

Growing and Marketing Basil at Local Green Markets in Southeast Florida

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Sweet basil (*Ocimum basilicum* L.) was first grown in 2002 in the 0.38-acre backyard market garden of Stephen's Produce. It was one of 30 crops being grown to help supply local green markets with a weekend supply of "garden fresh" produce. Planting schedules, growing and harvesting methods, yields, and sales figures will be discussed. For the 2003–04 season, 18 plantings of basil were made. Basil was sold at all of the 32 weekends for the sales season, which began 19 Oct. and concluded 22 May. Stems were cut, bunched, and banded the day before sales. Bunches were either stored in a cooler with ice or stood upright in a bucket or bin with water. Bunches of 5–10 stems were generally sold for \$1.00 to \$2.00 each. Plants were allowed to regrow for multiple harvests at 3- to 4-week intervals. In 2003–04, an average of 50 bunches of basil were sold each week.

THE BEGINNING OF BASIL SALES FOR GREEN MARKETS IN SOUTHEAST FLORIDA, 2002–08. Fresh basil was available from other greenmarket vendors in Southeast Florida before it was offered for sale by Stephen's Produce in 2002. Our regular customers were already getting other leafy salad greens from Stephen's Produce: cilantro, Italian parsley, lettuce, arugula, Swiss chard, mizuna, bekana, mache, garden cress, and spinach (Shuler et al., 2003a, b; 2004a; 2005a; 2006a, b). Stephen's Produce was looking for new crops to grow and sell since the garden had continued to be expanded and there was not a need to greatly expand production of existing crops. There is large-scale commercial production of basil by two growers in eastern Palm Beach County. Several consecutive weekly plantings of basil were made beginning in late summer so that basil would be available for sale at the first market in late October. Lemon basil, cvs. Sweet Dani and Mrs. Burns (Johnny's Selected Seeds, Winslow, ME), was the first type grown by Stephen's Produce beginning in 2002 and was grown for two seasons (Fig. 1). 'Genovese' sweet basil, cvs. Italian Large Leaf and Nufar (*Fusarium* resistant) (Johnny's Selected Seeds, Winslow, ME), was added to the crop mix the next season, 2003–04, and has continued to be grown each season since then. Basil is in the same plant family as mints, but the plant is an annual grown from seed. The dried leaves are used to flavor stews, dressings, and soups. Fresh basil leaves are a primary ingredient for making pesto; other ingredients include fresh parsley leaves, garlic, almonds, and olive oil. (Markle et al., 1998).

SOIL PREPARATION, IRRIGATION SETUP, AND MANAGEMENT. Garden soil preparation, broadcast fertilization, bed making, and irrigation setup and management have been handled similarly for the past several years (Shuler et al., 2001a, b; 2002a, b; 2003a, b; 2004a, b; 2005a, b; 2006a, b; 2007a, b).

CROP ESTABLISHMENT WITH DIRECT SEEDING. A 1% chlorpyrifos mole cricket bait (Micro Flo, Memphis, TN) used to control wire worms and cutworms and approximately 80–67 lb/acre N

and K, respectively, from mixing equal amounts of potassium nitrate and ammonium nitrate were sprinkled on the bed top just before seeding. The cultivator attachment of a wheel-hoe was used on the row areas of the bed surface to incorporate the soil insecticide and fertilizer amendments and to loosen the area for planting.

Row furrows were pushed open with a hoe and basil seeds were sowed rather thickly in two or three rows per bed. 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



Fig. 1. Basil grown at 'Stephen's Produce' local produce market in Palm Beach County, FL.

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Table 1. 'Genovese' basil production from 0.026 acres for sale at green markets in Southeast Florida, 2003–04.

