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GROWING AND MARKETING GREEN ONIONS AT LOCAL GREEN MARKETS IN SOUTHEAST FLORIDA

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Abstract. **Stephen's Produce began growing and marketing green onions in 2000 from a 0.14 acre backyard market garden to help supply the West Palm Beach Green Market with a Saturday supply of "garden fresh" produce. The garden has been expanded each year. In 2004-05, 0.37 acres were under cultivation and clientele were being served at two weekend green markets. Green onions was one of the 30 crops grown and have been included in the crop mix for the past five seasons. Planting schedules, growing and harvesting methods, yields, and sales figures are discussed. For the 2003-04 season, 32 plantings of green onions were made for the 32 week sales season which began 18 Oct. and concluded 22 May. Onions were pulled, bunched, and banded the day before sales. Soil was spray washed out of their roots. They were generally sold for $1.00 per bunch for the first three years; prices were increased to $1.50 for the 2004-05 season. An average of 50 bunches were sold each week in 2003-04.**

The beginning of green onion sales for green markets in Southeast Florida, 2001-05. Stephen's Produce was not the first vendor to offer green onions (*Allium cepa* L.) for sale at green markets in Southeast Florida. At least two other vendors who bought their produce from local wholesalers were selling green onions. For the green markets that Stephen's Produce has supplied, we were the only source of locally grown green onions. With the onset of a food poisoning scare involving imported green onions which occurred in summer 2003, one of the vendors dealing in green onions stopped handling them because his wholesaler's supply was mostly imported.

We had grown and sold sweet bulb onions for two seasons before growing them as green onions. Our initial foray into providing green onions for sale came by accident. For the 2000-01 season we had planted too many transplants for our intended bulb onion production. In the process of pulling sets to transplant, we decided to bunch and sell the extra seedlings. This proved successful, so the next season we discontinued sales of bulb onions to concentrate on green onion production. Since we already offered other leafy salad greens for sale (mizuna, lettuce, arugula, Swiss chard, and spinach), we felt that green onions would fit well into our crop mix (Shuler et al., 2003a, b, 2004a). We felt that we could grow green onions successfully since I had known a commercial grower from Michigan who had grown them for a season in the Everglades Agricultural Area in the early 1980s. After making several test plantings of a multiplying onion using sets in 2001-02, but decided to stick with growing our onions from seed. The first green onions offered for sale were from the bulb onion cultivar 'Yellow Granex Improved' (Sunseeds, Morgan Hill, Calif.) in December 2000. The next season, 2001-02, we began with another bulb onion variety 'Sweet Success' (Sunseeds, Morgan Hill, Calif.) before switching to a green onion variety 'White Spear' (Johnny's Selected Seeds, Winslow, Maine). In 2001-02 we also grew a purple variety, 'Deep Purple' (Johnny's Selected Seeds, Winslow, Maine). The purple variety was discontinued because it lacked vigor and its roots were very susceptible to Rhizoctonia root rot (resulting in small plants and low yield). Since 2002, we have continued to grow 'White Spear'.

Soil preparation. Garden preparation began in mid May shortly after harvest of spring crops was completed by pulling out the remaining vegetation (mostly weeds). Weeds which emerged over the summer were controlled by spraying with glyphosate (Roundup Ultra, Monsanto Company, St. Louis, Mo.) herbicide. The garden has been enlarged each season and is now 0.37 acres (39 raised beds approximately 100 ft long). Compost from the Palm Beach County Solid Waste Authority, locally available horse bedding/manure, and garden debris from the previous season were spread over the garden area each year, May-Aug. This past season 144 cubic yards of compost and 18 cubic yards of top soil were spread over the garden to a depth of about 3.8 inches. Dolomitic limestone, which had been used each year in the past, was not applied this season. Powdered sulfur, which was only applied to older sections of the garden, and broadcast fertilizer were spread with a small hand-pushed rotary sling spreader and incorporated with a rotary tiller (Table 1). Applications of broadcast soil nutrients were made over a six week period beginning in mid August just before beds were to be made. Tilling also mixed the compost in with the underlying sand.

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Table 1. Soil amendments broadcast August and September 2004 to 0.35 acre (15,246 sq. ft.) market garden area (2.86 plots per acre).

