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Staff Paper

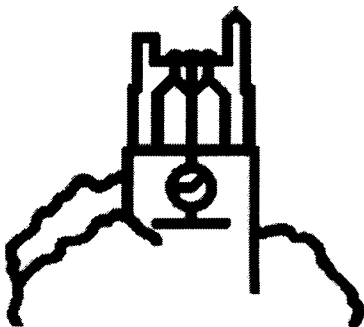
**Cost of Fresh Market Sweet Corn Production
in Monroe County, Michigan**

by

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Roy Black
Paul Marks
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Staff Paper 2002-40

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This bulletin represents a tool that can help producers, consultants, educators, and agribusinesses working with producers estimate costs of production and expected profit based on “typical” sweet corn management strategies found in Monroe County, Michigan. The budget included in this bulletin will allow users to revise inputs based on their management strategies and calculate their expected cost and profit. This flexibility provides a decision aid to search for systems that generate higher net returns to the farm’s resource base.

The brief outline of cultural and pest management practices included in this publication should be supplemented with publications from Michigan State University or from other Universities. See the References section for resources. Many are available on-line.

Sweet Corn Production

In Michigan, about 50% of the sweet corn crop is produced in the southeast region with the rest grown throughout the Lower Peninsula. Sweet corn is a warm season crop. Air temperatures between 65-80°F are ideal with 50°F the minimum necessary for plant development.

Temperatures above 89°F often result in inferior quality corn. Sweet corn can yield as high as 1,000 dozen ears per acre under optimal conditions. Sweet corn can yield as high as 1,000 dozen yields per acre under optimal conditions. When clear plastic mulch is used, primarily to market earlier, the average yield may increase to 1,200 dozen ears per acre.

Site Selection & Planting

Sweet corn will grow well on many soil types as long as there is sufficient moisture. Due to disease risks, sweet corn should not follow field corn, oats or barley. The field may be prepared using a moldboard plow, chisel plow or another reduced tillage system. Clod and trash-free beds should be prepared with rows that are spaced 24-36 inches apart with 7-12 inches between plants in the row. Generally plant population is between 18,00 and 22,000 per acre but depends on variety and preferences. Seeds can be selected from the (su) gene (standard), (se) gene (sugar enhanced) or (sh²) gene (shrunken) varieties. For maximum yield, there should be 16,000-20,000 plants per acre under dryland production and as many as 22,000 plants on irrigated land. Sweet corn should be planted every three days between April 15 and June 20 to have mature corn available all season, and at least three cultivars should be used. In Michigan, planting after July 4 will not allow adequate time for ears to mature. The amount of acreage planted per week

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should produce the amount that can be sold in one week. Sweet corn requires a good fertility program with adequate nitrogen to grow and produce well.

Pest Management

When seeking advice on use of labeled pesticides (including herbicides), please refer to the most current versions of Michigan State University Extension Bulletins titled "Insect, Disease and Nematode Control for Commercial Vegetables" (Extension Bulletin E-312) and "Weed Control Guide for Vegetable Crops" (Extension Bulletin E-433). They are available on-line at <http://www.msue.msu.edu/vegetable/Resources/E312/E312.htm> and <http://www.msue.msu.edu/vegetable/Resources/weeds/weed.htm> respectively. Specific herbicide and pesticide names have been used in this publication to facilitate accurate budgeting. Michigan State University does not endorse any of the brand name products listed and does not direct producers to limit management systems to these products.

Pest management is critical to obtain clean marketable sweet corn. Scout fields often and apply pesticides as needed. A subscription to the MSU Vegetable Crop Advisory Alert would provide a good pest management reference. It is available as a mail subscription or over the internet at <http://www.msue.msu.edu/ipm/vegCAT.htm>

Weed Control should be accomplished mechanically and with pre- and post-emergence herbicides. All weeds compete with sweet corn but Johnsongrass should be carefully controlled since it is the alternate host of Maize dwarf mosaic virus. Johnsongrass is not a common problem throughout Michigan, but does exist in some isolated areas.