Date planted	Harvest period (dates)		Days to harvest		Avg days to harvest	Linear bed ft planted ^z	Bunches harvested (no.)	Total value (\$) ^y	\$ per acre	\$ per acre per day ^x
	Start	Finish	Start	Finish						
12 Sept.	17 Oct.	2 Jan.	35	112	74	14	116	\$116	\$90,231	\$806
19 Sept.	24 Oct.	3 Jan.	35	106	71	14	137	\$137	\$106,567	\$1,005
24 Sept.	31 Oct.	3 Jan.	37	101	69	14	133	\$133	\$103,455	\$1,024
14 Oct.	28 Nov.	17 Jan.	45	95	70	16	101	\$101	\$68,743	\$724
20 Oct.	5 Dec.	17 Jan.	46	89	68	14	70	\$70	\$54,450	\$612
26 Oct.	12 Dec.	2 Jan.	47	68	58	14	50	\$50	\$38,893	\$572
12 Nov.	9 Jan.	13 Mar.	58	124	91	16.5	109	\$109	\$71,940	\$580
18 Nov.	23 Jan.	5 Mar.	66	108	87	16	133	\$133	\$90,523	\$838
25 Nov.	30 Jan.	13 Mar.	66	119	93	18	159	\$159	\$96,195	\$808
2 Dec.	20 Feb.	3 Apr.	80	123	102	14	96	\$96	\$74,675	\$607
23 Dec.	27 Feb.	16 Apr.	66	115	91	12	140	\$140	\$127,050	\$1,105
30 Dec.	6 Mar.	9 Apr.	67	101	84	13	75	\$75	\$62,827	\$622
6 Jan.	19 Mar.	17 Apr.	73	102	88	7	60	\$60	\$93,343	\$915
13 Jan.	26 Mar.	24 Apr.	72	101	87	12	91	\$91	\$82,583	\$818
21 Jan.	2 Apr.	1 May	72	101	87	11	55	\$55	\$54,450	\$539
3 Mar.	9 Apr.	21 May	37	79	58	12	106	\$106	\$96,195	\$1,218
10 Mar.	1 May	21 May	52	72	62	11	30	\$30	\$29,700	\$413
17 Mar.	8 May	21 May	52	65	59	10	42	\$42	\$45,738	\$704
Totals			55.9	98.9	77.4	280.5	1,563	\$1,563	\$60,681	\$614
Avg for 18 plantings						15.6	86.8	\$87		
Avg for 32 weeks sales							49	\$49		

^zBeds were planted with 3 rows; i.e., 14 linear bed ft is 42 row ft.

^yBased on \$1.00 per bunch if all bunches were sold.

^xCalculated by dividing "\$ per acre" by "Days to harvest—Finish."

depth of planting was judged to be about 0.5 inches. During warm weather in late summer seedlings emerged quickly, usually in 3–4 d. For plantings made in winter, emergence was much slower, often taking 7–10 d.

CROPSCHEDULING. Since basil could be cut and left to regrow for multiple harvests, several sets of consecutive weekly plantings of basil were made throughout the season (Table 1). Growth of basil, more than any other crop, was slowed by cooler winter weather. Days to first harvest for plantings made in September usually ranged from 35 to 40 d, while days to first harvest for plantings made in December and January ranged from 65 to 70 d.

GROWING THE CROP AND PEST MANAGEMENT. Weed pressure has increased dramatically over the past four seasons because end-of-season weeds were allowed to go to seed. Since basil was cut and allowed to regrow for multiple harvests, weeds could compete with and shade-out first harvests of recently cut basil plants. Basil plantings made during the winter grew very slowly and competed very poorly with weeds. Basil plantings were hand-weeded several times throughout the season. Since basil stems were cut and bunched, harvesting was performed more quickly where weeds were controlled such that weeds did not have to be separated out from the basil stems before banding. From August to mid-November, when conditions were favorable (dry foliage and no wind), paraquat dichloride (Gramoxone Max, Syngenta Crop Protection, Inc., Greensboro, NC) was occasionally sprayed in the alleyways and on bed shoulders of planted crops and on the tops of unplanted beds to control recently emerged weeds. For the cruciferous crops, DCPA, a pre-emergence herbicide, was used for the first time in the 2007–08 season. However, DCPA was phytotoxic to basil and was not used where basil was planted. After several harvests basil would grow taller and compete well with weeds.

Crop protective chemicals were used as described in previous reports of our garden crops (Shuler et al., 2003a, b; 2004a, b; 2005a, b; 2005a, b). Our crop protective chemical program for insects usually provided excellent control of worms. Worms could have been a problem for basil, especially in the spring, as evidenced by the presence of egg masses on crop leaves. Scouting for pests was done at harvest and when pests were detected, younger plantings would be further examined and sprayed if needed.

Early growth of basil seemed to thrive more under very moist soil conditions than any other crop. However, where basil was growing very quickly under warm, moist conditions in the fall, regrowth after cutting was often affected by bacterial soft rot and damping-off. During cooler weather in winter and spring, basil leaves were often affected by a black spot and sometimes a mild chlorosis. Leaf bronzing often occurred after cool windy weather. Basil and green beans were the two crops most adversely affected by very cold winds and frost and freeze conditions. Established plantings of basil could be severely "burned" by very cold winds and frost. After being "burned" by cold weather, established plantings would eventually regrow to produce marketable stems. However, frost and freeze often killed very young plantings.

