

High Tunnel Production of Organic Specialty Vegetables

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Content

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2. Results

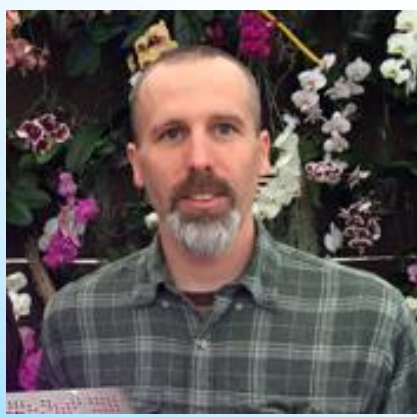
3. How we did the research

**4. Lessons learned and some
take home messages**

Why High Tunnels?

- **Controlled environment plant production is more resource efficient and with higher yield than field production; however the initial investment can be high...;**
- **Extend growing seasons;**
- **Prevent some weather related damage;**
- **Grow specialty crops which are difficult to grow in the field;**
- **Can be used to reduce pests...;**
- **Can be movable;**
- **Light, humidity, Temperature can be controlled to some extend;**
- **....**

Project History and Participants' Expertise



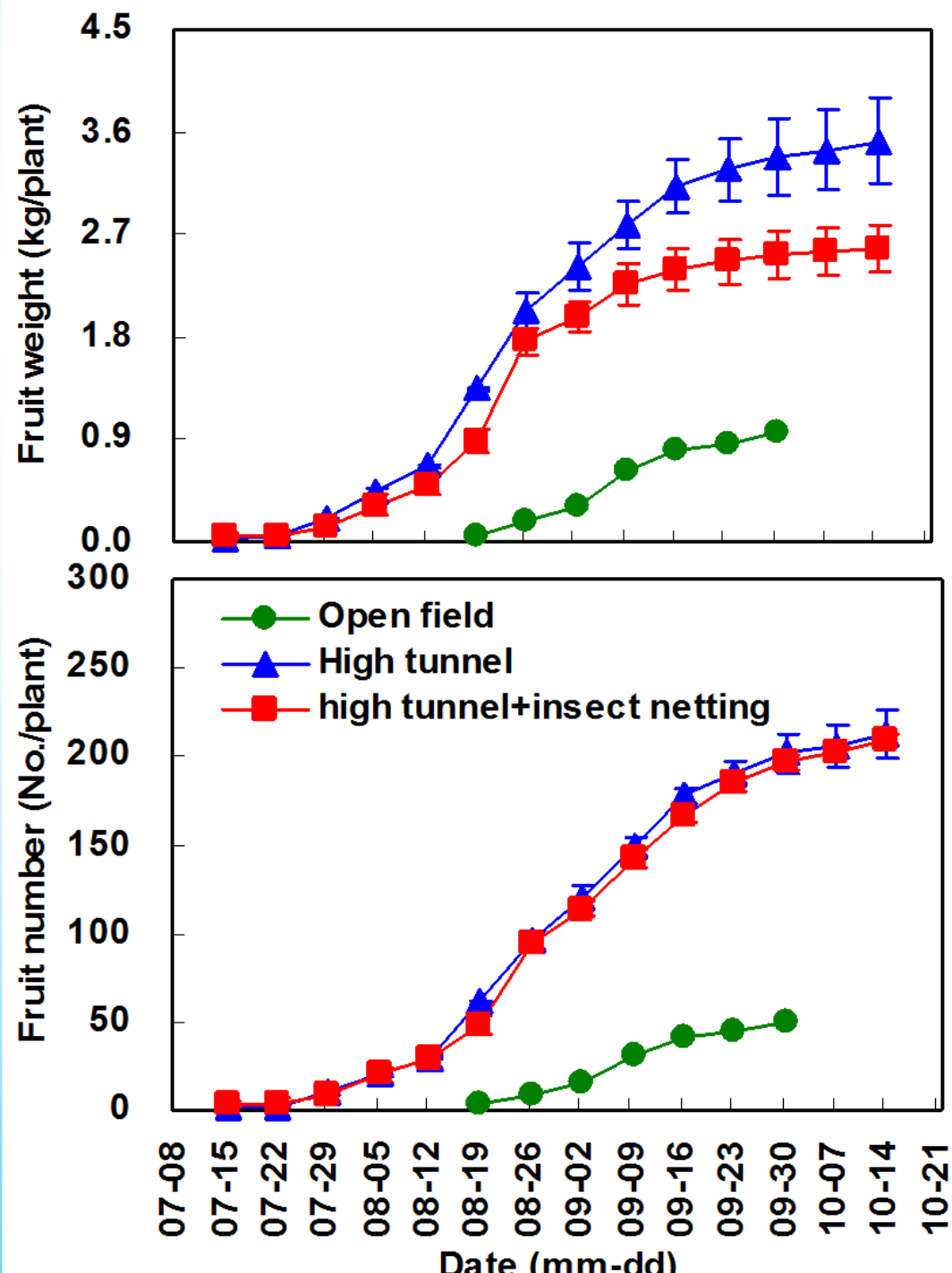


Huge difference between tunnel and field plants on July 23



Cherry Tomato --Sarina Hybrid



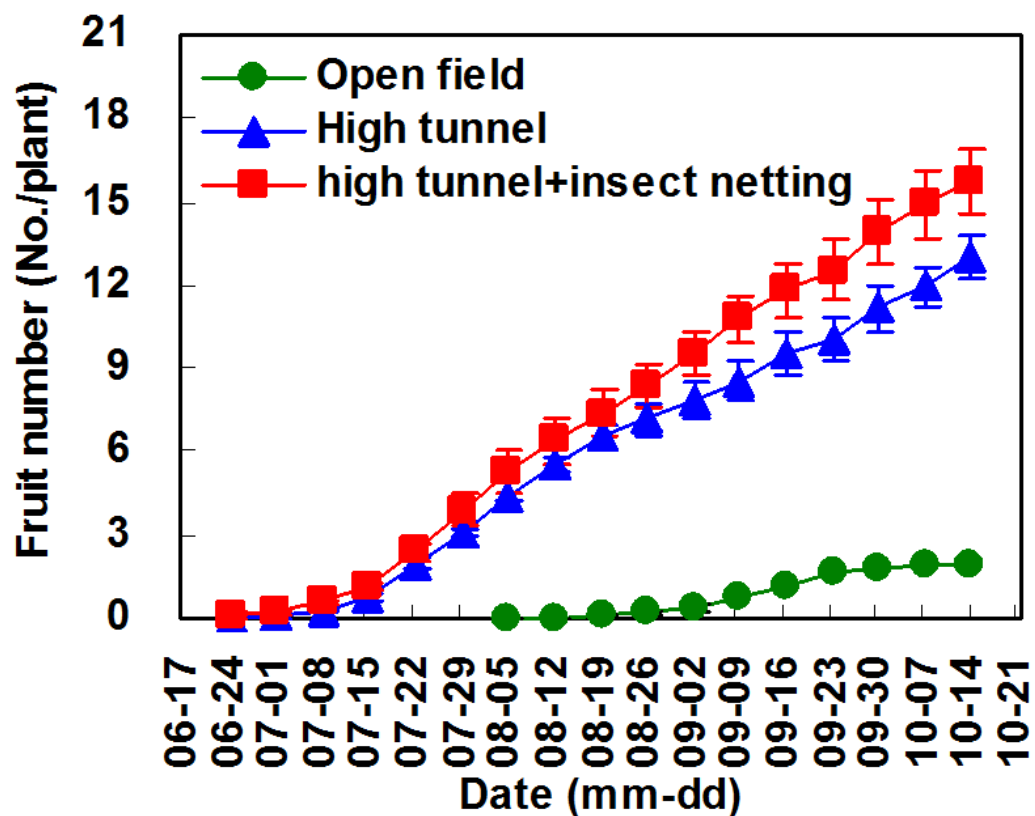
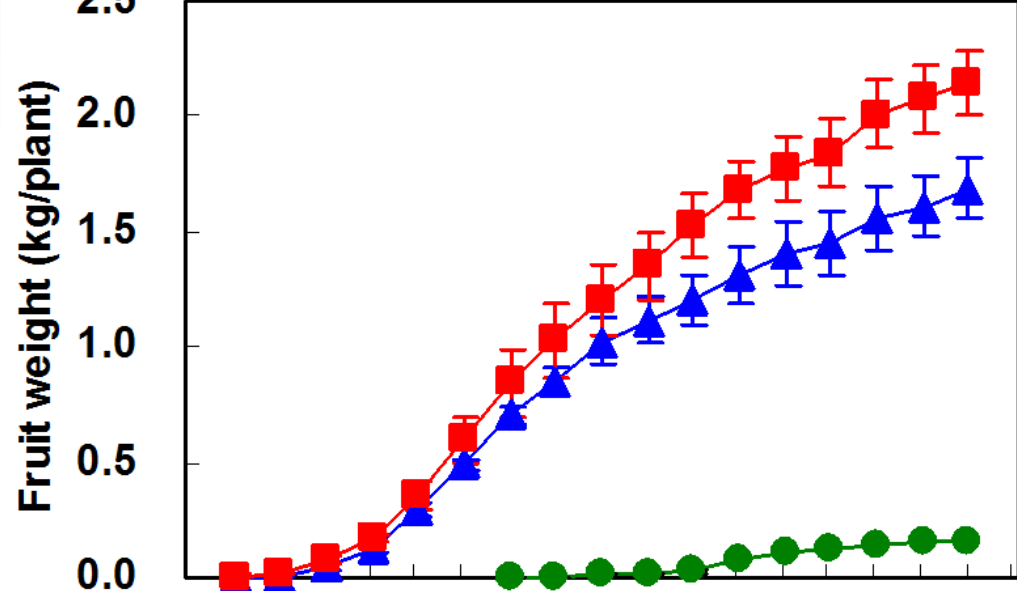


