

# Applying non-fumigant combinations to a buffer zone

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# *Macrophomina phaseolina*





# *Fusarium oxysporum*



# NON-FUMIGANT COMBINATIONS

- Mustard + Solar
- Mustard + Steam
- Steam + Solar



# Mustard seed meal 2,000 lbs /a





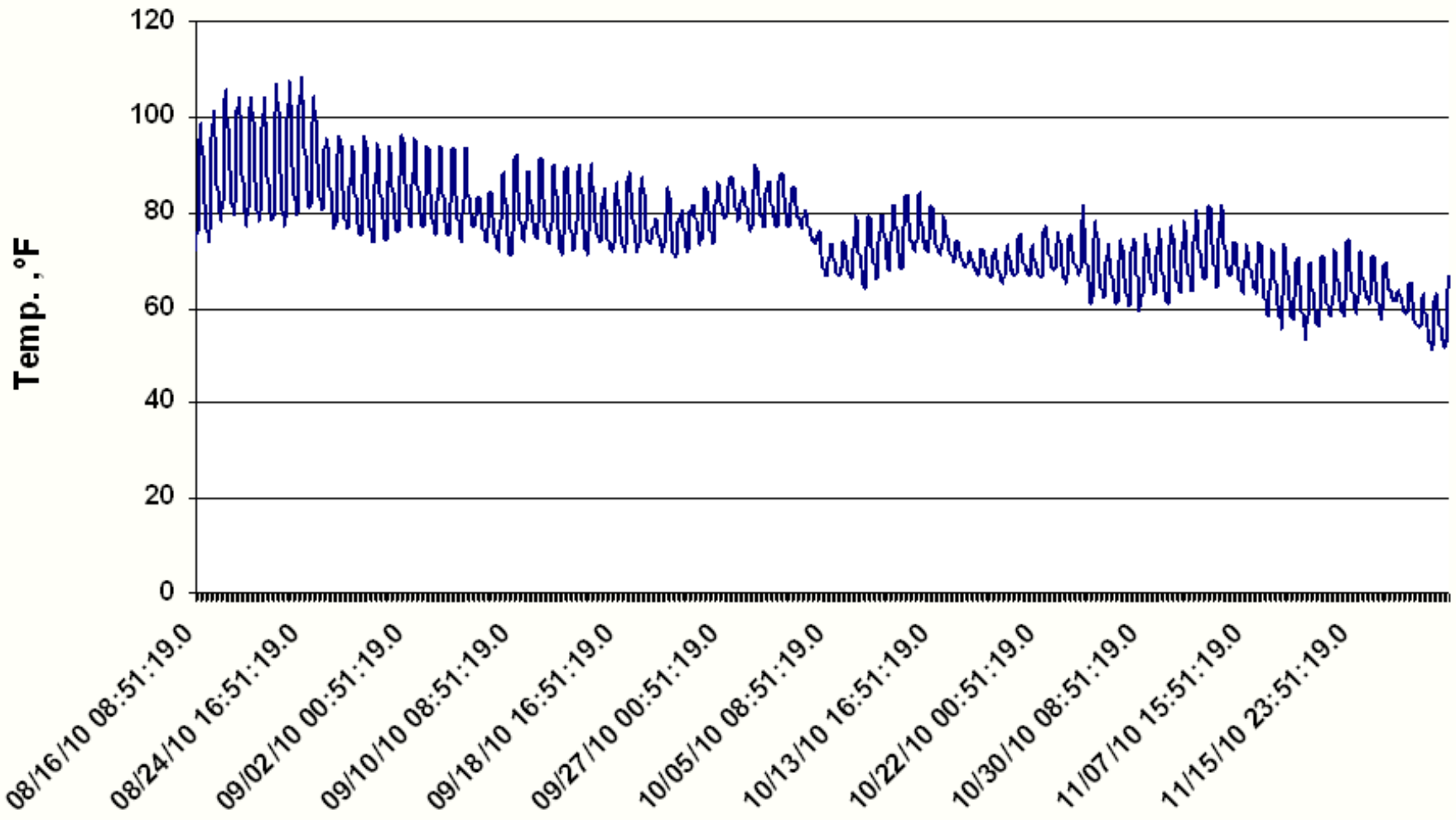


140°F at 12"





