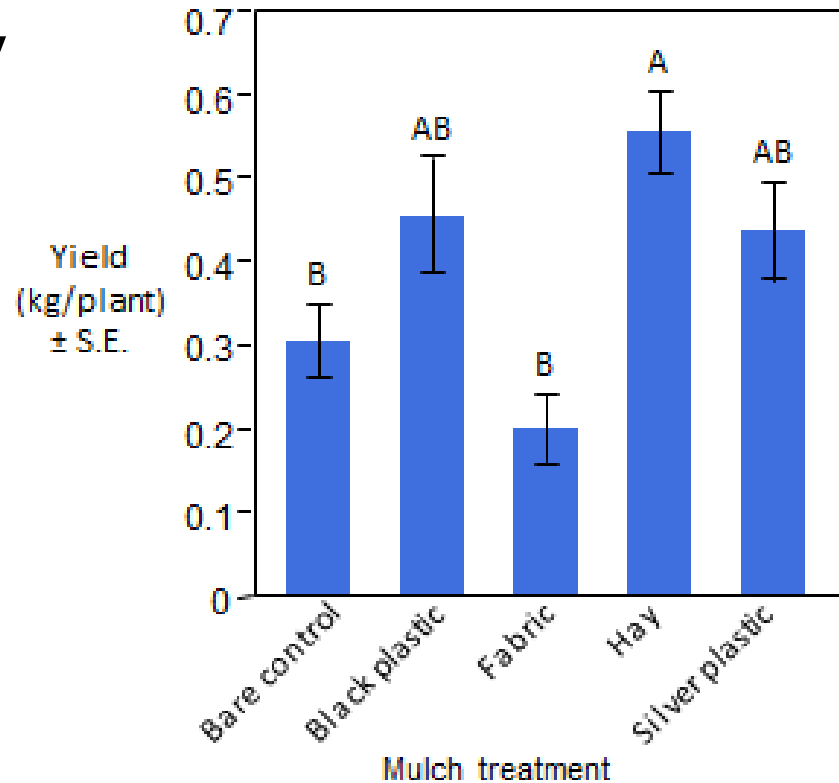
# Results – Soil Moisture

- Higher soil moisture under landscape fabric than other mulches



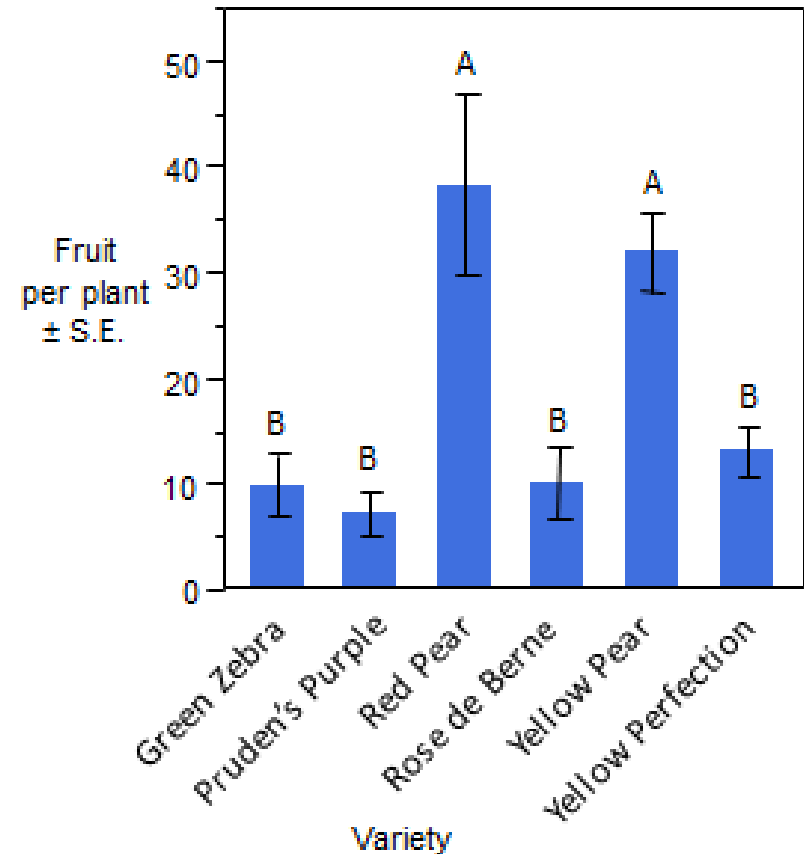
# Results - Yield

- Yields higher with hay mulch than with no mulch or landscape fabric



# Results – Yield by Variety

- More tomatoes from pear varieties
- No significant effect of variety on total harvest weight



# Conclusions

- Advantages of hay:
  - Moderates soil temperature
  - Maintains soil moisture as well as plastic, but not as well as landscape fabric
  - Contributes organic matter to soil
  - Improves yield of summer-grown heirloom tomatoes



Questions?

