

On-Farm Commercial Vegetable Demonstration and Observation Plots in South-Central Kentucky

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Introduction

Two on-farm commercial vegetable demonstrations were conducted in south-central Kentucky, along with three specialty melon observation plots in 2003. Grower/cooperators were located in Edmonson and Larue counties. The grower/cooperator in Edmonson County grew one acre of cantaloupes, marketed through Green River Produce Marketing Cooperative located in Horse Cave, Kentucky. In Larue County, the cooperator grew approximately 0.7 acre of mixed vegetables, half on plastic mulch/trickle irrigation (watermelon, cantaloupes, specialty melons, cucumbers, zucchini, broccoli, tomatoes, and peppers). The other half was grown on bare ground with only trickle irrigation (potatoes, squash, okra, gourds, sweet corn, bush, lima, and pole beans). The cooperator used local farmers' markets and on-farm marketing.

Specialty melon observation plots were located in Barren, Hart, and Larue counties. These plots ranged from 20 plants to a few hundred plants. Varieties included Sprite, Sundew, St. Nick, Golden Beauty, and Dorado. The cooperators in Barren and Larue counties sold through local farmers' markets, while the Hart County cooperator sold through an established roadside market.

Materials and Methods

Grower/cooperators were provided with black or green plastic mulch and drip irrigation lines for up to one acre and the use of the Horticulture Department's equipment for raised-bed preparation and transplanting. For those cooperators participating in observation plots, only the transplants were provided. Field preparation was followed by fertilizer application according to soil test results and recommendations provided by local fertilizer dealers or the University of Kentucky. Plastic was laid in late April and early May, a few weeks before transplanting. The wet spring made it difficult to lay plastic without wind damage and packed beds. Part of the cantaloupe demonstration was flooded out before transplanting.

The plastic and irrigation lines for the cantaloupe demonstration were laid in rows 800 ft. long. Thus, a low flow drip tape was used to achieve uniform flow. Beds were 6 to 7 ft. between centers allowing the producer to use the 7,200 linear ft. of plastic on about a 1½ acre plot. The drip irrigation system used municipal water. The cooperator/grower provided locally grown transplants. Setting them was delayed for about 1½ weeks due to rain. The 4+ week old plants were transplanted mid-May. Transplants were spaced 24 in. apart in the row, allowing 3,600 plants per acre. A small number of plants were lost to flooding. After plants were established, insecticides were applied to prevent damage from cucumber beetles and other insects. Imidacloprid (Admire) was used as a soil drench and was effective for nearly four weeks; for the remainder of the growing

season, control was achieved by alternating insecticides (imidacloprid, endosulfan, and permethrin) weekly until harvest. Bravo Weather Stik was applied weekly for disease control after vines ran off the plastic. Plants were irrigated weekly with 50 to 70 pounds per acre of calcium nitrate fertigated on the field each time. Harvest began in mid-July and ended in August. Melons were harvested daily during that period. Melons were not harvested by the "slip" technique but by observing a subtle color change (referred to as the "breaker" stage when the skin under the netting turns a light cream and the skin near the sutures is still a greenish color).

The mixed vegetable demonstration consisted of both plastic mulch and bare ground production. However, both methods included trickle irrigation. Melons, cucumbers, zucchini, broccoli, peppers, and caged tomatoes were all grown on plastic, with the melons grown on green plastic mulch. Plastic was installed in mid-May just before planting, due to wet field conditions earlier in the season. Bare ground production included beans and potatoes, squash, okra, gourds, and sweet corn. Straw was used to mulch the bare ground crops. Plant spacings were those recommended in *Home Vegetable Gardening in Kentucky* (ID-128). The cooperator used Admire on crops for which it is labeled. Other insecticides were used as needed. Bravo Weather Stik and copper were the fungicides used and were applied as needed. The University of Kentucky's recommendations for fertigation, *Vegetable Production Guide for Commercial Growers* (ID-36), were followed.

