

THE VEGETABLE AND SMALL FRUIT GAZETTE

February, 2000

Volume 4, No. 2

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Tip for the Month: "The future of civilization depends on water"--Cousteau

Comments from the Editor

Bill Lamont, Department of Horticulture

Last month and this month are the time for winter meetings. The Mid-Atlantic Fruit and Vegetable Convention is now history and although "Mother Nature" decided to spread a blanket of white around the eastern United States on Tuesday, the attendance was good.

The Program Chair will rotate to Dr. Peter Ferretti who will develop the Vegetable Program for 2001. Kathy Demchak will be developing the Small Fruit sessions. I will be developing the program for the three potato sessions for 2001 and will be requesting ideas for topics/speakers at the upcoming county meetings.

We have an excellent slate of winter meetings coming up so be sure to check out the upcoming meetings section at the end of the gazette.

All I can say for this month is: keep the snowplow handy, put another log in the woodstove and continue to work on your equipment and prepare for the upcoming season.

As always, the Vegetable and Small Fruit Gazette Team encourages your feedback so that we can better serve your needs and address your concerns. The month of February also presents growers with time to attend some of the excellent upcoming educational opportunities at the county, state and national levels. I would refer you to the extensive listing of upcoming meetings at the end of the gazette.

References To Pesticide Label Information

Tom Murphy, Lycoming County

The following is a list of web sites for information on pesticide labels.

Dupont
DowAgro

www.dupont.com
www.dowagro.com

FMC	www.fmc.com
Mycogen	www.mycogen.com
Rohm and Haas	www.rohmass.com
Zeneca	www.zenecaag.com
Valent	www.valent.com
Uniroyal Chemical Co	www.uniroyalchem.com
Bayer Turf & Ornamental Products	usagri.bayer.com
Bayer Corporation	www.nobugs.com
Rhone-Poulenc Ag Co Sedagri	www.rp-ag.com
Ecogen Inc.	www.ecogeninc.com
DowElanco	www.dowagro.com
Abbott Laboratories	www.abbott.com
AgroEro USA Company	www.agrero.com
Sandoz	www.cp.novartis.com
Novartis	www.cp.novartis.com
BASF	www.basf.com
Monsanto	www.monsanto.com

Other web site addresses can be obtained from the Farm Chemicals Handbook 1999.
That web site address is: www.meisterpro.com

Managing Stripe Cucumber Beetle in Vine Crops with Admire and Provado

Lew Otjen, Department of Horticulture and Shelby Fleischer, Department of Entomology

Fresh-market cantaloupe and cucumber production is important for diversified vegetable farms in the northeastern United States. Cantaloupe production in Pennsylvania alone occurs on 5,200 acres, with an on-farm value of \$18 million. Thirty to 50% of diversified vegetable farms surveyed in Pennsylvania, New Jersey, and New York are involved in cantaloupe or cucumber production.

Several beetles are found in vine crops. Two species of "cucumber beetles" [striped cucumber beetle, and spotted cucumber beetle] retain a close affinity for cucurbits. Two additional species [northern corn rootworm, and western corn rootworm] invade late in the season. Within this complex, the striped cucumber beetle is present in the highest density and over the longest time span. Adult feeding during early plant growth can cause stand reduction and rind-feeding by adults or larvae later in the season renders crops unmarketable and may serve as routes of entry for pathogens. Larval feeding also impacts root development and has been correlated with fusarium wilt. More importantly, the striped cucumber beetle vectors bacterial and viral pathogens. The major pathogen is *Erwinia tracheiphila*, the causal agent of bacterial wilt. Disease management currently relies on vector management. Even a low beetle density during colonization of young plants can result in significant plant disease, and the severity of disease over time correlates to beetle density during early plant growth. Disease development is strongly influenced by inoculum dose. Cultural methods can manage the problem in machine-harvested, short-season processing pickles that have high plant populations, but the vector/disease complex presents very difficult risks for long-season, fresh-market vine crops that are grown at much lower plant populations.

Almost a decade ago, growers relied on the systemic Furadan at planting, and supplemented with foliar sprays. Furadan, however, presents concerns about groundwater contamination, reduced effectiveness in soils with a history of use, bird kills in the granular formulation, and is among the most toxic insecticide based on acute toxicity. Imidacloprid, a relatively new systemic neonicotinoid insecticide, is now labeled for striped cucumber beetle in vine crops in two formulations: Admire and Provado. The active ingredient (imidacloprid) is the same for both pesticides, but the formulations differ. Admire is intended for soil applications and Provado for foliar applications. Admire and Provado also differ in the percent active ingredient. In a gallon of formulated product, Admire 2F contains 2 pounds active ingredient whereas Provado 1.6F contains 1.6 pounds active ingredient. Imidacloprid translocates to new leaf tissue when taken up by the roots. Imidacloprid may allow a return to a management program based on application of a systemic insecticide at planting supplemented with few foliar sprays, but with a systemic with much lower acute toxicity.

