

The Vegetable and Small Fruit Gazette

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Horticulture Department
The Pennsylvania State University

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Comments from the Editor

Bill Lamont, Department of Horticulture

The Mid-Atlantic Fruit and Vegetable Convention concluded yesterday and I want to thank everyone who was involved in helping to make it a success. The next few months are full of educational meetings and I would refer you the listing of upcoming meetings at the end of the gazette. I want to thank Emelie Swackhammer for her excellent article "**Converting Pesticide Rates into Practical Amounts**". We have George Perry and Steve Bogash on deck for articles for the March issue. 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

March	George Perry and Steve Bogash
April	Greg Burns
May	Tom Butzler
June	Laura McNutt
July	Steve Bogash
August	Mary Conklin
September	Eric Oesterling
October	Cheryl Bjornson
November	John Esslinger
December	Andy Muza

Converting Pesticide Rates into Practical Amounts

Emelie Swackhamer, Horticulture Extension Agent, Lehigh and Northampton Counties

How often have you found yourself looking at a pesticide label, trying to figure out how much of the product to use? The quality of your crop absolutely depends on your ability to apply the labeled rate, while taking the acreage of crop and/or the volume of your application equipment into account. Accurate calculations allow you to use the correct amount to be effective. You'll also avoid using more pesticide than you need which is wasteful, and can be harmful to the crop.

Some people have a natural talent for doing this type of calculation. If you are not one of them, here are a few tips to help your spring arithmetic sessions go more smoothly.

No matter what calculation you need to make, you can almost always use conversion factors to translate what you do know, (for example the recommended rate of a

product), into what you need to know (for example, how much product to use for a small area application).

Start with the recommended rate and line up conversion factors so the units in the numerator (the top part of the fraction) cancel the units in the denominator (the bottom part of the fraction) until you get it expressed in a unit of measure you can work with.

Suppose you want to treat a small planting of a certain crop that is four feet wide and forty feet long. The label says to use 12 ounces of product per acre. How do you translate the recommended rate into the amount you need to apply to the patch? Follow this example to see how to do the math:

Your patch measures 4ft X 40ft = 160ft²
 Use the conversion factor: 1 Acre = 43,560 ft²

$$\frac{12 \text{ oz.}}{A} \times \frac{1A}{43,560\text{ft}^2} \times \frac{160\text{ft}^2}{1 \text{ patch}} = \underline{0.044 \text{ oz}}$$

Notice, the units A (acres), and ft² (square feet) cancel out of the numerator and denominator in this equation, and you are left with oz (ounces) needed to treat the patch.

But how do you measure out 0.044 oz of product? Use one more conversion factor in your equation to translate it into units you can measure, for example milliliters (ml).

$$\frac{12\text{oz}}{A} \times \frac{1A}{43,560\text{ft}^2} \times \frac{160\text{ft}^2}{1 \text{ patch}} \times \frac{29.578\text{ml}}{1\text{oz}} = 1.3\text{ml needed}$$

Most growers can find something to measure out 1.3 ml, and keep it in the pesticide shed with other measuring equipment. If you need something to measure ml, you could try asking at a drug store; they usually stock syringes without needles to help people measure out small amounts of medicines.

Here are a few conversion factors to help you in future calculations:

$$1 \text{ Acre} = 43,560 \text{ ft}^2 \quad 1\text{pt} = 473.167\text{ml} \quad 1 \text{ teaspoon} = 4.93 \text{ ml}$$

1 oz = 29.578 ml 1 tablespoon = 3 teaspoons 1 quart = 2 pints = 4 cups

Use of Dual Magnum in Vegetable Production

Mike Orzolek, Department of Horticulture

Since the reformulation of metolachlor in 1999, Dual Magnum is labeled for use on the following vegetable crops: snap beans, cabbage - 24C, pepper - 24C, sweet corn, and Irish potato. Dual Magnum currently is not labeled for pumpkins and therefore is not recommended for use in Pennsylvania.

