

Cornell University  
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# Vegetable News

## Wireworms– Not Just in Your Fields!

Teresa Rusinek—ENYCHP



We don't normally think of wireworms as a pest in high tunnels, but every now and then, I do see it. Wireworms are the larval or immature stage of the click beetle. The majority of the lifecycle is spent underground in the larval stage, which takes two to six years to complete. Adult female click beetles are generally attracted to grassy/soddy fields, where they prefer to lay eggs. The adult stage does not inflict damage to crops. The wireworm larval stage can be especially damaging to root crops, where the marketable portion is constantly vulnerable to feeding. However, they may also feed on corn, small grains, grasses, flowers, beans, peas, tomatoes,

and cucurbits. The larvae primarily feed on small roots produced by the plants, or they will consume the insides of seeds, preventing germination. They will also burrow into larger roots and underground parts of the stem, cutting off the supply of nutrients and water to the plant. This results in the plants being stunted or wilted.

Wireworm infestations are generally not uniformly distributed throughout a field, so patches of damaged plants often result. In the high tunnels, I see damage more along the side walls; it's likely the adult beetles fly in when the side plastic is rolled up. All life stages remain in the same locality where they hatched (the adults will even return to where they hatched to lay their eggs) so one location could likely have multiple generations present.

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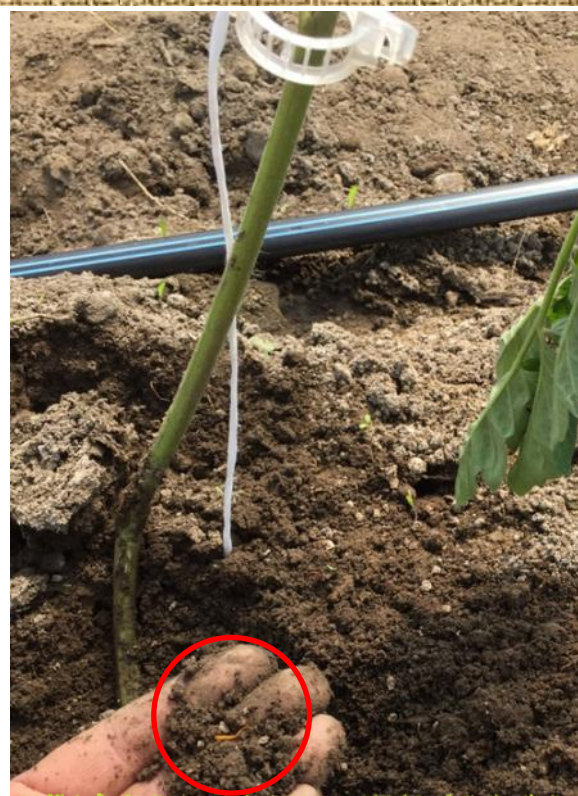




Since all generations tend to stay close to their origin and the wireworm stays in the larval stage for up to six years, an infestation could continue for several years. They prefer moist, cool, and heavy soil. If the topsoil is too hot or too cold, they will migrate further down into the soil. They are therefore less likely to be detected in extreme conditions.

If you suspect a wireworms may be a problem, bait stations can be used to monitor populations. However, they are not a reliable method to detect an infestation. Fields that were previously fallow or were planted with sod are more often infested with wireworms. In some cases, wireworm infestations are initiated in wheat, barley, timothy, and clover rotational crops. Adults are more attracted to these areas and are more likely to lay their eggs in these sites. In contrast, fields previously planted with corn or soybeans are at less of a risk of being infested.

Generally, the longer it takes for a seed to germinate and grow, the more susceptible it is to wireworm damage. Therefore, it is better to plant the seeds when the soil is warm. Planting when it is cold and wet will slow growth and encourage damage. If a field is known to have a wireworm infestation, the use of an insecticide when planting or as seed piece treatment can minimize damage. Avoid planting in poorly drained soils or wet areas and keep land free of grassy weeds during egg laying period ( May-late June) will greatly reduce potential for infestation. This spring we are studying the use of entomopathogenic (insect-killing) nematodes to control wireworms. The nematodes are native to New York and known to persist in the soil. We will be applying the nematodes to plots of sweet potato in a field that was heavily infested last year. Stay tuned for updates on this research.



