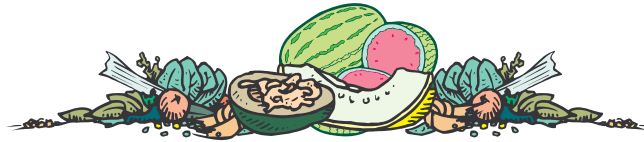


VEGETABLE CROPS HOTLINE

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

Chris Gunter, Editor
(812) 886-0198
gunter@hort.purdue.edu



No. 423
June 27, 2003

<http://www.entm.purdue.edu/entomology/ext/targets/newslett.htm>

IN THIS ISSUE

- WEEDS AT PLASTIC EDGE AND BETWEEN PLASTIC BEDS
- INSECTS COLLECTED BY BLACK LIGHT TRAPS IN THE EARLY SEASON
- MAGNESIUM AND MANGANESE AVAILABILITY
- POWDERY MILDEW ON MUSKMELON
- SECOND POPULATION OF CABBAGE LOOPER IN SOUTHERN INDIANA
- MANAGING SQUASH VINE BORER IN PUMPKINS AND SQUASH

WEEDS AT PLASTIC EDGE AND BETWEEN PLASTIC BEDS – (*Liz Maynard*) - Plastic-mulched beds offer many advantages for warm season crops. One of the disadvantages is managing weeds at the edge of the plastic. Cultivation and hand hoeing, which are sometimes relied upon for weed control between the beds, are difficult to do without damaging the buried plastic. This article lists some post-emergence herbicides that may be used and provides a reference for specialized cultivation equipment.

Table 1 lists herbicides that may be used between beds. The non-selective materials will injure the crop if

they contact it. The grass herbicides may be applied over the top of the crop or just between the rows. There is a smaller margin of safety for the postemergence broadleaf herbicides than for the grass herbicides. Because herbicide landing on the plastic mulch can be washed into the planting hole and thereby concentrated around the vegetable, it is less risky to apply the broadleaf materials only between the rows of plastic. In some cases (i.e., for Sandea) between the row application is the only method that is recommended on the label. The last section lists herbicides that will not kill emerged weeds and don't require incorporation. They may be useful to reduce future weed pressure. These materials containing sonalan should be applied only between rows of plastic, not over the top of plastic.

Many of the herbicides in Table 1 have preharvest intervals that must be followed even when they are applied between the rows of the crop. Pre-harvest intervals can be found in the *Midwest Vegetable Production Guide for Commercial Growers 2003* (ID-56) <www.entm.purdue.edu/entomology/ext/targets/ID/index.htm> and will also be on the product label. Read and follow all label instructions for the product you use.

Materials containing glyphosate are not included in Table 1, because I am not aware of a label that lists row middle applications for vegetables. The Touchdown label does list spot spray applications for many vegetables, but this is not the same as shielded/hooded applications between rows. As a non-selective and systemic herbicide, glyphosate will cause injury if it contacts the crop, and the herbicide will move in the plant from the point of uptake to new growth in the shoot and roots.

Cultivation is often used alone or in addition to herbicides between rows of mulch. Implements for cultivating the edge of the plastic have been developed. Two examples are illustrated in the video "Vegetable Farmers and their Weed-Control Machines" produced by Extension staff in Vermont and Massachusetts. The video may be ordered for \$15 from Center for Sustainable Agriculture, University of Vermont, 63 Carrigan Drive, Burlington, VT 05405-0004, Phone (802) 656-5459. The video may also be viewed on-line with a fast internet connection at <www.uvm.edu/vtvegandberry/Videos/videos.html>. A single copy of the video is available for loan from my office. Call (219) 785-5673 to request.



TABLE 1. HERBICIDES FOR WEED CONTROL BETWEEN ROWS OF VEGETABLE CROPS GROWN ON PLASTIC MULCH THAT MAY BE APPLIED AFTER THE CROP IS IN THE GROUND AND DON'T REQUIRE PHYSICAL INCORPORATION.

