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Florida Vegetable Transplant Producers Survey, 1989-1990

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Summary. Thirty-four operators produced > 1.15 billion vegetable transplants in Florida in the 1989-90 season. Sales, concentrated in the winter and spring, were estimated at $30 million. Firms in the industry also made additional sales of ornamental and agronomic plants. Nine large firms accounted for 88% of all transplants produced. More than 109 acres (44 ha) of greenhouse area are allocated to containerized vegetable production. The majority (83%) of Florida s vegetable transplants were from three crops--tomatoes (45%), peppers (28%), and cabbage (10%). Only 36% of the transplants produced in the state were shipped out-of-state. This report discusses various facets of production, marketing, labor, and general business conditions of the containerized vegetable transplant industry.

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The vegetable transplant plug industry, a major component of Florida s agricultural community, was last inventoried more than 10 years ago (Miller and Smith, 1980). A preliminary 1989 survey administered by Florida county agents indicated that the number of production facilities had risen to 47 from 19 since 1980. Therefore, in Spring 1990, Florida s 47 vegetable transplant production houses (Vavrina, 1991) were surveyed to assess various aspects of the industry. Nine major firms and 25 minor firms responded (72% response rate) to the detailed survey by answering a standard questionnaire. The major firms accounted for 88% of all transplants produced in Florida in 1990. The firms that did not answer were very small and would not appreciably affect the estimates presented here.

Potentially, this survey can be used to position this industry for third-party pesticide registrations, to identify areas of common concern or interests that might be addressed by university research, or simply to answer some often-asked questions. It can be used further as a gauge upon which other states can compare their status as transplant producers.

Production houses

The Florida containerized vegetable transplant industry is concentrated geographically in two locations. The Sarasota-Ruskin-Plant City area (central Gulf coast) accounts for about 40% of the transplant acreage, while the Immokalee-LaBelle-Naples area (central-southwestern Florida) accounts for another 40%. An isolated, but major, production area (17%) is in Bushnell, where the bulk of the ebb-and-flow irrigation production is located.

Slightly >109 acres (44 ha) of transplant production under glass (plastic, actually) were logged in 1990, 46 acres (18.6 ha) more than recorded in 1980. Eighty-four percent of these acres use traditional overhead irrigation. Ebb-and-flowirrigation (bottom watering) services 16% of the production acreage (97.5% of which are at Bushnell).

Greenhouse styles include: aluminum-trussed bow houses [65 acres (26.3 ha)], wooden-trussed houses [13 acres (5.3 ha)], saw-toothed houses [3 acres (1.2 ha)], quonset houses [12 acres (4.9 ha)], and 19 acres (7.7 ha) in unspecified structures. Trussed bow houses (aluminum or wood) in Florida production traditionally have curtain sides that are raised or lowered for ventilation. Quonset houses do not have curtain sides.

Transplant production volume

More than 1.15 billion vegetable transplants (Table 1) were grown in Florida during the 1989-1990 season (July-May), compared to 345 million in 1980. Tomato, pepper, and cabbage transplants represented the greatest volume (> 83%) of plants marketed by both large and small producers in Florida. Additionally, these crops were grown by more producers in either category (large or small) than other crops. These three crops accounted for 86% of the total transplant production in 1980. Ten other vegetable crops, largely in the *Cucurbitaceae* (melon) and *Cruciferaceae (Brassicaceae* or cole crops) families, were included among the plants produced by Florida containerized transplant operators.

