Proc. Fla. State Hort. Soc. 117:38-42. 2004.

ECONOMIC FEASIBILITY OF PRODUCING GALIA MUSKMELONS IN PASSIVE VENTILATED GREENHOUSES AND SOILLESS CULTURE IN NORTH CENTRAL FLORIDA

NICOLE L. SHAW, DANIEL J. CANTLIFFE[1],
JUAN C. RODRIQUEZ, AND CECIL SHINE III
University of Florida, IFAS
Horticultural Sciences Department
P.O. Box 110690
Gainesville, FL 32611-0690

Additional index words. *Cucumis melo*, protected agriculture, marketing

Abstract. **Galia muskmelons (*Cucumis melo* L.) produced in a passive-ventilated greenhouse as an alternative crop to traditional crops such as tomato or pepper can result in profitable returns to investment. Average yields for hydroponically grown Galia were five fruit per plant or 16.5 kg m^{-2} per crop, regardless of type of media or container used. Initial investment cost for a 1.0-hectare passive-ventilated greenhouse including land, labor, and transportation is $579,723 with an annual depreciation of $71,802. Net returns for a single crop are estimated at $3.46 per m^2 or for a double crop at $10.22 per m^2. Using 5-year market prices of Galia muskmelon, sensitivity analyses summarize potential losses and profits at yields below and above average.**

Over the past 6 years, the Protected Agriculture Project, Horticultural Sciences Department, University of Florida has conducted research on production practices and greenhouse vegetable cultivars for crops such as tomato (*Lycopersicon esculentum* Mill.; Hochmuth, 2001; Rodriguez et al., 2001), colored pepper (*Capsicum annuum* L.; Jovicich, 2001; Jovicich et al., 2003; Shaw and Cantliffe, 2002), Beit Alpha type cucumber (*Cucumis sativus* L.; Cantliffe et al., 2001; Shaw et al., 2000; Shaw et al., 2004), and Galia type muskmelon (*Cucumis melo* L.; Rodriguez, 2003; Shaw et al., 2001) and provided such information to the Florida greenhouse grower via publications and the website (www.hos.ufl.edu/protectedag). However, one major component of greenhouse production systems that is often over-looked in research is the economics and marketing of the crop. To provide Florida vegetable growers with alternative cropping ideas to traditional open-field systems, information is required not only on new crops and production methodology but also on the ability to take those crops to profitable markets. Therefore, research must take into consideration the postharvest and handling needs and the investments and returns of these new ventures. Currently, postharvest information has been published on greenhouse tomato, european cucumber, pepper (Sargent, 2001), Beit Alpha cucumber (Sargent et al., 2001; Villalta, 2002), and baby squash (*Cucurbita pepo* L.) blossoms (Villalta, 2003). Economic feasibility studies have been done by University of Florida researchers for greenhouse tomato (Zimet, 2001), colored pepper (Jovicich et al., 2004), and strawberry (*Fragaria* × *ananassa* Duch.; Paranjpe et al., 2004).

Galia is the most popular melon type in the Mediterranean and many European countries. It has a green-fleshed fruit with a golden-yellow rind at maturity with high sugar content and excellent quality. While mainly produced in Israel, Spain, Morocco, Turkey, and Egypt, it is more recently being produced in Latin American countries such as Guatemala, Costa Rica, and Honduras, where it is grown for export to the U.S. Galia was developed for open-field production under dry, warm conditions of desert areas in Israel (Karchi, 2000). Therefore, its production and quality can be adversely affected by weather and rainfall, especially under the tropical or sub-tropical conditions of Florida and Latin America. However, in Florida, high yields and quality can be achieved by producing Galia in greenhouses using soilless culture (Cantliffe and Shaw, 2001; Shaw et al., 2001). Galia melon is also produced under protected structure in the main production regions of Israel and Spain, where fruit quality and yield can be increased due to vertical production and high plant densities.

Fruit produced under structure in Israel generally weigh between 0.5 and 1.0 kg each, which coincides with the desired size in the European market. Though smaller than most muskmelons found in U.S. supermarkets, each fruit sells between $3 and $5. In the U.S., supply of Galia is sporadic. Production is generally under open-field conditions in states such as California and Texas, where harvested fruit weigh over 2.0 kg each and may not have the characteristic high quality due to adverse weather during fruit maturation. Imported fruit on the market are harvested immature to withstand shipping conditions and subsequently have low quality (Cantliffe and Shaw, 2001). Nevertheless, during the last 5 years, Galia muskmelons have been reported at the New York Terminal market at prices that range from $0.80 to $3.03 per kg. These fruit were imported or sold from Israel, Spain, Guatemala, Costa Rica, Honduras, and California (USDA, 2003).