Yield loss of field tomato from animals, hail, and disease



Bitter Melon—Canton Green F1

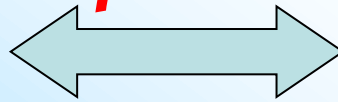




Happier bitter melons in the warmer high tunnels



*How
many
fruits
have
you
found
on the
plant?*

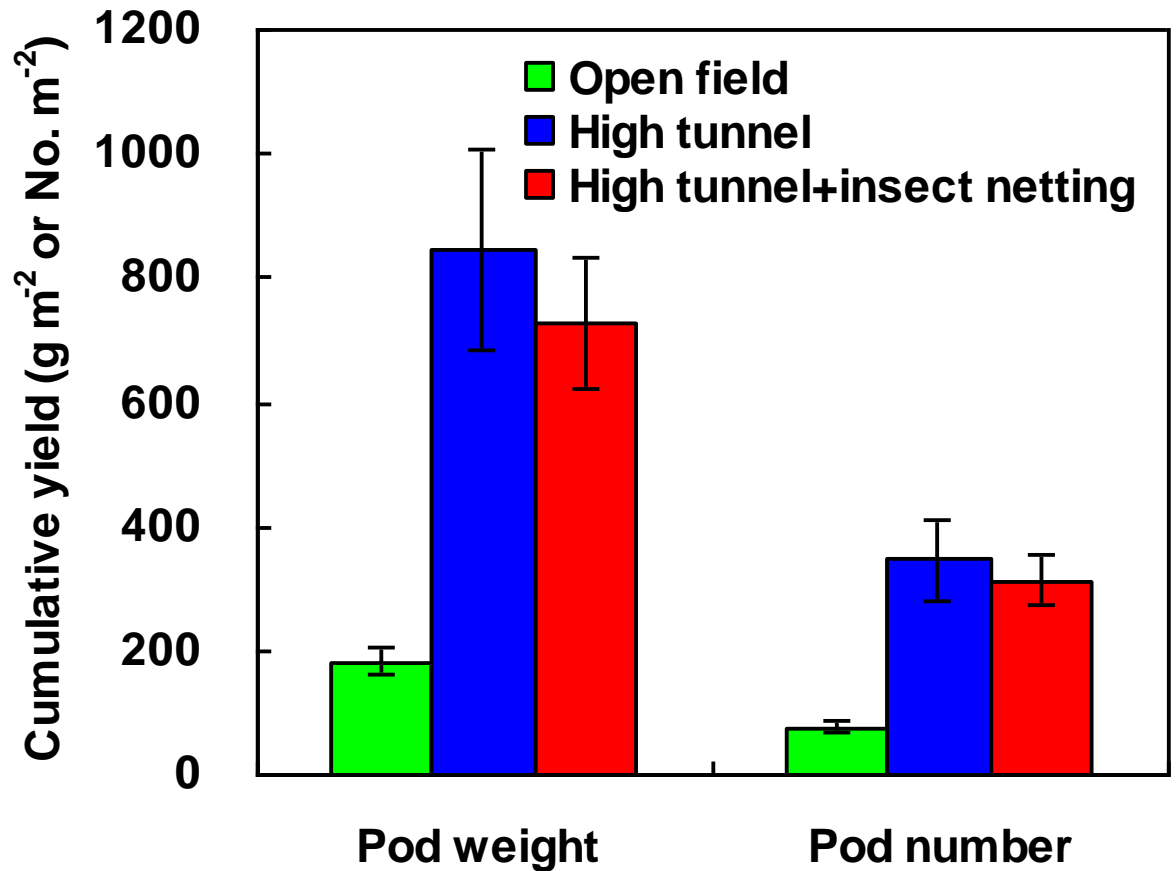




Glebionis coronaria
edible chrysanthemum
Tonghao

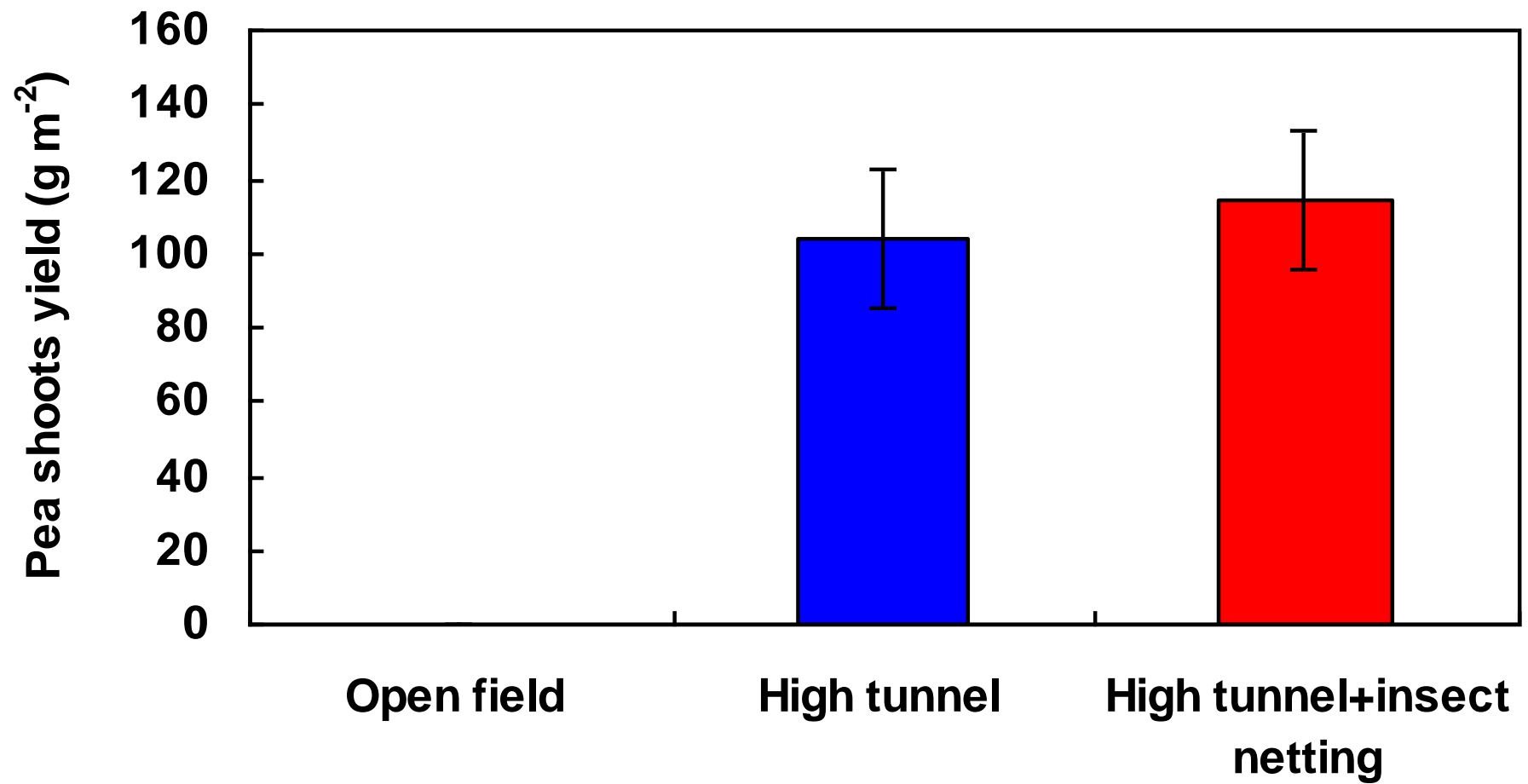


PEA PODS (China 6 snow pea)

