

Cranberry Crop Management Journal

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PRACTICES TO IMPROVE POLLINATION IN WISCONSIN CRANBERRY

by Janet van Zoeren and Christelle Guédot

UW-Madison Department of Entomology

HABITAT ENHANCEMENT

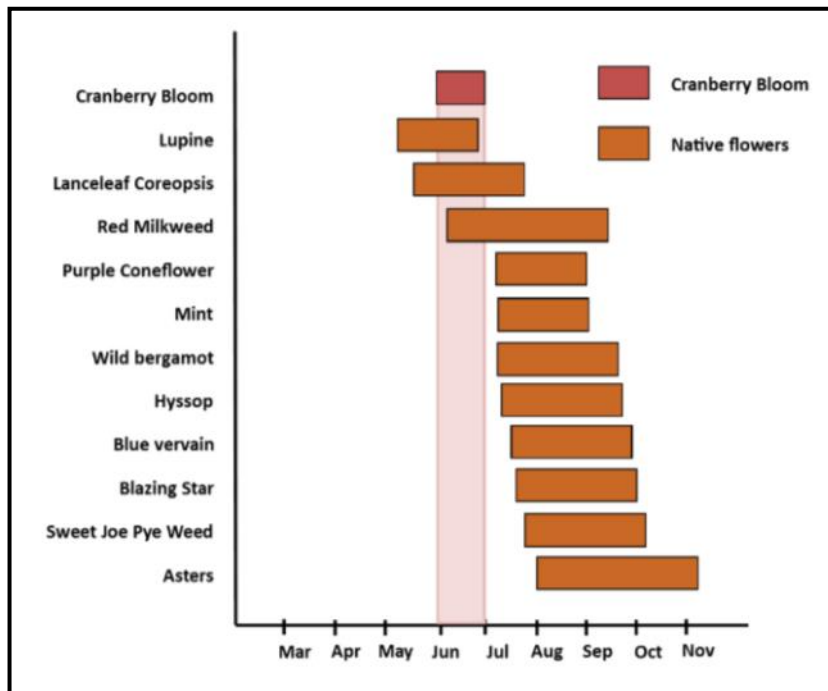
Floral nectar resources. Providing supplemental nectar resources will encourage native pollinators and may also improve honeybee health. When planning to establish a pollinator garden, select a site on your marsh that is:

- sunny
- large and round, rather than many small or irregularly shaped patches
- upland from the beds
- at least 1/3 mile away from the beds, with a road or mowed space in between to reduce weed potential
- within a mile of the beds



Purple coneflower.
Photo by Katy Thostenson.

Figure 1 shows the approximate bloom time of some plants which have been successfully grown and shown to provide floral resources on cranberry marshes. The pink column represents the time of cranberry bloom. It is best to provide several species that will bloom throughout the summer (minimizing during cranberry bloom).



Prairie blazing star.
Photo by Katy Thostenson.



Wild lupine.
Photo by Janet van Zoeren.

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Figure 1

Nesting habitat for wild bees. Wild bees need a place to build their nests. About 70% of native bees are ground-nesters, which need areas of bare, sandy or loamy soil. The remaining 30% build tunnels in stumps or twigs, or nest in cavities, such as in tall grasses or deserted rodent nests. In general, native pollinators can travel from 1/8 up to 1 mile.

Figure 2 shows the approximate flight periods for the main groups of native wild bees found around the cranberry marsh.

Government cost-share programs. There are several programs to help with costs of creating pollinator habitats, including:

- The Environmental Quality Incentives Program of USDA
- The Farm Service Agency of USDA
- The Land Owner Incentive program of Wisconsin DNR
- Bayer Crop Science, with their Feed a Bee Initiative

BEEKEEPER / CRANBERRY GROWER COMMUNICATION

Pollination services require understanding and cooperation between the beekeeper and grower. In some cases signing a written contract can be an appropriate way to ensure both parties are on the same page. Some topics worth going over with your beekeeper are discussed below.

- **Hive inspections** of a random 10% of hives will ensure they are of high quality and contain healthy bees. Ideally, a third party should conduct these inspections, with both beekeeper and grower present.
- The **timing** of when bees come onto and off of the marsh can be important for pollination and honeybee health. When possible, it can be helpful to have a nearby “staging area” with adequate floral resources where the beekeepers can bring the bees a few days before the grower wants them on the marsh.
- Within limits set by your bed layout and equipment needs, **hives placed centrally in several locations** may be the best distribution of hives. Recent research suggests that it is best to place hives in the center of the marsh and avoid placing hives near water reservoirs to increase cranberry visitation.
- Beekeepers and cranberry growers should be explicit about when, how and what can be **sprayed during bloom**. Information about reducing pesticide exposure to bees is provided below.

