

# THE VEGETABLE AND SMALL FRUIT GAZETTE

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Tip for the Month: “Take time to enjoy the beauty of spring and the re-awakening of the earth” -Bill Lamont

Comments from the Editor  
Bill Lamont, Department of Horticulture

Spring is really a beautiful time of the year and yesterday April 28<sup>th</sup> at State College was just one of those spring days in Pennsylvania that makes you glad to be alive and thankful that you can enjoy the blue sky and sunshine. Everything was just buzzing on campus and throughout the countryside. I thought that the in-services “New Pest Management Materials for Growing Vegetables” and “Operation and Use of High Tunnels” that we had last month were well-received and Phyllis and I enjoyed being able to host everyone over at our house for the cookout. It was a lot of fun. Speaking of in-services, how does November 15<sup>th</sup> sound for our annual Agent/Specialist Roundtable with a another cookout at our house on Tuesday November 14<sup>th</sup> prior to the in-service? Just wanted to get your input on a date. As always, I thank my colleagues in the other departments for their contributions to this publication and encourage them to keep up the good work. I also want to thank Tim Elkner for his excellent article on “Setting-Up Your No-Till Planter for Pumpkins” and I know that we are back on track. The Vegetable and Small Fruit Gazette Team encourages your feedback so that we can better serve your needs and address your concerns.

## Setting-Up Your No-Till Planter for Pumpkins Tim Elkner – Lancaster County

Last summer I heard a presentation by Grant Troop of Little Britain Agri-Supply here in Lancaster County regarding the proper way to set-up your no-till planter for planting pumpkins. I've heard about several growers that had poor stands when seeding pumpkins into a cover crop residue and one possibility for this failure would be an improperly set-up planter. Grant gave me permission to summarize his comments for the benefit of other growers here in Pennsylvania.

First – be sure that the planter is level. Grant believes that planters which are not level are the major source of poor stands. Ideally there should be 14 inches from the bottom of the drawbar to the ground.

Second – be sure that your front colter is not cutting too deep. Grant stated that this is the second major cause of poor stands. Never set the colter deeper than you want the seed set or else you may see uneven emergence and skips. A wave colter will provide a small amount of zone tillage. A 13-wave colter seems to be best. An 8-wave colter would provide a wider zone but it is harder to get into the ground. In order to get the seed into the bottom of the furrow, Steve Groff, a Lancaster grower, has added small “fingers” behind the seeder to help push the pumpkin seeds into the furrow before the closing wheels.

Third – be sure that your cover crop is in the proper condition for planting. The residue needs to either be dry and “strawy” or green and fresh. Cover crops that are merely wilted will not cut well and the colter often will just push them into the ground. This will result in poor seed to soil contact and poor stands or the cover may even pop back out of the soil bringing the seed with it. If your cover crop is dry be sure you plant later in the day so that the dew will have a chance to dry or else your cover crop may be pushed into the soil just like the wilted one.

Fourth – be sure that your closing wheels are adjusted properly. Steel wheels are better in tough closing conditions but be sure to use lower pressure on the springs with steel wheels.

Finally – don't overwear your disk openers or front colters. Follow the manufacturer's recommendations regarding replacement and be sure to adjust them as they wear during use.

Remember that the success of your pumpkin crop depends upon getting a uniform stand of plants. When seeding pumpkins into a cover crop residue be sure that your planter is level and be sure that the unit is actually penetrating the ground. Set-up the unit, plant a short distance and get off the tractor to be sure that everything is adjusted properly. If adjustments are made, plant a short distance and get off the tractor again to check. Only by checking the planter can you be sure that it is working properly. And even after you have the unit set properly you should still stop occasionally during planting and be sure that it is still planting the seed properly. A little extra time at planting can make all the difference come harvest season.

Online mapping of Sweetcorn pests, what's new in 2000

Chris Harding and Shelby Fleischer- Department of Entomology

During the past eight years, Pennsylvania has used pheromone lures to monitor for the 3 "worm" pests of sweetcorn: European corn borer, corn earworm, and the fall armyworm. Traditionally, this information has been available via telephone (1 800 PEN NIPM) or fax-back reporting. Proper monitoring allows growers to increase spray frequency when populations are high and decrease spray frequency when populations are low. Using trap counts to adjust spray frequency often results in fewer total sprays, offering a benefit in both dollar savings on pesticide and time saved by not spraying.