Three specialty melons observation trials were planted in south-central Kentucky this season. Trials in Hart and Barren counties were conducted by experienced cantaloupe producers, while the third plot was planted in the Larue County demonstration described above. All plots were planted on plastic mulch with drip irrigation and planted on 24- or 36-in. spacing. All plots were sprayed as needed with appropriate fungicides and insecticides and each cooperator followed a weekly fertigation schedule.

Results and Discussion

The 2003 season was the second wettest April through August and second coolest June through July on record for Kentucky. Conditions were not the best for crop production and market prices were often low, a combination that made it a very difficult season for even the experienced producers in the region.

Edmonson County

This grower/cooperator experienced some of the lowest prices for cantaloupes in the past five years, in addition to the poor weather conditions. Cantaloupe returns for the grower before production and marketing costs were 61 cents for large and 48 cents for medium melons. According to the East Coast

brokers, peak melon production in several different states was overlapping, due to late plantings in the southern United States. These late planting dates also resulted in times when eastern melons were not available. When there were shortages, cantaloupes were shipped from western states such as California, and these shipments provided market competition throughout the season. The grower sold 79% of his production as large No. 1 cantaloupes. But delayed transplanting and flooded fields decreased production to the point that the season was not profitable, especially at such low market prices (Table 1). However, the plot provided valuable information on use of ryegrass as a mulch between rows. A rate of 50 to 70 pounds of annual ryegrass per acre considerably reduced weed competition. The ryegrass, killed with Poast during the season, produced an effective mulch. This was less expensive than standard herbicides and also provided a clean mulch for fruit to sit on.

Larue County

Weather conditions for the grower/cooperators here also resulted in poor growing conditions. However, because of greater diversification of crops and marketing, outcomes were profitable (Table 2). The cooperators marketed produce through local farmers' markets, on-farm sales, and even made deliveries. The season was cut short for one cooperator because of disease in tomatoes, a product that the grower normally depends on late in the season. Nevertheless, the cooperator was pleased with the plastic mulch and drip irrigation that, based on his experience, increased yields compared to production on bare ground. He plans to try it again next season.

The specialty melons were a great item for all the grower/cooperators. Each had his/her own marketing method (farmers' market, roadside stand, and custom delivery). All reported that they had to provide samples before customers would purchase a melon. All the cooperators noted that of those who tried the melons, most would buy, and many would return and

Table 1. Muskmelon (cantaloupe) costs and returns, 2003.

Inputs	Edmonson County (1 acre)
Transplants	\$378
Fertilizer/lime	107
Black plastic	129
Drip line	128
Herbicides ¹	55
Insecticides	103
Fungicides	119
Pollination	free service
Machine ²	75
Irrigation/water ³	210
Labor ⁴	350
Co-op 15% commission	350
Box/pallet fee	366
Co-op labor expense	235
Co-op membership	50
Harvest bin rental	40
Total expenses	2,695
Yield	4,039 melons
Income	\$2,332
Net income (Loss)	(\$363.00)
Dollar return/dollar input	0.86

¹ Includes annual ryegrass seed cost.

² Machine rental, fuel and lube, repairs, and depreciation.

³ Municipal water cost; cooperator had Dosatron Injector from poultry operation.

⁴ All labor is unpaid family labor @ \$7.00 an hour.

Table 2. Grower/cooperator's cost and returns for mixed vegetables.

Inputs	Larue County (0.7 acre)
Plants and seeds	\$230
Fertilizer	99
Black plastic	34
Drip lines and connectors	91
Poly water line/layflat ¹	18
Fertilizer injector ²	63
Fungicides	73
Insecticides	50
Water	50
Equipment rental	150
Equipment repairs	26
Hired labor ³	204
Total expenses	1,088
Income	2,372
Net income	1,284
Net income (loss)/acre	1,834
Unpaid family labor ⁴	(196 hr)
Per hour return for labor	6.55
Dollar return/dollar input	2.18

¹ Five-year amortization of system.

² Includes three-year amortization of injector.

³ Does not include unpaid family labor; hired labor was 34 hr @ \$6.00.

