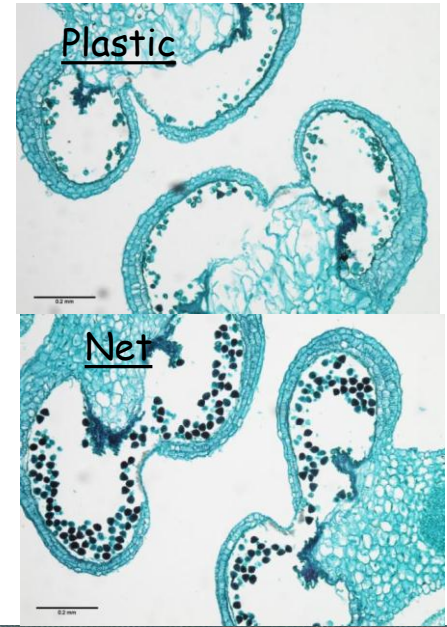
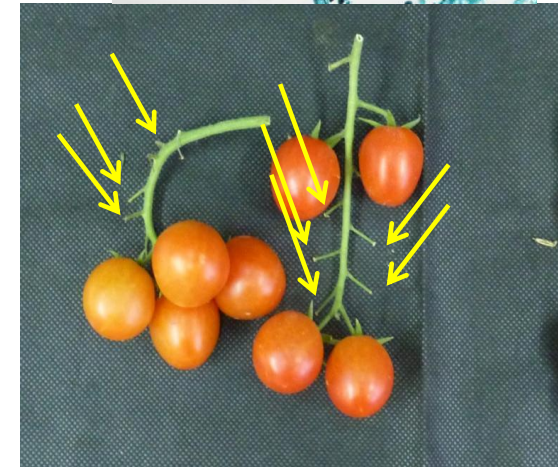
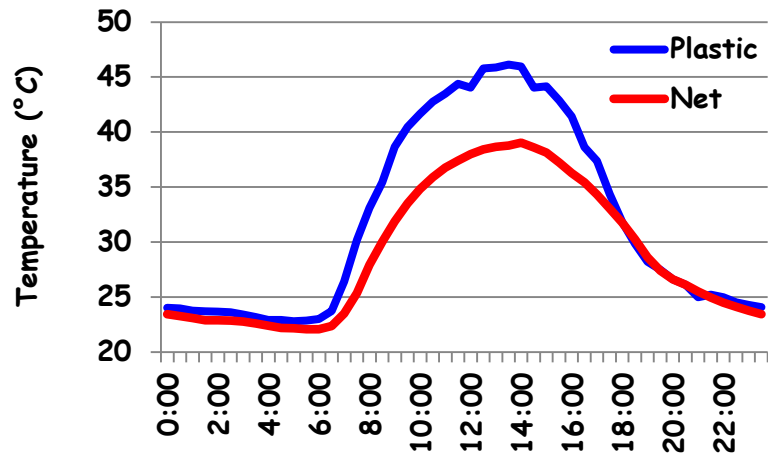


Developmental and reproduction processes of vegetable crops under environmental stress conditions



Avg. Hourly Temp. Aug. 2010

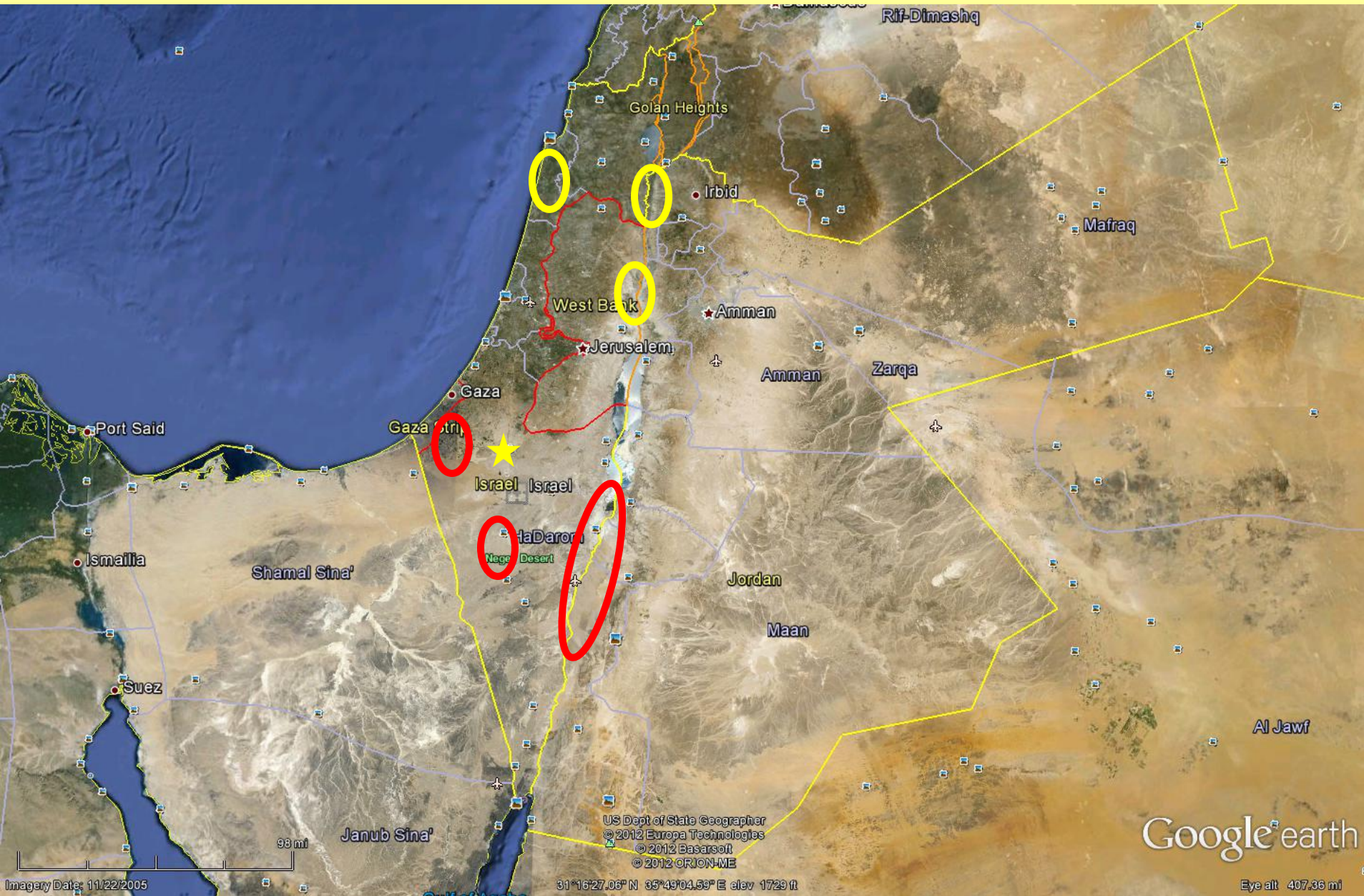


Hagai Yasuor
Gilat Research Center, ARO
Israel



Introduction

- Abiotic stress is the primary cause of crop loss worldwide, reducing average yields for most major crop plants by more than 50%.
- Heat stress due to increased temperature is an agricultural problem in many areas in the world. **Climate change, protective environmental conditions, hot seasons**
- Soil and water salinity present a major challenge to agriculture in arid regions.



