

## Don't Get Cross!

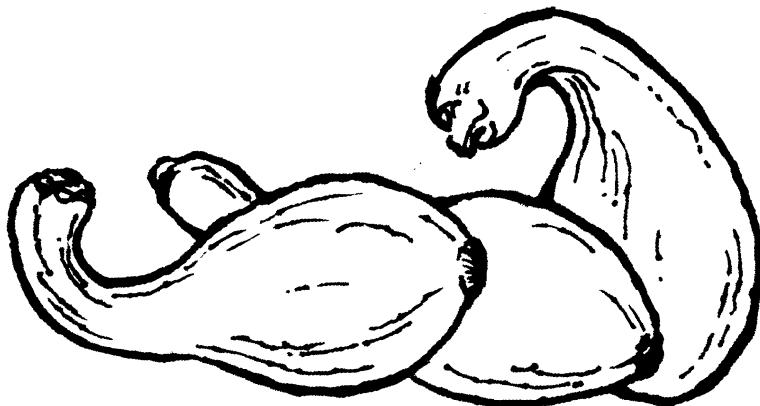
Dr. Rick Snyder  
Professor & Vegetable Specialist

Since the questions about cross pollination in the Cucurbit family (Cucurbitaceae, or the vine crops) have started coming in already, I thought it would be a good time to clear up the confusion.

As for the cucurbits crossing with each other, it is rather interesting .... for the most part, there is not much crossing, unless it is within the same species. Here are the general rules: 1) watermelons, cucumbers, and squash are in different species; therefore they cannot cross with each other. 2) However, some pumpkins are in the same species with some squashes. And various melons (*not* watermelons) are in the same species, so they can cross with each other.

To be more specific, 1) Watermelons *do not* cross pollinate with cucumbers, squash, or pumpkins. 2) Cantaloupe (really called muskmelons) *cannot* cross with cucumbers. 3) Some pumpkins *can* cross with some squashes, if they are in the same species, namely Cucurbita pepo. For example, Turk's Turban can cross with some other squashes and pumpkins in the Cucurbita pepo species.

Now, let's talk about melons. All cantaloupes (a.k.a. muskmelons, mushmelons, and just plain "melons"), honeydews, canary melons, crenshaw melons, santa claus melons, persian melons, etc. *can* cross together, since they are all within the same species, Cucumis melo (although in different subspecies).



*Remember, even if there is a cross, it will NOT show in the current year's fruit. ONLY the seed are affected, and if the seed are planted, the resulting fruit can be an unexpected mixture of good quality and off types.*



## New nutsedge herbicide available for vegetable growers

Dr. John Byrd, Extension Weed Specialist

Purple nutsedge (*Cyperus rotundus*), also called coco, nutgrass, and a host of other names, has been one of the most difficult weeds to manage in cropping systems. It was listed in Holms et al. book, "The World's Worst Weeds" as THE worst weed in the world. This perennial weed reproduces primarily by forming tubers along a rhizome. Each tuber is capable of producing a new shoot, hence, one rarely sees one purple nutsedge plant. Usually there are several hundred plants per infestation.

Vegetable producers have been foaming at the mouth since the labeling of Image and Permit for a selective herbicide to control purple nutsedge in various vegetable crops. Well, it has finally arrived. Gowan received federal labeling for Sandea last week. Sandea contains the active ingredient halosulfuron, which is the same active ingredient in Permit and Manage. Sandea is labeled for application to cucumber, cantaloupe, honeydew, crenshaw, winter and summer squash, pumpkin, watermelon, eggplant, and peppers. It was also labeled for snap beans and sweet corn in Florida only, and tomatoes in Florida, Georgia, North Carolina, and Tennessee. We are currently working with Gowan and the Mississippi Department of Agriculture to try to add Mississippi to the states in which Sandea can be used on tomatoes.

A copy of the label can be downloaded from the Gowan web site at [www.gowanco.com](http://www.gowanco.com). In addition to purple nutsedge, Sandea also provides preemergence or postemergence control of cocklebur, several of the smartweeds, wild mustard, several species of pigweed, common ragweed, sunflower, and velvetleaf. Some restrictions or precautions listed on the label include: Do not apply more than 2 oz. per acre per year; more than 1 inch rainfall or irrigation following preemergence treatments may cause injury; broadcast applications to plastic mulch may result in injury if Sandea is washed from plastic into holes; do not apply Sandea to crops treated with organophosphate insecticides; temporary yellowing may occur. For optimum control of these weeds and purple nutsedge postemergence, a nonionic surfactant must be added.

The following recommendations were prepared for the 2003 Weed Control Guidelines for the Mississippi vegetable section. As in all cases, these are guidelines, not the label. Be sure to read and follow all label directions.