REDUCING PESTICIDE EXPOSURE

Although eliminating the use of pesticides is rarely feasible, you can help promote bee health by considering the following strategies in your pollinator protection plan.

- **Practice IPM.** Since the formation in 1986 of the UW-Extension Cranberry IPM Program, Integrated Pest Management has been a focus of Wisconsin’s cranberry growers, with most growers practicing IPM.
- **Spray when bees are least active.** Most bees forage beginning in early morning and continuing throughout the day, until shortly before sunset. Therefore, the best time to apply a pesticide, especially during bloom, is in the late evening or at night.
- **Pesticide drift.** Even when the field being sprayed is not in bloom, it is important to target pesticide applications to avoid drift or runoff. Whenever possible, using a boom sprayer allows cranberry growers to precisely direct pesticide applications to target only the crop. Other ways to reduce pesticide drift include:
 - Be sure to calibrate your boom to optimize spray pressure and volume
 - When possible, spray when winds are under 10 mph
 - When possible, spray when the relative humidity is above 50%
 - When possible, avoid using pesticides with small particles

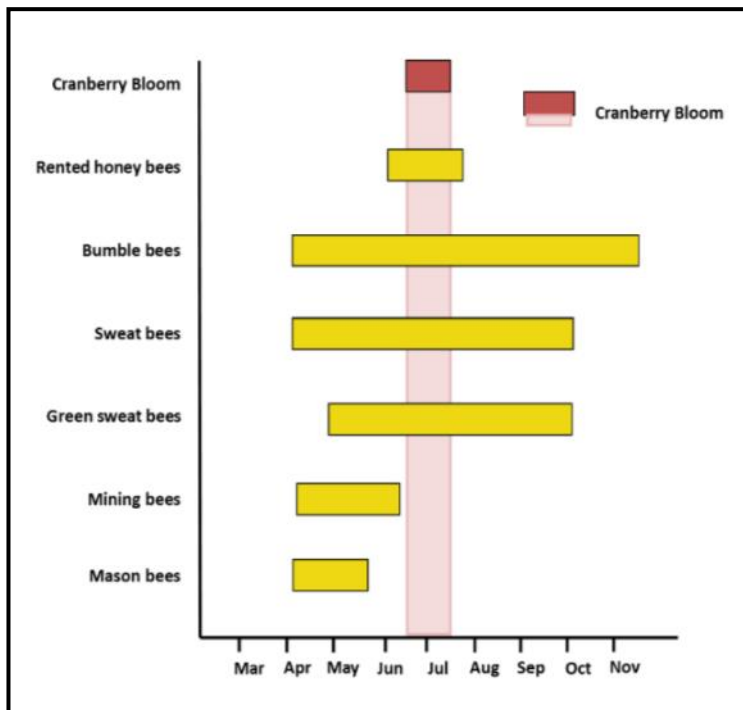


Figure 2



- **Use reduced risk chemistries.** Table 1 shows the least toxic insecticides and fungicides. A best practice is to rotate Insecticide Resistance Action Committee (IRAC) and Fungicide Resistance Action Committee (FRAC) codes to avoid pesticide resistance.

Table 1 – Least toxic chemistries for bees	Class (IRAC or FRAC code)	Example active ingredients	Example trade names
Insecticides (IRAC code)	Diamides (28)	chlorantraniliprole	Altacor
	Diacylhydrazines (18)	methoxyfenozide, tebufenozide	Intrepid, Confirm
	biological	<i>Bacillus thuringiensis</i>	Biobit, Dipel
Fungicides (FRAC code)	Strobilurins (11)	Azoxystrobin	Abound, Evito
	chitin synthase inhibitors (19)	Polyoxin D zinc salt	Oso
	Biological	<i>Reynoutria sachalinensis</i>	Regalia

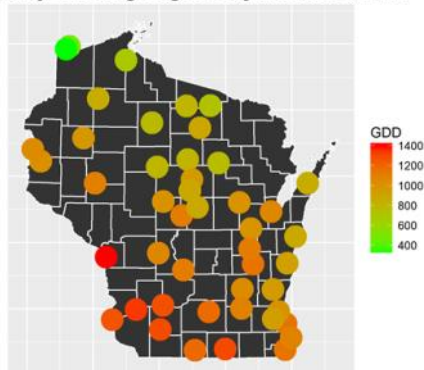
For more information, watch for a longer informational document on “Practices to improve Pollination and protect pollinators in Wisconsin cranberry” to be published soon.