Wireworm found in the high tunnel-Teresa Rusinek

## Spinach and Brassica Downy Mildew in Greenhouses

Ethan Grundberg—ENYCHP



Downy mildew spores on underside of spinach transplant; Photo A. Harrington

After the alert regarding brassica downy mildew on Long Island was published in last week's newsletter, we found trays of spinach, kale, and collard greens transplants in a propagation greenhouse in southern Dutchess County infested with downy mildew. Spinach downy mildew is caused by the water mold pathogen *Peronospora farinose* f. sp. *Spinaciae* and is only known to affect spinach. Brassica downy mildew is caused by a different oomycete, *Hyaloperonospora brassicae*, and is specific to cole crops. So, the presence of downy mildew symptoms on both brassicas and spinach would indicate that both pathogens are in the environment in the lower Hudson Valley. It is not known yet which races of spinach downy mildew are to blame, but the two varieties affected were Acadia (resistant to downy mildew races 1-13, 15, and 16) and Escalade (resistant to downy mildew races 1-14 and 16).

Both downy mildews of spinach and brassicas thrive in wet weather with temperatures in the 50s-60s. Since these cool and moist conditions are required for the pathogens to produce their wind-dispersed spores and infect host crops, the warm and dry weather forecast for most of the region should significantly reduce the risk of spread in the field.

However, greenhouses may still be vulnerable and very conducive to downy mildew infection! If nighttime lows are in the 50s, be sure to close up end-walls and roll up sides to keep temperatures above the ideal range for downy mildew (and to avoid the extreme temperature fluctuation that can cause leggy transplants). If transplants have become overgrown while waiting for fields to dry out, try to checkerboard flats to improve air flow. It may also help to bring in supplemental horizontal fans to push air through houses. Make sure to cut back on greenhouse watering during the cooler overcast days to prevent creating zones of high relative humidity and prolonged leaf wetness.

Spinach and brassica transplants should be inspected first thing in the morning when it is most likely that spores will be present. Symptoms can include dark spots on the tops of cotyledons, irregular yellow spots on the top of leaves, and spores that can range from fuzzy white to grayish purple. If you find transplants that may be infected, please send us pictures and cc Cornell Plant Pathologist Meg McGrath at [mtm3@cornell.edu](mailto:mtm3@cornell.edu).



*Downy mildew on collards; Photo A. Harrington*

According to Meg McGrath, “When downy mildew is found prior to transplanting, it is recommended the plants be thrown out as will be difficult to control and probably not worth the cost of the necessary fungicide applications to produce the crop.” Growers that try to manage downy mildew either in the greenhouse or field need to try to direct fungicides to the underside of leaves where spores are developing. Research by Chris Smart has found that conventional fungicides with the active ingredients chlorothalonil, mancozeb, fluopicolide are most effective at managing brassica downy mildew (check labels of formulations for allowances for greenhouse use). Copper products have generally been most effective in trials of organic fungicides, but efficacy is still limited and care must be taken to avoid phototoxicity in delicate transplants. Zonix has shown some promise for organic downy mildew management in the field and is labeled for greenhouse use, but it is not effective at warm temperatures. OxiDate, Regalia, and Double Nickel 55 are also options for organic growers.

More images of brassica downy mildew on transplants can be found at <http://livegpath.cals.cornell.edu/gallery/crucifers-cole-crops/downy-mildew-on-cabbage/> and spinach downy mildew at <http://livegpath.cals.cornell.edu/2016/11/15/disease-alert-spinach-downy-mildew/>.

## Maggot Reference Table

**Table 2. Maggot Comparative Table**

	Seed Corn	Cabbage	Onion
<b>Host</b>	40 different plants, large germinating seeds, seedlings (including allium and brassica!)	Brassicas	Alliums
<b>First peak flight</b>	360 GDD base 40°F	452 GDD base 40°F	735 GDD base 40°F
<b>Adult</b>	Small: ~ 3mm, 3 stripes on the thorax	Medium: ~5mm, 2 stripes on the thorax.	Large: ~6mm.
<b>Eggs</b>	Hatch in 2-4 days	Hatch in 7-10 days	Hatch in 2-5 days
<b>Larvae (maggot)</b>	Active for 3 wks	Active for 2-4 wks	Active for 2-3 wks
<b>Pupae</b>	In soil for 1-2 wks before next gen adults emerge (last gen pupae overwinter)	In soil for 2-3 wks before next gen adults emerge (last gen pupae overwinter)	In soil for 3-4 wks before next gen adults emerge (last gen pupae overwinter)
<b>Notes</b>	Short, 21-day lifecycle. 3 gen per year. Usually only spring gen is damaging.	Long, 60-day lifecycle. 4 gen per year. Spring and Fall gen most damaging.	Medium, 30-day lifecycle. 3 gen per year. Usually only spring gen is damaging.

