Cornell Cooperative Extension

Eastern NY Commercial Horticulture Program

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Herbicide Options for Pumpkins and Squash

by Chuck Bornt, CCE ENYCHP

The sun is shining and even though it still might be a bit early, I know there are a lot of long season vine crops going in the ground right now so it's time to think about herbicide options. Nothing new for herbicides in winter squash or pumpkins. The best weed control in these vine crops happens when you use the herbicides that we have labeled as post plant, pre-emergent applications (before weeds and crops). They are mostly seed germination inhibitors or root inhibitors and they need to be there before the weed seeds start to germinate.

For them to work properly, there are three important factors in my opinion – most of which you can control! **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. Many weed seeds only need a day or two to germinate (if the conditions are right). If you have to wait, 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 day after planting! Planting and spraying your herbicide within a day 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.

For the products we have labeled, I would highly recommend that you not use any of these products pre-emergent/post-plant by themselves. The exception being Strategy, which already has two different active ingredients (clomazone/Command and ethalfluralin/Curbit pre-mixed). We have seen that tank mixes are the best value and result in much better weed control. Many of these products have a narrow range of weeds they target so tank mixing a couple of them improves overall weed control. Tank mixes that we think have potential for pumpkins and winter squash are:

- Sandea (Profine is the generic version) plus Dual Magnum plus Command 3ME
- Sandea plus Command ME or Strategy plus Sandea.

My recommendation for pumpkins and winter squash: 0.5 ounces per acre Sandea/Profine + 1 pint Dual Magnum per acre + 1 pint Command per acre. If you want to use Strategy, I would stay to the 3 pints per acre rate on course-textured soils and no less than 4 pints on other soil type. These are just my observations and experience over the years - 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.

I am also going to warn you about a couple things – first, if you have never used Command before, do not be surprised if your plants come up and turn white – don't worry as this is pretty typical with Command use but they will grow out of it quickly and will not decrease yields or delay maturity. The same may happen to weeds that might also germinate especially perennial weeds that might be in the field. Second, if you have never purchased Sandea or the generic version, Profine, I should warn you that you might find the product to be a bit pricey – but in the end at the rate you use it is comparative to other products and is a valuable tool to have in your toolbox!

Dual II Magnum and Dual Magnum Notes: We go over this every year, as I want to make sure everyone is in compliance! Yes, pumpkins are on both the Dual Magnum and Dual Magnum II label—however, if you read the label it clearly states that it can only be applied **"as an inter-row or inter-hill application in pumpkin. Leave 1 foot of untreated area over the row, or 6 inches to each side of the planted hill and/or any emerged pumpkin foliage (inter-row or inter-hill means not directly over the planted seed or young pumpkin plants)."** So technically, you cannot broadcast either Dual Magnum product according to the regular label that comes on the jug. **In order to use the broadcast application, you must have the 24C Special Local Needs (SLN) label and the only formulation that has the broadcast application is Dual Magnum! Therefore, you cannot use Dual II Magnum broadcast on either pumpkins or winter squash!** The broadcast method of Dual Magnum and Reflex 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 at the beginning of every year and indicate that you are using this product on those specific crops. **The use of generic "Dual" products such as Charger Max is not legal to use on pumpkins or winter squash.** To register, go to www.farmassist.com and in the top header bar click "Crop Protection" and then select "Indemnified Labels". Follow the directions from there. **Remember, you need to have a copy of the Dual Magnum 24C label in your possession when using this material.**

Table 1: Recommended Pre-Emergent/Post Seeding Herbicides for Pumpkins and Winter Squash				
Product	**Crops**	**Weeds controlled**	**Rate/acre**	**Comments**
Sandea, Profine 75 (halosulfuron)	All cucurbits	Broadleaves	0.5 - 1.0 ounces	Needs to be mixed with a grass herbicide when used pre-emergent. Can stunt and delay emergence especially at higher rates but temporary **(I recommend 0.5 oz rate)**
Dual Magnum (S-metolachlor)	Pumpkins, winter squash	Mostly grasses and	2/3—1.33 pints 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. **Do not incorporate** 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).
Command 3ME (clomazone)	All cucurbits	Annual grasses and some broadleaves	2/3 – 1.33 pints 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. **Do not incorporate!** 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.
Curbit EC (ethalfluralin)	All cucurbits	Mostly annual grasses and some broadleaf suppression	3.0—4.5 pints depending on soil & organic matter level	Use 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 row covers.** Cold, wet soils can increase injury or even result in crop failure! Label recommends using a minimum of 20 gals/acre fixed spray volume. Weed control may be reduced on soils with organic matter over 5%. Not recommended for soils with more than 10% organic matter.
Strategy (Pre-mix of Command and Curbit) (clomazone + ethalfluralin)	All cucurbits	Most annual grasses and some broadleaves	2.0 - 6.0 pints depending on soil texture	I would recommend no less than 4 pints/acre. **Do not incorporate.** Use 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. Do not let this material freeze in storage as it could potentially settle out and clog your sprayer screens, tips etc. Be sure to check the label as there are crop rotational restrictions that are rate dependent.
Reflex (fomesafen)	Pumpkins and winter squash **except butternut**	Broadleaves and some annual grass suppression	0.5—1.0 pints	24C Special Local Needs label on pumpkins, summer squash and most varieties of winter squash **but do not use on butternut**. 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. Do not exceed 1 pint per acre of Reflex on pumpkins, winter or summer squash per season. Please note the 18-month crop rotation restrictions for sweet corn. Do not use Reflex alone.

