

The Vegetable and Small Fruit Gazette

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Horticulture Department
The Pennsylvania State University

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Tip for the Month: "Happiness is like potato salad-when you share it with others, it's a picnic"-
Unknown

Comments from the Editor

Bill Lamont, Department of Horticulture

Summer is upon us and I know most of you are glad to hopefully have spring behind us and maybe move on to more "normal conditions", whatever that means. What a tough spring!! We are moving into high gear at the Horticulture Research Farm and have several field days and workshops planned for this coming summer, so check the calendar of upcoming meetings and special articles on these activities in the gazette. In the high tunnels we have been harvesting some beautiful lettuce, leafy greens, broccoli, and will be harvesting the planting of early red potatoes (Red Pearl- only makes B size potatoes) next week. We continue to collect excellent environmental data inside the high tunnels compared to the outside environment that we will share this information at

field days/workshops, in this publication, on the Center for Plasticulture website: <http://plasticulture.cas.psu.edu> and in the High Tunnel Manual to be published in June. Steve Bogash will be writing an article for the July issue. I am adding meetings, field days and twilight meetings to the Upcoming Meetings List. If you have an event that you would like to advertise, please send it to me. As always, the Vegetable and Small Fruit Gazette Team encourages your feedback so that we can better serve your needs and address your concerns.

Schedule for Agent Articles

Bill Lamont, Department of Horticulture

| | |
|-----------|-----------------|
| July | Steve Bogash |
| August | Mary Conklin |
| September | Eric Oesterling |
| October | Cheryl Bjornson |
| November | John Esslinger |
| December | Andy Muza |

Ron Hostetler, Cambria County Extension Agent Retires

Bill Lamont, Department of Horticulture

Veteran Cambria County Extension Agent Ron Hostetler retired after a 38- year career as an extension agent, all with the Cambria office. Ron started working in extension right after he received his bachelor's degree in animal science from Penn State in 1964. He also received a master's in agronomy in the early 70's, also from Penn State. In Cambria County Ron worked closely with the potato growers and had many other responsibilities. I thoroughly enjoyed working with Ron and the potato growers on planting the Snack Food Association potato chip trials in Cambria County. Ron was a true professional and a great representative of extension. He is also a diehard Penn State Football fan. Ron's wife Cathy, the CED in the Cambria County Extension Office, will also be retiring in July. They have two grown children, a daughter and a son. As for Ron's plans, he said that he and Cathy plan on doing some travelling. He also said he is looking forward to building a greenhouse at his home and grow plants for family and friends. We wanted him to go with a high tunnel and grow early red potatoes and earn "big bucks" but he said that was too much like work. On behalf of all your friends in

extension, I want to wish Ron and Cathy many healthy and satisfying retirement years together. I look forward to seeing you at the home football games this fall.

Weed Control in Pumpkins with Herbicides

Mike Orzolek, Department of Horticulture

Within the last 12 months there have been several new herbicides or combination of herbicides labeled for weed control in pumpkin. Most herbicides labeled work best when tank-mixed to give a wider spectrum of weed control. All preplant incorporated and pre-emergence herbicides work more effectively when rainfall or irrigation (0.5 inches) occurs within 24 to 36 hours after application.

Command 4EC - (clomazone) - contains 4 pound active ingredient per gallon. Very volatile material that is subject to off-target movement, especially under low wind (3 -7 mph) conditions. Recommended application pre-plant incorporation only. Sensitive plants may show symptoms of foliar whitening or yellowing if contacted by Command 4 EC herbicide. It is further recommended that, prior to application, adjacent properties be checked and that spraying within 200 feet of desirable plants be avoided. Weeds controlled by the application of Command 4EC at 1.0 pint/A include: barnyardgrass, signalgrass, crabgrass, giant and green foxtail, goosegrass, common and fall panicum, seedling Johnsongrass, velvetleaf, spurred anoda, common ragweed, jimsonweed, common lambsquarters, Pennsylvania smartweed, purslane, prickly sida and Venice mallow. The recommended rate of Command 4EC as a preplant incorporated treatment for pumpkin production is 14-16 ounces/A. Do not exceed a rate of 2 pints per acre per year. Incorporate Command 4EC to a depth of 1 inch or less and place the pumpkin seed below the chemical barrier when planting. Do not apply Command 4EC within 500 feet of emerged winter wheat or within 1000 feet of the following areas: towns and housing developments, commercial fruit production, commercial nurseries, and commercial greenhouses and high tunnels. In terms of rotational crop guidelines, with the 1.5 pint/A rate, the following crops can be planted anytime, cotton, soybeans, pumpkins, peppers and tobacco. All other crops can safely be planted after 12 months from Command application.