Material	Amount applied (lb)	Rate (lb/acre)	N (lb/acre)	P (lb/acre)	K (lb/acre)	S (lb/acre)	Mg (lb/acre)
Sulfur (applied to 0.25 acre)	150	600				600	
10N-4P-8K with minor elements	192	550	55	22	44		
Triple super phosphate (0N-20P-0K)	32	92		18			
Ammonium nitrate (34N-0P-0K)	80	229	78				
Potassium nitrate (14N-0P-38K)	125	358	50		136		
Epsom salts (9.8% Mg, 12.9% S)	32	92				12	9
Total			183	40	180	612	9

Table 2. Green onion production for Stephen's Produce for green markets in Southeast Florida, 2003-04.

Date planted	Harvest period	Days to harvest	# harvests	Harvest duration (days)	Days between harvests	Linear bed ft planted[z]	# Bunches harv.	# Bunches/ acre	# Bunches/ acre/day
21 Aug.	16 Oct.-17 Oct.	56-57	1	1		12	31.0	28,133	494
21 Aug.	18 Oct.-24 Oct.	58-64	2	6	6	12	37.0	33,578	525
21 Aug.	25 Oct.-1 Nov.	65-72	2	7	7	12	53.0	48,098	668
26 Aug.	1 Nov.-8 Nov.	67-74	2	7	7	12	58.0	52,635	711
31 Aug.	14 Nov.-21 Nov.	75-82	2	7	7	12	55.0	49,913	609
7 Sept.[y]	21 Nov.	75	1	1		12	15.5	14,066	188
14 Sept.	21 Nov.-5 Dec.	68-82	3	14	7	12	67.5	61,256	747
21 Sept.[x]	5 Dec.	75	1	1		12	25.0	22,688	303
28 Sept.	6 Dec.-13 Dec.	69-76	2	7	7	12	88.0	79,860	1,051
4 Oct.	19 Dec.-20 Dec.	76-77	1	1		12	74.0	67,155	872
10 Oct.	2 Jan.-9 Jan.	84-91	2	7	7	11	69.0	68,310	751
16 Oct.	26 Dec.-2 Jan.	71-78	2	7	7	12	97.0	88,028	1,129
22 Oct.[w]	9 Jan.-10 Jan.	79-80	1	1		12	44.0	39,930	499
29 Oct.	16 Jan.-23 Jan.	79-86	2	7	7	12	85.0	77,138	897
13 Nov.	23 Jan.-24 Jan.	71-72	1	1		12	57.0	51,728	718
18 Nov.[v]	30 Jan.	73	1	1		12	35.0	31,763	435
25 Nov.	31 Jan.-7 Feb.	67-74	2	7	7	16	63.0	42,903	580
2 Dec.	13 Feb.-14 Feb.	73-74	1	1		12	61.0	55,358	748
9 Dec.	20 Feb.-21 Feb.	73-74	1	1		12	64.5	58,534	791
16 Dec.	27 Feb.	73	1	1		12	29.0	26,318	361
23 Dec.	28 Feb.-5 Mar.	67-73	2	6	6	13	46.0	38,548	528
30 Dec.	6 Mar.-12 Mar.	66-73	2	7	7	12	62.0	56,265	771
6 Jan.	13 Mar.-20 Mar.	67-74	2	7	7	12	52.0	47,190	638
13 Jan.	26 Mar.-27 Mar.	73-74	1	1		12	38.0	34,485	466
21 Jan.[u]									
29 Jan.	2 Apr.-3 Apr.	65-66	1	1		12	64.0	58,080	880
4 Feb.	9 Apr.-10 Apr.	64-65	1	1		13	53.0	44,414	683
11 Feb.[t]	16 Apr.	65	1	1		12	2.0	1,815	28
19 Feb.	16 Apr.-17 Apr.	58-59	1	1		12	51.0	46,283	784
25 Feb.	23 Apr.	57	1	1		12	41.0	37,208	653
3 Mar.[s]	23 Apr.-8 May	51-65	3	14	7	15	71.0	51,546	793
10 Mar.[s]	8 May-21 May	59-72	3	13	7	11	51.0	50,490	701
Totals						391	1,639.5		
Average of 31 plantings		68-73	1.6	4.2	6.8	12.6		48,808	669

[z]Planted mostly at four rows per bed.
[y]Very weak plant stand.
[x]Shaded and weedy; some spots with weak plant stand.
[w]Seeded too thickly; 20% left unharvested.
[v]Shaded, with thin and slightly weak plant stand.
[u]Very weedy; did not harvest.
[t]Diseased: dead, brown outer leaves and leaf tips; did not harvest.
[s]Some disease: brown outer leaves and leaf tips.