Insect Pests that are most important to control include flea beetles, European corn borers, corn earworms and fall armyworm. Seed pests may include wireworms, white grubs, cutworms and seed corn maggots. These pests typically are not a problem unless sweet corn follows a sod crop or pasture. Corn earworm and European corn borer can be monitored with a pheromone trap from June through September. Weekly European corn borer and corn earworm flight information is available through the Vegetable CAT alert and website. See MSU Bulletin E-312 for management recommendations. There are very good worm resistant sweet corn cultivars available that reduce the need for insecticide applications.

Diseases. The economically important diseases of sweet corn include maize dwarf mosaic virus (MDMV), corn rust and Stewart's wilt. The best way to control MDMV is by controlling the alternate host, Johnsongrass. Rust is a fungus that occurs on the leaves, husks and tassels. If rust occurs on an early sweet corn crop, subsequent plantings should be treated with a fungicide. Stewart's wilt is caused by a bacterium which is carried and transmitted by the corn flea beetle. Usually, it is only a problem on smaller, early-maturing varieties but monitoring for this insect is necessary for successful sweet corn production in Michigan. This disease can be controlled only by controlling flea beetles.

Harvest & Handling

Sweet corn is ready for harvest when the majority of ears are filled to the tip and have turned their mature color. Ears are ready for market approximately 21 days after silk emergence. Depending upon weather, this harvest window may be as small as two or three days, but most

cultivars can be harvested over a period of three to five days. Upon harvest the ears should be air cooled or hydro-cooled (32°F) to maintain quality. Se and sh² cultivars maintain their sugar level for a long time, but become tough and over mature. Su cultivars convert sugars to starch rapidly after harvest and their eating quality declines.

Cost of Production Budget

The budget developed using information gathered from growers is presented in Table 1. Details of some practices are mentioned in footnotes. To adapt this budget, insert or remove individual practices as necessary.

Because expected prices and yields vary across years and producers, no revenue was included in this budget. However, Tables 2 and 3 show expected net returns at a variety of typical prices and yields. Where indicated in the budget, the cost structure does vary by yield. Use of this table should help producers compare expected returns from typical prices and yields using practices outlined above and detailed in the budget. *If the budget is modified to better fit a different production system, Table 2 will not accurately represent net returns per acre.*

Approach

The information on sweet corn cost structure and yields was developed using a focus group of growers with a good knowledge of the industry and good field, enterprise, and financial records. The process was initiated by defining a sweet corn production system and strategic planning context representative of Monroe County, Michigan. Subsequently, both the sequence of decisions and the information necessary to make these key decisions were collected. This process resulted in a list of inputs and input prices that were then translated into costs, which were verified against grower records.

Because the production system and details were derived from grower input, fertilizer and chemical use may not match some horticultural recommendations. All grower practices were verified and do reflect current procedures. The following budget reproduces, as completely as possible, all costs incurred by these growers.

Pricing Annual Costs of Capital Services (Buildings, Machinery, and Equipment)

Estimating the annual cost of using buildings, machinery, equipment and other assets is a challenge in cost of production studies. In previous studies of Michigan horticultural crops, focus groups constructed a representative farm with fixed acreage and then constructed the buildings, machinery, and equipment needed to operate this farm. They also generated associated labor needs and repair and operating costs. This approach has the advantage of being very tangible but also makes it difficult to interpret results for alternative farm sizes.

In this study, an alternative approach was taken. Buildings, machinery and services were priced to the enterprise on a "custom" basis. Further, services such as land preparation were priced to the enterprise as a "bundled" service/task reflecting both the machinery and labor components of the service.

This approach requires some judgment because costs such as buildings to house machinery and equipment, the farm shop, and labor used in maintenance of machinery and equipment must be

included in the "custom fee" as well as the "depreciation and interest" on the machinery and equipment. The fact that this custom fee approach was used does not imply that custom operators did all the tasks. It simply means the tasks are priced to the enterprise as if a custom operator had completed them. The services may well have been provided by the "machinery services enterprise" of the farm. As a double check, members of the focus group attempted to compare the aggregate custom fee costs to those based on their accounting records which included labor, custom fees, and depreciation and interest on buildings, machinery, and equipment. Custom fees were also double-checked against survey information when available.

