



WEEKLY CROP UPDATE

UNIVERSITY OF DELAWARE COOPERATIVE EXTENSION

Volume 23, Issue 13

June 19, 2015

Vegetable Crops

Boron Deficiencies and Toxicities in Vegetable Crops - Gordon Johnson, Extension Vegetable & Fruit Specialist; gjohn@udel.edu

We have recently seen a suspected case of boron deficiency in eggplant. Boron (B) is a micronutrient required in very small amounts and there is a narrow range of safety when applying boron as toxicities can occur if too much is applied.

Boron has important roles in vegetable plants. It is needed for protein synthesis, development of cell walls, carbohydrate metabolism, sugar translocation, hormone regulation, pollen grain germination and pollen tube growth, fruit set, and seed development. Boron is mobile and readily leached in sandy soils and regular additions are necessary for many vegetables, but only in small amounts.

Vegetables vary considerably in their B requirements.

High B requirement crops include broccoli, cabbage, cauliflower, beets, spinach, turnips, and rutabaga. Apply 3 lbs/a of B for these crops.

Medium B requirement crops include asparagus, carrots, cucumbers, eggplants, leeks, muskmelons, okra, onions, parsnips, radishes, squash, strawberries, sweet corn, tomatoes, and potatoes. Apply 2 lbs/a of B for these crops.

Low B requirement crops include peppers and sweet potatoes. Apply 1 lb/a of B for these crops.

Very low B requirement crops include beans and peas. No additional boron is usually needed for these crops (snap beans actually are very sensitive to high B levels which will cause toxicities).

Boron deficiency symptoms in plants include the death of growing points resulting in a stunted or rosette appearance; leaves with a yellowish or reddish cast, and in members of the cabbage family most boron deficient cole crops develop cracked and corky stems, petioles and midribs. The stems of broccoli, cabbage and cauliflower can be hollow and are sometimes discolored. Cauliflower curds become brown and leaves may roll and curl, while cabbage heads may be small and yellow. Of all the cole crops, cauliflower is the most sensitive to boron deficiencies.

It is recommended in broccoli and kale to apply 3 pounds of boron (B) per acre in mixed fertilizer prior to planting. In Brussels sprouts, cabbage, collards and cauliflower, boron and molybdenum are recommended. Apply 3 pounds of boron (B) per acre and 0.2 pound molybdenum (Mo) applied as 0.5 pound sodium molybdate per acre with broadcast fertilizer.

Boron may also be applied as a foliar treatment to cole crops if soil applications were not made. The recommended rate is 0.2-0.3 lb/acre of actual boron (1.0 to 1.5 lbs of Solubor 20.5%) in sufficient water (30 or more gallons) for

coverage. Apply foliar boron prior to heading of cole crops.

We have seen cases of boron toxicity in snap beans in the past. Boron toxicity is common in western states where boron levels in soils or irrigation water are high. In the east, we do not have high boron soils or high levels in irrigation water. In addition, boron leaches readily from soils. Boron toxicities therefore occur only when excess boron is applied in fertilizers. The margin of safety for boron application is small and excess application or improper blending in fertilizers may lead to toxicities - deficiencies show up at 1 ppm and toxicities appear at 5 ppm of available boron in the soil (leaf tissue levels between 20 and 100 ppm are sufficient with tissue levels over 200 ppm being excessive leading to toxicities).

The vegetable crops most sensitive to excess boron are beans, particularly snap beans. Boron is generally not recommended for snap bean production and boron should never be included in starter fertilizer for snap beans. Boron toxicity often occurs where starter fertilizer containing boron for other crops, such as corn, is applied to snap beans.

Boron toxicity in beans commonly appears as yellowing in unifoliate leaves with burning of leaf edges and yellowing of leaf edges of the older trifoliate leaves that can progress to edge burn. In severe cases, plants will develop a scorched appearance and leaves may prematurely drop off.

Potato Late Blight Update #7: June 19, 2015 - Nathan Kleczewski, Extension Specialist - Plant Pathology; nkleczew@udel.edu

Note: Late blight on potato was confirmed in the Northeast part of North Carolina, approximately 30 miles from the Virginia border on 6/11/15.

Date	Townsend		Smyrna		Dover		Fairgrounds	
	DSV	Total DSV	DSV	Total DSV	DSV	Total DSV	DSV	Total DSV
5/11-5/15	1	1	1	1	8	8	1	1
5/15-5/22	3	4	3	7	2	10	3	4
5/22-5/28	0	4	0	7	0	10	0	4
5/28-6/5	24	28	15	15	8	18	5	9
6/5-6/11	12	36	5	20	6	24	3	12
6/11-6/19	11	47	8	28	6	30	3	15

Notes: Season severity of 18 severity values indicates the need for the first fungicide application. An accumulated severity of 7 after fungicide application identifies the need for a subsequent fungicide application.

