Row covers in vegetables, beyond season extension

Ramón A. Arancibia

Eastern Shore AREC, Virginia Tech.

raran@vt.edu

This material is based upon work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under award number 2015-38640-23780 through the Southern Sustainable Agriculture Research and Education program, under subaward number LS16-268. USDA is an equal opportunity employer and service provider. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture

Protected Systems

- Hot caps and hot/cold frames
- Low tunnel
  - Row covers (film and spun-bonded fabric)
  - Netting (insects)
- Floating row covers
- High tunnel (film)
- Rain shelters
- Net houses (mesh)
- Shade houses
- Greenhouse (plastic, glass, polycarbonate)

Row covers

- Polyethylene film (plastic) – slit or perforated to allow ventilation. Problem with water condensation
- Spun-bonded fabric – permeable, air can flow through, minimal condensation
- Thickness

Low tunnels and floating blankets

- Depend on crops
- May injure crop by wind-flapping

Nets (screens)

- Plastic material
- Available in different mesh (holes/sq-inch)
- Used to cover the air inlet in greenhouses
- As well as

Net-houses

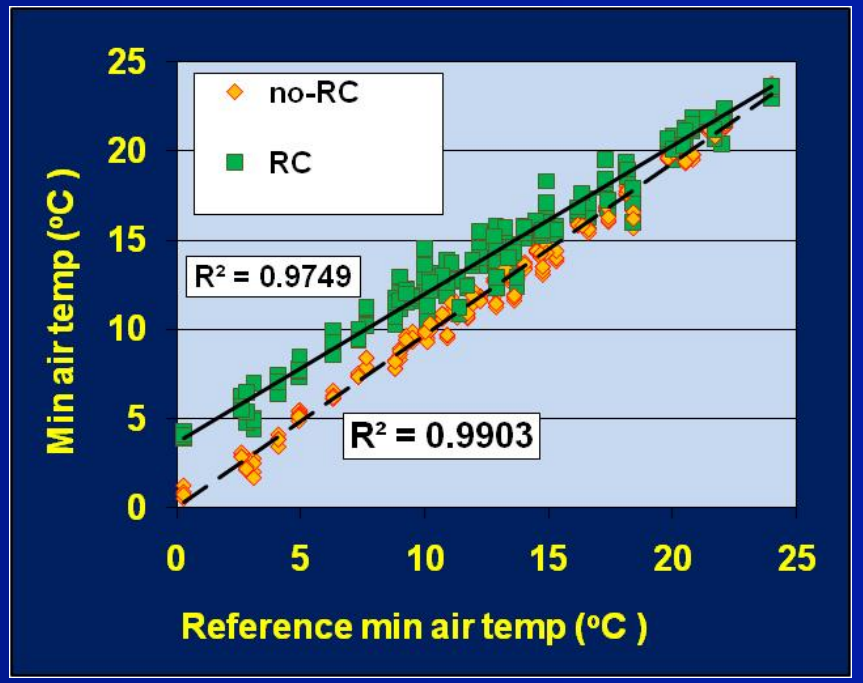
Low tunnels

Used mainly to:

- Rowcovers
  - Protect against cold temperatures in temperate climate
  - Extend growing season (mainly spring)
- Netting
  - Insect barrier
- Other benefits?

Spring watermelon, LA

- Planted in early April.
- Row cover removed 4 week after planting
- Increased air and soil temperature
- Enhanced vegetative growth



Spring cucumbers, ESAREC, VA

- Increased temperature
- Enhanced vegetative growth and yield
- Row cover removed at flowering

Spring sweetpotato slips Northampton, VA

- Increased temperature
- Enhanced vegetative growth and earliness for field planting

Spring lettuce, ESAREC, VA

- Enhanced vegetative growth and head size
- Shortened growth period till harvest

Spring and fall kale and chard, ESAREC, VA

- Row cover kept on until harvest
- Enhanced vegetative growth and yield (30% and 70%)
- Shortened growth period till harvest

Fall greens, VSU, VA

- Row cover kept on until harvest
- Enhanced vegetative growth

Fall Cilantro, ESAREC, VA

- Row cover kept until harvest
- Increased temperature
- Enhanced vegetative growth and increased yield (40% to 50%)
- Maintained quality after a light freeze event