⁴ Family labor for production and marketing.

buy more. Dorado and Golden Beauty were the best producing and most preferred melons by both the growers and consumers. Sprite was also an excellent seller at the farmers' market and was a high producer. Each cooperator/grower reported extremely low yields and very poor sales of the St. Nick type melons. It did not have the shelf life the other varieties had. Sundew, St. Nick, and Sprite were difficult for growers to properly harvest because they did not slip at harvest. These varieties had unique characters that indicated maturity, and by the end of the production season growers were getting better at identifying the proper stage for harvest (see page 43, 2002 *Fruit and Vegetable Crops Research and Report*). The grower/cooperators also noticed high cull rates for these varieties, a common characteristic of many specialty type melons. But, with prices between \$0.75 for the smaller varieties such as Sprite and \$2.50 for the larger melons, these producers plan to incorporate the specialty melons into their production and marketing next season.

On-Farm Commercial Vegetable Demonstration in Daviess County, Western Kentucky

Nathan Howard, Department of Horticulture

Introduction

One on-farm commercial vegetable demonstration was conducted in Western Kentucky as part of the Agriculture Development Board program of introducing alternative crop and production systems to tobacco growers. The grower had raised vegetables previously but never used the plasticulture method of production. The grower was located in Daviess County, Kentucky, and planted 0.5 acre of mixed vegetables (bell pepper, tomato, cantaloupe, cucumber, and squash). The grower marketed all of his products through the Owensboro Regional Farmers' Market.

Materials and Methods

According to the guidelines of the on-farm demonstration program, the grower was provided with black plastic mulch, drip irrigation lines, and the supervised use of UK's Department of Horticulture's equipment for plastic laying, transplanting, and plastic removal at the end of the season. Pre-plant fertilizer was applied according to University of Kentucky soil test results and recommendations. The grower purchased capital supplies such as fittings, supply lines, pesticides, fertilizers, and a fertilizer injector. The grower purchased transplants but had to raise some of his own transplants also. County water was used for irrigation during the growing season. As part of my duties as the Extension Associate for Vegetable Crops, I made weekly visits to scout for weed, disease, and insect problems, help with fertigation, and address any questions or concerns the grower might have. The grower also hosted a field day on his farm for interested growers and homeowners in the area to highlight the plasticulture system.

Plastic was laid on April 30 with no herbicides applied. The transplants were planted the following day with 7-14-7 starter fertilizer used at a rate of 0.5 pint per 50 gallons of water. The tomato varieties consisted of Mt. Fresh and Mt. Spring. Other varieties used were Multipik for squash, Marketmore for cucumber, Ambrosia for cantaloupe, and Jupiter for bell pepper. The grower sprayed fungicides on a weekly basis and insecticides, as needed.

Table 1. Costs and returns of a commercial mixed vegetable demonstration plot in Daviess County, Kentucky, in 2003.

Inputs (0.5 acre)	Dollar Amounts
Plants	281
Fertilizer/lime	163
Black plastic	75
Drip lines	70
Fertilizer injector	15
Insecticide	36
Fungicide	132
Water (135,000 gal.)	146
Labor ¹ (350 hr)	2,100
Machinery (10 hr)	100
Marketing expenses	390
Total expenses	3,508
Yield (bushels)	282
Income	6,656
Net income	3,147
Net income adjusted per acre	6,295
Dollar return/Dollar input²	1.90

¹ All labor was unpaid family labor.

² Dollar return/dollar input = Income ÷ Total Expenses.

Results and Discussion

The 2003 season started with a wet and cool spring, followed by a mild and wet summer. The grower had a challenging year for tomato production, his biggest crop. Two weeks after the first harvest, yellow shoulder disorder appeared on both tomato varieties grown and could not be controlled. Harvest was drastically reduced for both varieties. On the other hand, the pepper, squash, cantaloupe, and cucumber crops were very good. The grower's costs and returns are listed in Table 1.

In general, the grower was pleased with this newly adopted method of plasticulture production but was not pleased with the outcome of his tomato crop. The tomato disorder drastically reduced his dollar returns. Still, the grower admitted that having the drip irrigation helped him in the two weeks of hot, dry June weather. The grower has not decided what size plot he will grow next year but insists that the plasticulture system is the only way to go.