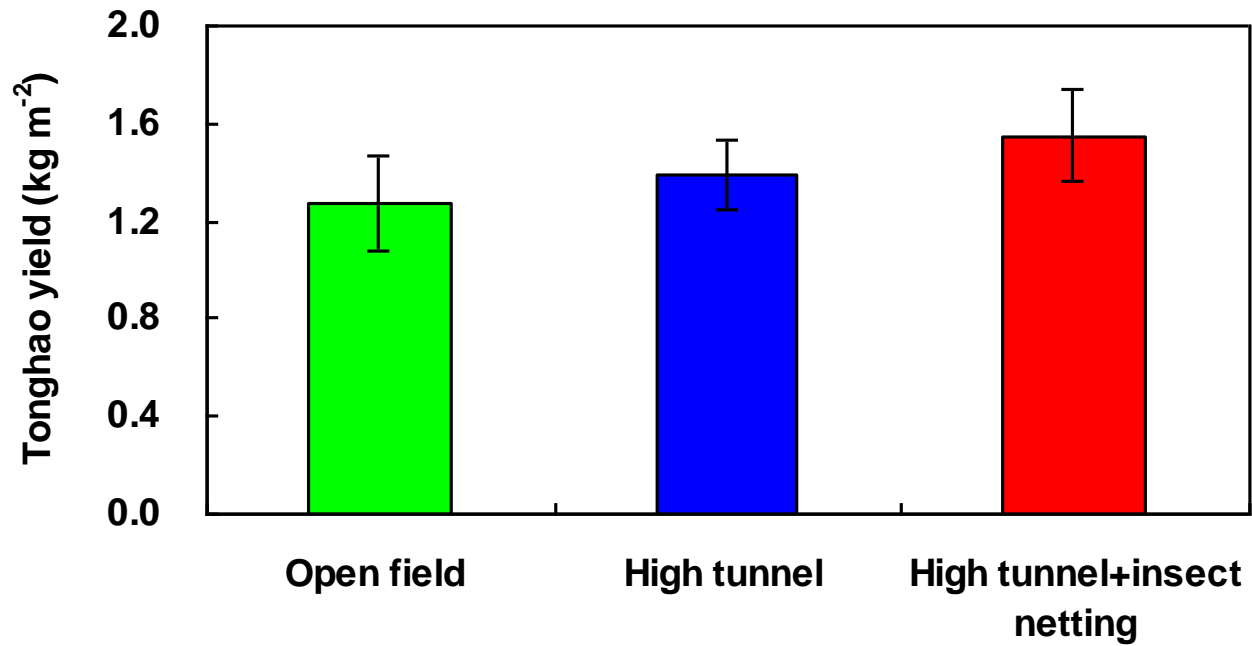


Pea shoot 'HO LAN DOW'



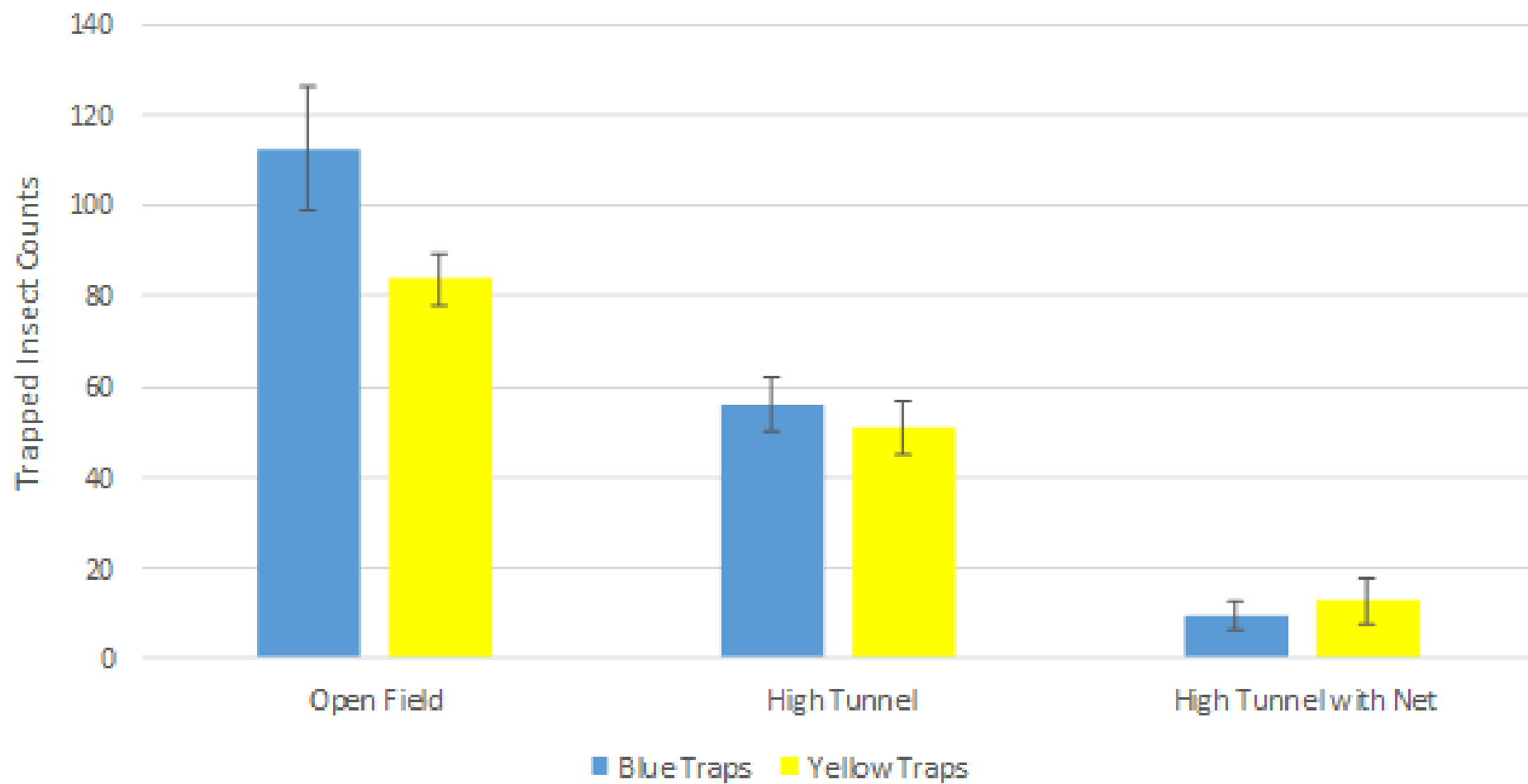


Intercropping



Tong Hao

Bitter Melon



How we did the trials?