Fall lettuce, ESAREC, VA

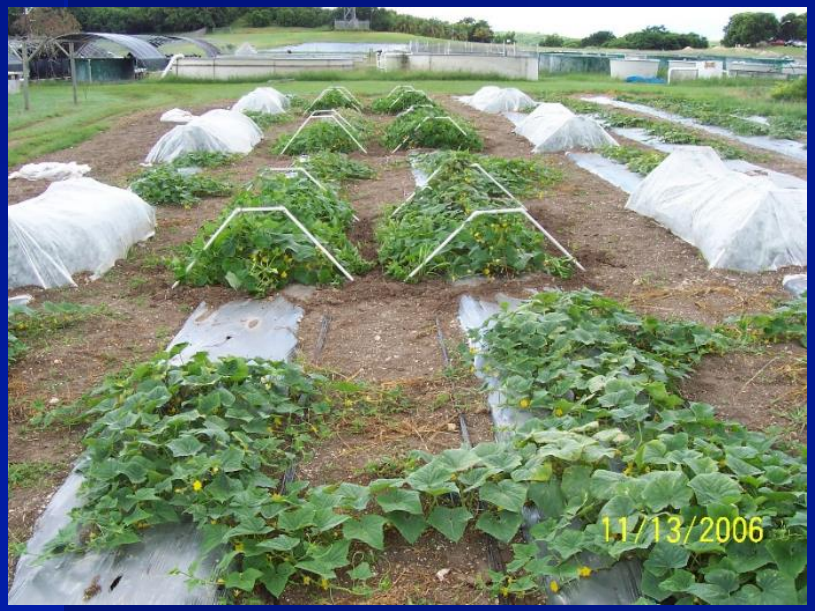
- Row cover kept on until harvest
- Enhanced vegetative growth and yield (30% and 70%)
- Shortened growth period till harvest

Row cover

- Evidence support the use of low tunnel for:
  - Season extension (spring and fall)
  - Enhance vegetative growth
- Can it be used in the summer?
  - To protect against insect pests
  - To enhance vegetative growth
  - To increase yield

Summer cucumbers, VI

- Increased temperature and reduced evapotranspiration
- Enhanced vegetative growth
- Protected against insects
- Increased yield (over 100%)

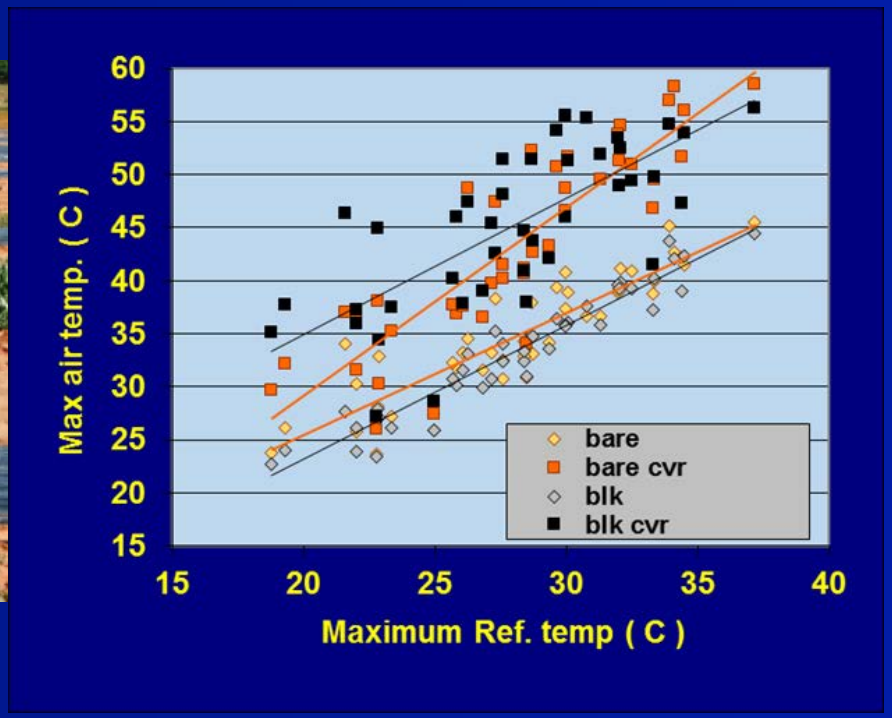


Summer Swiss chard and kale, ESAREC, VA

- Reduced insect infestation
- Rowcover and insect netting
- Tight cover to avoid infestation

Maximum temperature under low tunnels

- Watermelon (LA): 110°F to 140°F in sunny days
- However, have no detrimental effect on vegetative growth



Micro-environmental conditions

- Temperature: Increases, especially Tmax
- Humidity: Maintained
- Wind: Reduced or eliminated
- Solar radiation: Reduced
- Evapotranspiration: Reduced