Using maps to illustrate regional pest pressure has many advantages over telephone or fax-back reporting. Maps enable intuitive comparisons of trap counts. This regional view benefits all participants by increasing awareness of nearby pest densities. For example, the fall armyworm and corn earworm immigrate into Pennsylvania from the south. Maps from the 1999 season illustrate that before these pests immigrate into Pennsylvania, their densities increase in Delaware and Maryland. This provides Pennsylvania growers with a two-week warning before serious immigration of these pests occur in Pennsylvania.

A website to display maps of the pheromone trap captures was launched last year with good results. One hundred farms in four states (DE, MD, NY and PA) participated. The website providing maps of the trap captures was accessed approximately 1,200 times during the season. The website provides access to both current and historical pheromone and blacklight trap captures and includes information on integrated pest management (IPM). Data is reported in a buffer point format with larger circles representing higher moth captures. Clicking on any of the capture points links to a time series for that pest at that location. Users can also access the time series for all pests at a given location.

The sweetcorn pest monitoring website can be accessed at:

<http://www.ento.psu.edu/vegetable/sweetcorn/>

If you access the site now, you will see maps for 1999. The last map created at the end of the season in 1999 will be the default. Try going to earlier dates to see more valuable information. For example, go to the CEW maps from August 14, 1999 to September 11, 1999 to see the major CEW immigration in 1999. Use the scroll bar on the left-hand side of the web page to choose maps. We anticipate new maps from the 2000 growing season to be coming on-line in early to mid-June.

The 2000 growing season will see an increased number of trapping locations, the addition of European corn borer phenology and improvements to the resources materials. New Jersey is joining the regional trap catch program, and new sites are being added in Pennsylvania, which will increase the total trap sites to approximately 215. Phenology modeling (predicting the time of occurrence of specific life stages based on accumulated degree days) for the European corn borer will help provide advanced warning on the timing of both first and second generation European cornborer flight. The phenology models will be included with the time series. Resource materials have been developed with the goal of improving access to IPM information. Many of the resources developed as part of this project were formerly only accessible through the county extension office.

For example the Pennsylvania commercial vegetable production recommendations, a ten-dollar purchase at the county extension office will also be available online at no cost. Following are some additional resources available from this site:

Vegetable insect pest sheets: Penn States pest sheets for vegetable insect pests found in Pennsylvania.

Vegetable gazette online: An online version of the popular horticultural Magazine. This link includes access to back issues.

IPM references: Some of the best and most recent IPM guides available.

CDMS: is a privately held corporation which provides pesticide labels and MSDS for most agricultural chemicals.

These educational resources along with the sweetcorn trapping network are accessible from the following site: <http://www.ento.psu.edu/vegetable/>

If you are interested in being involved in the trap capture program or have ideas as to how we can improve these resources please contact me. Chris Harding  
[cxh403@psu.edu](mailto:cxh403@psu.edu).

Vegetable Supplemental Herbicide Labels for 2000  
Mike Orzolek, Department of Horticulture

PDA has approved a 24 ( c ) “Special local Needs” registration for the use of Matrix herbicide on transplanted tomato in Pennsylvania. Matrix (rimsulfuron) from DuPont will give selective control of certain broad leaf weeds and grasses when applied at 1.0 ounce per acre rate. It is recommended that Matrix be tank mixed with Sencor (metribuzin) at the rate of 2.0 ounces per acre as a postemergence application 1-3 days after transplanting tomato. If a second flush of weeds would appear after the initial application of Matrix/Sencor, a second application of the Matrix and Sencor tank mix could be made 14 to 18 days later at the 1.0 ounce per acre rate. Matrix applied postemergence will control the following weeds: volunteer barley, barnyardgrass, annual bluegrass, foxtails, fall panicum, quackgrass (4” to 8” tall), volunteer wheat, common chickweed, henbit, kochia, mustards, pigweeds, Shepherd’s purse, and wild radish. Matrix applied postemergence will also give partial control of the following weeds: Canada thistle (small actively growing thistle), cocklebur, common lambsquarters, ivyleaf morningglory, hairy nightshade, common purslane, common ragweed, Pennsylvania smartweed, and velvetleaf. Precautions: Do not apply Matrix within 45 days to harvest; Do not exceed 3.0 ounces of Matrix per acre per year; Do not use in Matrix in a spray solution or spray additive that reduces water pH below 4.0; and Do not apply Matrix through any type of irrigation system. The Pennsylvania Vegetable Growers Association holds the registration for the use of Matrix on tomato in Pennsylvania. To obtain a label for the use of Matrix on tomato contact Bill Troxell, Pennsylvania Vegetable Growers’ Association at (717) 694-3596.