Green row: May 11th, 2015

See the [2015 Commercial Vegetable Production Recommendations-Delaware](#) for recommended fungicides.

Any suspect samples can be sent to the UD Plant Diagnostic Clinic, dropped off at your local extension office. Dr. Nathan Kleczewski can also be contacted at nkleczew@udel.edu or 302-300-6962.

The website USABlight tracks tomato and potato late blight across the nation and can be found here: <http://usablight.org/>. Information on scouting, symptomology, and management can also be found on this website.

Wildlife and Produce Food Safety - Gordon Johnson, *Extension Vegetable & Fruit Specialist*; gcjohn@udel.edu

Many of the food borne illness outbreaks in produce can be traced back to issues with wildlife intrusion. Wildlife droppings (fecal matter) can be a direct source of E. coli or Salmonella contamination in produce and irrigation water contaminated with wildlife fecal matter can serve to inoculate large areas of fields with these pathogens.

Wildlife serve as natural reservoirs of these pathogens and wildlife can move pathogens from field to field, or water source to water source. Major wildlife of concern for field contamination in our region include deer, waterfowl (geese particularly), and gulls. Secondary sources of concern would be groundhogs, rabbits, voles, other small mammals, and amphibians. In packing houses the major concerns are roosting birds and rodents.

Wildlife management in vegetable and fruit fields can be difficult. Growers should do a risk assessment of all their fields each year in regards to wildlife and match fields according to the type of produce being grown. High risk produce such as leafy greens, tomatoes, and muskmelons should go in fields with the least signs of wildlife intrusion. Lower risk produce such as sweet corn would be more appropriate for other fields with more wildlife activity.

A major part of managing risk with wildlife is doing preharvest assessments. When doing a preharvest assessment, growers should look for wildlife intrusion and flag all areas where wildlife activity has been found. These areas and a buffer area surrounding them should not be harvested. In tree fruits, no fruit drops should be harvested.

In high value crops such as fruit, fencing and netting may be desirable to reduce wildlife intrusion (and damage to crops). Scaring devices and repellents, while not always effective, may also have a role in reducing wildlife activity in some crops. Damage permits for deer hunting can serve to reduce populations on some farms.

In surface water irrigation sources, efforts should be made to discourage wildlife,

particularly during the irrigation season. Fencing and scaring devices should be considered where practical. Where high risk produce is being grown, growers should assess the risk of wildlife contamination of surface water used for irrigation. High frequency water testing for indicator E. coli should be done on surface water sources with high risk of contamination by wildlife. Treating water may be an option where contamination risk is high.

Eliminating wildlife habitat has also been considered as a control measure. However, this must be weighed against conservation benefits of these habitats.

In packing houses, active pest management programs should be in place. Eliminate roosting areas for birds in packing areas. Active rodent control programs should also be in place.

Agronomic Crops

Small Grain Disease Update - Nathan Kleczewski, *Extension Specialist - Plant Pathology*; nkleczew@udel.edu

Barley is almost all out and wheat harvest is underway in many parts of the state. From what I hear and see, this looks like it will be a year without many mycotoxin associated issues. This is in line with the dry, hot weather we had before and during flowering as well as what was predicted by the scab forecast model around critical flowering periods. Although there are some subtle differences in scab levels in fields with different management practices, all fields that have been assessed are well below the critical 10% field index where we may start to see levels of DON above 2 ppm. Again, this falls in line with the weather and the scab forecasting model.

Now is a good time to direct you to an updated factsheet on selecting varieties for managing scab. Selecting a good, moderately resistant variety is the first, most important, cost effective, and best management practice for managing scab. The factsheet provides a quick synopsis on scab and also gives the last set of results from the misted nursery at UMD <http://extension.udel.edu/factsheet/moderate/>

[y-resistant-wheat-varieties-for-vomitoxin-don-suppression-in-wheat/](#). In the table you will notice that I have arranged the varieties by DON levels. This is because this is the most important characteristic we are looking at for managing scab. You will also note the column labeled ISK. This is a visual estimate of the amount of head bleaching and infected kernels in a variety, calculated from severity, incidence, and FDK values weighted for importance. Green values are the most resistant, followed by yellow. Another misted nursery can be found at Virginia Tech, although there isn't a great deal of overlap in varieties.

