

## Impact of Greenhouse Tomatoes on the Fresh Field Tomato Industry

U.S. greenhouse and fresh field tomato production have both continued to grow. Growers of mature green tomatoes have faced the most change with the decline in retail demand for their product; however, growth in foodservice demand has compensated for lost retail sales. Greenhouse tomato production is the latest in a string of developments that have put market pressure on the mature green tomato industry, the traditional backbone of the U.S. fresh tomato industry. The smaller vine ripe industry also faces increased competition from greenhouse tomatoes. The vine ripe is now the preferred round field tomato in retail channels, and its retail sales have been increasing. However, unlike mature green tomatoes, vine ripers have limited foodservice demand.

### U.S. Field Tomato Industry

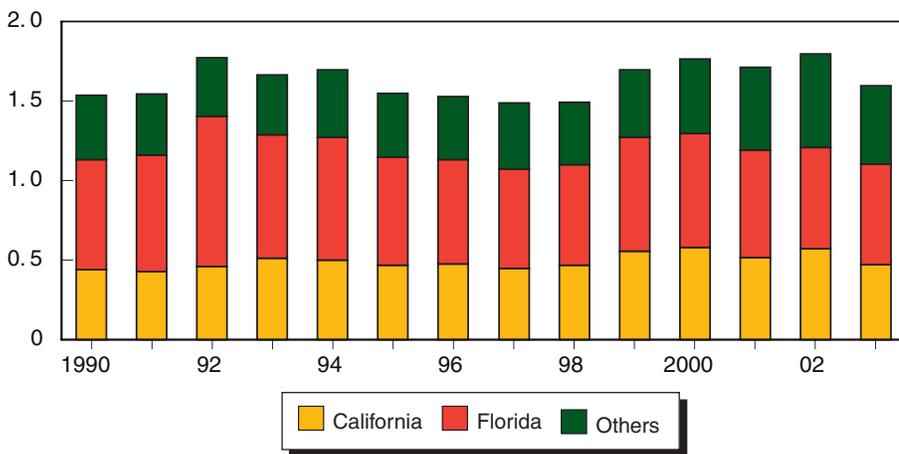
Florida and California are the primary domestic sources of fresh field tomatoes in the United States, accounting for 40 and 29 percent, respectively, of the U.S. field tomato production in 2003 (fig. 19).<sup>27</sup> Thirty-one other States produce fresh tomatoes commercially, making fresh market field tomatoes one of the more geographically diversified horticultural crops grown in the United States. Total U.S. production has fluctuated since 1990, and the average since 2000 is up 8 percent over the average in the 1990s. Florida's field tomato production fell while that of California and other States is up. Clearly, strong seasonal demand for locally or regionally produced fresh field tomatoes during the 1990s benefited numerous States. While total production increased, U.S. fresh field tomato area planted declined with the average since 2000 down 2 percent from the average in the 1990s (fig. 20). Yields have increased in all regions, particularly in the other States.

<sup>27</sup> In 2003, weather problems hampered fresh field production in California, as well as summer production in regions east of the Mississippi River. In 2002, California's share of U.S. fresh field tomato production was 32 percent, Florida's share was 35 percent, other States contributed 33 percent.

Figure 19

### U.S. fresh field tomato production<sup>1</sup>

Million metric tons



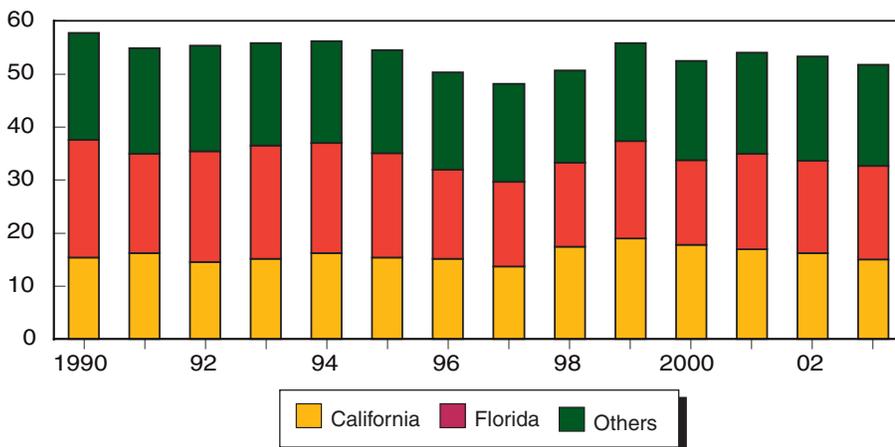
<sup>1</sup>Excludes cherry and grape tomatoes.