The purpose of this investigation was to provide the enterprise budget for Galia muskmelon produced under a passive-ventilated greenhouse in north central Florida and provide the economic feasibility of Galia melon production using different types of media and containers.

Materials and Methods

An economic study on the production of Galia muskmelons in a passive-ventilated greenhouse was prepared using standard soilless production systems, growing seasons, and predicted yields (Table 1). Complete cultural practices, fertigation scheduling, biological control methods, disease prevention, and estimated yields were based on 5 years of research at the Protected Ag Project, Gainesville, Fla. (Rodriguez, 2003). Most vegetable greenhouse operations in Florida use perlite and polyethylene bags as the cropping system (Tyson et al., 2002). This combination was used for the enterprise budget within.

Investment costs for a 1.0-ha greenhouse operation totaled $579,723 (Table 2). A passive-ventilated greenhouse (Top Greenhouses Ltd., Israel) covered with double layer polyethylene plastic (0.150 mm thickness, Ginegar Plastic

This research was supported by the Florida Agriculture Experiment Station, and approved for publication as Journal Series No. N-02542.

[1]Corresponding author.

Table 1. Galia muskmelon production system in a passive-ventilated greenhouse and soilless culture in north central Florida.

Item	Unit
Structure (Top Greenhouses, Ltd.)	
Greenhouse area	1.2 ha
Dimensions	210 m × 60 m
Gutter height	4 m
Number of bays	14
Available area for growing crops	10,000 m²
Crop system	
Production system	Coarse perlite bags
Polyethylene bags	1 m × 0.10 m
Perlite volume per bag	36 L
Plant density	3.3 plants per m²
Planting date	Spring (31 Jan-15 Feb)
Crop duration	16-24 weeks
Harvest period	5-8 weeks
Estimated marketable yields	
Number of fruit per plant	five fruit per plant
Average fruit weight	0.9-1.2 kg
Yield per unit area	16.5 kg·m⁻²

Products Ltd., Israel) and 50-mesh insect screen (Meteor Ltd., Petak-Tikva, Israel) as well as all necessary equipment to build the greenhouse, grow the crop, and manage the operation were included in the cost of the greenhouse. The largest portion of the investment costs were the structure and coverings at $424,745 (73%); the costs were due not only to the purchase price, but also, the shipping and construction costs, $230,689 (54%). However, construction costs are based on professional greenhouse contractors' prices and can be significantly reduced by using local labor. Annual depreciation varied for each component from 3 years for the coverings to 10 years for the steel frame of the greenhouse, which will survive for far more than 10 years. Total depreciation was calculated at $71,802. In most cases lenders will only loan 80% of the total investment costs at a 6.5% interest rate, therefore, an owner starting a 1.0-ha greenhouse enterprise would need cash savings of about $115,000 before the loan would be secure.

Enterprise budgets were developed to estimate the net returns for a single, 6-month crop (spring only) and a double crop (i.e., spring and fall) using the standard production sys-

Table 2. Investment cost and annual depreciation of a passive-ventilated greenhouse in north central Florida.