Flee Beetle and Spinach Leafminer

By Ethan Grundberg, CCE ENYCHP

Crucifer flea beetles, *Phyllotreta cruciferae Goeze*, have been causing significant damage on susceptible brassica crops in the region.

Prevention: Young transplants and recently emerged direct seeded crops at the cotyledon stage are the most susceptible to damage. Rotating spring brassicas as far away from fields that had cole crops the previous fall can help reduce pressure. Keeping field edges clean of mustard weeds can also reduce flea beetle populations that then migrate into production areas. Research from UMass has shown that reflective plastic mulch can help suppress flea beetle populations in some plantings: see

https://ag.umass.edu/sites/ag.umass.edu/files/pdf-doc-ppt/mulches_2018_report.pdf for more information. On a smaller scale, insect netting or floating row cover can also be used, but must be secured at soil level before flea beetle emergence. Mustard cover crops can also attract flea beetles and should be carefully managed as far away from brassica cash crop fields as possible. Once flea beetles have reached a threshold of an average of 1 beetle per plant or 10% average leaf damage, it's time to consider chemical control options.

Conventional Options: There are a number of pyrethroid (IRAC Group 3A) insecticides labeled for flea beetles that provide quick knock downs of populations. A few of the labeled pyrethroids labeled for use in New York are Baythroid XL (beta-cyfluthrin), Brigade 2EC (bifenthrin), Warrior II with Zeon Technology (lambda-cyhalothrin), and Mustang MAXX (zeta-cypermethrin). Given that this generation of flea beetles will still be active for a few weeks, growers may want to consider pre-mix products of pyrethroids and neo-nicotinoids (IRAC Group 4A) that will provide longer residual control. Two common options are Leverage 2.7 (imidacloprid + cyfluthrin) and Endigo ZC (lambda-cyhalothrin + thiamethoxam). One other pre-mix product with longer residual than a straight pyrethroid and with less potential to hurt pollinators than the neo-nic mixes is Besiege. Besiege is a mix of lambda-cyhoalothrin and the IRAC Group 28 diamide insecticide chlorantraniliprole. The neo-nicotinoid Admire Pro (imidacloprid) is labeled as a foliar spray for flea beetles. Please note, soil applications of Admire Pro on brassicas are only labeled for aphid, leafhopper, thrips, and white fly control, **NOT** for flea beetles. Dr. Faruque Zaman has been conducting insecticide evaluations on Long Island in conjunction with the Brassica Pest Collaborative the past few years and found that Warrior II and Harvanta 50SL (cyclaniliprole) have good activity on flea beetles; read more of the details of his research here: https://ag.umass.edu/vegetable/special-topics/brassica-pest-collaborative/research-reports-on-management-of-brassica-pests

Organic Options: Like with the conventional options, there are a number of OMRI-listed options labeled for flea beetle suppression. However, in field trials both at UMass and New York State IPM, few provided a statistically significant reduction in flea beetle pressure over untreated controls. Spinosad products, like Entrust, have generally shown the highest efficacy and can be mixed with OMRI-approved spreader-stickers to improve performance. A trial in Maryland from 2011 showed good performance from Azera, a pre-mix of azadirachtin and pyrethrins (IRAC Group 3A), especially when mixed with Surround WP (kaolin clay). Finally, a 2013 trial in New York found that both Grandevo (*Chromobacterium subtsugae* strain PRAA4-1T and spent fermentation media) and Venerate (Heat-killed *Burkholderia* spp. strain A396 cells and spent fermentation media) reduced flea beetle damage on cabbage under low pressure.

Typical shotgun type small holes caused by crucifer flea beetle feeding on white mustard cover crop.