Source: U.S. Department of Agriculture, National Agricultural Statistics Service.

Figure 20

### U.S. field tomato planted area<sup>1</sup>

1,000 hectares



<sup>1</sup>Excludes cherry and grape tomatoes.

Source: U.S. Department of Agriculture, National Agricultural Statistics Service.

Traditionally, Florida and the California Central Valley have produced mature green tomatoes. U.S. vine ripe production is concentrated in southern California along the coast (San Diego to the Oxnard area), where temperatures are moderate, in contrast to the California Central Valley. Four firms produce the bulk of the California vine ripe crop. Climate limits the ability of most growers of mature green tomatoes to grow vine ripe tomatoes in their current locations.

Vine ripe tomatoes were not always strong competition for mature green tomatoes in the retail sector. Before the early 1990s, vine ripe tomatoes had poor shelf-life characteristics, compared with mature green tomatoes. In the late 1980s, a California firm and a few Mexican firms in Sinaloa began growing extended shelf life (ESL) vine ripe tomatoes.<sup>28</sup> These new vine ripe tomatoes had better color than mature green tomatoes and held up just as well, a major improvement over the softer, older varieties. ESL tomatoes are typically harvested at a later maturity level, which contributes to an attractive red color. The emergence of the ESL tomato was critical to improving the competitiveness of the fresh field export tomato industry in Mexico (Sparling and Cook, 2000). By 1994, most Mexican growers had adopted the new ESL varieties to improve product quality and grower profitability. Most of the Baja California and southern California vine ripe growers adopted ESL tomato varieties shortly thereafter. This improved vine ripe tomato greatly intensified competition for mature green growers, offering a year-round alternative to retailers.

In addition, the market strength of mature green tomatoes has been challenged by other field varieties that are gaining in consumer popularity. Mature green growers have been able to capture some of that growth by producing roma, grape, cherry, and other types of tomatoes.

Expansion of the greenhouse tomato industry has also pressured vine ripe tomato growers. Vine ripe and greenhouse beefsteak tomatoes have similar

<sup>28</sup> ESLs are also known as long shelf-life varieties.

characteristics—both are large and red and sold in retail channels. In summer 2003, due to vine ripe tomato shortages, prices of vine ripe tomatoes occasionally rose above greenhouse beefsteak prices, leading some Baja California growers to sell their greenhouse beefsteak tomatoes in the United States as vine ripe tomatoes. Fears over more competition spurred the State to establish a legal definition of greenhouse tomatoes produced or marketed there.

In summary, during the early to mid 1990s, the U.S. mature green industry first felt the effects of greater retail competition from ESL vine ripe tomatoes. Then, in the late 1990s, both mature green and vine ripe tomatoes were confronted with the expanding supply of greenhouse tomatoes.

## **Response of U.S. Field Tomato Growers to Increased Competition**

Both Florida and California growers have tried to adapt to changing consumer preferences, but they face several agronomic challenges. The tomato varieties developed for the Florida climate are better harvested and handled as mature greens rather than vine ripers. In the 2002-03 season, 73 percent of Florida field tomato sales (by weight) were mature green tomatoes, down from 86 percent in 1997 (table 12). Eleven percent of mature green tomato production was harvested at a vine ripe maturity stage. The very popular grape tomato was first grown in Florida although it is now grown elsewhere, too.

None of the large U.S. tomato greenhouses operate in Florida, which comprises only small greenhouses (less than 3 ha). The conventional wisdom is that the humid, warm climate precludes any large-scale greenhouse production in Florida. Unless new vine ripe varieties for the Florida climate are developed, the industry will probably remain focused on mature greens.

In recent years, the product mix of the California fresh market tomato industry has been changing in favor of vine ripe, roma, and small but growing volumes of specialty tomatoes, such as heirloom, grape, cherry, and various colored tomatoes (orange, yellow, etc.). The California Tomato Commission provides statistics on mature green, vine ripe, and roma tomato shipment volumes. From 1997 to 2002, the share of mature green tomatoes in California trended downward from 77 percent to 69 percent. The upswing in mature green tomato share in 2003 was due to poor weather conditions that had a particularly adverse effect on vine ripe tomatoes.