Item	Original cost	Expected life (years)	Depreciation
Land: (1.5 ha)			
$5,000 per acre or $12,000 per ha)	$18000	—	—
Greenhouse (Total area 1.3 ha usable area 10, 400 m²)			
a) Structure (galvanized steel) ($6.84 per m² × 13565 m²)	$92,865	10	$9,287
b) White ground cover ($0.66 per m²)	$8,953	7	$1,279
c) Warehouse (2 units of 6 m × 6 m)	$4,000	10	$400
Freight Supervision Labor for Construction:			
a) Ocean freight + Insurance (four 40' containers)	$12,292	10	$1,229
b) Site preparation	$37982	10	$3798
c) Labor for GH construction ($13.58 per m²)	$184,307	10	$18,431
d) Construction supervision for 20 clays + airfare	$8,400	10	$840
Coverings:			
a) Plastic for roof & side-walls ($2.53 per m²)	$34,400	3	$11,467
b) 50-mesh insect screen for roof & sides ($0.78 per m²)	$7,536	5	$1,507
Heating & Ventilation:			
a) Sundair heaters ($1,400 × 28 units)	$39,200	8	$4,900
b) Four fuel tanks for 28 heaters	$10,852	8	$1,357
c) 24-inch air blower fans (54 units × $275 each)	$14,850	8	$1,856
d) Climate control + cables	$8,140	8	$1,018
e) Operating gear motor for side-curtains ($1,750/motor × 10 motors)	$17,500	5	$3,500
Service Buildings: (183.6 m²)			
Office, storage space for equipment, pesticide storage room, fertilizer storage room	$8,000	10	$800
Water Supply:			
a) Wells, tanks, pumps	$6,000	10	$600
b) Water mains	$2,000	10	$200
Wiring:			
a) Domestic electrical fittings	$1,000	10	$100
b) Diesel heaters ($300 × 28 units)	$8,400	10	$840
Fertilizer System: Netafim injector systems and drip irrigation system	$22,896	10	$2,290
Misc. Equipment:			
Tools, scales, pH & EC meter, N03- & K+ meter	$3,500	4	$875
Spray Equipment: Sprayer (2)	$1,150	5	$230
Transportation:			
a) Truck (20 ft.) for pick-up & delivery	20,000	8	$2,500
b) Forklift	$14,000	8	$1,750
c) Metal carts for transporting flats from GH to loading dock (10 carts)	$6,000	8	$750
Total investment	$579,723		$71,802

Note: Taxes and insurance rate (%) = 1.3; Interest rate (%) = 6.5. Sources: Azrom Metal Industries LTD and Top Greenhouses LTD, Israel.

tems and estimated yields in Table 1. The enterprise budget is comprised of three main components, net returns, revenue, and total costs, where:

Net returns = Revenue – Total costs

Revenue = Yield * (Market price – 20% transaction fee)

Total costs = Variable + Fixed costs

Variable costs include all inputs that will have to be added to the system each season. Variable costs include media, containers, transplants, trellising string (rollerhooks, Paskal Technologies Ltd., Galilee, Israel), plastic clips, fertilizer, fuel, fungicides, biological control, bumblebees, transportation of product, packing boxes, repairs and maintenance, and labor for pruning, mixing fertilizer, and harvesting. Fixed costs are those costs that remain constant regardless of changes in the crop production system, such as, loan payments (including depreciation and interest), a manager's salary, licenses, annual dues, office expenses, taxes, and insurance. Positive net returns equal profit above total costs.

New York terminal market prices for Galia muskmelon were averaged from 1999-2003 to determine a market price for use in the enterprise budget. The average price over the 5-year period was $1.80, however, approximately 20% is lost to transaction fees, and therefore the grower should receive about $1.50 per kg in revenue.

A sensitivity analysis was conducted to view potential financial scenarios when production systems, crop yields or market prices of Galia muskmelon change. Conditions that changed included the choice of media (perlite or pine bark) and the type of growing container (polyethylene bag or 11-L plastic nursery pot). Crop yields ranged from three to six fruit per plant, or 9.9 to 19.8 kg m^{-2}. Market prices (after 20% transaction fee) used in the sensitivity analyses ranged from $0.75 to $2.50 per kg.

Results and Discussion

Total investment cost for a 1.0 ha passive-ventilated greenhouse operation in north central Florida was $579,723 with an annual depreciation of $71,802 (Table 2). A typical production system for Galia muskmelon (Table 1) included perlite filled polyethylene bags, a 16-24-week crop planted in late January or early February, a plant density of 3.3 plants per m^{-2} and average yields of 16.5 kg m^{-2} (five fruit per plant weighing about 1.0 kg each) was used in the enterprise budget for a single season (Table 3).

The enterprise budget itemizes revenue, variable costs, fixed costs, and net returns for a single season crop with a market price of $1.50 per kg (Table 3). Variable costs totaled

Table 3. Enterprise budget for Galia muskmelons produced in a passive ventilated greenhouse during one, 6-month crop cycle in north central Florida.

