Greenhouse Tomatoes Expected to Dominate the Fresh Tomato Market

Greenhouse-produced tomatoes may someday dominate the fresh tomato market in the United States, according to a University of Arizona researcher.

Dr. Gene Giacomelli, professor and director of the Controlled Environment Agricultural Center at the University of Arizona, believes that if the present growth rate continues, the only major market for field-grown tomatoes in a few years may be to processors for tomato juice, tomato paste, ketchup and other processed products.

“Twenty to 25 percent of fresh market tomatoes today were grown in greenhouses,” Giacomelli says, “Five years ago, I wrote a report placing the figure at six percent. That’s incredible growth.”

Will the greenhouse tomato industry continue to increase market share?

There’s little doubt about it, the researcher believes. The question is not whether the industry will grow but how fast.

Market Dominance Possible

“Eventually, greenhouse-produced tomatoes could claim 100 percent of the fresh-market category,” he says. “Europe is almost there now. Its fresh-market tomato category is completely dominated by greenhouse product. Here in the U.S., consumers, too, have begun to appreciate the consistency and quality of greenhouse tomatoes and are buying them in larger numbers than ever before.”

The introduction of the cluster tomato (in different colors), super sweets, cherry tomatoes and, more recently, cocktail tomatoes are bringing variety as well as improved taste and color to the marketplace, the researcher says.

“Most exciting about this industry is its growth potential,” Giacomelli points out. “The stage is set for a bright future. We’re seeing young people coming into our greenhouse educational programs here at the University of Arizona. They are enthusiastic and rejuvenated about the future of high technology production agriculture.”

But greenhouse tomato production today is far from regular farming, he underscores. It is high technology and requires education, training and special skill.

“We’re not talking about dirt farming anymore,” he smiles. “It’s hydroponics, computers and a tightly controlled environment. It’s beautiful aluminum structures and plants that look like they could be growing in a hospital because they are perfectly clean and neat and pest free — due to the biological controls available today.”

The infrastructure and technology required to make the greenhouse tomato industry go have come together, the researcher believes, and the combination is now improving productivity and the ability to make money.

Producers have learned how to grow product virtually year-round. Eight weeks in advance of terminating the old tomato crop, workers initiate the new crop by planting small seedlings underneath the older plants. This practice, in itself, has reduced
downtime, when there is no production, from a month to a month and a half down to about a week.

**Trained Professionals Needed**

Experienced greenhouse production companies such as EuroFresh Farms have set up shop in Arizona and are seeking young, trained professionals to step in and help them run and manage their operations, Giacomelli says.

Today, the University of Arizona is offering high-tech education in hydroponics and greenhouse production and operates a 5,000-square-foot greenhouse teaching laboratory year round to give students hands-on experience. In addition, a greenhouse crop production and engineering design short course is offered once each year to those outside of the university setting. It includes four days of intense training, including classroom instruction by academia, growers and others active in the industry. Attendees also spend time in the university’s greenhouse teaching laboratory and participate in a tour of nearby commercial greenhouse facilities owned and operated by EuroFresh Farms.

The 2005 Greenhouse Crop Production and Engineering Design Short Course will take place Jan. 16-20 at the Tucson campus.

“This year, 65 people attended from as far away as Hawaii,” Giacomelli notes. “Twenty-five percent were from Mexico; only a handful lived here in Arizona. We’ve been targeting the western U.S., as other greenhouse short courses are offered in the South and other parts of the country.”

**Arizona Leads the Industry**

Soon to be at 240 acres, Arizona now tops the country in greenhouse vegetable crop production, according to the researcher. EuroFresh Farms has 165 acres at one site with another 45 to be added soon; it has another 20 acres at a second site. Today, there are slightly less than 900 acres of greenhouse tomatoes grown in the U.S.

Companies such as EuroFresh have truly “tamed the desert,” according to Giacomelli. Utilizing as much sunlight as possible and the latest technologies available, they have learned how to help their crops survive the state’s blistering temperatures and low humidity levels.

“Here in Arizona, growers are primarily using rock wool and drip fertigation systems,” the researcher says. “Dippres feed each group of plants. Managers use a recycling system that picks up the drainage, tops it off with additional nutrients, when necessary, and recirculates everything. The system monitors nutrient and pH levels, adjusting both to maintain plant growth.” Yearly production per acre is 10 times that of the field, and it uses four to six times less water per pound of fruit harvested.

The hydroponics system makes changing the nutrients relatively easy, Giacomelli says. Changing the electrical conductivity, or EC, to manage the needs of the plants during various growth stages and during different times of the year, also, is relatively simple.

Two types of supportive research at the University of Arizona are going on, according to Giacomelli. One focuses on environmental controls, while the other is targeted at improving productivity and fruit quality. Dr. Chieri Kobota, a professor and greenhouse plant physiologist, is focusing on improving tomato taste and quality.
“Primarily, she is experimenting with the nutrient environment. Growers, here, have been doing a lot of work, adding nonessential salts to increase the EC at certain times of the day and then reduce it at other times,” Giacomelli explains. “The goal is to help the plants grow better and produce higher quality taste. The market is demanding improved taste.”

A good example is the introduction of the cocktail tomato, the researcher points out. Not a cherry tomato and nowhere near beef stake size or tomato sizes coming out of Europe, cocktail tomatoes have a strong flavor and can be very sweet. In ways, they are the same old tomato but in a new package. The greenhouse is morphing its tomato output and is turning out different shapes, sizes, flavors and colors, adding excitement to the marketplace. Even more important, such tomatoes are now available year-round, as the market demands.

Year-round Producers

“To make that this happen, is something we’ve been working on for a long time,” Giacomelli says. “Our goal has been to take the greenhouse grower from being a seasonal, ‘hit the high market,’ or ‘hit the market whenever you can’ producer to a year-round tomato factory turning out high value fruit continuously.”

Consumers are recognizing this is a different type of tomato, and, therefore, it demands a higher price, Giacomelli says. They also are displaying a willingness to pay for that added quality.

University of Arizona scientists also are looking at the environment and how it influences plant growth and, ultimately, fruit quality. They are manipulating both temperature and humidity levels inside the greenhouse.

In one study, the research team has been experimenting with changes in the salt level in the root zone, electrical conductivity and the vapor pressure deficit in the air around each plant. Certain changes influence the plant to be more vegetative and produce less fruit and more leaves; others make it more reproductive with more fruit and less leaves.

“Combining engineering and horticultural concerns, we have been documenting at what levels the combination of these two affects the plant,” Giacomelli explains. “We want to know how fast the plant can change from an unbalanced, too vegetative or too reproductive scenario to a more balanced situation.”

As the seasons change, so does the amount of solar radiation available. Being able to manipulate the plant helps growers maximize yields.

“Our goal is to maintain the health and vigor of the plants as long as possible,” he says. “We want to keep them in balance with the sunlight available from nature. Ideally, we don’t want a plant to produce a lot of fruit on the first four or five clusters and then be so depleted in its energy reserves that the next four or five clusters are smaller than desired or there is an overall reduction in the number of clusters.

“Both growers and researchers call this ‘steering the plant.’ We want that plant to produce a load of fruit that matches its capability, given the particular environment. And that’s exciting from an engineering standpoint, because we can control the environment. We can manipulate temperatures, relative humidity and, ultimately, vapor pressure deficit, or VPD, to where the plant is most productive. Environmental control in
agriculture (CEA), the new technology agriculture, can get it to produce more consistent
taste and overall quality as well as the number of fruit.”

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