E. Coli & Fresh Produce:
Some Lessons Learned

Presented by
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NC State University
Program Outline

- Economic impact of E. coli in spinach and onions
- Potential economic impact on NC crops
- Management tools to implement GAPs
- Critical GAP practices
- Lessons learned
The Economics of Implementing GAPs

- Reduced risk
- Protected reputation
- Reduce the possibility of catastrophic sales loss
- Maintain/protect market access
Overall consumption of fresh fruits and vegetables is increasing.

U.S. Consumption of Fresh Fruits & Vegetables

Pounds of consumption per capita

- **Fresh Fruits**
- **Fresh Vegetables**
- **Total**

The industry is consolidating

- A smaller number of processors are handling a larger volume of product
- Outbreaks are more likely to be traced to the source if large numbers of consumers become ill
E. Coli is most likely to occur in:

- Leafy greens
- Tomatoes
- Melons (particularly cantaloupes)
E. Coli and Leafy Greens

- Since 1996:
- 34% of all outbreaks due to microbial contamination traced back to a specific fruit or vegetable
- 10% of illnesses
- 34% of deaths
  20 of the 24 outbreaks have involved E.col O157:H7.

E. coli O157:H7 illnesses linked to leafy greens reached new record in 2006

Source: U.S. Food and Drug Administration.
Weekly bunched spinach shipments rebounded after outbreak

But the price did not
In 2007, bagged spinach and salad retail sales values still lag

<table>
<thead>
<tr>
<th>Percent change in sales value from a year ago for:</th>
<th>January 24-February 24, 2007</th>
<th>August 24, 2006-February 24, 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bagged spinach</td>
<td>-27</td>
<td>-43</td>
</tr>
<tr>
<td>Bagged salad with spinach</td>
<td>-24</td>
<td>-42</td>
</tr>
<tr>
<td>Bagged salad without spinach</td>
<td>-5</td>
<td>-8</td>
</tr>
</tbody>
</table>

### E.coli Sep ’06 Spinach Outbreak Impact on Producer Prices

<table>
<thead>
<tr>
<th></th>
<th>1982=100</th>
<th>% change from month-month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sep 2006</td>
<td>419.5</td>
<td>*</td>
</tr>
<tr>
<td>Oct 2006</td>
<td>312.1</td>
<td>-26%</td>
</tr>
<tr>
<td>Nov 2006</td>
<td>367.1</td>
<td>17.6%</td>
</tr>
<tr>
<td>Dec 2006</td>
<td>479.5</td>
<td>30.6%</td>
</tr>
<tr>
<td><strong>Annual</strong></td>
<td>304.2</td>
<td>-54.8%*</td>
</tr>
</tbody>
</table>

*Represents change from previous year

Source: USDA Economic Research Service
**Nov/Dec ’06 Green Onion E.coli Outbreak Impact on Producer Prices**

<table>
<thead>
<tr>
<th></th>
<th>1982=100</th>
<th>% change from month-month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov 2006</td>
<td>258.1</td>
<td>*</td>
</tr>
<tr>
<td>Dec 2006</td>
<td>177.3</td>
<td>-31%</td>
</tr>
<tr>
<td>Jan 2007</td>
<td>327.4</td>
<td>85%</td>
</tr>
<tr>
<td>Feb 2007</td>
<td>286.2</td>
<td>-12.6%</td>
</tr>
<tr>
<td>Mar 2007</td>
<td>182.3</td>
<td>-36.3%</td>
</tr>
<tr>
<td><strong>Annual</strong></td>
<td></td>
<td><strong>-58.8%</strong></td>
</tr>
</tbody>
</table>

*Represents change from previous year

Source: USDA Economic Research Service
Fresh Vegetable Shipments

- Down 17% from the previous year for spinach
- Down 10% from the previous year for green onions

Source: USDA Economic Research Service
Putting it into an NC Perspective

- 2005 NC Fresh Tomato Crop valued at $22.4MM
  
  *A 55% drop in prices to the grower would reduce the value to $10.1MM*

- 2005 NC Strawberry Crop valued at $18.5MM
  
  *A 55% drop in prices to the grower would reduce the value to $8.3MM*

Source: NCDA
Other Factors in the Spinach Outbreak

- No third party audit was performed for the 2006 growing season
- The fields were adjacent to those used for cattle operations
- The grower was in the 2nd year of transition from traditional to organic production
Figure 4
Daily green onion free-on-board prices in the United States, 2002 and 2003¹
Dollars per 13-lb box

FDA announcements
- Nov. 15, 2003
- Nov. 20, 2003
- Nov. 21, 2003
Figure 5
Weekly U.S. and Mexican green onion shipments, 2002/03 and 2003/04

# Impact on Growers Following Hepatitis A Outbreak in Green Onions from Mexico, June 2004

## Table 2—Impact of food safety outbreak on Mexican growers, by GAP status

<table>
<thead>
<tr>
<th>GAP status</th>
<th>Impact on: Volume of green onion sales</th>
<th>Demand for other products</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAPs</td>
<td>Fairly constant</td>
<td>No impact</td>
</tr>
<tr>
<td>Partial GAPs</td>
<td>Down a bit</td>
<td>Some impact</td>
</tr>
<tr>
<td>No GAPs</td>
<td>Down by 50 percent</td>
<td>Down by about 30 percent</td>
</tr>
<tr>
<td>No GAPs and named by FDA</td>
<td>No sales and most fields plowed under</td>
<td>Shippers stopped selling all or almost all products from these growers</td>
</tr>
</tbody>
</table>

Making Food Safety Plans worth the effort

Employees: Infected employees who work with fresh produce increase the risk of transmitting foodborne illness.

- Train employees to follow good hygienic practices
- Establish a training program directed towards health and hygiene – include basics such as proper handwashing techniques and the importance of using toilet facilities
- Become familiar with typical signs and symptoms of infectious diseases in employees

Source: http://www.cfsan.fda.gov/~dms/prodglan.html
- Offer protection to workers with cuts or lesions on parts of the body that may make contact with fresh produce
- If employees wear gloves, be sure the gloves are used properly and do not become a vehicle for spreading pathogens
- Customer-pick and road-side produce operations should promote good hygienic practices with customers – encourage handwashing, provide toilets that are well equipped, clean, and sanitary and encourage washing fresh produce before consumption

Source: http://www.cfsan.fda.gov/~dms/prodglan.html
Production practices: Poor management of human and other wastes in the field or packing facility increases the risk of contaminating fresh produce

- Be familiar with laws and regulations that apply to field and facility sanitation practices
- Toilet facilities should be accessible to workers, properly located, and well supplied
- Keep toilets, handwashing stations, and water containers clean and sanitary
- Use caution when servicing portable toilets to prevent leakage into a field
- Have a plan for containment in the event of waste spillage

Source: http://www.cfsan.fda.gov/~dms/prodglan.html
Crop Production Water

- Know routes & handling of surface water sources, seasonal influences on quality and any microbial monitoring programs of the supplier
- Identify potential sources of contamination
- Ensure wells aren’t contaminated by surface run-off and soil infiltration
- Foliar applications from pathogen free source
- Currently, foliar applications from potable source within two weeks of harvest
GAPs are a *way of life*, NOT a “one day event” when the auditor is on site.
Lessons Learned

- Economic loss from a disease outbreak can be widespread and far-reaching
- All production methods – traditional and organic – require careful monitoring
- Food safety plans need to be worth more than the paper they are written on

A *practice* is something that is done *daily*.