The Vegetable Industry of Pennsylvania

Mike Orzolek, Department of Horticulture

While there was some commercial vegetable production in Pennsylvania prior to 1840, mostly in the vicinity of Philadelphia and Pittsburgh, the industry did not begin to assume importance until about 1850. From 1850 to 1875, truck gardening was quite profitable near urban centers, which then were supplied totally by local gardeners. After 1900, commercial production of vegetable crops increased rapidly throughout the Commonwealth. In addition to fresh market production, the first processing plant in York County was established in Hanover in 1874. By 1938, there were 80 companies engaged in processing vegetables, including mushrooms, in the state. Philadelphia was the center of early vegetable production in the Commonwealth. David Landreth and Son established the first seedhouse in America about 1784. In 1847, his company moved to Bristol where it developed one of the largest vegetable seed farms in the nation. In 1870, it was the largest seedhouse in the United States, with several hundred acres devoted to vegetable seed production in Bucks County. Since 1890, vegetable seed production has gradually declined in this area and today is limited only to very small acreage. In 1962, there were 30 vegetable processing plants in Pennsylvania, processing tomato (13,400 acres), snap beans (7,300 acres), sweet corn (8,300 acres), peas (4,100 acres), green lima beans (1,000 acres). The most important fresh market vegetables grown in 1962 were: sweet corn (19,000 acres), fresh market tomato (3,400), cabbage for market (4,700) and snap beans (1,500 acres). Total vegetable production acreage in 1962 was approximately 75,000 acres with about another 30,000 acres of potato. Crops being grown in 1962 in the state included asparagus, beets, snap beans, lima beans, broccoli, cabbage, carrots, cauliflower, celery, lettuce, melons, peas, peppers, potatoes, spinach, squash, sweet corn, tomato and sweet potato. In 2002, there are still approximately 100,000 acres of vegetables being produced in Pennsylvania including: snap beans, asparagus, sweet corn, potato, cantaloupe, sweet pepper, cabbage, broccoli, spinach, lettuce types, pumpkin, cucumber, tomato, winter and summer squash, onion, watermelon, horseradish, herbs, and specialty vegetables. Many commercial growers have started to grow specialty crops and market at their own roadside markets, a number that seems to be increasing every year. Processing

vegetable acreage has dropped dramatically in the last 5 years. This article has been paraphrased from an article written by Jim O. Dutt in the October 1963 issue of the American Vegetable Grower, "The Vegetable Areas of Pennsylvania". Jim Dutt was the Extension Vegetable Specialist in the Horticulture Department, PSU in 1962.

Bug vs. Bug - Biological Control of Western Flower Thrips with the Predatory Mite, *Neoseilus (Amblyseius) cucumeris*

Cathy Thomas, Integrated Pest Management Program
Pennsylvania Department of Agriculture

Western flower thrips have a broad host range and may feed upon tomatoes, peppers, cucumbers, impatiens, fuchsia, chrysanthemum, ivy geraniums, and many other ornamental hosts. This pest is difficult to control since it has widespread resistance to many different classes of insecticides. In addition to damaging plant tissue, this insect transmits Impatiens Necrotic Spot Virus (INSV) and Tomato Spotted Wilt Virus (TSWV) to both vegetable and ornamental plants. Early first instar nymphs acquire the virus as they feed on infected plants. The virus is retained in the thrips until they reach the adult stage that transmits the virus to susceptible hosts.

Growers in Pennsylvania have utilized the predatory mite, *Neoseilus cucumeris* to control larval stages of thrips. This predatory mite has been used for many years in European countries to control thrips on greenhouse vegetables such as tomatoes, peppers and eggplants. *Neoseilus* should be used when thrips populations are at low levels or as preventative treatment. Biological control is not a rescue treatment and should not be used when thrips populations are high. Virus indicator plants should be used in vegetable production if there is a history of INSV in the greenhouse range. Indicator plants (susceptible varieties of plants) provide an early warning for locating thrips. Certain petunia varieties are very effective (Carpet Blue, Blue Madness) in detecting thrips and INSV. Petunias attract thrips and may show symptoms of virus infection, however the petunias do not become a reservoir for the virus. Virus symptoms appear as small brown to black spots. Infected petunia leaves can be removed and the plant can be used for further detection throughout the season. For more information on indicator plants, consult this web site for the University of Connecticut.