Command 3ME - (clomazone) contains 3 pound active ingredient per gallon. Because this formulation is micro-encapsulated, off-target movement of this product is not as serious as the Command 4EC formulation. Weeds controlled by the application of Command 3 ME at 1.0 pint/A include: barnyardgrass, signalgrass, crabgrass, giant and green foxtail, goosegrass, common and fall panicum, seedling Johnsongrass, velvetleaf, spurred anoda, common ragweed, jimsonweed, common lambsquarters, Pennsylvania smartweed, purslane, prickly sida and Venice mallow. The recommended rate of Command 3 ME for processing pumpkin production is 8 to 18 ounce/A as a pre-emergence treatment applied prior to transplanting or seeding in the field. Do not exceed a rate of 2 pints per acre per year. Rotational crop guidelines are similar to the Command 4EC label.

Curbit EC - (ethalfluralin) contains 3 pound active ingredient per gallon. Do not apply Curbit to soils that are wet, cloddy, or subject to prolonged periods of flooding because poor weed control and/or crop injury may result. Weeds controlled by Curbit at the 3 pint./A rate include: signalgrass, crabgrass, goosegrass, foxtail millet, fall panicum, seedling Johnsongrass, carpetweed, common lambsquarters, prostrate, redwood, smooth and spiny pigweed and Florida pusley. The recommended rate of Curbit EC for pumpkin production is 3 to 4 pints/A as a pre-emergence treatment for seeded pumpkins and as a banded spray between rows for transplanted pumpkins. Do not incorporate Curbit and if replanting is required within 6 months of the Curbit application, only replant the following crops: cucumbers, cantaloupes, watermelons, pumpkins, summer squash and winter squash.

Sandea - (halosulfuron-methyl) can be applied either as a pre-emergence or post-emergence application. For pre-emergence application the rate is 0.50 to 0.66 ounce/A in a minimum of 15 gallons water per acre. For best results, tank-mix with either Prefar (especially if irrigation is available) or Command for grass control. Optimum weed control is achieved if 0.25-0.50 inches of water from rainfall or irrigation is received within 3 days of the application. For post-emergence application, the rate is 0.5 to 0.66 ounce/A in a minimum of 15 gallons of water and a nonionic surfactant. Treat when plants are in the 2-5 true leaf stage. Sandea is rainfast within 4 hours of application. Suggest waiting 2-3 days after application to irrigate or 7 days for cultivation. Weeds controlled pre-emergence include: yellow nutsedge, pigweeds, wild radish and mustard, common lambsquarters, ragweed, Pennsylvania smartweed, velvetleaf, galinsoga and purslane (suppression). Weeds controlled with post-emergence applications include: yellow nutsedge, pigweeds, wild radish and mustard, ragweed, Pennsylvania smartweed, velvetleaf, and galinsoga. **Note the lack of lambsquarters and purslane control with Sandea post-emergence application.** On pumpkin and winter squash, Sandea may cause treated plants to appear yellow for 14 or more days after application. In addition, younger leaves may exhibit a crinkled appearance. Rotational crop guidelines for Sandea are: 3 months - sweet corn and popcorn, 9 months - peas, potatoes, cucumber, pumpkin, squash, snap beans soybeans and transplanted tomatoes, 15 to 18 months - most other vegetable crops, 24 months - red beets and spinach.

Prefar 4E - (bensulide) contains 4 lb active ingredient per gallon. Application of Prefar 4E to soil that is cold and/or wet for an extended period of time due to rains or poorly drained soil during the germination period may result in reduction of crop stand or yields. . The recommended rate of Prefar 4E for pumpkin production is 5 to 6 quarts./A as a preplant or pre-emergence to flat-planted or bedded crops. Weeds controlled by the application of Prefar 4E include: crabgrass, fall panicum, foxtails, goosegrass, jungle rice, sprangletop, barnyardgrass, lambsquarters, purslane, and redroot pigweed. Carrots, cotton, and crops on the Prefar 4E label may be replanted following applications of Prefar 4E without restriction. All other crops should not be planted for 120 days and the soil must be tilled to a minimum depth of 4 inches prior to replanting. Prefar 4E may be used on labeled crops grown through or under plastic mulch. Rainfall

or irrigation within 24 hours after the application of Prefar 4E results in maximum response.

Strategy - packaged mix of Curbit and Command (ethalfluralin and clomazone) containing 1.6 pounds of ethalfluralin per gallon and 0.5 pounds of clomazone per gallon. The recommended rate of Strategy for pumpkin production is 3 to 4 pints/A as a pre-emergence treatment for seeded pumpkins and as a banded spray between rows for transplanted pumpkins. Do not incorporate Strategy and if replanting is required within 6 months of the Strategy application, only replant the following crops: cucumbers, cantaloupes, watermelons, pumpkins, summer squash and winter squash. Weeds controlled by the application of Strategy include: barnyardgrass, signalgrass, crabgrass, giant and green foxtail, goosegrass, common and fall panicum, shattercane, seedling Johnsongrass, wildproso millet, black seeded plantain, carpetweed, velvetleaf, spurred anoda, common ragweed, common lambsquarters, Pennsylvania smartweed, common purslane, prickly sida, Florida pusley, prostrate, redwood, smooth and spiny pigweed and Venice mallow. . Rotational crop guidelines for Strategy used at the 2 to 4 pint rate are: anytime - cucumbers, cantaloupes, watermelons, pumpkins, summer squash and winter squash, 9 months - beans (succulent and dry) cabbage (all), corn, peas, peppers, potatoes, soybeans, sweet potatoes, tobacco, tuberous vegetables and transplanted tomatoes, 12 months - direct seeded tomatoes and wheat, 26 months - all other crops