For the 2004-2005 season, 39 beds were formed in Sept. and early Oct. to provide some protection from flooding after heavy rains. (Bed making and plantings of early crops were disrupted by Hurricanes Frances, Ivan, and Jeanne which passed through in Sept. 2004.) The beds ran north and south, were on 48 inch to 51 inch centers, and were approximately 5 to 6 inches high with 20 to 30 inch wide tops. Beds were made with a hand pushed wheel-hoe using the plow attachment as reported previously (Shuler et al., 2003a, b, 2004a, b).

Irrigation. For the 2001-2002 season, each bed was fitted with a single line of drip tape with 4-inch emitter spacings that was rated at 64 gal/h/100 ft (High Flow, Queen Gil International; Berry Hill Irrigation, Inc., Buffalo Junction, Va.) and managed as reported previously (Shuler et al., 2002a, b, 2003a, b, 2004a, b). Untreated well water was used without filtering. Ball shut-off valves were attached to each line to allow for individual bed irrigation. Also, a household paper element sediment filter was added in-line to reduce emitter plugging by sediment.

For the 2002-03 season, a 100 mesh screen in-line sediment filter was used and each bed was fitted with a single line of drip tape with 4-inch emitter spacings that was rated at 32 gal/h/100 ft (Medium Flow, Queen Gil International; Berry Hill Irrigation, Inc., Buffalo Junction, Va.) and managed as reported previously (Shuler et al., 2002a, b, 2003a, b, 2004a, b). Timely irrigation was especially important for maintaining growth of newly emerged seedlings which needed constant and adequate surface moisture. The drip system was shut off after moderate to heavy rains.

Table 3. Green onion production for Stephen's Produce for green markets in Southeast Florida, 2004-05 season.

Date planted	Harvest period	Days to harvest	# harvests	Harvest duration (days)	Days between harvests	Linear bed ft planted[z]	# Bunches harv.	# Bunches/ acre	# Bunches/ acre/day
4 Oct.[y]						15			
4 Oct.[y]						15			
6 Oct.[x]	10 Dec.	65	1	1		7	11	17,116	263
12 Oct.[x]	17 Dec.	66	1	1		7	12	18,672	283
19 Oct.[x]	18 Dec.-25 Dec.	60-67	2	7	7	15	11	7,986	119
26 Oct.[y]						15			
2 Nov.[y]						15			
9 Nov.[x]	1 Jan.-7 Jan.	53-60	2	7	7	15	35	25,410	424
16 Nov.[x]	8 Jan.	53	1	1		15	4	2,904	55
23 Nov.[y]						15			
2 Dec.[y]						15			
13 Dec.	12 Feb.-26 Feb.	61-75	3	14	7	15	18	13,068	174
22 Dec.	11 Mar.	79	1	1		12	21.5	19,511	247
30 Dec.	4 Mar.-5 Mar.	64-65	1	1		11	18.5	18,315	282
11 Jan.	12 Mar.	60	1	1		15	10	7,260	121
18 Jan.	19 Mar.-1 Apr.	60-73	2	7	7	15	9	6,534	90
25 Jan.	1 Apr.	66	1	1		12	14	12,705	193
1 Feb.	2 Apr.-9 Apr.	60-67	2	7		14	26	20,228	302
8 Feb.	15 Apr.	66	1	1		12	5	4,538	69
15 Feb.	15 Apr.-16 Apr.	66-67	1	1		13	24	20,112	300
22 Feb.	22 Apr.-23 Apr.	59-60	1	1		12	21	19,058	318
1 Mar.	23 Apr.-30 Apr.	53-60	2	7	7	7	12	18,672	311
8 Mar.	30 Apr.-6 May	53-59	2	6	6	6	9	16,335	277
21 Mar.	7 May-14 May	47-54	2	7	7	10	10	10,890	202
Totals						213 (303)[w]	271		
Average of 18 plantings which were harvested (out of a total 24 plantings)		60.6-64.6	1.5	3.9	6.9	11.8	15	13,856	214

[z]Planted mostly at three rows per bed.
[y]Diseased: dead, brown outer leaves and leaf tips; did not harvest.
[x]Diseased: dead, brown outer leaves and leaf tips.
[w]Total planted area was from 303 linear bed ft; harvest was made from 213 linear bed ft.