Common Name	Product Name	Labeled Crops	Comments
Non-selective contact herbicides with no soil activity, kill only emerged weeds			
pelargonic acid	Scythe	many	Use directed or shielded spray, 75 to 200 gal. per acre spray solution.
paraquat	Gramoxone	eggplant, pepper, tomato	Use precision directed spray. Restricted use pesticide.
paraquat	Boa	eggplant, pepper, tomato, melons, squash, pumpkin, cabbage	Use precision directed spray. Restricted use pesticide.
Grass herbicides with no soil activity, kill only emerged weeds			
sethoxydim	Poast	many	
clethodim	Select	many	
Broadleaf herbicides that will kill small emerged weeds and have residual soil activity			
halosulfuron	Sandea	cucumbers, muskmelons, watermelons, pumpkins, squash, tomatoes, peppers, eggplant	
metribuzin	Sencor	tomato, potato	
rimsulfuron	Matrix	tomato, potato	Also provides some grass control.
Herbicides that will not kill emerged weeds but do have residual soil activity and do not need incorporation			
sonalan	Curbit	cucumber, melons, squash, pumpkins	Do not apply over the top of plastic. Grasses and some broadleaf weeds.
sonalan and clomazone	Strategy	cucumber, melons, squash, pumpkins	Do not apply over the top of plastic. Grasses and broadleaf weeds.
naphtalium	Alanap	cucumber, melons	Some broadleaf weeds.

INSECTS COLLECTED BY BLACK LIGHT TRAPS IN THE EARLY SEASON - (Frankie Lam) - In April, Ken Scheeringa and I published an article in the *Vegetable Crops Hotline* (Issue No. 418) discussing winter temperatures and predicting the winter survival of insects in Indiana. In the article we compared the past winter temperatures (2002-2003) with the climate normals (1971-2000) for the nine Indiana agricultural statistics districts. We had concluded that due to the past cold winter, the over-wintering insect populations in the nine districts during the early season would be relatively smaller than that of a normal year and would not be as high as that of last spring.

In the past few weeks of this season, there were less insect problems in melon and cucumber fields compared to the previous season (*Vegetable Crops Hotline*, Issue No. 422). It seems that the insect pressure was also relatively low in cornfields during the early season. Table 1 presents the total numbers of the insects collected by the black light traps located at Purdue Agricultural Centers from the fourth week of April to mid-June (8 weeks) of 2002 and 2003. These data were organized by Ron Blackwell and originally published in the *Pest&Crop* newsletter (Issue No. 14) of the Entomology Department. The insects commonly collected by the light traps are corn pests, including the adults of armyworm (AW), black cutworm (BCW), corn earworm or fruitworm (CEW), European corn borer (ECB), fall armyworm (FAW), southwestern corn borer (SWCB), and variegated cutworm (VC). By comparing the insects collected we may conclude that the numbers of insects collected at 2002 was higher than those of 2003. I do hope that sweet corn growers have enjoyed this past early season.

County/Cooperator	From 4/22/02 to 6/17/02 (8 weeks)							From 4/23/03 to 6/16/03 (8 weeks)						
	VC	BCW	ECB	SWCB	CEW	FAW	AW	VC	BCW	ECB	WECB	CEW	FAW	AW
Dubois/SIPAC ^a	11	3	27	1	1	0	24	2	0	43	1	0	0	5
Jennings/SEPAC	10	0	150	0	1	0	30	5	1	85	0	0	0	11
Knox/SWPAC ^b	6	10	45	7	0	1	10	5	5	27	2	2	4	11
LaPorte/Pinney Ag Center	2	2	263	0	0	0	45	3	0	133	0	0	0	27
Lawrence/Feldun Ag Center	4	1	12	0	1	0	68	2	2	14	0	0	0	20
Randolph/Davis Ag Center	3	2	380	0	0	0	103	2	0	66	0	0	0	4
Tippecanoe/TPAC ^c								2	0	7	0	0	0	14
Whitley/NEPAC	2	20	540	0	0	0	508	1	0	167	0	0	0	195

^a For 2002 from 4/29 to 6/17 (7 weeks).
^b For 2002 from 5/14 to 6/17 (5 weeks).
^c No data for 2002.