CRANBERRY PLANT AND PEST DEGREE DAYS– JUNE 12, 2017

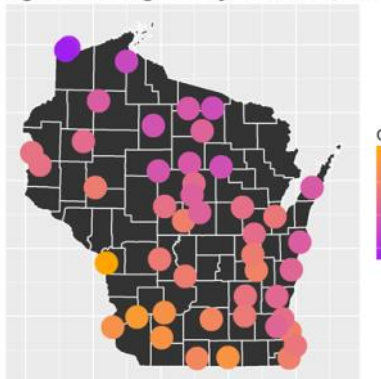
by Elissa Chasen and Shawn Steffan
USDA-ARS and UW Entomology

The maps below show how spring is progressing across Wisconsin (and rapidly becoming summer!). Developmental thresholds for each species are: cranberry plant - 41 and 85°F; sparganothis fruitworm - 50 and 86°F; and cranberry fruitworm - 44 and 87°F. Interactive maps are posted online. The interactive feature allows you to click on the map locations, prompting a pop-up that names the location and gives exact degree-days. These are available through the Steffan lab website (<http://labs.russell.wisc.edu/steffan/cranberry-growing-degree-days/>). Once on the website, follow the link to the interactive maps.

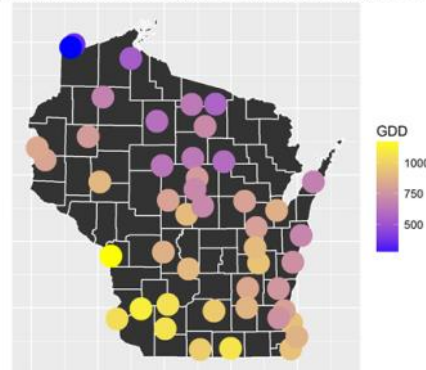
Cranberry Growing Degree Days: June 12, 2017



Sparganothis Degree Days: June 12, 2017



Cranberry Fruitworm Degree Days: June 12, 2017



The table to the right allows for comparison of degree-days over the last three years.

	June 12	Cranberry DDs			Sparg DDs			CFW DDs		
		2015	2016	2017	2015	2016	2017	2015	2016	2017
Northern WI (Minocqua)		901.9	867.2	813	453.8	438.3	397.5	734.4	705.4	654.1
Central WI (Wisconsin Rapids)		1194.8	1169.8	1113.6	660.9	648.5	601.2	999.6	972.6	923

Event	DDs from March 1 (approximate)
Flight initiation	595.7
First eggs laid	681.0
Peak flight	884.12
First egg hatched*	895.4
End of egg laying	1,634
Last egg hatched*	1,890

* Egg hatch window: 895 – 1,890 DDs

We saw the first CFW moths in traps last week in Wood County, which is earlier than we would have predicted, based on our 2016 observations correlating CFW DDs with CFW flight (last year we observed flight initiation at ~960 CFW DDs). Since this is just the second year of observation, it is premature to assess which year represents the real ‘signal’ versus the ‘noise.’ Our model predicts that Sparganothis flight is now starting. The table to the left shows the predicted life benchmarks and their associated Sparg DDs.

FUNGICIDE TIMING – CALCULATING PERCENT IN BLOOM

by Pam Verhulst
Lady Bug IPM, LLC

Growers that experienced heavy rot in 2016, are planning on using fungicides in 2017. It has been determined, through research, that the best timing of fungicide applications to prevent fruit rot is “early to mid-bloom then at 10- 14 day intervals” (P. McManus Cranberry Pest Management in Wisconsin 2017).

To help growers determine when early bloom is we use the guideline of 10-15% in bloom.

During the first full week in June we started to observe flower buds or pods. As these pods start to show, we begin preparing growers for their fungicide applications. Some growers already had a few open pods or flowers. We asked these growers to keep an eye on their plants, in case things progress quicker than we anticipated. In other words, we needed them to conduct a few calculations in between our visits for optimal timing.

Below is a review on how to calculate percentages in bloom:

1. Randomly choose a location in a cranberry bed. Avoid the extreme edge of the beds and weak areas. The location should best represent the majority of the bed.
2. Select the first 10 reproductive uprights you see. It is important that you include reproductive uprights that do not have flowers yet; do not only select uprights with open flowers (see Figure 1). Write down how many pods and flowers are on each upright. Create columns on a piece of paper. Each row should represent an upright (see Figure 2).
3. Add the columns from the ten uprights. Divide the number of flowers by the total (pods + flowers) and multiply by 100.
4. Repeat 2-3 times, throughout the bed. Average each result for you bed percentage in bloom.



