



## Development of commodity specific GAPs

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## Good Agricultural Practice

- Commonly called GAP or GAPs
- Should be considered an “Insurance Policy”, not a burden
- Basic GAPs are a collection of common sense and easy to implement practices
- Many are already being performed by prudent growers when performing daily tasks


## Basic tenets of GAPs

1. Pesticides and there use
2. Employee Hygiene and Training
3. Field Sanitation and Harvesting Practices
4. Water
5. Soil, Manure & Biosolids
6. Vertebrate Pest control
7. Traceability/Records/Documentation

## Why are we discussing produce safety?

- Recent foodborne outbreaks focused the attention of regulatory, public and media’s interest towards produce safety
- Outbreaks involving produce, have resulted in increased scrutiny and legal actions
- Media coverage has force companies to take reactionary measures




## Foodborne illness

- There exists a continuing, but preventable, burden of foodborne illness within the US.
- Trends have seen some decreases in recent years

United States

- 76,000,000 cases estimated
- 350,000 hospitalization
- Approximately 5,000 deaths
- Approximately only 1:40 to 1:100 cases are ever are reported



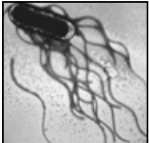
Mead et. al, 1999

## Estimated frequency of bacterial foodborne illness in humans in the U.S.

<i>Escherichia coli</i> O157:H7	73,480 cases
<i>Salmonella</i> spp.	1,412,498 cases
<i>Campylobacter</i> spp.	2,453,926 cases
<i>Listeria monocytogenes</i>	2,518 cases

<i>Escherichia coli</i> O157:H7	61 deaths
<i>Salmonella</i> spp.	582 deaths
<i>Campylobacter</i> spp.	124 deaths
<i>Listeria monocytogenes</i>	504 deaths



Emerging Infectious Disease, Vol. 5, 1999. (<http://www.cdc.gov/hciddoieid/vol5no5/mead.htm>)

## 1996-2006 produce outbreaks by commodity



Lettuce	14	Spinach	2
Tomatoes	13	Basil or Mesclun	2
Cantaloupe	7	Parsley	2
Raspberries/berries	6	Melons	2
Romaine lettuce	4	Honeydew melon	2
Basil	4	Mango	2
Green onions	3	Almonds	2
Unknown	2	Mixed lettuce	1
		Cabbage	1
		Green grapes	1
		Snow Peas	1
		Squash	1
<b>Total = 72 outbreaks</b>			

Guzewich, FDA, 2007

## 1998-2006 produce outbreaks

5 commodity groups make up >75 percent of produce-related outbreaks

Commodity	% produce outbreaks
Lettuce/leafy greens	30%
Tomatoes	17%
Melons	13%
Herbs (basil, parsley)	11%
<u>Green onions</u>	<u>5%</u>
<b>Total % of 5 top commodities</b>	<b>76%</b>

Guzewich, FDA, 2007

## What is the industries response?

- The growers were faced with possible three scenarios:
  - Do nothing (I've been farming for 40 years and I haven't killed anyone yet)
  - Wait until the government imposed mandatory regulations
  - Be proactive and self regulate (GAPs and GMPs)



## So what can be done?

- We are left with two basic strategies to reduce the risk of foodborne illness associated with whole and fresh cut product
- Prevention
- Intervention



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- We are left with two basic strategies to reduce the risk of foodborne illness associated with whole and fresh cut product
  - Prevention**
  - Intervention
- Try to avoid contaminating the product in the first place



## LG Marketing Agreement

- Initiation of California Marketing Agreement 01/2007
- Agreement is *voluntary* to join
- Participants *must* follow rules



### Signatories

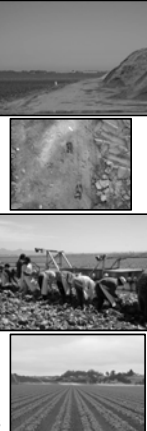
– LGMA is a *Handler* marketing agreement

