RUTGERS
New Jersey Agricultural Experiment Station

The Blueberry Bulletin

A Weekly Update to Growers

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- *Visit the Blueberry Bulletin webpage at njaes.rutgers.edu/blueberry-bulletin*
- *The 2022 Commercial Blueberry Pest Control Recommendations for New Jersey is available on njaes.rutgers.edu*

BLUEBERRY CULTURE

Dr. Gary C. Pavlis, PhD.
Atlantic County Agricultural Agent

Growers are aware that bloom is the best timing for the first application of an N-P-K fertilizer. If it is applied as a granular, a split application is best - one half now and one half in 6 weeks. If fertigation is the method used, again half at bloom and half 6 weeks later. Even better, it has been found that spreading the fertigation application over 6 weeks is optimum.

As growers are also aware, the Rutgers IPM program also takes leaf and soil samples at the appropriate times and sends the samples to a lab for analysis. In 2021, 355 leaf samples were taken and 325 soil samples were taken. The lab analysis shows that 155 or 68% of soil samples were below 4.5 which is the low range of optimum. Very few samples were above 5.0. There needs to be an increase in the application of lime. Research we did years ago shows that for every tenth increase desired, 100lbs./A of lime should be applied. Thus to go from 4.0 to 4.5, 500lbs./A lime should be applied.

The leaf analysis also indicated a few problems. First and four most, 98.8% of the samples were below optimum for Nitrogen. If the pH of the soil is too low, N uptake is decreased so the lack of N in the leaf samples is partly due to the low pH in many of the samples. Growers should check their pH soil tests and if it is below 4.5, low N may be due to the pH. However, if the pH is in the proper range of 4.5 to 5.0, an increase in N is warranted. Understand that just applying additional N when the pH is low can result in softer fruit. A good rule of thumb is to look at the plants and see if most had 3-5 new canes that grew to the full height of the plant in 2019. If this didn't happen, it is usually due to low pH or low N or both.

Lastly, the leaf analysis showed that there is a problem with some of the micro nutrient levels. 88% of the samples were deficient in Iron and 86% were deficient in Copper. Growers should check their leaf analysis results and if a deficiency is indicated, a foliar application is warranted. Both of these elements are very important for optimum plant growth and fruit yield. In addition, 70% of the samples showed excessive levels of Boron. In many case, boron should be omitted from the fertilizer program in 2020.

Grower should again consult with their analysis and if the level is above 75 ppm, omit Boron this year. The optimum range is 30ppm to 50ppm. I saw the highest levels of Boron I have ever seen from these 2019 samples. **Too much Boron is as bad as too little.**

Gary C. Pavlis, Ph.D.
Atlantic County Agricultural Agent

Goldenrod Control in Blueberry

Dr. Thierry E. Besancon, Extension Weed Science Specialist, Rutgers University

Recent favorable weather conditions stimulated the emergence of some summer weeds, including goldenrods. Flat-top goldenrod (*Euthamia graminifolia*), tall goldenrod (Solidago altissima), Canada goldenrod (*Solidago canadensis*) are common perennial weeds of blueberry fields with low soil pH growing with companion weed species including broomsedge grass (*Andropogon virginicus*), white boneset (*Eupatorium album*) and red sorrel (*Rumex acetosella*) among others.

Biology and Identification

Goldenrods are rhizomatous perennial plants that grow approximately 1 to 4 feet in height. Plants usually form large patches and reproduce by both seeds and a creeping rhizome system. Shoots will emerge from rhizomes in mid-April while seedlings emerge from seeds in early summer. Rhizomes will start developing after the first year of seedling growth. Most goldenrod species will produce yellow flowers in late summer. Various species will differ in overall stature, width of the leaf blade, hairiness of leaves and stems, and shape of the inflorescence.

Emerging shoots of tall (left) and flat-top goldenrod (right) on April 12, 2022, Chatsworth, NJ.

Flat-top goldenrod shoots by mid-summer (left) and tall goldenrod bloom (right) in October, Chatsworth, NJ.