Rif-Dimashq

Golan Heights

Irbid

Mafraq

West Bank

Amman

Jerusalem

Amman

Zarqa

Gaza

Gaza Strip

Israel Israel

HaDarom

Negev Desert

Jordan

Maan

Al Jawf

Shamal Sina'

Janub Sina'

US Dept of State Geographer
© 2012 Europa Technologies
© 2012 Basarsoft
© 2012 ORION-ME

Google earth

98 mi

31°16'27.06" N 35°49'04.59" E elev 1729 ft

Eye alt 407.36 mi

Imagery Date: 11/22/2005

1959-2005

Ein Yahav: past and present



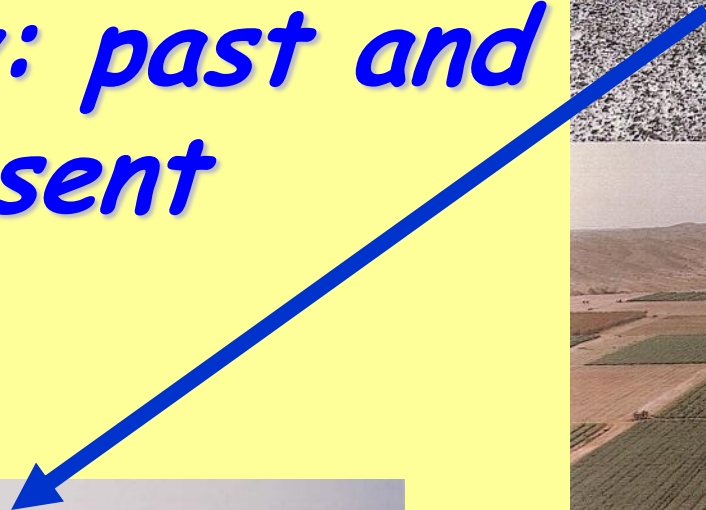