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Table 1. Fresh market sweet corn budget. Michigan, 2002.

Sweet Corn, Fresh Market					
Machine Harvested					
	Quantity	Unit	Price per Unit	Cost per Acre	Your Farm
REVENUE SOURCES					
Sweet Corn ¹	200	crates		\$ -	
TOTAL REVENUE				\$ -	
EXPENSES					
Soil test				\$ 2	
Soil preparation ²				\$ 23	
Planting				\$ 14	
Seed ³	10	lb	\$ 11.00	\$ 110	
<i>Fertilizer</i>					
Nitrogen	155	lb	\$ 0.25	\$ 39	
P ₂ O ₅	125	lb	\$ 0.18	\$ 23	
K ₂ O	125	lb	\$ 0.13	\$ 16	
Limestone	0.25	ton	\$ 20.00	\$ 5	
Applications	2	apps	\$ 6.00	\$ 12	
Scouting				\$ 7	
Herbicide materials ⁴				\$ 13	
Insecticide materials ⁵				\$ 51	
Fungicide materials ⁶				\$ 1	
Spray applications	7.1	app	\$ 7	\$ 50	
Cultivation				\$ 10	
Irrigation ⁷				\$ 54	
<i>Harvest</i>					
Machinery ⁸				\$ 240	
Labor ⁹	320	crate	\$ 0.90	\$ 288	
Hydrocooling	200	crate	\$ 0.50	\$ 100	
Icing ¹⁰	200	crate	\$ 0.25	\$ 50	
Crates	200	crate	\$ 1.40	\$ 280	
Trucking	200	crate	\$ 0.30	\$ 60	
Land rent ¹¹				\$ 163	
Insurance				\$ 7	
Interest ¹²	7%			\$ 12	
Tool shed & repair overhead ¹³				\$ -	
Marketing, management & supervision ¹⁴				\$ 200	
TOTAL EXPENSES				\$ 1,828	

FOOTNOTES

1	Assumes 5 dozen ears per crate of marketable yield. Harvested yield is 320 crates or 60% higher than marketable yield.
2	Includes chisel plowing and a pass with field cultivator or disc.
3	Assumes 23,500 kernels per 10 lb.
4	Includes application of Atrazine and Lasso. Does not account for occasional need for post-emergent broadleaf control.
5	7 applications including Lannate, Warrior and Lorsban.
6	1 application of Tilt generally needed every 4th year on about 50% of acreage.
7	Assumes a variable expenses only for a center pivot system. There is no charge for water. See "Selecting a Sprinkler Irrigation System" in the Reference section for more details.
8	Machinery includes a 4 row self-propelled harvester, 2 live bottom wagons, tractors to move corn from the field to the packing shed, labor to drive the tractors, and a 4x20' conveyor and 10' diameter table for sorting.
9	Labor for sorting, grading and packing ears and putting into a hydrocooler. Assumed 40% of harvested crop is sorted out and not marketed.
10	Includes cost of ice and packing labor.
11	Average cost of cash crop acreage rate (\$125 per acre) and vegetable ground rate (\$200 per acre). Includes fixed cost of irrigation system.
12	Operating capital assumed to be half of the variable costs (excluding custom charges) for half of the year.
13	These costs are included in custom rates.
14	Includes cost of marketing, management and supervision time and a vehicle for the manager.

Table 2. Expected fresh market sweet corn net income (loss) per acre at selected price and yield combinations.

Price	Yield, crates				
	200	225	250	275	300
\$ 5.50	(\$728)	(\$688)	(\$647)	(\$607)	(\$567)
\$ 6.00	(\$628)	(\$575)	(\$522)	(\$470)	(\$417)
\$ 6.50	(\$528)	(\$463)	(\$397)	(\$332)	(\$267)
\$ 7.00	(\$428)	(\$350)	(\$272)	(\$195)	(\$117)
\$ 7.50	(\$328)	(\$238)	(\$147)	(\$57)	\$33
\$ 8.00	(\$228)	(\$125)	(\$22)	\$80	\$183
\$ 8.50	(\$128)	(\$13)	\$103	\$218	\$333