For the 2003-04 and 2004-05 seasons a second drip line was added to each bed to eliminate the need to physically move the drip line from side to side to accommodate crops planted 3 to 4 rows per bed.

Crop establishment with direct seeding. Just prior to each planting, Chlorpyrifos 1% bait (Mole Cricket Bait, Micro Flo Company LLC, Memphis, Tenn.) was sprinkled on the bed surface to control wire worms and cutworms. Approximately 250 lb/acre 23-0-23 topdress fertilizer made from mixing equal amounts of potassium nitrate and ammonium nitrate was also spread at this time. The row areas of the bed surface were loosened with the cultivator attachment of the wheel-hoe and raked level to further incorporate the insecticide and fertilizer amendments.

A hoe was pushed to open furrows about 1.5 inches deep for planting. Onion seeds are elliptical and relatively small and were sown by tapping the side of the seed bag. In 2003-04 onions were usually seeded four rows per bed. In 2004-05, three rows per bed were used to allow more space for growth and to make the onions easier to hand weed. After growing thin, weakened plants from planting too thickly, an effort was made to scatter seed less thickly. Loose soil was pulled over the furrow and an automobile tire was rolled over the plant row to firm up the soil. After rolling, the effective depth of planting was judged to be about 0.5 inches. Plants were not thinned.

Crop scheduling. Onions were generally planted once a week with the anticipation of a once over harvest. Because of seasonal differences in growth rates, late summer plantings of onions were scheduled 7 d apart, fall plantings at 5 to 6 d intervals, and winter plantings for spring harvest at 7-10 d intervals. Each year the schedule had to be compromised in mid to late fall (Oct.-Dec.) when there was no free space left to plant. Planting then continued on a weekly basis in areas where crops had just been harvested (Shuler et al., 2002a, b).

For the 2003-04 season, onions were planted 31 times and were available for sale on all 32 market weekends (Table 2). The first planting was made 21 Aug. and the last was made 10 Mar. Days to first harvest varied from 51 d for a 3 Mar. planting harvested 23 Apr. to 84 d for a 10 Oct. planting harvested on 2 Jan. Average days to harvest were 68-73 d (this represents the average of multiple harvest dates when a planting was pulled over a period of two or more weeks) (Table 3). We have continued to make refinements in crop scheduling each season.

Growing the crop and pest management. There had been commercial production of green onions in the EAA of Palm Beach County in the early 1980's by a grower from Michigan. The insecticide bait treatments made just before planting have been very effective for controlling wire worms and cutworms.

The most common weed problems for the 2004-05 season were pigweed and other broadleaf weeds along with smaller populations of purslane and miscellaneous grasses. After the garden had been initially planted over by early December, areas for on-

Table 4. Green onion sales for Stephen's Produce at green markets in Southeast Florida, 2003-04.