- Handlers agree to market product only from growers who use the accepted "Good Agricultural Practices"
- Assessments paid on all leafy greens received
  - Funds inspection program, administration, research
- Handlers use the Service Mark

Harris, UC Davis, 2008

## LG-GAPs Metrics

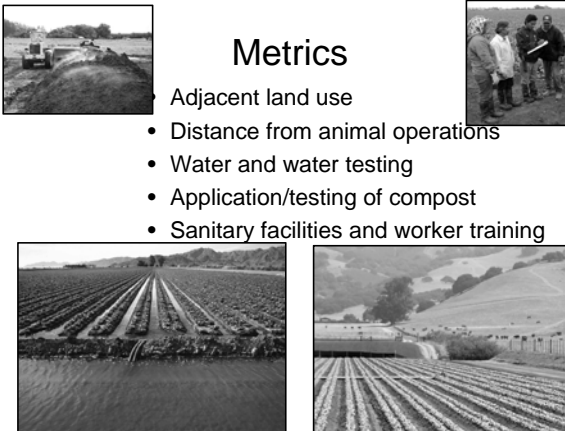
- Mandatory GAPs developed by a panel of industry members, academics and scientists
  - Represent the best practices available
  - Flexible enough to evolve over time as science advances
  - Target water and inputs, wildlife and worker hygiene
  - [www.CALeafyGreens.ca.gov](http://www.CALeafyGreens.ca.gov)



Harris, UC Davis, 2008


## Metrics

- Adjacent land use
- Distance from animal operations
- Water and water testing
- Application/testing of compost
- Sanitary facilities and worker training



## Audits



- Field and plant audits by USDA-trained CDFA inspectors
  - Mandatory audits
    - Growers and handlers
  - Auditors use a uniform checklist linked to the metrics
- Began July 23, 2007 in California
- Arizona implemented 2008



Harris, UC Davis, 2008



## T-GAPs and T-BMPs

- T-GAPs for production in field and greenhouse
- T-BMPs for packinghouse operations and post harvest handling
- Industry adopted voluntary September 7, 2006
- FDACS adopted in 2008
- <http://www.doacs.state.fl.us/fs/ TomatoBestPractices.pdf>

## T-GAP Metrics



1. Prevent/minimize risks in the field from run-off from animal operations, debris that might harbor pests, or other environmental risks
2. Provide for safe water sources for irrigation and provide adequate monitoring
3. Addresses worker cleanliness, health & hygiene
4. Assures adherence to current fertilizer, pesticide and chemical requirements
5. Ensures harvesting crews are aware of food safety risks


Roberts, UF, 2008

## T-GAP Metrics


6. Ensures cleanliness & sanitation of harvesting containers and prohibits use of final pack containers
7. Requires sanitation and cleaning of equipment
8. Requires diligent removal of injured fruit to minimize internal microbial contamination
9. Prohibits field pack of tomatoes, after a phase-in period, unless a sanitizing step that will achieve a 3 log reduction of *Salmonella* and *Erwinia* is approved
10. Establishes required record keeping for key provisions
11. Requires safe water for dilution of pesticides/chemical applied to crop



Roberts, UF, 2008




### What does this mean for fresh citrus?




- Fear exists that metrics developed for leafy greens or tomatoes will be uniformly applied to all fresh fruits and vegetables, including fresh citrus
- Production practices of citrus and other tree crops, are significantly different from annual and row crops
- GAP metrics should not be a “one size fits all” regulation


### What is being done...



- Two meetings of the National Tree Crop Food Safety working group
  - October 2007 and May 2008
  - Set a list of research priorities, both commodity specific and applicable to all tree crops, to determine appropriate metrics for tree crop GAPs
- Citrus Research Board has set up an Introduction to GAPs for Citrus growers
  - <http://www.citrusresearch.org>



### Take home message



- Be aware of GAPs, and that mandatory, regulated gaps are being applied to some commodities
- An effort is underway by a consortium of tree crop groups to prevent the adoption of “one size fits all” GAPs regulations
- An introduction to citrus GAPs can be found online, and modified to individual growing operations
  - <http://www.citrusresearch.org>