Figure 1
Illustrations by Skyler Wolff
Lady Bug IPM, LLC

Figure 2

PODS	FLOWERS
5	0
4	1
5	0
3	2
5	0
3	2
4	1
5	0
5	0
5	0
44	6

$$44 + 6 = 50$$

$$6 \text{ FLOWERS} / 50 = .12$$

$$.12 \times 100 = 12\% \text{ IN BLOOM}$$

IDENTIFYING FROST DAMAGE IN CRANBERRY BUDS

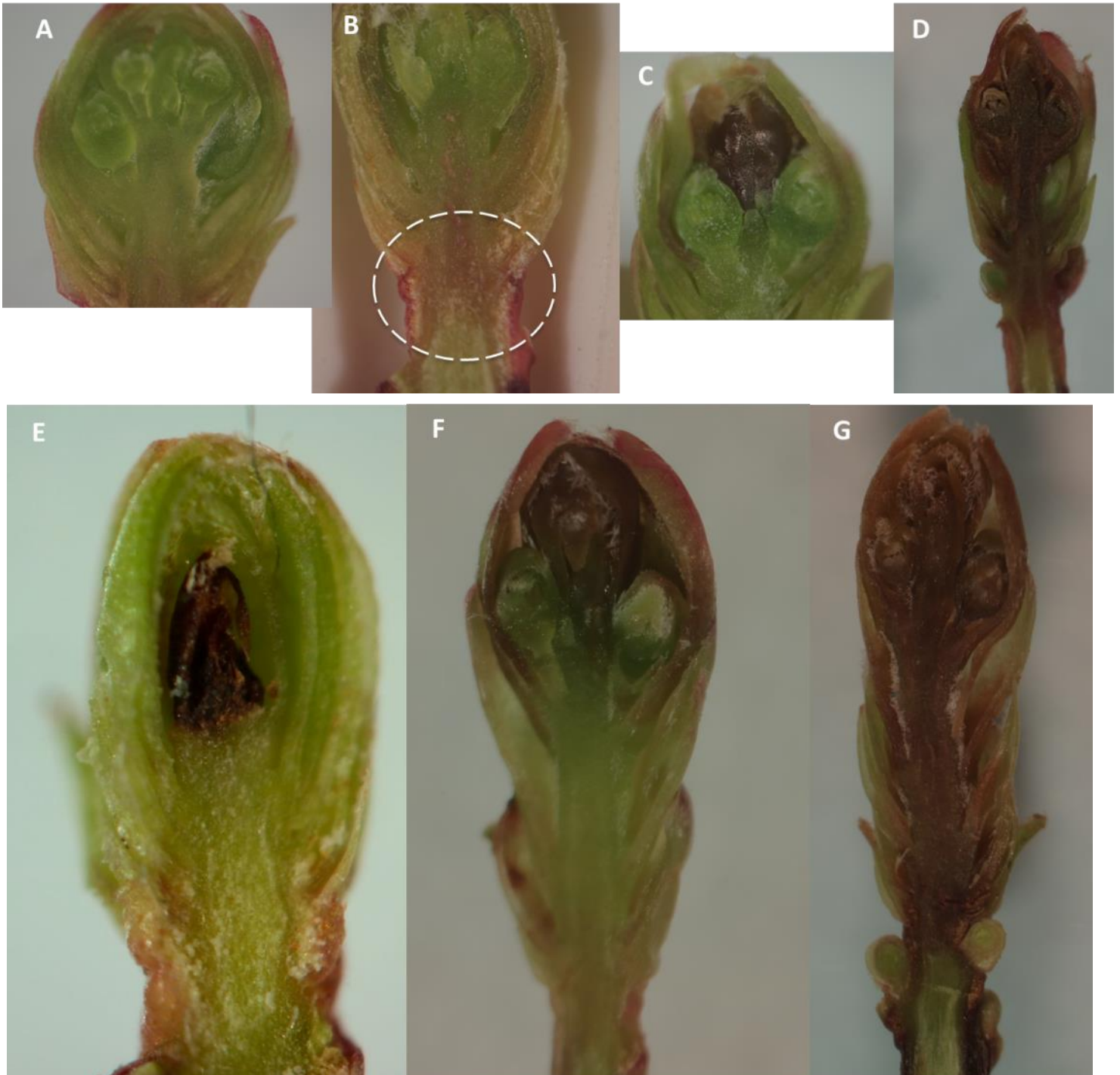
by Amaya Atucha

UW-Extension Fruit Crop Specialist

During the last year, my lab has been working on understanding how and when freezing damage occurs in cranberry buds. This article is to provide some examples to assist you in identifying freezing damage on your own marsh. During the last month, we have been recording the damage to buds collected from the field that were subjected to controlled freezing tests in our laboratory. As part of our research, we subject buds to freezing temperatures ranging from 32 to -40 °F. We have noticed that freezing damage is expressed in many ways within the bud structure (Figure 1). Symptoms can vary depending on how low the temperature drops, but also the phenological stage of the buds.