AW=Armyworm; BCW=black cutworm; CEW=corn earworm; ECB=European corn borer; FAW=Fall armyworm; SWCB=southwestern corn borer; VC=Variegated cutworm

In addition to the cold winter temperatures, we also had a relatively cool spring this year. The cool spring temperatures may slow down the development of the insects, as well as the crops. This might be another reason for having relatively low insect population in this spring. However, based on the temperatures of the past winter and the insect numbers in spring, it seems that the accumulated subfreezing temperature of winter can be used as an index to predict the trend of insect populations in the early season.



MAGNESIUM AND MANGANESE AVAILABILITY - (Chris Gunter) – I have seen this years first samples of cantaloupe and watermelon vines showing symptoms of magnesium deficiency and manganese toxicity. Both disorders are related to acid soils and usually occur in clusters in a field.

Magnesium deficiency appears on sandy ridges and can be recognized by intervinal yellowing and death of tissues on older leaves (Figure 1). Manganese



Figure 1: Magnesium deficiency on cantaloupe, note necrotic intervinal tissue (Picture by Gerald E. Wilcox)

toxicity also first occurs on older leaves but appears in heavier or darker sands, often in swales. The diagnostic feature of manganese toxicity are the tiny pin hole type lesions with yellow halos clustered between the veins (Figure 2). Leaves are best viewed when held up to the sun.

These disorders can easily be confused with an infectious disease. Symptoms may seem to “spread” from areas of the lowest pH to areas of somewhat higher



Figure 2: Manganese toxicity on cantaloupe, note necrotic lesions (Picture by Gerald E. Wilcox)

pH. Individual rows seem to be worse than adjacent rows. Such rows may have received less lime. The remedy for these disorders is to raise the pH of the soils involved. This can be difficult to accomplish with crops growing under plastic mulch, because of the difficulty of getting the lime into the root zone.

Although growers may have soil tested and spread lime before the season, there may still be pH problems in some areas of the field. Learn the symptoms of these disorders so you won't be wasting fungicides on a nonexistent disease.

For more information on this topic please see "Muskmelon Problems on Acid Sandy Soils, Manganese Toxicity and Magnesium Deficiency Diagnosis and Correction" (HO-191), by Osmon Elamin and Gerald E. Wilcox. This publication is available on the Purdue Fruit and Vegetable Connection website <www.hort.purdue.edu/fruitveg> or by calling Purdue Extension Knowledge to Go 1-888-EXT-INFO.



POWDERY MILDEW ON MUSKMELON - (Rick Latin and Dan Egel) - Growers who have planted muskmelon varieties that are susceptible to powdery mildew should be thinking about applying a systemic fungicide.

In contrast with most other foliar diseases of muskmelon, powdery mildew does not require leaf wetness; high humidity is sufficient for the disease to grow. As the leaf canopy of muskmelon vines increase, humidity will increase inside the canopy and powdery mildew may occur.

We recommend that growers with early melons apply systemic fungicides 10 to 14 days before harvest. Another spray is advisable in 14 to 21 days for fields with the potential for a 4 to 6 week harvest period. Powdery mildew is not a serious disease of watermelon.

Systemic fungicides labeled for use against powdery mildew on muskmelon include Flint, Nova 40 W, Procure 50 WS and Topsin 40. Cabrio and Quadris are also labeled for powdery mildew and will have activity against anthracnose, Alternaria leaf blight and gummy stem blight.

The fungi that cause powdery mildew may become resistant to the systemic fungicides listed here unless precautions are taken. It is important to always alternate between fungicides with different modes of action. Cabrio, Flint and Quadris have the same mode of action and must never be applied in back to back sequence. Similarly, Nova and Procure have the same mode of action. Topsin has yet a different mode of action. Be certain to read and follow the label of any pesticide carefully. More information is available in the *Midwest Vegetable Production Guide for Commercial Growers 2001* (ID-56) <www.entm.purdue.edu/entomology/ext/targets/ID/index.htm>.