1959



1979



1999



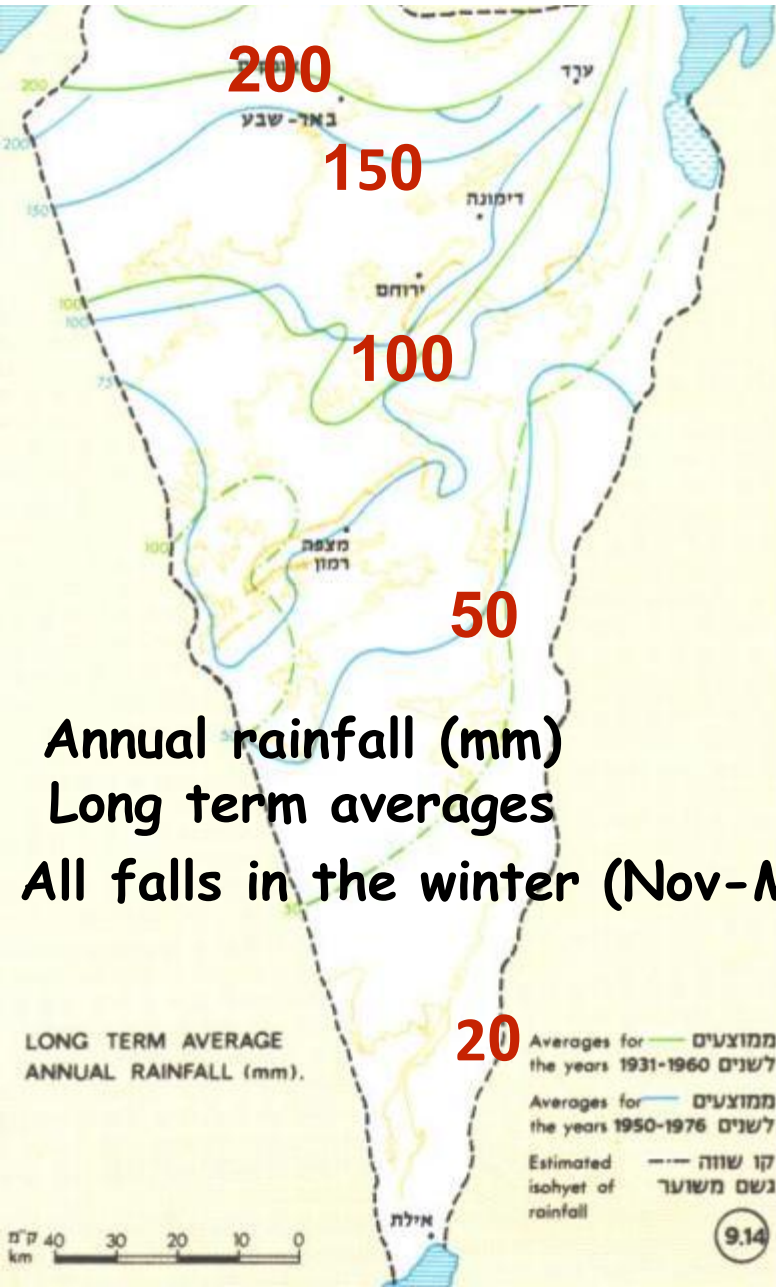
Types of buildings



Arava Valley 2014

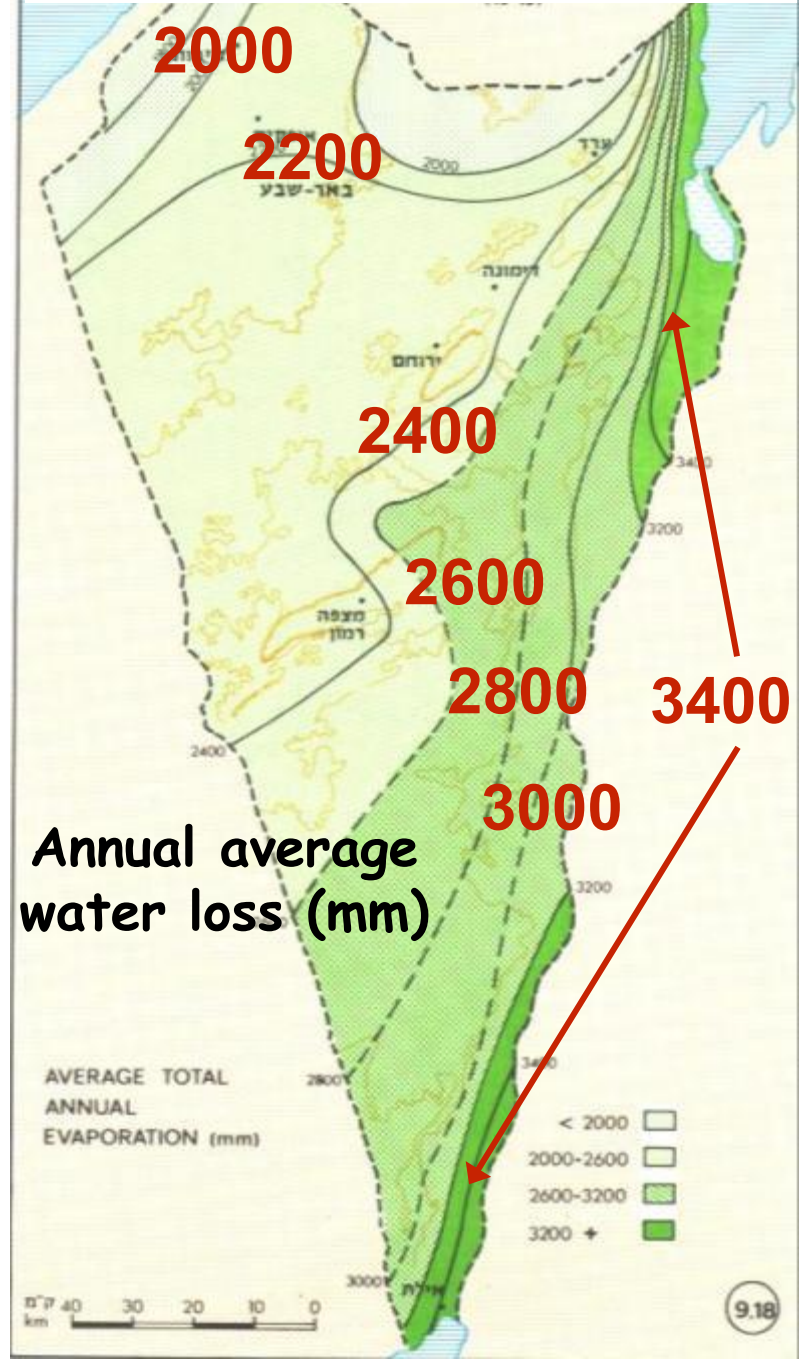


Israel's Negev desert-rainfall



Annual rainfall (mm)
 Long term averages
 All falls in the winter (Nov-March)

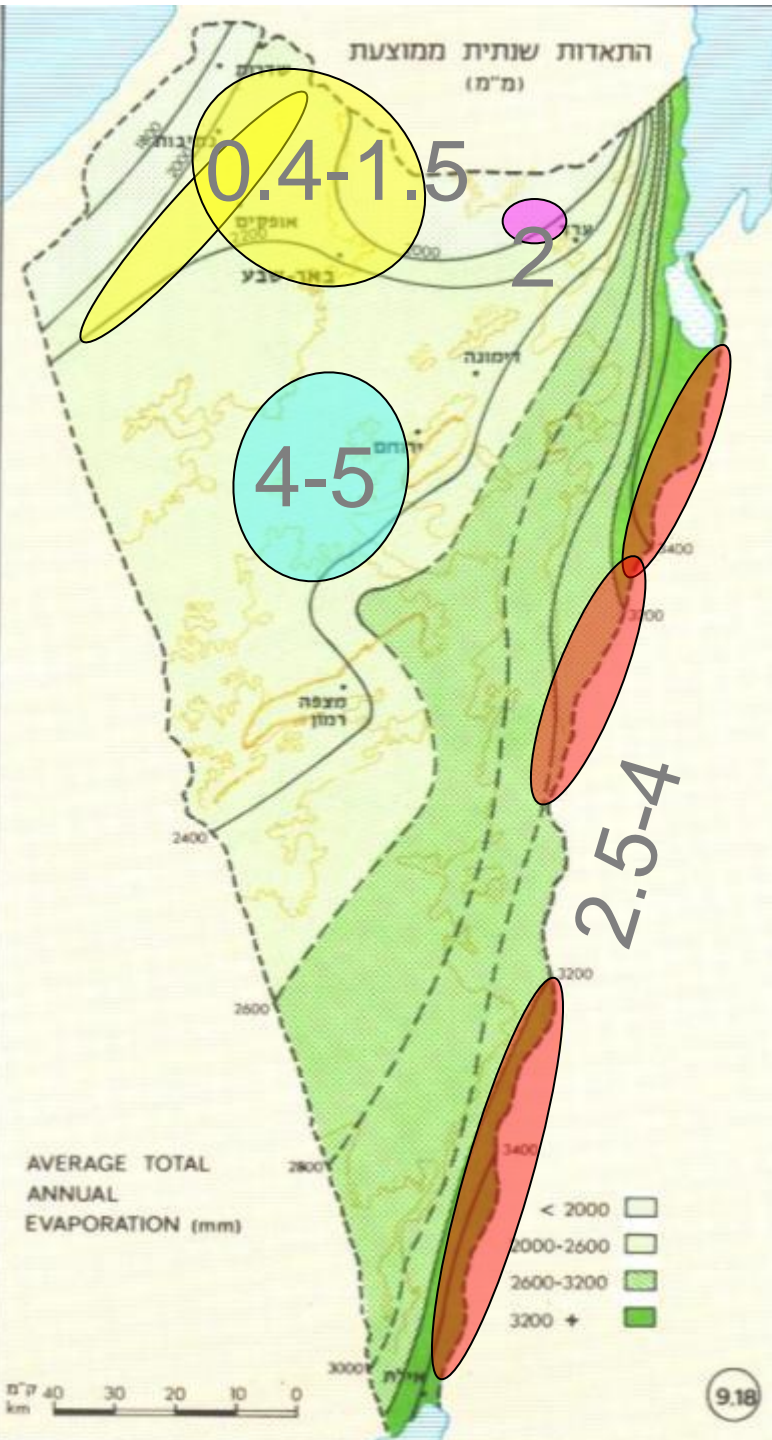
potential evaporation



Annual average water loss (mm)

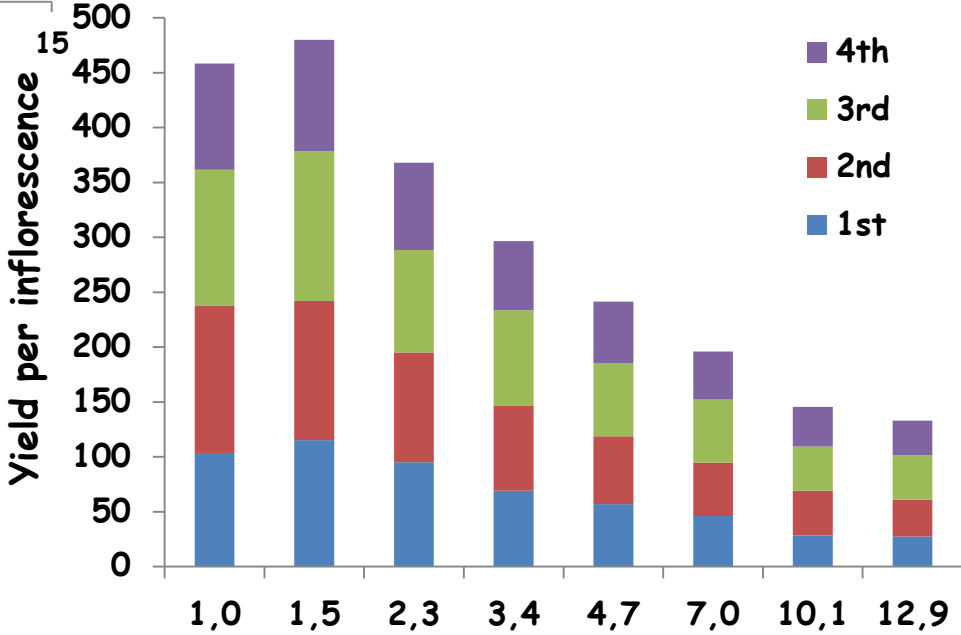
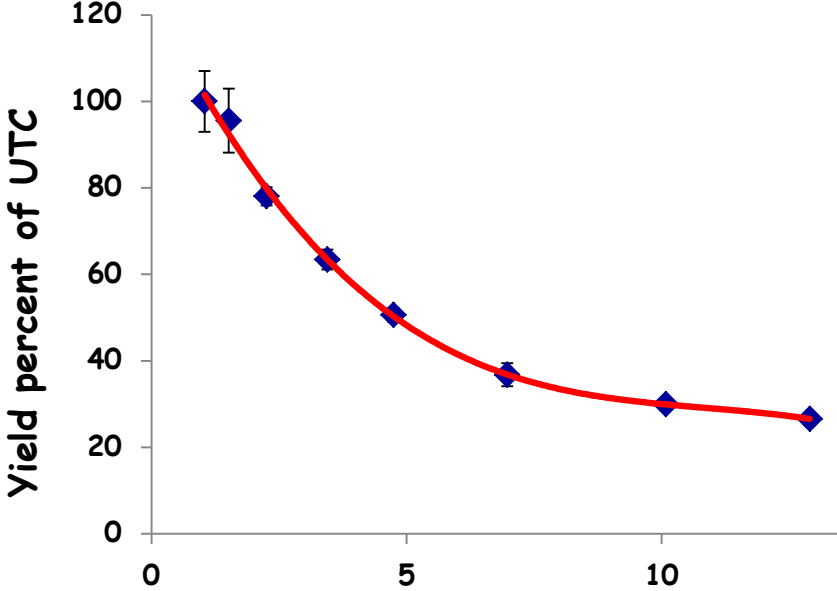
AVERAGE TOTAL ANNUAL EVAPORATION (mm)

