Cornell Cooperative Extension | Cornell Vegetable Program

VEGEdge

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Controlling Pea Volunteers in Snap Bean Fields

Lynn Sosnoskie, Cornell AgriTech

Volunteer peas (Pisum sativum) in snap bean (Phaseolus vulgaris) fields can reduce crop growth and yield and interfere with harvesting. In 2021 and 2022, volunteer peas were observed on multiple occasions in commercial snap bean fields intended for processing, prompting growers to seek guidance on effective management strategies. Herbicide options for controlling volunteer peas in snap beans are limited, as both crops are legumes and share sensitivity to many of the same chemistries. Among the few options considered by growers were Reflex® (fomesafen, WSSA Group 14), applied post-emergence (POST), and Sandea® (halosulfuron, WSSA Group 2), applied pre-emergence (PRE) and POST.

Research Finding

Cornell AgriTech conducted research to test these potential treatments on 'Little Marvel' pea control in in 'Huntington' snap beans. Snap beans were planted in mid-June in plots that were 4 rows wide (with rows on 30-inch spacing) by 25 feet long. Volunteer peas were seeded into the plots at the same time at an average density of 10 pea plants per row of plot.

Herbicide treatments included: Sandea® (0.023 lb ai/A) PRE at snap bean planting, Sandea® POST at the snap bean 2nd trifoliate leaf stage, Sandea® POST at the snap bean 4th trifoliate leaf stage, Reflex® (0.313 lb ai/A) POST at the snap bean 2nd trifoliate leaf stage and Reflex® POST at the snap bean 4th trifoliate leaf stage. At the snap bean 2nd trifoliate stage, volunteer peas were at growth stages V1 to V3. By the

Pea volunteer in snap beans in a commercial field located in Western NY. *Photo: L. Sosnoskie*

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About VegEdge

VegEdge newsletter is exclusively for enrollees in the Cornell Vegetable Program, a Cornell Cooperative Extension partnership between Cornell University and CCE Associations in 14 counties.

The newsletter is a service to our enrollees and is intended for educational purposes, strengthening the relationship between our enrollees, the Cornell Vegetable Program team, and Cornell University.

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The next issue of VegEdge will be produced on May 21, 2025.

Cornell Vegetable Program Welcomes Summer Field Technicians

Destiney Schultz

Hi! My name is Destiney Schultz, and I am a returning Summer Technician with the Vegetable Team. I graduated with a bachelor's in biology from Houghton University last year and am so excited to be back for my third summer with Cornell and the CVP. I am from Churchville NY, and I am thrilled to be Lead Scout for the Wayne and Oswego Co. onion scouting program, and to continue to learn more about agriculture and food systems. Looking forward to a great summer with everyone!

Kaitlyn Stearn

Hi, I'm Kaitlyn and I am going to be a third-year environmental science major at RIT. I love field work and am very excited to be spending time outside this summer! I have always loved plants and insects (especially native and invasive ones) and am interested in learning more about how they interact in agriculture. At RIT I work in a lab studying the microbial ecology of salamanders and I've worked with plants and insects in the past, including in my many classes outside that involve field work. I have yet to learn hands-on about the intricacies of agriculture, so I am very much looking forward to my experience here this summer!

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4th trifoliate stage, peas had reached V4 or later. Non-treated plots were included to describe how peas and snap beans would grow without herbicide intervention. All other weeds were removed by hand.

Key Findings About Herbicide Treatments

Reducing Pea Growth

- When Sandea® was applied early (either PRE or when snap beans had their second set of trifoliate leaves), pea growth was reduced approximately 55 to 60% compared to the untreated plots.
- Reflex® showed some suppressive effects on peas when applied at the early POST timing, reducing their growth by about 35%, compared to the untreated plots.
- Applications of Sandea® and Reflex® at the 4th trifoliate snap bean leaf stage, when peas were V4 or greater were not effective at stunting pea growth.

Effects on Snap Bean Yields

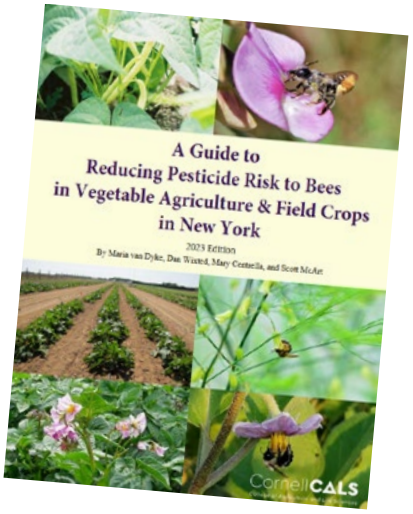
- Marketable snap bean yields were lowest in the untreated plots and where Sandea® and Reflex® were applied late (when snap beans had their fourth set of three leaves).
- Marketable snap bean yields were generally better than untreated areas when using:
  - Sandea® applied PRE (11% increase compared to untreated check).
  - Sandea® (17% increase) and Reflex® (7% increase) applied at 2nd trifoliate snap bean leaf stage.

Conclusions and Future Research

Neither Sandea® nor Reflex® completely controlled volunteer peas, but they can slow down pea growth, depending on the timing of applications. Early treatments (PRE or early POST) were most effective at suppressing pea growth and improving snap bean yields in this research trial. However, it is important to remember that registered herbicides can also cause injury to the desired crop. Growers should follow label requirements to prevent unnecessary damage to small snap beans. Sandea® herbicide can be applied to snap beans when plants have 2 to 4 fully expanded trifoliate leaves, while Reflex® can be applied starting at the first fully expanded trifoliate leaf stage. More studies are needed to understand how these treatments affect harvest quality and efficiency, how rates affect performance, and how these herbicides can be used in sequence to reduce volunteer pea pressure.

