Tuesday, August 11, 2020

OMAFRA Vegetable Team:

Travis Cranmer, Guelph
519-835-3382
travis.cranmer@ontario.ca

Dennis Van Dyk, Guelph
519-766-5337
dennis.vandyk@ontario.ca

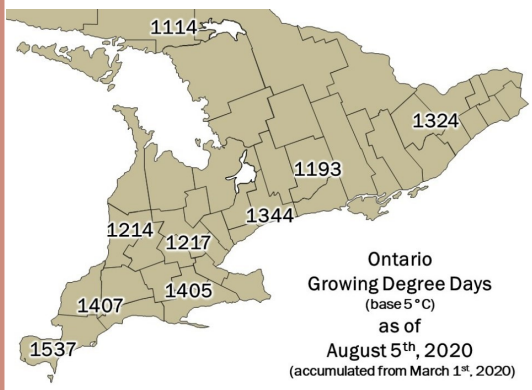
Andrew Wylie, Ridgetown
519-401-5890
andrew.c.wylie@ontario.ca

Amanda Tracey, Ridgetown
519-350-7134
amanda.tracey@ontario.ca

"In This Issue"

VCR – Vegetable Crop Report – August 6th

The VCR (vegetable crop report) is a weekly update which includes crop updates, weather and growing degree summaries for various vegetable growing regions across Ontario.



Temperature – Temperatures are expected to rise again moving into the weekend. All regions remain above their GDD 10 year average. Onion maggot has reached threshold in all regions except Essex and Sudbury. Carrot rust fly is at its second threshold in all regions except Essex, Chatham-Kent and Norfolk. Degree day data for each region is shown below.

Rainfall – Simcoe region has already received significantly more rain than its 10 year average for August and many other regions are also nearing their 10 year averages. There is a chance of rain and thunderstorms across the province beginning Monday (or Sunday in some areas). Precipitation data for each region is shown below.

Crop Updates

Beans & Peas – Cooler wet conditions have been favourable for the start of white mold in beans caused by *Sclerotinia sclerotiorum*. Apothecia may be visible where sclerotia have germinated (Figure 1): sclerotia can survive for up to 5 years in soil which can exceed shorter crop rotations. Look inside the canopy for white cottony mycelial growth, especially in fields that have dense canopies from close row spacing or nitrogen fertilization. Initial infections often occur on flower petals that have fallen into the canopy. As noted for peppers, European corn borer is active.

Figure 1 – Apothecia of *Sclerotinia*, Essex county, August 5. Photo Courtesy of Dr. Owen Wally, AAFC.

Brassica Crops – Conditions have been favourable for Alternaria, Sclerotinia, clubroot, bacterial rot and downy mildew development in some areas. High temperatures from 3-4 weeks ago has been hypothesized to be the reason there is uneven growth in broccoli or cauliflower heads that are currently being harvested. If heads are uneven and trap water droplets, bacteria may enter and cause rotting in the heads. If irrigating, allow the canopy to dry out quickly by irrigating in the morning opposed to the late afternoon/evening. The level of lepidopteran pests remain high in most areas and thrips have been observed in high numbers in some fields.

Carrots – Leaf blights remain important to stay on top of. As canopies close it may be helpful to get in a white mold specific fungicide if the field has a history of Sclerotinia white mold.

Celery – Bacterial leaf spot and blackheart/calcium deficiencies have been observed. Conditions have been conducive for celery leaf curl. tarnished plant bugs, wireworms, and aster leafhoppers are active.

Cucurbits – Downy mildew pressure remains high (Figure 2), and has now been confirmed on cucumbers as far North as Wellington county(https://cdm.ipmpipe.org/). Early detection of downy mildew this year increases the possibility of fungicide resistance. If you think that you may have downy mildew that is not well controlled by rotating Orondis Ultra, Torrent, and Zampro, please contact Andrew C Wylie (andrew.c.wylie@ontario.ca) or Katie Goldenhar – Pathologist-Horticulture (katie.goldenhar@ontario.ca).

Figure 2 – Advanced symptoms of cucurbit downy mildew on top surface of cucumber leaf (left), and dark purple sporangia on underside (right). Ridgetown, July 30.

Cucumber beetles continue to be active, if you haven't reviewed the usage details in our earlier VCR(https://onvegetables.com/2020/07/23/2020vcr-13/) for Harvanta (cyclaniliprole), this has been registered as an alternative insecticide labelled for this pest.

Wet weather increases the risk of *Phytophthora* in cucurbits and other crops: Examine wet areas for wilted or stunted plants, looking for dark crown lesions on zucchini, squash, and pumpkin, and for water-soaked lesions with white spores developing on the fruit in cucumbers and melons.

Powdery mildew is developing on several cucurbits, particularly squash and pumpkin. Infection with this pathogen can affect yield and fruit quality. High humidity increases the spread of powdery mildew although it does not need leaf wetness for infection. Scouts should inspect 10 leaves at 20 random locations in the field to determine % infection – 2% of leaves with one lesion is the control threshold. Powdery mildew is sometimes confused with downy mildew: See Figure 3 for a comparison of signs and symptoms.