Transplanting dates



May 6-8, 2015

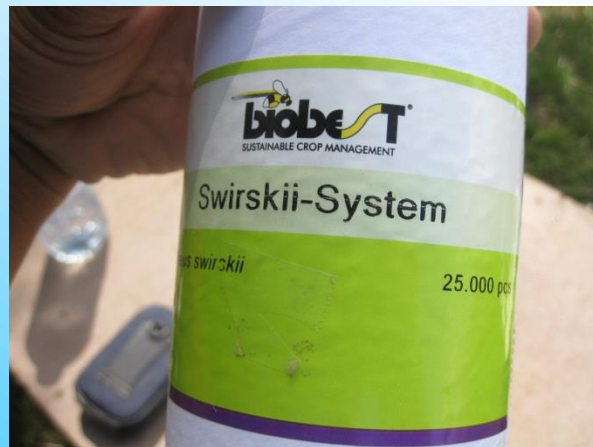
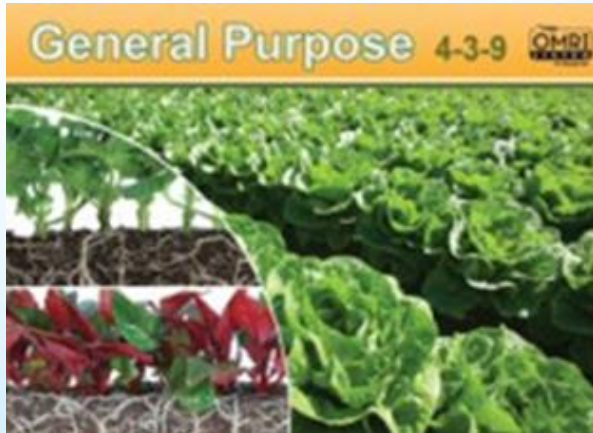


Jun 3-4, 2015

Planting density

- Bitter melon: 1.9 plants/m²
- Tomato: 2.4 plants/m²
- Pea pod: 15 plants/m²
- Tonghao (edible mums): 15gseeds/m²

Plant Management



Lessons Learned



End Walls

- Careful construction is essential to proper functioning and tight-fitting doors (jig)
- Don't scrimp on latch hardware
- Need for securing propped-open doors on hot and windy days

Winter Storage of Poly

- Full roll-up sides is a unique design
- Clean, on-site storage
- Can be easily rolled down in spring to begin warming/drying soil



Environment Measurement and Control



Average Temperatures

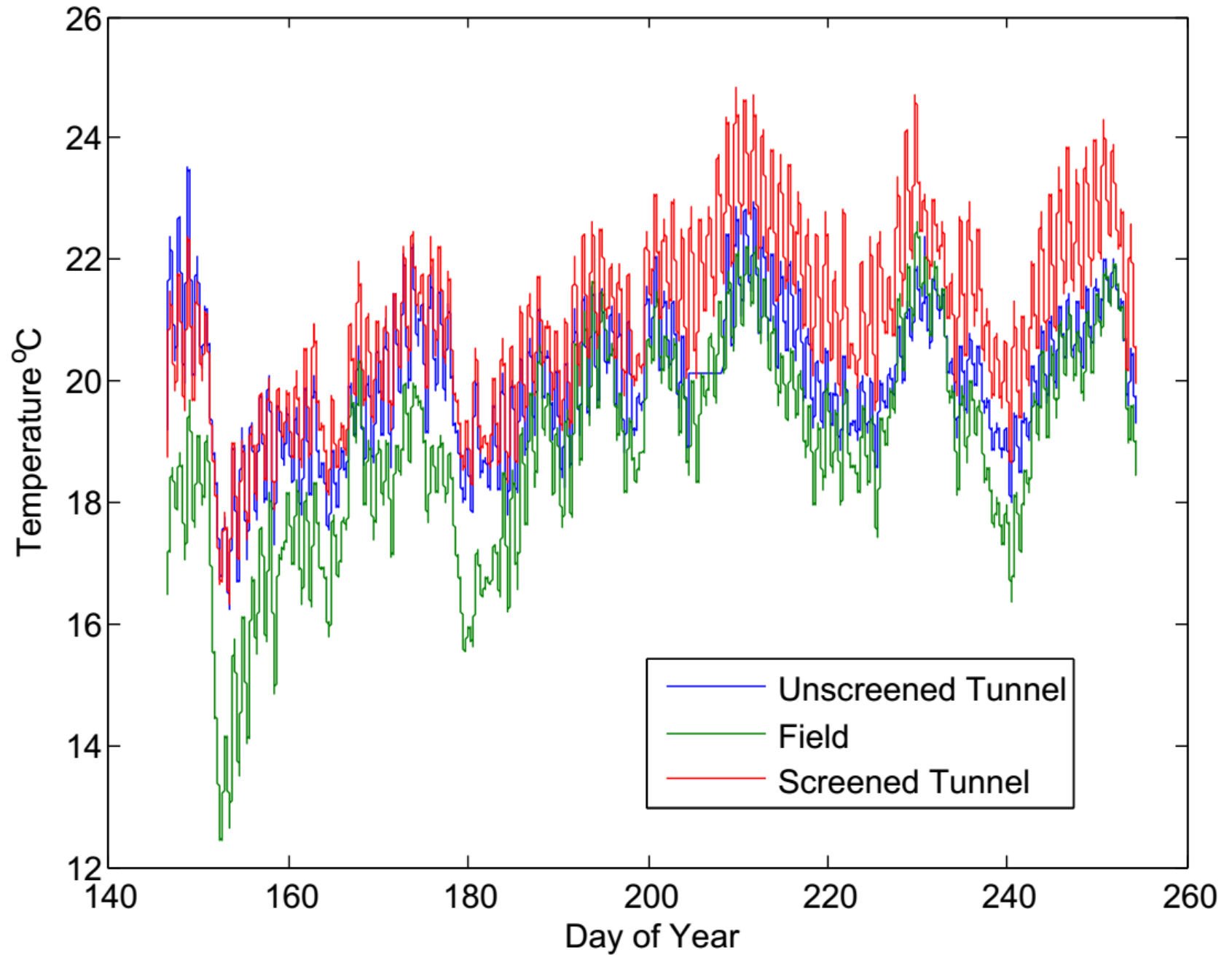
	Field	Unscreened Tunnel	Screened Tunnel
Air Temperature Season	19.3	20.2	21.7
Air Temperature June	17.5	19.1	20.4
Air Temperature July	20.3	21.1	22.9
Air Temperature August	19.1	19.7	21.1
Soil Temperature Season	18.9	20.0	21.0