I found this quick reference for maggots to be helpful as we continue to see seedcorn maggot feeding on a wide variety of crops and now also seeing some cabbage maggot and onion maggot adults. Knowing how long to expect feeding, and on which crops, can help you avoid planting (or replanting) into infested areas. —Crystal  
Source: UMass Veg Notes May 11, 2017



## Herbicide Options for Pumpkins and Squash

Chuck Bornt– ENYCHP

With the changing of the weather I think it's safe to say that there will be a lot of pumpkins and winter squash going into the ground in the next couple of weeks so I thought it was time to dust off the old herbicide recommendations. Again, we don't have anything new labeled for pumpkins or winter squash this year so we need to work with what we've got. As I try to remind everyone, the herbicides we do have labeled all work best as post plant, pre-emergent applications. They are mostly seed germination inhibitors or root inhibitors and in some cases they do have some post-emergent activity. In my opinion, there are three important factors for these herbicides to work their best:

- ⇒ **Field preparation:** Fit and plant the field as closely together as possible. Do not fit the field and let it sit for more than 2 or 3 days before planting it as this will allow weed seeds to germinate (if the conditions are right) and in the case of many of these products, their activity and efficacy is reduced when seeds are already germinated. If you have to wait for some reason, I would consider re-fitting the field with a shallow cultivation before planting. Also, make sure the field is not full of clumps as this will also reduce the efficacy of the herbicides.
- ⇒ **Application timing:** As with field fitting, do not delay your herbicide application for more than a couple of days after planting! The same reason applies—this gives seeds time to germinate and reduces herbicide activity. Planting and spraying your herbicide within a day or two will improve weed control.
- ⇒ **Moisture:** All of these materials require either a rain or irrigation after application in order to “activate” them. Not only does this activate the herbicide, but it also activates seed germination. If it looks like there is no rain coming for a while and you don't have irrigation, my suggestion is to go ahead and still get the herbicide on. It's better than waiting for a rain.

Lastly, I would not use any of these products pre-emergent/post-plant by themselves with the exception of Strategy (already has 2 different active ingredients pre-mixed). We have seen that tank mixes are the best value and result in much better weed control. Tank mixes that we think have potential are: Sandea plus Dual Magnum plus Reflex; Sandea plus Command ME or Sandea plus Dual Magnum plus Reflex. As always, please read the label carefully and if you have questions about what you read below, please do not hesitate to call me at 518-859-6213 and I will do my best to answer them.

**Dual Magnum Notes:** If you have Dual Magnum or Dual II Magnum, you will note that “Pumpkins” are on those labels. However, if you read the Dual II Magnum label, you will see it stated clearly that it is labeled only as a banded application and the applicator must leave a 12 inch area over the seed row untreated. What I would recommend is that you obtain the Dual Magnum 24 c Special Local Needs (SLN) label. The SLN label for Dual Magnum does not have this restriction and it can be used as a broadcast application. However, you need to obtain a copy of the correct 24 (c) label and have it in your possession at the time of application. The use of Dual Magnum in this way is an indemnified label which means that you accept the risk of using this material and any injury or crop loss is not the responsibility of the company. In order to obtain the correct label, you will need to register with Syngenta and indicate that you are using this product on those specific crops. The good news is, this process is simple and can be done via the internet. (More to follow below). And as far as I know, the use of generic “Dual” products is not legal to use on pumpkins or winter squash.