<http://www.hort.uconn.edu/ipm/greenhs/htms/tospov.htm>

Life Cycle of *Neoseilus cucumeris*

Neoseilus cucumeris is a beige predatory mite with eight legs and less than 1 mm long. After the female mite mates she deposits eggs daily on leaf hairs close to the veins on the underside of the leaf. The egg stage is followed by the larval stage, two nymphal stages and finally the adult stage. Both the nymphal and adult stage will feed on thrips larvae. Total development time for the mite is about six to nine days at 77 degrees F. Predatory mites kill their prey by piercing the thrips larvae and sucking out the body contents. They are most effective against the small first instar stage. The second instar

thrips and thrips adults will attack the predatory mite by striking out with its abdomen. Timing predatory mite introductions with the presence of first instar larva increases their effectiveness. *Neoseilus* may also prey on spider mites or eggs.

Products

Neoseilus cucumeris is commercially available in the US. The predatory mites are sent to the grower as adults mixed with a carrier such as bran, and flour mites are added as food during shipment. The mites can be distributed loosely by sprinkling on leaves. Most growers prefer to use small sachets (envelopes) that contain different stages of predatory mites and flour mites. These sachets serve as breeding system over a period of six weeks. They are hung on the plants and the predatory mites exit through the top of the sachet onto the plants.

Product names by major suppliers:

Neoseilus - system, Neoseilus - Breeding System, - Biobest Biologicals, Belgium
Thripex, Thripex Plus - Koppert Biologicals, Netherlands Ambly-line cu, Ambly-line cu
CRS (controlled release sachet) - Syngenta Bioline

These products are available through biocontrol distributors located throughout the US
A list of distributors in the US can be found at this web site: www.anbp.org. the
Association of Natural Bio-control Producers

Introduction Method

- Consult supplier for rates.
- Reduce high thrips populations with a compatible insecticide. (consult biocontrol supplier or this web site: www.koppert.nl/e0110.shtml)
- Introduce the predatory mites as soon as possible after delivery. The material may be stored for a short period in a cool dark place with at least 85% relative humidity.
- Allow the mites to adjust to greenhouse temperature before distributing. Turn and shake the tube slightly in order to distribute the predatory mites equally in the bran.
- The predatory mites should be sprinkled equally throughout the plants. Sprinkle the material (predatory mites + bran) on the leaves or in small piles on the rockwool cubes.
- If using the controlled release sachets, hang them near thrips infestations.

Points to consider

- Use when thrips populations are at low levels
- Never use predatory mites as a curative treatment for thrips
- The predatory mites develop well when relative humidity is at least 65%.

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

Cathy Thomas

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A PSU Fall Armyworm Pheromone Lure

S. J. Fleischer, Department of Entomology

Horticulturists get cultivars named after special places or people. I guess entomologists settle for things less obvious. Never-the-less, its worth noting that Scentry Biologicals, the manufacturer of fall armyworm pheromone lures, will start selling a new formulation aimed at the northeastern US market, called the PSU lure.

For years, the northeastern US had problems with high capture rates of a non-target species in pheromone traps baited to catch fall armyworm. It has been documented as a major problem in CT, MA and PA. We thought the non-target species was wheathead armyworm, but taxonomic work showed that it was a species without a common name (the latin name is *Leucania phragmatidicola*). Recent work at Penn State by C. Harding, P. Blom, J. Greham, and S. Fleischer at Penn State, and J. White at Scentry Biologicals, resulted in a new commercial formulation that avoids this problem. We did not invent a new lure, but we worked with the literature, helped the private sector find a more appropriate lure, and did 2 years of field tests. The cooperation of the Frost Entomological Museum (J. Greham) and the private sector (J. White) was essential. The new lure more accurately reflects the volatiles given off by the calling female, as opposed to compounds extracted from the gland in the females used to make the sex pheromone.

The PSU lure does not capture significant numbers of the nontarget species. It does capture the fall armyworm, however it does so at lower rates. Our captures will be smaller, but cleaner. We have incorporated the new lure into the sweet corn monitoring program.

New Pesticides for Small Fruit

Kathy Demchak, Department of Horticulture

Quadris 2.08F fungicide and Abound 2.08F (both from Syngenta) recently obtained labels for some small fruit uses. Quadris and Abound are both the same material (azoxystrobin); however, Quadris is labeled for use only on strawberries while Abound is labeled for use only on blueberry, elderberry, gooseberry, huckleberry, lingonberry, and juneberry. These are supplemental labels, so even new containers of these

materials won't have these uses on the label at this point. Your chemical dealer should be able to supply you with the supplemental labels. In the paragraphs below, Dr. Mike Ellis points out that anthracnose fruit rot incidence in Ohio is increasing; this appears to be happening in PA as well. Apple growers AND small fruit growers with neighbors who are apple growers should pay particular attention to the points below concerning phytotoxicity to some apple cultivars.