- < 2000
- 2000-2600
- 2600-3200
- 3200 +



Water resources for irrigation and quality (salinity EC (dS m^{-1}))

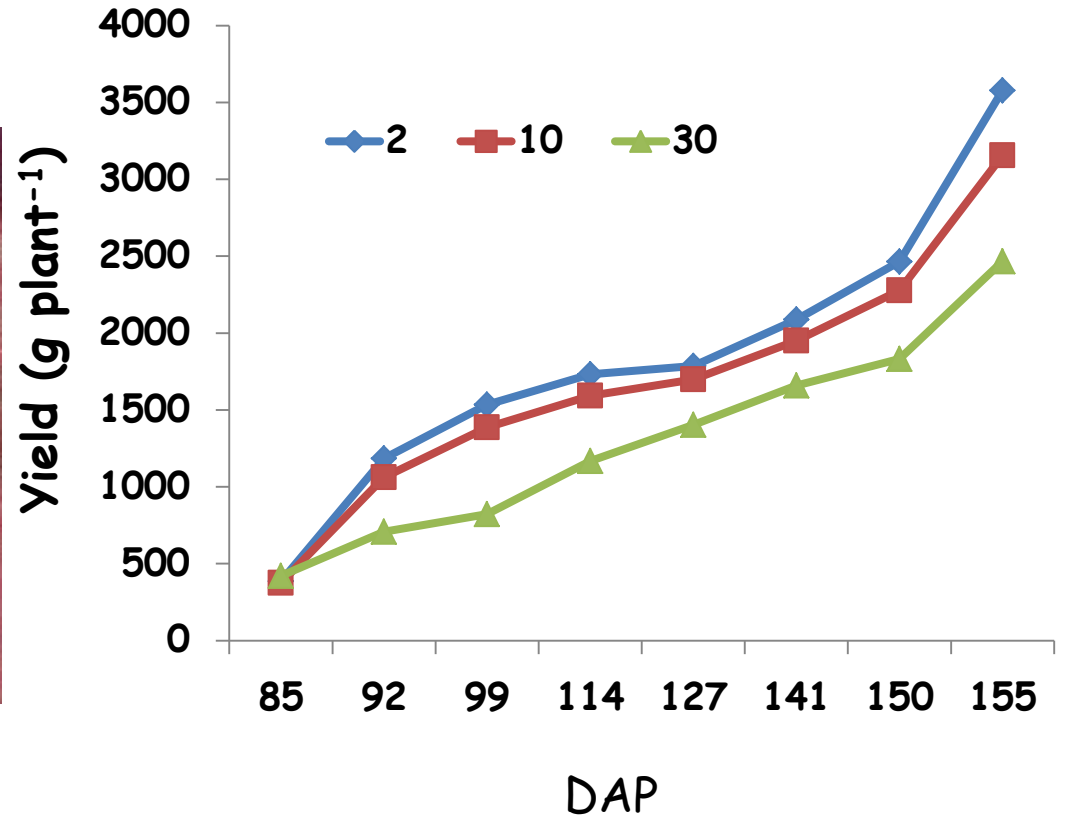
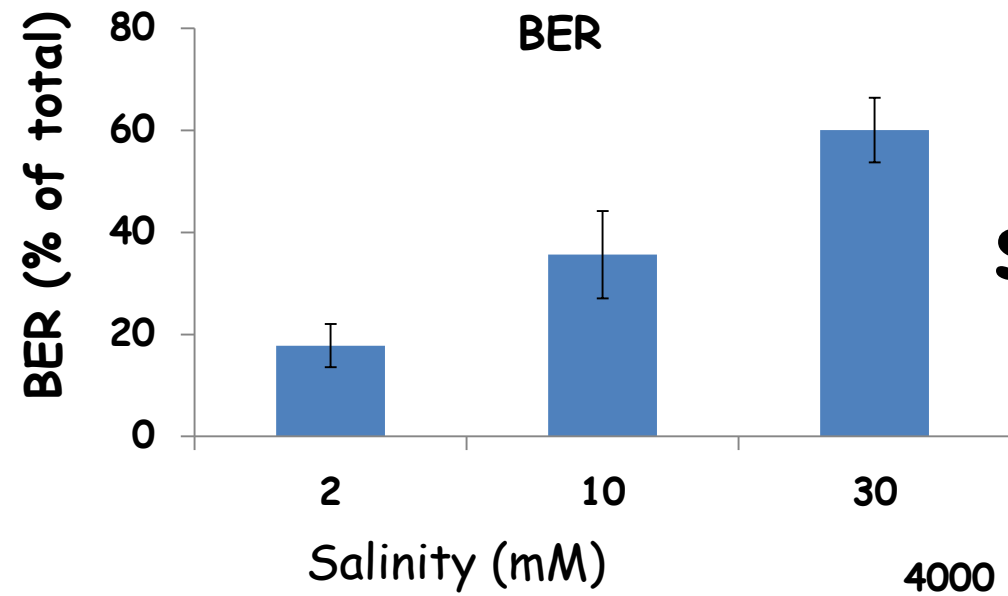
Influence of salinity on tomato yield



Leaching fraction

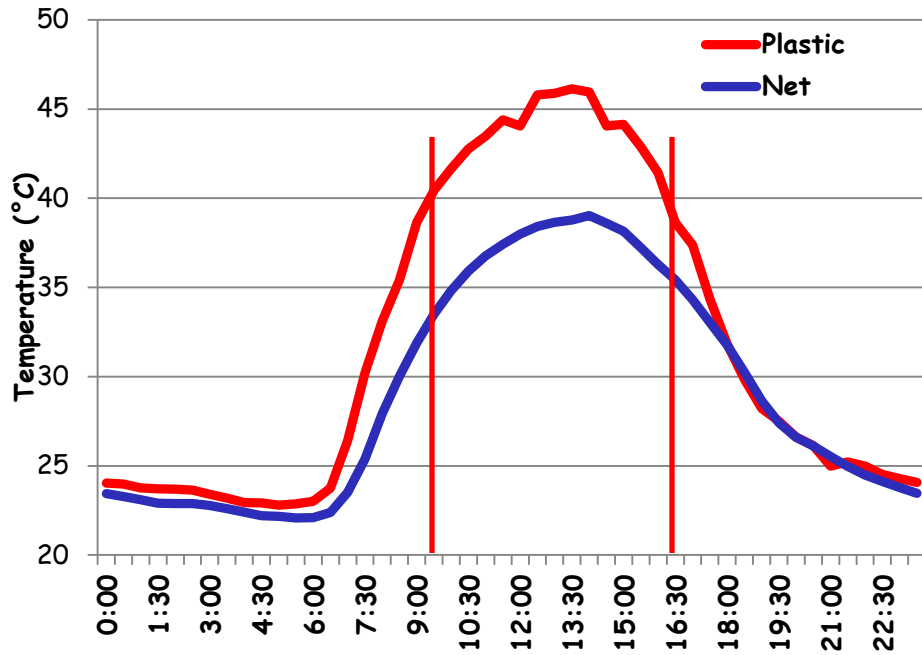
Irrigation salinity (dS m⁻¹)

