The second annual Tomato Packinghouse Managers Workshop was held on September 5 in conjunction with the Florida Tomato Joint Tomato Conference, and was co-sponsored by University of Florida/IFAS Extension & the Florida Tomato Committee.

The workshop was attended by 49 packinghouse managers, technical reps, and IFAS state and county extension faculty. This year’s theme was, “Sanitation and Food Safety Update for the Fall Season”, and a brief summary of the technical presentations follows.

Steve Sargent, meeting coordinator and Extension Postharvest Horticulture Specialist, spoke about the “Sources of Contamination during Harvest and Packing”. He stressed that each step from harvest through packing and shipping must be properly managed to minimize the risk of contaminating the crop (in this case tomatoes) with postharvest decay pathogens or human pathogens. An effective field sanitation program begins with use of clean water in the field, use of cleaned and sanitized picking buckets/bins/gondolas, and the availability of portable toilets and hand-washing facilities. Packinghouse sanitation begins with proper management of the dump tank to reduce the potential for cross-contaminating sound tomatoes with pathogens entering the water. Infiltration of pathogens into tomato stem scars, blossom ends or skin breaks can promote the development of decays during handling and shipping. Packing line equipment must be cleaned and sanitized daily to avoid the growth of biofilms on surfaces; brush and sponge rollers are particularly susceptible since they remain wet from day to day.

Jerry Bartz, postharvest pathologist, discussed “Controlling Postharvest Decays: the old and the new”, beginning with an overview of water chlorination. The current UF/IFAS recommendation is to maintain a minimum of 150 parts per million of free chlorine in the dump tank and any other recycled water. The pH should be maintained from 6.5 to 7.5. Sources of chlorine include solid forms that require premixing with water, liquid forms that readily mix, and gaseous forms. Dr. Bartz also noted his concerns about how uniformly chlorine products and pH buffers are mixed in with the water circulating in the dump tanks and flumes.
Recent studies using chlorine dioxide gas show promise for uses as varied as disinfection of cold rooms to disinfection of microorganisms in wounded tomatoes.

Extension Food Safety Specialist, Keith Schneider, presented two talks. In “Food Safety Update: Pathogens and Alternative Sanitizers”, he reviewed the main human pathogens that have been associated with outbreaks followed by a discussion on means for reducing the risk of contaminating fresh produce. When we use the word “sanitation”, it is not to be confused with sterilization or disinfection. A product or piece of equipment is sanitized when harmful microbes have been reduced to a safe level. In laboratory setting a sanitizer must meet a performance standard which is a reduction of 99.999% (or a 5-log unit reduction) in the test microbes within 30 seconds of exposure. In the real world results will probably be much less. To achieve the best reductions in packinghouses, the use of several steps, or hurdles, makes it less likely that pathogens will remain on the product.

In his second presentation, “Salmonella and Tomato Research Update”, Dr. Schneider started off with recent studies about chlorine efficacy. A 5 log unit reduction was recorded with 50, 100 and 150 ppm of free chlorine, but he stressed the need for the higher levels of oxidant to ensure good sanitation throughout the day. When tomatoes are injured (punctured or scraped), Salmonella was able to survive in the wound despite treatment with free chlorine. This stresses the importance of culling as an effective method to reduce contamination. When tomato ripening room conditions were simulated, the presence of ethylene gas had no effect on microbial growth. In another test studying the importance of sanitation of equipment, Salmonella remained viable on unwashed tomato fruit and stainless steel surfaces for up to 28 days, and up to 21 days on conveyor belt material. Regarding the effect of tomato type on potential for increased Salmonella survivability, the only difference found between round and roma-type tomatoes was that roma tomatoes had a slightly higher pH (4.4) than round tomatoes (4.2), which did not effect the growth.

Jeff Brecht, postharvest physiologist, discussed “Temperature Management for Tomato Handling: How ‘Good Enough’ Can Lead to Disaster”. Tomato pulp temperature can increase significantly during harvest and packing operations, making removal of this field heat after packing and palletizing an important consideration. High ripening temperatures can lead to “checker-boarding” and increased decay. Tomatoes with a pulp temperature of 84°F were placed in a ripening room at 68°. Under these conditions pulp temperatures were still 72° after 2.5 days. As a result tomatoes from these pallets ripened less uniformly than tomatoes that were precooled to 72° prior to ripening. In another test based on temperature measurements made during commercial shipping tests, pink tomatoes from a commercial ripening room were inoculated with soft rot bacteria (Erwinia) and cooled at three rates: quickly cooled from to 76° to 54°, cooled from 76° to 57° in 1 day, or cooled from 76° to 66° in 4 days. After 4 days, those cooled quickly had 8% slight decay, while those cooled to 57° in 1 day had 84% decay ranging from slight to moderate; those cooled to 66° in 4 days had 100% severe decay.

“Tomato Best Management Practices for Packinghouses” was presented by Martha Roberts, Special Assistant to Director, Florida Agricultural Experiment Stations. After describing the nutritional benefits, she outlined the few, but significant, foodborne illnesses that have been associated with fresh tomatoes since 1999. The majority of these outbreaks were with fresh-cut tomatoes (cut, sliced or diced). As a proactive response to these outbreaks, the Florida tomato industry is collaborating with the Florida Department of Agriculture, the Food & Drug Administration and UF/IFAS researchers to develop Tomato Good Agricultural Practices (T-GAP) for field and greenhouse operations and Tomato Best Management Practices (T-BMP) for
packinghouse operations and other postharvest operations. Establishment of uniform food safety practices would serve as a voluntary means for Florida growers, packers and shippers to address food safety concerns until the practices are adopted by the Department of Agriculture. Proactivity by the industry is preferable to mandatory measures imposed by federal agencies.

This plan would have the following components:

- Mandatory registration of all grower/handler locations
- Recovery of costs of registration and inspection
- Mandatory education and training of all sectors
- Assurance of compliance through regulatory inspections and 3rd party audits
- Continued Federal Marketing Order requirements

Exemptions would be for those tomatoes sold on premises where grown or sold by growers at local market – not to exceed two 25 lb boxes per customer, and for charitable donations that will not be diverted into commercial channels. Other components would include: continuing education for industry personnel, recordkeeping, third-party audits, and specifications for labeling and containers.

Dr. Roberts also mentioned that a Methods Evaluation and Research Committee will be established consisting of 2 to 3 members of the Florida Department of Agriculture and Consumer Services (FDACS), the University of Florida, Institute of Food and Agricultural Sciences (IFAS) and one industry representative. The purpose of this committee will be:

- To evaluate sanitation methods proposed to ensure credible science and reduction of microorganisms and to ensure measures meet current law and regulations
- To approve adequacy or equivalency of education & training materials
- To review 3rd party audit firms and provide a list to industry of those acceptable for use
- To provide a listing of critical research needs
- Provide recommendations on monitoring frequencies, record keeping, etc.

In summary, sanitation during harvest, packing and shipping continues to be an important aspect of postharvest management. Implementation and maintenance of a comprehensive sanitation program is critical to successful marketing of Florida tomatoes.

-Sargent