Monsanto has Sempra labeled for application to sweet corn. Sempra contains the same active ingredient as Permit, Manage, and Sandea.

Cantaloupe & Watermelon	halosulfuron <i>Sandea</i>	0.38 to 0.56 oz ai 0.5 to 0.75 oz	purple nutsedge, pre pigweed, ragweed, smartweed plus others	post row middles only	CANTALOUPE, HONEYDEW, AND CRENSHAW MELONS ONLY. Direct seeded without plastic mulch, apply after planting, but before cracking, or if used with plastic mulch apply after final bed shaping, but before laying plastic. Do not seed into treated areas less than 7 days after laying plastic. If transplanting without plastic mulch, do not transplant into treated areas within 7 days after application. If transplanting with plastic mulch, apply <i>Sandea</i> after final bed shaping but before laying plastic. Do not transplant within 7 days after application. Direct seeded bareground or with plastic mulch apply after crop has 3 to 5 true leaves, but before flowering. Postemergence applications to transplants should not be made less than 14 days after transplanting. For best results on nutsedge, a sequential application may be needed. WATERMELON OR MELONS ABOVE. Apply to row middles only, taking precautions to avoid contacting vegetable foliage or minimizing deposits on plastic mulch. Always add nonionic surfactant at 1 qt/100 gal. spray solution. Do not exceed 2 oz/acre per 12 month period. Do not apply ovetop of plastic mulch or apply to crops treated with soil applied organophosphate insecticides. Do not apply an organophosphate insecticide 21 days before or until 3 days after a <i>Sandea</i> application.
Cucumber	halosulfuron <i>Sandea</i>	0.38 to 0.56 oz ai 0.5 to 0.75 oz	purple nutsedge, pre pigweed, ragweed, smartweed plus others		Direct seeded without plastic mulch apply after planting, but before cracking, or if used with plastic mulch apply after final bed shaping, but before laying plastic. Do not seed into treated areas less than 7 days after laying plastic. If transplanting without plastic mulch, do not transplant into treated areas within 7 days after application. If transplanting with plastic mulch, apply <i>Sandea</i> after final bed shaping but before laying plastic. Do not transplant within 7

# 'New' Insecticides for Commercial Vegetables

Dr. Blake Layton, Extension Entomology Specialist

[Editor's Note: Blake has been with Mississippi State University for 15 years, but has recently been reassigned to work with horticultural crops. We welcome Blake as an author of the Vegetable Press Newsletter, following the retirement of Dr. Pat Harris last June.]



During recent years, a number of new insecticides have been labeled for use in commercial vegetables. Before these products began to be introduced in the late 90s, practically all of our insecticides belonged to one of three classes of insecticide chemistry: organophosphates (malathion & Cygon are examples), carbamates (like Sevin & Lannate), or pyrethroids (such as Ambush or Warrior). Insecticides within a given class of chemistry have a common 'mode of action' or way in which they kill insects. These 'new' insecticides are exciting because they represent a number of new classes of insecticide chemistry, with new modes of action. This means that they are more likely to be effective against pests that have become resistant, or difficult to control with the older products.

In most cases, these newer insecticides also have many other desirable qualities, including good efficacy against labeled pests, improved worker safety, and good environmental safety. One quality that practically all of these newer products share is that they are more target specific than the older products, which in most cases are very broad spectrum. This trait of being more target specific is a two-edged sword. When you only need to control caterpillar pests, it is great to be able to use a product that only controls caterpillars and preserves beneficials. Likewise, when you only need to control aphids, it's great to have a product that works only on sucking pests. But when you've got caterpillars and aphids, and maybe some other pests as well, it can be difficult to find a single product that will do the job.

Several of the newer insecticides are designed primarily for use against caterpillar pests. In this article we will briefly review three of these new caterpillar insecticides. In discussing each of these products we will introduce them by their common chemical name or active ingredient, rather than the brand name. It is important for producers to be aware of the active ingredient of a product, because a given active ingredient may be formulated and sold under several different brand names. Although this article is devoted specifically to these three products, keep in mind that there are several older products, which also are effective against caterpillar pests.

One trait that the three products discussed below share is that they kill insects more slowly than many of the older products. This does not mean that they are less effective in protecting the crop; caterpillars usually stop feeding relatively soon after treatment. But because of the different mode of action, it may take a couple of days for affected caterpillars to die. This is an important

point to keep in mind when making follow up checks on insecticide treatments. With most of these newer products, the full effect of the treatment won't be observed until two or three full days after treatment.