The following information is from Mike Ellis of Ohio State University, and is excerpted from articles which appeared in the January 2002 issue (Vol. 6, No. 2) of the Ohio Fruit ICM News. These are labeled uses in Pennsylvania as well.

"Quadris 2.08F fungicide...has received full label registration for use on strawberry in Ohio. The active ingredient in Quadris is azoxystrobin and is the same product as Abound fungicide, which has been registered for use on grapes for several years. Quadris is registered for control of Anthracnose and powdery mildew on strawberry. Although Botrytis fruit rot is not on the label, research in New York has shown that Abound (azoxystrobin) provides good to fair control of Botrytis. In addition, azoxystrobin has good activity against Phytophthora fungi on several other crops. Therefore, it may provide some level of leather rot (a fruit rot caused by *Phytophthora cactorum*) control when applied for control of Anthracnose fruit rot on strawberry. To repeat this point, although Quadris is only registered for control of Anthracnose and powdery mildew, it may provide some level of control against Botrytis fruit rot (gray mold) and leather rot as well.

Quadris is registered for use at the rate of 6.2 to 15.4 fl. oz. per acre and may be applied the day of harvest (0-day PHI). For fungicide resistance management, do not apply more than two sequential sprays of Quadris before alternating with a fungicide that has a different mode of action. Do not make more than four (4) applications per acre per crop year. Do not apply more than 1.92 quarts per acre per season. This is four applications at the maximum rate.

Special Note: The active ingredient in Quadris (azoxystrobin) is very phytotoxic to McIntosh apples and other varieties related to McIntosh. We recommend that Quadris not be used in the same sprayer or equipment that will be used on apples. It is also important to prevent any drift from strawberry to apple. Apple varieties related to McIntosh are: Bancroft, Bromley, Cortland, Cox, Discover, Empire, Gala, Janamac, Kent, McIntosh, Spartan and Summared.

Abound 2.08F fungicide is now registered for use on blueberry, currant, elderberry, gooseberry, huckleberry, lingonberry and juneberry. Abound is the same fungicide as Quadris (azoxystrobin). At present, it is not registered for use on brambles (raspberry and blackberry). It is registered on the above mentioned crops for control of mummy berry, *Alternaria* fruit rot, *Phomopsis* stem canker, and Anthracnose fruit rot. It is registered at the rate of 6.2 to 15.4 fl oz per acre. Do not apply more than two sequential sprays of Abound before alternating with a fungicide that has a different mode of action. Do not make more than three (3) applications of Abound per acre per crop year. Do not apply more than 1.44 quarts per acre per season. This is three

applications at the highest label rate. Abound may be applied the day of harvest (0 day PHI)."

That's a Berry Good Question

Kathy Demchak, Department of Horticulture

Q. You had given a talk on strawberry nutrition and had some pictures of nutrient deficiency symptoms. Is there a Web site where I can find pictures like those? John Shenk, Shenks Berry Farm.

A. Several folks had asked about this, and actually, there's something even better. If you have Web access, you can take a look at the Berry Diagnostic Tool developed by Dr. Marvin Pritts at Cornell. There, you will be able to click on the small fruit crop of interest, then through a series of symptoms and descriptions. This will get you to likely causes of a problem, including nutrient deficiencies, along with a picture. Diseases, insects, herbicide effects, environmental causes, and nutritional problems are all considered in this site. Visit

<http://www.hort.cornell.edu/departments/faculty/pritts/BerryDoc/BerryDoc.htm>. A similar key, and many of these same pictures are also in the back of the NRAES Strawberry Production Guide. 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

Bill Lamont, Department of Horticulture

Potato Program at the Mid-Atlantic Fruit and Vegetable Meeting in January

Bill Lamont, Department of Horticulture

The educational program on potato production at the Mid-Atlantic Fruit and Vegetable Meeting was an excellent opportunity for potato growers of all sizes to learn more about production, storage and marketing of potatoes. It is time to really spread the word to all potato growers that they should plan on attending the 2003 meeting. If you have specific topics that you would like to see addressed at next years meeting, either call me at 814-865-7118 or drop me a line at Department of Horticulture, 206 Tyson Building, The Pennsylvania State University, University Park, PA 16802 or e-mail me at wlamont@psu.edu.