Fairview Produce Auction Vegetable Demonstration

Shane Bogle, Joe Masabni, Harold Eli, and Jay Stone, Department of Horticulture and Christian County Extension Office

Introduction

Fairview, Kentucky, is a fast-growing community, and production of farm fresh vegetables occurs on hundreds of acres. The Fairview Produce Auction, a Mennonite-owned facility, is used by local growers and growers from surrounding counties and attracts buyers from as far as Atlanta, Georgia.

In 2003, a demonstration plot was set up on the auction grounds, in order to compare 1) new vegetable varieties, 2) production practices, and 3) sales of two sweet corn varieties. The demonstration plot was also set up as an educational plot for growers and members of the Fairview Produce Auction for their annual field day held in July.

Materials and Methods

The demonstration plot compared the effects of black and red plastic mulch on yields of different cultivars of cantaloupe, tomato, and watermelon grown with trickle irrigation. The tomato varieties used in this plot were Mt. Fresh, Mt. Spring, Florida 47, and BHN 951. The watermelon varieties used were Black Diamond, Sangria Seedless, and Charleston Gray. Only one cantaloupe variety, PXC221, was used in this plot. Tomatoes were transplanted on 30 May, whereas the watermelons and cantaloupes were direct-seeded on 2 June. Insecticide application consisted of Admire 2F applied as a soil drench to cantaloupe, tomato, and watermelon at a rate of 16 fl oz per acre one week after planting and Pounce 3.2EC applied six weeks later.

The sweet corn varieties, CSYBF1-12 (bicolor) and Attribute GSS0978 (Bt-ready F1 yellow), were planted on 28 May. Cultural practices according to current commercial recommendations for Kentucky were followed. Fifty pounds of N per acre and all P and K were applied preplant according to UK soil test and recommendations. Sweet corn was side-dressed with an additional 50 lb of N per acre when it was about knee high. The second application of N for the tomato, watermelon, and cantaloupe (see ID-36 for recommended rates) was applied through the drip irrigation system over a seven-week period.

Plots consisted of eight raised beds, 100 ft. long each, set up with trickle irrigation with half the rows on black plastic and the other half red plastic mulch. Bed centers were 6 ft. apart. Within the row, spacing for the tomato plants was 18 in. and 36 in. for the watermelons and cantaloupes. Eight rows of CSYBF1-12 and 16 rows of Attribute were planted on 40-in. spacing with rows approximately 200 ft. long. Preemergence weed control for the sweet corn consisted of 2.3 qt of Bicep and 1 pt of atrazine per acre.

Results and Discussion

Plastic laying and planting were delayed more than two weeks due to the wet, cool spring. Still, the growing season was overall favorable to vegetable production here. Exces-

sive rain caused one low area of the field to consistently hold water, stunting several tomato plants. Raccoons also were a problem in the CSYBF1-12 but did not seem to like the Bt-ready sweet corn. When sold on the auction floor, Attribute was clearly labeled as Bt-ready sweet corn. A total of 187 dozen ears of Attribute were sold with prices ranging from \$0.75 to \$1.50 per dozen. Due to excessive feeding by raccoons, only 24 dozen ears of CSUBF1-12 were sold at a price of \$2.00 per dozen. Buyers seemed to bypass the Bt-corn if other sweet corn was available.

A total of 46 watermelons and 186 cantaloupes were sold from the demonstration plot. No significant yield differences were observed between the red and black plastic mulches, for any of the crops.

Tomato plants were harvested five times and separated into two grades: large and small. Each variety was harvested and weighed separately for plants grown on black and red plastic mulch. None of the varieties were significantly different in yields of large or small size fruits or in terms of total harvest weight when grown on black or red plastic mulch (Table 1). Table 2 shows that the plastic mulch color did not influence the overall combined yields for all five harvest dates and all four tomato varieties.

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Table 1. Comparisons of yields of four tomato varieties grown on black or red plastic mulch.

