Lettuce Production in Yuma: Some noted differences (ag practices and environmental conditions) that might influence risk levels

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Different Ag Practices

- Preparation of Soil: Sterilization of soil (e.g. Vapam) is not done in Yuma.

- Irrigation Water: Overhead sprinklers is not commonly used in Yuma (exception is baby leafy greens, grown on 84” beds, and some romaine).

- Nitrogen levels in fertilization program seem lower in Yuma than in Salinas (observation).

- Phosphoric acid is commonly used in the Yuma area.
Yuma Lettuce Production: Some Facts

• Yuma leafy greens never implicated with any outbreak (a melon outbreak in the 80s is mentioned, no information available).

• Based on FDA information over 70% of the outbreaks have occurred during the months of July through November.

• In 2003, in an informal survey to 10 top AZ growers (American Vegetable Grower) only 1 would monitor water quality. Currently, this has changed. Two local labs in place provide service for bacteria indicators analyses.
Surface Water Quality (Imperial County)

Total Coliforms - MPN /100 mL

Sites Monitored
- A
- B
- C

Months

Source: T. Suslow, 2005
Vegetable Production In Yuma

• With exception of migratory birds very few wild animals roaming fields (observation)

• No forest nearby fields

• Only one cattle ranch close to a land that is being farmed (but several sites with domestic animals nearby fields)
Effect of Termination Irrigation on Microbial Population

Microbial Population (Log 10 CFU/g)

Timing of Last Irrigation (Days before Harvest)

Head Weight (g)

LSD=76.48

Timing of Last Irrigation (Days before Harvest)
Effect of Rain on Mesophilic Bacteria Load

Microbial Population (Log 10 CFU/g)

Days before or after a rainfall event
Environmental Conditions in Yuma differ from those in Salinas

Relative humidity and soil temperature in South Salinas and Yuma during the leafy vegetable season
Low temperature during December/January

‘In Arizona crews had to wait up to six hours on some days to harvest because of ice on lettuce; this caused variable quality during December’
Jan., 2006 – US Dept. Agriculture
Environmental Conditions During Harvest Season in Yuma

- Water quality: Almost 100% of the growers source water from Colorado river
- Water quality: High content of salt in water
- Daily sunlight in Yuma appear lower than most places but day length differs (effect?)
- In general soil temperature is lower in Yuma
- In general relative humidity is lower in Yuma
On-going and Future Research

• Study to monitor water in irrigation canals and determine any possible abiotic/biotic factors that correlates with bacteria population fluctuation

• Survival rate of pathogen under different conditions

• Sanitizing alternatives to chlorine
Some Remaining Questions

- No information about monitoring of E. coli O157.H7 in domestic animals in the Yuma area

- Private lab has not confirmed the rumor that E. coli O157.H7 was found once in the river/canal. Other pathogens have been found (work by Gerba et al.), but little is known about fate of pathogens in real conditions

- A feasibility study has not been done on the potential use of sanitizers in the water