Poast - (sethoxydim) contains 1.5 pounds of sethoxydim per gallon. Poast is a selective, broad spectrum, post-emergence herbicide for control of annual and perennial grasses. Poast does not control sedges and broadleaf weeds. Essentially, all grass crops including sorghum, corn, small grains, and ornamental grasses are susceptible to Poast. Poast rapidly enters the target weed through its foliage and translocates throughout the plant. Symptoms observed within 3 weeks from Poast application on susceptible plants include; slowing or stopping of growth, reddening of foliage, leaf tip burn, and foliage burnback. The recommended rate of Poast for pumpkin production is 1.5 pints/A as a post-emergence application with crop oil concentrate. Maximum application of Poast on pumpkins per acre per year is 3.0 pints. Grasses controlled by Poast include: goosegrass, itchgrass, seedling Johnsongrass, jungle rice, lovegrass, wildproso millet, tame and wild oats, seedling orchardgrass, browntop and fall panicum, red rice, annual ryegrass, field sandbur, shattercane, signalgrass, red sprangletop, stinkgrass, witchgrass, and volunteer barley, corn, oats, rye and wheat.

Prism - (clethodim) contains 0.94 pounds of clethodim per gallon. Prism is a selective, broad spectrum, post-emergence herbicide for control of annual and perennial grasses. Prism does not control sedges and broadleaf weeds. Essentially, all grass crops including sorghum, corn, small grains, and ornamental grasses are susceptible to Prism. Prism rapidly enters the target weed through its foliage and translocates throughout the plant. Symptoms observed within 7 to 14 days from Prism application on susceptible plants include; reduction in vigor and growth, early chlorosis/necrosis of younger plant tissue, and eventual collapse of the remaining foliage. The recommended rate of Prism for pumpkin production is 13 to 17 fluid ounces/A as a post-emergence application with crop oil concentrate. Maximum application of Prism on pumpkins per

acre per year is 68 fluid ounces. Grasses controlled by Prism include: barnyardgrass, brome species, canarygrass, crowfootgrass, southwestern and wholly cupgrass, goosegrass, itchgrass, seedling Johnsongrass, junglerice, lovegrass, wildproso millet, tame and wild oats, seedling orchardgrass, browntop and fall panicum, red rice, annual ryegrass, field sandbur, shattercane, signalgrass, red sprangletop, stinkgrass, witchgrass, and volunteer barley, corn, oats, rye and wheat.

Select 2EC - (clethodim) contains 2.0 pounds of clethodim per gallon. Select 2EC is a selective, broad spectrum, post-emergence herbicide for control of annual and perennial grasses. Select 2EC does not control sedges and broadleaf weeds. Essentially, all grass crops including sorghum, corn, small grains, and ornamental grasses are susceptible to Select 2EC. Select 2EC rapidly enters the target weed through its foliage and translocates throughout the plant. Symptoms observed within 7 to 14 days from Select 2EC application on susceptible plants include; reduction in vigor and growth, early chlorosis/necrosis of younger plant tissue, and eventual collapse of the remaining foliage. The recommended rate of Select 2EC for pumpkin production is 6 to 8 fluid ounces/A as a post-emergence application with crop oil concentrate. Do not apply more than 8 fluid ounces per acre in a single application. For repeat applications, make on a minimum of a 14-day interval. Grasses controlled by Select 2EC include: barnyardgrass, brome species, canarygrass, crowfootgrass, southwestern and wholly cupgrass, goosegrass, itchgrass, seedling Johnsongrass, junglerice, lovegrass, wildproso millet, tame and wild oats, seedling orchardgrass, browntop and fall panicum, red rice, annual ryegrass, field sandbur, shattercane, signalgrass, red sprangletop, stinkgrass, witchgrass, and volunteer barley, corn, oats, rye and wheat.

The Ground Hog

Gary San Julian, Department of Forestry

Ground hog, woodchuck, and whistle pig are all common names for this member of the squirrel family -*Marmota monax*. The woodchuck can be found throughout Pennsylvania in both rural and urban settings. They are a common sight along highways and in open fields from March through the late fall. We all wait for Phil to wake up on the second of February to get a hint of when spring will really be here. Ground hogs are one of the few animals in our state that are considered true hibernators.

We start seeing them in March when days start getting warm, and they are in search of food and a mate. Two to six young are born after a 32-day gestation period-blind and hairless. Woodchucks are food for hawks, fox, dogs, coyotes, man and other predators, but judging from the carcasses on the highways it seems like the automobile is the major one.

Woodchucks are considered a game animal in Pennsylvania, however, when they damage personal property, legal methods can be used by property owners to control them. There are numerous methods to control these vegetarian rodents.

In small gardens they can be excluded by using an L-shaped wire mesh fence that has the leg of the L buried under ground and the top part of the fence bent out to keep them from climbing over.