Cultivar	Black Plastic			Red Plastic		
	Large Fruit (lb/plant)	Small Fruit (lb/plant)	Total Fruit (lb/plant)	Large Fruit (lb/plant)	Small Fruit (lb/plant)	Total Fruit (lb/plant)
Mt. Fresh	1.8	2.2	3.9	1.1	1.9	3.0
Florida 47	1.5	2.2	3.7	1.2	1.9	3.1
BHN 951	1.2	2.3	3.5	1.3	2.2	3.4
Mt. Spring	2.5	2.4	4.9	2.5	2.2	4.6
LSD 5%	NS	NS	NS	NS	NS	NS

Table 2. Yields of tomatoes grown on black and red plastic mulch.

Plastic Mulch	Large Fruit (lb/plant)		
	Large Fruit (lb/plant)	Small Fruit (lb/plant)	Total Fruit (lb/plant)
Black	6.9	9.1	16.0
Red	5.9	8.2	14.0
LSD 5%	NS	NS	NS

On-Farm Commercial Vegetable Demonstration in Western Kentucky

Shane M. Bogle, Joseph G. Masabni, and Nathan Howard, UK Research and Education Center, Department of Horticulture

Introduction

Four on-farm commercial vegetable demonstrations were conducted in Western Kentucky in 2003. Grower/cooperators were located in Caldwell, Hopkins, and Webster counties. In Caldwell County, the grower planted 0.9 acre of mixed vegetables (bell pepper, green bean, staked tomato, okra, and squash, among others). There were two growers/cooperators in Hopkins County with one growing 1.7 acres of mixed vegetables such as staked tomato, bell pepper, cantaloupe, and squash, and the other growing 5 acres of bell pepper, 3.5 acres of cucumber, and 0.5 acre of staked tomato. In Webster County, the grower/cooperator planted 0.5 acre of staked tomatoes and 0.5 acre of cantaloupes. All plots used black plastic mulch with trickle irrigation. All growers came from a tobacco production background and were looking to diversify their operation and supplement their tobacco income.

Materials and Methods

As in previous years, growers/cooperators were provided with black plastic mulch and drip irrigation lines for up to one acre and the supervised use of UK's Department of Horticulture field equipment for raised bed preparation and transplanting. Soil fertility was tested at the University of Kentucky Research and Education Center, and fertilizer was applied according to soil test results and recommendations. The growers acquired their own transplants and provided labor for pesticide sprays and harvests.

Growers used pond, well, and county water for their drip irrigation. An Extension Associate made weekly visits to each plot throughout the growing season to scout for insects and diseases, address growers' concerns, and make recommendations. The county Extension agents also worked closely with the growers. Among other duties, the Extension agents were helpful in scheduling, promoting, and coordinating field days at each location.

The tomato demonstration plots were established from late April to mid-May. Grow-

ers planted the varieties Mt. Fresh, Mt. Gold, BHN 641, and BHN 591. Mt. Fresh was the most widely used tomato variety. Tomatoes were transplanted into raised beds that were spaced on 6-ft. centers with in-row spacing of 18 in. Tomato plants were trellised with stakes placed every three plants with one metal T post every 30 ft. and were pruned and tied according to current recommendations. The pepper plots were set with Ironsides, Aristotle, and Wizard varieties. Pepper plants were set 12 in. apart in an offset manner in double rows 15 in. apart. Speedway cucumber plants were set with row spacing similar to peppers. Minerva was the most commonly used cantaloupe variety with in-row spacing of 36 in. All plots were sprayed with appropriate fungicides and insecticides as needed, and each cooperator followed a weekly fertigation schedule suggested by the University of Kentucky.

Results and Discussion

The 2003 growing season began with wet and cool weather, which delayed plastic laying and planting at most locations. The wet conditions early also forced two growers to abandon use of a waterwheel setter for transplanting. They opted to manually transplant all their plants. Cooler-than-normal temperatures and above-average rainfall throughout the summer helped reduce temperature and water stresses, resulting in higher-than-expected yields at three of the four locations.

Table 1. Costs and returns of four commercial vegetable demonstration plots conducted in Western Kentucky in 2003.