The nine companies that accounted for 88% of Florida s transplants (>1,019,427,000) were Classie Plants; CollierGro; Johnny Johnson Greenhouses; LaBelle Plant World; Plants of Ruskin; Redi-Plants; Speedling, Inc. (two facilities); and The Plant Farm (Vavrina, 1991). The primary crops produced by these nine companies were tomatoes (46%), pepper (29%), cabbage (10%) and tobacco (6%). Twenty-five smaller companies responding to the survey estimated a total production of 133,531,600 transplants: 40% in tomatoes, 22% in celery, 18% in pepper, and 14% in cabbage. The remaining crops grown by all producers included: broccoli, muskmelons, cauliflower,

Table 1. *1990 Census of Florida vegetable transplant volume.*

Type	Major producers[z] (no. plants)		Minor producers (no. plants)		Total (no. plants)
Tomato	466,105,000	(n^y = 9)	53,333,800	(n = 15)	519,438,800
Pepper	299,270,000	(n = 9)	24,499,000	(n = 13)	323,769,000
Cabbage	99,036,000	(n = 8)	18,764,800	(n = 11)	117,800,800
Tobacco	57,950,000	(n = 3)	500,000	(n = 1)	58,450,000
Celery	25,034,000	(n = 3)	30,000	(n = 1)	55,034,000
Watermelon	22,318,000	(n = 7)	807,100	(n = 7)	23,125,100
Broccoli	16,896,000	(n = 6)	234,600	(n = 8)	17,130,600
Onion	9,957,000	(n = 6)	1,387,200	(n = 6)	11,344,200
Lettuce	6,127,000	(n = 4)	63,600	(n = 6)	6,190,600
Eggplant	5,129,000	(n = 6)	1,368,900	(n = 9)	6,497,900
Cauliflower	4,295,000	(n = 3)	100,000	(n = 1)	4,395,000
Muskmelon	3,727,000	(n = 5)	9,600	(n = 3)	3,736,600
Collard	2,173,000	(n = 4)	2,237,900	(n = 9)	4,410,900
Other	1,156,000	(n = 8)	180,000	(n = 2)	1,336,000
Squash	254,000	(n = 2)	45,100	(n = 6)	299,100
Total	1,019,427,000		133,531,600		1,152,958,600

[z]*Major producers accounted for >88% of Florida vegetable transplants produced in 1991.*
[y]*Number of respondents.*

celery, collards, eggplant, lettuce, onion, squash, and watermelon.

The crops in Table 1 are ranked according to the transplant volume of the major producers (note the similarity in total volume statistics). Smaller producers market more collards, onions, eggplant, and watermelon proportionally than do the major producers.

Most transplant operations also produced some non-vegetable transplants, including tobacco, ornamentals, annual plugs, foliage, citrus liners, and pine trees. Tobacco is the fourth-largest-volume transplant grown in Florida, but only three major houses and one minor house produce it.

There are various factors that make it difficult to assign a dollar value to this industry, including species raised, size of cells in the flat, whether the plants were shipped in the flat or pulled and shipped in boxes, the cultivar of the plant grown (OP or hybrid), number of plants purchased, bare root vs. containerized production, etc.

The greatest volume of Florida transplants, however, are containerized, and most are grown in 1 × 1 -inch cells. Therefore, based on $26 per thousand ($18.09 in 1980), Florida s 1990 vegetable transplant industry was worth more than $30 million, a 3.5-fold increase from 1980.

Transplant production trends

Most vegetable transplant producers (major and minor) indicated that they expected future production to either increase or remain stable across all crops. Of the principal crops produced (tomato, pepper, cabbage), 40% of the growers expected production volume to increase, 45% expected stable production, and 15% predicted a decrease in volume. Where areas of decreasing production were a concern, growers cited various reasons, such as yearly fluctuations in acreage, market conditions, over-production, and changes in production areas to which plants were shipped due to competition.

Shipping trends

Half of the vegetable transplants grown by Florida s major producers were shipped to users in-state, a third (36%) were shipped out-of-state, and the remainder (14%) were used on-farm. Distribution of transplants used in-state and on-farm substantiate Florida s status as a major producer of tomatoes, peppers, and watermelons. By comparison, 65% of the total number of transplants produced in 1980 remained in Florida. Tomato, pepper, cabbage, tobacco, celery, watermelon, broccoli, lettuce, and collard transplants make up the bulk of Florida s out-of-state sales volume.

