



# WEEKLY CROP UPDATE

UNIVERSITY OF DELAWARE COOPERATIVE EXTENSION

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## WCU Subscription Options for 2016: Mail, Fax, Email or Text

We hope that this first issue of Weekly Crop Update for 2016 will help you get your growing season off to a good start. The next WCU for 2016 will be issued on April 1. The WCU will then be posted on the web, and sent to mail and fax subscribers by 4:30 p.m. each Friday until September 23. The cost of mail or fax subscription is \$40. You can subscribe by returning the form at the back of this issue. The WCU is also available for free online as a printable PDF or blog format at:

<http://extension.udel.edu/weeklilycropupdate/> .

For those who access the newsletter via the internet we send a weekly email reminder which will let you know when the WCU has been posted online, provide a link directly to the current issue, and give you a taste of the headlines. If you would like to receive the email reminder please click on the "Sign Up For Our Emails" link on the WCU blog site. If you experience problems with the online WCU please contact me at [emmalea@udel.edu](mailto:emmalea@udel.edu) or (302)-856-7303.

I will also send out a text message each week when a new issue is posted. The message will be brief, and the text message distribution list will not be used for other announcements except those of an urgent nature (i.e. pest or disease alerts). If you would like to receive the text reminder please send your name, number and cell phone carrier to me at the above email address or send a message to 302-233-4719.

*Emmalea Ernest*

## Vegetable Crops

March is the Month for Planting Sweet Onions -*Gordon Johnson, Extension Vegetable & Fruit Specialist; [gcjohn@udel.edu](mailto:gcjohn@udel.edu)*

There has been increased demand for sweet onions grown both for local sales and wholesale markets in our region. Sweet onions can be grown in Delaware but are challenging and require attention to some critical details to produce economically.

Sweet onions have low pungency which is determined by measuring pyruvate and must have a score of 5.0  $\mu\text{mol/gfw}$  or less to using a standard onion pungency test to be marketed as a sweet onion in wholesale channels. Soluble solids (a measure of sugars) in sweet onions varies considerably by variety and the sweetest types will be over 7% soluble solids.

Planting date is very important to have the highest yields and largest bulbs. For sweet onions large (Jumbo) and colossal sizes greater than 3 inches in diameter have the most value in wholesale markets. Delaware trials have shown that to achieve these sizes consistently, it is necessary to plant by the end of March.

Local trials have also shown that to consistently achieve these sizes, transplants must be used and they must be grown on black plastic mulch with drip irrigation. Four foot wide plastic is laid on a raised bed so that there is a 3 foot bed top with 2 drip tapes so that 4 rows of onions can be planted 8-10 inches between rows and 4-6 inches

between transplants and a drip tape between pairs of rows. Transplants are set by hand, which requires considerable labor.

Growers can produce their own transplants but they must be seeded in the greenhouse in January. Transplants are started in 200-288 cell flats at least 10 weeks before intended transplant date. Our research has shown that very small plugs (400-500 cell trays) will also produce transplants that yield a high percentage of large bulbs. Growers can also arrange to have transplant growers in the Southwest (Texas, Arizona) produce transplants and ship them to our area for spring planting. While it is too late to have plants grown for 2016, some transplant growers do produce surplus for sale.

Intermediate day sweet Spanish onion types are best adapted for our area; however, some long day varieties also can be grown successfully. The standard yellow sweet onion variety has been 'Candy'. 'Expression' has replaced 'Candy' to a large extent because it is more disease tolerant and stores better. Other yellow intermediate day varieties that showed good adaptation to Delaware in 2014 and 2015 trials included 'Great Western' (March planted only), 'Bradley', 'Cimarron', 'Scout', 'Avalon', and 'Spanish Medallion'. White varieties that did well over 2 years of trials in were 'Mt. Whitney', 'SV4058NU', and 'Solstice'. All of these varieties have the potential to produce a large percentage of large and jumbo onions, have yield potential of over 20 T/a, and can be sold into sweet onion wholesale fresh markets. Red sweet onions tested in Delaware performed very poorly and no red varieties are recommended at this time.

One versatile yellow onion that has dual purpose as an overwintering type as well as a spring transplanted sweet onion has been 'Bridger'.

It is important that once transplanted, onion growth is not interrupted. Steady, frequent applications of irrigation water are necessary because onions have small root systems. If beds are allowed to dry out at any time, yields will be reduced. Fertility varies with grower and field but in general 50 lbs. of N/acre is applied preplant along with P & K based on a soil test. An additional 25-50 lbs N/acre is applied through drip before bulbing starts.

Pennsylvania has developed a program to grow, sell, and promote sweet onions from their state. Sweet onion production in Delaware has more risk due to our hotter and more variable late spring and summer weather. However, there is still potential to develop wholesale markets for onions produced here with careful variety selection and attention to detail in production.



Onions from the 2015 variety trial in Delaware.

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### **Foliar Fertilization of Vegetable Crops** - *Gordon Johnson, Extension Vegetable & Fruit Specialist; [gcjohn@udel.edu](mailto:gcjohn@udel.edu)*

Growers will apply most (>90%) of their plant nutrients for vegetable crops as soil applications (preplant, sidedressed, fertigated) based on soil tests and crop nitrogen needs.

To monitor vegetable nutrient status during the growing season, tissue testing is recommended just prior to critical growth stages. Growers can then add fertilizers to maintain adequate nutrient levels during the growing season or correct nutrient levels that are deficient or dropping.

Foliar fertilization is one tool to maintain or enhance plant nutritional status during the growing season. Often quick effects are seen and deficiencies can be corrected before yield or quality losses occur. Foliar fertilization also allows for multiple application timings post planting. In addition, there is reduced concern for nutrient loss, tie up, or fixation when compared to soil applications.

However, foliar fertilization has limitations. There is the potential to injure plants with fertilizer salts, application amounts are limited (only small amounts can be taken up through leaves at one time), multiple applications are often necessary (increasing application costs) and foliar applications are not always effective, depending on the nutrient targeted and plant growth stage.

Where foliar fertilization does have a good fit is for deficiency prevention or correction, particularly when root system function is impaired. This commonly occurs when there is extended rainy weather and soils are waterlogged. Foliar fertilization is also necessary when soil conditions, such as low pH, causes the tie up of nutrients so that soil uptake is limited. Foliar fertilization can also be used to target growth stages for improved vegetable nutrition thus improving color, appearance, quality, and yield.