Management

Controlling goldenrods can be challenging because of the perennial nature of these weeds. Herbicides with systemic activity will provide the highest level of control but will have to be applied at the proper time for maximizing their efficacy. One of the most effective and safest herbicide for goldenrod control is Stinger (clopyralid). Stinger received a new 24(c) Special Local Need label in 2021 which is valid until December 31, 2025. Other clopyralid formulations are available but **ONLY** Stinger is labeled for use on highbush blueberry in New Jersey. In addition to goldenrods, Stinger is also effective at controlling other troublesome asteraceae species such as dandelion (*Taraxacum officinale*), marestail (*Conyza canadensis*), Canada thistle (*Cirsium arvense*) or mugwort (*Artemisia vulgaris*). Stinger will also provide control of leguminous including vetch (*Vicia* spp.) and clover (*Trifolium* spp.) species.

The maximum labeled rate of Stinger per application is one-third of a pint per acre (0.125 lb ai/A), and the maximum rate per year application is two-thirds of a pint per acre (0.25 lb ai/A), but the rate needed varies, depending on the target species. Two fluid ounces per acre (0.047 lb ai/A) will control seedling annual weeds such as common ragweed and annual vetch. Three to four fluid ounces per acre (0.070 to 0.094 lb ai/A) are needed to control perennial clover species, horseweed, and groundsel. Most other susceptible perennial weeds including goldenrods require the full rate of one-third of a pint per acre (0.125 lb ai/A).

The application of Stinger timed to match the emergence of the perennial weed in the spring coincides with the time of year when the carbohydrate food reserves in the plant are at the lowest point. Treatment at this time reduces the weed's chance of recovery and survival. Optimum results controlling deep rooted and hard to control perennial weeds, including Canada thistle, goldenrod species, and mugwort will be obtained if the Stinger application is split. Apply Stinger at 1/3 pint per acre in late April when the weed is emerging in the spring. Some weeds can "survive" for months on established existing foliage even though Stinger suppresses all new growth. Tank-mix with Gramoxone to increase the spectrum of weeds controlled and kill existing foliage of perennial asters, goldenrod species and mugwort. Be sure to mark the sprayed rows and to spray adjacent sod and row middles. Blueberry plants are more sensitive to Stinger applied in the spring prior to bloom, before and/or during the crop's annual flush of growth, than after bloom. Therefore, do not apply Stinger from one week prior to bloom until one week after bloom.

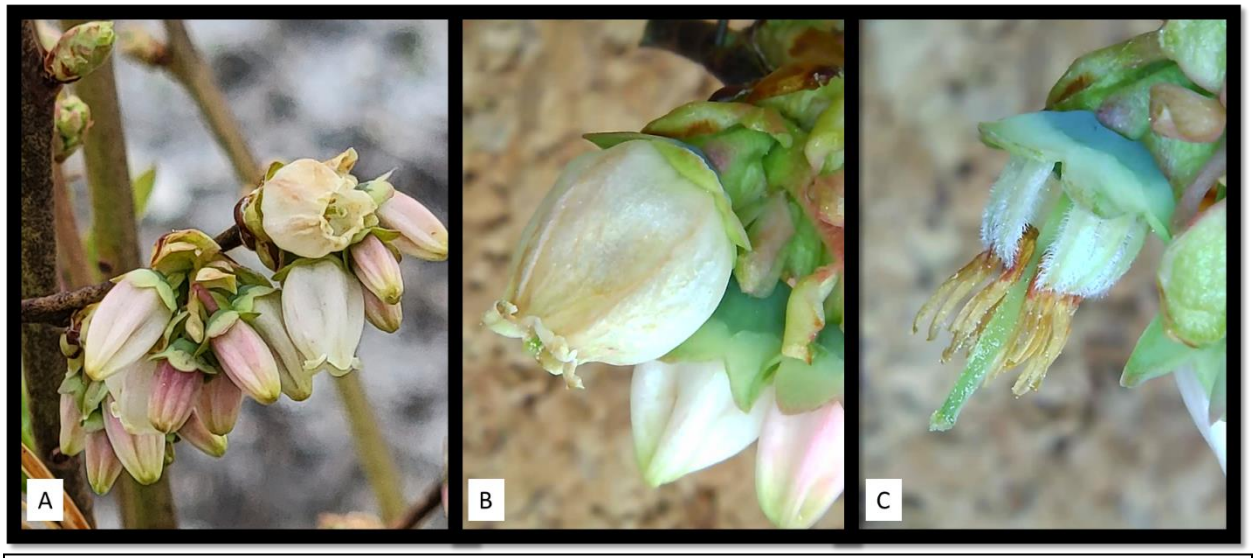
Apply another 1/3 pint of Stinger to the marked rows, or sections of rows immediately after harvest in mid-summer. Spray the second application even though no growth of the target weed is evident. The second application is essential for the elimination of the hard to kill established perennial weeds. If the second application is skipped, expect to see the weed re-emerge in late August or September. Time all applications to maintain a 30 days preharvest interval.