Protecting Bees in the Field from Pesticide Activity

Robert Hadad, Cornell Cooperative Extension, Cornell Vegetable Program



Vegetable production, like fruit production, requires pollination from bees in order for plants to produce the marketable end product. We have all seen what happens to cucumbers, squash, tomatoes, and pumpkins when there is incomplete pollination usually caused from too few visits by bees. This past winter has seen some devastating losses to bee colonies, most likely weather related but some causes might be linked to weakened bee health.

For some time, research has pointed to one area that can affect the health of bees. This is from bee contact with some pesticides that can be toxic to these important insects. There has been a push by researchers and Extension to communicate the toxicity issues to bees and come up with strategies to help reduce problems.

One approach is to use lower-risk pesticides. Pesticide risk comes from a combination of toxicity levels and the time the insects are exposed to the chemical. Exposure can be directly from spray contact but also can come from chemicals that accumulate in puddles in the field, from plant leaf secretions, pollen and nectar.

To compound the problem, it has been discovered that combination of some chemical sprays can make the toxicity problem worse. The term for this is synergistic interactions. Active pesticide ingredients from different products can combine increasing the overall toxicity. Knowing if a pesticide is of low risk is important but also knowing if the other chemicals being used in spray mixes or from close applications can increase the risk of toxicity.

Regulating synergistic chemicals is beyond the scope of the EPA at this time. However, there is currently a resource that provides information on these pesticides and synergies. A Guide to Reducing Pesticide Risk to Bees in Vegetable Agriculture and Field Crops in New York is available: https://cornell.app.box.com/v/ProtectionGuide-FieldCrop2023. It was put together by the Cornell Entomology Dept and it gives quite a bit of detail and lists products that can have these synergistic affects.

Check out the guide before spray season kicks in. Follow the IPM approach of reducing risk to bees so that the pollinators can keep working for you in the fields.

CROP Insights

Observations from the Field and Research-Based Recommendations

GENERAL

There has been an uptick in seedling issues since the onset of the wet weather at the beginning of the month. Problems include damping off caused by pythium, wirestem and damping off caused by rhizoctonia, and botrytis, which is extraordinarily common and aggravating in greenhouses containing ornamentals. In all three cases, best course of action is to manage your transplants on the dry side, increase airflow around the seedlings (space trays) and in the greenhouse, probably treat with an appropriate fungicide (see guidelines) and sanitize the bench and flats once the crop moves out.

Of note, if you are raising verbena alongside cucurbits, know that verbena powdery mildew and cucurbit powdery mildew are the same exact disease. Don't let sketchy looking or insect-infested flower crops ruin your field produce before you even get planted. I'm looking at you, thrips and aphids that routinely vector virus into peppers, tomatoes and cucurbits. And the horrible and difficult to treat broad mite infections that move into peppers now and only show up in the field weeks later. I'm a huge fan of pretty posies, don't get me wrong. I also know that they're a risk for your field plantings and if you have both in one space then you've got to be diligent in your management practices. – EB

ASPARAGUS

Asparagus harvest is well underway. Asparagus beetles are now present in many areas. The adults are about twice as long as wide and are red and black with white-yellow spots in a grid pattern on their backs. The adults are mostly feeding - egg laying is just beginning and will pick up quickly. It is often not worth treating adults in mature asparagus unless your population is quite high. Young plantings are far more susceptible to damage and warrant more aggressive treatment. Picking and removing all your spears, including the unmarketable ones, is a very effective way to crash the population because you will be removing the eggs from the field. This is the only option for the in-harvest period for organic production. Conventional growers have a few chemical options with short enough PHIs for use during harvest but these are harsher materials and most require spray licenses. See the Cornell Guidelines or reach out for more info. I think it is a much better move in mature plantings to manage asparagus beetles with your harvesting techniques until you reach fern stage.

By now you will have a good idea of what perennial weed species are surviving your spring herbicide program. Many perennials will still look sickly. Unfortunately, any perennial weeds living at this point are quite unlikely to die and will need to be dealt with after harvest. Make note of their progression while you harvest so they don't regain a footing and get the better of you. – EB

BEETS

Early field-grown table beets have emerged. Cool, wet weather in the spring favors Bacterial leaf spot (BLS), which is commonly found during the early stages of growth (2 to 6 true leaves). BLS lesions are predominant on the leaf edges, although they may occur across the leaf surface. They are irregularly shaped and dark brown to black. Lesions cause the leaves to become puckered. The good news is that plants usually grow out of the disease once warm dry weather occurs and no loss of yield is expected. It is most important to correctly identify beet leaf diseases because fungicide sprays do not work on BLS and are only warranted later in the season if Cercospora leaf spot, Phoma leaf spot, or Alternaria leaf spot are present and of economic concern. Brush up on identification of these diseases using the series of table beet fact sheets at Disease factsheets and articles | Cornell Vegetables and if you need assistance, please contact our vegetable specialists. – JK

COLE CROPS

Early cabbage, cauliflower and broccoli are in. The spring brassicas like radish are developing nicely. Cabbage maggot is of course a concern in all these crops. Roughly, the first flight occurs when yellow rocket is in bloom and the second flight about when daylilies flower. If you're planting in those high risk windows, do your homework and have a management plan in place. Row cover and exclusion netting are both effective avoidance techniques for small plantings IF the cabbage maggots are not already present when the covering is installed. That includes avoiding planting into sites where cabbage maggot is likely to have overwintered, like in areas with lots of cruciferous weeds like penny cress, shepherd's-purse, wild mustard and similar.