Foliar fertilizers are applied as liquid solutions of water and the dissolved fertilizers in ion or small molecule form. Foliar nutrient entrance is mostly through the waxy cuticle, the protective layer that covers the epidermal cells of leaves. Research has shown that there is limited entrance through the stomata. While the waxy cuticle serves to control water loss from leaf surfaces, it does contain very small pores that allows some water and small solute molecules to enter into the underlying leaf cells. These pores are lined with negative charges. Fertilizer nutrients in cation form or with neutral charges enter most readily through these channels: this includes ammonium, potassium, magnesium, and urea ( $\text{NH}_4^+$ ,  $\text{K}^+$ ,  $\text{Mg}^{++}$ ,  $\text{CH}_4\text{N}_2\text{O}$  respectively). In contrast, negatively charged nutrients (phosphate-P, sulfate-S, molybdate-Mo) are much slower to move through the cuticle (they must be paired with a cation). Movement through the cuticle is also dependent on molecular size, nutrient concentration, time the nutrient is in solution on the leaf, whether the nutrient is in ionic or chelated form (complexed with an organic molecule), and the thickness of the leaf cuticle.

Another factor in foliar fertilizer effectiveness is what happens once the nutrient enters into the leaf area. Some smaller molecules or those with less of a charge are readily transported in the

vascular system to other areas of the plant ( $\text{NH}_4^+$ ,  $\text{K}^+$ ,  $\text{Mg}^{++}$ , Urea). Other larger molecules and more strongly positive charged nutrients stay near where they enter because they bind to the walls of cells in intercellular areas that contain negative charges. Tightly held nutrients include Calcium, Manganese, Iron, Zinc, and Copper ( $\text{Ca}^{++}$ ,  $\text{Mn}^{++}$ ,  $\text{Fe}^{++}$ ,  $\text{Zn}^{++}$ ,  $\text{Cu}^{++}$ ). Therefore, when applied as foliar fertilizers, calcium does not move much once it enters plant tissue, the negatively charged nutrients such as phosphorus and sulfur are very slow to enter the plant, and iron, manganese, copper, and zinc are slow entering and do not mobilize once in the plant.

The following is a list of the major plant nutrients that are effective as foliar applications, fertilizer forms best used for foliar applications, and recommended rates;

- Foliar applications of nitrogen (N) can benefit most vegetables if the plant is low in N. Urea forms of N are the most effective; methylene ureas and triazines are effective with less injury potential; and ammonium sulfate is also effective. Recommended rates are 1-10 lbs per acre.
- Foliar potassium (K) is used on fruiting vegetables such as tomatoes and melons. Best sources are potassium sulfate or potassium nitrate. Recommended rate is 4 lbs/a of K.
- Foliar magnesium (Mg) is used on tomatoes, melons, and beans commonly. The best source is magnesium sulfate and recommended rates are 0.5-2 lbs/a of Mg.
- Foliar calcium is often recommended, but because it moves very little, it must be applied at proper growth stages to be effective. For example, for reducing blossom end rot in tomato or pepper fruits, foliar calcium must be applied when fruits are very small. Best sources for foliar calcium are calcium nitrate (10-15 lbs/a), calcium chloride (5-8 lbs/a) and some chelated Ca products (manufacturers recommendations).
- Iron (Fe), manganese (Mn), or zinc (Zn) are best applied foliarly as sulfate forms. Rates are: Fe, Mn, 1-2 lbs/a, and Zn ¼ lb/a. While these metal micronutrients are not mobile, foliar applications are very effective at correcting local deficiencies in leaves.

- The other micronutrient that can be effective as a foliar application is boron. Boron in the Solubor form is often recommended at 0.1 to 0.25 lbs/a for mustard family crops such as cabbage as a foliar application. Boron is very toxic to plants if applied in excess so applying at correct rates is critical.

For foliar fertilizers to be most effective they should remain on leaves or other targeted plant tissue in liquid form as long as possible. Urea and ammonium nitrogen forms, potassium, and magnesium are normally absorbed within 12 hours. All other nutrients may take several days of wetting and rewetting to be absorbed. Therefore, it is recommended that foliar fertilizers be applied at dusk or early evening when dew is on the leaves, in high volume water, and using smaller droplets to cover more of the leaf. Applications should also be made when temperatures are moderate and wind is low. While foliar fertilizers are sometimes applied with pesticides, for best effectiveness and reduced phytotoxicity potential it is recommended that they be applied alone. Use only soluble grade fertilizers for foliar applications (many are already provided in liquid form) and adjust water pH so it is slightly acidic.

Foliar fertilizers are most effective when applied to younger leaves and fruits. Research has shown that as leaves or fruits age, cuticles thicken, and these thicker cuticles absorb significantly lower amounts of nutrients such as potassium. However, younger plant tissue is also the most susceptible to potential fertilizer burn.

Because foliar fertilizers are in salt forms they can damage plant tissue if applied at rates that are too high. Generally a 0.5-2% fertilizer solution is recommended. Certain vegetables are more sensitive to fertilizer salt injury than others. Vegetables with large leaves with thinner cuticles (such as muskmelons) have greater risk of salt injury when compared to crops, such as cabbage, that have thick cuticles. Apply foliar fertilizers at recommended rates and dilutions for each specific vegetable crop.

In addition, some fertilizer sources are much more likely to cause injury than others. In the past this was given as the salt index for a fertilizer, the lower the salt index the less osmotic stress the fertilizer would place on the

plant tissue. A better index would be the osmolality values for the fertilizer material. For foliar nitrogen materials, osmolality values (mmol/kg) for common N sources are as follows: Urea = 1018, UAN-28 = 1439, Ammonium sulfate = 2314, Potassium nitrate = 3434. This shows that potassium nitrate has over 3x the osmotic stress potential compared to urea when applied as a foliar fertilizer. This means that potassium nitrate has much more potential to cause salt injury to plants than urea and must be used at lower rates.

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**2016 Mid-Atlantic Commercial Vegetable Production Recommendations Available** -  
*Emmalea Ernest, Associate Scientist - Vegetable Crops; [emmalea@udel.edu](mailto:emmalea@udel.edu)*

The 2016 Mid-Atlantic Commercial Vegetable Production Recommendations have been posted online at <http://extension.udel.edu/ag/vegetable-fruit-resources/commercial-vegetable-production-recommendations/>.

Printed copies of the Vegetable Recommendations are available at all three Delaware county Extension offices. Cost is \$15 for members of the Fruit and Vegetable Growers Association of Delaware and \$25 for non-members.

