VEGETABLE CROPS HOTLINE

A newsletter for commercial vegetable growers prepared by the Purdue University Cooperative Extension Service

Issue: 636
September 14, 2017

In This Issue

Indiana Vegetable Growers Seeks Board Members

The Indiana Vegetable Growers Association board is seeking board members for 3-year terms beginning at the annual meeting in February 2018. Members interested in serving, or with suggestions for potential members, should contact President John Young at jmyoungco@yahoo.com or 5028 E. Landersdale Rd. Mooresville, IN 46158. For more information about the IVGA visit ivga.org.

Blackheart of Celery

(Wenjing Guan, guan40@purdue.edu, (812) 886-0198)

Blackheart of celery is a physiological disorder that causes significant crop loss in major celery production areas. It is characterized by the breakdown of young leaf tissues in the heart of the plants (Figure 1). The affected young tissues turn black, which give it the name “blackheart”. The cause of blackheart of celery is related to calcium deficiency in the fast expanding tissues, similar to the cause of blossom-end rot of tomato and tip-burn of lettuce. The symptom is more severe as plants approach maturity. Fluctuation in soil moistures; excessive soil fertility, especially nitrogen and potassium; and high soil salinity favor the development of blackheart. Varieties may show different tolerance to the physiological disorder. In addition, the problem can be prevented by avoiding wide fluctuation of soil moisture and over-fertilization. Drench application and foliar spray of soluble calcium direct to the heart of the plant may help to prevent the physiological disorder.

Figure 1. Blackheart of celery is characterized by the breakdown of young leaf tissues in the heart of celery plants.

The Update of Soil Solarization in a High Tunnel at SWPAC

(Wenjing Guan, guan40@purdue.edu, (812) 886-0198)

Soil solarization can be used as a tool for soil disinfestation. It is accomplished by covering moist soil with transparent polyethylene film for 4 to 6 weeks in the summer. During this period, soils are heated to temperatures that are lethal to many soil pathogens, nematodes and weed seeds.

This summer we conducted a demonstration trial in one of the high tunnels at Southwest Purdue Ag Center. The high tunnel was divided into three parts that were covered with 6-mil plastic, 1.5-mil plastic, and no plastic. The 6-mil plastic is the old covering of the high tunnel, and the 1.5-mil plastic was purchased from a paint store. Air temperature and soil temperature at the depth of 12 inches were recorded. We saw little difference between temperatures of the soils covered with 6-mil plastic and 1.5-mil plastic, which indicated that the old coverings of high tunnels are as good as thin plastic for soil solarization.

The maximal daily temperatures in the top 12 inches of the soil under solarization are generally above 110ºF for 5 to 9 hours per day (Figure 1). In the areas without solarization (no plastic

covering), maximal daily soil temperatures at the depth of 12 inches are around 100ºF. The duration of the highest temperature determines the lethal effects on soil pathogens. Temperatures above 110ºF for more than 10 hours normally have a lethal effect on most soil pathogens.

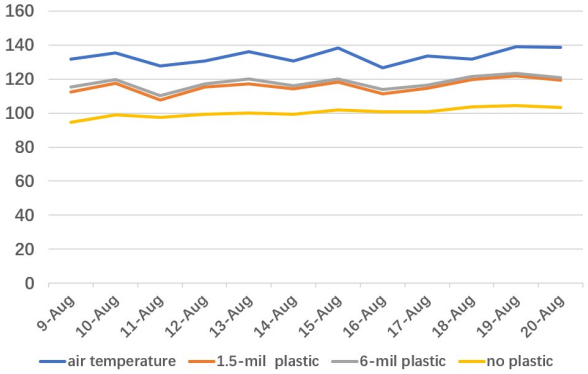

Figure 1. Air and soil temperatures (ºF) at a depth of 12 inches under the 1.5-mil plastic, 6-mil plastic, and no plastic.

The following pictures were taken during and after the soil solarization (Figures 2 and 3). It clearly showed that soil solarization suppressed the weeds in the high tunnel. In the next step, we are going to plant carrots in the tunnel, which will provide us with the opportunity to see a longer effect of soil solarization on weed control in the high tunnel.