Pesticide rates are usually provided on a per acre basis. These rates are often difficult for farm-market vegetable growers with fields less than 1 acre. Vegetable growers must also correct these rates when using plasticulture and applying materials through drip irrigation since the effective treated area is reduced to that of a “mulched acre”. Compounding these problems are very low application rates that often require measuring volumes of less than one fluid ounce. The purpose of this report is to provide advice about timing and calculating and measuring small amounts of Admire and Provado for cucurbit crops occupying less than 1 acre.

Timing

The striped cucumber beetle overwinters as an adult both inside and outside of cucurbit fields. Adults invade fields soon after transplanting, and lay eggs at the base of plants. The hatching larvae feed on the roots of vine crops, pupate, and then emerge as new adults in about 25-30 days. There are at least 2, and probably more, generations per year in Pennsylvania.

That early immigration can be the most serious. Populations invade in large numbers and up to 10% of these adults have tested positive for carrying the pathogen that causes bacterial wilt using ELISA tests. Where this immigration very soon (within 3 days to a week) after transplanting has traditionally occurred, we recommend an application of Admire to the transplants. We recommend this because the plants at this stage can be decimated by the high cucumber beetle populations during this growth stage, and the roots of these young plants may not be established enough to take up material applied through the irrigation system. We have obtained about 10 days to 2 weeks of control using very low rates applied to the transplants. After transplanting, the roots are training to the drip lines, and a single application through the drip irrigation at that time (about 10 days to 2 weeks after transplanting) should control the immigrating adults. We anticipate that no, or only a very few (about 1 or 2) foliar applications of insecticide would be needed if that early immigrating population is prevented from establishing. We recommend using an insecticide with a different mode-of-action for those foliar sprays - Do NOT spray Provado where you have used Admire previously. This is to avoid insecticide resistance.

If this approach is successful for several years, we may no longer see this dramatic invasion of fields soon after transplanting. Should that occur, we would recommend scouting fields and adding Admire through the drip irrigation when immigration starts.

Admire 2 Flowable:

To control cucumber beetles invasion at transplanting, we recommend using Admire at a very low rate (0.02 ml/plant) to treat transplants about 1 day prior to planting in the field. To treat a flat of 200 transplants with Admire at this rate, a grower would need to dilute 4 ml (0.135 oz) of Admire in a volume of water sufficient to soak to soil mix evenly. This treatment will protect the plants for a short period of time (about 2 weeks) and after that should be followed by field application. To help make other conversions: multiply 0.02 ml per plant times the number of plants in your flat. For example, use 20 ml to treat 1000 transplants. (This rate is just a little higher than suggested for tomato transplants, which is - 15 ml - or 0.5 ounce - per 1000 transplants). You can convert ml to oz by dividing by 29.6 (there is 29.6 ml in a fluid oz). Be careful of phytotoxicity (burning the plants) at higher rates. We observed burning of leaf margins at 0.04 ml/melon plant at the 2-leaf stage, although these plants did grow out of this in about 2 weeks.

The best way to apply Admire to the field is through an injector connected to a drip irrigation system. As with all chemical injections, the irrigation system should be primed with water prior to beginning the injection, and the material should be injected slowly to provide even distribution. Remember: the more evenly distributed the material is, the better job of protection, and the chance of phytotoxicity will be reduced (i.e. the more emitters on your drip tubing the better). It is also important that the zone of moisture created by the drip tubing be within the root zone of the crop because it is the roots that will move the material into the plant. Below is a table which shows the number of ounces (oz) or milliliters (ml) of Admire that need to be applied per 100 row-feet of a cucurbit crop for a application rates of 16-24 oz/A. As you can see by Table 1 the amount required to treat a 100 ft row is very small and not easily achieved by commonly available measuring devices. We recommend that growers with small fields use milliliters as a measurement unit, and use syringes if available (without a needle-they will plug up) for extracting these amounts. A syringe will provide a very accurate and safe method of measuring these small quantities.

Table 1. Linear rates for Admire in cucurbits for 100 row feet (Remember: do not apply Admire within 21 days of harvest!).