While no repellents or toxicants are registered for use on ground hogs in Pennsylvania, two fumigants are registered for them and kill by producing a toxic gas. The gas is toxic to any wildlife so it is important that you only use these products in burrows that are actively used by ground hogs. As with any pesticide, carefully read and follow all label directions. The most common type of fumigant can be purchased at most local hardware and farm supply stores. These cartridges are ignited with a fuse and produce carbon monoxide gas. It is imperative these devices are not used when burrows are located under buildings, sheds or near combustible materials. Aluminum phosphide is a restricted use chemical and can only be applied by a certified applicator. The product is placed deep in a burrow that has been tightly sealed and as the material comes in contact with moisture, hydrogen phosphine gas is produced. Do not use the material within 15 feet of a building or structure where the gas could escape into occupied areas.

Large, box-like live traps can be used to trap ground hogs and move to locations where they will not be a problem. Vegetables and fruits can be used as bait, but they must be fresh. Block the trap open until you are sure the ground hogs are taking the bait. A tarp, light-proof cover or grass can be used to conceal the trap and rocks or logs can be used to guide them into the trap. Check the trap twice a day and quickly move trapped animals. Make sure you have permission from the landowner before releasing the ground hog on anyone's property.

Ground hogs can be hunted or shot throughout the year. If you are hunting them, you must possess a valid Pennsylvania hunting license and there is no bag limit. Shooting can be an effective method for landowners or hunters to reduce a population or maintain one a low level. Shooting is also an excellent follow-up to other control methods. Hunters should request permission to hunt ground hogs well in advance of spring. Once arrangements have been made, it is always a good practice to keep in touch with the property owner and ask permission regularly.

High Tunnel Workshop to be held on July 19th

Bill Lamont, Department of Horticulture

The second workshop of the 2002 season is scheduled for Friday, July 19th from 9:30-4:30. This will be co-sponsored by PASA (Pennsylvania Association for Sustainable Agriculture). The registration fee for this workshop is \$10.00 and will be used to provide lunch and beverage as well as printed materials. Advanced payment is expected in order to reduce the number of "no-shows." Walk-in registration will be limited to 10 and total registration will not exceed 75. Please send a check made out to 'Penn State University' to the attention of Lisa White, 112 Tyson

Building, University Park, PA 16802.

The tentative program for the summer workshop is as follows:

Introduction to high tunnels, maintenance tips, and design considerations

Michael Orzolek, Bill Lamont, and Bruce Dye

Update on high tunnel environmental research along with considerations for maximizing crop productivity

Eric Burkhart

Summer vegetable crop and culinary herb report: scheduling and performance

Eric Burkhart, Michael Orzolek, and Bill Lamont

Bramble culture and research

Kathy Demchak

Cut flower culture and research

Lisa White

High tunnel integrated pest management: biological control options

Lisa White and Eric Burkhart

Irrigation options for high tunnels: drip and overhead irrigation design and assembly

Eric Burkhart, Michael Orzolek, Bill Lamont, and an industry representatives

Research reports, demonstrations, and grower experiences will ensure that each workshop is full of useful and practical information. Interested persons are encouraged to register early.

Questions should be directed by phone or email to Lisa White, High Tunnel Facility Manager at 1-814-865-5587 (ldw112@psu.edu).

Other workshops/field days will be conducted during the year and are listed below. Put them on your calendar now and plan on attending. **There will be a county agent in-service training program on the high tunnels on September 6, 2002.**

Agent Inservice Training

Fri. Sept. 6th

Autumn Workshop

Sat., October 26

Winter Workshop

Fri., December 13

Bug vs. Bug - Bumble Bee Pollination in Greenhouse Vegetable Crops

Cathy Thomas, Integrated Pest Management Program

Proper pollination is needed for optimal fruit set and production. In the past, greenhouse tomato growers have relied on manual pollination which can be very time consuming. Using bumble bees for pollination is an effective alternative and can completely replace manual pollination. In addition to saving on labor, bumble bee pollination has many advantages. These advantages include: (1) bumble bees are active at low temperatures (41°F), windy and cloudy conditions, (2) effective in greenhouses, high tunnels and in open air, (3) bumble bee pollination results in higher yields and large, high quality fruit in crops such as tomatoes, peppers and blueberries.

According to Richard Gerhart, distributor of bumble bees colonies, (International Technology Services, Biobest), bumble bee pollination started when Dr. Roland de Jog a medical doctor in Belgium had a hobby of raising bumble bees. To enhance his colonies, he placed them in a friend's tomato greenhouse, and the rest is history. Roland is the founder and principal owner of Biobest Biologicals, a distributor of biological controls and bumble bees. Kopperts, another producer of natural enemies also began producing bumble bees. Biobest rears in Belgium and Lamington, Ontario, Spain and has joint ventures in other areas. Kopperts rears in Holland, Detroit, New Zealand and has joint ventures in other areas. Several species are used throughout the world. *Bombus impatiens* is used east of the Rockies, *Bombus occidentalis* in the west, and *Bombus terrestris* is used in most other areas of the world.