Time to Scout for Corn Diseases - Nathan Kleczewski, Extension Specialist - Plant Pathology; nkleczew@udel.edu

Now is the time to be scouting corn for development of common, potentially problematic diseases.

Anthracnose

Look for irregular, “candle flame” lesions on the lower leaves of corn seedlings (Figure 1). Close inspection of these lesions with a hand lens may reveal dark spines resembling eyelashes (Figure 2). These structures, called setae, are a pretty good diagnostic feature of corn anthracnose caused by the fungus *Colletotrichum graminicola*. This disease is residue borne and can cause a leaf blight during early phases of growth (around V5-8). Conditions that favor the disease include corn after corn production, no till or minimal till production, and irrigation. Early foliar symptoms are not the direct cause of anthracnose stalk rot that can occur later in the season. However, if you have anthracnose in seedlings you should take note and scout for anthracnose stalk rot later in the growing season. The stalk rot phase is distinguished by black shiny lesions on the surface of the stalks. For more information on Anthracnose of corn, refer to my factsheet: <http://extension.udel.edu/factsheet/anthracnose-leaf-blight-and-stalk-rot-of-corn/>



Figure 1. Symptoms of anthracnose on the lower leaves of corn. Note the irregular lesions with yellow halos. Inspection of lesions should yield black spines or setae (see Figure 2).

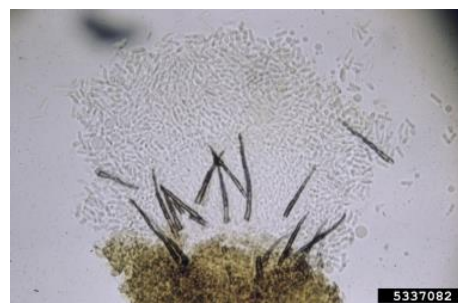


Figure 2. Close up of *Colletotrichum* fruiting body with characteristic “eyelash” setae and spores. Photo by C. Drake. Obtained from Bugwood image archive at www.ipmimages.org.

Gray Leaf Spot

Another important disease you start scouting for soon, particularly if you are irrigating and planting corn after corn, is Gray Leaf Spot. The disease first appears as small, necrotic spots or flecks. Spots usually expand to become rectangular lesions, about 1/8" wide by up to 2"-3" long and gray to brown in appearance (Figure 3). When held to the light, lesions are opaque. Conditions favorable for disease include wet weather and warm (70-80°F) temperatures, and high amounts of corn residue in the field. The disease starts on lower leaves and will move up the plant as long as conditions remain favorable for infection. Additional information on Gray Leaf Spot can be found in the following factsheet: <http://extension.udel.edu/factsheet/gray-leaf-spot-on-corn/>



Figure 3. Mature lesions of Gray leaf spot on corn. Note rectangular appearance.

Rust

On another note, we have seen rusts start up early in corn early in the South this season, and recent tropical storms are likely to increase disease spread. Southern rust has appeared late in fields over the last two seasons but can be quite damaging if it arrives before grain fill, as the pathogen can reproduce in as little as 5 days. Southern rust differs from common rust in many aspects (Table 1).

Table 1. A comparison of Southern rust and common rust in corn.

Feature	Southern Rust	Common Rust
Pustule color	Light orange to brown	Brown/red
Location on leaf surface	Upper leaf surface (mostly)	Upper and lower leaf surfaces
Presentation on leaf	Patches	Scattered
Tissues affected	Leaves and husks	Leaves only
Temperature optima	77-82 ^o F	61-77 ^o F

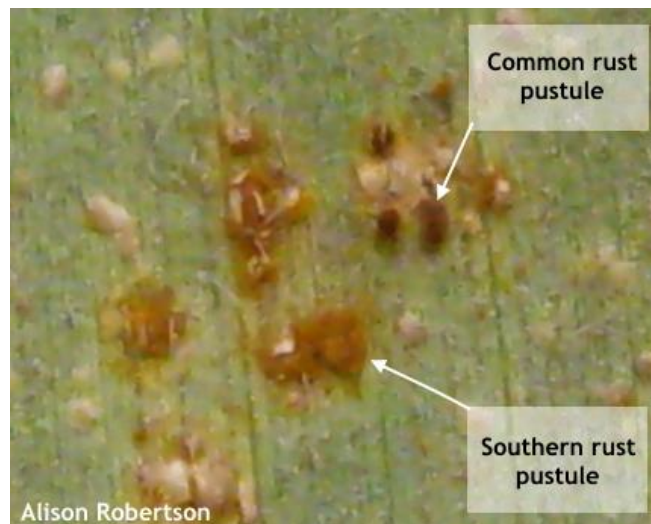


Figure 4. A visual comparison of Southern rust pustules and common rust pustules.