Figure 3 – Powdery vs downy mildew symptoms on pumpkin. Bottom left, appearance of early downy mildew infection of pumpkin, credit: T. A. Zitter http://vegetablemdonline.ppath.cornell.edu/DiagnosticKeys/CucurLeaf/Downy/Down_pump.htm . All others, powdery mildew on pumpkin leaves, Ridgetown ON, July 30th

VCR – Vegetable Crop Report – August 6th…con't

Garlic – The Garlic Growers Association of Ontario has just announced that it is taking orders from members for clean planting material from the SPUD unit at the New Liskeard Agricultural Research Station, University of Guelph. E-mail garlicgrowersofontario@gmail.com for the roundel order form and if you are not a member, the membership form as well. The cut-off to become a member and order this year is August 15th, 2020. Roundels are expected to ship in September. For more information, see the recent article on garlic clean seed program here: https://onvegetables.com/2020/08/05/spud/

Figure 4 – Roundels, small, single-cloved bulbs, ready to be shipped from the SPUD unit.

Onions – Transplant onions are starting to lodge and seeded onions are bulbing. Tip dieback is becoming more prevalent with Stemphylium, purple blotch, botrytis and bacterial leaf spot being observed as well. Conditions over the past week have been favourable for Stemphylium and be on the lookout for downy mildew as plants have been experiencing prolonged periods of leaf wetness. The level of thrips has been low.

Figure 5 – Onion downy mildew will start as a tan lesion with purple-grey, velvety growth. Diseased leaves turn pale-green, yellow, and then collapse. Usually starts as a small patch then quickly spreads throughout the field – August 22, 2019

Peppers – continue size, set new fruit, and some varieties are starting to be hand harvested this week. The second generation of European corn borer is flying and laying eggs so be sure to be on the lookout for adults and scout for larval entry holes in the peppers. As of Wednesday, August 6th 2020, no pepper weevil have been caught on any outdoor traps in our pepper weevil monitoring program. A couple specimens have been brought for identification, but no populations of pepper weevil have been reported. Recently there have been a number of inquiries about sprays for pepper weevil in field peppers. With limited options for pepper weevil control, sprays should only be used when pepper weevil is present in your field, which is why monitoring traps and scouting regularly is so important. Pepper weevil can look similar to other native weevil species so if you think you have pepper weevil adults on traps, or damage in your crop, please confirm the ID by send pictures or specimens to Cassandra Russell (cassandra.russell2@ontario.ca) or Cara McCreary (cara.mccreary@ontario.ca). Another helpful tool for correctly identifying pepper weevil adults on sticky cards can be found here: What weevil warrants worry (https://medium.com/ongreenhousevegetables/which-weevil-warrants-worry-6f6a8402b23c).

Figure 6 – Cabbage weevil (Left) that was misidentified as a pepper weevil (Right). Cabbage weevils are common in some areas and are very similar in size and appearance to pepper weevil. The most distinguishing feature between the two is the difference in snout. Cabbage weevil have a long, narrow and downward-curved snout, whereas the snout of a pepper weevil is often shorter with a less drastic curve. No control is needed for cabbage weevil in peppers.

VCR – Vegetable Crop Report – August 6th…con't

Potatoes – Vines are collapsing in many fields as tubers really bulk up with the recent rains. The early regions of the province are ramping up harvest in the next week or two. Some early reports of bacterial rots, scab and secondary growth. All not very surprising considering the stretch of hot and dry weather we had at a critical time with little the growers could do to mitigate. No cases of late blight have been reported in the area but stay vigilant.

Tomatoes – The rains have been welcomed by field tomato growers, but in certain varieties fluctuations of soil moisture (heavy rains followed by hot and dry) will favour disorders such as leaf curling and blossom end rot. Some fruit are showing signs of bacterial spot/speck. It's important to remember that prevention is the best tool against bacterial diseases in tomatoes. Late blight has **not** been reported anywhere further north than North Carolina(https://usablight.org/map/) so far this season. Spores that cause this serious disease in tomatoes tend to move up from the southern US throughout the season and will cause brown, greasy-looking spots on developing fruits. If you are looking for a refresher on scouting and identifying diseases in tomatoes, you can click here to watch this lecture(https://www.youtube.com/watch?v=Y8cqKfUHpm0&t=944s) by OMAFRA pathologist, Katie Goldenhar.

Sweet corn – Sweet corn is being harvested and lepidopterans continue to build. Monitor the Great Lakes and Maritime Pest Monitoring Network(https://ontarioca11.maps.arcgis.com/apps/MapSeries/index.html?appid=df7c044f224e4345825e75d1fa561560) for up-to-date reports of pest levels. Traps have been filling with gypsy moth adults. Identification of gypsy moth adults can be difficult because when they are collected in large numbers their scales can rub off. This reduces their markings and creates a red spot on their back.