Bumble bees hives are shipped to growers in completely maintenance-free hives. The housing made of solid, recyclable cardboard with a moisture resistant coating. The hive has two flight openings. The standard flight opening is used under normal conditions. A tapered tube is attached to hole no. 2 which creates a lock in system. When this valve is open, the bumble bees can enter, but are unable to get out. This is a convenient option if the hive needs to be removed from the greenhouse. The hives are supplied with sugar water for the total life expectancy of the hive, since crops such as tomato have blossoms that do not produce nectar.

Tomato Pollination

Tomato blossoms require slight movement for sufficient pollen from the stamens to fall onto the stigma of the flower. Bumble bees cause movement by hanging upside down on the flower, fastening their jaws onto the staminal tube, and then setting the flower into vibration by activating their flight muscles. This is called "buzz pollination". These jaw marks will soon appear as a brown discoloration on the blossom assuring the grower that flower has been visited and "set". Bumble bees are most active in the morning and in the afternoon at temperatures between 50 and 86 °F. They function best at temperatures between 59 and 77°F

Bumble bees can be used to pollinate other crops such as peppers, cherry tomatoes, and eggplants and blueberries.

Consider these factors when using bumble bee pollination:

- Use pesticides selectively since many of the traditional classes of insecticides will have a negative impact on the hive. Contact a bumble bees distributor for specific information about persistence and compatibility of specific compounds.
- Systemic pesticides (pesticides that are absorbed through the roots) may damage the bumble bee population.
- Bumble bees perform best when used with natural enemies to control pests.
- Remove blue sticky cards since they may attract the bumble bees.
- Keep ants away from the hive.
- Do not put ornamental hanging baskets treated with systemic insecticides in houses with bumble bees.

Informative Websites:

<http://www.koppert.nl> - Koppert Biologicals, 734-641-3763, MI

<http://www.biobest.be> - Biobest Biologicals, 303-661-9546, CO

Please phone or email me if there are specific issues you would like me address in this column.

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Pestwatch: Initializing The Sweet Corn Trapping Network And Related Links

Shelby Fleischer, Department of Entomology

In 2002, through the cooperation of Penn State Extension and PVGA, over 40 sites in Pennsylvania are providing information of the timing and intensity of adult moth flight for the 3 "worm" pests of sweet corn in sweet corn: the European corn borer (ECB), the corn earworm (CEW), and the fall armyworm (FAW). The information is being organized regionally with another ~160 sites in Maryland, Delaware, New Jersey, and New York. In addition, we are working to include sites southward, in Virginia, and northward, in other New England states, and hope to have those states on-line during this field season. We are working so that all the data are on-line, in as close to real-time as possible. In 2002, we hope to have a similar geographic coverage, albeit at lower trapping densities due to budget cuts in many states. If you are interested in establishing a new site, the best contact in Pennsylvania would be your Extension agent, or an agent working in this effort from a nearby county.

The trapping information can be viewed at the "Pestwatch" site:

<http://pestwatch.cas.psu.edu/>. When you click on "sweet corn", cooperators can navigate to enter data, and anyone with web access can view maps that display the trap capture for each

pest species. When you are looking at a map, you can click on a trap site to see the catch-over-time (we call it the time series graph) at that site. Both current and historical maps are posted. Please remember that you are looking at estimates of catch-per-night. We divide the total trap captures by the number of days trapping to estimate a catch-per-night, which we can display across the geographic region. More detailed information can be seen by looking at these data as a table. This is also on the website - just click on the text called "Yearly Reports".

From the Pestwatch site, you can also click on "Tomatoes". This links to tomato disease forecasting websites from Dr. Alan MacNab. The "HoneyBee" link is being developed to track apiary inspection efforts, and the "Grapes" link was a trial effort for several grape pests.

All the sites in Pennsylvania, and some of the New England sites, are using a lure developed from cooperative research from Penn State and Scentry Biologicals to monitor for fall armyworm. This is now being sold through Scentry as the FAW-PSU lure, and we believe it controls the problem of non-target captures. However, it also lowers the rate of capture by about 1/3rd. So the captures should be cleaner, but smaller. This summer, Mike Smith will help run this data. Mike has a BS in Geography from Penn State, with an emphasis on GIS. You can reach Mike at mss212@psu.edu and 814-863-6116.

Work went on during the winter to make it easier to enter data and to accommodate the expanding geographic area. Databases are now on the web, in Microsoft Access databases, edited through an ActivePages software application we call Remote Data Manager. When users enter data, you are using Remote Data Manager to directly change/update/edit the Microsoft Access databases. These databases will be downloaded by us, and by the Outreach program of the College of Earth and Mineral Sciences (EMS). The outreach program in EMS has the facilities to support maps that allow interactive zoom in and out, and we will be working in 2002 to make use of that. This allows us to expand geographically, while simultaneously supporting detailed views at a local scale.

We are also working to incorporate phenology predictions for ECB. These are degree-day models that estimate/predict when the ECB will be in any given lifestage. Phenology models will help with ECB, but not CEW or FAW because the latter two species primarily immigrate from the south. We will provide more information on this as it gets implemented.