Foliar Lesions in Soybean Seedlings - *Nathan Kleczewski, Extension Specialist - Plant Pathology; nkleczew@udel.edu*

You may be seeing some spots and lesions on the unifoliate or first 1-2 trifoliate leaves in full season soybeans. At first look you may think these look like Frogeye leaf spot (FLS) lesions. We have seen FLS early in no till fields of continuous beans in the past, and variety plays a big role in symptom development and expression. However, there are some chemicals that can cause similar looking symptoms in soybeans. Here are some clues that can help you determine if you are not dealing with FLS: 1) There is an obvious pattern to the symptoms; 2) The entire field is affected; 3) Nearly all plants show symptoms of disease somewhat uniformly, it's everywhere.

If you really want to see if you have FLS, look at the undersides of the leaves. On the underside of leaves infected with FLS you will see dark spots and if you are lucky you may even see long, silvery spores with the aid of a hand lens. This makes the lesion look as if it has whiskers (Figure 1). Regardless, keep an eye on the field and see if the symptoms progress or stay the same.



Figure 1. Closeup of Frogeye leaf spot lesion. Note purple boarder and grey/black mass at center of lesion. If viewed from the side, this black area will appear fuzzy or will have “whiskers.”

Greensnap versus Root Lodging in Corn -
Richard Taylor, Extension Agronomy Specialist;
rtaylor@udel.edu

With the possibility that the remnants of tropical storm Bill will arrive in the MidAtlantic region this weekend, there’s a chance of either high winds or some straight-line winds in thunderstorms. Many of the corn fields in Delaware have recently received sidedress nitrogen (N) and have reached the rapid growth phase in corn development. This may mean that at least some fields will be at risk for greensnap or storm induced breakage. Hybrids differ in their susceptibility to greensnap and the stage of development also influences the risk of this type of wind injury. Corn in the V10 to V12 (10 to 12 leaf collars fully emerged and visible) is most at risk. Although this problem is more often seen in MidWest corn fields where the prevalence of high winds is greater, the remnants of tropical storm Bill could easily create the same conditions for us over the coming weekend. Although not common in the MidAtlantic, we did observe greensnap last year in the 2014 Corn Hybrid Performance Trials, especially in the Marydel, Delaware location.

Greensnap can be distinguished from root lodging in that the breakage occurs at a stem

node. The upper portion of the corn plant can be completely severed from the lower stem and root or can remain partially attached, although in all the cases I’ve observed in Delaware the impact on yield is almost a total loss. Plants can break anywhere along the stem although it most often occurs below the node where the ear will form. For root lodging, large sections of a field or perhaps individual plants will be pushed over by the winds but the stalks do not break. Root lodging often is associated with heavy rainfall, higher winds, and will be worse where corn root worms or cultivation has clipped some of the roots that help support the plant. If it occurs before tasseling, the plant often produces new brace or adventitious roots at the nodes close to or in contact with the soil surface and the new growth begins to turn upright again. Although root lodging can cause harvest problems, its impact on yield potential is often minimal compared with greensnap.

Growers will ask whether there’s anything they can do to prevent greensnap and unfortunately the answer is that other than choosing a hybrid that’s resistant to greensnap there’s nothing a grower can do about the situation. Since the condition only occurs on rare occasion in our region, most of the hybrids available to growers may not have greensnap ratings and even with such ratings other characteristics such as yield potential, gray leaf spot resistance, etc. are more important to our growers than greensnap resistance.

After the storms pass, growers should observe their fields for evidence of greensnap; and, if present, estimate the severity of the problem since this estimate will likely correspond to a potential loss estimate. Estimates of loss from root lodging where the plant tries to resume vertical growth vary greatly depending on how early the damage occurs and the growing conditions for the rest of the season.

General

New USDA Tool Enables Farmers to Request Conservation Assistance Online

The U.S. Department of Agriculture recently launched a new online tool that allows farmers and private forest landowners to conduct business with USDA's Natural Resources Conservation Service (NRCS) remotely. With the launch of Conservation Client Gateway, producers will have the ability to work with conservation planners online to access Farm Bill programs, request assistance, and track payments for their conservation activities.

"This tool saves producers that extra trip or even phone call to their USDA service center because now the desired information can be accessed from a computer through Conservation Client Gateway," said NRCS State Conservationist Kasey Taylor.

Conservation Client Gateway enables farmers and private landowners to securely:

- Request NRCS technical and financial assistance;
- Review and sign conservation plans and practice schedules;
- Apply for a conservation program;
- Review, sign and submit contracts and appendices for conservation programs;
- Document completed practices and manage certification of completed practices;
- Request, track and view payments for conservation programs; and
- Store and retrieve technical and financial files, including documents and photographs.