**Registering with Syngenta and obtaining the 24 c SLN:** First, go to [www.farmassist.com](http://www.farmassist.com) where you will need to create a user name and password. Once logged in, select “Products” where a dropdown menu will appear. Under that, select “Indemnified Labels”. Next, select “New York” under the state and “Dual Magnum” under the “product”. It is very important to note here that *only the Dual Magnum formulation is labeled on pumpkins and winter squash and not Dual II Magnum*. Then the list of Dual Magnum indemnified labels comes up and you need to find the appropriate one (should be the one that included pumpkins and winter squash). Click the crop you are applying it to and the “submit” button. You will then be navigated to a “WAIVER OF LIABILITY AND INDEMNIFICATION AGREEMENT” page where you will either accept or decline the special instructions for using this product on the selected crops. If you accept it, the label you need to print will appear as a pdf file and you can then print it and you are ready to go. If you decline it, the labels

Product	Labeled crops	Weeds controlled	Rate	Comments
<a href="#">Sanda, Profine 75</a> (halosulfuron)	All cucurbits	Broadleaves (pigweed, velvetleaf, etc.)	0.5 1.0 ounces per acre	Can stunt and delay emergence especially at higher rates (I recommend 0.5 oz rate) but temporary, short residual of about 4 weeks, will start to see some weed species breaking through (common lambsquarter, Eastern black nightshade) around the 4th of July. Using a 0.5 oz. once pre-emergent allows you to use a another 0.5oz. once post emergent, needs to be mixed with a grass herbicide when used pre-emergent.
<a href="#">Dual Magnum</a>	Pumpkins, winter squash,	Mostly grasses and some broadleaf suppression	2/3—1.33 pints per acre depending on soil type	PLEASE SEE OTHER NOTES ON DUAL MAGNUM! I have seen very good results and limited injury using the 1.0 pints per acre rate. <u>Do not incorporate</u> as this increases the risk of severe injury! Best if used as a post plant pre-emergent and can be used post transplant within 72 hours of planting (weed seed germination issues).
<a href="#">Command 3ME</a>	All cucurbits	Annual grasses and some broadleaves	2/3 – 1.33 pints per acre depending on soil type	Labeled on all cucurbits (Label actually says “Do not use on Jack-O-Lantern pumpkins” because the companies distributing this product will not accept liability for potential off-color responses that have been observed in numerous varieties). I find that the 1.0 pint per acre rate is used and provides good control. <b>Do not incorporate!</b> The ME (micro-encapsulated) formulation does not need to be incorporated! May be used prior to seeding or transplanting (make sure transplant is planted below the chemical barrier) or post seeding but before crop emerges.
<a href="#">Curbit EC</a>	All cucurbits	Mostly annual grasses and some broadleaf suppression	3.0—4.5 pints per acre depending on soil type and organic matter level	Use as a as a post plant pre-emergent application only within 2 days of planting or banded application between rows after crop emergence or transplanting (be very careful of drifting onto the crop). Do not use under plastic mulches or rowcovers. Cold, wet soils can increase injury or even result in crop failure! Label recommends using a minimum of 20 gals/acre fixed spray volume. Do not incorporate as this will increase the chance of injury.
<a href="#">Strategy</a> (Pre-mix of Command and Curbit)	All cucurbits	Most annual grasses and some broadleaves	2.0 - 6.0 pints depending on soil texture	<b>Do not incorporate</b> , recommended as a post plant pre-emergent or banded application between rows after emergence or transplanting. Do not broadcast apply and then transplant into treated soil as severe injury will occur. It can also be banded to row middles after a cultivation. Again, do not let this material freeze in storage as it could potentially settle out and clog your sprayer screens, tips etc. If it has frozen, be sure to contact the manufacturer for recommendations of how to proceed. Label also recommends to use 10 to 30 gallons per acre finished spray volume. Be sure to check the label as there are crop rotational restrictions that are rate dependent.
<a href="#">Reflex</a>	Pumpkins and winter squash except butternut	Broadleaves and some annual grass suppression	0.5—1.0 pints per acre	24 c Special Local Needs label on pumpkins, summer squash and most varieties of winter squash, except butternut. “Indemnified” label like Dual Magnum which means you accept any crop loses associated with using this material and you will need to register with Syngenta in order to print a copy of the label. See the “Registering with Syngenta and obtaining the 24 c SLN” section under Dual Magnum. For direct seeded crops you need to apply to the row middles only or leave the area over the seed furrow untreated. Do not use as a broadcast application on direct seeded pumpkins or squash! However, for transplants you can use it as a pre-transplant non-incorporated pre-emergence (weed seeds) broadcast application up to 7 days prior to transplanting. Apply Reflex at a rate of 0.5—1.0 pints per acre. Do not exceed 1 pint per acre of Reflex on pumpkins, winter or summer squash per season and do not harvest any of these crops within 32 days of the Reflex application. Please note the 18 month crop rotation restrictions for sweet corn. Do not use Reflex alone.



