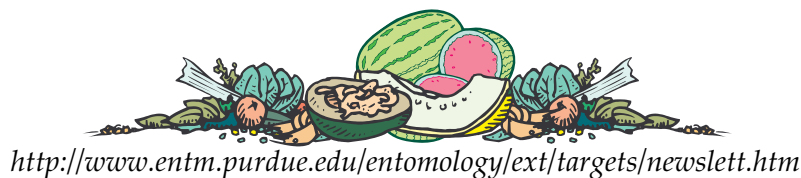


# VEGETABLE CROPS HOTLINE

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

Dan Egel, Editor  
(812) 886-0198  
egel@purdue.edu

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**CATERPILLARS ON CRUCIFERS** - (Rick Foster) - One of the earliest groups of vegetables to be attacked by insects are the crucifers, such as cabbage, broccoli and cauliflower. These cool season crops can be planted early and are fed upon by a variety of insect pests. The most important pests that growers have to deal with are the caterpillars. There are three primary species of caterpillars that attack crucifers; the imported cabbageworm, the diamondback moth, and the cabbage looper.

The adult of the imported cabbageworm is the common, small, white butterfly that can be seen flying around on sunny spring days. The butterflies lay eggs on crucifers and the velvety, green larvae grow to be over an inch long. They consume large amounts of foliage and foul crops with their feces. Imported cabbageworms can be controlled with a variety of insecticides, including the BT products (DiPel, Javelin, MVP, etc.), which do an excellent job if applied when larvae are small.

The diamondback moth larvae are much smaller than the other species, but can occur in extremely high numbers. The larvae are resistant to many insecticides in some areas. My recommendation is to use BT products to control this insect because we have seen no evidence of resistance to BT products in Indiana and because BT insecticides do not kill the parasites that will keep diamondback moth numbers low. The worst infestations of diamondbacks occur when growers use a chemical insecticide to which the pest is resistant but that kills the parasites. Our research has shown that as many as 85% of the larvae may be killed by parasites when broad spectrum chemicals insecticides are not used.

The cabbage looper does not overwinter in Indiana and moths must fly in from the South each year. Thus, it is more of a later season

problem. It can, however, be the most serious pest in some years, because it is not attacked by as many natural enemies and is more difficult to kill with the BT insecticides. Moderate to heavy infestations of loopers will require insecticides such as the pyrethroids (Warrior, Capture, Ambush, Pounce, Asana, Ammo, Scout, Fury, and Mustang) to achieve good control. There are several newer "safer" insecticides available that will provide very good control of the caterpillars, including SpinTor and Proclaim.

Treatment thresholds are dependent upon the stage of growth of the crop. Treat cabbage when 30% of the plants are infested from transplanting until cupping, 20% plants infested from cupping to early head formation, and 10% when heads are maturing. On broccoli and cauliflower, treat when 50% of the plants are infested prior to first flower or curd and 10% thereafter. For leafy crucifers, treat when 5% or more of the plants are infested.



**COLORADO POTATO BEETLE** - (Rick Foster) - One of the most consistent insect problems on vegetables is the Colorado potato beetle, especially on potatoes, but also on eggplant and tomatoes. Both the larvae and adults of this pest feed voraciously on foliage. Potato beetles can occur in extremely large numbers and are resistant to many insecticides. It may be too late for some management decisions, such as crop rotation and the use of an insecticide at planting time for some growers. However, during the growing season, there are a number of practices that can improve your management of this pest.

First, if you used Admire at planting time, you should receive a long period of control because of the systemic activity of the insecticide. However, you do not have the option to use Provado later in the season. In most cases, it wouldn't be necessary anyway.

Second, if you did not use Admire at planting, you should begin to scout your potatoes as soon as they start to emerge. Potato beetles often are found on plants that are just emerging. Thresholds for potato beetles are based on the amount of defoliation that potato plants can tolerate. Before flowering, they can tolerate 20-30% defoliation. So, treatment will only pay for itself if that much of the leaf tissue is being removed. During flowering, the plants are very susceptible to insect feeding, and treatment is justified if 5-10% of the leaf area is missing. During tuber formation, plants again can tolerate considerable feeding, and the threshold increases to 30% defoliation.

Finally, choose insecticides wisely. Again, you cannot use Provado if you used Admire. The reason for this restriction is the possibility of the development of resistance. Provado, Agri-Mek, and Spin-Tor are effective rescue treatments, even in areas where resistance has been a problem. To avoid resistance to these products, it would probably be a good idea to rotate among these products rather than continually treating with one of them. Agri-Mek and Spin-Tor will not provide control of potato leafhoppers.



**STRIPED CUCUMBER BEETLES** - (Rick Foster) - Look for striped cucumber beetles to become active any time now in the southern part of the state. Frequently, the beetles will arrive in large numbers in a short period of time. Often they will mass on plants near the margin of the field for several days before moving out into the remainder of the field. Looking at plants around the perimeter of your fields daily for the next few weeks will provide early warning that the beetles have arrived. For cantaloupes and cucumber, the economic threshold is 1 beetle per plant because these crops are very sensitive to bacterial wilt. For watermelons, the threshold is 5 beetles per plant. Because the beetles are not active throughout the growing season, spraying on a weekly basis is not the most efficient way of managing these pests. Scouting and treating when necessary has been shown to not only



reduce the number of insecticide applications needed, but has provided significantly higher yields and returns over spraying weekly. Also, growers should bear in mind that Sevin, even the XLR formulation, will only provide about 3-5 days of residual activity. Spraying on a weekly basis may result in plants being exposed to considerable feeding injury during the last 2-4 days of the week. We have had better success with the pyrethroid insecticides than with Sevin.