Conservation Client Gateway is entirely voluntary, giving producers a choice between conducting business online or traveling to a USDA service center.

Conservation Client Gateway is available to individual landowners and will soon be extended to business entities, such as Limited Liability Corporations. It is part of the agency's ongoing Conservation Delivery Streamlining Initiative,

which will feature additional capabilities in the future.

For more information about Conservation Client Gateway, visit:
www.nrcs.usda.gov/clientgateway.

Announcements

2015 Weed Science Field Day

Tuesday June 30

University of Delaware

Carvel Research and Education Center,
Route 9 (16483 County Seat Highway),
Georgetown, DE

Registration begins at 8:15 at the Grove near the farm buildings and new office building on the north side of the road. We will start to view the plots at 8:45 am.

Women In Ag Webinars

2nd & 4th Wednesday of each month

<http://extension.umd.edu/womeninag/webinars>

Cost is FREE and all are invited to participate

UPCOMING WEBINARS

6/24: Social Media Privacy - When the world of social media is constantly evolving and new networks are appearing by the day we need to keep ourselves updated on how to make sure our clients, as well as ourselves, know what information is public or private.

7/8: Analytics - Digital media is at the front of most marketing and strategic plans for business and organizations. It's not easy to know how to track the success of your campaigns and your websites which is why keeping up with analytics and trends in optimization is key.

7/22: Enterprise Budgeting - Enterprise budgets are an organized listing of the expected income and costs of a product or service. This webinar will take a look at parts of an enterprise budget, how to develop an enterprise budget and how to analyze the projected profitability of that enterprise.

Archived Webinars are also available at the website.

Onion Twilight

Tuesday, July 7, 2015 6:00-8:00 p.m.
Carvel Research and Education Center
16483 County Seat Highway
Georgetown, DE 19947

University of Delaware Extension Vegetable Program will hold an onion twilight meeting on July 7, 2015. See variety trials of over 50 bulbing onion varieties being grown on plastic mulch and bare ground from spring transplants. Varieties include sweet onions and longer storing types of intermediate day and long day onions. Included are yellow, white and red varieties. Information will be presented on growing practices, harvest, storage, and marketing. Also presented will be information on overwintering onion work.

To register, contact Karen Adams at (302) 856-7303 or email adams@udel.edu

For additional program information, contact Gordon Johnson, gcjohn@udel.edu, (302)-856-7303, gcjohn@udel.edu.

Blueberry Educational Meeting and Tour

Tuesday, July 14, 2015 6:00-8:00 p.m.
University of Delaware
Carvel Research & Education Center
16483 County Seat Highway
Georgetown, DE 19947

This meeting will highlight our extension IPM program addressing Spotted Wing Drosophila monitoring and management in small fruits as well as ongoing variety testing and other research with blueberries and other small fruit.

- Tour the blueberry variety trial, mulch and soil amendment experiments.
- See and sample berries from the blueberry variety trial.

The meeting will conclude with an ice cream and berry treat.

Please pre-register before July 10 by contacting Karen Adams at (302) 856-7303 or adams@udel.edu.

Webinar

Ag Labor: Complying with the I-9 Process

June 22, 2015 12:00 noon

This free webinar which will be hosted by University of Maryland Ag Law Initiative.

Complying with federal and state labor laws can be complicated matters for not only agricultural producers but any business operator. One aspect of federal labor law is verifying the individual is eligible to work in the United States. On June 22, Dr. Shannon Ferrell, Oklahoma associate professor of agricultural economics, Department of Agricultural Economics, Oklahoma State University, will cover this topic and touch upon other issues related to federal labor laws. The webinar is open to all and is free. The webinar will be recorded for those unable to attend.

Free Registration, but you must sign up at <https://aleii-9webinar.eventbrite.com>

Weather Summary

Carvel Research and Education Center Georgetown, DE

Week of June 11 to June 17, 2015

Readings Taken from Midnight to Midnight

Rainfall:

0.14 inch: June 14

0.01 inch: June 16

Air Temperature:

Highs ranged from 93°F on June 16 to 80°F on June 17.

Lows ranged from 75°F on June 13 to 65°F on June 11.

Soil Temperature:

79.4°F average

Additional Delaware weather data is available at http://www.deos.udel.edu/monthly_retrieval.html and <http://www.rec.udel.edu/TopLevel/Weather.htm>

Weekly Crop Update is compiled and edited by Emmalea Ernest, Associate Scientist - Vegetable Crops

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