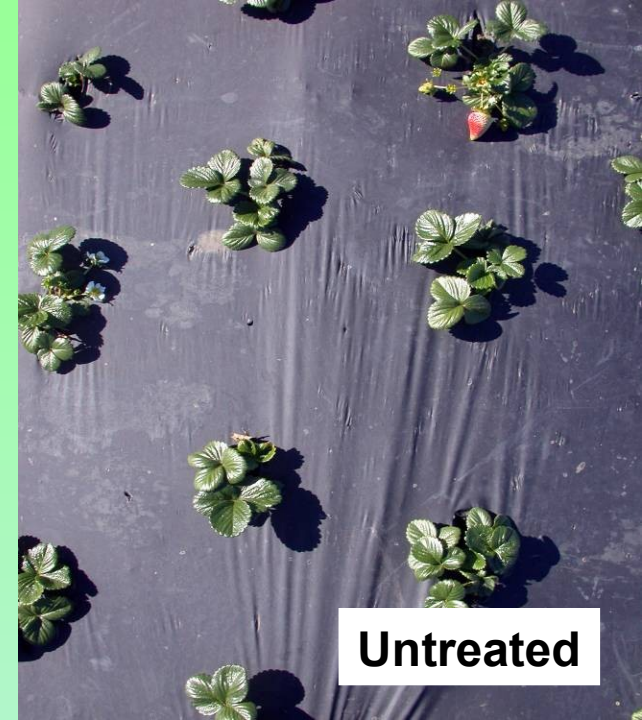
# Soil temperature at 6" under clear mulch (solarization effect)