Several of the currently labelled insecticide options work best when used in combination with cultural controls. See the Cornell Guidelines. – EB

GARLIC

Garlic, for the most part, is coming along. Growth seems decent. Excess rain will probably have diluted some of the early spring applications. It may already be too late to add a second helping of fertilizer if it wasn't applied earlier. Remember, fertilizer needs of the plants drop by mid May. – RH

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LETTUCE AND GREENS

Slugs and flea beetles are a menace in the greens plantings. Wet soils are threatening root rots. Over anxious growers are out in soils that are too wet and compaction is going to be a problem. – RH

ONIONS

It's been a wet spring, which has delayed planting, put onions under water to fight for their lives, caused growers to miss preemergent-to-onion application of bromoxynil (Buctril) and made for some very tricky herbicide application decisions. With only a couple of exceptions, Elba muck has finished seeding and transplanting continues on track, while seeding is delayed in Wayne and Oswego Cos. Since mid-April, Sodus and Fulton NEWA weather stations recorded over 4 inches of rainfall. Killing barley windbreaks is on the agenda this week for fields where onions are in flag-leaf stages. Most commonly, missing bromoxynil spray results in increased escapes of mustard (marsh yellowcress) and ragweed escapes. I also saw several fields in Elba where onions were flag to flag with 1st leaf starting that have weed escapes in the cotyledon to 0.5-inch stage (Fig. 1). Unless you have a laser weeder, addition of Goal 2XL 0.25 – 0.5 fl oz/A to barley-kill herbicide tank mix (with Outlook and Prowl) will kill or injure such weeds (and volunteer potatoes) to keep them small until more post-emergent herbicides can be applied at 1.25-2 leaf stages. A 2-step barley-kill strategy can also offer additonal opportunties - See article on page 9 for 1- vs. 2-step barley-kill strategies. – CH

Figure 1. Onions at flag leaf stage where weed escapes are cotyledon to 0.5-inch. When the first leaf starts to grow, Goal 2XL 0.25-0.5 fl oz/A may be added to barley-kill herbicide to kill and/or injure these weed escapes to keep them under control until the next opportunity to apply post-emergent herbicides. *Photo: C. Hoepting, CCE*

PEAS

Planting of the processing pea crop began during the dry period at the end of April but was delayed last week because of the rain. Growers are trying to catch up with planting this week. The earliest plantings have emerged and have a few nodes of growth. At least one field suffered flooding damage in southern Livingston County. Tiny velvetleaf, ragweed, and lambsquarters seedlings are already present in some fields. Make sure to scout fields for weeds and have a plan for post-emergence weed control. – JK

PEPPERS

You know what's gross and dispiriting? Peppers transplant stems folding in half due to slimy stem infections of botrytis. Airflow is your friend! Falling petals from baskets are not. – EB

SNAP BEANS

Processing growers take note of the cover article on controlling volunteer peas in snap bean fields. – JK

SWEET CORN

Planting of early season processing sweet corn started this week, on a bit of a delay because of wet soils last week. – JK

Early fields of fresh market corn under plastic are about to get cut out and seem to be doing well so far. Open field plantings have started going in with early and drier ground fields beginning to emerge. Corn traps are out in Eden and will be placed out in other WNY sites over the next 2 weeks as crop progression allows. Reach out to Elizabeth Buck if you want to receive text alerts for trap counts in Erie, Niagara, Genesee, and Orleans counties. – EB

TOMATOES

A malady known as oedema was observed this week in high tunnel tomatoes. The symptoms include rough scarring on the underside of the leaf that is tan to white in color, accompanied by yellow on the upper leaf surface (Fig. 2). This condition is caused by moisture swings within the plant. In times of excess moisture cells will swell and burst leaving the scarred tissue. This can happen particularly if the soil vacillates between excessively dry and then wet. Relative humidity in the greenhouse house can also increase oedema. If the relative humidity is too high, and soil moisture is also high, an actively growing crop will take up more moisture than it can transpire into the atmosphere. This will cause water to 'back-up' in the plant and lead to the rupturing of cell walls. The condition is not contagious, and minor amounts will not affect yield. However, oedema can become infections sites for Botrytis Gray Mold. To prevent oedema, ventilate regularly (even on cool, cloudy days) and maintain uniform soil moisture, with daily irrigation, sufficient for crop demand. – JR

Figure 2. Yellow, semi-circular spots on the upper leaf surface caused by oedema could easily be confused with leaf mold or other diseases (top). Oedema scarring on the underside of a leaf (bottom). *Photos: J. Reid, CCE*

Adding Satellite Hydrocap (= Generic Prowl H2O) At-Planting to Transplanted Cabbage Preemergence Herbicide Program: 2024 Research Results Highlights

Christy Hoepting, Cornell Cooperative Extension, Cornell Vegetable Program

This article highlights new research results from 2024 trial, which emphasized using Satellite Hydrocap (= generic Prowl H2O) at-planting including pre- and post-transplant and in combinations with Goaltender and Dual Magnum.