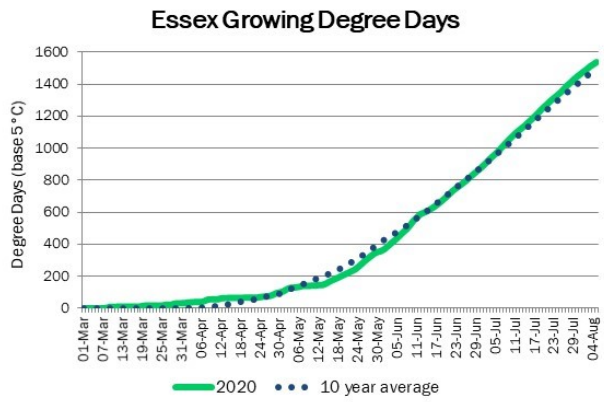
NOTE: Data as of August 5th, 2020
Pest Degree Day Forecasting

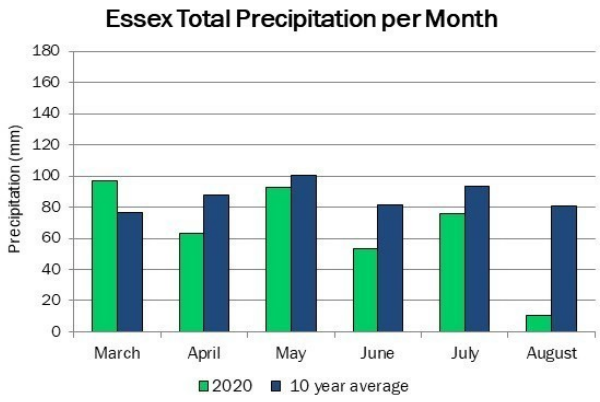
Pest	Carrot Rust Fly	Onion Maggot	Carrot Weevil	Aster Leafhopper	Tarnished Plant Bug	Cabbage Maggot	Seedcorn Maggot	European Corn Borer
THRESHOLD	329-395, 1399-1711	210-700, 1025-1515	138-156, 455+	128+	40+	314-398, 847-960, 1446-1604	200-350, 600-750, 1000-1150	See legend below
Essex*	1802	1665	**1301**	**1095**	**816**	1415	1665	1000
Chatham-Kent*	**1658**	1527	**1188**	**992**	**687**	1293	1527	899
Norfolk**	**1659**	1529	**1178**	**982**	**680**	1286	1529	889
Huron***	**1436**	**1322**	**1015**	**827**	**542**	1112	1322	737
Wellington**	**1448**	**1328**	**1017**	**834**	**557**	1114	1328	747
Simcoe County***	**1469**	**1351**	**1044**	**861**	**585**	1142	1351	774
Durham***	**1582**	**1460**	**1136**	**950**	**661**	1235	1460	861
Peterborough	**1429**	**1307**	**990**	**805**	**524**	1088	1307	716
Kemptville***	**1559**	**1439**	**1118**	**934**	**653**	1216	1439	848
Sudbury***	1310	**1210**	**935**	**771**	**510**	1021	1210	692

*- Bivoltine region for ECB. First Peak Catch: 300-350 DD, Second Peak Catch 1050-1100 DD
**- Overlap region for ECB. First Peak Catch : 300-350 DD Second Peak Catch 650-700 DD, Third Peak Catch 1050-1100 DD
***-Univoltine region for ECB. Peak Catch 650-700 DD

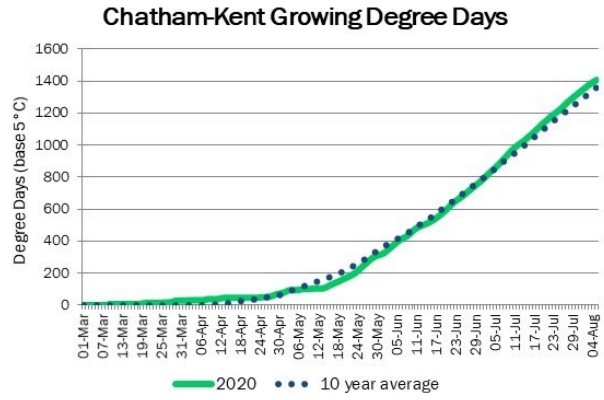
Use these thresholds as a guide, always confirm insect activity with actual field scouting and trap counts.
Select a region below for the latest weather, crop and pest degree day information:
Essex County(https://onvegetables.com/2020/08/06/2020vcr-15/#essex)
Chatham-Kent County(https://onvegetables.com/2020/08/06/2020vcr-15/#chatham-kent)
Norfolk County(https://onvegetables.com/2020/08/06/2020vcr-15/#norfolk)
Huron County(https://onvegetables.com/2020/08/06/2020vcr-15/#huron)
Wellington County(https://onvegetables.com/2020/08/06/2020vcr-15/#wellington)
Simcoe County(https://onvegetables.com/2020/08/06/2020vcr-15/#simcoe)
Durham County(https://onvegetables.com/2020/08/06/2020vcr-15/#durham)
Peterborough(https://onvegetables.com/2020/08/06/2020vcr-15/#peterborough)
Kemptville(https://onvegetables.com/2020/08/06/2020vcr-15/#kemptville)
Sudbury(https://onvegetables.com/2020/08/06/2020vcr-15/#sudbury)