**Nov 29, 2010**



**Mustard+Steam**



**Untreated**



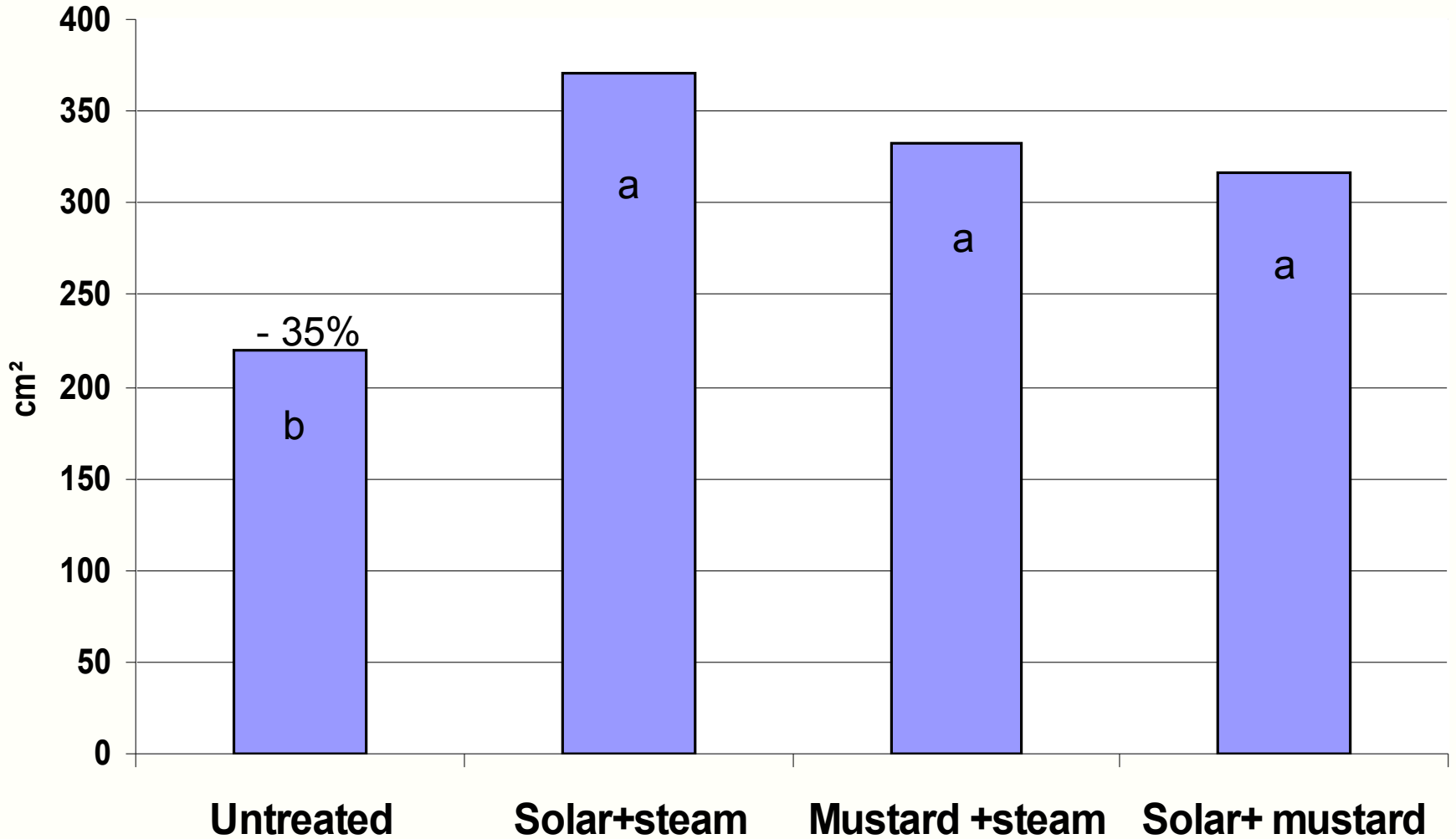
**Solar+Steam**



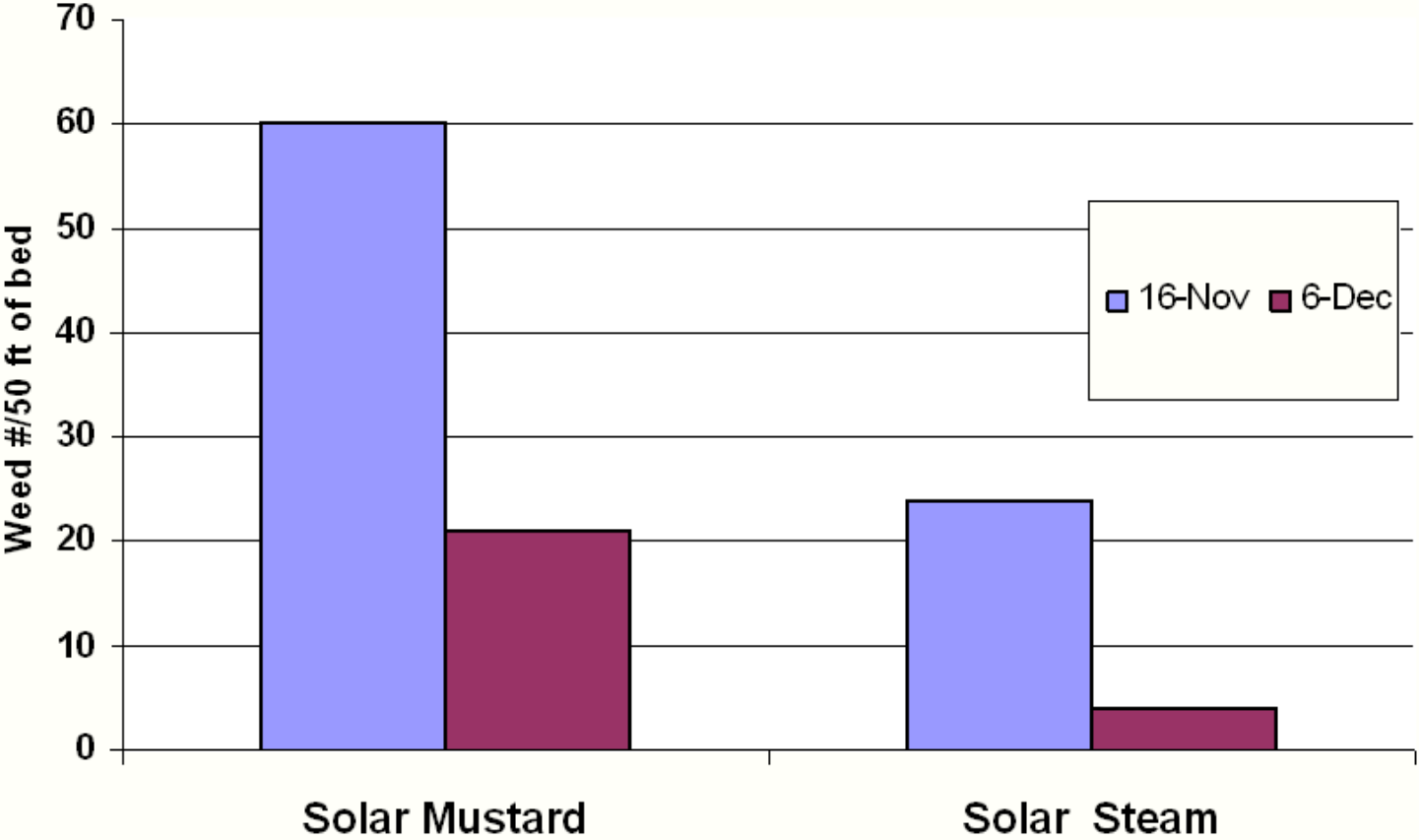
**Mustard+Solar**



# PLANT CANOPY AREA (size), Nov. 29, 2011



### Weed desnities