Please bear with us as we make these changes. As always, whenever you see glitches, call or e-mail to let us know. I think the IPM programs will be better, but the first few months may be a bit difficult. This is an example of developing regional programs, where the combined information value benefits more than what any one person could achieve.

Smart Pricing Strategies

Wen-fei L. Uva, Senior Extension Associate
Department of Applied Economics and Management

Pricing is an important piece of smart marketing. The price a farmer receives depends largely on the distribution channel used to sell the product. Farmers are usually price-takers at terminal and wholesale markets. One of the major attractions of direct marketing for farmers is the opportunity of gaining control over the prices they can charge. Yet frustration often arises when trying to determine prices, and one of the most difficult problems in direct marketing often centers around the all-too-common practice of price-cutting.

Price provides income, guides the quantity supplied and demanded, serves as a signal to customers, and transfers ownership. Questions one should ask before determining prices including: How much do the competitors charge? How much are customers willing to pay? Does the product have additional value for which the price may be raised? What is the cost to produce the product? And if you slash prices (below competition), how will you maintain profitability?

The most basic element of pricing is to know your costs, including variable costs and fixed costs. Variable costs are cost items directly related to production ?? plants, seeds, fertilizer, labor, packaging, etc. Fixed costs are cost items that do not vary with production volume such as rent, taxes, management salaries, and cost of capital. The price of one item should at least cover variable costs in the short run and need to cover both variable and fixed costs in the long run. It is important to establish a gross margin that will cover the total costs of growing and marketing the product and provide a satisfactory profit for the business. Gross margin is the difference between the cost of the product and its selling price.

$$\text{Gross Margin \%} = \frac{\text{Selling Price} - \text{Cost}}{\text{Selling Price}} * 100$$

$$\text{Retail Price (\$)} = \frac{\text{Cost of Goods Sold (\$)}}{100(\%) - \text{Desired Gross Margin (\%)}} * 100$$

After the prices are established based on the desired gross margin for each product, it is often necessary for the smart marketer to adjust the prices to match the marketing strategy. One might want to lower prices of certain items to meet competition, attract customers to the retail outlets (i.e. advertised specials), or sell products that may have been damaged, overstocked or seasonal. Sometimes, one will want to increase prices of certain items to reflect the value of a unique product, a special service, or a prestige image. When considering changing prices, it is important to calculate the impact of such a reduction or increase on the total gross margin of the business. This can be done as illustrated in the following example.

Assume a direct marketer is selling just five major items from a farm stand. The direct marketer has calculated the gross margin for each product sold using the cost of goods (a cost of production or market wholesale price) and has also estimated the approximate sales for each

product as a percent of total sales. The percentage of sales and gross margin for each product are shown below.

Contribution to Total Sales and Gross Margin before Price Reduction

| Item | A. Percent of Total Sales (Estimated) | B. Percent Contribution to Gross Margin | C. Total Gross Margin (C = A x B) |
|--------------|--|--|--|
| Apples | 35 | 30 | 10.5 |
| Mums | 10 | 35 | 3.5 |
| Pumpkins | 15 | 30 | 4.5 |
| Sweet Corn | 10 | 20 | 2.0 |
| All Others | 30 | 20 | 6.0 |
| Total | 100% | | 26.5% |

In this situation, if the direct marketer decided to lower the price on pumpkins as Halloween promotions to meet a lower price by a competitor or to sell out the seasonal stock. If the price reduction resulted in a gross margin of 10 percent (a drop from 30 percent) and stimulated sales to increase to 20 percent of the total (up from 15 percent). The impact of the price reduction on the total sales and profits of the business could be calculated as following:

Contribution to Total Sales and Gross Margin after Price Reduction

| Item | A. Percent of Total Sales (Estimated) | B. Percent Contribution to Gross Margin | C. Total Gross Margin (C = A x B) |
|---------------|--|--|--|
| Apples | 33 | 30 | 9.90 |
| Mums | 9 | 35 | 3.15 |
| Pumpkins | 20 | 10 | 2.00 |
| Sweet Corn | 10 | 20 | 2.00 |
| All Others | 28 | 20 | 5.60 |

| | | |
|-------|------|--------|
| Total | 100% | 22.65% |
|-------|------|--------|

Therefore, the direct marketer could forecast a drop in total gross margin from 26.50% to 22.65%, or a loss of -3.85% in gross margin. Assuming that sales for the business averaged \$5,000 per week, this would mean a loss of: $\$ 5,000 \times -3.85\% = -\$ 192.5$.

However, if the lower price on pumpkins attracted more customers or more sales for the business, and resulted in an overall increase in sales of more than \$192.50, the result would be an increase in total gross revenue for the direct marketer.

For example:

Gross margin before the price reduction $\$5,000 \times 0.265 = \$1,325.00$

Gross margin after the price reduction (with a \$900 sales increase) $\$5,900 \times 0.2265 = 1,336.35$

Now there is a slight gain in total gross margin.