	# onions taken	# onions sold	Total $	Avg $/bunch	Time sold out	# onions unsold or given away
West Palm Beach						
18 Oct.	24	24	24.00	1.00		
25 Oct.	29	29	29.00	1.00	10:30	
1 Nov.	28	28	28.00	1.00	10:45	
8 Nov.	38	31	31.00	1.00		7
15 Nov.	31	30	30.00	1.00		1
22 Nov.[z]	31	31	31.00	1.00		
29 Nov.	39	39	39.00	1.00		
6 Dec.	40	40	40.00	1.00		
13 Dec.	46	46	46.00	1.00		
20 Dec.[z]	53	51	51.00	1.00		2
27 Dec.	60	52	52.00	1.00		8
3 Jan.	62	50	50.00	1.00		12
10 Jan.	40	40	40.00	1.00		
17 Jan.	61	55	55.00	1.00		6
24 Jan.	46	31	31.00	1.00		15
31 Jan.[y]	35	35	35.00	1.00	11:35	
7 Feb.	35	35	35.00	1.00		
14 Feb.	43	43	43.00	1.00		
21 Feb.	43	43	43.00	1.00	12:30	
28 Feb.	31	31	31.00	1.00		
6 Mar.	30	30	30.00	1.00		
13 Mar.	46	38	38.00	1.00		8
20 Mar.	32	32	32.00	1.00	12:00	
27 Mar.	29	29	29.00	1.00		
3 Apr.	42	42	42.00	1.00		
10 Apr.[z]	39	36	36.00	1.00		3
17 Apr.	35	35	35.00	1.00		
24 Apr.	55	55	55.00	1.00		
Total	1123	1061	$1061.00			62
Avg/wk 28 weeks	40.1	37.9	$37.90	$1.00		2.2
Wellington						
2 Nov.	16	16	16.00	1.00	10:30	
9 Nov.	17	17	17.00	1.00		
16 Nov.	10	10	10.00	1.00		
23 Nov.[z]	10	10	10.00	1.00	9:05	
30 Nov.						
7 Dec.	10	10	10.00	1.00		
14 Dec.	11	11	11.00	1.00		
21 Dec.[z]	11	11	11.00	1.00		
Total	85	85	$85.00	1.00		
Avg/wk 7 weeks	12.1	12.1	$12.10	$1.00		
Stuart						
19 Oct.	15	15	15.00	1.00		
26 Oct.	10	10	10.00	1.00		
7 Dec.	10	10	10.00	1.00		
14 Dec.	11	11	11.00	1.00	11:26	
21 Dec.[z]	12	12	12.00	1.00		
28 Dec.	19	19	19.00	1.00	12:40	
4 Jan.	25	25	25.00	1.00		
11 Jan.	23	23	23.00	1.00	12:00	
18 Jan.	26	26	26.00	1.00	10:45	
25 Jan.	28	28	28.00	1.00		
1 Feb.	11	11	11.00	1.00		
8 Feb.	17	17	17.00	1.00	10:35	
15 Feb.[y]	18	17	17.00	1.00		1
22 Feb.	21	21	21.00	1.00	11:20	
29 Feb.	16	16	16.00	1.00		

[z]Saturdays and Sundays before Thanksgiving, Christmas and Easter.
[y]Sales affected by rainy or overcast weather.
[x]Easter Sunday or Mothers' Day.

Table 4. (Continued) Green onion sales for Stephen's Produce at green markets in Southeast Florida, 2003-04.

	# onions taken	# onions sold	Total $	Avg $/bunch	Time sold out	# onions unsold or given away
7 Mar.	16	16	16.00	1.00		
14 Mar.	16	16	16.00	1.00		
21 Mar.	12	12	12.00	1.00		
28 Mar.	9	9	9.00	1.00		
4 Apr.	22	11	11.00	1.00		11
11 Apr.[x]	16	13	13.00	1.00		3
18 Apr.	18	18	18.00	1.00		
25 Apr.	22	20	20.00	1.00		2
2 May	20	16	16.00	1.00		4
9 May [x]	16	16	16.00	1.00		
15 May	21	13	13.00	1.00		8
22 May	25	25	25.00	1.00		
Total	475	446	$446.00			29
Avg/wk 27 weeks	17.6	16.5	$16.50	$1.00		1.1

[z]Saturdays and Sundays before Thanksgiving, Christmas and Easter.
[y]Sales affected by rainy or overcast weather.
[x]Easter Sunday or Mothers' Day.

ion plantings were made in spots where crops had just been harvested. Weeds and crop debris from harvesting were pulled out and removed to provide a "clean" planting area for the new plantings. Extra effort was made to keep onion plantings free of weeds so that they could be pulled quickly without taking a lot of extra time to remove weeds. Where flushes of weeds emerged along with the onions, weeds were usually pulled out by hand within 4 or 5 weeks (once the onions got large enough so that they would not be pulled out along with the weeds). Often a second weeding was made shortly before harvest.

All seeds were stored in a refrigerator at 43-45°F. Since onion seeds are notorious for decreases in emergence rate and crop vigor over relatively short storage periods, it is recommended to purchase new seed each year. Even though new onion seed was usually purchased every 12 to 18 months, seedling emergence was somewhat unpredictable and seeds were often sown rather thickly to ensure an adequate stand. When emergence rates remained high, onion stands were often too thick and seedlings grew rather spindly. With spindly plants, it would take many more seedlings to make up a bunch for sale. Production of relatively disease free green onions was highest for the 2003-04 season. However, onions grown for the 2004-05 season were beset with several diseases (botrytis leaf blight, purple blotch, and cercospora leaf spot) which reduced vigor and yield and made it difficult and very time consuming to make up a "clean bunch" free of dead older leaves and brown leaf tips. Since several onion pathogens are seed borne [including both alternaria (purple blotch) and cercospora], the use of new seed in 2004-05 might have been partially responsible for these disease problems.