Stinger is both a postemergence foliar absorbed herbicide and a residual herbicide. The initial twisting and curling observed after application to susceptible species is due to foliar absorption of the herbicide by the weeds. Control of established perennials is due to the residual activity of Stinger in the soil which prevents regrowth from the roots. In certain species such as mugwort, Stinger prevents regrowth but does not kill the mature leaves. The plant will survive unless another herbicide such as Gramoxone or glyphosate is used to defoliate the plant.

Do **NOT** apply Stinger in a hand held sprayer used to "spray until wet". Stinger is a residual herbicide that must be applied on a rate per acre basis. When treating "patches" of perennial weeds, apply the recommended rate per acre with a calibrated sprayer. Treat ten to fifteen feet beyond the weed "patch" on all sides. Spray the sod or row middles adjacent to the weed "patch" in the row.

To “Gib” or not to “Gib”?

By Peter V. Oudemans, Ph.D.
Professor and Extension Specialist
Plant Pathology



Frost damage in blueberries (April 18, 2022). Temperatures as low as 24F were experienced in our Duke field here in Chatsworth. Others experienced even lower temperatures. The temperature tolerance chart (at the end of this article) suggests that open bloom will see damage whereas closed flowers are more tolerant. The photos suggest this is true. Open bloom was damaged although stigmas seem intact at this location and will probably make fruit. Closed flowers basically in good shape.

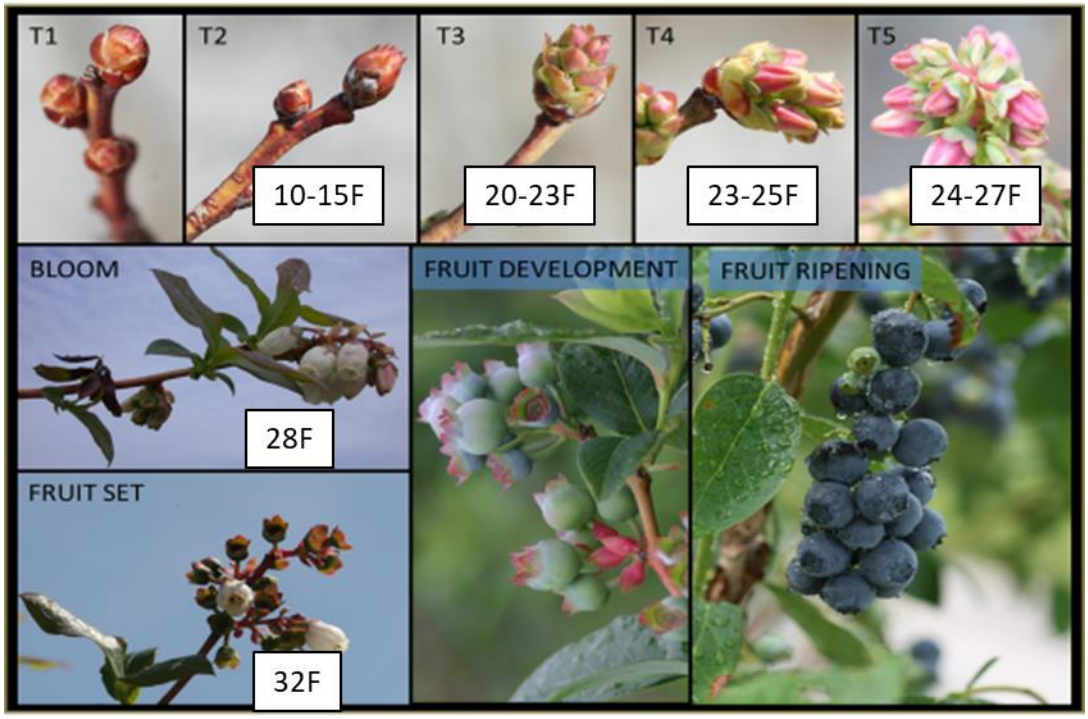
With the frost over the past week the question concerning the use of gibberellin to promote fruit set. The basis for this question lies in the knowledge that soon after pollination has occurred the flower transforms from a non-growing state to rapidly developing fruit. Production of gibberellin is triggered by pollination and it, is in part, responsible for this transformation. Applications of gibberellin can also trigger this change from non-growing or static state to fruit development in the absence of pollination. So given the amount of open bloom vs closed bloom what should you base your decision on?