HARVESTING AND WASHING. Harvesting for basil was non-destructive. For the first harvest of a given planting, handfuls of stems were gathered, cut with a knife, and banded. Stems would be cut from each planting every third to fifth week. Note: Usually four or five plantings were in a harvest cycle at any given time. After the first or second harvest, when regrowth was less uniform, stems would tend to be cut individually. Larger bunches with more stems were usually made when supply was abundant and quality was good. Whenever regrowth had to be harvested

after a cold weather incident, stems would be selected from several plantings and these plantings would be harvested for several consecutive weeks.

On Friday, basil was usually one of the last crops harvested, and it would usually be cut via headlight after dark. On Saturday, all crops were usually harvested after sundown. After dark, basil would usually be turgid and would not be subject to dehydration from exposure to sunlight. Postharvest quality of basil did not seem to be adversely affected by preharvest dew or moderate rainfall. However, after heavy rainfall and/or strong winds, plants could be bent over and splashed with soil and leaves could be tattered. Bunches of basil were wrapped with a rubber band near the ends of the stems and the stems cut square at the end. Since the leaves were generally held off the ground by the plant, bunches were usually stored immediately in coolers with ice without being washed. Bunches of basil usually contained from 5 to 10 stems. Bunches were either laid flat on top of another crop (to keep them from coming in contact with cold water at the bottom of the cooler) or stood upright in a bucket or plastic bin. Whenever bins were used, they were placed inside the coolers on top of ice packs. Any basil left unsold at the Saturday market would be taken back home, placed in sales bags, and held in a household refrigerator until time for loading for the Sunday market.

MARKETING, PRICING, AND SALES TECHNIQUES. The primary greenmarket outlets for Stephen's Produce have been the Saturday market in West Palm Beach, FL (7 to 8 AM to 1 PM for 27 or 28 weeks, late October to late April since Fall 1998 and the Sunday market in Stuart, FL (9 AM to 1 PM for 28 to 30 weeks, late October to early May), since Spring 2003. The demand for fresh basil has generally been steady and it was often sold out. Most customers who bought basil would buy a single bunch. Many customers who bought basil would also buy cilantro, Italian parsley, or green onions. Whenever they were going to make pesto, customers would often buy two or more bunches of basil.

The bunch size for basil remained fairly constant over the years; however, price per bunch was increased from \$1.00 to \$1.50 to \$1.75 to \$2.00. One or two bunches of basil were usually kept outside on display and replenished with fresh bunches from the storage cooler as needed. If the basil on display became wilted, it would either be replaced with a fresh bunch for display or upon sale the wilted bunch would be left on display and a fresh bunch sold. Prices were usually not reduced in an attempt to sell more bunches; however, if the last bunch on display was wilted, it would often be sold at a reduced price.

PRODUCTION AND SALES FIGURES. Detailed production and sales figures for basil were provided for the 2003–04 season (Tables 1 and 2). This was our most productive season and was not affected by September or October hurricanes as were the 2004–06 seasons.

The greatest number of lemon basil bunches sold were for the 2 and 9 Nov. 2002 weekends when 29 bunches were sold for

Table 2. Basil sales for green markets in Southeast Florida, 2003–04.

Market weekend	Genovese basil				Lemon basil			
	Taken (no.)	Sold (no.)	Sales (\$)	Unsold (no.)	Taken (no.)	Sold (no.)	Sales (\$)	Unsold (no.)
18 Oct.	31	31	\$31		14	14	\$14	
25 Oct.	42	42	\$42		19	19	\$19	
1 Nov.	47	45	\$45	2	20	20	\$20	
8 Nov.	46	46	\$46		16	16	\$16	
15 Nov.	51	51	\$51		26	21	\$21	5
22 Nov.	55	54	\$54	1	19	18	\$18	1
29 Nov.	66	44	\$44	22	12	10	\$10	2
6 Dec.	56	50	\$50	6				
13 Dec.	38	38	\$38					
20 Dec.	52	49	\$49	3				
27 Dec.	34	34	\$34		5	5	\$5	
3 Jan.	31	31	\$31					
10 Jan.	43	43	\$43					
17 Jan.	46	46	\$46					
24 Jan.	37	37	\$37					
31 Jan.	50	47	\$47	3				
7 Feb.	56	56	\$56					
14 Feb.	60	51	\$51	9				
21 Feb.	66	66	\$66					
28 Feb.	67	64	\$64	3				
6 Mar.	63	63	\$63		6	5	\$5	1
13 Mar.	80	78	\$78	2	5	5	\$5	
20 Mar.	88	87	\$87	1	6	6	\$6	
27 Mar.	67	67	\$67		5	1	\$1	4
3 Apr.	86	79	\$79	7				
10 Apr.	70	58	\$58	12				
17 Apr.	87	80	\$80	7				
24 Apr.	61	61	\$61		15	15	\$15	
2 May	30	18	\$18	12	7	5	\$5	2
9 May	20	12	\$12	8	5	5	\$5	
15 May	17	16	\$16	1	7	1	\$1	6
21 May	35	21	\$11	14	19	13	\$3	6
Total	1,678	1,565	\$1,555	113	206	179	\$169	27
	Avg/wk (32 weeks)				Avg/wk (17 weeks)			
	52.4	48.9	\$48.60	3.5	12	10.5	\$9.94	1.6
Percent unsold				6.7%				13.1%