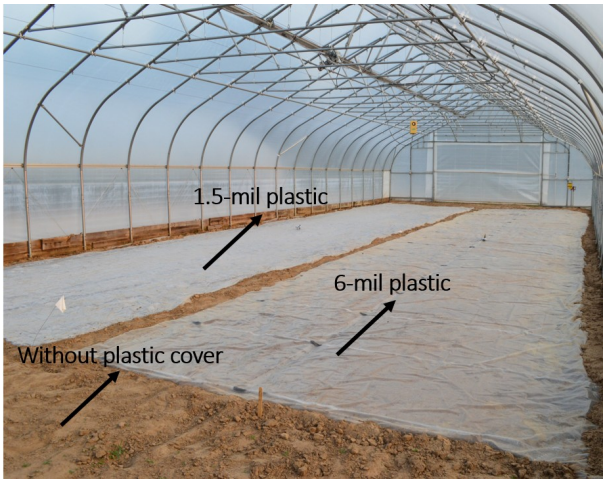

Figure 2. Demonstration of soil solarization in a high tunnel.

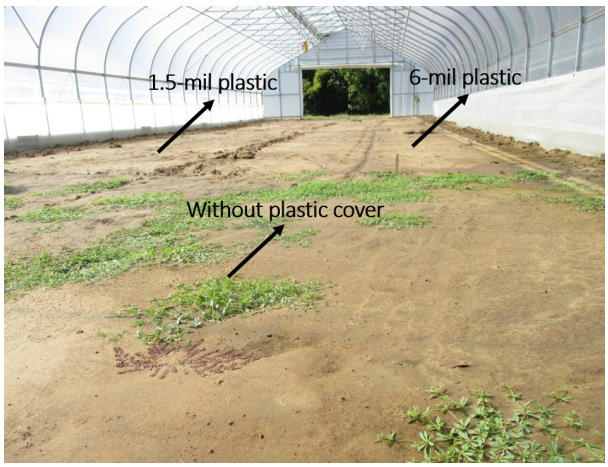

Figure 3. Weeds observed in the area without soil solarization.

Building Enterprise Budgets for Indiana Specialty Crop Growers

(Andres Gallegos) & (Ariana Torres, torres2@purdue.edu)

Financial tools can help farmers improve farm's performance and assure profitability. Enterprise budgets, financial statements, and sensitivity analyses are examples of financial tools that assist farmers on their decision-making.

Enterprise budgets are a reliable tool that help keep track of revenues and expenditures associated with a specific crop. Farmers using these budgets can estimate the net profits per area of production, and assess if this profit is enough money to achieve their profitability goals. Budget information can also help farmers determine the minimum quantity of produce they need to sell (***breakeven yield analysis***) and the minimum price (***breakeven price analysis***) they should charge to cover all costs. Overall, enterprise budgets can help farmers to provide a realistic projection of the income, expenses and profits of a new crop or enterprise.

Building the HortBusiness Calculator for Cantaloupes

Our team, at the Horticulture Business Extension program at Purdue University, is developing the HortBusiness Calculator. Our long-term goal is to help Indiana specialty crop growers increase farm productivity and profitability. We are currently testing a melon calculator to assist growers make informed decisions.

The HortBusiness Calculator is a spreadsheet that guides farmers on building an enterprise budget and provides financial reports such as cost structure, sensitivity, and breakeven analyses. The calculator aims to help melon farmers understand their cash flow needs and constraints. Having these values visible can assist farmers on their recordkeeping activities and on creating reliable financial assessments. Several universities offer enterprise budgets for different crops grown under various production systems (check our website for examples).

Melon enterprise budget

Budgets are designed and presented in many ways. In general, enterprise budgets have three main sections: revenues, expenses, and net profits.

Revenues: includes all the ways that farmers make money. Producers can sell melons directly to consumers (e.g. farmers markets, farm stand) or sell to wholesalers and retailers. Our tool asks farmers to input the melon sales done through different market channels with the respective quantity and average price.

Expenses: includes variable, labor, asset, crop services, and overhead costs.

Net profits: is the result of computing revenues minus expenses, which can be expressed as dollars per acre, square feet, or total cultivated area.

The five components of the enterprise budget

We organized our enterprise budget into five main components:

1. **Revenues and basic information** includes sales, prices, and general information about the farm
2. **Total variable costs** includes the amount of money spent on seeds, compost and other inputs whose value depends directly on the production activities
3. **Total labor costs** sums up the season expenses on wages of all hired workers and asks farmers to estimate wages for unpaid labor
4. **Total fixed costs** includes assets, crop services, and fuel costs
5. **Total overhead costs** includes all other expenses not directly related to production, but that are essential to the operation of the farm. Examples of overhead costs are taxes, insurance, marketing costs and other costs

Total variable costs include costs that depend directly on the production activities. Variable costs are the seeds, transplants, tools, fertilizers, and other inputs such as the quantity of boxes farmers need to store, transport, and sell produce.