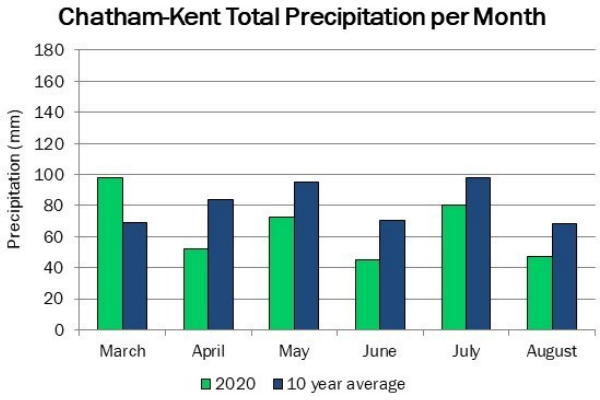
Essex County



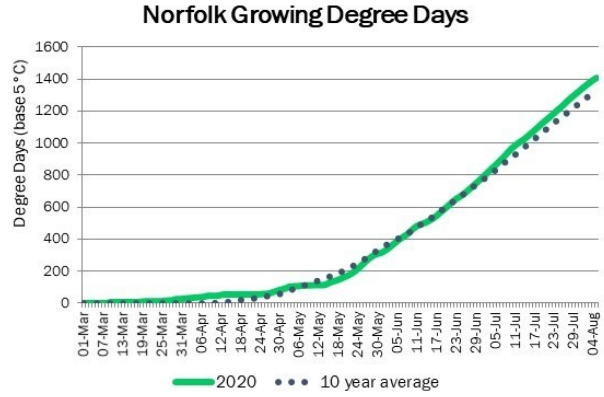


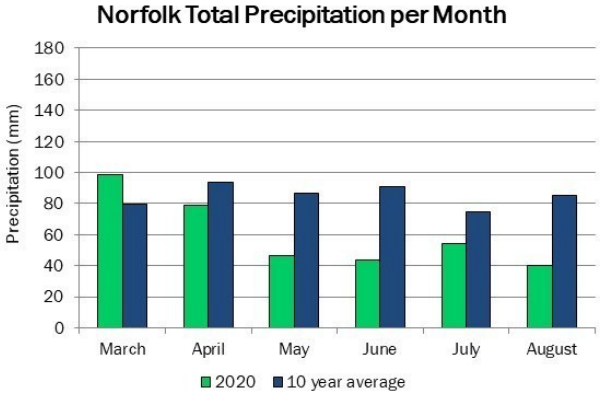
Chatham-Kent County



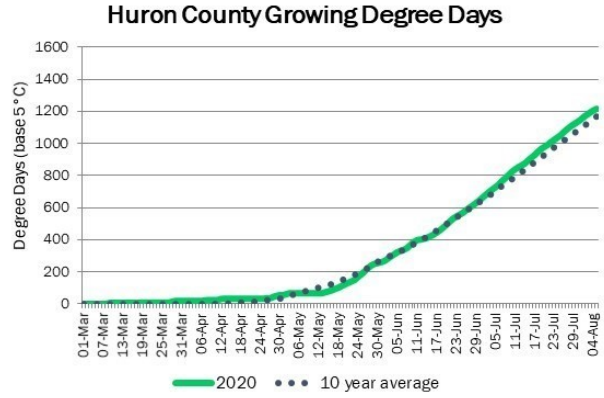


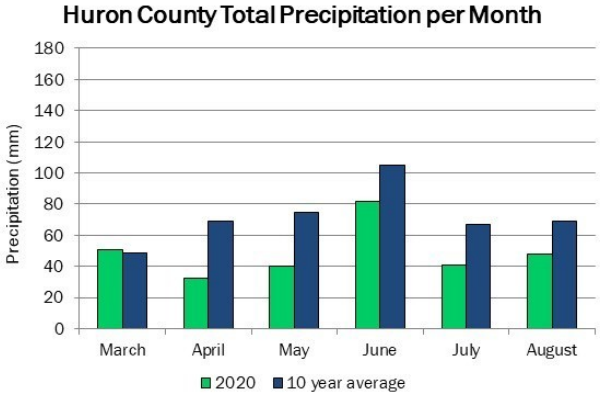
Norfolk County



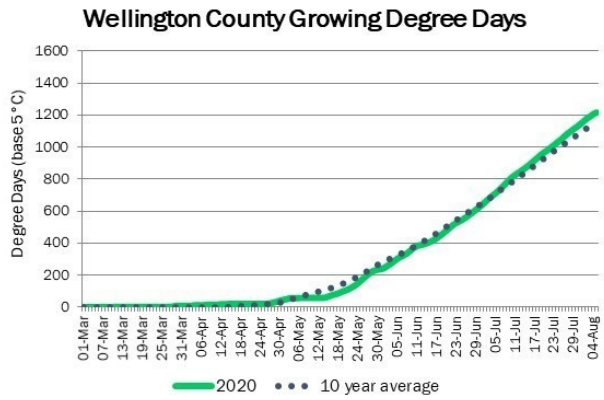


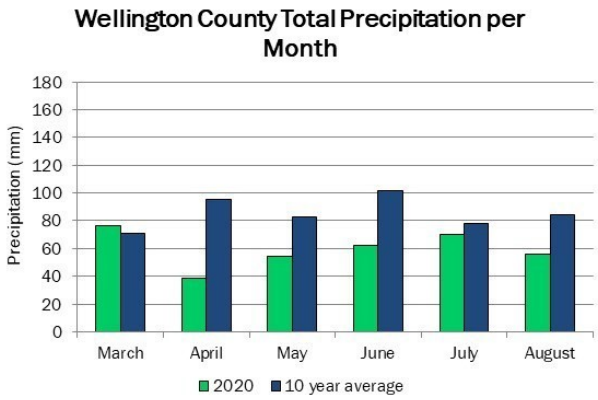
Huron County



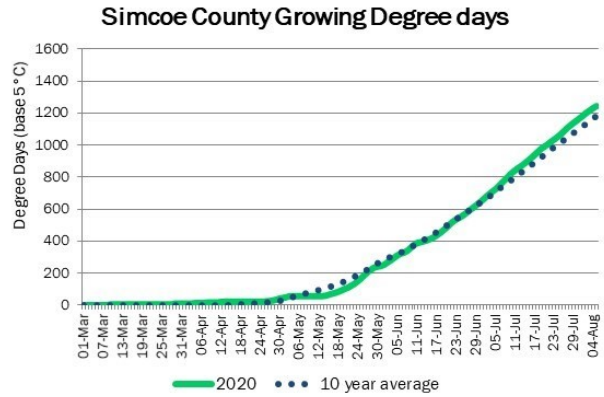


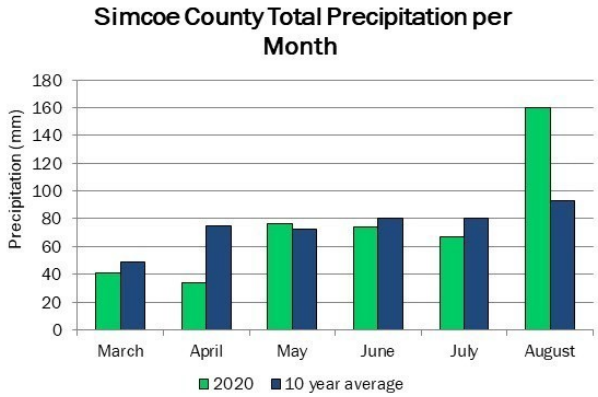
Wellington County



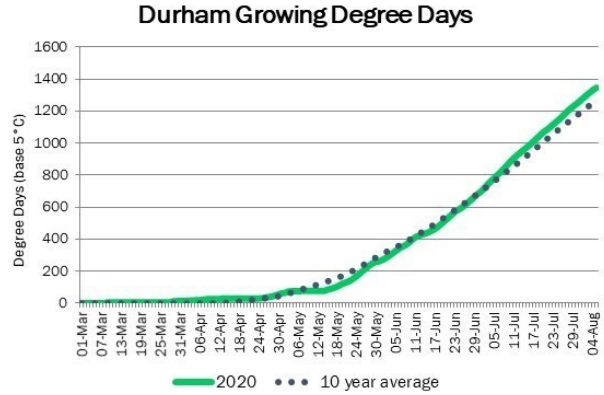


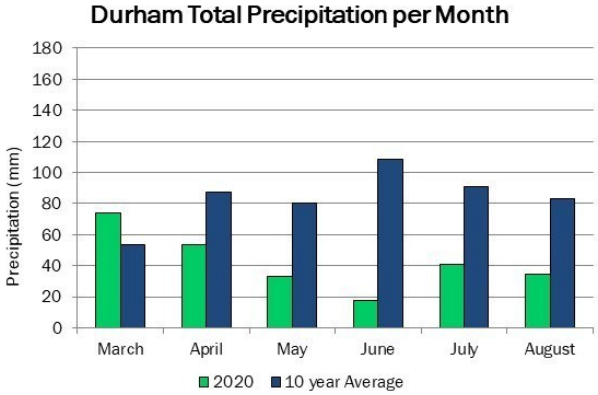
Simcoe County



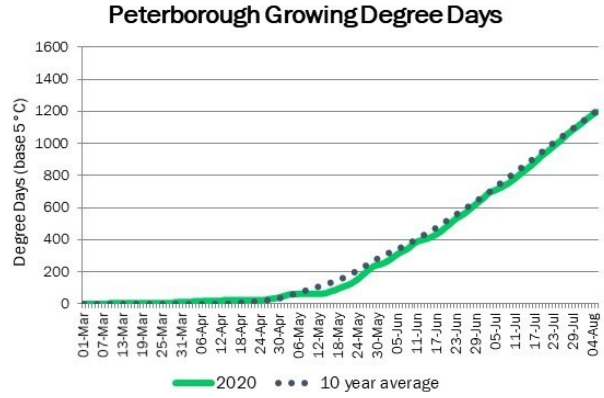


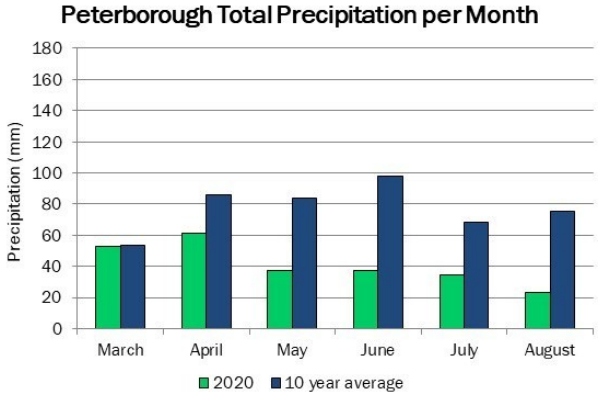
Durham County



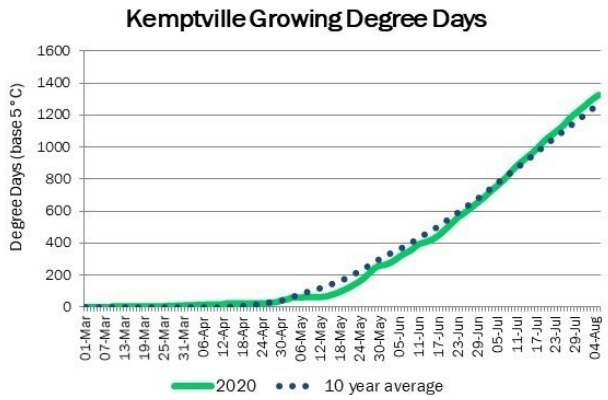