Planting Schedule and Update on High Tunnels  
 Bill Lamont and Mike Orzolek  
 Department of Horticulture

<b>1 Tomato</b>	<b>5 Small Fruit</b>	<b>9 Spinach</b>	<b>13 Peppers</b>	<b>17 Peppers</b>	<b>21 Peppers</b>
<b>2 Tomato</b>	<b>6 Small Fruit</b>	<b>10 Bedding Plants</b>	<b>14 Peppers</b>	<b>18 Peppers</b>	<b>22 Hairy Vetch</b>
<b>3 Tomato</b>	<b>7 Potato Transplant</b>	<b>11 Lettuce</b>	<b>15 Hairy Vetch</b>	<b>19 Peppers</b>	<b>23 Peppers</b>
<b>4 Tomato</b>	<b>8 Summer Squash</b>	<b>12 Potato Seedpiece</b>	<b>16 Peppers</b>	<b>20 Hairy Vetch</b>	<b>24 Peppers</b>

An update on the 24 High Tunnels that are part of the activities of the Center for Plasticulture

**Tomato Variety Trial - Tunnels # 1-4.**

A tomato variety trial will be conducted evaluating 8 varieties: 'Mountain Spring', 'Mountain Fresh', 'Royal Mountie', 'Sunbeam,' 'Daybreak', 'Ultra Sweet', 'Seedway 10250', 'NC Grape'. The tomato varieties will be evaluated for use in high tunnels with special emphasis on earliness, yield and size of fruit. After the tomato crop a green manure crop will be planted in three of the four tunnels and incorporated the following spring prior to again planting tomatoes.

**Small Fruit Raspberry and Thornless Blackberry Variety Trial -Tunnels # 5 and 6.**

An evaluation of two methods of production, the "Earth Boxes growing system" and ground culture, will be conducted for brambles (raspberries and thornless blackberries). Tunnel 5 will have the Earth Boxes and Tunnel 6 will have the bare ground culture. The raspberry cultivars are Heritage and Autumn Britten, which are primocane-bearers, and Triple Crown is a thornless blackberry cultivar. (This summer these two tunnels will be converted to the Penn State High Tunnel Design).

**Potato Transplant Trial - Tunnel # 7.**

A round white potato cultivar has been transplanted in 4-sets of double rows with an in-row spacing of 12 inches. Drip irrigation and fertigation will be used. Once the potatoes have been harvested, ornamental gourds will be planted on four raised beds covered with plastic mulch and using drip irrigation tape. (During the summer this tunnel will be converted to the Penn State High Tunnels Design). Then a late fall planting of leafy greens, one row each of kale, kohlrabi, loose-leaf lettuce and endive will be made.

#### **Summer Squash and Okra – Tunnel # 8.**

Two rows in this high tunnel will be planted with zucchini squash spaced two-foot apart while the other two rows will be planted with double rows of transplanted okra, cultivar, Annie Oakley. The in-row spacing will be 15 inches. Drip irrigation and fertigation will be used. (During the summer this tunnel will be converted to the Penn State High Tunnels Design). A green manure crop will be established for the winter.

#### **Spinach - Tunnel # 9.**

This tunnel was directed seeded to three double rows of spinach spaced 8 inches apart in the row and 12 inches between the double rows. The spinach will be harvested the first and second week in May. Once the spinach is harvested, slicing cucumbers will be transplanted on 4 rows of newly applied IRT plastic mulch and drip irrigation tape. The cucumbers will be transplanted on a 12 inch by 12-inch spacing and will be planted in staggered double rows.