Labor costs are the costs of having people working in the farm and include those hired permanently, temporarily, or those unpaid family members. It is important that farmers keep track of all the labor hours dedicated to the production of melons, especially if they are growing other crops. We categorize labor costs further depending on the type of activity: pre-planting, pre-harvest, and post-harvest, so we can help farmers estimate the stages of production that are more (or less) labor-intensive. Examples of labor costs are preparation for land or high tunnel, soil tests, planting (*pre-planting*), transplanting, pruning, pest management (*pre-harvest*), harvest, packaging, and transporting (*post-harvest*).

Fixed costs includes expenses related to assets, crop services, and fuel costs that are directly related to the production of melon, but do not vary with the level of production. Below we provide breakdown of fixed costs:

1. ***Ownership costs*** are the expenses farmers incur when buying fixed assets such as tractors, high tunnels, and machinery in general. These expenses occur whether the crop is sold or not. Because it is likely that farmers use fixed assets for multiple crops, our enterprise budget asks farmers to calculate the percentage of input dedicated to the production of melons. Our budget also accounts for expenses related to maintenance and annual insurance costs of fixed assets.
2. ***Crop services costs*** are related to those services that farmers hire from other agribusinesses. Common crop services expenses are renting a tractor, a rototiller, or paying for a nutrient delivery system.
3. ***Fuel costs***. Owning a vehicle or a tractor is costly, not only because farmers purchase them, but also because of their usage. Our enterprise budget calculates fuel expenses by asking farmers to provide information on the fuel cost ($/gallon), fuel usage of the equipment (gallons/hour), and its use during the growing season (hours/season). In doing so, the enterprise budget gives the total amount of dollars farmers spent on fuel used by every machine or vehicle per season.

Overhead costs are similar to fixed costs, but they are *not directly related* to melon production. For example, telephone and Internet bills are important for the proper functioning of the farm business, but these payments occur if melons were harvested or not. Common overhead costs are electricity, marketing and advertising, and display materials.

Cost structure, sensitivity, and breakeven analyses

After farmers have added all sources of revenues and expenses, our enterprise budget will automatically calculate and summarize the financial information in the sheet called “Analyses”. Here, farmers can obtain the financial results, and cost structure, sensitivity, and breakeven analyses of their melon production. This section is key to assist farmers on their financial decision-making.

The financial results illustrates the revenues, costs, and profits per area and for the entire farm. Table 1 illustrates the financial results table per acre and for the total cultivated area with melons. This table illustrates an example of a farmer selling melons at the farmers markets: sales are $12,000 and total costs are $4,436. Thus, net profits are $7,564 per acre or $226,906 for the total area.

Financial Results	Values per acre ($)		Total Values ($)	
	Values	Totals	Values	Totals
Farmers Market Sales	$ 12,000		$ 360,000	
Sales to Wholesale/Retail	$ -		$ -	
Other Sales	$ -		$ -	
Total Gross Revenue		**$ 12,000**		**$ 360,000**
Total Variable Costs	$ 1,383		$ 41,488	
Total Labor Costs	$ 1,990		$ 59,692	
Total Ownership Fixed Costs	$ 644		$ 19,324	
Total Crop Services Costs	$ 67		$ 2,000	
Total Fuel Costs	$ 96		$ 2,890	
Total Overhead and Marketing Costs	$ 257		$ 7,700	
Total Costs		**$ 4,436**		**$ 133,094**
NET PROFITS	**$**	**7,564**	**$**	**226,906**

Table 1. Financial results for a melon operation.

The cost structure information helps farmers take an in-depth look at how they spent their money on each of the costs categories. Figure 1 shows the cost structure pie chart that allows farmers compare the proportion of variable, ownership, crops services, fuel, labor, and overhead costs. In our example, the farmer reported that labor costs accounted for almost 45% of the total costs. Other costs reported where variable costs (31.2%), ownership costs (14.5%), overhead costs (5.8%), fuel costs (2.2%), and crop services (1.5%).