(From my newsletter article 2020) Research has demonstrated that gibberellin application can significantly increase fruit set under a variety of conditions. This increase in fruit set often comes with a reduction in fruit size, seed number and stemmy fruit as well as a delay in ripening. As a result, the cost of the application may not always justify the benefit. However, there are several known factors that play into the successful use of gibberellins. These factors include timing, rate, number of applications and conditions during and after application. There is also considerable variation in the level of success with these materials. Researchers in Georgia

(NeSmith and Krewer) and Michigan (Hansen) have lead investigations on the use of gibberellin and recommendations have been developed from that work.
The benefit, especially with frost affected flowers, is that gibberellin application can help set flowers that would otherwise be incapable of being pollinated. Although, even flowers with damaged ovaries have been shown to make fruit, as the severity of the damage increases the likelihood for marketable fruit declines.

For a gibberellin application to be effective applications should be made shortly following a frost event and again 10-18 days later. Since this application can inhibit natural pollination an assessment should be made on the level of damage and if the application should be delayed until bee pollination has reached a desired level. The first application should be made in-bloom since post bloom applications are much less effective and could have undesirable side effects. Rates are provided on the label and should not exceed 80 g ai/acre total (ie. 2 applications of 40g or one of 80g). For the material to be active there must be sufficient contact time with the plant to be taken up. Up to 50% activity is achieved within the first 4 hours of contact and the remaining activity is taken up over the next 72hrs. Any wash-off prior to this time may require re-application. Applications should be made in sufficient water to fully wet the plant and the water diluent should be between pH 4-8.5.

Keep in mind that gibberellin is a very potent growth regulator that is involved in a diversity of functions in the plant. This ranges from fruit thinning, flower bud suppression, shoot elongation, as well fruit sizing. These different effects are achieved with different rates and timing of application. It is therefore critical to use optimal timing.