In Short...

- Goaltender applied at planting is key to best control of ragweed. The higher the rate, the better the control.
- 3-product combinations at planting of Goaltender 0.5 – 1 pt/A, Dual Magnum 0.5 pt/A and Satellite 1 - 2.1 pt/A offered excellent control of Lamb's quarters and ragweed.
  - But, when Dual Magnum 0.5 pt/A + Satellite 2.1 pt/A was applied as a tank mix post-transplant (following Goaltender 0.5 – 1 pt/A pre-transplant), it caused yield reduction due to stunting injury.
  - Additionally, post-transplant application of Goaltender 0.5 pt/A + Dual Magnum 0.5 pt/A + Satellite 1 pt/A resulted in yield reduction due to stunting and leaf necrosis (from Goaltender).
  - The safest of these 3-product combinations was when Goaltender 0.5 – 1 pt/A and Satellite 1 – 2.1 pt/A were applied in a tank mix with Dual Magnum 0.5 pt/A pre-transplant or followed by Dual Magnum 0.5 pt/A by itself post-transplant.
- When applied when soil temperatures were warm, tank mixes of three herbicides applied pre-transplant were safe, unlike when soil temperatures were cold (in 2023 early spring trial).
- Be aware that any treatments with the low-rate of Dual Magnum 0.5 pt/A may not result in adequate control of yellow nutsedge (although not trialed specifically).
- Theoretically, when Goaltender and Satellite are used in combination, control of velvet leaf should be adequate and Command may be dropped.
  - **If anyone has a good velvet leaf site, I would love to prove this theory!**

For more information on pre-emergent weed control in transplanted cabbage, please see article, "Weed Control in Cabbage with Pre-Emergent Herbicides: Pieces of the Puzzle Falling into Place" on page 3 of the April 17, 2024 issue of VegEdge available at https://rvpadmin.cce.cornell.edu/pdf/veg_edge/pdf286_pdf.pdf.

IMPORTANT NOTE: Growers must read, understand and follow the current New York State approved pesticide labels. The label is the law. All herbicides mentioned in this article are labeled on cabbage in New York, however, not all of the uses that I tested adhere exactly to current label restrictions. My research goal is to find information to support requests for future label expansions.

Background – Key Findings from Previous Studies (7 field trials from 2019 to 2023)

- **Goaltender 0.5 pt/A + Dual Magnum 1 pt/A consistently resulted in best season-long broad-spectrum weed control.** It has provided excellent control of Lamb's quarters, pigweed, marsh yellowcress, Shepherd's purse, purslane, annual grasses and sod and good control of ragweed.
- A lot of work has been done on **timing and rates of Dual Magnum and Goaltender combinations**.
  - This combination is **safest when the two herbicides are separated into Goaltender pre-transplant (PRE-T) followed by (fb.) Dual Magnum post-transplant (POST-T)**.
  - The higher rate of Goaltender 1 pt/A PRE-T fb. lower rate of Dual Magnum 0.5 pt/A POST-T resulted in the least crop injury of the Goaltender/Dual Magnum combinations. This was one of the few treatments that did not cause reduced yield in the early spring trial when soil temperatures were cold at planting.
  - Generally, stunting injury caused by Dual Magnum was higher when it was applied PRE-T, especially at the higher rate (1 pt/A) and as the number of products in the PRE-T tank mix increased.
  - Goaltender POST-T can cause leaf necrosis injury, especially when applied in a tank mix with Dual Magnum. Often, plants grow out of this injury within 2-3 weeks.
- **By far, Prowl H2O/Satellite provided the best control of Lamb's quarters**, although Trifluralin and Goaltender also provided some control, while Dual Magnum was weak. It has generally been found to have great crop safety when applied POST-T.
  - **Satellite Hydrocap is a generic version of Prowl H2O** that unlike Prowl H2O, which can only be used in cabbage as a directed row middle spray, Satellite **allows for "broadcast postemergence foliar spray"**. The label states that Satellite must be applied to cabbage plants with 2-4 leaves within 1-3 days POST-T.
  - Tank mixes of Satellite + Goaltender POST-T caused no more necrotic leaf injury than Goaltender alone.

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2024 Cabbage Herbicide Trial

The emphasis of the 2024 cabbage herbicide trial was to study Satellite at-planting in combination with Goaltender and Dual Magnum, including using it pre-transplant (as I had only trialed it POST-T previously).

- Located at Bejo Research farm, Geneva, NY.
- Bellicose variety (~ 80 days to maturity).
- **Late-Spring trial once soils warmed up.** Pre-plant incorporated and PRE-T treatments applied on May 23, trial was planted and POST-T treatments applied on May 24 (air temp 84°F, soil dry).
- The trial did not receive rainfall until 20 days after planting when it got 1.54 inches on June 12 and 0.74 inches on June 14. Adequate rainfall fell throughout July and August.
- **Lamb's quarter's (LQ) pressure was high. Ragweed (RW) pressure was moderate.**
- Entire trial was hand weeded 38 days after planting on July 1st.
- Yield was reported as mean head weight. There were no differences among treatments in unmarketable heads (which were minor).

Table 1. Evaluation of pre-emergent herbicide combinations and timings for improved control of Lamb's quarters (LQ) and ragweed (RW) and crop safety in spring-planted (May 24) transplanted summer cabbage (c.v. Bellicose, ~ 80 days) in Geneva, NY, 2024.