**NEW INSECTICIDE FOR VINE CROPS - (Rick Foster)** - The systemic insecticide Admire, active ingredient imidacloprid, is now labeled for use on the cucurbit crops for control of aphids, cucumber beetles, thrips, and whiteflies. Our results for cucumber beetle control with this product have been very promising. Growers have several options as to how to apply Admire: 1) In a band during bedding operations prior to planting, 2) As an in-furrow spray during planting, 3) As a transplant drench, 4) As a sidedress application after plants are established, and 5) In drip or trickle irrigation water.



**PUMPKIN FERTILIZATION AND SPACING - (Liz Maynard)** - How much nitrogen (N) do pumpkins need? Recommendations for pumpkins in the Midwest range from 50 to 90 lb. N/A depending on soil type and previous cropping history. Recent research supports these recommendations. A trial on a Lake Co., Indiana, farm found no difference in yield between 140 and 100 lb. N applied before a late planting in a dry year. In New York, S. Reiners and D. Riggs evaluated N rates from 60 to 140 lb./A on silt loam soils, and based on those tests recommended rates of 60 to 100 lb./A. In S. Carolina, R. Dufault and his colleagues grew pumpkins on black plastic mulch with 200, 300, and 400 lb. N/A, and found greatest yields at the lowest N rate.

Still, 50 to 90 lb. N/A is quite a range. Should you aim for the high end or low end? Conditions indicating that the higher N rate should be used include: light (sandy) soil with low organic matter; corn or vegetables in previous year; use of irrigation; history of high yields; good management of insects, weeds, and diseases. Conditions indicating that a lower N rate should be used include: heavy soil with high organic matter; legume crop in previous year; history of manure applications; no irrigation; use of plastic mulch.

Both over- and under-application of N can limit pumpkin yields. Too much N stimulates growth of stems and leaves, and fruit set may be delayed and/or reduced. Too much N may also affect pumpkin quality: in one year, S. Carolina researchers reported lighter-colored pumpkins at high N rates (400 lb. N/A) than at lower rates. If too little N is applied, vegetative growth

will not be adequate for optimum fruit production.

Pumpkin spacing also affects yield. Traditional recommendations have been spacings of 3 to 5 ft. in the row, and 6 to 8 ft. or more between rows, corresponding to populations of 2420 to 1089 plants/A. In New York, S. Reiners and D. Riggs grew pumpkins at 1200, 1800, and 3600 plants/A. They saw yields increase and fruit size decrease with higher populations. At the highest population, each plant produced an average of less than one pumpkin, suggesting that 3600 plants/A (spacing of 6 ft. X 2 ft. or 12 ft. X 1 ft.) is too many. The different plant populations were compared using either a 6-ft. row spacing or a 12-ft. row spacing. The 6-ft. row spacing consistently produced more pumpkins per acre, but did not always produce more tons per acre. When the 6-ft. row spacing did produce more tons per acre than the 12-ft. row spacing, it happened at the highest population (3600 plants/A), and in a field with greater yield potential.

What spacing is best? In irrigated fields with high yield potential and where maximum fruit size is not desired, a population of 2420 plants per acre, corresponding to 6 ft. X 3 ft. spacing, would be reasonable. If the fruit size desired is towards the top of the range for the cultivar being grown, more space between plants in the row is recommended, for example 5 or 6 ft. The spacing between rows does not have as big an influence on fruit size as the spacing between plants in the row. It makes sense to choose a row spacing adapted to planting and cultivation equipment, and then adjust the in-row spacing to get the desired population. In unirrigated fields, there may be an advantage to lower populations in a dry year. Fewer plants per acre will mean less competition for water between plants before canopy closure, and should reduce drought stress and related problems.



**GOODBYE - (Dan Egel)** - Jerry Brust has left the SW Purdue Ag Center for a position as Director of Research with a consulting firm in Florida. Until a new entomologist has been hired to replace Jerry, insect questions should be addressed to Rick Foster (765) 494-9572 in West Lafayette.

We would like to take this opportunity to thank Jerry for his fine work in vegetables, alternative controls, organic vegetable production, soybean cyst nematode testing and teaching. We wish Jerry the best of luck.



**DUAL MAGNUM - (Fred Whitford)** - EPA has approved a section 18 for the use of Dual Magnum herbicide for the control of Eastern black nightshade on transplanted tomatoes. The exemption authorizes the use of this product in Indiana for Eastern black nightshade control through July 1, 2000.

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.



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Vegetable Crops Hotline  
c/o Daniel S. Egel  
Southwest Purdue Agricultural Program  
4369 N Purdue Rd  
Vincennes, IN 47591