Measuring Potato Yields

Bill Lamont, Department of Horticulture

Dig 10 feet of row per sample. Collect at least 5 samples per field. Add up the total pounds dug and divide by the number of samples collected. Refer to the following table to calculate yield. (Use average weight).

Weight in lbs of 10 ft of row	CWT/A	Weight in lbs of 10 ft of row	CWT/A
10	153.7	21	322.8
11	169.1	22	338.1
12	184.4	23	353.2
13	199.8	24	368.9
14	215.2	25	384.3
15	230.6	26	399.6
16	245.9	27	415.0
17	261.3	28	430.4
18	276.7	29	445.7
19	292.0	30	461.1
20	307.4		

(Information taken from Long Island Fruit and Vegetable Update author Dale Moyer)

Upcoming Meetings

Bill Lamont, Department of Horticulture

Local

February 6, 2002: Northeast Vegetable Growers Meeting, Thompson's Dairy Bar, Clarks Summit, PA. Contact: John Esslinger (717) 963-4761

February 7, 2002: Tri-County Vegetable and Small Fruit Meeting, Penn Township

Community Bldg., Shippensburg, PA. Contact: Steve Bogash (717) 263-9226

February 19, 2002: Lebanon County Auction Vegetable Meeting, Shaefferstown Fire Community Building, Shaefferstown PA. Contact: Ginger Pryor (717) 240-4391

February 20, 2002: Cambria and Somerset Regional Vegetable and Potato Meeting, Ebensburg, PA. Contact: Ron Hostetler (814) 472-7986

February 28, 2002: Lehigh/Schuylkill County Potato Growers Meeting, Schnecksville Grange in Neffs PA.. Contact: Bob Leiby (610) 391-9840

March 5, 2002: Schuylkill County Regional Vegetable Growers Meeting, Extension Office, Pottsville, PA. Contact: George Perry (570) 622-4225

March 6, 2002: Southeastern Vegetable Growers Meeting, Heritage Restaurant, Franconia, PA. Contact: Mary Conklin (610) 489-4315

March 7, 2002: Kutztown Vegetable Auction Growers Meeting, Fleetwood Grange Hall, Kutztown, PA. Contact: John Berry, Lehigh County Extension Office (610) 391-9840 or Laura McNutt, Berks County Extension Office (610) 378-1327

March 12, 2002: North Central Vegetable Meeting, Pleasant Gap, PA. Contact: Tom Butzler, (570) 726-0022

March 13, 2002: North Central Vegetable Producers Conference, Coudersport, PA. Contact: Greg Burns (814) 776-5331

March 14, 2002: Erie County Potato and Vegetable Growers Meeting. Contact: Andy Muza (814) 825-0900

March 15, 2002: Butler County Potato Meeting. Contact: Tom Zundel (412) 662-3141

March 30, 2002: Pond Management for Irrigation, Livestock and Recreational Uses. Biglerville Fruit Lab, Biglerville PA. Contact: Steve Bogash (717) 263-9226

Regional

February 4-6, 2002: New York State Framers' Direct Marketing Association's Direct Marketing Conference; Holiday Inn, Auburn, NY. Contact: Diane Eggert (315) 475-1101.

February 6-8,2002: Ohio Fruit and Vegetable Growers Meeting, Seagate Center and Radisson Hotel, Toledo, OH. Contact: John Wargowsky (614) 249-2424.

February 15, 2002: The Northern Piedmont Specialty Crops School, Oxford, NC. Contact: Carl Cantaluppi (919) 603-1350.

February 20-23,2002: Mid Atlantic Direct Marketing Conference, York, PA. Contact:

John Berry (610) 391-9840.

March 22-23, 2002: Passive Solar Greenhouse-Design, Construction and Year around Production. Contact: Steve Moore (717) 225-2489

National

February 23-26, 2002: 30th American Society for Plasticsulture Congress, San Diego, CA. Contact: Pat Heuser Phone: (717) 238-9762 Fax: (717) 238-9985 or website <http://www.plasticulture.org>