Treatment: Product[1] and Rate/Acre				34 DAP[2] Jun 27 Pre-cupping 12-14" Dia.[3]		84 DAP Aug 15-16 Harvest
	Application Timing[4] and Date			Weed Control (% / plot)		
No.	PPI May 23	PRE-T May 23	POST-T May 24	LQ[5]	RW	Mean weight (lb) / head
1	Untreated			0 g[6]	0 e	3.45 f
Goaltender / Dual Magnum combos:						
2		Goaltender 0.5 pt	Dual Magnum 1 pt	89 abc	72 c	5.81 a
3		Goaltender 1 pt	Dual Magnum 0.5 pt	94 ab	87 abc	5.90 a
4		Goaltender 0.5 pt + Dual Magnum 0.5 pt		74 cd	75 bc	4.94 cde
Goaltender / Dual Magnum / Satellite 1 pt combos:						
5		Goaltender 0.5 pt + Dual Magnum 0.5 pt + Satellite 1 pt		90 abc	88 ab	5.92 a
6			Goaltender 0.5 pt + Dual Magnum 0.5 pt + Satellite 1 pt	89 abc	75 bc	4.86 cde
Goaltender / Dual Magnum / Satellite 2.1 pt combos:						
7		Goaltender 0.5 pt	Dual Magnum 0.5 pt + Satellite 2.1 pt	99 a	88 ab	4.98 b-e
8		Goaltender 1 pt	Dual Magnum 0.5 pt + Satellite 2.1 pt	100 a	85 abc	4.98 b-e
9		Goaltender 1 pt + Dual Magnum 0.5 pt + Satellite 2.1 pt		99 ab	94 a	5.49 abc
10		Goaltender 1 pt + Satellite 2.1 pt	Dual Magnum 0.5 pt	98 ab	77[7] bc	5.24 a-d
Improving a Trifluralin / Command / Dual Magnum Program: add Goaltender/Satellite:						
11	Trifluralin1 pt	Command 0.5 pt + Dual Magnum 0.5 pt		91 ab	50 e	4.44 e
12	Trifluralin1 pt	Command 0.5 pt + Dual Magnum 0.5 pt + Goaltender 0.5 pt		99 ab	84 abc	5.58 ab
13		Command 0.5 pt + Goaltender 0.5 pt	Dual Magnum 0.5 pt + Satellite 2.1 pt	98 ab	86 abc	5.01 b-e
p value (α = 0.05), Fisher's Protected LDS test.				<0.0001	<0.0001	<0.0001

1 Treatment Products: Trifluralin 4EC; Command 3ME; Satellite Hydrocap.

2 **DAP:** days after planting

3 **Dia.:** diameter.

4 Application Timing: PPI: pre-plant incorporated; PRE-T: pre-transplant, broadcast soil surface application; POST-T: post-transplant, broadcast application within 24 h of planting.

5 **LQ:** Lamb's quarters. **RW:** ragweed.

6 Numbers in a column followed by the same letter are not significantly different. Note, 8 other treatments were analyzed in this dataset, but not presented in this table.

7 Results are an anomaly, unusual, do not make sense. RW control is low compared to similar treatments (e.g. 8 & 9).

Results

Goaltender/Dual Magnum Combos (Table 1: Trts. 2-4):

- When Goaltender/Dual Magnum combinations included 0.5 pt/A of one and 1 pt/A of the other (Trts. 2, 3), LQ control was excellent (89%, 94%), but when both rates were low (0.5 pt/A), LQ control dropped to 74% (Trt. 4).
- **RW control was better (87%) when the high rate of Goaltender 1 pt/A was used** with Dual Magnum 0.5 pt/A (Trt. 3) than when the lower rate of Goaltender 0.5 pt/A (Trts. 2, 4) was used (75%, 72%).
- **Goaltender 1 pt/A PRE-T fb. Dual Magnum 0.5 pt/A POST-T and Goaltender 1 pt/A PRE-T fb. Dual Magnum 0.5 pt/A had the 2nd and 3rd-highest average head weights in the trial, a testament to their very good weed control and crop safety.**
- The combination with low rates (0.5 pt/A) of both Goaltender and Dual Magnum (Trt. 4) had lower head weight due to more weed competition from LQ and RW compared to the other Goaltender/Dual Magnum combinations.

Adding Satellite to Goaltender/Dual Magnum Combinations (Table 1: Trts. 5-10):

- In this study, the addition of the low rate of Satellite 1 pt/A to Goaltender 0.5 pt/A and Dual Magnum 0.5 pt/A improved control of LQ from 74% (Trt. 4) to ~ 90% (Trts. 5 & 6) but had no effect on RW control, as expected.