# Mustard+Steam



# Untreated



1 March 2011



# Solar+Mustard

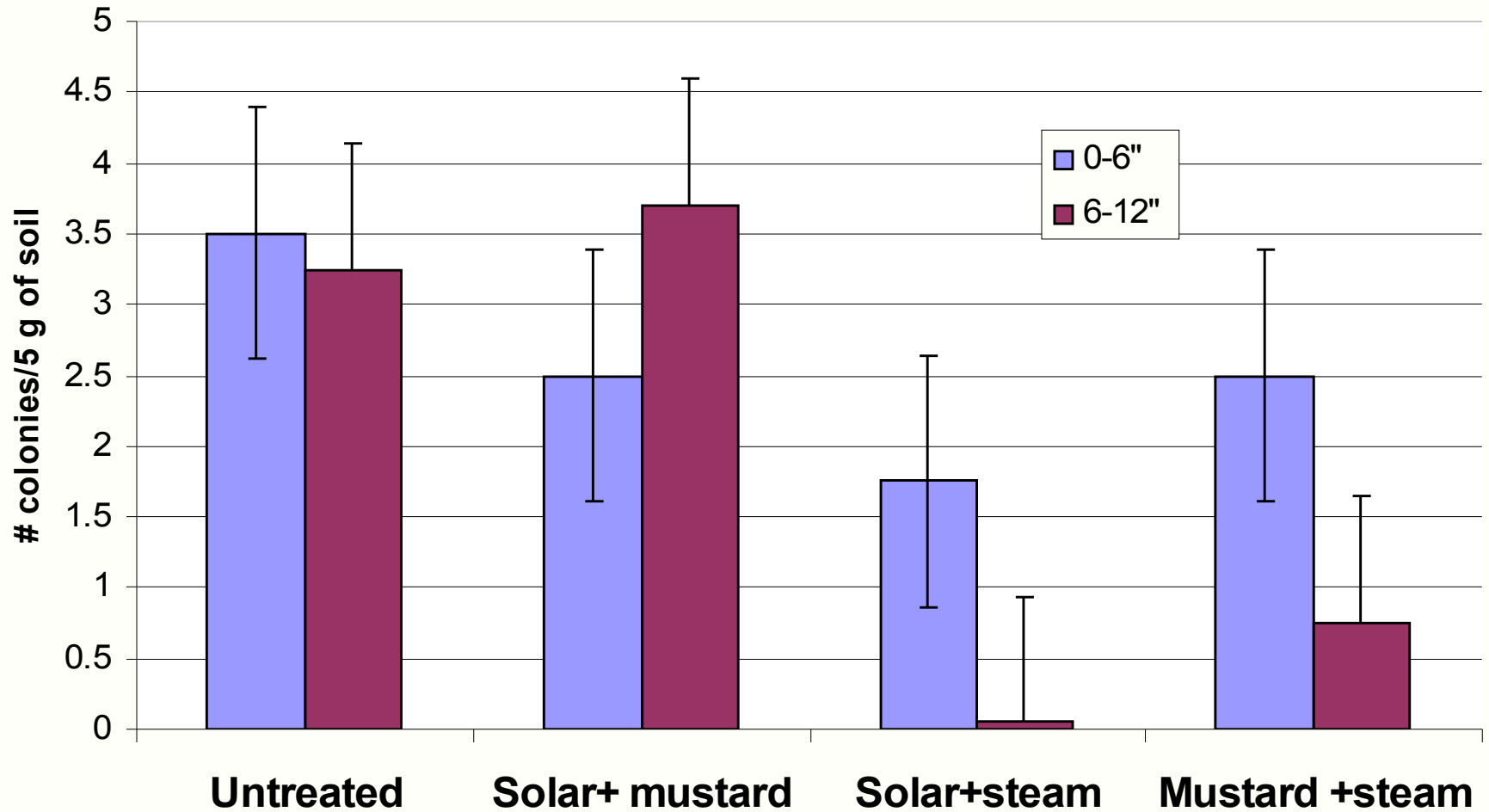


# Solar+Steam



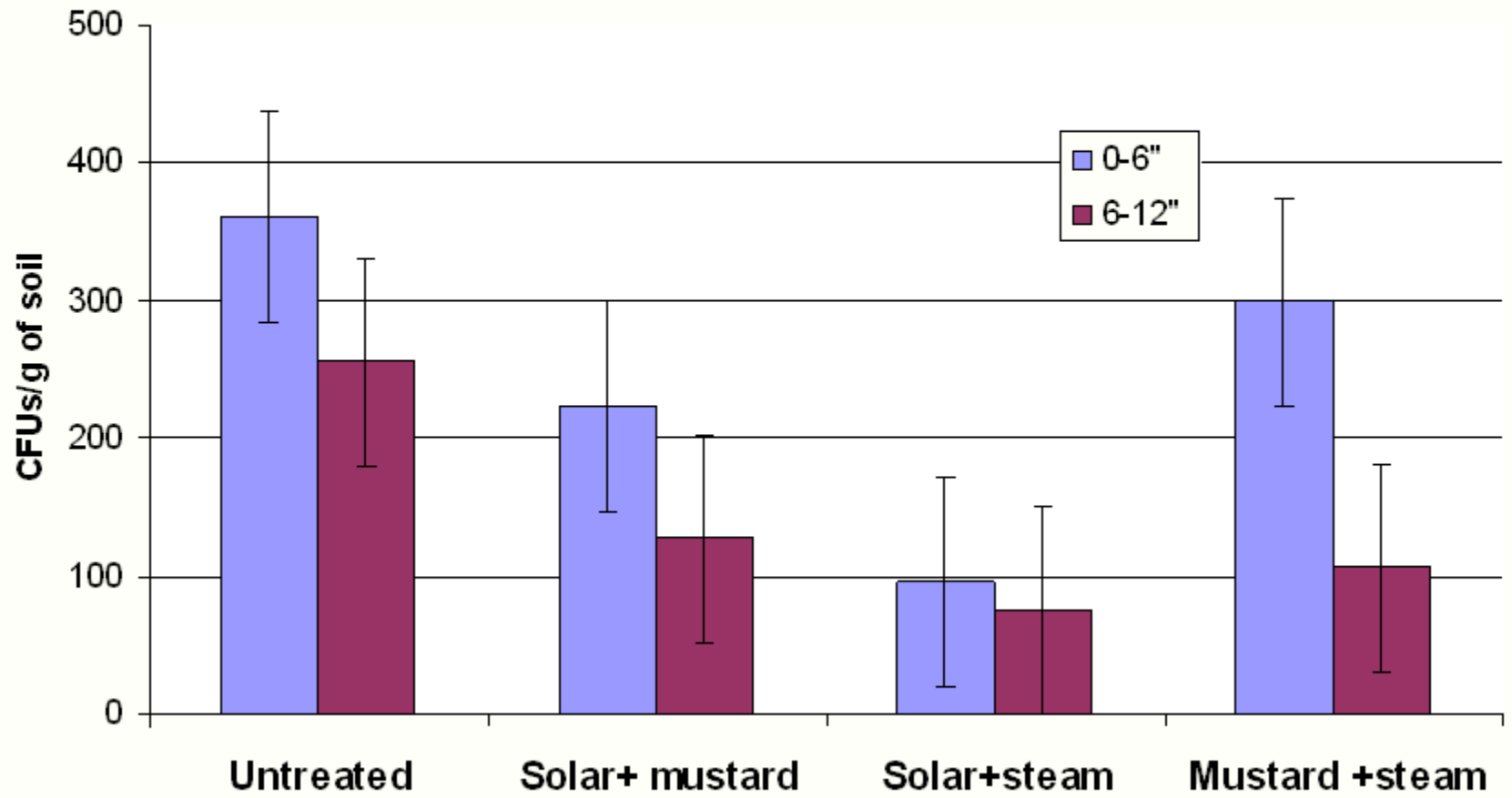
1 March 2011

## Macrophomina phaseolina

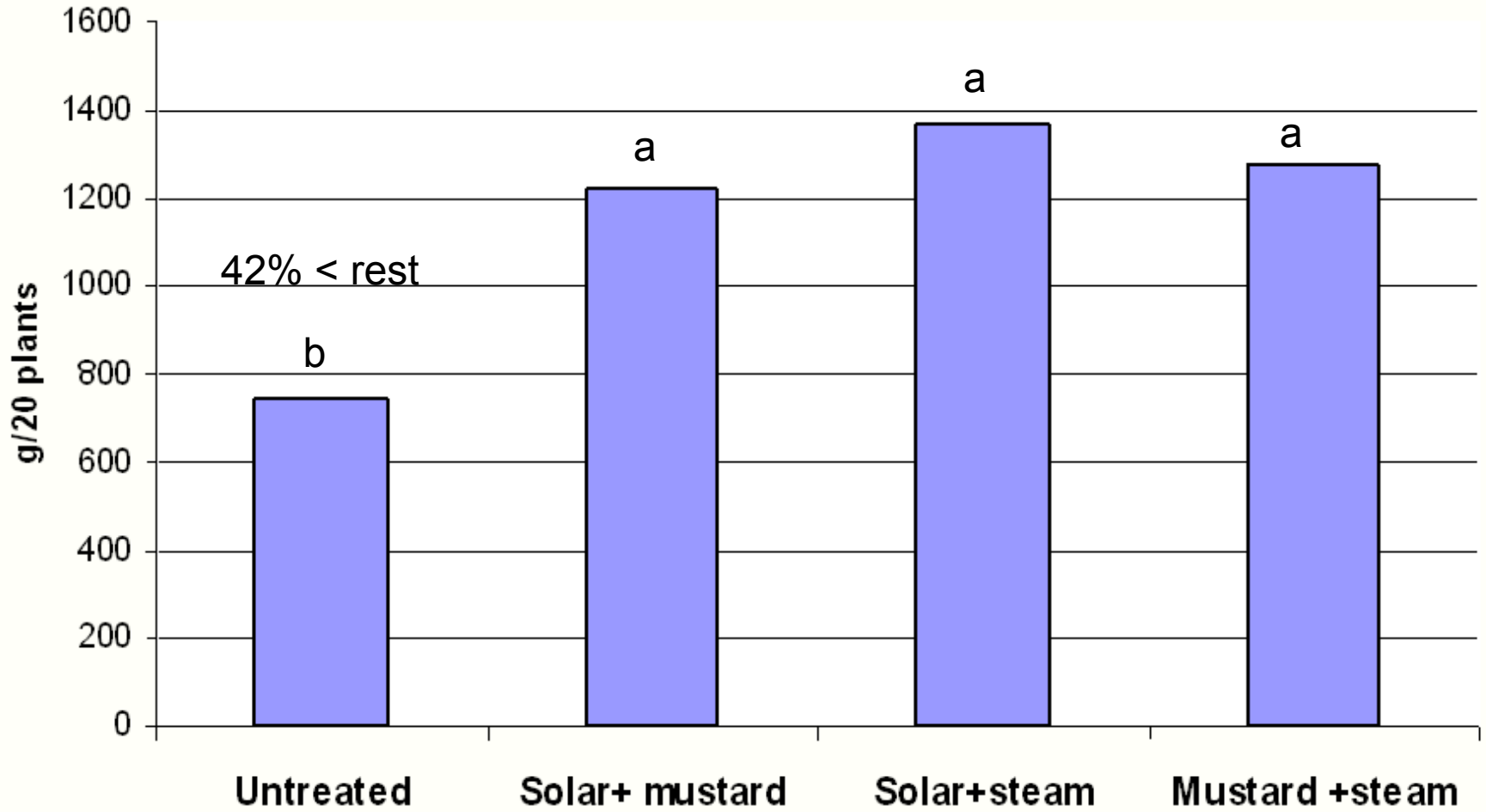