Spinosad (Spintor 2SC, Success 2SC, and Entrust 80WDG): Spinosad is a very unique and interesting insecticide. It is produced through a fermentation process using a unique soil inhabiting bacteria that was discovered at the site of an old rum still in the Caribbean. Spinosad is primarily a caterpillar product, but it also has activity against thrips and a few other pests. Although spinosad is a "biological," it is very effective against many caterpillar pests, however, it is not effective against any of the sucking pests, such as aphids, whiteflies, or stink bugs, and, with the exception of Colorado potato beetles, it is not effective against beetles. Spinosad is especially useful against hard to control pests like diamondback moth, armyworms, loopers, cabbage worms, and tomato fruitworm. It is labeled for use on a wide range of vegetable crops, including cucurbits, cole crops, fruiting vegetables (like tomatoes, okra, and peppers), and leafy vegetables (like lettuce and turnips). Because of its narrow spectrum of activity, spinosad is relatively easy on most beneficial insects, but it is toxic to bees until the spray has dried. Spinosad is produced by Dow AgroSciences, and is sold under three different labels for use in commercial vegetables: SpinTor 2SC and Success 2SC are both liquid formulations, and Entrust 80WDG is a dry product. The Entrust product is approved for use in organic production, and there are even formulations of spinosad that are available for use in the home vegetable garden (Monterey Garden Insect Spray and Conserve Naturalyte Insect Control are two).

Indoxacarb (Avaunt 30WDG): For the commercial vegetable market, indoxacarb is sold under the brand name Avaunt 30WDG, which is a DuPont label. Avaunt is strictly a caterpillar product, but it is quite effective against those pests for which it is labeled. Currently, indoxacarb is labeled on only a few vegetable crops, but these include: tomatoes, peppers, sweet corn, lettuce, cabbage, broccoli, and cauliflower. It is especially useful against fruitworms and other caterpillars in tomatoes and against diamondback moth and other caterpillars in cabbage. Avaunt does have activity against some beneficial insects, but it is less disruptive of beneficials than the older, broader spectrum products.

Tebufenozide (Confirm 2F, Confirm T/0): Tebufenozide belongs to a group of insecticides known as 'insect growth regulators' or 'IGR's'. Actually, insect growth disruptors would be a more accurate term, because Confirm works by causing caterpillars to molt (shed their skin) before they are really ready to do so, and this is lethal to them. Confirm is labeled for use on cole crops, leafy vegetables, and fruiting vegetables. Confirm is strictly a caterpillar product. It is especially useful against armyworms, cabbage worms, hornworms, and loopers, but it is not labeled for control of diamondback moth or tomato fruitworm. One of the key benefits of tebufenozide is that it provides relatively long term residual control against those pests for which it is labeled. Because of its mode of action, tebufenozide has little effect on most beneficials.

Before using any insecticide, always carefully read the label and be sure that the product is labeled for use on the specific crop that you intend to treat. Be sure to note the REI (re-entry

interval) and the PHI (pre-harvest interval) for the crop you intend to treat and the rate that you intend to use. PHI's often vary considerably from one crop to another, and the same insecticide may have a 1 day PHI in one crop and a 7 day PHI in another. In some cases, higher rates may require longer REI's or PHI's. Read and heed all label directions and restrictions!

## Diagnosis of Tomato Spotted Wilt Virus

Dr. David M. Ingram, Extension Plant Pathologist and Dr. Blake Layton, Extension Entomologist

There have been a number of reports recently indicating that populations of thrips are increasing on vegetable crops in southern and central Mississippi. We have



personally visited tomato and pepper fields where flower blossoms contained as many as five thrips. There did not appear to be any foliage or fruit damage in these fields. However, one must keep in mind that there are several species of thrips, and some, such as the western flower thrips, have a higher potential for causing damage. So far, the majority of the thrips that have been identified from submitted samples have been eastern flower thrips, but this is a very limited sample. Thrips can cause damage to fruiting vegetables, such as tomatoes and peppers, by feeding on or laying eggs in the small developing fruit. This



damage occurs before the bloom is shed from the fruit, and is then 'magnified' as the fruit grows.

For many the mention of thrips in vegetable crops means to be on the lookout for a potentially devastating virus disease of tomatoes and peppers. Tomato Spotted Wilt Virus (TSWV) caused significant losses in the mid 1990's and has continued to be a sporadic problem in both commercial and homeowner vegetable crops, particularly tomato and pepper. In the past couple of years the virus disease has been increasing in severity in Georgia and North Carolina. The virus affects over 160 plant species in over 30 plant families. Most of the host plants affected by the virus are in the Solanaceae, Compositae, and Leguminosae plant families and include tomato, pepper, eggplant, potato, celery, lettuce, several ornamentals, and several weed species. I want to refresh your memory of what to look for when attempting to diagnose TSWV in the field.