Influence of salinity on pepper yield and quality

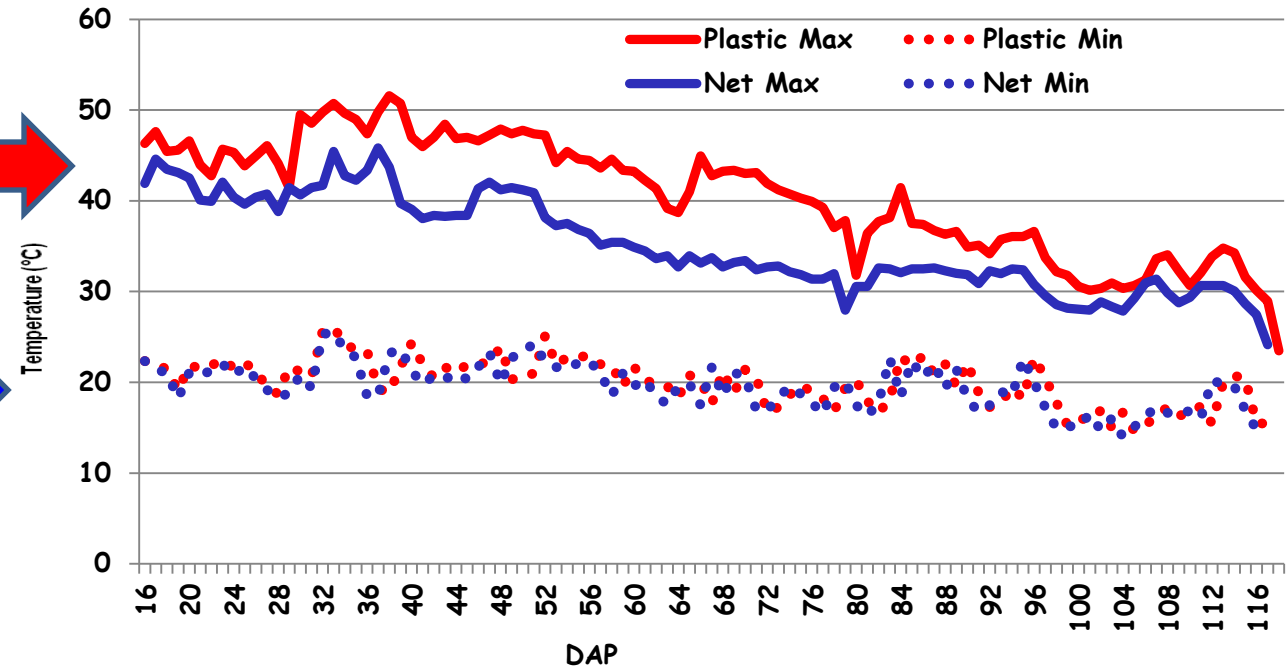
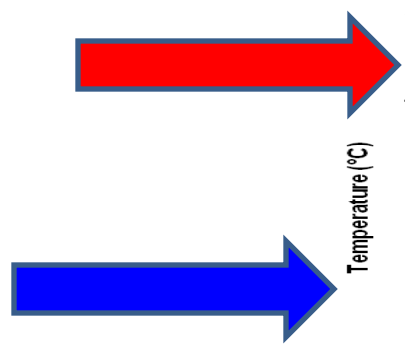