### *Fusarium oxysporum*

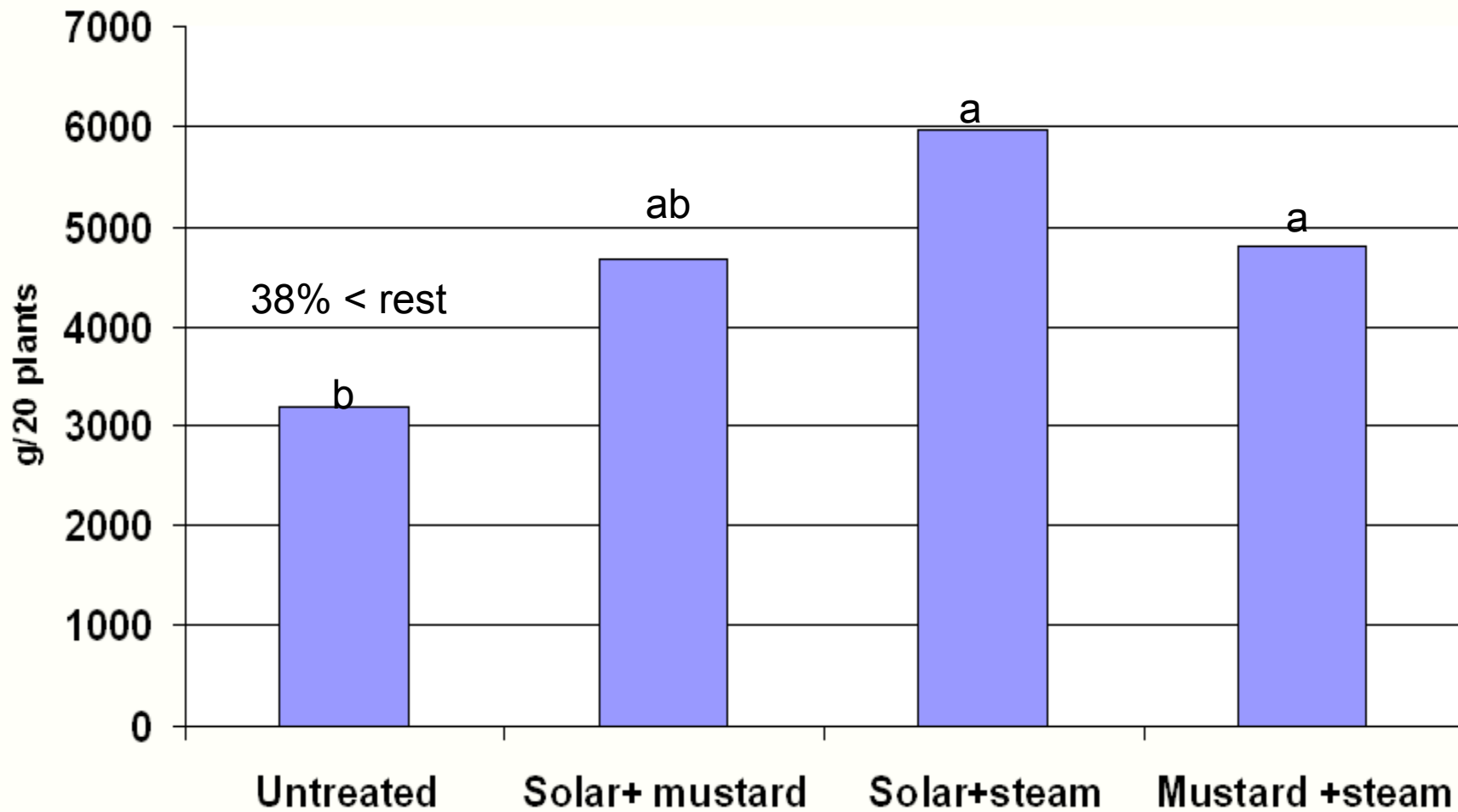


### Early marketable fruit yield (Jan-Feb. 2011)

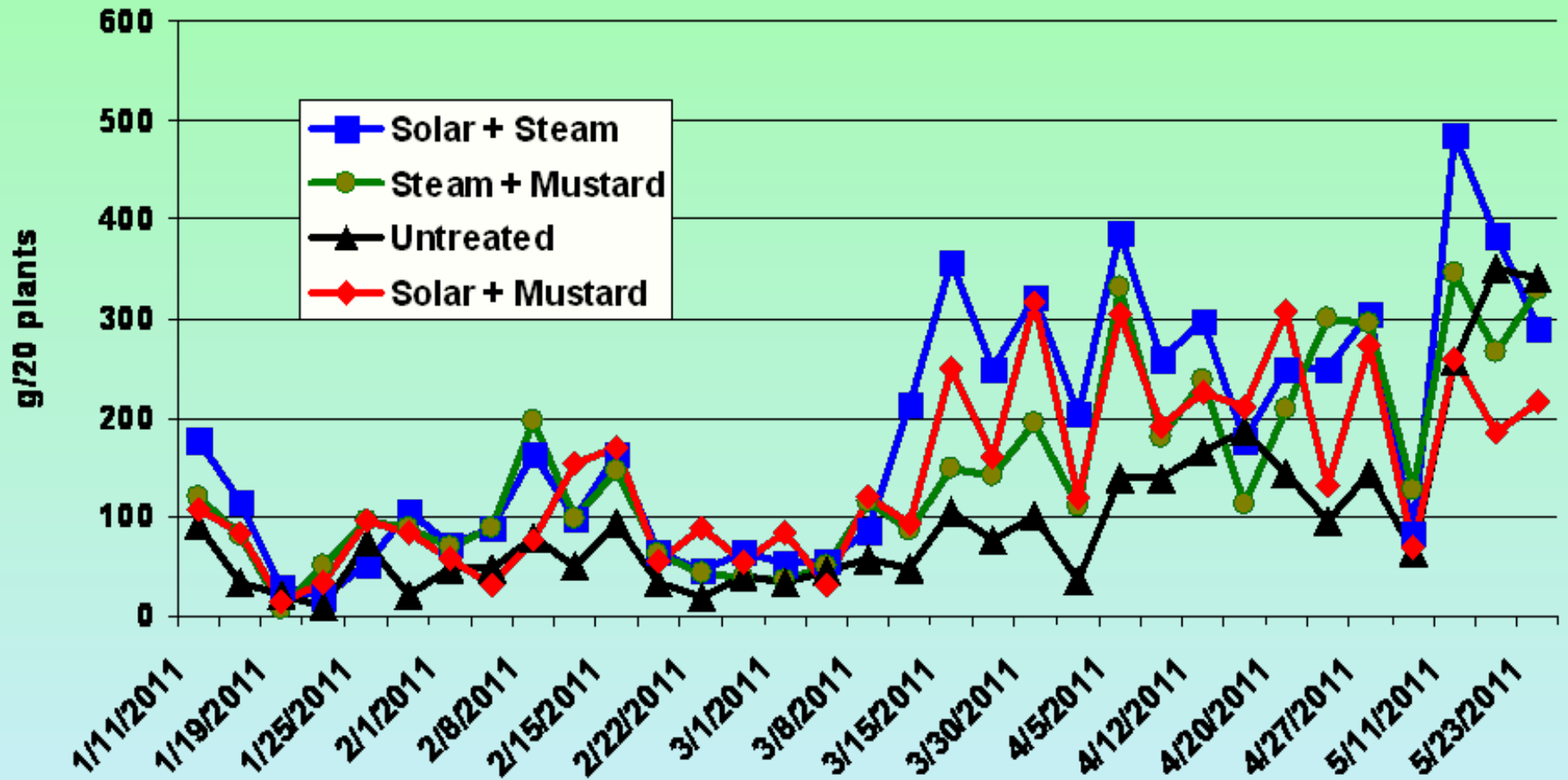




### Total marketable fruit yield (Jan- June 2011)



# Marketable