Spinach Leafminer: This leafminer species only feeds on plants in the goosefoot family, chenopodiaceae, like beets, Swiss chard, and spinach. Maggots tunnel through the leaf tissue creating "mines" that often coalesce into larger blotchy areas of dead leaf tissue. The larvae are the only life stage that causes foliar damage. Depending upon environmental conditions, the maggots feed for 10-16 days then fall to the ground to pupate in the soil. Early scouting to determine the beginning of larval emergence and feeding is critical for effective chemical control. Since the maggots are embedded in the leaf tissue, systemic insecticides and those with translaminar activity like Agri-Mek (abamectin), Trigard WSP (cyromazine), and Entrust (spinosad), are most effective. If affected leaves are manually removed, make sure that they are destroyed through shredding, burning, or deep burial to ensure that larvae do not survive and emerge during the next flight (usually in early July).

Managing Striped Cucumber Beetles

By Elisabeth Hodgdon, CCE ENYCHP

Striped cucumber beetles (SCB), an important pest of cucurbits, are expected to emerge soon. Adults spend the winter along the edges of fields, and emerge in late May or early June. Young cucurbits in the field and high tunnel cucumbers are at risk for damage now from the newly emerging adults.

Beetles feed on leaves, stems, flowers, and fruits, reducing yield. In addition to feeding damage, beetles carry the pathogen that causes bacterial wilt. Bacterial wilt can cause the collapse and death of otherwise healthy, large plants.

Systemic neonicotinoids can be used to treat seeds and seedlings as a preventative control measure to reduce damage to young plants. Organic growers may use netting, row cover, or apply kaolin clay to protect seedlings. While kaolin clay does not kill the beetles, it acts as a feeding deterrent. To protect high tunnel cucumbers, some organic growers install insect exclusion netting along the side walls and vents of their tunnels. Netting can be secured via wiggle wire along the sides and rolled up when not in use.

Foliar applications of insecticides, such as pyrethroids and carbamate can be used for beetle control for conventional growers, as well as pyrethrin for organic growers. Spray when populations reach one beetle for every two plants for the most susceptible crops (cucumber, zucchini, summer squash, and melons). To avoid toxicity to bees, spray in the late afternoon or evening while pollinators are less active. Manage beetles while plants are young to reduce populations and avoid spraying during flowering.

Research from Jude Boucher at the University of Connecticut showed that perimeter trap cropping with blue hubbard squash is effective for striped cucumber beetles. To be most effective, one or two rows of the squash should be planted around the entire field, and the beetles should either be controlled using insecticides on the trap crop, or the trap crop should be disked up to manage the first generation of beetles. Research is underway to improve mass trapping and organic insecticide efficacy for striped cucumber beetle.

New Resource Alert: High Tunnel Cucumber Production Guide
Drs. Wenjing Guan, Laura Ingwell, and Dan Egel from Purdue University released a new comprehensive high tunnel cucumber production guide that is available online. The guide includes cultivar recommendations and variety trial results, trellising information, and pest and disease identification and management strategies.

Reports of Symphylan 'Hot Spots'

By Teresa Rusinek, CCE ENYCHP

Several reports of declining vegetable transplants have come in the past week. The damage looks like Rhizoctonia or Pythium disease but in at least two cases was likely caused by a small (about a quarter inch), white, centipede–like soil creature called a symphylan that feeds on plant roots and underground stems. In the northeast, symphylans are an occasional but destructive pest. Noticeable damage can be observed if populations exceed an average of 1 to 2 per 6 x 6 x 12-inch sample, in moderately to highly susceptible crops, such as broccoli, squash, spinach, and cabbage. The first indication of an infestation is a small area or “hot spot” of stunted, unhealthy plants. Damage continues in the same spots year after year and may increase by 10-20 feet each year. In most cases little can be done without replanting after damage is observed. Reducing symphylan populations is difficult. Tillage when symphylans are in the upper soil profile in the spring and fall may decrease populations. Over the summer, they move deeper into the soil strata. A spring oat winter cover crop has been shown to reduce populations. Mustard and spinach are hosts for symphylans and may increase populations. No rescue treatment can be used effectively while the crop is growing. Baythroid XL (restricted use) has a 2(ee) label for control of Garden Symphylan in brassica and leafy vegetables as a soil-incorporated treatment before or at planting or transplanting. In potato

production, Mocap EC is labeled as a pre-plant or at planting application (note: this is a restricted use pesticide not for use in Nassau and Suffolk Counties). In organic production growers can apply OMRI listed PFR97 microbial insecticide or AZERA insecticide as a soil drench spray. More info can be found at https://pnwhandbooks.org/insect/ipm/garden-symphylan

Damaged kale seedlings (above) and Symphylan (right). Photos provided by grower.

Trying to Reduce the Stress of Temperature and Moisture Swings

By Crystal Stewart Courtens, CCE ENYCHP

It looks like we are back to the "normal" cycle of cold and wet/hot and dry that we have seen at times during most springs/early summers recently. One week growers are scrambling to make sure that everything is covered to protect from light frosts and the next they are scrambling to make sure that cool season crops aren't getting too hot under covers. The plants have trouble keeping up too—cold, wet soils don't promote root growth, so even if plants were set weeks ago they might not have developed the robust root system you'd expect yet. As soon as it gets hot (and windy, everywhere I've been), the plants struggle to move enough moisture through the leaves.