The pictures below illustrate a range of different types of damage we have recorded from our control freezing tests. The buds were collected from the field on 05.12.17 for pictures A; B; C; D, and on 05.24.17 for pictures E; F and G.

Figure 1. Picture 'A' shows an undamaged bud with several flower primordia. Picture 'B' shows a slight brown section in the base of the bud; we tend to see this type of damage in buds that are still dormant. In Picture 'C' one of the flower primordia is brown and damaged, while the other flower primordia are undamaged. Picture 'D', all the flower structures, in addition to the base of the bud, are damaged. Picture 'E' shows pre-existing damage (i.e. that the damage occurred in the field before we collected the sample) on a bud in the control treatment; notice how the damage looks "dry" compared to picture 'F' and 'G' that present a more water soak damage, which is the result of a recent frost event. Pictures 'F' and 'G' present increasing damage to flower primordia and the base of the bud for buds at bud break stage.



OBSERVATIONS FROM THE FIELD

by Jayne Sojka
Lady Bug IPM, LLC

Flooding for insect control in 2017 proved to be quite favorable. We were able to control BHF, Sparg, Cutworm, Fruit tree leaf roller, spanworm and other spring insects, yet we kept a healthy environment for the beneficials to come back into the marsh. For example; spiders, green lace wings, dragon flies and damsel flies, plus some pollinators are already working those blossoms on the edges.

As the pictures indicate we were able to clean up extra trash with this insect flood and that in itself was an added attraction (Figures 2 and 3). With 2016's history of rot it was very advantageous to get rid of mummy berries, diseased leaves, and anything stuck in the duff layer of our cranberry beds that could cause challenges in 2017.

I understand that this task is extremely time consuming and difficult to do, but I commend all those growers that dedicated days on this single control measure. As stewards of our land and keeping Sustainability in mind you can be PROUD of a job well done!

This week we have observed drought stress in the pies and I expect to see even more as this HEAT is coming on strong.

Clubbed tips are another phenomenon that we have discovered in numerous marshes this week. It is typically something that we see with the use of Crop Oil when the vines are extra sensitive (Figure 4).

May 31 we had a frost event that caught some off guard. I understand that the dew points dropped rapidly and we were not quick enough in getting those pumps up and running.



Figure 1: Minor leaf damage, showing perfect holes chewed in each leaf. The leaf will eventually fall off. The week of June 8th was the highest amount of damage for the season. Once all the leaves fall off the highly populated areas stick out like a sore thumb. A dark dingy leafless upright draws attention to the area.



Figures 2 and 3



Figure 4: Clubbed tips; clubbed tips can come from crop oil application. Crop oil is safest when used very early in the season when vines are dormant.



Figure 5: Frost damage on flower fruiting buds.

PHOTOS FROM THE SPRING GROWER MEETINGS

photos by Matt Lippert
Wood County UW-Extension

Below are a number of photos that were captured at the Spring Grower meetings, showing bed renovations and sprinkler testing for the beginning of the season.



GROWER UPDATES

DUBAY CRANBERRY

Amazing what a little heat and sun will do to move things along! Since the rains stopped, we were finally able to complete our bed renovation, 6 acres of Sundance planted. Bloom is fast approaching and with low to non-existent insect numbers we decide not to spray before bloom, a first that I can remember. Our HyReds have enough bloom to keep our bumble bees that we received Friday, busy. Anticipating the arrival of some of our honey bees by week's end. With the sunshine and warmth, the earlier Explorer applications are really starting to take control of the weeds nicely. As the temps climb this past weekend we move quickly from frost protecting to irrigation mode during this hot spell. It is amazing how quickly nature can catch up.

Dave Hansen
DuBay Cranberry

SARATOGA CRANBERRY COMPANY

Planting has been done for over a week so now it's catch up time on the marsh. The grass was as tall as the tractor tires when we finally started our first day of mowing. Along with the mowing, we got an application of fertilizer on and did a bug spray. Looking ahead, we are gearing up for another application of fertilizer at about peak bloom and a fungicide application on the hybrids. As of today 6/12/2017 we are sitting at 1,041 growing degrees in Saratoga.

Russell Sawyer

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