fruit yield





**Untreated**



**Solar+Mustard**



**19 April 2011**



# Steam + Solar



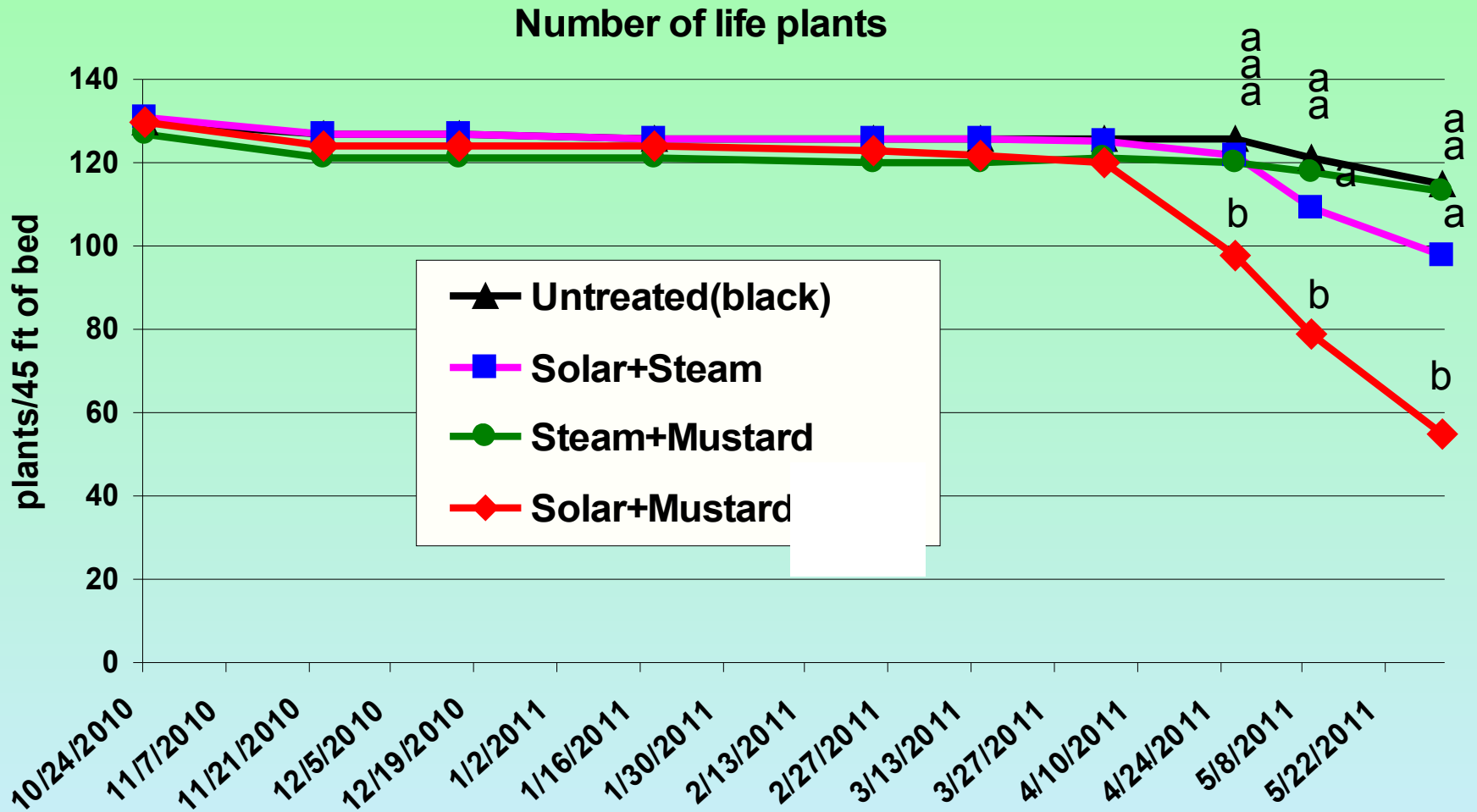
# Steam + Mustard



19 April 2011



# Mortality





# **End of the season mortality images**

**June 2, 2011**

# Untreated /clear





# Untreated / black





# Solar + Steam





# Solar + Mustard





# Steam + Mustard





# Fumigated / Black





# Fumigated / 'Skunk'



# Non-fumigant combinations

- Did not eliminate fungal pathogens but may reduce their abundance in soil
- Improve plant vigor and productivity
- Economics?

## Clear mulch: Earlier and greater

- **yield**
- **disease development and severity**



# Acknowledgements

- Andy Hooper and Terri Farms
- CSC and USDA funding