Shtain 2012 unpublished

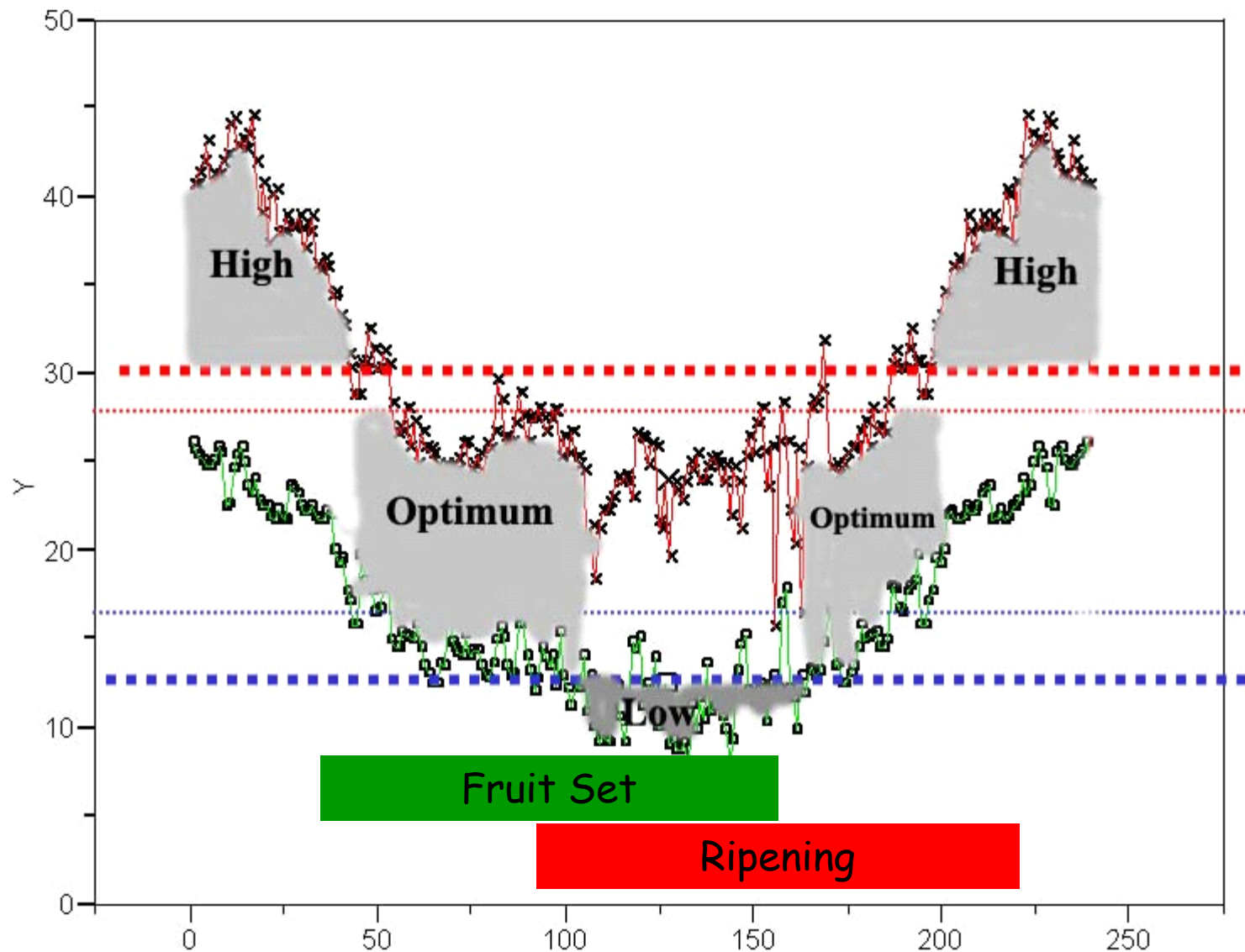
Avg. Hourly Temp. Aug. 2010



Temperatures in greenhouses and net houses during summer in Ramat Negev R&D

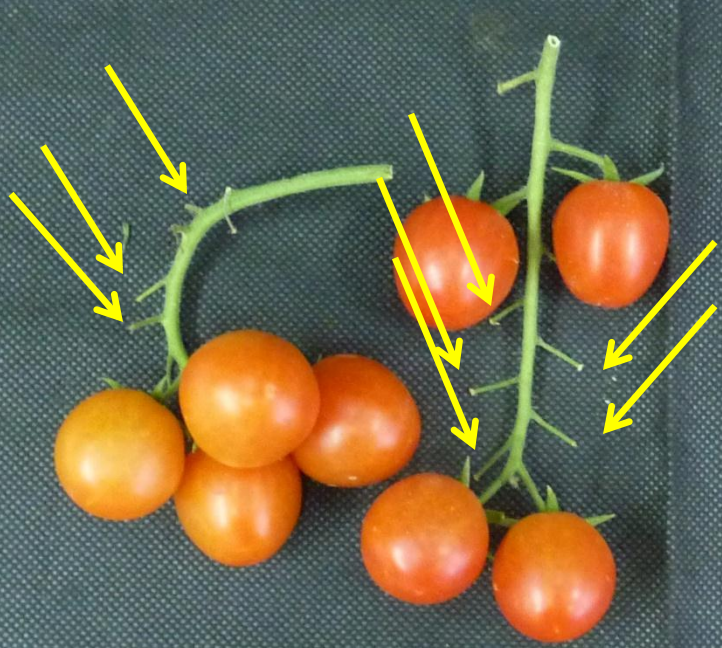


טמפרטורות מינימום ומקסימום יומיות במהלך עונת גידול פלפל בחממות בערבה
[Elkind et al., 2008.]





Control

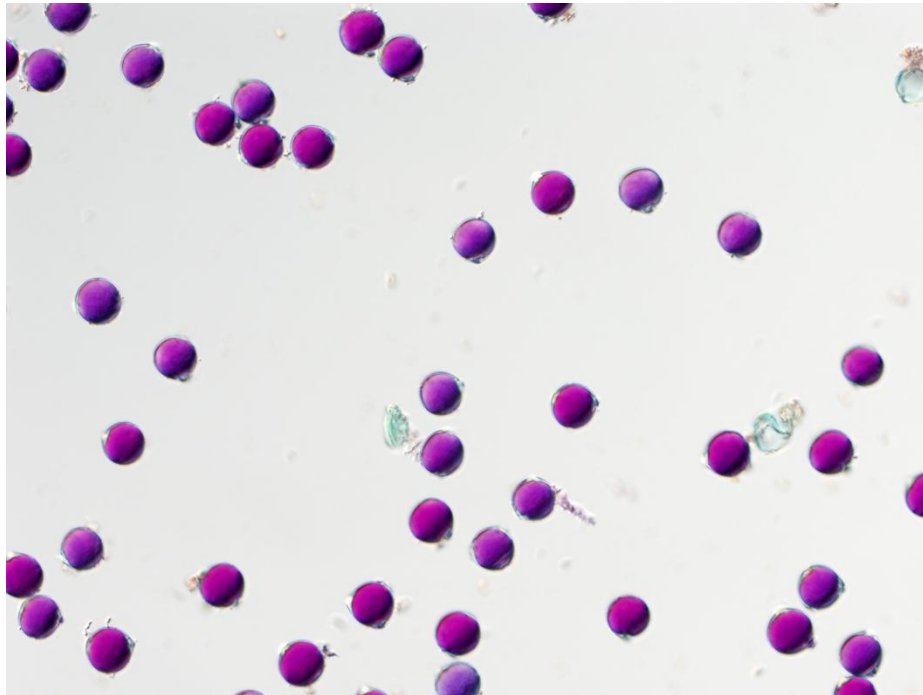
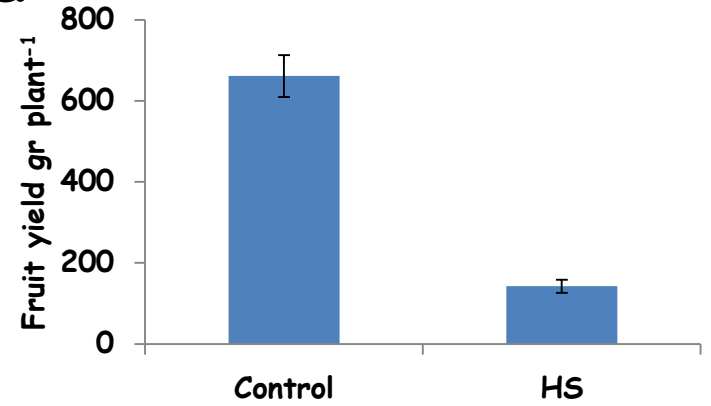
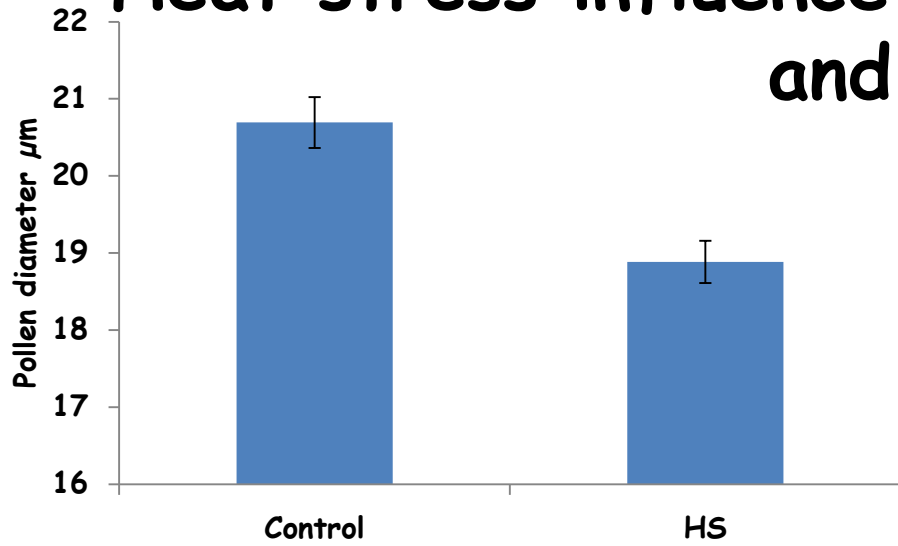