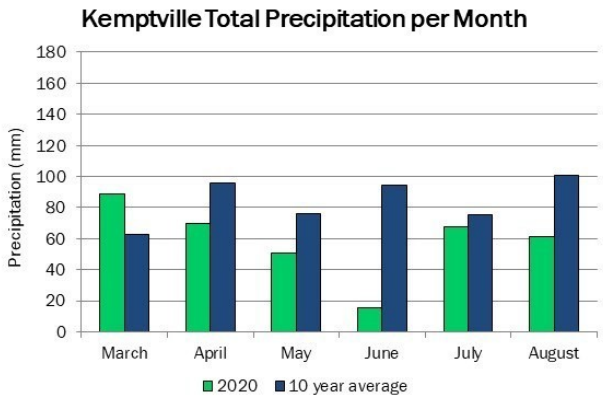
Peterborough



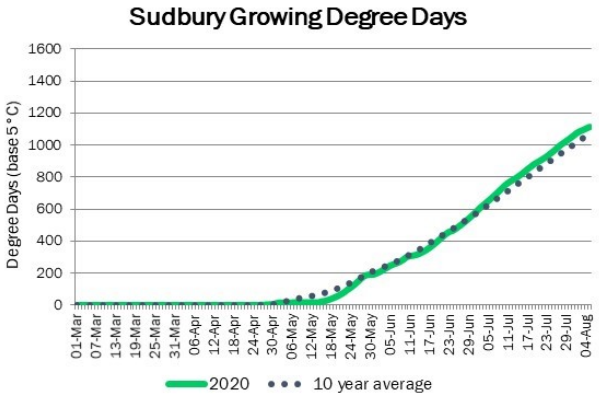


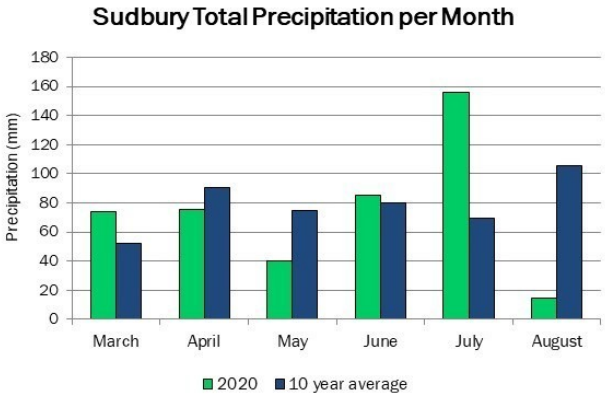
Kemptville





Sudbury





Garlic Growers Association Launch New Clean Seed Program

Travis Cranmer, Vegetable Crop Specialist, OMAFRA

The Garlic Growers Association of Ontario has just announced that it is taking orders from members for clean planting material from the SPUD unit at the New Liskeard Agricultural Research Station, University of Guelph. This is a big milestone that will allow growers to order clean material for fall 2020.

Garlic is a vegetatively grown crop, just like potatoes or strawberries, that is amplified not by seed, but asexually by clones, daughter tubers or cuttings. Unlike true