Remember that having the "lowest price in the market" image can't get you higher prices for higher quality products. Having a "value" image is to reach an optimal combination of quality, service, information and price. Price competition in a market situation with multiple similar sellers in one location can cause severe consequences.

The following are some pricing strategies for *Smart Marketers*.

- Price-lining: Price-lining features products at a limited number of prices, reflecting varying product quality or product lines. This strategy can help smart marketers to sell top quality produce at a premium price and an "economy line", e.g. overripe or smaller fruits. Price-lining can also make shopping easier for consumers and sellers because there are fewer prices to consider and handle.
- Single-pricing: The single-price strategy charges customers the same price for all items. Items are packaged in different volumes based on the single price they would be sold for. With such a policy the variety of offerings is often limited. The strength is being able to avoid employee error and facilitate the speed of transactions. Also, customers know what to expect. There are no surprises for customers.
- Loss-leader pricing: A less-than-normal markup or margin on an item is taken to increase customer traffic. The loss-leaders should be well-known, frequently purchased items. The idea is that customers will come to buy the "leaders" and will also purchase regularly priced items. If customers only buy the "loss leaders," the marketer is in trouble.
- Odd-ending pricing: Odd-ending prices are set just below the dollar figures, such as \$1.99 a pound instead of \$2.00. Some believe that consumers perceive odd-ending prices to be substantially lower than prices with even-ending. However, it might not be suitable in some markets. For example, in a farmers' market situation, products should be priced in round figures to speed up sales and eliminate problem with change.

- Quantity discount pricing: A quantity discount is given to encourage customers to buy in larger amounts, such as \$2.00 each and three for \$5.00. Gross margins should be computed on the quantity prices.
- Volume pricing: Volume pricing uses the consumers' perception to its advantage, and no real discount is given to customers. Rather than selling a single item for \$2.50, two are priced for \$4.99 or \$5.00.
- Cumulative pricing: Price discount is given base on the total volume purchased over a period of time. The discount usually increases as the quantity purchased increases. The type of pricing has a promotional impact because it rewards a customer for being a loyal buyer.
- Trade discount/Promotional allowances: Price is reduced in exchange for marketing services performed by buyers or to compensate buyers for performing promotional services.
- Cash discount: A discount is given to buyers who pay the bills within a specified period of time to encourage prompt payment.
- Seasonal discount: This type of discount is used to induce buyers to purchase at the end of the season or during off-season.

While the above strategies are widely used and proven effective, smart marketers should not be limited to these strategies. Creative pricing ideas can help you differentiate your products and services. No matter how you price your products, always go back to check it against your bottom-line. Make sure prices for your products reflect your business image and target market and make a profit. Smart pricing can be a good marketing strategy.

This article is from "**Smart Marketing**" a monthly marketing newsletter for extension publication in local newsletters and to place in local media. It reviews the elements critical to successful marketing in the food and agricultural industry. Articles are written by the faculty members in the Department of Applied Economics and Management at Cornell University

That's a Berry Good Question!

Kathy Demchak, Department of Horticulture

Q. After the dry summers we've had, and the need for frost protection this spring, I'm considering drilling a well for irrigation. The hydrologist says I'll be able to pump 60 gallons per minute from it. Will that be enough for me to frost protect my berries? I have a little less than an acre. (Anon.)

A general rule is that a minimum of 45 to 60 gallons per hour per acre is needed for frost protection. More would be needed for more severe events, or if there is wind. There is a table in the Commercial Berry Production Guide that lists the amount of water needed for an acre in inches per hour for various temperatures, levels of humidity, and wind speeds. The number above is arrived at in the following way: At a temperature of 24 degrees, if the relative humidity is 75% or higher, and there is no wind, 0.1 inches per hour is listed as the amount of water needed. If the wind is at even 2 miles per hour (granted, most nights with frost are still), this same amount is sufficient only down to 27 degrees. 0.1 inches/hour x 43,560 sq. ft/acre x 144

sq. inches/sq. foot = 627,264 cubic inches of water needed per acre. I know that's a weird set of units, but since we started in inches, I stayed in inches. 1 gallon=231 cubic inches. 627,264 cubic inches/acre divided by 231 cubic inches per gallon equals 2715 gallons of water needed per hour to apply 0.1 inches/hour. Or, 2715 gallons needed per hour = 45 gallons needed per minute.

Got a question? Send it to Kathy Demchak, at 102 Tyson Bldg., University Park, PA 16802. You will be credited with the question, or can remain anonymous, as you wish.

Small Fruit Research Projects at PSU

Kathy Demchak, Department of Horticulture

A number of research projects are in progress at PSU's Horticulture Research Farm at Rock Springs. There will be a Field Day on August 19 (the week of Ag Progress Days) offered in conjunction with PVGA and SHAP for those of you who can get away from the farm for a day or two. If you just happen to be in the neighborhood, you can stop by and take a look on your own. Here's a brief overview of what's happening with the projects:

Strawberry Plasticulture. This study, comparing 6 cultivars that had been planted on 3 different dates in 2000, is in its carryover year, and we're sure giving this system the test. Temperatures dropped below freezing on 11 nights after the onset of bloom this spring, with low temperatures of 23 degrees or lower on 5 nights. On 9 nights I needed to run the irrigation, generally starting between 11:30 p.m. and 1:30 a.m., even with row covers, so this field really got waterlogged. It turned into a slug utopia. I think we basically leached every bit of nitrogen out of the field in the process, with petiole values at one point being 1/20th of the recommended amount. If marketable yields are decent here this year, I'll feel comfortable recommending this system for just about any place or year.