## Asparagus Beetles

Crystal Stewart & Amy Ivy-ENYCHP

As you harvest asparagus take a close look at the spears for signs of asparagus beetle feeding injury. The larvae are out in some areas now but are mostly tucked away out of sight. Look for their characteristic feeding injury to the spears (photo bottom) and check for any lurking larvae in the clusters of developing fronds (photo top).

The larval stage is the most vulnerable, so a well-timed spray could help knock back the population. Conventional options include Sevin XLR Plus, Lannate and Ambush. The organic options are Pyganic and Entrust. Pyganic can be used up to the day of harvest, but you need to wait for the ferns to open to use Entrust as opposed to using it on the spears.

Asparagus beetle pressure is cumulative from year to year, so it is important to control this pest even during frond development to prevent worsening problems year after year.

**Resource: Chapter 12, Cornell Pest Management Guidelines for Commercial Vegetable Production.**



Lurking Larvae



Asparagus Beetle Feeding Damage

## What Happens if Garlic is Spring Planted?

Crystal Stewart -ENYCHP



Sometimes all that is needed to answer a question is a picture. This year, as part of the fusarium management trails, I spring planted garlic next to fall planted garlic. The garlic was held in a refrigerator over the winter at about 37 degrees F. It was planted out as soon as I could get into the ground. While this picture doesn't tell us the final yield or fusarium severity, it does show that plants are quite behind after a spring planting. Based on the stem size, which is a direct indicator of final bulb size, the spring planted garlic will be small.



## Flea Beetle Management

Amy Ivy –ENYCHP, Authored by Ruth Hazzard—UMass

Flea beetles have emerged from their overwintering homes in the shrubby or wooded areas surrounding fields and begun to feed on the first spring brassica plantings. Controlling flea beetles can seem like a losing battle, but we have seen real success on farms that have taken an integrated approach to management. The most important steps to reducing the population size and damage caused by flea beetles seem to be breaking the cycle (rotating spring crops as far as possible from overwintering sites near last years' fall crop), and controlling early season outbreaks using something like a trap crop or a "push-pull" approach to prevent the problem from spiraling out of control within the season or from building up to unmanageable levels over the years.

**Life Cycle:** The crucifer flea beetle (*Phyllotreta cruciferae*) is uniformly black and shiny, while the striped flea beetle (*Phyllotreta striolata*) has two yellow stripes on its back. Both are about 2 mm in length and hop away when disturbed. These flea beetles only feed on brassica crops; those found on corn or solanaceous crops are different species. Though they prefer the tender leaves of *Brassica rapa* & *B. juncea* crops such as arugula, tatsoi, mizuna, bok choy, and mustard, they will also feed on the more waxy *Brassica oleracea* crops such as broccoli, cabbage, kale and collard. Their feeding damage—small, round holes on leaves or leaf margins, which can coalesce to form large holes as leaves mature—can destroy or delay maturity in seedlings and reduce yield and marketability of older plants. The adults in fields now will lay their eggs in the soil. Larvae will feed on the root hairs of brassica crops, pupate underground, and emerge as adults in late July to feed on fall brassicas before moving outside of the field for the winter.

**Management:** Break the cycle. Plant spring crops far from fields where fall brassicas were grown, and where flea beetles will overwinter. When overwintering beetles emerge, if they can't find a host plant they will not survive and reproduce and you will reduce the population of flea beetles on your farm. You can also starve the overwintering beetles by delaying planting until July. This may not easily fit your markets, but it does work. With no food or place to lay eggs, the overwintered adults leave the area, instead of reproducing and emerging in time for midsummer dining. It may take 2-3 years to bring populations down. Control weeds at the same time. The best protection for a spring brassica planting is isolating the crop from where the beetles would have overwintered, near last years' fall crop. Finally, separate your fall crop from the spring crop, since second generation flea beetles will emerge at the same time that fall cole crops will be at their most vulnerable. These second generation adults are also the beetles that overwinter, so next spring, plan to use a field distant from previous late-season brassica fields. After harvests, till crop residue immediately to uproot and kill underground larval populations.