\$44. The greatest number of 'Genovese' basil bunches sold was for the weekend of 21 Mar. 2004, when 94 bunches were sold for \$94 and for the 10 Dec. 2005 weekend when 84 bunches were sold for \$147. A summary of seasonal basil production and sales is provided in Tables 3 and 4.

CUSTOMER PROFILE, OBSERVATIONS, AND CUSTOMER COMMENTS. A wide range of customers purchased vegetables at the green markets. Customers included older retired couples, single men and women, young families with children, as well as winter residents from the northern United States, Canada, and Europe.

For a few customers, basil was the only item purchased with some customers buying two or more bunches. Basil was often one of several leafy green items purchased. Customers would often comment on the freshness of our basil. Some of our customers of basil would buy it each time they shopped at the market.

Table 3. Summary of basil sales at green markets in Southeast Florida over a 6-year period, 2002–08.

Season	Location	Harvest and sales season	Wks sold (no.)	Basil taken (no.)	Basil sold (no.)	Sold per wk (no.)	Avg price per basil	Total sales value	Sales value per wk	Basil unsold (no.)	Unsold (% of total taken)
2002–03 ^z	WPB ^y , PBG ^x , Stuart	19 Oct.–18 May	26	389	329	12.7	\$1.19	\$393	\$15.11	60	15.4%
2003–04	WPB ^y , Wellington, Stuart	18 Oct.–22 May	32	1,678	1,565	49	\$0.99	\$1,555	\$48.60	113	6.7%
2004–05	WPB ^y , Stuart	13 Nov.–15 May	27	1,040	1,000	37	\$1.49	\$1,488	\$55.11	40	3.8%
2005–06	WPB ^y , Stuart	5 Nov.–14 May	28	1,233	1,142	41	\$1.75	\$1,994	\$71.21	91	7.4%
2006–07	WPB ^y , Stuart	21 Oct.–28 Apr.	28	967	899	35	\$1.99	\$1,791	\$63.96	68	7.0%
2007–08	WPB ^y , Stuart	20 Oct.–10 May	25	674	650	26	\$2.00	\$1,300	\$52.00	24	3.6%

^zOnly lemon basil was grown in 2002–03.

^yWest Palm Beach, FL.

^xPalm Beach Gardens, FL.

Table 4. Summary of Genovese basil production for sale at green markets in Southeast Florida over a 6 year period, 2002–08.

Season	Harvest and sales season	Wks planted (no.)	Linear bed ft per planting	Avg days to harvest	Median harvest days	Basil		\$ Value sold	\$ Per acre	\$ Per acre per day
						Harvested (no.)	Sold (no.)			
2002–03 ^y	19 Oct.–18 May	14	8.75	70–141	106	389	329	\$393	\$34,795	\$247
2003–04	18 Oct.–22 May	18	15.6	56–99	77.4	1,678	1,565	\$1,555	\$60,263	\$609
2004–05 ^x	13 Nov.–15 May	12	15.2	54–95	75	1,040	1,000	\$1,488	\$89,035	\$937
2005–06 ^{w,v}	5 Nov.–14 May	15	17.3	63–109	86	1,233	1,142	\$1,994	\$83,518	\$766
2006–07 ^u	21 Oct.–28 Apr.	11	20.2	50–105	77.5	967	899	\$1,791	\$87,856	\$837
2007–08 ^t	20 Oct.–10 May	11	21	63–112	88	674	650	\$1,300	\$61,286	\$547

^zCalculated by dividing “\$ per acre” by “Days to harvest—Finish”.

^yOnly lemon basil was grown in 2002–03.

^xThree early plantings lost to Hurricane Jeanne.

^wSome damage to first plantings from Hurricane Wilma.

^vDamaged by frost on 8 Jan. and 14 Feb. 2006.

^uDamaged by frost on 17 Feb. 2007.

^tDamaged by very cold wind on 2 Jan. 2008.

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