#### **Bedding Plants - Tunnel # 10.**

The following varieties are planted in four rows on and IRT Plastic mulch with drip irrigation and floating row cover over some of the plants. Temperatures have been monitored since last fall. 'Acnillea Anthea', 'Campanula -"Kent Belle"', 'Leucanthemum- "Summer Snowball"', 'Stokesia-"Purple Parasols"', 'Alehemilla Mollies', 'Campan- "Chettle Charm"', 'Chelone', 'Crococsmia -"Lucifer"', 'Sedum- "Art Joy"', 'Solidaster- "Lemore"', Salvia nem.- "Plumosa"'. This tunnel will be maintained for cut flower/bedding plant research.

#### **Transplanted Romaine Lettuce - Tunnel # 11.**

Romaine lettuce was transplanted on February 14, 2000 in double rows in the following replicated treatments: paper mulch from International Paper, bare ground and "Earth Boxes" covered with black mulch film. The spacing between the double rows was 12 inches with plants spaced 8 inches apart in the row. The lettuce will be harvested the 1<sup>st</sup> week in May and "Zavory Peppers" developed by Dr. Paul Grun will be transplanted on 4 rows of newly applied IRT plastic mulch and drip irrigation tape. The peppers will be transplanted on a 12 inch by 12-inch spacing and will be planted in staggered double rows.

#### **Potato Seedpiece - Tunnel # 12.**

Seedpieces of two varieties- 'Early Dark Red Norland' an early, red-skinned, white flesh variety and 'W8475R a small B size red-skinned, white flesh potato were planted on

March 17, 2000 in four rows with 2 replications. The in-row spacing was 8 inches with the double rows being staggered. The four rows were covered mechanically with red plastic mulch and drip irrigation tape. One half of the potatoes were covered with a Typar, a floating row cover. The row cover material did enhance the emergence and growth of the potatoes as has been observed in the field. The potatoes are 12 inches tall at this point. The plastic mulch and drip irrigation tape will be removed prior to digging the potatoes. Once the potatoes are harvested, cauliflower will be transplanted on four raised beds with drip irrigation. The spacing for the cauliflower will be double rows 12 inches by 16 inches. The potential for establishment of an early winter cover crop following the cauliflower will be evaluated.

#### **Pepper Project - Tunnels # 13, 14, 16, 17, 18, 19, 21, 23 and 24.**

This is a M.S. Research Project being conducted by Eric Burkhart under Dr. Lamont's supervision. The title is "Integrated Production of Bell Pepper (*Capsicum annuum* L. cultivar 'Paladin') using Compost, Drip Irrigation, and Season Extension Technology". The objectives of the project are 1. To assess and document the effects of composted manure applications on growth and yield of bell peppers, both alone and in combination with synthetic fertilizers, 2. To assess and document any differences in bell pepper growth and yield resulting from the use of two dissimilar mulch types, and 3. To determine the effectiveness of utilizing high tunnels for early production of bell peppers.

#### **Hairy Vetch - Tunnels # 15, 20 and 22.**

Hairy vetch will be planted and allowed to mature and dry down into a brown mat. Broccoli will be transplanted in four double rows into the mat. The spacing of the broccoli will be 12 inches between the double rows and 12 inches in the row. Drip irrigation and fertigation will be used to supply moisture and additional fertilizer.

The Center for Plasticulture Headquarters named the Tom Wentzler building is in the final stages of development and should be completed in early summer. It will house supplies and monitoring equipment used in the high tunnel projects. In addition, a weather station has been ordered and should be on board shortly. Progress continues on the outlying network of high tunnels.

#### **Organic Matter Application – Can You Apply Too Much** M. D. Orzolek- Department of Horticulture

Organic matter has long been known to improve soil fertility and tilth, which in turn, have increased crop yields. "Organic matter composts", however, is a poorly defined term used for a wide variety of materials - all of which impact soils differently. Therefore, prior to recommending the use of a specific organic compost for a specific purpose it must be tested to determine the nutritive value of the material and the total maximum amount of material to apply per acre. Organic compost/manures can consist of a variety of materials including: poultry – beef – hog manures, straw, leaves, sawdust, table scraps, treated sewage sludge, peatmoss, etc. Addition of organic composts to soil should

take into account; soil type, affect on soil pH, nutrient content of compost, crops to be planted in rotation after addition of compost to soil, and rainfall or total water application through irrigation.