Inputs	Caldwell County (0.9 acre)	Hopkins County (1.8 acres)	Hopkins County (9 acres)	Webster County (1 acre)
Plants	200	850	5,500	304
Fertilizer/lime	90	95	564	135
Black plastic	123	100	1,187	125
Drip lines	117	112	1,330	140
Fertilizer injector ¹	47	47	94	-----
Herbicide	38	-----	-----	59
Insecticide	120	72	116	79
Fungicide	160	-----	307	81
Water	(160,000 gal.)	550 (160,000 gal.)	400 ² (950,000 gal.)	660 ² (37,000 gal.)
Labor ³	1,650 (330 hr)	5,025 (558 hr)	11,217 (1,558)	585 (378 hr)
Machine	110 (11 hr)	240 (24 hr)	250 (50 hr)	263 (24 hr)
Marketing	40	696 (70 hr)	5,484	-----
Misc. expenses	100	600	2,275	193
Total expenses	2,795	8,387	28,724	2,624
Yield	17,560	39,500 lb	85,450 lb ⁴	19,030 lb
Income	5,500	16,180	21,560	3,976
Net income (loss)	2,705	7,793	(7,165)	1,352
Net income (loss)/acre	\$3,005	\$4,330	(\$754)	\$1,352
Dollar return/Dollar input	1.97	1.93	0.75	1.52

¹ Costs amortized over three years.

² Includes the cost of fuel and five-year amortization of irrigation system.

³ Does not include unpaid family labor.

⁴ Does not include approximately 10,000 lb not sold due to marketing problems.

Three of the growers/cooperators sold their produce through local channels such as farmers' markets, local wholesale distributors, grocery stores, and the Fairview Produce Auction. Even with the fluctuating sale prices, these three growers surpassed their projected income goals.

Bacterial and fungal diseases seemed to be the most prevalent problems for tomato growers. Wholesale tomato prices stayed relatively steady throughout the season, which made for excellent returns (Table 1). The cantaloupe grower lost revenue due to the loss of over 1,000 cantaloupes (Fast Break variety) that could not be marketed due to uneven ripening and short shelf life. One grower/cooperator marketed his cucumbers, peppers, and tomatoes through the West Kentucky Growers Cooperative in Owensboro, Kentucky. This grower experienced problems with

weather-related planting delays, inadequate watering, weed pressure, and a severe bacterial wilt problem early in the season, which slowed plant growth and lowered expected yields.

In general, the biggest concern expressed by most growers was weed pressure between the rows of plastic. Also, first-time vegetable growers learned that variety selection and timeliness of planting were two of the most important factors in delivering high-quality produce. Moreover, with high disease infection and insect infestation due to the wet, cool spring, growers sprayed insecticides and fungicides frequently to keep insects and disease pressure at manageable levels. Still, despite all the challenges experienced by the first-time vegetable growers, all four growers had positive experiences this year and will likely continue to grow vegetables.

On-Farm Commercial Vegetable Demonstrations, Central Kentucky

Dave Spalding and Brent Rowell, Department of Horticulture

Introduction

Eight on-farm commercial vegetable demonstrations were conducted in Central Kentucky in 2003. Grower/cooperators were from Clark, Harrison, Nicholas, Powell, and Scott counties. Of the two Harrison County grower/cooperators, one grew five acres of bell peppers, and the other grew three acres of slicing cucumbers for early and late production. The grower/cooperator in Nicholas County grew three acres of cucumbers, and the grower/cooperator in Scott County grew two acres. In Clark County, the grower/cooperator grew one acre of cucumbers for the early season and two acres for the late. Each of the cooperators who grew cucumbers grew some of them conventionally, without a trellis, and some with a trellis, to compare the two systems. The grower/cooperator in Powell County had a very small plot of mixed vegetables (tomatoes, peppers, squash, green beans, melons, cucumbers sweet corn, and herbs). This cooperator intends to grow for the local farmers' market in the future.