In 2002, 22 percent of tomato shipments tracked by the California Tomato Commission were vine ripers, up from 16 percent in 1997. However, much of the vine ripe production is on leased land in coastal areas with high rents, water costs, and urbanization pressures. While California has succeeded in shifting some area to vine ripe tomato production, its ability to shift further is limited. Unless tomato varieties are developed that allow for profitable vine ripe tomato production for a shorter season in a warmer climate, the California Central Valley is likely to remain a producer of mature green tomatoes.<sup>29</sup> As a result, the California industry is not currently well suited to respond to the growing consumer demand for vine ripe tomatoes. However,

<sup>29</sup> Current production of vine ripe tomatoes requires staking, an expensive practice only warranted in long season production areas. Production over a longer season increases yields and improves the return on investment from stakes.

**Table 12—Diversification of tomatoes grown in traditional field tomato areas**

Type of tomato by region	1997	1998	1999	2000	2001	2002	2003
<i>Percent of quantity produced</i>							
Florida <sup>1, 2, 3</sup>							
Mature green	86	84	76	73	73	70	73
Vine ripe	14	13	14	14	13	13	11
Roma	n.a.	n.a.	8	9	8	10	7
Cherry	n.a.	3	2	4	2	2	2
Grape	n.a.	n.a.	n.a.	n.a.	4	5	7
Total (metric tons)	542,940	649,267	750,425	787,967	732,978	770,356	690,474
California <sup>2, 4</sup>							
Mature green	77	71	70	69	66	69	72
Vine ripe	16	21	20	21	23	22	16
Roma	7	8	10	10	11	9	11
Cherry	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1
Total (metric tons)	464,718	462,056	462,056	436,983	437,100	462,006	421,028
Mexico <sup>2, 5</sup>							
Vine ripe	62	57	49	47	46	43	41
Roma	32	36	42	42	43	44	44
Cherry	6	7	8	6	6	5	4
Grape	n.a.	n.a.	n.a.	n.a.	n.a.	2	3
Greenhouse	n.a.	n.a.	1	5	5	6	8
Total (metric tons)	660,609	734,053	615,145	589,882	679,219	723,425	784,988

n.a. = Not applicable.

<sup>1</sup> Florida data for 1997 only are from the Florida Tomato Commission which tracks round tomatoes. These data do not include a small portion of production in northwestern Florida. Data for all other years are from the USDA, Agricultural Marketing Service, *Tomato Fax Report*, which includes all production and major types of tomatoes. Vine ripe tomatoes in Florida are grown as mature green tomatoes but harvested at the same stage of maturity as vine ripe tomatoes.

<sup>2</sup> New tomato categories of tomatoes are added in each region as new production becomes important. In the United States, the mature green tomato category may include other varieties of tomatoes before they received separate breakouts. For Mexico, vine ripe tomatoes are the residual category.

<sup>3</sup> The Florida season runs October 1-September 30. Data for 2003, for example, refers to the 2002/03 season.

<sup>4</sup> The California Tomato Commission reports data for mature green, vine ripe, and roma tomatoes. Cherry tomato data are from the USDA, Agricultural Marketing Service *Tomato Fax Report*.

<sup>5</sup> These figures use exports to the United States as a measure of production trends in the Mexican export-oriented industry. Assuming that all Mexican round tomatoes are vine ripe although a small portion is mature green.

Sources: USDA, Agricultural Marketing Service, *Tomato Fax Report*; Florida Tomato Commission; California Tomato Commission; and U.S. Department of Commerce.

it must be remembered that new varieties transformed the Mexican industry in the early 1990s, so it is not impossible to conceive of similar developments that could benefit California and Florida.

California roma production has been increasing but Baja California tomato growers serve much of the U.S. summer demand for romas. The AMS *Tomato Fax Report* reports cherry tomato shipments, which accounted for less than 1 percent of total California fresh tomato shipments in 2003. No statistics on California grape tomato production or shipments are available.

There are no annual statistics on greenhouse production in California. Only one of the four large greenhouses in the United States is located in (coastal) California. This greenhouse has successfully adapted technology to the environment, but it is surrounded by other agricultural operations that make it vulnerable to pest problems not faced by more isolated greenhouses. California has numerous small greenhouse operations, but they primarily serve

local markets. The Central Valley is not an ideal location for greenhouses due to hot summer weather, which limits the shipping season and the potential for earning a return on investment. Furthermore, greenhouse operations on the California coast face high land, water, and labor costs, as well as increasing environmental regulations and constraints. On the other hand, precisely because of these constraints, some California coastal vine ripe growers might someday view greenhouses (which use land and water more efficiently) as a more viable alternative than field production—market prices warranting.