seed production, the offspring of clones accumulate viruses and other pathogens in each progressive generation which results in a yield drag. In garlic, that yield drag has been estimated to be anywhere from 25 –50%. By propagating material that has been 'freed' of viruses through tissue culture, growers are able to take advantage of that yield boost until viruses and other pathogens build up in the crop over time (**Fig. 1**).

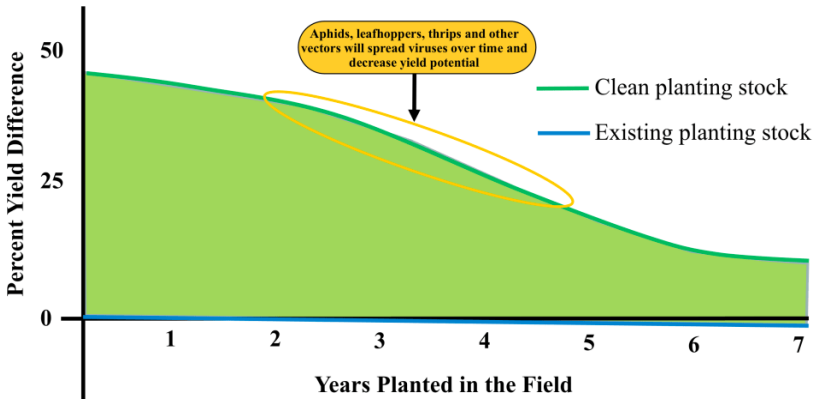


Figure 1 – Hypothetical yield improvement curve from clean planting stock. The initial increased yield difference is thought to be between 25-50%. How quickly insects spread viruses and decrease the potential yield over time will vary from field to field.