## Agronomic Crops

**Agronomic Crop Insect Management** -  
*Joanne Whalen, Extension IPM Specialist; [jwhalen@udel.edu](mailto:jwhalen@udel.edu)*

### Alfalfa

Begin sampling for alfalfa weevil larvae as soon as you see the first signs of new growth. The following is a link to a picture of an alfalfa weevil larva and damage (<http://entomology.k-state.edu/extension/insect-information/crop-pests/alfalfa/alfalfa-weevil.html>). With the warm fall, as well as warmer overwintering temperatures, we could start to see economic populations as early as late March. This is a direct result of more egg laying by adult beetles during the fall and early winter. Eggs are laid in the alfalfa stem any time temperatures are



above 48°F. Once eggs hatch, weevils can pass through four larval stages in approximately three weeks. When fully grown, the larvae spin a cocoon on the leaves of alfalfa plants or on the ground. A second generation of adult weevils emerges around mid-June, feeds for a few weeks, but it does not produce a second larval generation. During the first visit to a field, examine 5-10 stems for damage and larvae. A full stem sample is not needed until damage or larvae are found on the plants. If leaf feeding is present, randomly collect 30 stems from throughout the field. Grasp stems at the base and place each stem upside down in a bucket. After collecting the stems, separate them into 3 or 4 bundles and beat them against the inside of the bucket to dislodge larvae from the stems. Count and record all larvae found per 30 stems. You will also need to measure 10 of the 30 stems and record the average stem height. The following thresholds, based on the height of the alfalfa, should be used as a guideline when making a treatment decision: up to 11 inches tall - 0.7 per stem; 12 inches tall - 1.0 per stem; 13 - 15 inches tall - 1.5 per stem; 16 inches tall - 2.0 per stem and 17 - 18 inches tall - 2.5 per stem.

### Small Grains

In recent weeks there have been reports of low levels of winter grain mites (WGM) in *no-till* small grain fields. This arthropod pest is most likely to occur in small grains planted no-till into corn stubble. Two generations occur in our area with the second generation peaking in March and April. Temperature and moisture are the two most important factors influencing WGM development and abundance. They are most active when temperatures are between 50 and 60°F. On hot, dry days when temperatures exceed 75°F, the mites stop feeding and will burrow down 4 to 5 inches in the soil profile in search of moisture and to escape the warm temperatures. Egg hatching will also cease when daily temperatures exceed 75°F. For more information on identification, sampling decision making and management, please see the following links:

<http://extension.udel.edu/blog/winter-grain-mite-management-in-small-grains/>.

<http://entomology.k-state.edu/extension/insect-information/crop-pests/wheat/winter-grain-mite.html>

As we approach/start to see spring green up, I continue to receive questions about aphids in small grains. Although populations were higher than normal in some fields last fall and into early winter, populations remain low at this point. We are in the last year of an IPM project evaluating the use of "southern thresholds" for fall aphid management as they relate to barley yellow dwarf virus (BYDV) management. We will have more information to share before the fall planting season. In the meantime, there are a couple of things to remember about aphid management as it relates to BYDV management:

(1) Although all aphids found in Delaware small grain fields *can* move BYDV into a field, not all aphids have the virus and different aphid species are known to vector different strains of the BYDV. Some aphids can vector more severe strains and others only mild/moderate strains. In the last 2 years of our survey, we have only detected low levels of the mild/moderate strain. We will see if that changes this spring.

(2) The most significant damage from BYDV occurs from fall infections, especially during the first 60 days after plant emergence. However, the yield impact also depends on the strain of BYDV, time of infection, aphid species, and varietal tolerance.

So what about direct damage from aphids? Although direct damage from aphids generally *does not* occur, there are two exceptions:

#### (1) Greenbug

<http://texasinsects.tamu.edu/images/insects/common/images/a-txt/aimg104.html>) - This aphid species can cause losses due to direct feeding on young plants. While feeding, it injects a toxic saliva that causes small grains to turn yellow, and heavy feeding damage can cause plants to die. Heavy feeding also causes typical "greenbug spots" in a field. In the centers of the spots you will see dead plants surrounded by living plants that are heavily infested and beginning to turn yellow. This generally occurs in the fall during the first 30 days after plant emergence. We saw very low

levels of greenbug last fall. However, warmer overwintering conditions may have favored survival so be sure to look for them this spring.

## (2) English Grain Aphid (EGA)

([http://soilcropandmore.info/crops/Wheat/Insects/EnglishGrain\\_adults.jpg](http://soilcropandmore.info/crops/Wheat/Insects/EnglishGrain_adults.jpg))

In the spring, this is the only species of aphid that can be found feeding in the heads of small grains. Damage from EGA feeding in grain heads can result in shrunken kernels and reduced test weight. Heavy infestations have been shown to cause up to 13% yield loss. So be sure to sample fields for EGA as soon as grain heads emerge. The treatment threshold is 15-25 aphids per head with low beneficial activity.

## Timothy

Be sure to sample for cereal rust mites which are favored by cool temperatures. Symptoms can appear as retarded growth, leaf curling, stunting, and plant discoloration. Injured plants appear to be drought stressed, even when adequate moisture is available for plant growth. As a general guideline, treatment is recommended in fields with a previous history of cereal rust mites and/or when 25% of the plant tillers exhibit curled tips of the new leaf blades within several weeks following green-up. The use of a 20x-magnifying lens is often necessary to find mites on leaves. The only effective and labeled material on timothy is Sevin XLR Plus. Be sure to read the label for information on the number of applications per season as well as the days to harvest.

(<http://www.cdms.net/ldat/ldAK3029.pdf>). For effective rust mite control, the use of the higher labeled rate and at least 25 gal/acre of carrier to get good coverage of leaf surfaces generally results in better control.

<http://extension.udel.edu/factsheets/cereal-rust-mite-in-timothy/>

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**Wheat: To Split or Not to Split—That Is the Question** - Richard Taylor, *Extension Agronomy Specialist*; [rtaylor@udel.edu](mailto:rtaylor@udel.edu)

I've seen several small grain fields that had so much growth on them last fall that they look rather bad this spring because of winter injury

on the lush fall growth (Photo 1). In many cases, you will be seeing new green growth starting up as we have more and more days with warming temperatures. In these cases, the plants are fully tillered but lack leaf area to get off to a fast start this spring. Nitrogen application will be essential to help the crop recover from the damage caused over the winter months when we did experience some very cold temperatures.



Photo 1. Winter injury to wheat showing severe leaf symptoms from which the wheat was able to recover.