Admire 2 Flowable Rate Desired

oz/A	Oz/100 row-ft (3 ft bed)*	ml of Admire to apply per 100 row-ft
16	0.110	3.26
17	0.117	3.46
18	0.124	3.67
19	0.131	3.87
20	0.138	4.07
21	0.145	4.28
22	0.152	4.48
23	0.158	4.68
24	0.165	4.89

* These rates were calculated for irrigation systems supplying a 3 foot bed. The amount of material applied should be the same regardless of whether a single or double row occupies a bed of this size.

If a drip irrigation system is not available to deliver the pesticide to the root zone, it can be applied by directing a spray or drench into the soil at the base of the plant. It is important that the material be applied when the soil is moist, or with enough water to

soak the soil to the depth of the root zone. If it is applied only to the surface of the soil, the roots will not have good access to it. We would recommend applying the material directly to the base of the plant when the soil is moist and with at least 10 ml of water per plant for young plants (<4 true leaves) and 50 ml of water for larger plants. This can be achieved with a backpack sprayer rather efficiently, but you need to calculate how much time it takes for your backpack sprayer to deliver a 10 ml volume of water. To calculate the total volume of water to put in your backpack sprayer, multiply the number of plants you want to treat by the volume of water per plant. For example, let's say you wanted to treat a 100 foot row of cantaloupe with 16 oz/A of Admire. If your plant spacing was 2' then there would be 50 plants in that row. If the plants were young you would only need 10 ml of water per plant (minimum - please feel free to increase this amount if you wish). Multiply 50 plants by 10 ml and you will discover you need 500 ml of water to treat this row. Add 500 ml of water to the backpack sprayer and then add 3.26 ml of Admire (see Table 1), mix well, and apply. The trick with this type of delivery system is to estimate how long it takes to deliver 10 ml (a very small quantity) from your backpack sprayer. Often this is just a quick shot from the trigger. Remember to keep the nozzle close to the soil and direct the spray toward the base of the stem. Please test the output of your sprayer with water prior to performing these calculations, and remember - do not apply Admire within 21 days of harvest.

Provado 1.6 Flowable:

Provado is a formulation of imidacloprid that is labeled as a foliar spray, and will not translocate into the plant as well as Admire coming in from the roots. For resistance management purposes, do NOT use a Provado foliar application following a soil application of Admire in the same crop. For foliar applications directed at adults, we have observed good efficacy with pyrethroids, such as Asana, and for resistance management reasons we have not worked very hard at trying to make Provado work. Time your applications as late in the evening as possible to avoid direct contact onto pollinating bees.

If you are going to use Provado, you should realize that the rate given in Table 1 (ml/100 row ft) is based on spraying an area 3' in width and 100 feet long. Once vines have grown beyond an area 3 feet in width quantities must be recalculated using the new area the crop occupies (% of an Acre X 3.75 oz/A X 0.03378 ml/oz).

Provado 1.6 Flowable Labeled Rate

oz/A oz/100 row-ft

(3 ft bed)** ml of Provado to Apply per 100 row-ft 3.75 0.026 0.765 ** This rate was also calculated based on spraying an area equivalent to a 3 foot bed. If your crop occupies an area greater than this (which it will once the vines run) the rate needs to be recalculated using the new area.

Read the label

You should always read the label. Information on the label supercedes anything written here, and good information about rates per 1000 linear feet are on the label. You can get

a copy of the label from the web at [HYPERLINK](http://www.CDMS.net/ldat/ld949005.pdf)
<http://www.CDMS.net/ldat/ld949005.pdf> <http://www.CDMS.net/ldat/ld949005.pdf>
Also, your Extension agent should be able to get a copy from the web at that site.

That's a Berry Good Question!!!

Kathy Demchak, Department of Horticulture

Q. What makes 'Cavendish' strawberries ripen with white shoulders sometimes and sometimes not? We like the flavor and yield. (Anon.)

A. I asked this question of the breeder of 'Cavendish', Dr. Andrew Jamieson of Agriculture and Agri-Food Canada, at Kentville, Nova Scotia. According to Dr. Jamieson, the reason is still a bit of a mystery, because there have been exceptions to each of the following theories as to the occurrence. Dr. Jamieson said that the 'white shoulders' occur more frequently in older plantings, so his feeling was the cause may be nutritionally-related. It also seems to occur more frequently when high N rates are used. However, some other producers have thought that high temperatures have increased the incidence, which would explain the erratic occurrence, and have therefore recommended irrigating during hot spells to decrease the incidence. 'White shoulders' does not affect the flavor of 'Cavendish' - it's purely a problem with aesthetics. So, this will remain a 'Berry Good Question'.

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.

New Small Fruit Cultivars

Kathy Demchak, Department of Horticulture

Over the next few months, we'll cover releases from the last few years. Some are in current catalogs, while most of these will be available in trial quantities from larger suppliers only if you ask for them. We'll cover these by breeding program.

