

GROW BEETS, NOT WEEDS!

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The market for table beets has increased in New York State due to interest in health benefits and locally grown foods. Additionally, new beet products and varieties have sustained the table beet renaissance. Weeds are a huge management issue in beets, because they can directly reduce yields through shading and competition, and increase the risk for plant pathogens by reducing air movement in a field and potentially harboring pathogens. Furthermore, weeds interfere with mechanical harvest as they can wrap around and jam up the equipment. As a last resort, the tops of tall weeds are mowed-off just above the beet canopy prior to harvest. However, weeds allowed to pollinate in the field, generally continue down the path of seed production, creating large weed seed banks in the soil. For instance a single lambsquarters or pigweed plant can produce over 70,000 seed, perpetuating the problem for years to come. Hand-weeding costs can be in excess of \$100/acre depending on the density of weeds in a field.

A weed management plan for table beets in New York should include:

- A whole farm plan where weed issues are managed in rotational crops and with weed suppressing cover crops in the years prior to planting beets.
- Stale seedbeds when appropriate
- Appropriate cultivation techniques, which may include tine-weeders, field cultivators, finger weeders, and other implements. Dr. Bryan Brown, NYS IPM Program <https://nysipm.cornell.edu/> is a good resource for cultivation equipment in table beets and conducted trials in 2018 and 2019 with stacking different implements on a toolbar to assess both weed control and crop damage.
- Pre-plant incorporated and/or Pre-emergence herbicides. Note the potential for crop injury with these products under certain environmental conditions.
- Post-emergence herbicides. There are no good stand-alone products, so combinations of SpinAid, Nortron, UpBeet and Stinger should be applied when beets and weeds are small depending on weed species present. Select Max or Poast herbicide can be applied for post-emergence grass control.

Further information on the available herbicides for 2020 is available in the text and table that follow. Make sure to read the labels for full details.

DUAL MAGNUM (Group 15)²

Dual Magnum is one of the most widely used pre-emergence herbicides in vegetable crops. It predominantly controls annual grasses but also some key broadleaf weeds as well, e.g. redroot pigweed, hairy galinsoga, and eastern black nightshade. Yellow nutsedge is also significantly suppressed. Under cold, rainy conditions beets can be stunted as they emerge and occasionally stands are reduced. Do not use on coarse textured soils with less than 1.5% organic matter or on soils with greater than 10% organic matter. Please refer to the product label as well as the New York State Supplemental Labelling SLN NY-110004 (available at <http://www.dec.ny.gov/nyspad/>).

RO-NEET Herbicide (Group 8)^z

Ro-Neet is a pre-emergent herbicide that is typically used pre-plant in beets in NY. The label also says that it can be applied at planting or immediately post-planting. It must be incorporated immediately to prevent loss of the herbicide. The new label states that crops should be planted or seeded immediately after application, except for fall application; whereas the old label recommended delayed planting. We do not have recent experience in Cornell trials with planting date of beets relative to Ro-Neet application. The previous recommendation for delayed planting may have to do with concern over crop injury. A colleague in Texas reports that he has not seen any crop injury in his trials. Furthermore, he says that weed control is generally very poor after about 3 weeks. Thus, waiting to plant may reduce the efficacy of the herbicide by as much as 30%. If you have used Ro-Neet in the past, you should proceed cautiously before changing the timing of your planting relative to herbicide application. Use 2.0 – 2.67 qt/acre for table beets. The lower rate should be used on sandy soils, in hot weather, or on dry soils. Annual broadleaf weeds will only be controlled if the application is made when conditions are favorable for germination. It will not control established or germinated weeds present at the time of application. Do not use on muck soils.

NORTRON SC (Group 8)^z

While Nortron SC has a regular NYS label now, it is to be used in conjunction with New York State Supplemental labelling SLN NY-10014 (available at <http://www.dec.ny.gov/nyspad/>). This herbicide has both pre-emergence and post-emergence activity largely on annual broadleaf weeds, with some activity on foxtails and large crabgrass (see Table 1). Pre-emergence applications do not require incorporation as long as sufficient rainfall is predicted, and can have residual activity of 5 to 6 weeks. Cornell research tested 1.0 and 2.0 quart rates and generally injury was low and rapidly outgrown at the higher rate. Injury observed included some loss of stand, stunting, and occasional downward cupping of early leaves. Weed scientists in Oregon and Michigan have reported more significant injury with the 2.0 quart rate and frequently attribute this injury to soils having high amounts of sand. The label for New York lists 60 fl. oz (2.1 quart) for the pre-emergence rate. Do not use on muck soils.

Post-emergence applications are intended to be applied together with Spin-Aid, UpBeet, and Stinger. These 2 and 3 product mixtures are called ‘micro-rate’ applications. They are intended to be applied when the weeds are very tiny, cotyledon to 2 true leaves and are to be applied when the beets have 2, 4, and 6 leaves, roughly every 7 to 10 days. The rates for use in New York are 5.25 to 10.5 fl. oz depending on the size of the beets at the time of application. Also, specific to New York’s 24C is the restriction to making no more than 2 applications per acre per season. Thus, Nortron could be applied pre-emergence and followed by one post-emergence application later or it could be applied twice to emerged weeds with the other post-emergence herbicides. Adjuvants are not used in mixtures that include Spin-Aid as this product is an emulsifiable concentrate. If applied with UpBeet or Stinger, then adjuvants are recommended. See labels for specific details. The label does not list a PHI for this product.

UPBEET Herbicide (Group 2)^z

UpBeet has only post-emergence activity and provides excellent control of several broadleaf weeds. This herbicide will be of interest to growers who have had problems with velvetleaf.