Matted Row Strawberry Cultivar Trial. This study is just becoming established and consists of 28 cultivars or numbered selections from breeding programs from Nova Scotia, Quebec, New York, Minnesota, USDA Beltsville, North Carolina, and the cooperative NJ/MD/VA/WI breeding program. This spring has been ideal for plant establishment. Though no yield data will be available until 2003, growers will have chance to browse through the field and get an idea of plant growth habit and susceptibility to insects and diseases. We'll be a little stingy on sprays with this study so we get an idea of potential pitfalls of cultivars.

Blueberry Irrigation Study. Dave Eissenstat, and Elsa Sanchez, the Horticulture Department's newest faculty member, are looking at deficit irrigation on blueberries. Treatments will begin whenever the season starts to dry out in this multiple-year study.

High Tunnel Small Fruit Production. Two tunnels of berries look at the performance of 'Autumn Britten', 'Heritage', 'Josephine' and ND-F1 fall-bearing raspberries, 'Triple Crown' blackberry,

and a selection of Wyeberry (a blackberry/raspberry hybrid). Most of these cultivars/selections also appear in an identical field study for comparison. In another tunnel, twenty-four cultivars of strawberries are being grown in gutters to maximize use of tunnel space. Our newest addition to the small fruit high tunnel family is 2 cultivars of hardy kiwi (plus a male pollinator cultivar).

Potato Musings

Bill Lamont, Department of Horticulture

Electronic Sources of Potato Information

European Association for Potato Research www.agro.wau.nl/eapr

Global Potato News www.potatonews.com/index.html

International Potato Center www.cipotato.org

Maine Potato Board www.mainepotatoes.com

Michigan State University, Potato Breeding and Genetics <http://potato.msu.edu/groups/breeding>

National Potato Council www.npcspud.com

Oregon State University-Potato Research and Extension www.css.orst.edu/coarc

Plant Pathology Internet Guide Book www.ifgb.uni-hannover.de/extern/ppigb

Potato Association of America www.ume.maine.edu/PAA

Potato Engine www.potatoengine.com/thinkpotato.html

Potato Information Exchange www.css.orst.edu/potatoes/main.htm

Potato Research Online www.potatoresearch.com/

University of Idaho www.uidaho.edu/ag/plantdisease/plbstem.htm

University of Wisconsin www.hort.wisc.edu.usdavcru/

World Potato Congress www.potatocongress.org/

Nebraska Educational Guide <http://www.panhandle.unl.edu/potato/>

Nebraska Potato Eyes <http://www.panhandle.unl.edu/peyes.htm>

Upcoming Meetings

Bill Lamont, Department of Horticulture

Local

June 3, 2002. 6:00-8:00 PM Strawberry Twilight Meeting, Risser's Farm Market, Annville PA
Contact: Ginger Pryor, 717-270-4391

June 15, 2002. 2002 Penn State Master Gardener In-Service, Meadville Area Junior/Senior High School, Meadville, PA. Contact: Cindy Soltys Phone: 814-734-4957

July 15, 2002. 6:00-8:00 PM Lebanon County Produce Auction Twilight Meeting Contact: Ginger

Pryor, 717-270-4391

September 6, 2002. High Tunnel In-Service Training for County Extension Agents, High Tunnel Research and Education Facility, Rock Springs, Pa. Contact: Bill Lamont 814-865-7118 or E-mail: wlamont@psu.edu

Regional

August 19, 2002. Vegetable, Small Fruit and Tree Fruit Field Day, Horticulture Farm, Rock Springs, Pa. Contact: Mike Orzolek 814-863-2251 or e-mail mdo1@psu.edu

August 20-22, 2002. Ag Progress Days, Rock Springs, PA. Contact: Bob Oberheim 814-865-2081 or e-mail bah4@psu.edu

February 4-6, 2003. Mid-Atlantic Fruit and Vegetable Conference, Hershey, PA. Contact: Bill Troxell 717-694-3596 or e-mail: wt.pvga@tricity.net

National

August 11-17, 2002. International Horticultural Congress; Metropolitan Toronto Convention Centre, Toronto: Call (416) 504-4500 or visit www.ihc2002.org

August 11-17, 2002. Potato Association of America Annual Meeting; Metropolitan Toronto Convention Centre, Toronto: Contact Leslie Copp at (519) 824-4120 or lcopp@uoguelph.ca

August 11-17, 2002. American Society for Horticultural Science; Metropolitan Toronto Convention Centre, Toronto: www.ihc2002.org or contact ASHS at (703) 836-4606.