HT

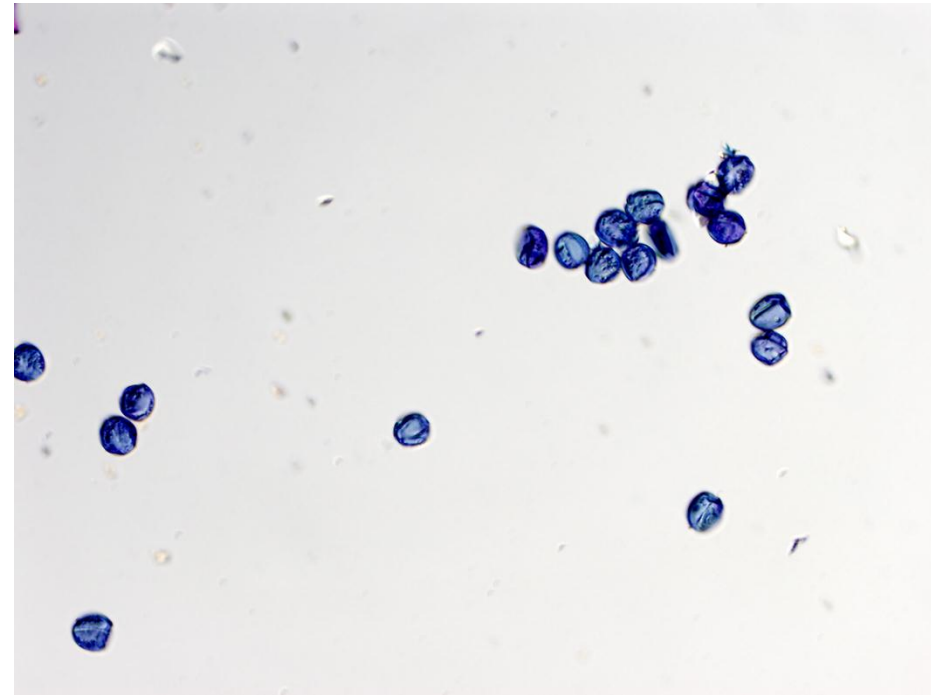


Ramat Negev R&D

Heat stress influence on pollen size, viability and yield



Control



34/28°C

Influence of high temperature on pepper: Fruit development

Z

T

C

Z

T

C



Net



Plastic



Fruit quality



Salinity in general improves the nutritional value

Heat affect fruit quality in tomato

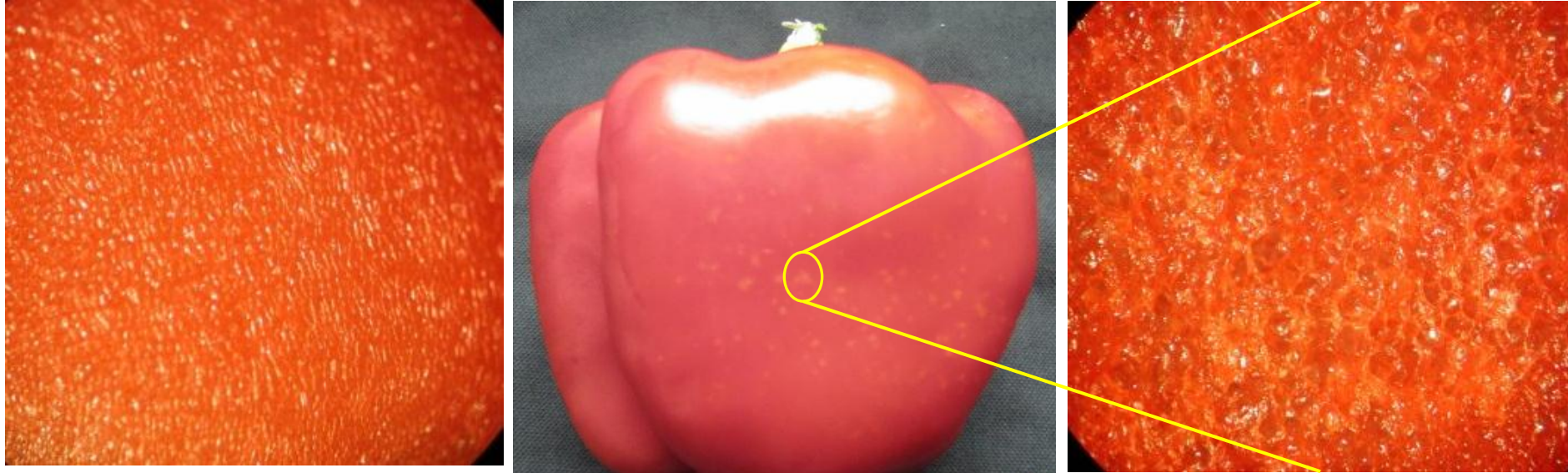
Greenhouse with cooling system



Net house



Heat damage in pepper



High
Temperature



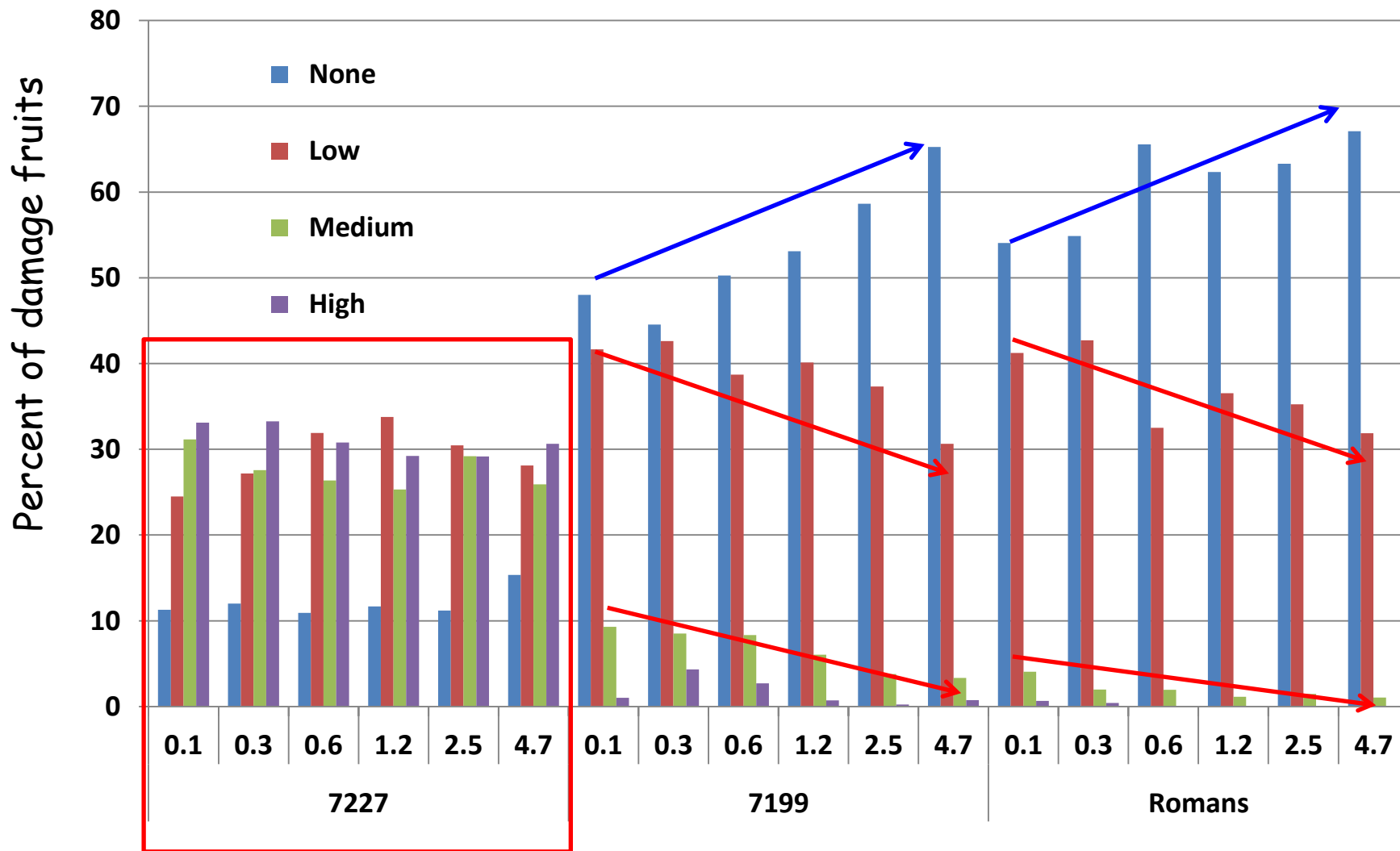
Oxidative
Damage



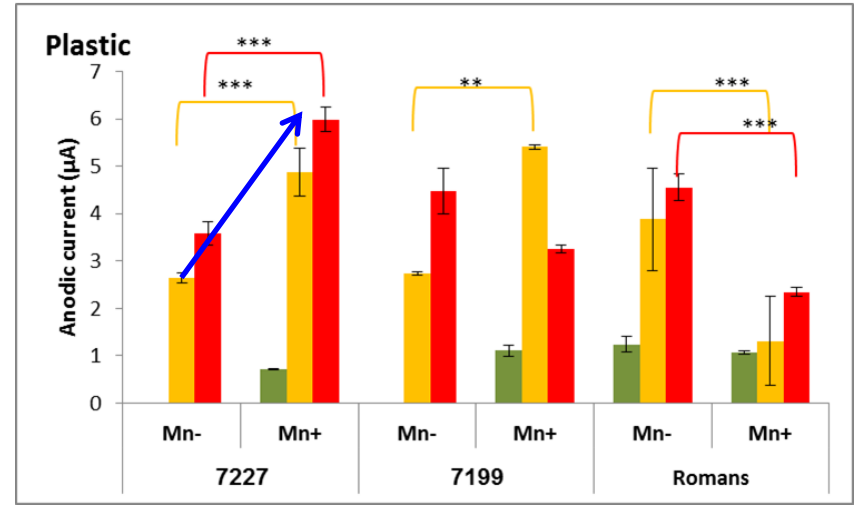
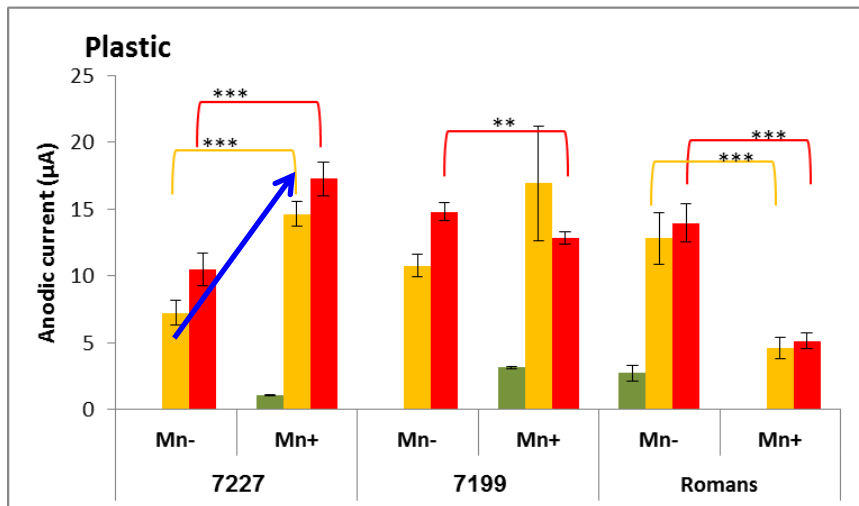
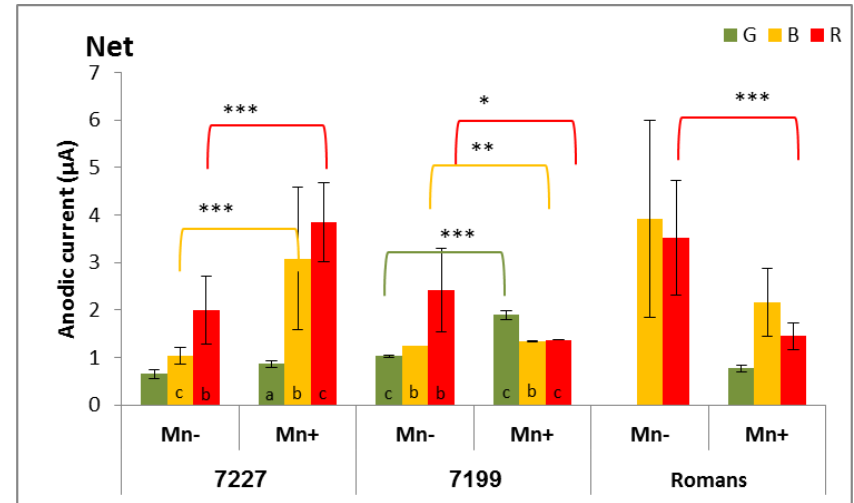
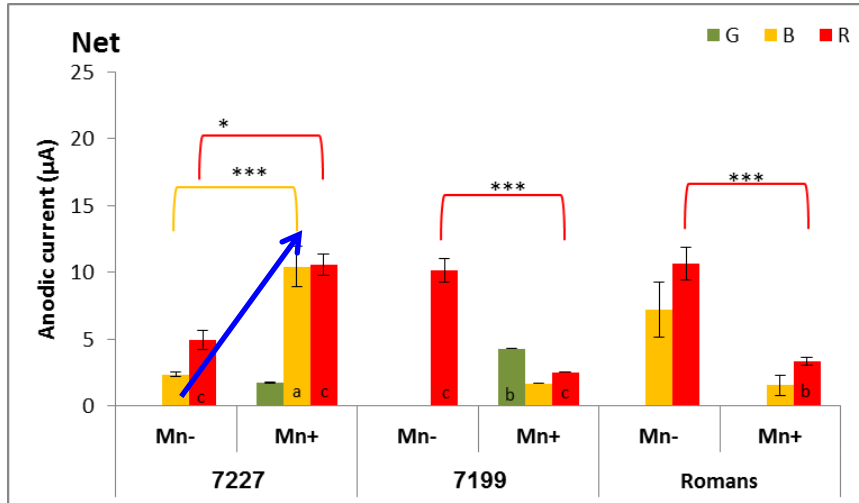
Cell death

Heat damages affecting fruit quality by affect its shelf life and post harvest quality

Influence of Mn fertilization on heat damages in greenhouse pepper



Mn fertilization and temperature affects on antioxidant activity (CV and DPV)



ANOVA Mn- vs. Mn+: * p<0.05; **p<0.01;***p<0.001

ANOVA Plastic vs. Net: a p<0.05; b p<0.01; c p<0.001

Summary

- Agronomical practices such as: cultivars, fertilization, might assist vegetable crops coping with abiotic stress

Mn fertilization reduced heat damages incidents and enhanced antioxidant activity of pepper fruit therefore improve its nutritional value

- Basic science (plant hormone) is needed to improve our tools for future breeding programs aims to improve vegetable performance and quality under abiotic stress