One of the most difficult decisions growers have to make is whether to apply in one single application all the nitrogen (N) the crop will need to obtain maximum yield. This decision is complicated by the fact that some fields tend to remain wet for long periods of time in the usually rainy spring or the worry that a wet spring will lead to the loss of a substantial portion of the applied N either through denitrification or leaching. If the small grain crop did not fully tiller last fall, it will require at least some N as soon after green-up occurs as possible. It will take some scouting to determine if there are adequate tillers present this spring to maximize crop yield. In research on intensively managed wheat in Virginia, the researchers determined that if more than 100 tillers are present per square foot of soil, additional N is not needed until the crop reaches the Feeke's Stage 5 growth stage (the first node is visible or can be felt above the soil surface). Below 60 tillers per square foot, at least half the total amount of N should be applied now to encourage tillering. I generally count a side

shoot as a tiller if I can see three leaves on the shoot. The leaves do not need to be fully developed leaves where the collar is visible on each leaf.

In research Bob Uniatowski and I conducted at the University of Delaware and research from other locations, we have seen some responses to split N applications ranging from about a 5 to a 10% yield increase for winter wheat. If your operation is set up to allow multiple or split N applications and if the fields in question usually dry out quickly enough to allow the needed equipment on the fields both now and around the time the crop begins to joint (Feeke's growth stage 5), then a split of 50% of the total N at green-up and 50% around Feeke's Stage 5 can increase your yield potential. If the field does not typically lend itself to more than one application timing, then a single N application can be effective. The single N application is most effective if it is applied shortly before or at crop green-up, unless the tiller count is above 100 tillers per square foot. The initial N is used by the crop to finish tillering and produce a vigorous root system. Late-season N applications at Feeke's growth stage 5 will promote higher yield per kernel and increase the crude protein content of the grain but the N will have less effect on tiller number or ultimate plant height.

To distinguish between growth stage 3, when tillering is nearly complete and sheath elongation begins, and growth stage 5, when jointing begins, you should carefully dig or pull several plants from the soil in a number of locations across the field. Carefully clean away excess soil from around the roots and plant base and remove any loose leaves and leaf sheaths from the base. A sharp knife can then be used to split the central stem down the center to look for the growing point. The growing point will be a conically shaped object about 1/8 inch or less in length that will be located near where the roots emerge from the stem base. If the crop is still at Feeke's growth stage 3, the growing point will still be below the ground right against the stem base where the roots emerge. At Feeke's growth stage 5, the stem internodes (the stem portion between stem nodes which are felt or seen as slight swellings in the stem) elongate moving the growing point upwards about a half inch to an inch above the stem base and at or

just above the soil surface. As the first joint elongates enough to move the growing point above the soil surface and additional internodes begin to elongate the crop will be at the beginning of growth stage 6.

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### **Nitrogen Fertilization of Spring Pastures or Hay Land** - *Richard Taylor, Extension Agronomy Specialist; [rtaylor@udel.edu](mailto:rtaylor@udel.edu)*

Good quality hay was not only hard to find this past fall and over the winter, but expensive as well. Livestock managers may be looking at their pastures and thinking about how to kick start them this spring. Researchers have found that mid- to late fall nitrogen (N) applications can help get pastures and hay fields off to a quick start in the spring although the benefit is not always consistent. In some cases, not enough N is stored in the grass to really trigger early and vigorous spring growth; or where fall N applications do not take place, an early spring N application will be necessary to jump start spring growth. If your operation is short of hay and you are hoping for an early spring to get feed for your livestock, you may want to consider an application of N at this time.

This year, although we've had a relatively mild winter, many of our fields are not yet actively growing. I would suggest applying about 30 lbs of N broadcasted over the pasture to stimulate the grass to begin growth as soon as the temperature reaches the minimum for the grass species dominating your pasture or hay field. I know a number of growers have in the past used products such as poultry litter or liquid dairy manure or other manure or composted organic source for N. At this time of year, however, you should be applying either granular or liquid inorganic fertilizer supplying ammonium, nitrate, or urea since the soil temperature is much too low for mineralization to take place in order to free the N contained in the organic N sources listed above. Using the pelletized poultry litter, regular poultry litter, compost, or other organic sources is best done once the soil has warmed above 50 to 55°F, or around late-April to mid-May. Before this timeframe, mineralization of N will be so slow as to not be



of value to the producer when trying to jump start a pasture or hay field.

Generally an actively growing pasture can use about a pound of N per day, but be sure to scout your pastures about 20 to 30 days after you apply the inorganic N fertilizer to see when the next shot of N will be needed. Since potash (K) tends to be released over the winter, I recommend waiting until mid-May to mid-June to apply the recommended phosphorus (P) and K using soil test recommendations for maintenance fertilizer application rates. If clovers are present add about 1 lb boron/acre with the required maintenance P and K and adjust later N application rates based on the amount of clover in the pasture. If half or greater of the biomass (dry matter) comes from clover, additional N will not be needed. If from 25 to 50 percent of the dry matter comes from clover, the N rate can be cut in half; but if the clover contributes less than 25 percent to the dry matter available, a full rate of N should be used.

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### **Frost Crack Seeding of Small-Seeded Legumes into Pastures and Hay Fields Is Still Possible** - *Richard Taylor, Extension Agronomy Specialist*; [rtaylor@udel.edu](mailto:rtaylor@udel.edu)

Many growers like to overseed with legumes into their pasture and hay fields by using a method called frost-crack seeding or frost seeding. This method offers a relatively inexpensive means of introducing legumes into pastures or hay fields.

For a quick review, let's look at the seven steps to take when considering a frost-crack seeding of forage legumes.

**Step 1.** Evaluate your soil fertility and soil pH status either by reviewing past soil test reports or taking a soil sample of the chosen field in the fall prior to the seeding. Make corrections in pH by liming the fall or spring before overseeding, as well as making corrections in the phosphorus (P) and potassium (K) status. You should avoid nitrogen (N) fertilizer additions in the fall prior to frost seeding the field, as fall applied N will be picked up and stored by the grasses (and weeds) present and will stimulate serious competition for the legume seedlings the next spring.

If you've waited until the spring of the frost crack seeding as many of us do, then use your old soil tests to determine the field's fertility status and take this into account when you are making your species selection in Step 3 below.

**Step 2.** Provide seedlings with more sunlight and less competition as well as make it easier to get soil to seed contact. By this I mean that when possible the fall before a frost-crack seeding, you should graze or mow the field very close to stress the grass present to make it less competitive the following spring. This activity can be repeated just before overseeding to maximize soil exposure to the seed and to freezing and thawing temperatures.