Chlorothalonil (Bravo, Syngenta, Greensboro, N.C.), and azoxystrobin (Quadris, Syngenta; Greensboro, N.C.) have been used occasionally for disease control, but were not used often enough to provide control of the onion disease complex infecting the 2004-05 crop.

Crops were usually sprayed every 7 to 10 d with a rotation of spinosad (SpinTor, Dow Agrosciences, Indianapolis, Ind.), emamectin benzoate (Proclaim, Syngenta), and indoxacarb (Avaunt, DuPont, Wilmington, Del.). These products were especially effective for worm control. Aphids and worms were usually never a problem on green onions and would most commonly be found building up on cruciferous crops first (Shuler et al., 2001a, b, 2004b). Imidacloprid (Provado, Bayer Corporation, Kansas City, Mo.) or pymetrozine (Fulfill, Syngenta) was used as needed for aphid control.

Harvesting and washing. Since we did not know what the demand would be at the new Sunday markets, we started by harvesting the entire week's planting on Friday for the Saturday market in West Palm Beach. Having a market on Sunday took away the temptation to lower prices to sell out on Saturday since we could take any unsold onions left over from the Saturday market to the Sunday markets. After we were able to get a feel for how many bunches of onions we could sell at each market, we would leave a portion of each planting for a Saturday evening harvest for Sunday sales. If we then did not sell out at the Saturday market, we would leave the unharvested portion remaining for harvest for the next week's market at West Palm Beach on Saturday. There were also times, either because of excessive shading or poor stand, that extra plants from the next week's planting would be pulled early for this week's harvest. Also, if there weren't enough unsold bunches for the Sunday markets, then onions for Sunday's market would be pulled from the next week's harvest area.

Green onions would either be harvested mid-day or very late, often after sundown on Friday and Saturday nights. Under good growing conditions when there were very few dead or diseased leaves to discard, onions would usually be pulled by the handful, shaken to knocked off most of the soil, and bunched with a #16 rubber band wrapped twice around the lower stems. However, when there were several dead or browned outer leaves and dead leaf ends, each seedling in the handful would be examined individually and the "bad" leaves removed. Additional time was also needed to wash remaining soil and compost particles out of the roots. The bunches would either be stacked flat in a cooler with ice or stacked upright in a bucket or tray with a small amount of water. Bunches which were not sold at the Saturday market would be taken back home where they would be either be stored in the refrigerator, or remain in the cooler or bucket until time for loading for the Sunday market.

Table 5. Green onion sales for Stephen's Produce at green markets in Southeast Florida, 2004-05.

	# onions taken	# onions sold	Total $	Avg $/bunch	Time sold out	# onions unsold or given away
West Palm Beach						
11 Dec.	11	11	11.00	1.00	10:35	
18 Dec.[z]	12	12	12.00	1.00	10:50	
25 Dec.[y]						
1 Jan.[y]						
8 Jan.	27	27	27.00	1.00	12:00	
15 Jan.						
22 Jan.						
29 Jan.						
5 Feb.						
12 Feb.						
19 Feb.						
26 Feb.	8	8	12.00	1.50		
5 Mar.	9.5	9.5	14.50	1.50		
12 Mar.	21.5	21.5	32.50	1.50		
19 Mar.						
26 Mar.[z]						
2 Apr.[x]	19	19	28.50	1.50		
9 Apr.	8	8	12.00	1.50		
16 Apr.	17	17	25.50	1.50		
23 Apr.	16	16	24.00	1.50		
Ft. Pierce Green Market						
30 Apr.	7	7	7.00	1.00	9:40	
7 May	7	7	10.50	1.50		
Total	163	163	$216.50			
Avg/wk 12 weeks	13.6	13.6	$18.04	$1.33		
Stuart						
19 Dec.[z]	4	4	4.00	1.00	8:30	
26 Dec.[x]	7	4	4.00	1.00		3
2 Jan.	8	8	8.00	1.00	9:45	
9Jan.	4	4	4.00	1.00		
16 Jan.						
23 Jan.[x]						
30 Jan.						
6 Feb.						
13 Feb.	4	3	3.00	1.00		1
20 Feb.	3	3	4.50	1.50	9:15	
27 Feb.[x]	3	3	4.50			
6 Mar.	9	9	13.50	1.50		
13 Mar.	10	10	15.00	1.50		
20 Mar.	4	4	6.00	1.50		
27 Mar.[w]						
3 Apr.	10	9	13.50	1.50		1
10 Apr.	8	8	12.00	1.50		
17 Apr.	12	9	13.50	1.50		3
24 Apr.	6	6	9.00	1.50		
1 May	6	6	6.00	1.00		
8 May[w]	3	3	3.00	1.00		
15 May	7	7	10.50	1.50		
Total	108	100	$134.00			8
Avg/wk 17 weeks	6.4	5.9	$7.88	$1.34		0.5