In contrast to the major producers, the 25 smaller companies indicated >80% of all transplants produced were used on-farm. This was true for all but four types of transplants: broccoli, muskmelon, eggplant, andsquash, most of which were shipped in-state. Only 3% of minor house production was shipped out-of-state.

Thirty-four states and two countries (Bahamas and Canada) were cited as recipients of Florida transplants. Among the most frequently mentioned states receiving transplants were Ohio, Pennsylvania, South Carolina, Tennessee, and Virginia. This factor may not identify those states receiving the bulk of Florida s transplants, however. Other states listed as receiving vegetable transplants include: Alabama, Colorado, Connecticut, Delaware, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Jersey, New York, North Carolina, North Dakota, Oklahoma, Texas, West Virginia, and Wisconsin.

Cultural practices

The following information is representative of 30 respondents or less-four of the major producers did not respond. Growers of containerized production employed a wide array of container styles, including Cell Pack, Speedling (Todd®), Blackmore, and Tray Master. Todd® trays or facsimiles were used most frequently; a few employed containers of their own design and construction.

Eighty-two percent of the operations responding (n = 22) to a question on growing media said they used a standard prepackaged mix, listing such manufacturers as Asgrow (Kalamazoo, Mich.), Grace (Milpitas, Calif.), Heco (J-M Trading Co., Burr Ridge, Ill.), or Verlite (Tampa, Fla.), mixes. A small percentage (18%) used a self-prepared mix consisting of one of the following three formulations: 40% peat, 60% bark; 60% peat, 15% polystyrene, 5% sand, 20% composted bark; or 50% peat 5% polystyrene, 45% vermiculite. Bark mix components would indicate that mostly non-vegetable transplants were grown by this group of respondents.

All major producers and most smaller operations seed directly into containerized flats. Some minor operations and one major operation used the time-honored technique of seeding into non-containerized flats then transplanting into containerized flats to improve singulation, for at least some of their production. Twenty three percent of the smaller operations said they employed bare-root field production (cole and Solanaceous

crops only). Almost all respondents (> 80%) used some or all fungicide-treated seed in their operation.

Components of a containerized transplant fertilization program varied greatly among producers. The following formulations were mentioned most often: (N-P-K) 10-10-10, 20-10-20, 20-20-20, 1248-8, and 9-45-15. All materials were solubilized and metered out with the irrigation water. Most growers included additional micronutrients and minor elements. Fertilizer sources were dictated by the particular fertilizer chosen; however, the sources most often mentioned as preferred were: *nitrogen*-calcium nitrate, potassium nitrate, ammonium nitrate, diammonium phosphate, and urea; phosphorus-phosphoric acid, di- and monoammonium phosphate; and *potassium*-- potassium nitrate, sulfate of potash, and monopotassium phosphate.

Frequency of fertilization was as varied as fertilizer formulation, and ranged from daily (constant feed) to two applications per 6-week crop time, with all manner of schedules in between. Generally, the crops were not fertilized until the cotyledon leaves unfolded, then were fertilized according to environmental conditions and experience. The media may even be leached to slow growth under adverse environmental conditions.

Twenty-five operations indicated the brands, models, and/or types of agricultural equipment used. Vacuum seeders for containerized production were manufactured by: Blackmore (Belleville, Mich.), Boots (now Bouldin & Lawson, McMinville, Tenn.), SK Design (Ruskin, Fla.), Williams (McConkey, Sumner, Wash.), Hamilton (B.F.G. Supply Co., Burton, Ohio), and Vandana (Growing Systems Inc., Milwaukee, Wis.). Field-grown seeding equipment included: StanHay (Solex Corp., Dixon, Calif.) and Planet Jr. (Powell Manufacturing Co., Bennettsville, S.C.). Overhead irrigation equipment used fertilizer proportioners by Anderson (Muskogee, Okla.), Dosmatic Plus (Dallas, Texas), Dosatron (Clearwater, Fla.), Smith (Newbury Park, Calif.), Hozon (Atlanta, Ga.), Commander (Waterbury, Mass.), HPA (Apopka, Fla.), Gewa (J.R. Johnson, Ruskin, Fla.), and homemade.