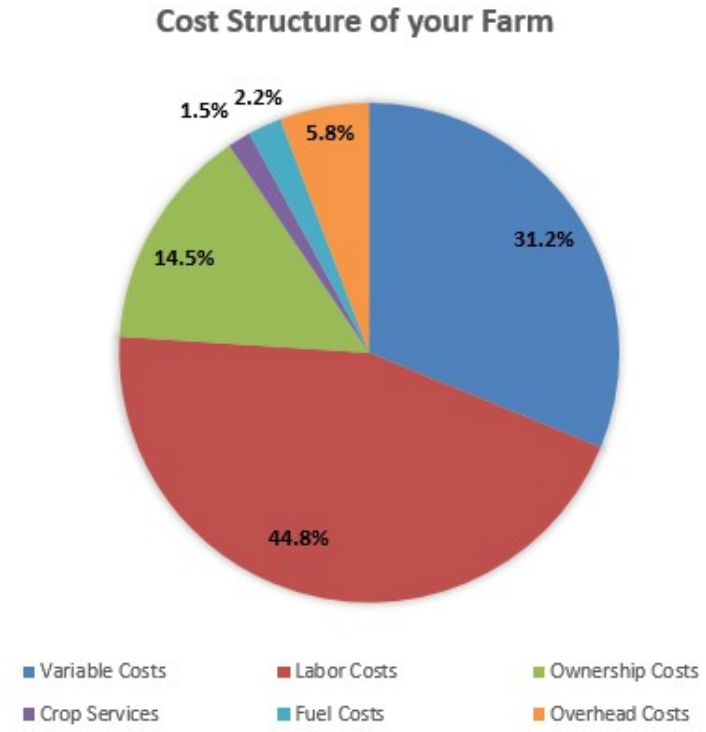

Figure 1. Cost structure analysis.

The sensitivity analysis illustrates how changes in prices and yield may affect farm profitability. Table 3 illustrates how our calculator creates different scenarios to help farmers understand risk, make investment decisions, and act proactively in case of unexpected prices and production scenarios.

In this example, a farmer sells 8,000 melons per acre at $1.50 per unit, which generates $12,000 of gross revenues. His/her net profit of $7,563.52 per acre is calculated by the difference between gross revenues ($12,000) and total costs ($4,436.48). Table 3 illustrates how variations in prices and yield may affect net profitability. For example, if price decreases by 10% (from $1.50 to $1.35 per unit) and yield stays the same (8,000 melons per acre), net profits per acre decrease from $7,563.52 to $6,363.52.

SENSITIVITY ANALYSIS

The net profits calculated with your assumed yield and prices were of $7563.52 per acre but as you can obtain a different yield and sell it at a different price, this tool lets you compare several different scenarios of yield and price to see if you face profitability risks. You can change the percentages at the margins of the table.

(Weighted average of your selling prices through the different market channels)

(In unit of melons per acre) (Net profits in dollars per acre)		-30%	-20%	-10%	Unit Price	10%	20%	30%
		$ 1.05	$ 1.20	$ 1.35	$ 1.50	$ 1.65	$ 1.80	$ 1.95
-30%	5600	$ 1,443.52	$ 2,283.52	$ 3,123.52	$ 3,963.52	$ 4,803.52	$ 5,643.52	$ 6,483.52
-20%	6400	$ 2,283.52	$ 3,243.52	$ 4,203.52	$ 5,163.52	$ 6,123.52	$ 7,083.52	$ 8,043.52
-10%	7200	$ 3,123.52	$ 4,203.52	$ 5,283.52	$ 6,363.52	$ 7,443.52	$ 8,523.52	$ 9,603.52
Yield	8000	$ 3,963.52	$ 5,163.52	$ 6,363.52	$ 7,563.52	$ 8,763.52	$ 9,963.52	$ 11,163.52
10%	8800	$ 4,803.52	$ 6,123.52	$ 7,443.52	$ 8,763.52	$ 10,083.52	$ 11,403.52	$ 12,723.52
20%	9600	$ 5,643.52	$ 7,083.52	$ 8,523.52	$ 9,963.52	$ 11,403.52	$ 12,843.52	$ 14,283.52
30%	10400	$ 6,483.52	$ 8,043.52	$ 9,603.52	$ 11,163.52	$ 12,723.52	$ 14,283.52	$ 15,843.52

Figure 3. Scenarios of the sensitivity analysis of the HortBusiness Calculator.

The breakeven analysis assists growers in computing the minimum price (breakeven price) and minimum yield (breakeven yield) that farmers need to achieve to be able to cover total costs (zero profits). Table 4 provides an example of the breakeven yield analysis. In this example, a farmer sells 8,000 melons per acre at $1.50 per unit, which generates $12,000 of gross revenues (see Table 1).

In the current scenario, at price $1.50 per melon and total costs of $4,436.48, the farmer needs to produce and sell at least 2,958 melons per acre to break even –cover total costs and have zero profits. The HortBusiness Calculator also combines breakeven analysis with sensitivity analysis to help farmers assess how changes in prices, yield, and costs can affect the farm profitability. For example, if prices decrease by 30% (from $1.50 to $1.05 per melon) and total costs per acre stay the same ($4,436.48), the farmer would need to sell at least 4,225 melons per acre to break even.

BREAKEVEN YIELD ANALYSIS

This tool lets you find your breakeven yield; that is, what should be your production level (measured in unit of melons per acre) in order to cover all your costs (assuming that they are $ per acre). You can also see a sensitivity analysis, because this table shows you different breakeven yields for different selling prices and different levels of cost. You can change the percentages at the margins of the table.