Symptoms of TSWV are variable depending on the time of infection and stage of plant growth. On tomato, the first symptoms usually show up in the terminal of the plant as numerous, small chocolate brown spots. Young leaves may take on a bronze appearance and will droop down, hence then name, TSW. Leaf petioles and stems may exhibit dark streaks. Plants will be stunted and in later stages of infection, will appear as though a propane torch has been passed over the plant with leaves become dry and crispy. Plants infected early in the season may

produce no fruit while those infected with green fruit will most likely develop faint ringspots. As fruit ripen, the ringspots become bright red, yellow, or even white colored.

It is important to understand how the virus spreads in the field. There are many weed species that serve as reservoirs for the virus. Natural spread in the field is caused only by thrips. Four species of thrips are reported to be the main carriers or vectors of TSWV. It is important to know what species of thrips are occurring in the field. Some recent observations suggest that a lot of the thrips are eastern flower thrips and that species is not thought to be as good a vector of TSWV as other species. Tobacco and western flower thrips are thought to be the main vectors of TSWV. So it is important to have the thrips species occurring in an area identified. Thrips can acquire the virus only in the larval stages and can only transmit the virus after they have become adults. The time required for the larval stages to acquire the virus is about 15 minutes. The efficiency of the adults to transmit the virus increases with feeding time. The virus is often retained by the thrips for its entire life. Symptoms begin to show up in the plant within 7-20 days following feeding by viruliferous thrips.

TSWV is extremely difficult to control. Because it has such a wide host range and infects so many weed species that occur near fields, it is very difficult to eliminate the disease. Controlling weeds that harbor thrips is a beneficial practice but can be costly. And some have even suggested that leaving the weeds there will attract the thrips and keep them from moving onto vegetable crops. Insecticides are also reported to be ineffective for controlling TSWV because the insect can transmit the virus before residual chemical kills the thrips. Also, the wind could be constantly blowing in viruliferous thrips from infected weed hosts near vegetable fields.

The recommended treatment level for thrips in tomatoes is 1 thrips per bloom. As previously indicated, many fields have had populations much higher than this, yet seem to be suffering little direct damage. Although insecticides are not effective in preventing initial inoculation with TSWV, they can aid in preventing secondary transmission within the field. This would be as a result of controlling the immature thrips carrying the virus before they become adults and can begin to transmit the virus. Obviously, preventing secondary spread will be more important in younger plantings. When selecting an insecticide to use for thrips control, be sure to consider any other pests that may be of concern in that crop and choose, or include, an insecticide that will control those as well. Also, be sure to pay close attention to pre-harvest intervals.

Our recommendation is to remove infected plants from the field once they are detected. The virus is unstable in the environment and does not transmit well from handling a diseased plant and then touching a healthy plant. There are a couple of resistant tomato and pepper varieties. The resistant tomato varieties BHN 444 (spring planted) and BHN 555 (fall planted) are sold by most commercial seed companies, and many co-ops carry them as well.

# Calendar of Coming Events

Dr. Rick Snyder, Professor & Vegetable Specialist

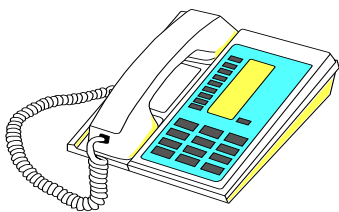
October 17 & 18 - Fall Flower & Garden Fest; at Truck Crops Experiment Station, Crystal Springs, MS. For information, call (601) 892-3731.

December 4-6 - Deep South Fruit & Vegetable Growers Conference & Trade Show; Adam's Mark Hotel, Mobile AL. For information, call (601) 892-3731.



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*If you have suggestions for articles, give me a call.*

## Web Pages

**Central Mississippi Research & Extension Center**  
<http://www.msstate.edu/dept/cmrec>

**North Mississippi Research & Extension Center**  
<http://www.msstate.edu/dept/nmrec>

**Fall Flower & Garden Fest**  
<http://msucares.com/gardenfest>

**Greenhouse Tomato FAQ**  
<http://www.msucares.com/crops/comhort/greenhouse.html>

**Vegetable Resource Page**  
<http://www2.msstate.edu/~ricks>

**Organic Fruit and Vegetable Web Page**  
<http://www.msstate.edu/dept/cmrec/organic>

**Greenhouse Tomato Short Course**  
<http://www.msstate.edu/dept/cmrec/ghsc.htm>

**Vegetable Press Newsletter**  
<http://www.msucares.com/newsletters/vegpress/index.html>

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