Garlic Growers Association Launch New Clean Seed Program…con't

Virus infection is generally transmitted by sap-sucking insects like aphids, thrips or leafhoppers. These insects have a stylet that pierces the plant's cells and if a virus is present, the virus can enter the insect's foregut and salivary glands. As the insect moves to a new plant and pierces it, some virus-infected saliva may be left behind from the previously visited plant. Viruses can accumulate in clones after years of production while not causing any visible symptoms. They can slow the plant down by causing a yield drag or making the plant more susceptible to other stressors. Since the cause is viral, it cannot be 'cured' with a pesticide application. Some crops, like potatoes, have a certified seed program which is federally regulated and has set limits on how much disease and virus can be tolerated. There are also seed classes based on age and disease/virus levels. Other smaller crops, such as garlic, do not have the same regulations; so seed is often reused indefinitely. In garlic, there is the option of growing out bulbils, the seed-like structure that is found in the scape in hardneck varieties. Growing the bulbils can clean the seed of nematodes, bulb mites, fungi and bacteria, but viruses are still found in this part of the plant.

In the early 2000s, a project to develop clean seed was undertaken by the New Liskeard Agricultural Research Station (NLARS) SPUD Unit, University of Guelph, CORD, FedNor as well as the Garlic Growers Association of Ontario (GGAO). The project goals were to develop an efficient/economical system to micropropagate a cultivar of garlic called 'Music' to be free of viruses. The project produced virus-freed planting stock, developed a greenhouse production system as well as developed guidelines for clean seed production. The NLARS SPUD unit determined the best type of plant tissue to use, the best media to promote plant development as well as established methods to detect bacterial and fungal contamination (**Fig. 2**).

Figure 2 – Garlic shoot tips being tested for pathogens in tissue culture.

In garlic, the cells of the meristem/shoot tip of a scape can grow faster than the virus can infect the cells. Meristem tips are cut and placed on a media, and under lights and ideal conditions they grow without the rest of the plant present. A mass of cells, known as a differentiated callus, develops and root and shoot hormones are used to produce, you guessed it, roots and shoots. This plant tissue is then tested for viruses multiple times and if clean, these plants are then multiplied (**Fig. 3**) and used to create bulbs, called roundels, for field production (**Fig. 4**).

Figure 3 – Virus-freed microplant being divided into multiple plants.

Over the next few years, growers will see new garlic cultivars added to the public germplasm besides 'Music' and work will be conducted to increase the multiplication rate of the micropropagation process for all cultivars. This is a huge step forward for the garlic industry. Implementation of this clean seed will see increases in bulb size, yields, storage life as well as reduce the presence of storage rots, bulb and stem nematode, bacteria, fungi and viruses. Even just the ability to store and sell the crop into January will allow growers to fetch a premium.

France and other countries have had a clean seed systems in place for a while. The vigour and size of the bulbs is impressive; however, these cultivars do not always perform well in Canadian conditions, may take a couple years to acclimatize and the material is often difficult to import in time for planting. The SPUD unit offers a more local source of planting material that does well in our climate and has cultivars that already perform well in our growing conditions.

Garlic Growers Association Launch New Clean Seed Program…con't

Figure 4 – Roundels, small, single-cloved bulbs, ready to be shipped from the SPUD unit.

The hardest part of implementing clean seed into a current program will be growing out the roundels into marketable bulbs quickly while keeping them relatively separate from the existing field. Propagating roundels can be done many ways and it is still uncertain as to what is the most efficient method of propagation would be. The roundels could be started the same way that you would start onion transplants and then planted in a secluded field or grown in a greenhouse with insect screens.

The roundels leave the SPUD unit about the size of a dime. After a few months of growth, a round (single clove bulb) the size of a toonie, or a small, double clove bulb is harvested. Planting this material yields a small to medium size bulb and then the following year is when a large increase in size and yield is typically seen (**Fig. 5**). During this process scapes could be harvested and those bulbils could be planted as virus-freed planting stock as well.

Figure 5 – A comparison in bulb size between existing and clean plant material (Photo B. Hughes, 2008)

This process of growing out clean planting stock will not be for everyone, and similar to potatoes, there may be growers that focus on seed or multiplication of seed during the fourth and fifth generation. If growers continually choose to use virus-freed planting stock, over time the amount of disease will be pushed out of the production system. While clean planting stock may have a greater upfront cost, the benefits and yield bumps in the future greatly outweigh the initial costs.

This year, the program will have at least 10,000 roundels that are currently available to order if you are a member of the GGAO. The cost per roundel is $1.50 plus postage and each member has the opportunity to purchase 200 roundels. Members interested in purchasing more should indicate their max amount and if there are extra roundels available, orders greater than 200 will be fulfilled. Roundels are not to be resold and only growers in Ontario are eligible to purchase roundels.

E-mail garlicgrowersofontario@gmail.com or call 416 567-7323 for the roundel order form and if you are not a member, the membership form as well. The cut-off to become a member and order this year is August 15th, 2020. Roundels are expected to ship in September.