**Step 3.** Select the correct species for your situation. In the mid-Atlantic region, we have three primary clover species from which to select. For fields that are generally wetter or lower in soil pH, alsike clover may be the best choice, unless the ultimate consumer of the forage will be horses, which can have reactions to this clover. All-around, white or ladino clover seems to respond best to this method of seeding especially under good soil fertility levels. Red clover is another species that responds well to frost-crack seeding but it is a taller growing species, but like alsike clover it is a short-lived perennial.

If you decide to base your selection on the grazing animal species you have, then for horses I would choose white clover. You will need to keep the seedling rate lower since we recommend no more than about 20 percent white clover in a horse pasture, even though this limits the effectiveness of the legume in providing N for the companion grass crop. For beef, all three species are suitable but for small ruminants where close grazing occurs, white clover is again probably the best choice.

For hay production fields where some legume contributed N is desired to boost grass yields and lower N fertilizer costs, the choice is more problematic. The tall growing species, red clover and alsike clover, have certain limitations. Red clover is more difficult to dry and because of the fine hairs that are on stems, petioles, and leaves it can make for dusty hay. Alsike clover is not suitable for the horse hay market since some



horses develop alsike clover poisoning which shows up as photosensitivity causing the animal to sunburn easily. I've seen a vigorous tall growing ladino-type of white clover used in hay but its contribution to yield is limited to leaves and petioles since the stem stays on the soil surface. Ladino-grass hay for second and third cuttings can be very good although producers often are disappointed in the amount of legume in first cutting hay.

Finally on species selection, many of the species that contain quantities of condensed tannins that are thought to be useful in small ruminant parasite control are very difficult to establish using the frost-crack seeding method. The legumes in this category such as Birdsfoot trefoil and Sericea lespedeza are suited for more conventional seeding methods.

**Step 4.** Inoculate the seed before planting. Although the probability is very high that white, red, and alsike cover inoculating bacteria are present in all pasture and hay fields, buying preinoculated seed or inoculant for the seed is a good habit to get into. If preinoculated seed is past its sell-by date, you should add more inoculant before seeding. Also when you buy the inoculant, check the label to be sure that you are within the expiration date on the package. Inoculant consists of live bacteria so protect its viability by keeping it cool and out of sunlight. If the soil pH is below 6, then consider adding molybdenum (Mo) to the seed before planting. The rate for seed treatment ranges from  $\frac{1}{8}$  oz/acre to a maximum of 1 oz/acre using ammonium molybdate (54% Mo) or molybdenum trioxide (66% Mo) [but please note that sodium molybdate (39% Mo) is toxic to the rhizobia bacteria]. Depending on your source of Mo and seeding rate, you will need to calculate the amount of the Mo product to add per 100 lbs of seed.

**Step 5.** Calibrate your seeding method and equipment to be sure that you are putting on the correct amount of seed. Making a pass over a parking area or tarp that's been placed on the ground is a good way to check both the width of the application pass and the density of seeds per square foot. Careful attention to this detail will pay extra dividends later in the season. This is especially true for broadcast spreaders or

cyclone spreaders that fling the seed outward. Although clover seed is light it is fairly dense and may not travel as far as you expect.

**Step 6.** Frost seed at the correct time. Do not frost seed so early that the seed sits on frozen soil where heavy rainfall can move it off site. Also, do not frost seed on snow covered soil since rapid snow melt can again move the seed off-site. Instead seed in very early spring once the soil has at least begun to thaw, daytime temperatures are enough above freezing that the surface of the soil will thaw, and nighttime temperature are below freezing. You will need a number of weeks of this type of weather (at least off and on) to work the seed into the soil. You can also help in this process by allowing grazing animals access to the pasture or by running over hay fields with the tractor and mower. In addition to pressing the seed into the soil, you will also help reduce competition against the legume seedlings as they emerge and try to establish themselves.

**Step 7—The Final Step.** Essentially by returning to Step 2, your goal again is to control spring vegetation growth to encourage enough sunlight, nutrients, and water reaching the legume seedlings that they can effectively compete and establish themselves. Grazing can again help at this step but you will need to manage the grazing intensity closely as well as frequently so that you prevent the animals from grazing the tender young leaves of the new legume plants. As soon as you notice animals feeding on the new legumes or the legume reaches a height that will tempt the animals, remove them and change over to mowing. Once the plants have 6 to 8 trifoliate leaves or reach a height of 3 to 4 inches, the legume should be able to compete with the grass and weeds present in the pasture or hay field. Do not apply N-containing fertilizers since this will stimulate grass growth and suppress the nitrogen fixing ability of the legumes. Use grazing or hay harvest management techniques and fertilizer (lime, P, and K) management to favor the legume species you frost seeded. A rotational grazing system or hay cut system designed for the legume seeded can help ensure a longer lasting stand.

**To summarize:** If you are considering frost-crack seeding to thicken or improve your pastures,

then a keep in mind the dos and don'ts that apply to this practice.

#### Do's:

- Plan ahead and obtain the needed seed and rhizobia inoculant before it's time to seed.
- Use either fresh (with an unexpired expiration date) rhizobia inoculant on the legume seed or use lime-coated pre-inoculated seed that is not more than 9 months since it was inoculated and lime coated. If older than 9 months, new inoculant should be applied just prior to seeding using a commercial sticking agent.
- Choose the legume species or variety best adapted to your location and grazing style.
- Frost-crack seed at the end of winter or in early spring when daytime temperatures are above freezing and nighttime temperatures fall below freezing so that the surface soil goes through freezing and thawing cycles that will help work the small seeds into the top few millimeters of soil.
- Closely mow the area or heavily graze the area before seeding to remove any excess vegetation and maximize sunlight penetration to the soil surface.
- After seedling emergence in the spring, watch the new seedlings closely and mow the pasture to the height of the legume if the pasture grasses begin to significantly shade the new seedlings.

#### Don'ts:

- Do not attempt frost-crack seedings with large seeded legumes and grasses. Although small seeded grasses such as timothy and very vigorous grasses such as ryegrass and festulolium have been frost seeded successfully according to producer reports, results have been very variable and probably would not justify the seed expense.
- Do not mix inoculated seed with fertilizer since many fertilizers will cause salt injury to the rhizobia bacteria and often kill the bacteria due to osmotic pressure.

- Do not broadcast seed on snow covered pastures.

- Do not broadcast seed just prior to a predicted or expected snow, ice, or rain storm since the risk of seed loss is great if runoff occurs.