Item	Unit	Quantity (1.0 ha)	Price ($)	Value·m^{-2} ($)
Revenue				
16.5 kg·m^{-2} at $1.50 per kg				24.75
Variable costs				
Perlite	m^3	300	40.00	1.20
Polyethylene bags	box	24	85.00	0.20
Labor filling bags	hour	150	7.00	0.11
Rollerhooks	box	60	200.00	0.60
Plastic clips	case	22	87.00	0.19
Transplants	plug	33,000	0.33	1.10
Planting labor	hour	360	7.00	0.25
Pruning labor	hour	6,950	7.00	4.87
Fertilizer	liter	48,500	0.26	1.26
Labor for fertilizer	hour	45	7.00	0.03
Diesel[z]	gallon	7,000	1.45	1.02
Fungicides	liter	2.5	36.40	0.01
Biological control[y]			5,000.00	0.50
Bumble bees	hive	10	100.00	0.10
Boxes	each	13,750	0.70	0.96
Harvest and packing	hour	1,080	7.00	0.75
Transport	shipment	37	300.00	1.11
Repairs and utilities			5,000.00	0.50
Total variable costs				14.76
Fixed costs				
Manager's salary, etc.[x]			1.06	
Depreciation and interest[w]			5.09	
Taxes and insurance				0.38
Total fixed costs				6.53
Total costs				21.29
Net returns				3.46

[z]Fuel based on 60, 8-h nights with added heat (4.16 gal diesel × 28 heaters × 60 nights = 7,000 gal).
[y]Biological control includes two releases each of *Neoseiulus californicus*, *Aphidius colemani*, and lady beetle larvae.
[x]Annual manager's salary, $20,000; licenses and dues, $400; misc. office expense, $800.
[w]Annual depreciation, $71,802 plus 6.5% interest on unpaid balance of $463,778 (80% of initial investment costs).

$14.76 per m^2. Fixed costs, including manager's salary, loan payments, and taxes were $6.53 per m^2. Using the average yields of 16.5 kg m^{-2} (Table 1), revenue of $24.75 per m^2 is calculated. Revenue minus the total cost (variable plus fixed costs) provides a net return of $3.46 per m^2 or $34,600 per ha.

Since greenhouse growers must operate year-round whether producing one crop or several, an enterprise budget was developed for a double-crop of Galia muskmelon (Table 4). Certain items listed under variable costs can be re-used for two or more seasons; therefore, they are not increased in a double-crop budget. Those items include the growing media and containers, the labor required to fill the bags, rollerhooks, and plastic clips. Other items will double, such as, the transplants, pruning labor, fungicides, biological control, bumblebees, and harvesting costs. Labor costs are approximately 65% of total variable costs annually. Total costs increase from a single crop to a double crop by 84% while returns double. Revenue minus total costs for a double crop of Galia muskmelon yield net returns of $10.22 per m^2, or $102,200 per ha. A double crop of Galia muskmelon provides three times greater income than a single crop due to the items that can be re-used.

Yields of Galia muskmelons were similar regardless of type of container or soilless media used for production (Rodriguez, 2003). However, depending on the choice, the initial cost of containers and media will reflect on net returns. For example, perlite costs $40 per m^3 and pine bark costs nearly five times less at $8.50 per m^3. Though polyethylene bags cost about $0.20 each compared to plastic nursery pots at $1.00-$1.20 each, bags become brittle and breakdown after 1 year or less and pots may last up to 8 to 10 years in use, making polyethylene bags more expensive over a 10-year span ($2.00 for bags versus $1.20 for pots). Growers can use pine bark in plastic nursery pots for up to 3 years for greenhouse colored pepper production (Shaw et al., 2004).

Sensitivity analyses were conducted to view the potential losses and returns for Galia muskmelon production using different media and containers when either lower or higher than average yields occur (Table 5a-d). The choices of media and container included perlite and pine bark media and polyethylene bags or plastic nursery pots as containers. When perlite and pine bark are used in pots, it is $0.27 or $0.06 per m^2 more expensive, respectively, than when used in bags. When pine bark is used in bags or pots, there is a $0.96 to $1.17 per m^2 savings over perlite. Regardless of yield or media/container combination, net losses occur when the market price of Galia melon is less than $1.00 per kg. When yields are 9.9 kg m^{-2}, market price must be at least $2.25 per kg for profit to occur. However, at yields of 19.8 kg m^{-2} (or six fruit per plant), net

Table 4. Enterprise budget for double-cropped Galia muskmelons produced in a passive ventilated greenhouse in north central Florida (6 months per crop: January-June, July-December).