The recommended soil pH range for optimum plant growth, best nutrient availability and best bacterial activity is 6.5 to 7.2. The soil pH affects nutrient availability and at a pH of 5.0 to 5.5, both iron and boron become more available to plants causing potential toxicity symptoms while phosphorus and potassium are less available to plants and may result in nutrient imbalances in the plant.

While liberal applications of organic composts (5 to 10+T/A) has been a rule of thumb for many growers in the last decade, it has lead to some very difficult problems in the fields where the organic compost was applied. The most serious problem has been a large release and availability of nitrogen resulting in almost all cases very extensive vegetative growth at the expense of reproductive growth (reduced fruit production and quality). There has been an extreme build-up of phosphorus in the soil especially with the use of animal manures at rates greater than 5 T/A; resulting in soil P levels in excess of 1000 lbs/A – potential for opening phosphorus mines in PA. Also the high P levels in soil probably contribute to the high P levels in the Susquehanna River and ultimately, the Chesapeake Bay. There also can develop an imbalance in the ratios of soil K-Mg-Ca availability which will have a profound affect on the quality for fruit produced in the field (poor color, soft tissue, blossom end rot, poor shape).

Therefore, important to a good fertility program is calculating the total nitrogen availability in the soil from all potential nitrogen sources. Nitrogen sources include; graded fertilizers (10-10-10 would contain 10% nitrogen per 100 lbs material), legume cover crops (hairy vetch produces the equivalent of 100 lbs N/A, animal manures (need to know N-P-K analysis before field application) and organic composts (peanut hulls, straw, etc). Plants generally respond to nitrogen when there is low organic matter in the soil, soil consists of a large percentage of sand, and/or it is a cold, wet growing season (much like 1996). How much nitrogen should be applied for the crop to be grown? The crop nitrogen requirement equals the recommended rate of nitrogen application minus the contribution from the previous crop (residual N), minus the contribution from cover crops (especially legumes) planted in rotation, and minus the contribution from manure. Using this method to calculate a crop's nitrogen requirement can reduce/eliminate runoff and leaching of nitrogen and other elements from the soil.

An example of organic matter application is given below in reference to a pumpkin fertility program based on the nitrogen requirement for the crop. A grower plants pumpkins on ground that was in soybeans last year; was planted to hairy vetch after the soybeans were harvested; and 3 tons/A of chicken manure (6-4-3 analysis) was broadcast and incorporated in the spring prior to seeding pumpkins. How much nitrogen should the grower apply to the pumpkin crop? Since the recommended nitrogen application for pumpkins grown on heavy soils is 60 lbs per acre, the grower needs to subtract 25 lbs residual N produced by the soybeans, 60 lbs N produced by the vetch (killed vetch in late March) and 18 lbs N from the manure application.  $[60 - (25+60+18) = \text{surplus } 43 \text{ lbs/A nitrogen}]$ . The grower will not have to add any nitrogen to the pumpkin crop since he has a surplus of 43 lbs/A N over and above the required 60 lbs/A nitrogen recommended for pumpkin production.



In conclusion, a sound, well planned organic matter management program will provide; 1) optimum fertility for maximum crop yields and quality, 2) minimize runoff and leaching of water soluble elements, and 3) reduce total fertilizer costs over time.

Commercial Berry Production Guide Available  
Kathy Demchak, Department of Horticulture

The 2000-01 version of the Commercial Berry Production and Pest Management Guide is now available. Changes from the 1996-98 Small Fruit Production Guide include (besides a new title) updated cultivar information and pest control information, a description of strawberry plasticulture, expanded information on sources of growers supplies, an appendix on toxicity of insecticides to honey bees, a description of diagnostic services available through Penn State, and expanded information on other publications and Web sites. It contains much of the same information on biology and culture. One omission is the color plates of diseases in the back, so if you found those particularly useful, pull them from your old copy before you discard it. Cost is \$10.00. Copies can be obtained from Penn State Cooperative Extension offices. Credit card orders can also be called in to Publications Distribution at 877-345-0691.

That's a Berry Good Question!  
Kathy Demchak, Department of Horticulture

Q. What is the best stage to pick a strawberry? Is a white tip OK? Do berries ripen after being picked? Are there differences in ripening traits among cultivars? My pickers often ask these questions. (Anonymous).