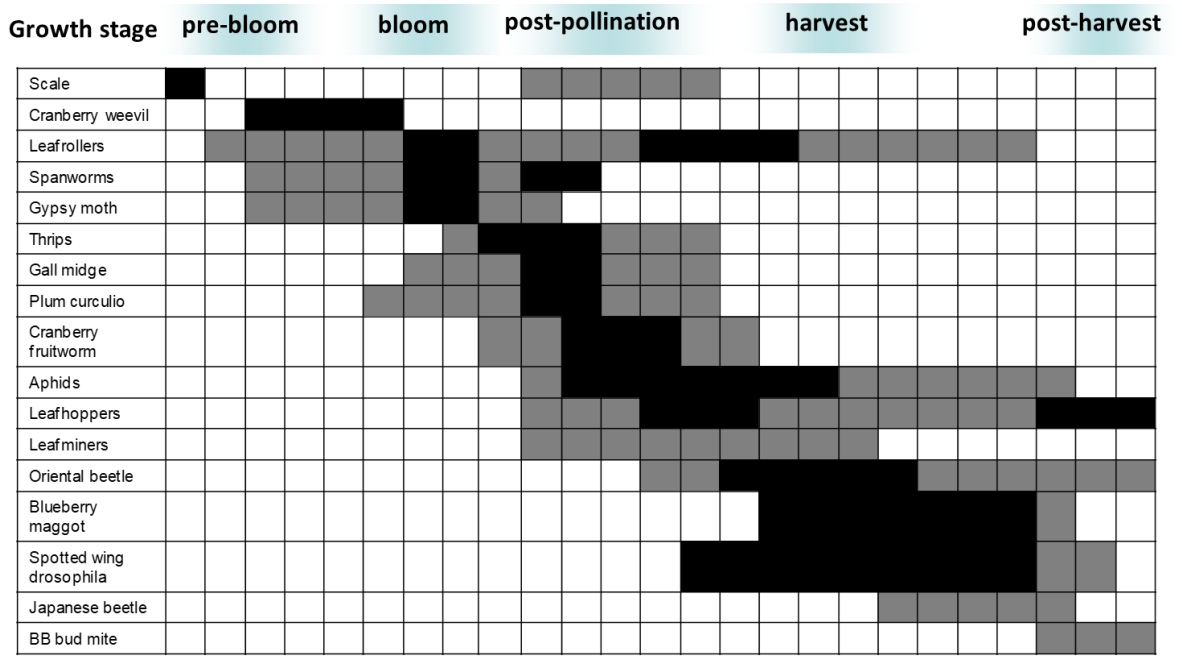


Development chart for blueberries showing the critical temperatures for bud damage. Critical temperature data is from Michigan State University (https://www.canr.msu.edu/blueberries/weather/critical-spring-temperatures

PEST MANAGEMENT

Dr. Cesar Rodriguez-Saona, Extension Specialist in Blueberry Entomology, Rutgers University
Mr. Dean Polk, IPM Agent – Fruit
Ms. Carrie Mansue Denson, IPM Program Associate – Fruit

The Table below shows the activity periods of insect pests of blueberries in New Jersey. Bars show the period when scouting (in grey) and management (in black) of the pest is most important.



Cranberry Weevil

During the week of 4/10-16 there a few sites where treatment of cranberry weevil was needed. All activity was recorded in Atlantic County. However, one plum curculio and a few spanworms were also seen. A summary of survey results is below. During this past week of scouting, weevil adults averaged 2.07 per bush with a high of 13.3. About 40% of our samplers near wooded areas have been above treatment levels.

Cranberry Weevil on a Blueberry Flower Bud (Photo by D. Polk)

Week Ending	Adults/Bush (Beating Tray)	
	Avg	Max
4/15	2.07	13.3

Life cycle: Adults move from wooded areas, where they overwinter, into the fields; however, adults occasionally overwinter inside blueberry fields if left unmanaged. The adults are small (1/16 inch long), dark reddish brown beetles, with few whitish bands on the wings, and a long snout. Eggs are laid singly through the feeding holes into the flower. Larvae feed from egg hatch to pupation within the flower buds in which they were deposited as eggs. Pupation occurs within the infested flowers and adults emerge in late May. Infested flowers turn purplish, fail to open, and eventually fall to the ground.

Cranberry Weevil feeding injury to buds
Photo by D. Polk

Scouting and Control: To monitor adults, use a beating tray under each bush and hit the bush to dislodge weevils; repeat on both sides of the bush to obtain number of weevils per bush. Because weevils are abundant near the woods where they overwinter, sampling for weevils should be intensified along the edge rows near the woods. Adults are found on sunny days. Monitor at least 10 bushes per sample site. Spraying should be confined to these "hot" spots on edge rows. Treatment thresholds are 5 weevils per bush or 20% of blossom clusters with feeding injury (i.e., at least 1 injury/puncture per 5 clusters). Asana, Avaunt, Imidan, or Mustang Max are recommended for cranberry weevil control.