Item	Unit	Quantity (1.0 ha)	Price ($)	Value per m^{-2} ($)
Revenue				
33 kg·m^{-2} at $1.50 per kg			49.50	
Variable costs				
Perlite	m^3	300	40.00	1.20
Polyethylene bags	box	24	85.00	0.20
Labor filling bags	hour	150	7.00	0.11
Rollerhooks	box	60	200.00	0.60
Plastic clips	case	22	87.00	0.19
Transplants	plug	66,000	0.33	2.20
Planting labor	hour	720	7.00	0.50
Pruning labor	hour	13,900	7.00	9.74
Fertilizer	liter	97,000	0.26	2.52
Labor for fertilizer	hour	90	7.00	0.06
Diesel[z]	gallon	7,000	1.45	1.02
Fungicides	liter	5	36.40	0.02
Biological control[y]			5,000.00	1.00
Bumblebees	hive	20	100.00	0.20
Boxes	each	27,500	0.70	1.92
Harvest and packing	hour	2,160	7.00	1.50
Transport	shipment	74	300.00	2.22
Repairs and utilities			5,000.00	1.00
Total variable costs				26.22
Fixed costs				
Manager's salary, etc.[x]				2.12
Depreciation and interest[w]				10.18
Taxes and insurance				0.76
Total fixed costs				13.06
Total costs				39.28
Net returns				10.22

[z]Fuel based on 60, 8-h nights with added heat (4.16 gal diesel × 28 heaters × 60 nights = 7,000 gal).
[y]Biological control includes 2 releases each of *Neoseiulus californicus*, *Aphidius colemani*, and lady beetle larvae.
[x]Annual manager's salary, $20,000; licenses and dues, $400; misc. office expense, $800.
[w]Annual depreciation, $71,802 plus 6.5% interest on unpaid balance of $463,778 (80% of initial investment costs).

Table 5. Sensitivity analysis for Galia muskmelon produced in different combinations of media and containers.

Yield (kg·m^{-2})	Prod. cost ($ per kg)	Terminal market prices ($ per kg) 0.75	1.00	1.50	1.75	2.00	2.25	2.50
		Net returns above total cost ($ per m^2)						
A.) Perlite and polyethylene bags								
9.9	21.80	-14.38	-11.90	-6.95	-4.48	-2.00	0.48	2.95
13.2	22.26	-12.36	-9.06	-2.46	0.84	4.14	7.44	10.74
16.5	22.72	-10.35	-6.22	2.03	6.45	10.28	14.40	18.53
19.8	23.18	-8.33	-3.38	6.52	11.47	16.42	21.37	26.32
B.) Perlite and plastic nursery pots								
9.9	22.07	-14.65	-12.17	-7.22	-4.75	-2.27	0.20	1.12
13.2	22.53	-12.63	-9.33	-2.73	0.57	3.87	7.17	10.47
16.5	22.99	-10.62	-6.49	1.76	5.88	10.01	14.13	18.26
19.8	23.45	-8.60	-3.65	6.25	11.20	16.15	21.10	26.05
C.) Pine bark and polyethylene bags								
9.9	20.84	-13.42	-10.94	-5.99	-3.52	-1.04	1.43	3.91
13.2	21.30	-11.40	-8.10	-1.50	1.80	5.10	8.40	11.70
16.5	21.76	-9.39	-5.26	2.99	7.11	11.24	15.36	19.49
19.8	22.22	-7.37	-2.42	7.48	12.43	17.38	22.33	27.28
D.) Pine bark and plastic nursery pots								
9.9	20.90	-13.48	-11.00	-6.05	-3.58	-1.10	1.37	3.85
13.2	21.36	-11.46	-8.16	-1.56	1.74	5.04	8.34	11.64
16.5	21.82	-9.45	-5.32	2.93	7.05	11.18	15.30	19.43
19.8	22.28	-7.43	-2.48	7.42	12.37	17.32	22.27	27.22

returns are greater than $6.35 per m^2 when market price is at least $1.50 per kg. The range of market prices used in the sensitivity analysis have all occurred at some point from 1999-2003 at the New York Market (USDA, 2003), therefore, at higher market prices, such as $2.50 per kg, net returns can be as high has $27.28 per m^2 (per crop) when yields are 19.8 kg m^{-2} (pine bark with polyethylene bags, Table 5c). The sensitivity analyses within only take into consideration one season, however, based on results from the double-crop enterprise budget (Table 4), potential yearly returns on a double-crop could be three times greater.