Summer peppers, VI & VA

- Enhanced vegetative growth
- Reduce incidence of viruses transmitted by aphids (VI)
- Increased yield (20% to 100%)

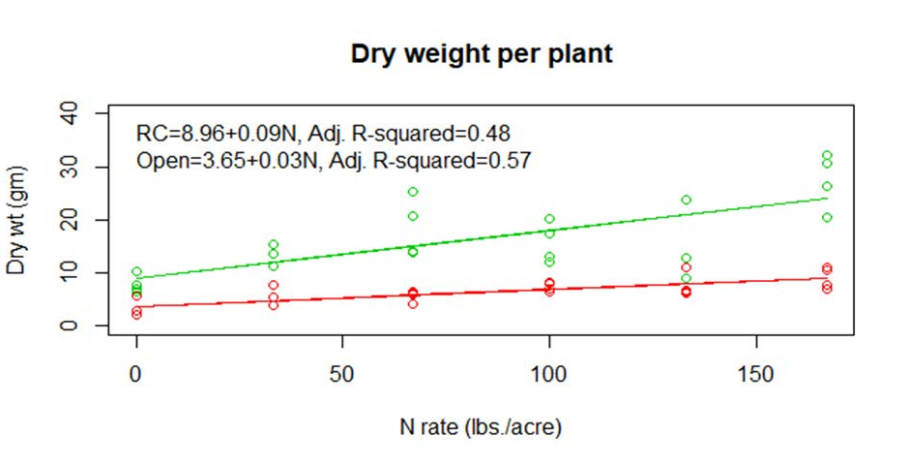
Summer lettuce, kale and chard, ESAREC, VA

- Enhanced vegetative growth
- Increased yield (20% to 70%)
- Shortened growth period till harvest (lettuce)

	Air T	Tmx	Tmn
Blk RC	29.2	37.0	23.4
Wht RC	28.4	37.2	22.9
Net	27.3	34.0	23.6
open	26.9	33.2	21.7

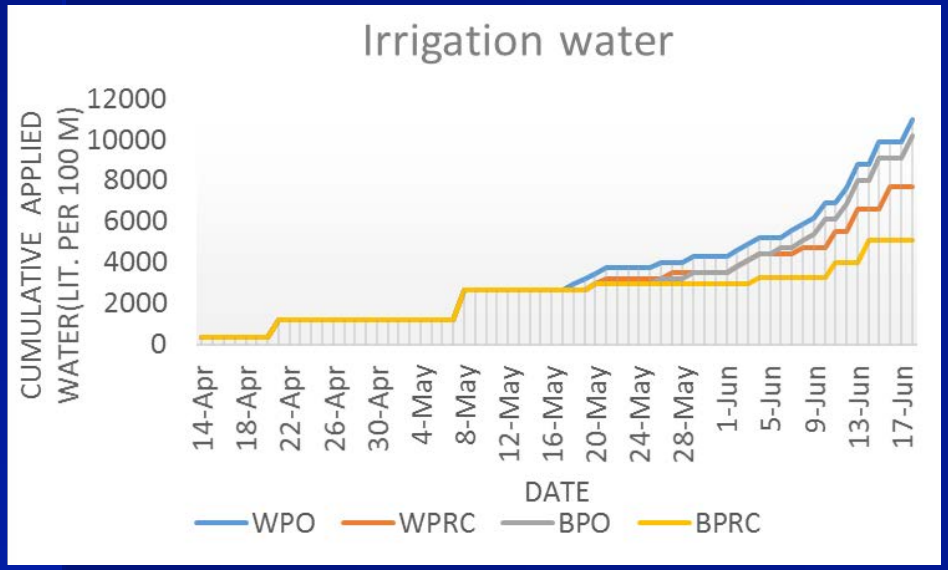
Summer basil, VA

- Enhanced vegetative growth
- Increased yield over 100% (biomass)
- Increased nutrient use efficiency



Irrigation efficiency, ESAREC, VA

- Reduced evapotranspiration and irrigation requirement
- Increased water use efficiency



Does it pay the investment?

- Depends on price, yield and costs
- Broker: possible, but less likely
- Direct to consumer market: most likely

Conclusions

- Row covers/low tunnels effectively protect against:
  - Insects
  - Environmental stresses
- Enhance vegetative growth, yield and quality (exceptions?)
- Improve water and nutrient use efficiency
- Can be used throughout the season with some vegetable crops

Thank you