Here are the newest strawberry releases from Andrew Jamieson of Agriculture and Agri-Food Canada. Previous cultivars released from this program included 'Annapolis', 'Blomidon', 'Cavendish' and 'Kent'.

'Sable' (Veestar x Cavendish). A '98 release. Early and productive in trials with good flavor. Better for pick-your-own, as it's not firm enough for shipping. Has been increasing in acreage rapidly in Canada. Performed well on heavy soils.

'Evangeline' (Honeoye x Veestar). A '99 release. Early season, moderately productive. Long, conic, attractive berries with firm flesh and good size. Skin strength still a question. Not red stele resistant.

'Brunswick' (Cavendish x Honeoye). A '99 release. Early-midseason. Described as larger than Honeoye, smaller than Cavendish, with Honeoye flavor. Has done better in colder climates. Viewed as a 'Glooscap' replacement. Has developed crown rot in some plantings.

'Mira' (Scott x Honeoye). A '96 release. Midseason, productive, with medium-red berries that hold size well. Looks promising for PA. Resistance to most foliar diseases and most races of red stele.

'Cabot'. The parentage is comprised of 'Elsanta' and several numbered selections. A '98 release. A mid-late season berry with size as its claim-to-fame, so it may be more of a novelty berry. Primary berries are 50-60 g, with the largest from research plots weighing in at 112 g (28 g equals 1 oz.). Doesn't runner well, does better in warmer and drier climates, and the berries can be misshapen.

Potato Musings

The potato session on Tuesday, January 25th at the Mid-Atlantic Fruit and Vegetable Convention was well attended considering the weather. We look forward to increasing the number of sessions to three next year and also the attendance. Please let me hear from you about topics or issues that you would like to have covered next year.

In upcoming issues of the gazette I will be expanding on the checklist for producing high quality potatoes presented below. If I have forgot any, please let me know.

Checklist for Profitable Potatoes

Crop Rotation	Irrigation
Condition of the Soil	Insect Pest Management
Variety Selection	Disease Management
Seed Quality	Weed Management
Seed Piece Size	Vine Killing
Planting Date	Harvesting, Handling and Storage
Plant per acre	Marketing
Fertility	

Upcoming Meetings

Bill Lamont, Department of Horticulture

Local

February 3, 2000: Northeast Vegetable Growers Meeting, Thompsons Dairy Bar, Clarks Summit, PA. Contact: John Esslinger (717) 963-4761

February 10, 2000: Franklin, Cumberland, Adams Counties Vegetable Growers Day, Huntsdale, PA. Contact: Eric Vorodi (717) 263-9226

February 16, 2000: Cambria and Somerset Potato Meeting. Contact: Ron Hostetler (814) 472-7986

February 17, 2000: New York and Pennsylvania Producers Conference. Contact: Greg Burns (814) 776-5331

February 22, 2000: Regional Vegetable Growers Meeting. Contact: George Perry (570) 622-4225

February 23, 2000: Southeastern Vegetable Growers Meeting. Contact: Scott Guiser (215) 345-3283

February 24, 2000: Berks County Vegetable Growers Meeting. Kutztown, PA. Contact: Berks County Extension Office (610) 378-1327

March 2, 2000: Lehigh/ Schuylkill County Potato Growers Meeting. Contact: Bob Leiby (610) 391-9840

March 7, 2000: Western Pennsylvania Potato Meeting, Butler, PA. Contact: Tom Zundel (724) 662-2323

March 14, 2000: North Central Vegetable Producers Meeting, Coudersport, PA. Contact: Greg Burns (814) 776-5331

March 15, 2000: Erie County Potato and Vegetable Growers Meeting. Contact Andy Muza (814) 825-0900

Regional

February 4-5, 2000: PASA (Pennsylvania Association for Sustainable Agriculture) 9th Annual Farming For The Future Conference, The Penn Stater Conference Center Hotel, State College, PA Contact: Shirley Gryczuk (814) 863-7235.

February 10-12, 2000: Ohio Fruit and Vegetable Growers Congress, Cincinnati, OH. Contact: Mike Pullins (614) 249-2424.

February 8-10, 2000: New York Vegetable Conference, Holiday Inn and Convention Center, Syracuse, NY. Contact: Jean Warholic (607) 539-7648.

National

February 21-22, 2000. Wisconsin Vegetable and Potato Meeting, Stevens Point, WI. Contact: Helen Harrison

March 2-4, 2000: National Potato Council Chip Seminar, Buffalo, NY. Contact: (716) 526-5356.

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.