SECOND POPULATION OF CABBAGE LOOPER IN SOUTHERN INDIANA - (Frankie Lam) - Last week twelve cabbage looper moths were collected by the black-light trap at Southwest Purdue Agricultural Center. During the last week of April we collected the moths from the first population in the light trap at the Center. The larvae of cabbage looper feed on a wide variety of cultivated plants and weeds. The economic thresholds for some vegetables are listed in an previous issue of the *Hotline* (Issue No. 419). Please check the list in the *Midwest Vegetable Production Guide for Commercial Growers 2003* (ID-56) <www.entm.purdue.edu/entomology/ext/targets/ID/index.htm> for further information of insecticide application. Read and follow the label carefully before applying any insecticide.



MANAGING SQUASH VINE BORER IN PUMPKINS AND SQUASH - (Frankie Lam) - Squash vine borer eggs were found on my pumpkins last week; however, less than 2% of the pumpkins that I scouted had at least one egg on the plant. Last year I had about 25% squash vine borer infestation in my pumpkins. We have a lower population of squash vine borer this year, relative to last year.

The squash vine borer is an occasional pest of pumpkins and squash in Indiana. The squash vine borer adult is a "clear wing" moth with a wingspan of about 1 1/2 inches. Their front wings are metallic green, whereas the hind wings are almost without scales.

The body of the moth is generally orange-red with black bands on the abdomen. The moth is a daytime flier, and is commonly mistaken as a wasp.



Squash vine borer larva (Picture by Purdue University)

Symptoms of plants attacked by the borers appear in mid-summer when a runner or an entire plant wilts suddenly and the infested vine usually dies beyond the point where the borer tunneled into the stem. The presence of the borer is usually not noticed by growers until after the damage is done. Damage is usually worse in areas where squash and pumpkins are grown year after year.

The eggs of the borer, which are small (1/20 inch) and brown, were laid usually singly at the base of the plants, on the petioles of leaves, or on the stems. The eggs will hatch within a few days. The squash vine borer larvae bore into the plant immediately after hatching. As the larvae bore

into the stem, they leave behind a tell-tale sign of sawdust-like frass at the entrance hole. The larvae, which are white grub-like caterpillars, feed inside the stem for 2 to 4 weeks.



Squash vine borer adult
(Picture by C. Welty)

The larvae destroy the vessels in the stem, causing the vine to wilt and eventually die. Once inside the vine, little can be done to control the pest. After full-grown, the larvae leave the vine and spin silken cocoons in soil. In the northern areas of the Midwest, the larvae overwinter in the cocoons, whereas in the southern areas, they pupate and give rise to the second-generation. Currently no economic threshold has been developed for the squash vine borer. From mid-June through early August, if adult moths are found in fields, vines should be checked for any signs of eggs and larval feedings. Scout at least 5 plants in 10 locations for borer eggs and frass in each 20-acre field. One of the methods recommended for the management of the borer is to scout for moist, sawdust-like frass piled outside small holes at the base of the plant and split the stem lengthwise above the point

of attack to remove the larvae from the stem, then cover the stem with soil to encourage new roots to form above the damaged areas. This method may save the plant, depending on the severity of the damage; however, if the infested plant is too weakened to recover it will eventually die. Conducting this tactic for the management of the pest in large areas is time consuming and labor intensive. Another method, once frass and larvae are found in the plant, is two insecticide applications spaced 5 to 7 days apart. This is recommended to control the majority of the newly hatched larvae before they enter the vines. Ambush, Asana, Pounce, and Thiodan are labeled for the control of squash vine borer. Be certain to read and follow the label carefully before using any pesticides.



Squash vine borer (Picture by F. Lam)

It is the policy of the Purdue University Cooperative Extension Service, David C. Petritz, Director, that all persons shall have equal opportunity and access to the programs and facilities without regard to race, color, sex, religion, national origin, age, marital status, parental status, sexual orientation, or disability. Purdue University is an Affirmative Action employer. 1-888-EXT-INFO <<http://www.ces.purdue.edu/extmedia>> Disclaimer: Reference to products in this publication is not intended to be an endorsement to the exclusion of others which may have similar uses. Any person using products listed in this publication assumes full responsibility for their use in accordance with current directions of the manufacturer.