Materials and Methods

As in previous years, grower/cooperators were provided with black plastic mulch and drip irrigation lines for one acre, and the use of the Horticulture Department's equipment for raised bed preparation and transplanting. The cooperators supplied all other inputs, including labor and management of the crop. In addition to identifying and working closely with cooperators, county Extension agents took soil samples from each plot and scheduled, promoted, and coordinated field days at each site. An Extension Associate made weekly visits to each plot to scout the crop and make recommendations.

The bell pepper demonstration plots were transplanted using the bacterial-spot-resistant variety Aristotle. Peppers were transplanted into 6-in.-high raised beds covered with black plastic with drip lines under the plastic, centered on the bed. Plants were set 12 in. apart in an offset manner in double rows that

were 15 in. apart. Raised beds were 6 ft. from center to center. Plots were sprayed with the appropriate fungicides and insecticides as needed, and cooperators were asked to follow the fertigation schedules provided.

The cucumber plots were set up to compare trellising versus rowing of the vines, the conventional production practice. The plots were planted using the variety Speedway. The cucumbers were planted into 6-in.-high raised beds covered with black plastic, with drip lines under the plastic. The plants were transplanted in single or double rows 12 in. apart in the row and 15 in. between double rows. The beds were 6 ft. apart. A portion of each plot was trellised using stakes spaced 3 ft. apart in the center of each bed with strings running from stake to stake at 6- to 8-in. intervals. The trellised plots were trained to climb the strings. The conventional plots were rowed to keep the vines on the plastic mulch. Plots were sprayed with the appropriate fungicides and insecticides as needed, and cooperators were asked to follow the fertigation schedules provided.

Results and Discussion

The 2003 growing season was very wet for most of the growing season. Because of early wet weather, the bell pepper producer was about 10 days late transplanting the crop. Weather delayed two of the three cucumber growers and nearly prevented planting in Powell County. The grower/cooperator who grew bell peppers lost at least one acre due to drowning of plants. Bell pepper growers who got their crops out on time experienced exceptionally good prices. After the early rains, growing conditions were good, as were prices and yields. Despite the wet weather, the bell pepper grower/cooperator had a moderately profitable year due to relatively high prices (Table 1).

Cucumber yields were good for both trellised and conventional production and prices were strong in the early season (Table 2). Total boxes produced differed substantially between the trellised and conventional production. For two of the grower/

Table 1. Bell pepper costs and returns, Harrison County grower/cooperator.

Inputs	Harrison County (5 A)
Plants and seeds	\$2,864
Fertilizer	80
Black plastic	625
Drip lines	700
Fertilizer injector	55 ¹
Herbicide	65
Insecticide	240
Fungicide	140
Water	635 ² (540,000 gal.)
Labor	3,250 ³ (1,680 hr)
Machine	172 (30 hr)
Total expenses	8,862
Income	10,087
Net income	1,225
Net income/acre	245
Dollar return/Dollar input	\$1.14

¹ Cost amortized over three years.² Includes cost of water and five-year amortization of irrigation system.³ Does not include unpaid family labor.

cooperators, the marketable yield from trellised production was significantly higher than that from conventional production. Material and labor cost for trellising was around \$350 to \$420 per acre, but the greater marketable yield more than offset this

Table 2. Boxes of marketable and unmarketable slicing cucumbers and gross income, trellised and convention production in Harrison, Nicholas, and Scott counties.

Treatment	Unmarketable (boxes/A)	Marketable (boxes/A)	Gross Income (\$/A)
Harrison County			
Single-row conventional	198	445	\$4,619
Double-row conventional	241	614	6,373
Double-row trellised	241	859	8,916
Nicholas County			
Double-row conventional	242	512	5,315
Double-row trellises	160	802	8,325
Scott County			
Double-row conventional	184	710	7,370
Double-row trellised	170	760	7,889

cost. The grower/cooperator in Harrison County also compared single-row conventional production to double-row conventional and double-row trellised production. The grower/cooperators are convinced that trellising more than pays for itself, and they intend to trellis all of their future production. The late season slicing cucumber crop was planted 10 to 14 days late and that, coupled with an early killing frost, essentially wiped out the late season crop. In light of this year's experience, a more detailed evaluation of these production methods for the late season crop is warranted.