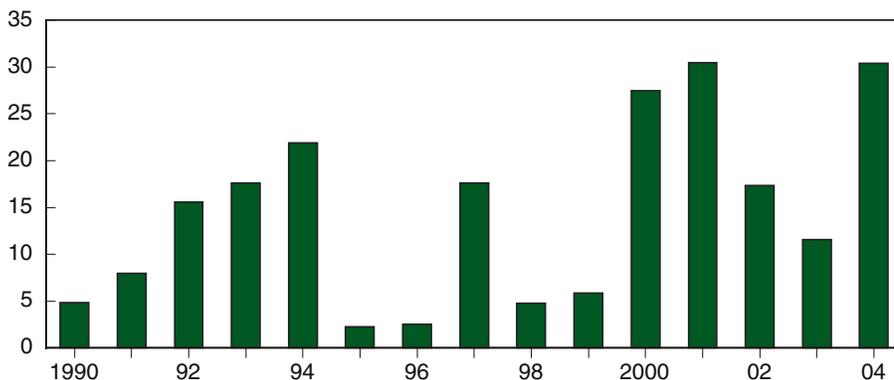
In general, both Florida and most California field production areas seem unlikely spots for future greenhouse development. In addition, the high costs of greenhouse production pose a barrier to field producers (see box, “Economic Barriers to Entry: Comparison of Greenhouse vs. Field-Grown Fresh Tomato Unit Costs”). The financial difficulty of large U.S. greenhouse firms in the late 1990s and the well-publicized financial restructuring of some leading U.S. greenhouse tomato firms, (in conjunction with a complicated marketing situation during the dumping disputes), seems to have limited the interest of California and Florida tomato growers in venturing into greenhouse production. At least one U.S. field tomato shipper is expanding into greenhouse tomatoes by marketing for other growers (*The Packer*, 2003). This provides a broader product line with less investment and risk. But as the greenhouse industry has grown, there does seem to be increasing interest on the part of some field growers to at least investigate the possibility of greenhouse production in other locations.

The growth of the Mexican greenhouse tomato industry may be having an impact on U.S. field tomato exports to Mexico. Traditionally, U.S. field tomato exports to Mexico were small and sporadic, with demand only in periods of short supply in Mexico (fig. 21). However, Mexico is still the second largest export market for U.S. tomatoes, and California growers, the primary U.S. exporters to Mexico, have viewed Mexico as an important market outlet. Now, California growers are concerned that summer greenhouse production in Mexico may be able to fill part of that demand. In early summer 2004, Mexican greenhouse quality problems and lower U.S. summer prices for greenhouse tomatoes kept a significant amount of green-

Figure 21

**U.S. fresh tomato exports to Mexico**

1,000 metric tons



Source: U.S. Department of Commerce.

## Economic Barriers to Entry: Comparison of Greenhouse vs. Field-Grown Fresh Tomato Unit Costs

Greenhouse tomato production is more expensive than field production, due to dramatically higher investment costs, as well as higher variable, or operating, costs. For example, a high technology greenhouse may cost from \$600,000 to over \$1 million in construction (plus site purchase and improvement) costs per hectare just to begin operation, excluding variable growing costs. U.S. industry experts estimate that an initial investment of \$1.25 million per hectare is required when also including the inputs for the hydroponics growing system, such as the artificial growing medium.

These greenhouse costs compare with average pre-harvest costs (including overhead, depreciation and capital costs) of \$3,100 per hectare in the California Central Valley and from \$12,500 to \$16,000 per hectare in Florida, depending on the region and season. Of course, substantial variation in per unit production costs can exist between growers in the same growing regions, based on individual cost and yield performance, regardless of whether production is open field or protected. Per-unit production costs can also change significantly over time as growers gain experience.

Average U.S. and Canadian greenhouse yields frequently approach 500 metric tons per hectare per season, compared with U.S. average field tomato yields of 34 metric tons per hectare in California and 36 metric tons per hectare in Florida. The most efficient and experienced greenhouse growers in the United States and Canada may reach 700 metric tons per hectare. But higher yields do not offset the higher investment and variable costs, making per unit greenhouse production costs higher than field, in all three NAFTA countries and for all technology levels. In the past, greenhouse tomatoes generally received a hefty price premium over field tomatoes that helped compensate for higher per unit costs of production. But with the rapid increase in greenhouse production, prices have declined and the differential between field and greenhouse tomato prices has diminished.

house tomato production, initially intended for export, in Mexico, potentially competing with California fresh field tomato exports. However, despite these worries, U.S. fresh tomato exports to Mexico in 2004 were just short of the 2001 high due to a production shortfall in Baja California. The evolution of the Mexican fresh tomato market, both in terms of demand for imports and summer export availability of greenhouse tomatoes, will continue to affect the California industry.