So what's a farmer to do? For plants that were in the ground during the cold and are now experiencing their first heat, careful moisture management is important. These plants may not be able to yet handle the lower moisture levels they will easily grow through a little later in the season. It seems early to be turning on irrigation for most folks, but checking soil moisture and doing so if it's low will help a lot. That early dry spell we had means that some beds got formed with drier than usual soils, and in fact need to be irrigated ahead of the regular schedule.

Hardening plants off fully before they go out helps plants cope with the weather of this week. Ensuring that the root systems of new plants have experienced a bit of moisture stress and that the leaves and stems are physically prepared for both sun and wind can prevent much of the immediate shock that plants can experience at transplanting. 3-4 days of gradual exposure to outdoor conditions and small reductions in watering should do it. When it is time to set out plants, doing so in the later afternoon allows an overnight chance for the plant to catch up on getting water back to above ground parts, which dramatically reduces the chance that plants wilt onto the plastic, a scenario that often spells sudden doom. And of course watering them in at planting is essential for good root to soil contact, allowing immediate root growth.

Vegetable Growers with Farm Employees - We Need Your Help!

Cornell's Dyson School and NYS Ag and Markets are conducting a study this summer to see what the impact of the changes in Ag labor regulations (overtime for ag workers, day of rest, etc.) has had on farm income and farm viability in NYS. I will be looking for vegetable growers this summer who are willing to be part of this study. You must have paid ag labor and have good financial records, including tracking hours worked and pay rate. All data will be confidential – no individual data will be attributable to a specific farm.

It is likely that NYS will be revisiting the overtime rule again this fall and this study is intended to provide better data to the Board and the Legislature. Your participation could make a big difference!

If you are willing to help, please contact Elizabeth Higgins at emh56@cornell.edu

Restaurant Revitalization Fund - Not Just for Restaurants!

By Elizabeth Higgins, CCE ENYCHP

This program provides emergency assistance for eligible restaurants, bars, and other qualifying businesses impacted by COVID-19.

The Restaurant Revitalization Fund (RRF) provides qualifying businesses with funding equal to their pandemic-related revenue loss of at least $1,000 and no more than $5 million per physical location. The maximum grant is $10 million for businesses with multiple locations. Recipients are not required to repay the funding as long as funds are used for eligible uses no later than March 11, 2023. Wineries, breweries and distilleries that sell directly to the public are eligible for this program. Farms where a significant portion of the gross revenue (33%) comes from on-site sales of food and beverages to the public may also be eligible.

Funding received from the Restaurant Revitalization Fund will not be taxable as gross income by the IRS and you can still deduct the expenses paid for with Restaurant Revitalization Funds from your federal taxes.

$28.6 billion has been appropriated for this program. These appropriations remain available until expended. SBA will continue accepting applications subject to availability of funds. The program is available now (as of May 14). There are set-asides for small businesses.

You can apply through SBA's website at: https://restaurants.sba.gov/. I have developed a longer fact-sheet on this program at http://bit.ly/RRFInfoMore. SBA's website with much more detailed information about the program is available at https://www.sba.gov/funding-programs/loans/covid-19-relief-options/restaurant-revitalization-fund.

USDA's Farm Service Agency is Currently Accepting New and Modified CFAP2 Applications!

By Elizabeth Higgins, CCE ENYCHP

Did you miss out on CFAP 2 last year? Do not make the same mistake this year! USDA has reopened CFAP 2 (or the Coronavirus Food Assistance Program) so if you did not receive funding yet you can still apply. CFAP 2 is a COVID-19 assistance program for farms that provides a check to farmers who grew produced and sold an eligible crop or livestock.

Most vegetable crops are eligible and your payment would be a percentage of your FY2019 sales. For fruit, vegetables, herbs and greenhouse ornamentals you do not need yield data, just your sales information. This program is great for diversified farmers because you apply at the same time for everything you produced, crops and livestock.

YOU DO NOT HAVE TO SHOW THAT YOU HAD A LOSS IN 2020!!!!!!! I cannot stress this enough. If you grew and sold an eligible crop (or livestock) and had FY2019 sales (or FY2020 if you were a new grower) then you are eligible to receive CFAP 2 funds. You can receive a payment even if you had a great season in 2020.

USDA has not set a cutoff date yet for applications, but my advice would be to apply ASAP as this opportunity may not come about again. From what I have heard, USDA-FSA is making it as easy as possible to apply and folks are being paid quickly. Contact me (emh56@cornell.edu) if you have questions.

Go to Coronavirus Food Assistance Program | Farmers.gov

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