- Do not mow or graze below the height of the newly establishing seedlings until the anchoring root system is well established and sufficient top growth has occurred to sustain the seedlings.

Also consider using a no-till drill to incorporate or improve a legume component in the pastures. No-till legume seedings are more frequently successful than frost-crack seedings. Some producers report additional recruitment of new legume seedlings in the second spring following an initial frost-crack seeding. Many legumes contain a significant proportion of hard seed that is broken during the following winter period permitting the seed to germinate the second spring following frost-crack seeding.

Regardless of your method, your goal should be to maintain at least 70% soil coverage in your pastures and hay fields to ensure you protect your soil resource, maintain pasture productivity, and reduce the incursion of weed species.

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**Field Crop Disease Guides Available** -  
*Nathan Kleczewski, Extension Specialist - Plant Pathology; [nkleczew@udel.edu](mailto:nkleczew@udel.edu)*

Hillary Mehl at Virginia Tech and I have updated the Field Crop Disease Management Guides, which is part of a larger section of the Virginia Tech Agronomic Guide. To help you, I removed our disease management sections for relevant crops in Delaware and Maryland. The guide has information on scouting, IDM, and chemical recommendations for soybean, small grains, corn, and forage for DE, VA, and MD. Copies will be made available at the county offices and will also be posted online on the new Plant Pathology webpage, which should be launched soon. Contact me directly at [nkleczew@udel.edu](mailto:nkleczew@udel.edu) for an electronic copy. Your local extension agents can also be contacted for copies.

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**Wheat Powdery Mildew** - Nathan Kleczewski,  
*Extension Specialist - Plant Pathology;*  
[nkleczew@udel.edu](mailto:nkleczew@udel.edu)

We have been getting our wheat plots set up over the past week and there certainly is a fair amount of powdery mildew inoculum out there. At this point in time powdery mildew will look like grey patches on foliage and you may see some black dots present as well. Powdery mildew needs a living host to survive. This means that when we have a warm winter or you plant extra early, there is opportunity for this pathogen to colonize tissues and hang out until the following spring. When things warm up (persistent temperatures above 59°F for 1-2 weeks), the fungus “wakes up” and then you may see some white fuzz appearing on foliage. That fuzz contains spores that can be wind dispersed to other plants, resulting in new infections. The pathogen can continue to produce spores and infect provided that the environment is conducive.

There is good resistance to powdery mildew, but some varieties, particularly those that contain the pm6 resistance gene, are not doing the job for us in the mid-Atlantic. As a result, we can see some striking varietal differences when comparing different varieties side by side (Figure 1).



**Figure 1.** A comparison of powdery mildew damage this spring on a resistant variety (right) and a variety containing the pm6 resistant gene, which is now susceptible to powdery mildew. Fungicides would not be recommended for controlling pm in the variety on the right, saving money, reducing risk of fungicide resistance development, minimizing fungicide effects on

residue decomposition and environmental impacts, and improving yield.

When you go out and put out your first shot on nitrogen, take a second to check out your field and see if you have powdery mildew. If you do, this is an indication that the resistance is not up to par and that you may see the disease start to take off in this field when things warm up. If this is the case, you may need to consider including a fungicide in with your second shot of nitrogen. Do not apply with your first shot, as the fungus is still dormant and the plant is not producing new tissues at this point, so the fungicide will not work well, if at all.

**What else should you do if you have powdery in your field?** Back off on the nitrogen. Rapidly growing plants cannot produce as many defensive chemicals and rapid increases in canopy density can create a nice, humid environment, allowing the pathogen to really take off. Last season we had some individuals who mistook chlorosis due to powdery mildew for nitrogen deficiency. The additional nitrogen that was applied ended up making the powdery mildew situation worse; fungicides had no impact. If you have severe levels of powdery bad in a field now, the best thing you can hope for is fairly dry or hot weather until flag leaf emergence. Under these conditions powdery mildew is not likely to not progress to the flag leaf, which would result in additional yield impacts.

**What about next year?** We will have good powdery mildew data on the variety trials coming out of DE and MD. I suggest going through those and seeing which varieties are resistant to our powdery mildew populations, and **avoiding the susceptible ones if possible**. An added bonus for you -- we have a misted Fusarium Head Blight nursery up and running again in Maryland, so we can start to provide local information to you on varietal resistance to head blight as well.

Finally, a note on fungicides for powdery mildew. You can get away with generics containing propiconazole or tebuconazole without an issue. There are several products with labels for early applications, but these are cut rates. Cut rates may result in fungicide resistance development or may not be sufficient

to curtail severe powdery mildew infestations. For this reason I would suggest avoiding these in severely infected fields. Read labels for restrictions, but in severely infected fields, consider using a mid/upper range rate of the product to ensure that you have sufficient efficacy. Some of these products can heat up your mix, so be careful how many things you include in your tanks. Shoot for 15-20 gallons per acre and 300-350 um droplet size. Adjuvants should not be needed at this stage in the game. Now is also a good time to see if the results of the fall applications some of you tried are the result of uncharacteristic powdery mildew infections or due to other factors. Check your untreated areas first and look for foliar diseases.

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**Comments on Small Grain Weed Control -**  
*Mark VanGessel, Extension Weed Specialist;*  
[mjv@udel.edu](mailto:mjv@udel.edu)

Small grains are larger than usual this time of year, which complicates decisions for weed management. Wheat can be a very competitive crop and so you need to determine whether there is a need to apply a herbicide.

- Is the weed density sufficient to reduce yield? A few scattered weeds will not reduce yields or weeds much smaller than the wheat crop may not grow fast enough to compete with wheat.
- Can you achieve adequate spray coverage of the weeds with the amount of wheat growth present?
- Has wheat started to joint or reach a stage that limits application timing?
- Are weeds still small and at a susceptible stage?

Fields need to be assessed on an individual basis to determine the need for a spring herbicide application.

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**Glory Herbicide Registered for ALS-Resistant Chickweed Control in Small Grains** - *Mark VanGessel, Extension Weed Specialist;* [mjv@udel.edu](mailto:mjv@udel.edu)

Delaware Department of Agriculture and MANA (Makhteshim Agan of North America) have approved a state label (24c) for use of Glory herbicide for winter wheat and barley. The active ingredient is metribuzin, formulated as a 75% DF. GLORY herbicide was requested for control of ALS-resistant chickweed. Glory is the only formulation of metribuzin with this special label in DE.