Additional Degree Days for High Tunnels, Compared to Field
(for 107 days – May 26 to Sep. 11, 2015)

Unscreened Tunnel: 101 degree days

Screened Tunnel: 259 degree days

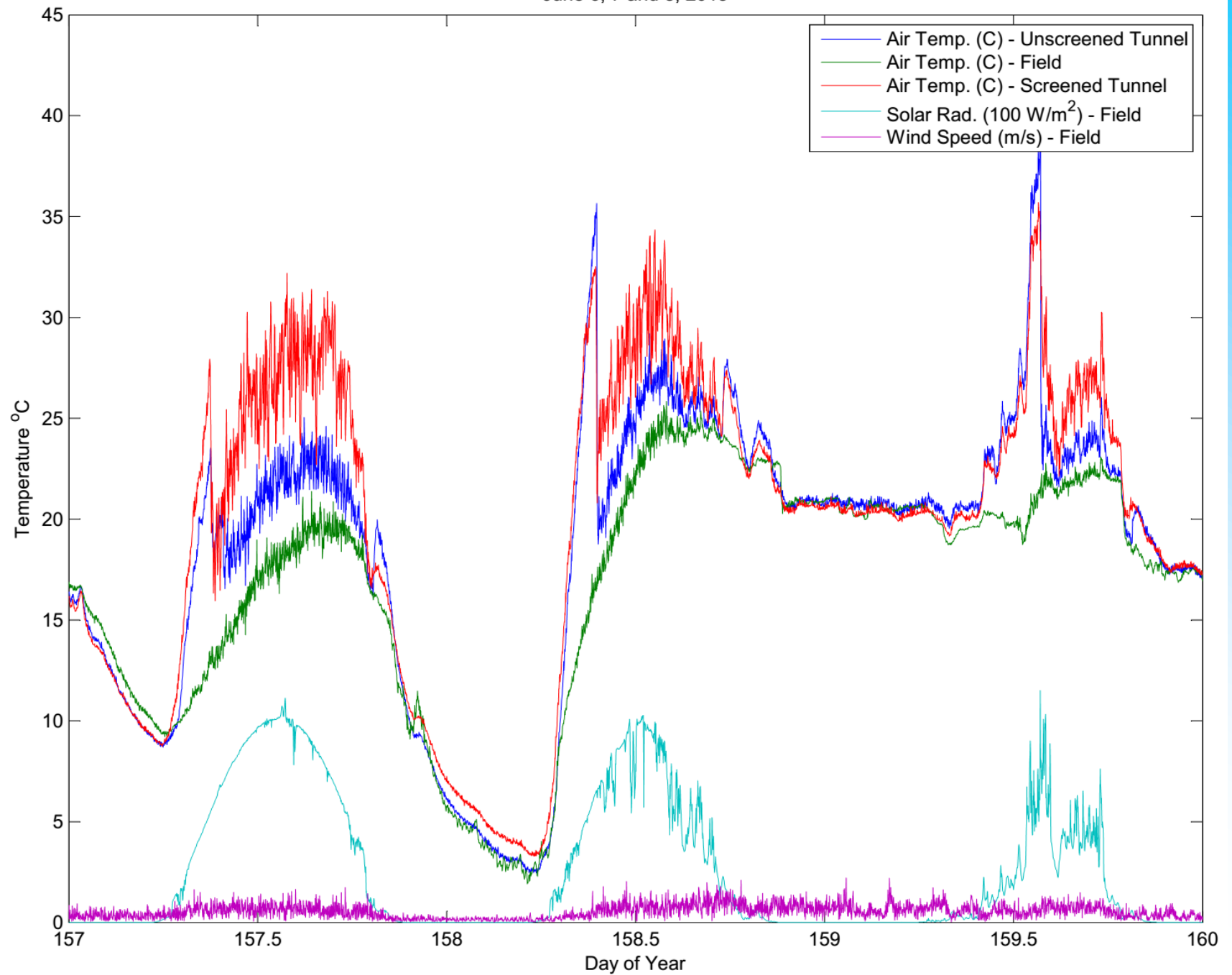
Soil Temperatures



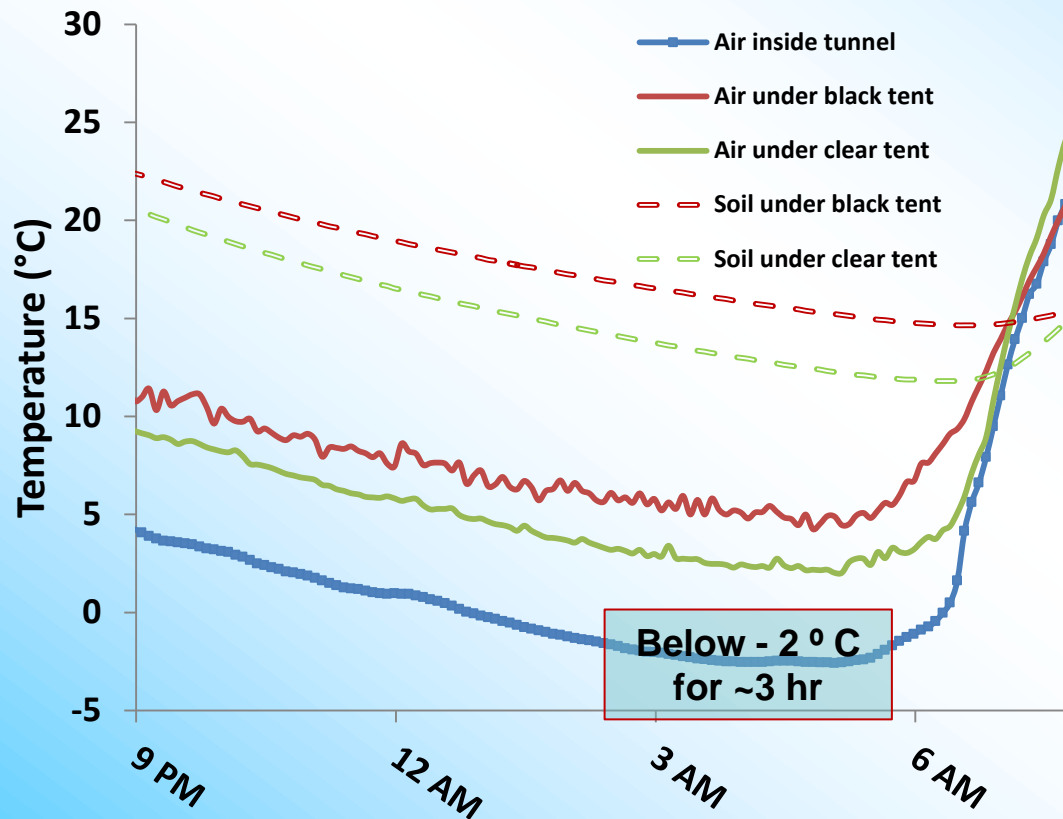
Solar Radiation

- Average solar radiation (season):
 - Field: 231 W/m²
 - Unscreened: 171 W/m²
 - Screened: 163 W/m²
- Transmissivity of glazing ~ 70-75 %
 - Complicated by presence of plants later in season.

June 6, 7 and 8, 2015



Early Season Frost Protection Inside Tunnels: Overnight May 13, 2015





Summary

High tunnel improved crop yield possibly due to:

- extended production period;
- Reduced yield loss from disease, animals and severe weather (e.g., hail, heavy rain);
- Created a better microclimate for crop production.

More work is needed for environmental control and on other species

THANKS



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Katherine Vinson, Nora Alsafi, Patrick Kelly, Amy Kong and many more!