**Row covers:** Floating row cover provides the most effective protection from flea beetles, especially in spring and early summer. It is expensive in both materials and time, but it works. It is critical to seal the edges immediately after seeding, because brassica seeds germinate quickly and beetles rapidly find the cotyledons. Flea beetles can fit through small openings – not to mention the large holes and tears that often develop in row cover over time. Edges of the cover must be sealed on all sides using soil, black plastic bags filled with soil, or some other method. Fortunately hoops are not needed on brassica crops, but management is still time-consuming because the cover has to be removed for cultivation. Replace it as soon as possible to avoid letting beetles in.



Striped Flea Beetle

Photo by: Steve Albert—Harvest to Table.com



Flea Beetle Closeup

Other insect barriers, such as Proteknet, Biothrips, and Filbio, are available in a range of mesh sizes and can be used to protect against a variety of pests, including flea beetles. These provide less heat and greater air circulation than spunbonded row covers, though for early spring crops, the additional warming benefit of traditional row covers of various weights may be preferred.

**Chemical control.** Maturing plants should be scouted frequently. When plants are young, an average of 1 beetle per plant or 10% average leaf damage is a reasonable threshold for chemical intervention. Several synthetic pyrethroids (Group 3A), carbamates (Group 1A), neonicotinoids (Group 4A, either as foliar or soil drench), and the relatively new diamide class

(Group 28) are labeled for flea beetle in brassicas. Avoid repeated use of one type of chemistry over multiple generations or using both soil and foliar applications of the same group. Note that as of 2012, the registration for Thionex has been cancelled and is no longer allowed on cole crops. Soil-applied systemic insecticides, such as Admire Pro and Actara can provide longer term control against damage, although beetles may still be seen when scouting. Products containing the new active ingredient cyantraniliprole, a diamide (Exirel for foliar applications; Verimark for soil), are labeled for flea beetle and have been shown in trials to have good efficacy against this pest. Be aware that systemic insecticides may have longer days to harvest intervals. With foliar sprays, even if good control was achieved, re-infestations can occur rapidly and may require additional sprays.

For organic farmers, the choice of chemistries includes spinosad (Entrust) and pyrethrin (Pyganic). In UMass trials, Entrust showed the greatest efficacy in suppressing flea beetles and reducing damage, while Pyrethrin (Pyganic EC 5) showed poor to moderate efficacy in our trials but is reported by growers to cause a significant short-term knockdown. Abby Seaman, NYS IPM, found in 2012 trials that both kaolin (Surround WP) and hot pepper wax worked well. They did not prevent enough feeding for salad greens to be marketable, but they did prevent enough feeding for broccoli, cauliflower, cabbage, etc. to outgrow the damage. In 2013 NYS trials, Entrust, as well as both Venerate and Grandevo, two OMRI-approved bioinsecticides, were all found to significantly reduce damage from flea beetle on cabbage under low pest pressure. Another promising organic product is Azera, a mix of azadirachtin and pyrethrins. A 2011 University of Maryland trial found that Azera significantly reduced flea beetle feeding damage, and that mixed with Surround, it both reduced feeding damage and maintained efficacy over time.

**Control brassica weeds.** Brassica weeds also harbor flea beetles (both adults and larvae) and reduce the efficacy of your crop rotation schemes that aim to break the pest cycle by changing crop families. Yellow rocket, wild mustard, and shepherd's purse are familiar weeds that are widespread in fields and roadsides. The list of weed hosts probably also includes garlic mustard (*Alliaria petiolata*), a serious invasive weed in the brassica family. It is a biennial with white blooms in spring (May). It thrives in roadsides and field edges as well as shady woodlands, and has rapidly spread throughout Massachusetts. A good fact sheet on garlic mustard can be found at: <http://www.nps.gov/plants/alien/fact/alpe1.htm> or through the Invasive Plant Atlas of New England (IPANE) website.