Trianum P Biological Fungicide label expanded via Minor Use Program for suppression of diseases on greenhouse and field vegetables in Canada

J. Chaput, Minor Use Coordinator, OMAFRA

The Pest Management Regulatory Agency (PMRA) recently announced the approval of a minor use label expansion registration for **Trianum P Biological Fungicide** for:

- the Suppression of Post-Emergence Damping Off Caused by *Rhizoctonia solani* and *Pythium ultimum* and Fusarium Root Rot Caused by *Fusarium oxysporum* on Sowing of Greenhouse Vegetables (Bulb Vegetables, Leafy Vegetables, Brassica Vegetables, Fruiting Vegetables and Cucurbit Vegetables) and Greenhouse Herbs
- the Suppression of Post-Emergence Damping Off Caused by *Rhizoctonia solani* and *Pythium ultimum* and Fusarium Root Rot Caused by *Fusarium oxysporum* on Transplanting and Repotting of Greenhouse Vegetables (Bulb Vegetables, Leafy Vegetables, Brassica Vegetables, Fruiting Vegetables and Cucurbit Vegetables), Greenhouse Herbs, Greenhouse Strawberries and Indoor-Grown Cannabis
- the Suppression of Post-Emergence Damping Off Caused by *Rhizoctonia solani* on Field Grown Vegetables (Bulb Vegetables, Leafy Vegetables, Brassica Vegetables, Fruiting Vegetables and Cucurbit Vegetables), Herbs, Cannabis and Hemp

Trianum P Biological Fungicide was already labeled for use on a wide variety of crops in Canada for control of several diseases.

The following is provided as an abbreviated, general outline only. Users should be making pest management decisions within a robust integrated disease management program and should consult the complete label before using **Trianum P Biological Fungicide.**

Sowing of greenhouse vegetables (including bulb vegetables, leafy vegetables, Brassica vegetables, fruiting vegetables, cucurbit vegetables) and greenhouse herbs

Crop(s)	Target	Rate	Application Information
Greenhouse vegetables: Bulb vegetables (CG3-07), Leafy vegetables (CG4-13), Brassica vegetables (CG5-13), Fruiting vegetables (CG8-09), Cucurbit vegetables (CG9), Herbs (old CG19A)	Post-emergence damping off caused by *Rhizoctonia solani* and *Pythium ultimum* Fusarium root rot caused by *Fusarium oxysporum*	1.5 g/m2 of cultivated area, suspended in 2.5-5 L of water	One drench application immediately after sowing seeds or sticking cuttings

Trianum P Biological Fungicide label expanded via Minor Use Program for suppression of diseases on greenhouse and field vegetables in Canada…con't

Transplanting and repotting of greenhouse vegetables (including bulb vegetables, leafy vegetables, Brassica vegetables, fruiting vegetables, cucurbit vegetables), greenhouse herbs, greenhouse strawberries and indoor-grown cannabis

Crop(s)	Target	Rate	Application Information
Greenhouse vegetables: Bulb vegetables (CG3-07), Leafy vegetables (CG4-13), Brassica vegetables (CG5-13), Fruiting vegetables (CG8-09), Cucurbit vegetables (CG9), Herbs (old CG19A), GH strawberries, Indoor-grown cannabis	Post-emergence damping off caused by *Rhizoctonia solani* and *Pythium ultimum* Fusarium root rot caused by *Fusarium oxysporum*	Start drench application directly after planting	<u>High Crop Density:</u> Apply 3 g/m2 of cultivated area. Use a water volume equivalent to 10% of the substrate volume or 2-5 L/m2. Use a half-rate dose (1.5 g/m2) if plants have been treated with TRIANUM P previously. Repeat the half-rate booster dose every 10 weeks or after potting-on. <u>Low Crop Density or in Rows</u>: Apply 30 g/1000 plants. Use a water volume equivalent to 10% of the substrate volume or 100 litres/1000 plants. Use a half-rate dose (15 g/1000 plants) if plants have been treated with TRIANUM P previously. Repeat the half-rate booster dose every 10 weeks or after potting-on.

Field-grown vegetables (including bulb vegetables, leafy vegetables, Brassica vegetables, fruiting vegetables, cucurbit vegetables), herbs, cannabis and hemp

Crop(s)	Target	Rate	Application Information
Field Grown vegetables: Bulb vegetables (CG3-07), Leafy vegetables (CG4-13), Brassica vegetables (CG5-13), Fruiting vegetables (CG8-09), Cucurbit vegetables (CG9), Herbs (old CG19A), Field-grown cannabis and hemp	Post-emergence damping off caused by *Rhizoctonia solani*	<u>After Sowing</u>: 1.5 g/m2 of cultivated area in 1.33 L of water. <u>After transplanting</u>: 6 g in 1 L of water and apply 500 L/ha of suspension.	Start drench application immediately after sowing seeds or transplanting, repeat every 10 weeks.

Do not apply or allow drift of Trianum P Biological Fungicide to other crops or non-target areas. Do not contaminate off-target areas or aquatic habitats when spraying or when cleaning and rinsing spray equipment or containers.

Follow all other precautions, restrictions and directions for use on the Trianum P Biological Fungicide label carefully.

For a copy of the new minor use label contact your local crop specialist, regional supply outlet or visit the PMRA label site https://www.canada.ca/en/health-canada/services/consumer-product-safety/pesticides-pest-management/registrants-applicants/tools/pesticide-label-search.html