In addition to common chickweed, UD Weed Science has also had encouraging results with control of corn speedwell, henbit, and knawel when applied to weeds 3 inches or less. Injury has been a concern with metribuzin so we looked at metribuzin applied in the fall and two timings in the spring. Early-spring (early-March) applications caused some leaf burn on certain varieties, but injury was transient and no yield reduction was observed in three years of our trials. Late spring applications (first week of April) caused leaf burn, as well as some stunting and reduced yields in one of the three years.

Application timing is from 2 leaf stage of the small grain until jointing; and rate is dependent on crop stage, refer to label.

GLORY may be tank mixed with Axial, Harmony, Harmony Extra, 2,4-D, MCPA, Banvel/Clarity, Osprey, or Powerflex herbicides. A nonionic surfactant containing at least 80% active ingredient may be used in GLORY tank mixes. Do not use a crop oil concentrate or methylated seed oil (MSO) or any adjuvant containing vegetable or petroleum oils as crop injury may result. Use only water as the carrier, do not apply in nitrogen.

**Precautions from the Glory label:**

- Do not use on soils containing less than 0.75% organic matter.
- On irrigated cereals, do not apply more than 0.5 inch of water for the first irrigation. The maximum amount for each additional irrigation should not exceed 1 inch. Allow a minimum of 14 days between the first irrigation and subsequent irrigations.



Risk of crop injury can increase when applications are made:

1. when the crop is under stress such as winterkill, frost damage, disease, drought or excessive moisture, severe grazing, or when these conditions follow the application;
2. in combination with fluid fertilizer especially with the addition of surfactant;
3. prior to the growth stage specified on this label;
4. to soils high in lime or sodium, a pH greater than 7.7, calcareous, gravelly, thinly covered, or exposed subsoil areas;
5. to fields where cereal seeds have been planted less than 1 inch deep;
6. to a sensitive wheat or barley variety; and
7. to frozen soil or crop still in winter dormancy.

Crop rotations range from 4 to 18 months. Refer to the label for rotations.

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### **New Mid-Atlantic Field Crop Weed Management Guide** - *Mark VanGessel, Extension Weed Specialist; [mjv@udel.edu](mailto:mjv@udel.edu)*

There is a new "Mid-Atlantic Field Crop Weed Management Guide" developed by weed specialist from Penn State, Univ. of Delaware, Univ. of Maryland, Virginia Tech, and West Virginia Univ. The 240-page guide covers corn, sorghum, soybean, small grains, and hay and pastures. The guides includes information on commonly used herbicides for these crops, including relative effectiveness for burndown, preemergence, and postemergence control of most of the common weeds in the region. There are tables on premixes and what is included in the premixes, and a section on management of problem weeds. The guide is available in the Delaware county offices for \$15 or can be ordered on-line at <http://extension.psu.edu/publications/agrs136>. Available on-line are the printed copies for \$20 + shipping; an enhanced pdf copy for use on

computers and tablets for \$10 or both a hard copy and pdf for \$25 + shipping. A free low resolution pdf is available at <http://extension.udel.edu/ag/weed-science/weed-management-guides/>. Note the low resolution version is not "searchable".

## General

### **Insecticide Updates** - *Joanne Whalen, Extension IPM Specialist; [jwhalen@udel.edu](mailto:jwhalen@udel.edu)*

#### **EPA's Notice of Intent to Cancel the Insecticide Flubendiamide**

On March 1, 2016, the EPA issued a notice of intent to cancel all flubendiamide products. More information can be found at <https://www.epa.gov/ingredients-used-pesticide-products/flubendiamide-notice-intent-cancel-and-other-supporting>.

#### **Sulfloxaflor - Final Cancellation Order**

On November 12, 2015, EPA issued a cancellation order for all previously registered sulfloxaflor products. More information can be found at: <http://www.epa.gov/pesticide-registration/sulfoxaflor-final-cancellation-order>

#### **EPA Proposes to Revoke Chlorpyrifos Food Residue Tolerances**

On October 30, 2015, EPA issued a proposal to revoke all U.S. tolerances for chlorpyrifos. More information can be found at <http://www.epa.gov/pesticides/epa-proposes-revoke-chlorpyrifos-food-residue-tolerances>.

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### **Free Herbicide Site of Action Chart** - *Mark VanGessel, Extension Weed Specialist; [mjv@udel.edu](mailto:mjv@udel.edu)*

Using herbicides with different sites of action is important to deal with herbicide resistant weeds, but knowing sites of action can be challenging. A colorful reference chart on herbicide site of action is available free of charge at the Delaware Cooperative Extension offices. This chart is specific for common herbicides used in the Mid-Atlantic States for agronomic and vegetable crops.

The Mid-Atlantic chart was customized from one developed for the Mid-West States and designed it collaboration with the Delaware Soybean Board and the US Soybean Board. It is part of the US Soybean Board's "Take Action: herbicide-resistance management" campaign.

## Announcements

### Free Webinars in March, Sponsored by the Mid-Atlantic Women in Agriculture

**3/9: Hiring and Firing Practices** - This webinar will outline how to protect your operation with efficient hiring practices and tools such as background checks, employee handbooks and more. Alternatively, the webinar will also go over the correct course of action when firing an employee and help to ease any issues that may arise during the process.

**3/23: Estimating and Tracking Production Costs** - The ability to effectively estimate and track production costs is essential to farm business decision making. This session will discuss methods for estimating costs and how to manage expenses.

To register:

<http://www.eventbrite.com/e/wednesday-webinars-registration-11452674257>

Webinars begin at noon EST. Duration is approximately 1 hour. For optimal performance we suggest using Internet Explorer as your web browser and connecting via Ethernet connection instead of wireless (wireless will work, but a hard line is more stable)

See website for more information and other upcoming topics: <https://extension.umd.edu/womeninag/webinars>

If you do not have access to high speed internet and would like to participate in one of the above webinars, contact Tracy Wootten at [wootten@udel.edu](mailto:wootten@udel.edu).

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### 7th National Small Farm Conference CREATING AND SUSTAINING SMALL FARMERS AND RANCHERS

September 20-22, 2016  
Virginia Beach Convention Center  
Virginia Beach, VA

The 7th National Small Farm Conference, "Creating and Sustaining Small Farmers and Ranchers," will be hosted by Virginia State University's College of Agriculture, Virginia Cooperative Extension and the U.S. Department of Agriculture.

This conference will consist of short courses, oral and poster paper presentations, exhibits, success stories and educational tours in and around Virginia Beach and the Chesapeake Bay.