Conclusion

Successfully protected Galia muskmelon production systems have dominated regions of the Mediterranean and could be profitable in areas such as Florida. Consumers are willing to pay a premium for high quality products that are unique, flavorful, and consistent. The Galia muskmelon is one such commodity that may become as popular with U.S. consumers as those in Europe. The economic study within was based on market prices of fruit that were most likely produced under open-field conditions, imported or shipped across the U.S. and grown under standard chemical recommendations for pest and disease control. The potential price consumers would pay for a premium, hydroponically grown Galia melon fruit, produced locally and labeled as 'pesticide-free' is unknown.

Literature Cited

Cantliffe, D. J., N. L. Shaw, E. Jovicich, J. C. Rodriguez, I. Secker, and Z. Karchi. 2001. Passive ventilated high-roof greenhouse production of vegetables in a humid, mild winter climate. Acta Hort. 559:195-201.

Hochmuth, G. 2001. Florida greenhouse vegetable production handbook, Vol. 3. Univ. of Fla. Coop. Ext. Serv. SP48:HS787. (25 May 2004) <http://edis.ifas.ufl.edu/CV265>

Jovicich, E. 2001. Hydroponic greenhouse pepper in Florida—practices of plant trellising, population, transplant depth, soilless media, and irrigation. MSc thesis, Univ. of Fla., Gainesville.

Jovicich, E., D. Cantliffe, and P. Stoffella. 2003. 'Spanish' pepper trellis system and high plant density can increase fruit yield, and reduce labor in a hydroponic, passive-ventilated greenhouse. Acta. Hort. 614:199-203.

Jovicich, E., J. J. VanSickle, D. J. Cantliffe, and P. J. Stoffella. 2004. Greenhouse-grown colored peppers: A profitable alternative to vegetable production in Florida? HortTechnology (In review).

Rodriguez, J. C., D. J. Cantliffe, and N. Shaw. 2001. Performance of greenhouse tomato cultivars grown in soilless culture in north central Florida. Proc. Fla. State Hort. Soc. 114:303-306.

Sargent, S. A. 2004. Operational considerations for harvest and postharvest handling, p. 59-61. In Florida greenhouse vegetable production handbook, Vol. 3. Univ. of Fla. Coop. Ext. Serv. SP48:HS787. (25 May 2004) <http://edis.ifas.ufl.edu/CV265>

Sargent, S. A., S. C. Stapleton, and A. J. Fox. 2001. Postharvest handling considerations for greenhouse-grown beit alpha cucumbers. In Vegetarian Newsletter. 01-06:9-11. (25 May 2004) <http://www.hos.ufl.edu/vegetarian/01/June01/June01.PDF>

Shaw, N. L., D. J. Cantliffe, J. Funes, and Cecil Shine III. 2004. Successful beit alpha cucumber production in the greenhouse using pine bark as an alternative soilless media. HortTechnology 14:289-294.

Shaw, N. L. and D. J. Cantliffe. 2002. Brightly colored pepper cultivars for greenhouse production in Florida. Proc. Fla. State Hort. Soc. 115:236-241.

Shaw, N. L., D. J. Cantliffe, and B. S. Taylor. 2001. Hydroponically produced 'Galia' muskmelon—What's the secret? Proc. Fla. State Hort. Soc. 114:288-293.

Shaw, N. L., D. J. Cantliffe, J. C. Rodriguez, S. Taylor, and D. M. Spencer. 2000. Beit alpha cucumber—an exciting new greenhouse crop. Proc. Fla. State Hort. Soc. 113:247-253.

USDA. 2003. Terminal market prices 1999-2003: New York. USDA Agricultural Marketing Service. (25 May 2004) <http://www.ams.usda.gov/fv/mncs/index.htm>

Villalta, A. M., S. A. Sargent, A. D. Berry, and D. J. Huber. 2003. Sensitivity of beit alpha cucumber (*Cucumis sativus* L.) to low temperature storage. Proc. Fla. State Hort. Soc. 116:364-366.

Villalta, A. 2004. Squash blossoms. Proc. ISHS Symp. Protected Culture in a Mild-winter Climate, Orlando, Fla. 22-27 Mar. 2004. Acta Hort. (in press).

Zimit, D. 2001. Enterprise budget and cash flow for greenhouse tomato production. p. 91-98. In Florida greenhouse vegetable production handbook, Vol. 3. Univ. of Fla. Coop. Ext. Serv. SP48:HS787. (25 May 2004) <http://edis.ifas.ufl.edu/CV265>