Other weeds controlled include wild mustards, wild radish, and smartweeds. Like post-emergence Nortron, control of multiple weeds increases when UpBeet is applied together with the other post-emergence herbicides at the 2, 4, and 6 leaf stages. It is applied at 0.5 oz/A when weeds are tiny, cotyledon to 2 true leaves, and also requires adjuvants when applied with Nortron and/or Stinger but not with Spin-Aid. The PHI for this product is 30 days.

SPIN-AID Herbicide (Group 5)²

Spin-Aid is a key component of the 'micro-rate' application program mentioned above. The labeled rate ranges from 1.5 to 3 pints/A depending on the number of beet leaves present. Spin-Aid is one product that is more likely to cause slight injury, leaf chlorosis or tip burn after application, but most of the time, recovery occurs within a week or two. However, Spin-Aid can be very "hot" under higher rates as I have burned 2-leaf beets with 1.5 pints/A. Please use this product cautiously if you are not familiar with it. Weeds are most successfully controlled when they are tiny, cotyledon to 2 true leaves. Spin-Aid is one of the only beet herbicides with significant activity against common lambsquarters. Some of the other well controlled weeds include: common chickweed, c. purslane, c. ragweed and annual sowthistle. This herbicide does not require the use of adjuvants. The PHI for beets is 60 days.

STINGER (Group 4)²

Stinger has a fairly narrow spectrum of weed species controlled and should only be used if those species are problematic in a given field (based on scouting). Stinger has primarily post-emergence weed control activity but does remain in the soil for an extended period of time and due to this has specific crop rotation restrictions. It is important to review these on the product label. Stinger is noted for excellent control of common ragweed, galinsoga, nightshade species, wild buckwheat, prickly lettuce and annual sowthistle. It also does a good job of suppressing Canada thistle and dandelion. Stinger may be applied twice per season, to beets having 2 to 8 leaves at rates of 0.25 to 0.5 pint/A with a total of 0.5 pint being applied. The product label states that adjuvants are not required for applications of Stinger; however, they are sometimes used when mixed with Nortron and UpBeet. The PHI for Stinger is 30 days.

SELECT MAX (Group 1)²

A post-emergence herbicide with activity against many annual grass species. The use rate is 12 to 16 fl. oz, with no more than 0.5 lb a.i./A per season. NIS at 0.25% (v/v) is recommended. Do not cultivate within 7 days before or after application. The PHI for Select Max is 30 days.

POAST Herbicide (Group 1)²

A post-emergence herbicide with activity against many annual grass species. Apply to actively growing grasses according to the maximum grass sizes on the label. Do not exceed 2.5 pt per application or 5.0 pt/acre per season. Always add 2.0 pt/a crop oil concentrate. Do not cultivate within 5 days before or 7 days after treatment. The PHI for Poast is 60 days.

¹Some of the information in this article originated from the late Dr. Robin Bellinder, Cornell University.

²Weed Science Society of America (WSSA) Mode of Action.

Relative Effectiveness of Herbicides Available for Use in Table Beets in New York for 2020

(compiled by Julie Kikkert, CCE Cornell Vegetable Program with information from the late Robin Bellinder, Cornell University)

Key to Compare Effectiveness G = Good F = Fair P = Poor to None	Rate/A	PHI	BROADLEAF ANNUALS											ANNUAL GRASS				PERENNIALS				
			Lambsquarters	Purslane	Common Ragweed	Pigweed	Smartweed	Galinsoga	Mustard	Nightshade	Chickweed	Shepherds Purse	Velvetleaf	Wild buckwheat	Barnyardgrass	Crabgrass	Fall Panicum	Foxtail sp.	Quackgrass	Yellow Nutsedge	Canadian Thistle	Dandelion
Pre-Plant Incorporated																						
Ro-Neet (cycloate)	2.0-2.67qt		F-G	F	P	G	P	F	P	F-G	F	G	F	F	G	G	F	G	F	F-G	P	P
Pre-Emergence																						
Dual Magnum (s-metolachlor)	0.67pt		P	F	P	G	P	G	P	G ^b	P	P	P	F	G	G	G	G	P	G	P	P
Nortron (ethofumesate)	60 fl oz		F	F	P	F	G	P	G	G	G	P	P	G	P	P	P	F	P	F	P	P
Post-Emergence																						
Nortron (ethofumesate)	5.25-10.5 oz		F	P	P	F	G	P	G	G	F	P	P	F	P	P	P	F	P	P	P	P
UpBeet (triflurosulfuron-methyl)	0.5 oz	30 d	P	P	F	F	F-G	F	G	F	F	F	G	F	P	P	P	P	P	P	P	P
Spin-Aid (phenmedipham)	1.5-3.0 pt	60 d	G	G	G	P	P	P	P	P	G	G	P	P	P	P	P	P	P	P	P	P
Stinger (clopyralid)	0.25-0.5 pt	30 d	P	P	G	P	G	G	P	G	P	P	P	G	P	P	P	P	P	P	F	F
Select Max (clethodim)	9-16 fl oz	30 d	P	P	P	P	P	P	P	P	P	P	P	P	G	G	G	G	F	P	P	P
Poast (sethoxydim)	0.5-2.5 pt	60 d	P	P	P	P	P	P	P	P	P	P	P	P	G	F	G	G	F	P	P	P

^aFor general comparison only. Effectiveness may vary with method of application, rate, use of an adjuvant, size of weed, soil type and weather. See the 2020 Cornell Guidelines for Vegetable Production for more details. Always read and follow label directions.

^bEastern black nightshade only