Costs

Twenty-three operations responded when asked to break down costs according to production, seed, and labor. Transplant industry costs accruing from production (buildings, machinery, flats, soilless mix, pesticides, sterilization, shipping, etc.) ranged from 10% to 65%, with a median of 40%. Seed costs averaged 24% while labor costs (including management) in the industry ranged from 14% to 70%, with a median of 36%.

Costs were not partitioned correspondingly in 1980, but labor represented about 30%. Otherproduction costs amounted to 70%; however, seed purchase costs were not mentioned.

Problems confronting the industry

The survey listed 11 risks in producing transplant crops and asked respondents to check those factors that generally gave them the biggest problems and to specify the crops involved (Table 2). For those respondents indicating that insects were a production problem, the pests and crops specified included: leaf miner (watermelon and tomato), whitefly (tomato), aphids (peppers), and diamondback moth (cabbage and cole crops); others cited loopers (cabbage), Colorado potato beetle (tomatoes and eggplant), and pinworm (tomato).

Thirty-eight percent found poor germination a problem with pepper, tomato, cole, and celery crops. Thirty-eight percent had problems with heat stress in the same crops. Two companies indicated they were experiencing heat stress in all types of transplant crops.

Table 2. ***Respondents identifying selected major problems with Florida vegetable transplanted crops.***

Problem	Respondents (no.)	Respondents (%)
Insects	15	58
Poor germination	10	38
Heat stress	10	38
Damping off	7	27
Bacterial spot	7	27
Water stress	3	12
Fertilizer burn	3	12
Over-production	3	12
Nematodes	1	4
Improper handling	1	4
Other disease	9	35

Damping off (pepper and cole crops) and bacterial spot (tomatoes and peppers) proved to be a problem for about 25% of the growers polled. However, 35% of the respondents named at least one other disease causing serious problems for their transplants, specifically downy mildew (cole crops) and alternaria or early blight (tomatoes).

Water stress, fertilizer burn, and over-production were each noted as serious problems by some respondents. Field production personnel indicated problems related to nematodes and improper handling.

When asked to isolate the major problems currently confronting the transplant industry and future challenges, 23 growers responded. Issues most often identified included increasing pesticide restrictions and regulation, disease management, labor regulations, market acceptance, liabilities associated with supplying plants, high costs, over-production, and increasing water concerns.

Seventeen operations noted at least one area of transplant production in which they would like to see more university research. Areas mentioned included disease management, pest management, pesticide resistance, transplanting techniques and efficiency, heat stress, improved germination, and marketing.

When growers interviewed in 1980 were asked about major problems, they responded with: getting farmers to decide on varieties, educating farmers, pesticide use and registration for greenhouses, transportation, sales competition, plant quality, production scheduling, credit, competition for inputs, and general marketing.

Future outlook

The Florida vegetable transplant industry has more than doubled in area and nearly quintupled in dollar value over the past 10 years. Although competition among firms is increasing, volume either remains constant or is expanding. The business is basically an in-state driven market and buyers here generally will divide their orders among several firms to ensure against transplant crop failure-thus guaranteeing equal opportunity for sales. The nine largest firms, while accounting for 88% of all transplants produced,

generally are increasing production acreage. One firm is expanding, with a facility planned for California. As long as Florida remains a major player in the vegetable production arena, Florida vegetable transplant producers will realize a secure future. However, as with all agricultural pursuits, production efficiency, reduced costs, and a quality product will ensure survival.

Literature Cited

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