[z]Saturdays and Sundays before Thanksgiving, Christmas, and Easter.
[y]Market on Christmas and New Years' Day.
[x]Sales affected by rainy, cold, or overcast weather.
[w]Easter Sunday or Mothers' Day.

Marketing, pricing, and sales techniques. In addition to the green market in West Palm Beach, Fla., where Stephen's Produce has sold produce for the past seven seasons, another market opened in January 2003 in Palm Beach Gardens, Fla. This was a Sunday market open from 9 AM to 1 PM and was closer to home than the West Palm Beach market. Stephen's Produce sold green onions at this market as well as at a market in Stuart, Fla. which opened the same season. The Stuart

Table 6a. Summary of green onion sales for Stephen's Produce at green markets in Southeast Florida over a 5-year period, 2000-05.

Year	Location	Harvest and sales season	# of weeks	Total # onions taken	Total # onions sold	# sold/ week	$/bunch	Total $	$/week	Unsold (% of total taken)
2000-01	WPB[z]			90						
2001-02	WPB	3 Nov.-27 Apr.	26	454	450	10.9	$1.00	$449	$17.27	1.0%
2002-03	WPB, PBG[y], Stuart	26 Oct.-18 May	30	964	900	30.0	$1.25	$1,122	$37.38	2.8%
2003-04	WPB, Wellington, Stuart	19 Oct.-22May	32	1,621	1,592	49.8	$1.00	$1,592	$56.86	1.8%
2004-05	WPB, Ft. Pierce, Stuart	11 Dec.-15 May	18	271	263	14.6	$1.33	$351	$19.47	0.3%

[z]West Palm Beach, Fla.
[y]Palm Beach Gardens, Fla.

Table 6b. Summary of purple onion sales for Stephen's Produce at the West Palm Beach (WPB) green market, 2001-02.

Year	Location	Harvest and sales season	# of weeks	Total # onions taken	Total # onions sold	# sold/ week	$/bunch	Total $	$/week	Unsold (% of total taken)
2001-02	WPB	8 Dec.-16 Mar.	13	86.5	85.5	6.6	$1.00	$85.5	$6.58	1%

market was also a Sunday market opened from 9 am to 1 pm and was about the same distance from home as the market in West Palm Beach. In fall 2003 another Sunday market opened in Wellington, Fla. Stephen's Produce began selling at this market on their opening day, 2 Nov., until sales were discontinued on 21 Dec. because of low sales (Table 4). Sunday sales were made at both Stuart and Wellington for three weekends, 7 Dec. to 21 Dec. and continued at Stuart for the remainder of the season, ending on 22 May 2004. For the 2004-05 season, sales continued at both the West Palm Beach and Stuart markets (Table 5). After the West Palm Beach market closed in late Apr. 2005, Stephen's Produce sold produce on Saturday at the Ft. Pierce Green Market for two additional Saturdays, 30 Apr. and 7 May.

Onions were bunched according to supply: smaller bunches were made only when we knew we had a severe shortage. Sometimes prices were adjusted based on the size of the bunch. From the beginning of sales in 2000, green onions were mostly sold for $1.00/bunch until 2004-05 when prices of other bunched crops (mizuna, parsley, cilantro, and basil) were increased to $1.50/bunch. However, because of the quality problems associated with leaf diseases that were experienced in 2004-05, prices fluctuated between $1.00 and $1.50/bunch. Samples were gladly provided to anyone requesting a taste.

A display area was made with five large coolers which were raised off the ground by portable stands to a height of 29 inches at the front edge and lined up with their tops opened and supported from behind to form an inclined platform of the inside top surface. The produce display was covered by a tent which helped shield the vegetables from sunlight. Bunches of green onions would remain in the cooler or bucket until being laid out for display in short stacks of three to five bunches.