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- **Best in trial:** When this 3-product low-rate combination was applied all PRE-T (Trt. 5), it resulted in the heaviest mean head weight in the trial at harvest (Fig. 1 left).
- Alternatively, when this 3-product low-rate combination was applied as a POST-T tank mix (Trt. 6), head weight was significantly lower, due to slow growth recovering from necrosis injury, caused by Goaltender being applied POST-T in a tank mix with Dual Magnum and Satellite.
- In all 3-product combinations where the high rate of Satellite 2.1 pt/A was applied (Trts. 7-10), LQ control was excellent (98-100%), which was numerically ~ 10% (percentage units) better than when the low rate of Satellite 1 pt/A was used. Control of RW was not affected by addition of Satellite, as expected.
- Goaltender 1 pt/A + Dual Magnum 0.5 pt/A + Satellite 2.1 pt/A all applied PRE-T (Trt. 9, Figure 1 middle) and Goaltender 1 pt/A + Satellite 2.1 pt/A PRE-T fb. Dual Magnum 0.5 pt/A POST-T (Trt. 10) resulted in the 5th and 6th heaviest heads in the trial, which were not significantly different than the best treatment (Trt. 5), a testament to their excellent weed control and crop safety.
- Alternatively, when Goaltender 0.5 pt/A (Trt. 7) or 1 pt/A (Trt. 8) PRE-T was fb. Dual Magnum 0.5 pt/A + Satellite 2.1 pt/A POST-T, yield was significantly lower than when this 3-product combo was applied all PRE-T (Trt. 9, Figure 1 right) or when Dual Magnum was applied POST-T alone (Trt. 10). This was due to stunting caused by Dual Magnum 0.5 pt + Satellite 2.1 pt POST-T.
- **These results indicate that Satellite 1-2.1 pt/A should not be applied in a tank mix with Dual Magnum ± Goaltender POST-T.**
- Although 3-product combinations of Goaltender, Dual Magnum and Satellite were safe in this trial when soils were warm, it is likely that in cold soils more stunting injury would occur, especially when high rate of Dual Magnum 1 pt/A are used.

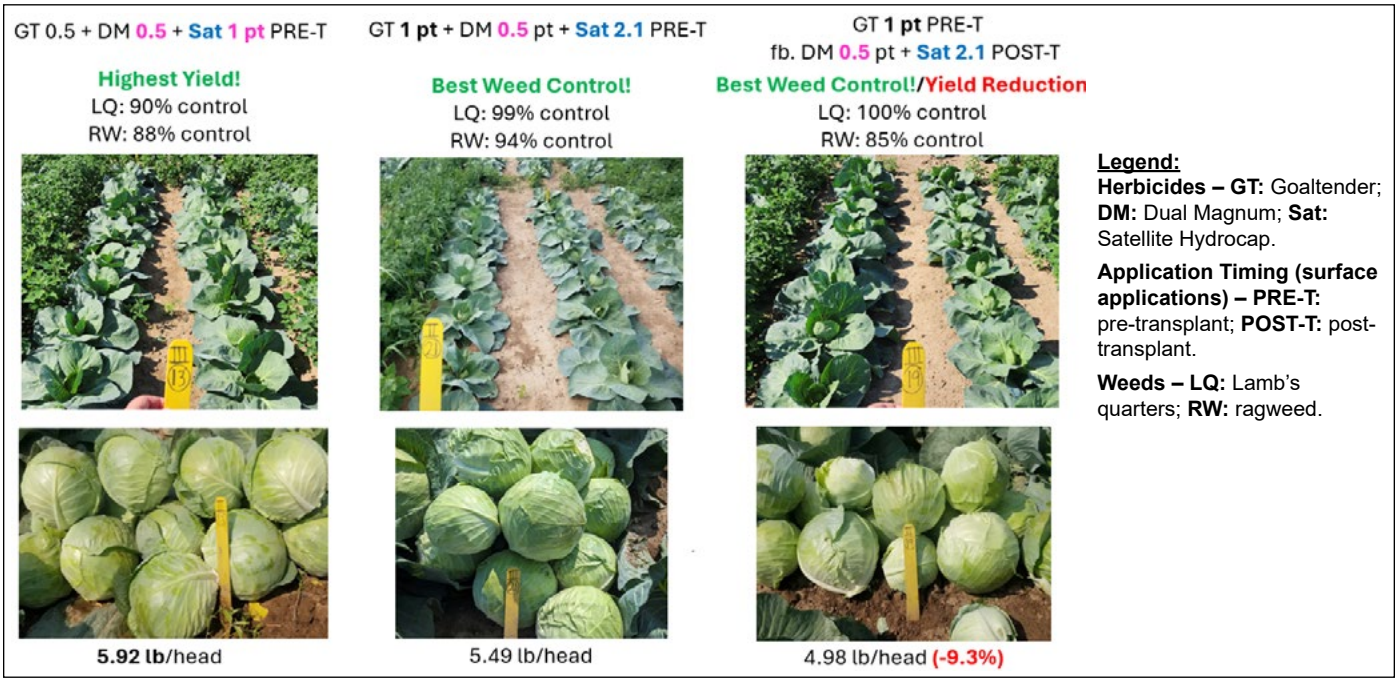

Figure 1. Adding Satellite Hydrocap to Goaltender and Dual Magnum herbicides at planting (May 24) in transplanted cabbage (c.v. Bellicose) for improved weed control while maintaining crop safety.
Left: Using a 3-product combination of low rates of all three applied PRE-T resulted in the highest yield in the trial, but the lower rates of Satellite and Goaltender let some RW and LQ escape, respectively.
Middle: Using high rates of Goaltender and Satellite in the 3-product combination all applied PRE-T resulted in close to perfect control of LQ and RW with no significant yield reduction.
Right: When Dual Magnum + Satellite were applied in a tank mix POST-T following Goaltender PRE-T, yield was significantly reduced. *Photos: Christy Hoepting, CCE Cornell Vegetable Program*

Improving a Trifluralin/Command/Dual Magnum program with Goaltender and Satellite (Table 1: Trts. 11-13):

- In 2023 early spring trial, treatments with Trifluralin pre-plant incorporated (PPI) and Command PRE-T resulted in more stunting injury than treatments without or when Satellite was substituted for Trifluralin.
  - Command is used predominantly for control of velvet leaf (VL). However, if a program includes Goaltender and Satellite, this combo should theoretically control VL so that Command can be dropped (I have yet to have enough VL pressure in a trial to confirm this).
- Trifluralin 1 pt/A PPI fb. Command 0.5 pt/A + Dual Magnum 0.5 pt/A PRE-T (Trt. 11) resulted in 91% control of LQ and 50% control of RW.