Trap cropping. Take advantage of the flea beetle's preferences for particular brassicas by using the preferred species or varieties as a draw. Their numbers will build up in the more attractive plants, and are less likely to move into or stay in those less preferred. A border or even a middle row planted to *Brassica rapa* or *B. juncea* crops such as Komatsuna, tatsoi, mizuna, bak choy, and mustard has been shown to reduce numbers and feeding damage on less preferred *B. oleracea* crops such as broccoli, cabbage, or traditional kale (eg, Winterbor types). Red Russian kale (*B. napus*) and Lacinato kale (*B. oleracea*) seem to be of intermediate attractiveness. To make it work, here's some tips:

- Make sure the trap crop is established before the main crop (the one you are trying to protect) or is at least as big (e.g. transplanted same day). Direct-seeded crops can be used around transplants if seeded 7-14 days earlier.
- Use a fast-growing, vigorous cultivar for the trap crop.
- Use a border crop to prevent beetles from moving farther into the field. Traps at ends of rows help make a complete perimeter, which stops beetles coming from all directions. Interior trap crops also can act as a 'sink' within the field.
- Spray only the trap crop to kill the accumulated beetles, and avoid having to spray the main crop. You also want to keep the trap crop viable enough to do its work, and potentially be harvestable as well. Use a longer-residual product, if possible.
- Combine with a repellent on the main crop. Surround WP and garlic sprays can be used for this purpose.

A variation on this theme is the push-pull system, in which most of the brassica crop is treated with a repellent such as Surround, to "push" the beetles to a sensitive crop (e.g. bok choy or mustard), which is left untreated. This strategy limits the amount of time and material used in controlling the pest, since you only need to spray the "pull" crop, instead of all of the brassica acreage with an insecticide. The trick is to catch the beetles on the sensitive crop before they cause too much damage there, or make the "pull" crop something you don't intend to harvest, like an extra row of direct-seeded mustard. We saw this work really well on a farm in MA where flea beetles had built up to very high levels and were a major production challenge. When the farmers combined this strategy with crop rotation, separating spring from fall fields and going into a field that had been out of brassicas several years, the results were impressive. So there is hope!

-Updated by L. Mckeag and S. Scheufele, UMass Extension, Vegetable Program.

**Photo caption: Effect of push/pull system. Kale treated with Surround is protected from damage (top and bottom) while untreated bok choy (center) draws flea beetles, where they can be sprayed (hopefully before they cause this much damage!). Credit: UMass Extension.**

Resource: Hazzard, R. "Materials for Beating Flea Beetles in Brassicas". New England Vegetable and Fruit Conference, 2005 Conference Proceedings: [http://www.newenglandvfc.org/2005\\_conference/sessions\\_05/biorantional\\_biological\\_pest\\_control/Materials%20for%20Beating%20Flea%20Beetles%20in%20Brassicas%20.pdf](http://www.newenglandvfc.org/2005_conference/sessions_05/biorantional_biological_pest_control/Materials%20for%20Beating%20Flea%20Beetles%20in%20Brassicas%20.pdf)



# Garlic Twilight Meeting

Join Crystal Stewart & David Stern as we tour a trial examining the effects of different cultural controls for fusarium including raised beds, flat ground, white and black plastic, straw mulch, and spring planting. We will also have a general discussion about garlic best practices, and the state of the industry.

The meeting will be from 5-7, with a pot-luck dinner to follow ending at 8

Bring your favorite garlicky dishes to share!

Cost: Free, courtesy of the generous support of SARE



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**Cornell University**  
Cornell Cooperative Extension  
Eastern New York Commercial Horticulture



**Hudson Valley Farm Hub**  
1875 Hurley Mountain Rd  
Hurley, NY 12443

**When: 5pm-7pm**  
**June 21st**  
**(rain date June 22nd)**

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## What is FSMA and What Do I Need to Do to Comply?

Erik Schellenberg—ENYCHP

The Produce Rule, which is part of the Food Safety Modernization Act, is the new FDA legislation that covers fresh produce growers. If you sell fresh fruit and/or vegetables, and your farm operation grosses over \$500,000 on a 3 year average (this total includes MORE than just produce – it includes ALL FOOD for human or animal consumption) you must comply with the Rule by January 2018. To comply, you must attend a one day FSMA food safety education training. During this training you will learn about everything else you need to do to comply with the rule. If your operation grosses less than \$500,000, it is still highly recommended to attend a training. It will be easier for you to come into compliance in the future if your business is growing if you are already creating systems to accomplish the goals of the legislation. The information is important for all growers of fresh produce.

The next local training is on June 6<sup>th</sup>, from 8:30 AM to 5 PM, being held at the Hudson Valley Research Lab in Highland, NY. Please call Jill DeBlock at 845-344-1234 to register for the class. Registration fee is \$35.