Production and sales figures. Green onion sales averaged 30 bunches per week in 2002-03 and 50 bunches per week in 2003-04 before dropping to 15 bunches per week in 2004-05. Average weekly value peaked at $57 for the 2003-04 season. The greatest value of green onions sold was for the 18 Jan. 2004 weekend when 81 bunches were sold for $81 at two markets. Under good growing conditions, as many as 97 bunches have been harvested from one planting (16 Oct. 2003 planting of 12 linear bed ft with four rows per bed).

To produce an average of 53 bunches per week for 32 weeks in 2003-04, 384 linear bed ft (12 linear bed ft with 4 rows per bed for each planting) was occupied for an average of 70 d. Total sales of 1,592 bunches at $1.00 per bunch was valued at $1,592 or $47,394 per acre or $649 per acre per day. A summary of green onion production and sales for the past five market seasons, 2000-2005, is provided in Tables 6a and 7a. A summary of production and sales for purple "green" onions for the 2001-02 market season is provided in Tables 6b and 7b.

To deal with the disease problems encountered during the 2004-05 season, whole plantings were often skipped and later pulled out and discarded to provide space for new plantings of other crops. After skipping the scheduled planting, we would often harvest from younger plantings which were often not as diseased. This practice was self-defeating since it would take more seedlings of the younger and usually smaller onions to make up a bunch and we sometimes ran out of onions that were large enough to be harvested at all. Since it took so much time to prepare the diseased onions for sale, we often physically ran out of time and did not harvest as many bunches as were ready. Since there were a few regular customers who really liked our onions, we would frequently just harvest enough for them.

Customer profile, observations, and customer comments. A wide range of customers purchased vegetables from Stephen's Produce. Customers included older retired couples, single men and women, and young families with children, as well as winter residents from the northern USA, Canada, and Europe.

For most of our customers, green onions were one of several items purchased. Many customers would buy a single bunch while some customers would purchase as many as four bunches at once. Customers would often comment on the freshness of our onions and that they could often hold them in the refrigerator for over a week. They would also mention that our individual onions were usually smaller (and younger) than those purchased from the supermarket.

Discontinuing production and sales? Because of the disease and production problems encountered during the 2004-05 season as well as the extra time needed to wash the roots, we may discontinue production and sales of green onions for the coming season. If we were to continue production, an at-

Table 7a. Summary of green onion production by Stephen's Produce for sale at green markets in Southeast Florida over a 5-year period, 2000-05.

Year	Harvest and sales season	# weeks planted	Linear bed ft planted/ week	Avg days to harvest	Duration of harvest	Avg # of harvests/ planting	Total bunches	Bunches/ acre	Bunches/ acre/day	$/acre	$/acre/day
2000-01	2 Dec.-20 Jan.	1	[z]	53-102	49.0	6.0	90				
2001-02	3 Nov.-27 Apr.	27	5.8[y]	60-62	2.0	1.3	454	34,141	857	$33,840	$546
2002-03	26 Oct.-18 May	29	9.2[x]	68-72	4.0	1.6	928	38,064	644	$47,580	$663
2003-04	19 Oct.-22May	31	12.6[w]	68-73	4.0	1.6	1,640	48,808	844	$47,394	$649
2004-05	11 Dec.-15 May	18 (24)[v]	11.3[u]	61-65	3.9	1.5	271	13,856	214	$17,921	$276

[z]Planted at three rows per bed.
[y]Six plantings at three rows per bed; 18 plantings at four rows per bed; three plantings at five rows per bed.
[x]Ten plantings at three rows per bed; 19 plantings at four rows per bed.
[w]One planting at three rows per bed; 30 plantings at four rows per bed.
[v]Onions were harvested from 18 of 24 plantings.
[u]One planting at two rows per bed; 17 plantings at three rows per bed.

Table 7b. Summary of purple onion production by Stephen's Produce for sale at green markets in Southeast Florida, 2001-02.

Year	Harvest and sales season	# weeks planted	Linear bed ft planted/ week	Avg days to harvest	Duration of harvest	Avg # of harvests/ planting	Total bunches	Bunches/ acre	Bunches/ acre/day	$/acre	$/acre/day
2001-02	8 Dec.-16 Mar.	15	4[z]	61-62	1	1	87	16,887	272	$16,887	$272

[z]One planting at three rows per bed; 11 plantings at four rows per bed; three plantings at five rows per bed.

tempt would be made to more precisely plant seed to allow for more space and hence thicker and larger seedlings. The most weed-free areas would be chosen as planting sites and several different cultivars might be tried.

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