(Weighted average of your selling prices through the different market channels)

(Breakeven yield in unit of melons per acre)		-30%	-20%	-10%	Unit Price	10%	20%	30%
		$ 1.05	$ 1.20	$ 1.35	$ 1.50	$ 1.65	$ 1.80	$ 1.95
-30%	$ 3,105.54	2,958	2,588	2,300	2,070	1,882	1,725	1,593
-20%	$ 3,549.18	3,380	2,958	2,629	2,366	2,151	1,972	1,820
-10%	$ 3,992.83	3,803	3,327	2,958	2,662	2,420	2,218	2,048
Total Cost ($ per acre)	$ 4,436.48	4,225	3,697	3,286	2,958	2,689	2,465	2,275
10%	$ 4,880.13	4,648	4,067	3,615	3,253	2,958	2,711	2,503
20%	$ 5,323.78	5,070	4,436	3,944	3,549	3,227	2,958	2,730
30%	$ 5,767.42	5,493	4,806	4,272	3,845	3,495	3,204	2,958

Table 3. Scenarios of breakeven yield analysis obtained from the HortBusiness Calculator.

Conclusions

This publication describes the components, use, and benefits of an enterprise budget. We are currently looking for Indiana melon farmers willing to test our tool and give us feedback. Your feedback will help us validate and improve our budget. For more information on testing the calculator, please contact Dr. Ariana Torres to torres2@purdue.edu or 765-494-8781.

Upcoming Events

Beginning Farmer East Regional Workshop

Date: Oct. 28, 2017, 8:30 am – 4 pm

Location: Randolph County Fairgrounds, 1885 U.S. Route 27, Winchester

Attendees for this workshop can learn about:

- Business planning
- Pasture management
- Fruit and vegetable pest management
- Pastured poultry
- Greenhouse and high tunnel management
- Marketing products

Purdue Extension experts will be available to discuss and answer questions. Cost is $10 and lunch will be provided. **To register** or find more information about the next four regional workshops, go to www.conf.purdue.edu/BegFarmerTours.

Southwest Indiana Melon and Vegetable Growers' Technical Meeting

Date: November 21, 2017 5:00 pm to 8:00 pm (EST)

Location: Southwest Purdue Ag Center (SWPAC), 4369 N. Purdue Road, Vincennes, IN

The meeting will start at 5:00 pm for board members to discuss topics for the March meeting, which will be held in French Lick, IN. Any member who wants to participate in the discussion is welcome. At 6:00 pm, dinner will be served. Following that, we will showcase variety trials conducted at SWPAC in 2017, which includes seedless watermelons, cantaloupes, and personal-sized watermelons. Any grower interested in becoming a member is invited to attend. Membership dues are $15 per year and can be paid at the meeting. To register please call (812) 886-0198. Registration is due by Nov. 10. Any questions, please contact Wenjing Guan at guan40@purdue.edu

Indiana Hort Congress & Trade Show

Indiana Hort Congress & Trade Show will be held on Feb. 13-15, 2018. It is an educational meeting designed to meet the needs of fruit, vegetable, wine, organics, and specialty crop growers and marketers in Indiana and surrounding states. All interested individuals are invited to attend.

Please check the website https://www.inhortcongress.org/ for more information about Indiana Hort Congress & Trade Show.

Midwest Mechanical Weed Control Field Day

Date: Sep 26, 2017, 10:00 am – 5:00 pm

Location: Michigan State University Horticulture Teaching and Research Center – 3291 College Rd, Holt, MI 48842

Registration: The fee for the field day and lunch is $15. Register before September 15th. More information and Registration of the field day is available at http://msue.anr.msu.edu/events/midwest_mechanical_weed_control_field_day

Second National Conference on Cover Crops & Soil Health

Date: Dec 7-8, 2017

Location: Sheraton Indianapolis at Keystone Crossing, 8787 Keystone Crossing, Indianapolis, Indiana 46240, USA

The conference is intended for anyone interested in the practical use of cover crops and soil health improvement, including farmers; conservation agents; certified crop advisers (CCAs) and agribusiness staff; and university, nongovernmental organization (NGO), and agency representatives.

More information about the conference and registration is available at http://www.swcs.org/en/conferences/2017_national_conference_on_cover_crops/

Vegetable Crops Hotline © Purdue University - vegcropshotline.org
Editor: Wenjing Guan | Department of Horticulture and Landscape Architecture, 625 Agriculture Mall Dr., West Lafayette, IN 47907 | (812) 886-0198