A. The best stage depends on your market. Maximum fruit flavor and aroma develops when the fruit has developed full color on the plant. So, if your market is local, or pick-your-own, picking the fruit when just fully colored is best, and should balance flavor development and shelf-life. If the fruit stays on the plant much past this stage, susceptibility to decay once picked will increase. A white tip is OK if the fruit needs to be shipped. In my opinion, it's not OK if the fruit will be sold retail. PYO and roadside stand operations have is the opportunity to show customers how much better their berries are than those shipped in and sold in supermarkets. If we pick berries with white tips, or allow PYO customers to do so because that's how they're accustomed to seeing them, they may never find out just how good our berries can be - and opt to buy supermarket berries the next time because they didn't find much difference. Berries will develop additional red color after they are picked (if they don't decompose first!). But, they will develop very little, if any, additional flavor. As far as differences between cultivars go, there are differences, but none of the work has been done with cultivars commonly grown in PA, so I can't really say. Thanks for asking some great, timely questions!

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.

## Potato Musings

### Potato Educational Sessions at Hershey in 2001

At the Mid-Atlantic Fruit and Vegetable Growers Convention January 30-Feb. 1, 2001 there will be three educational sessions starting at 1 PM on Tuesday Jan. 30 and concluding on Jan. 31<sup>st</sup> at around 5 PM. I am in the process of developing the program and if anyone has any burning issues that they would like to hear discussed at this meeting please let me know. Also mark the dates down on your long-range planning calendar and plan on attending and supporting the potato sessions.

### Potato Cull Piles

Bill Lamont, Department of Horticulture

Cull piles of potatoes are a source of late blight inoculum. It is important not to increase ones' chances of having late blight by leaving potato in a cull pile grow. Cull potato tubers can be buried and this method is effective if they are buried deep enough so that the sprouts cannot reach the soil surface. Generally this requires at least two feet of soil on top of the tubers. Another technique is to completely cover the cull piles with black plastic or an opaque tarp. It is important that no light reaches the tubers, as this will allow the volunteers to survive and encourage sprouts to push through or around the covering. Keep those piles under control.

### 2000 Potato Trials

Bill Lamont, Department of Horticulture

### Snack Food Association Trial

Cambria County

We will be evaluating 11 varieties for chipping at this site in association with Synder's of Berlin Chip Company. The varieties are MSNT-1, MSA091-1, MS246-5 from Dr. David Douches program at Michigan State University; NY112 and NY120 from Dr. Bob Plaisted's program at Cornell University; AF1668-60, AF1775-2 from Dr. Al Reeves program at the University of Maine, and W1431 from Dr. Horia Groza's program at the University of Wisconsin; and BO766-3 from Dr. Kathleen Haynes program at USDA in addition to our standard check varieties Atlantic and Snowden.

### NE-184 Trial

Horticulture Research Farm, Rock Springs

We will be conducting a trial of potato varieties and lines in cooperation with the Northeast Technical Committee for the "Development of New Potato Clones for Environmental and Economical Sustainability in the Northeast".

Specialty Potato Trial  
Horticulture Research Farm, Rock Springs

We will be conducting a trial of promising specialty potatoes for the tablestock or fresh and processing marketplace looking at expanding the market for Pennsylvania potatoes.

Vine-Killing Trial  
Horticulture Research Farm, Rock Springs

We will be conducting a trial of several new vine-killing materials.

On-Farm Drip Irrigation Test on Potatoes  
Schuylkill County

We will be comparing 2 acres of drip irrigated potatoes to 2 acres of overhead irrigated potatoes using some new planting technology.

Upcoming Meetings  
Bill Lamont, Department of Horticulture

Local  
August 14, 2000. Vegetable and Small Fruit Field Day, Horticulture Research Farm, Rock Springs, PA. Contact: Mike Orzolek: 814-863-2251

August 15-17, 2000. Ag Progress Days, Ag Progress Day Site, Russell E. Larson, Research Center, Rock Springs, PA. Contact: Bob Oberheim 814-692-5262.

Regional

January 30-Feb. 1, 2001: Mid-Atlantic Fruit and Vegetable Growers Convention, Hershey, PA. Contact: Bill Troxell (717) 694-3596.

National

September 23-26, 2000: 15th International Agricultural Plastics Congress and the 29th National Agricultural Plastics Congress, Hershey, PA. Contact: Pat Heuser, Executive Secretary, American Society for Plasticulture (814) 238-7045.