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- **Addition of Goaltender 0.5 pt/A PRE-T (Trt. 12) increased LQ control to 99% and most importantly increased RW control to 84%, which increased head weight significantly** from 4.44 lb to 5.58 lb (**4th largest heads in trial**) and not significantly different than the best treatment (Trt. 5). This is a **testament to the improved RW control brought to the table by Goaltender, and to the crop safety of this treatment.**
  - **Caution!** In the cold spring trial of 2023, this treatment was detrimental due to extreme stunting. Soils must be warm to pull off this 4-product combination PPI/PRE-T.
- **Substituting Trifluralin 1 pt PPI for Satellite 2.1 pt POST-T and separating Goaltender and Dual Magnum** such that Dual Magnum was POST-T with Satellite (Trt. 13) resulted in similar weed control as Trifluralin 1 pt/A PPI fb. Command 0.5 pt/A + Dual Magnum 0.5 pt/A + Goaltender 0.5 pt/A (Trt. 12), but slightly smaller head size (5.01 lb).
  - Knowing what we know now: Dual Magnum + Satellite POST-T causes stunting and reduced head size. Thus, this 4-product combo would be safer if Satellite was applied PRE-T with Command and Goaltender while Dual Magnum was applied POST-T alone. Furthermore, the Command is very likely not needed, due to the Goaltender and Satellite picking up the VL control. E.g. Trt. 10: Goaltender 1 pt/A + Satellite 2.1 pt/A PRE-T fb. Dual Magnum 0.5 pt/A.

Acknowledgements

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Many thanks to the staff at Bejo Seeds including Jan van der Heide, Travis Mattison, Dennis Ferlito and Jason Plate for hosting this trial and all its associated in-kind contributions – most importantly, loaning me your weeding crew for a day!

One- vs. Two-Step Kill of Barley Nurse Crop in Direct Seeded Onion

Christy Hoepting, CCE Cornell Vegetable Program; originally in VegEdge Vol. 19, Iss. 7, 5/17/23

Onion seedlings are tiny during their first month of life, which makes them extremely vulnerable to damage and mortality from wind erosion. Barley is commonly used as a nurse crop to protect young onion seedlings from the ravaging effects of wind. Barley is planted at the same time as the onions, either between the onion rows or as a broadcast application. Ideally, the barley nurse crop will continue to provide wind protection until the onions have reached the 2-leaf stage.

WHEN to Kill Barley Nurse Crop

- Killing of barley nurse crop is typically timed between flag and 1-leaf stage.
- Barley nurse cover crops will continue to provide crop protection for about 2 weeks after they are sprayed, but they will not use moisture or nutrients, and thus do not compete with the crop.
- When barley gets too big, it can trap air between the rows and increase the chances of seedling burn-off, and the barley can compete for moisture and nutrients, and stunt the onions.
  - There is a higher risk of burn-off in onions that have been treated with "heavy" rates or tank mixes of pre-emergent herbicides prior to onion emergence, or when seed was planted deep (0.75 to 1 inch), because the onion seedlings can be weaker in these situations.
  - Once barley has started to tiller, it is much harder to kill.
- Alternatively, killing off barley windbreaks too soon leaves the young onion seedlings vulnerable to wind damage, especially when conditions are dry.

HOW to Kill Barley Nurse Crop

- Use grass herbicides belonging to WSSA Group 1 (see table).

Grass Herbicides

Trade Name	Active Ingredient	Rate/A	Adjuvant*
Select EC, Tapout, Intensity	clethodim	1 pt	0.25% NIS
Fusilade DX	fluazifop-p-butyl	0.5 pt	COC 1% v/v or NIS
Poast	sethoxydim	1.5 pt	COC 1% v/v

* **NIS:** Non-ionic surfactant; **COC:** Crop oil concentrate.

- These herbicides **work best when barley is actively growing**.
  - If barley has been nipped by frost, wind or Goal 2XL, it will be stressed, and the barley-kill herbicide will work better after waiting a few days.
- Select EC kills the barley faster than the other two herbicides by 3 to 4 days.
- **Tank-mixing Prowl EC with Fusilade:** It is common for Prowl to be applied with barley-kill herbicide. Since Prowl EC contains petroleum distillates in its formulation, the amount of crop oil concentrate (COC) required when using Fusilade can be reduced according to the following recommendations by Roy Ellerbrock (see tank-mixing table on next page).

