

market share in other parts of the world, especially the United States. Not only are prices competitive from Spain, but also the quality of Spanish produce is excellent.

Presently, the marketing scheme of auctions and/or cooperatives is not as efficient in Spain as it is in other areas such as the United States or the Netherlands. Also transportation costs have increased dramatically, especially in the last year due to the increase in fuel prices. For production from Almeria to continue to increase, it will continually need to be more sophisticated in both production and marketing practices. There are several growers, especially over in the Murcia area, that produce approximately 300 hectares of tomatoes, which equates to over 750 acres of greenhouse tomatoes for a single producer. These growers are well educated, seem to be financially sound, and have new and exciting tomato products that they will be introducing into the U.S. marketplace this year, such as >Baby Sweetheart= cluster tomatoes which could be a high impact commodity for Spanish producers to break in heavily into the U.S. tomato market.

In the Netherlands, rapid innovations have kept Dutch producers competitive. They are strongly vertically integrated and they look to consumer- and retail-driven types of production. They thrive on producing high-quality products under environmentally-sound production techniques. Unfortunately, the Dutch have the disadvantage of expensive raw materials, labor, and a high demand for fuel in the winter season. Technologically, the Dutch are very quick to adapt and innovate as any needs demand to improve their efficiency and effectiveness of production. The Dutch also have developed what they call organizations of grower groups, which are small groups of growers with the same specific crop and in the same area, wherein they visit each others= greenhouse and discuss matters related to production. These groups along with groups at the national level operate under LTO, an organization of farmers and growers. LTO develops programs for producers and sets priorities for research. There is no effectively run extension service at this time in Spain. There are several public and private research stations in Almeira. The Dutch privatized what they call their governmental advisory (extension) service several years ago, whereas the Spanish have never had an effective

extension type of service that cooperated both with research center and university research programs.

Greenhouse production of vegetable crops has increased throughout the world resulting in increased imports of greenhouse-produced vegetables from Canada, Mexico and Europe into the U.S. These vegetables compete with field-grown crops in U.S. supermarkets and institutional outlets. Higher productivity and competitive cost structures allow greenhouse vegetables to enter the U.S. and compete with field-grown tomatoes. It is critical that Florida growers develop new technologies to compete with the quality and cost of greenhouse-grown tomatoes. Increased imports from European sources are likely to continue and will force the U.S. industry to adapt to changes in consumer tastes that are being developed by these greenhouse grown tomatoes.

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## New Greenhouse Vegetable Crops for the Southeast

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Greenhouse vegetable production has increased in Florida from approximately 55 acres in 1996 (Hochmuth, 1996) to greater than 80 acres in 2001 (Tyson et al., 2001). With the rapidly growing population in Florida, demands for land, water, and other natural resources are increasing. Much of the urban development occurs in areas traditionally devoted to agricultural production (Gordon, 1998). Because of increased plant densities and longer growing seasons, greenhouse vegetable production can provide greater yields than field-grown crops (Eversole, 1999; Johnson, B., 1999), thus, reducing the need for land, especially for crop rotation. Greenhouse

vegetables are commonly grown in sterile media, such as perlite, which does not require fumigation, thus the need for crop rotation or chemical fumigation with methyl bromide is eliminated. Furthermore, protected agriculture structures or greenhouses provide an excellent place to produce consistent, superior quality produce that brings a higher price at the market than field-grown produce (Johnson, G., 1999).

As part of the Florida-Israeli Protected Agriculture Project, the Horticultural Sciences Department at the University of Florida and several Israeli agricultural companies are working together to promote and improve

the greenhouse industry in the southeastern U.S. An important goal of the project is to adapt Israel technology and especially new commodities for production in Florida. Quite common to the European market are the 'Galia' muskmelon and the 'Beit Alpha' cucumber. Both cultivars were developed in Israel and can have exceptional production and quality when produced in greenhouses or through protected ag cultivation.

The 'Galia' melon is a green-fleshed muskmelon with a golden-yellow netted rind at maturity. 'Galia' fruit have a unique aroma and sweet flavor, and show great promise as a specialty melon (Simon et al., 1993). Grown hydroponically in a protected ag structure, 'Galia' fruit quality surpasses the quality of field-grown orange-flesh muskmelons because of its bold aroma and high sugar content, leading to higher market value.

'Galia' has become an identifiable trade-name in the European market (Karchi and Govers, 1977). The cultivar can yield up to 22 t/A of high-quality fruits with soluble solids readings between 13 and 15° Brix (Karchi, 2000; Karchi and Ayalon, 1977). 'Galia' melon, while being well accepted in the European market, one drawback is that the fruit must be picked at vine-ripe stage for peak flavor (Karchi, 1979), thus, potentially limiting long distance shipment to market. A lucrative market could be developed for Florida growers, by producing 'Galia' melon and targeting niche markets within the southeast U.S. and exporting to the eastern seaboard. Cultivar trials conducted at the Protected Ag Project ([www.hos.ufl.edu/protectedag](http://www.hos.ufl.edu/protectedag)) during 1999 and 2000, have shown that 'Galia', 'Gal-52', and 'Galor' would be best chosen for production in Florida based on high yields of 5 fruit per plant and high fruit quality (Shaw et al., 2001).

The Beit Alpha cucumber is the primary cucumber grown in Israel and exported to Europe. The Beit Alpha cucumber originated on a Kibbutz in Israel and is now being distributed by several seed companies in the U.S. and Israel. Beit Alpha cucumbers are hybrids that are gynocious and parthenocarpic, thus they do not require pollination. The fruit is seedless and has a thin skin like a 'hothouse' cucumber, but does not require plastic wrap to prevent dehydration after harvest. Fruit production is prolific for Beit Alpha cultivars. The plant characteristics include multiple fruit set at each node and on the laterals. Depending on season, yields can be compact with 10 harvests or less, or continuous with greater than 30 harvests. Beit Alpha cultivars grow well under extreme environmental conditions, especially high temperature (30-40°C), but also continue to produce well at low temperatures (10-15°C; Shaw et al., 2000).

Yields from Beit Alpha cultivars can be three times greater than that from common 'hothouse' cultivars. The cultivar 'Sarig' produces well regardless of season. Individual fruit are approximately 15 cm long and under 4 cm in diameter. In spring 1999, the average marketable fruit yield per plant was 65 fruits over 23 harvests (Shaw et al., 2000). The Beit Alpha cucumber fruit matures rapidly when environmental conditions are favorable (high solar radiation and warm temperatures). Fruit can be

harvested daily or every other day depending on stage of maturity desired by the market. Consumer acceptance in the European market is for Beit Alpha cucumbers with approximately a 3-cm diameter, however, for some specialty markets the flowers themselves are harvested.

Research is currently being conducted at the University of Florida Protected Ag Project on both 'Galia' melon and Beit Alpha cucumber (see website). Research includes cultivar trials, plant density studies, and use of locally available pinebark as a media substitute for perlite. Furthermore, both crops can be successfully grown using biological control, which in turn provides 'pesticide-free' product to a consumer conscience market. 'Galia' muskmelon and Beit Alpha cucumber are new commodities to the U.S. and are well suited for greenhouse production in the Southeast.

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