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Tank-mixing Prowl EC with Fusilade

Rate of Prowl EC/A	Rate of COC with Fusilade
4 pt or more	None
Less than 4 pt	**Half rate**: 0.5% v/v (2 qt/100 gal)
No Prowl EC or Prowl H_2O	**Full rate**: 1.0% v/v (4 qt/100 gal)

Using a 2-Step Barley-Kill Method

- **Step 1:** e.g. Select EC 10-16 fl oz/A at **loop-flag.** This application stunts the barley so that it does not tiller.
- **Step 2:** e.g. Fusilade 8 fl oz + Goal 2XL 0.25-0.5 fl oz/A **5-7 days later** (flag-1st start to 1-leaf/flag intact).
- Be aware that COC will heat up Goal 2XL considerably and will also kill the barley faster. To compensate for the faster barley kill, you can use a lower rate of barley-kill herbicide.
- It is recommended to use different products for each barley-kill application.
- Advantages of 2-step barley-kill technique:
  - Barley does not tiller or get too big to compete with and stunt the onions.
  - Addition of low rate of Goal 2XL 0.25-0.5 fl oz/A to barley-kill herbicide injures and/or kills weed escapes that are in the cotyledon to 0.5" stage.
  - **There are two timings to incorporate applications of pre-emergent herbicides Prowl and/or Outlook.**
    1. Opportunity to ensure 1-2 weeks between split application of Outlook. Studies have shown that when timing between split applications of Outlook exceeds 2 weeks, weed control decreases. For early plantings when onions are growing slow, there can be 3 weeks between first (pre-emergent to onion) and second (with barley-kill herbicides in 1-step program) split applications of Outlook.
    2. 2-stepping Prowl EC into 2 x 1.5 pt/A applications in a 2-step barley kill program can be safer and offer a longer residual than a single 3 pt application in a 1-step barley-kill program.

Barley-Kill Timing (1-Step vs. 2-Step)

Barley-Kill Program	Step 1 Date	Step 1 Crop Development Stage and Herbicide Application	Progress (May 24): Onions 1-Leaf/Flag Intact	Step 2 Date	Step 2 Crop Stage and Herbicide Application	Final Result (June 4): Onions 2-2.25-Leaf
1-Step	May 19	Onions: Flag – Flag-1st start; Barley: 6-8"/tillering Select 16 fl oz + COC 1% v/v (4 qt/100 gal)	(5 days after Step 1)	--	--	
2-Step	May 14	Onions: Loop-flag; Barley: 5-6"/3-leaf Select 10 fl oz + COC 1% v/v (4 qt/100 gal)	(10 days after Step 1, and 1 day before Step 2)	May 25	Onions: 1-leaf/flag intact. Fusilade 8 fl oz + COC 1% v/v (4 qt/100 gal)	

Figure 1. 1-step (top) and 2-step (bottom) barley kill programs in direct seeded onion. Left: Crop stage at the timing of only (1-step) and first (2-step) barley kill herbicide application. Middle: Size of barley when onions are most vulnerable to heat stress/burn-off between 1- and 2-step barley kill programs. Right: Biomass of dead barley between 1- and 2-step programs when onions are at 2-leaf stage. *Photos: Christy Hoepting, CCE Cornell Vegetable Program*

Upcoming Events

Planning for Immigration Enforcement at Your Farm

May 20, 2025 (Tuesday) | 12:00 noon - 1:00 PM
via Zoom

Ramped-up immigration enforcement is spreading fear and resulting in family and workforce disruptions across the farm landscape. Farms and employees should take action by making a plan for what to do in case of an immigration enforcement action at your farm. Planning is critical to avoid the worst outcomes. Learn about available resources and hear from the experience of crisis support leaders!

Hosted by Richard Stup, Cornell Agricultural Workforce Development with Guest Panelists (TBA).

REGISTRATION: Advance registration is required: https://cornell.zoom.us/webinar/register/WN_YhmmnebOTW6aUxUVi699aA

Online Berry Office Hours

May 21 - July 9, 2025 (Wednesdays) | 8:00 AM - 8:30 AM
via Zoom

We hope you will join berry specialists Anya Stansell and Heather Kase over Zoom to discuss berry production.

Join Zoom Meeting: https://cornell.zoom.us/j/98945641042?pwd=qtLxLuYLE4uKJrkglzIzz0s8PoOnkL.1

Meeting ID: 989 4564 1042; Passcode: 12345

Fruit & Berry Twilight Meetings

May 29, 2025 (Thursday) | 7:00 PM - 8:30 PM
Hurd Orchards, 17260 W Ridge Rd, Holley, NY

Join specialists Anya Stansell and Janet Van Zoeren at this series of monthly meetings examining seasonal changes in tree fruit and berry crops, demonstrating scouting techniques, and discussing integrative pest management solutions to maximize the health and productivity of berry and fruit plantings. Meetings will be held on the last Thursday of every month, from April through July. Attendees are encouraged to bring pictures or descriptions of pests they are concerned about on their farm.

1.5 DEC credits will be offered in categories 1a, 10, and 22. Please arrive at 6:45PM to sign-in for DEC credits.

This event is free to attend, and no pre-registration is required. Pizza and refreshments provided by Valent. Questions? Please contact aco56@cornell.edu

Muck Donut Hour

starting June 3, 2025 (Tuesdays)
corner of Transit Rd and Spoilbank Rd in the Elba muck

Contact Christy Hoepting for more info. 585-721-6953.

Muck Onion Growers Twilight Meeting

June 26, 2025 (Thursday) in Oswego

Save the date! More info will be available soon!

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VegEdge is the highly regarded newsletter produced by the Cornell Vegetable Program. It provides readers with information on upcoming meetings, pesticide updates, pest management strategies, cultural practices, marketing ideas, and research results from Cornell University and Cornell Cooperative Extension. VegEdge is produced every few weeks, with increased frequency leading up to and during the growing season.

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