Successes in small farm activities will be shared, as well as innovative ideas in research, extension and outreach to strengthen collaboration and partnership among state specialists who work to ensure that small farmers and ranchers not only survive, but thrive in today's economy. This conference will also serve as a forum to discuss the results of research geared towards addressing challenges facing small farmers and ranchers. Strengthening partnerships created at the six previous National Small Farm Conferences will continue to be a priority for the Virginia Beach meeting.

*More information and registration at:*

<http://www.vsu.edu/nationalsmallfarmconference/>

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### Produce Marketing Workshop – Selling Through the Laurel Farmers' Auction Market

Monday, March 28, 2016 6:00-9:00 p.m.

University of Delaware

Carvel Research and Education Center  
16483 County Seat Highway, Georgetown, DE

The Laurel Farmers' Auction Market is expanding and is seeking to recruit new produce growers and to encourage existing growers in Delaware and the Eastern Shore of Maryland to sell through the auction.

This workshop will highlight opportunities and resources provided by the Laurel Farmers' Auction. The session will include information on produce that buyers are looking for, scheduling production, harvesting and handling, grading, packing, and transport. There will be hands-on activities showing best grading and packing methods. Auction procedures such as dates and hours of operation, delivery/drop off, identification of lots, selling areas, selling methods, and payments will also be discussed. Workshops at the auction are being planned during the growing season.

Contact Karen Adams at (302) 856-7303 or [adams@udel.edu](mailto:adams@udel.edu) to register.

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### 2016 Horticulture Short Courses

For the complete list of 2016 courses go to:

<http://extension.udel.edu/lawngarden/commercial-horticulture/2016-horticulture-short-courses/>

#### **Basic Landscape Design**

March 17, 4:30 – 6:30 p.m.

Fischer Greenhouse, Room 102

531 S College Avenue, Newark, DE

Cost: \$30

*Credits: 1 Nut. Mgmt., 2 ISA, 1 CNP*

Take a refresher on the basics of landscape design. Site evaluation, plant selection, spacing, design criteria, some basic drafting and sustainable landscape practices will be covered. You will create a design on a base plan, which should help you prepare for the Certified Nursery Professional Exam in the fall. Bring a scale, pencils and other design tools you like to use (circle templates, French curve etc.). We will supply the base plan and trace paper. Class size limited to 20. Instructors: Valann Budischak and Susan Barton

Register with Carrie Murphy (302) 831-2506 or [cjmurphy@udel.edu](mailto:cjmurphy@udel.edu).

#### **Plant Identification- Woody Shrubs**

April 5 4:30 – 5:30 p.m.

University of Delaware Botanic Gardens

531 S College Avenue, Newark, DE

Cost: \$15

*Credits: 1 Pest., 1 ISA, 1 CNP*

Learn to identify some of the woody shrubs used in the landscape. We will cover the common disease and insect pests of each and strategies for incorporating into the landscape. Many of these shrubs are on the Certified Nursery Professional Exam, so you can attend this short course as a review for the fall exam. Meet at the entrance to Fischer Greenhouse. Instructors: Valann Budischak and Sue Barton

Register with Carrie Murphy (302) 831-2506 or [cjmurphy@udel.edu](mailto:cjmurphy@udel.edu).

#### **Tree Identification Walk**

April 7 4:30-6 p.m.

Delaware State University Campus

1200 North DuPont Highway, Dover, DE Washington

Building near the Herbarium (additional details will be provided following registration)

Cost: \$15

*Credits: 1 Pest., 2 ISA, 1 CNP*

Come prepared to walk around the Delaware State University TREE CAMPUS USA - Arboretum as we exam the growing characteristics of nearly 178 different tree/shrub species (*of which 70 are native to Delaware*) established at this location. Discover common insect and disease issues found in the urban landscape. Instructors: Dot Abbott and Megan Pleasanton

Register with Jan Unflat (302) 730-4000 or [jmunflat@udel.edu](mailto:jmunflat@udel.edu).

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### The Culinary Herbal: Growing and Preserving 97 Flavorful Herbs

Tuesday, March 15 6:30 p.m.

Carvel Research and Education Center  
16483 County Seat Highway, Georgetown, DE

Dr. Arthur Tucker, Emeritus Professor of Delaware State University, will discuss his new book, *The Culinary Herbal: Growing and Preserving 97 Flavorful Herbs*. Good cooks know that nothing beats fresh-clipped herbs. The gorgeously photographed *Culinary Herbal*, by herb experts Art Tucker and Susan Belsinger, highlights 97 delicious varieties—like black cumin, fenugreek, lemon balm, and saffron—that you'll want to grow, whether you're a gardener who loves to cook or the cook who loves to garden. Copies of the book will be available for purchase and can be signed by the author.

*The workshops will be held at the . Pre-registration is required. You may register [online](#) or contact Tammy Schirmer at 302-856-2585, ext 544*

*MORE Workshops offered - Please see the website at <http://extension.udel.edu/lawngarden/master-gardener-volunteer-educators/sussex-county/workshops/>*

# Weather Summary

Carvel Research and Education Center Georgetown, DE

Week of February 25 to March 2, 2016

Readings Taken from Midnight to Midnight

## Rainfall:

0.17 inch: March 2

## Air Temperature:

Highs ranged from 65°F on February 29 to 42°F on February 26.

Lows ranged from 41°F on February 25 to 25°F on February 27.

## Soil Temperature:

45.1°F average

Additional Delaware weather data is available at [http://www.deos.udel.edu/monthly\\_retrieval.html](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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*Weekly Vegetable and Agronomic Crops Newsletter*

*April 1 through September 23, 2016*

<http://extension.udel.edu/weeklycropupdate/>

Timely Production Topics

Current Ag Issues

Disease and Insect Outbreaks

Latest Weed, Insect and Disease Control Options

Pasture and Forage Management

Weather Summary

Upcoming Meetings and Events

Information provided by University of Delaware Cooperative Extension Specialists and Agents.

The Weekly Crop Update is available by:

[First Class Mail \(\\$40/season\)](#), [Fax \(\\$40/season\)](#), or [on the Internet \(FREE\)](#)

The Weekly Crop Update is mailed, faxed and posted on the internet each Friday by 4:30 pm.

To receive **FREE** weekly email reminders go to <http://extension.udel.edu/weeklycropupdate/> and click on "Sign Up For Our Emails" in the right navigation column. To receive weekly text reminders, email or text Emmalea Ernest (302) 233-4719

To receive the WCU by First Class Mail or Fax, complete the form below and return to:  
Emmalea Ernest, Carvel Research & Education Center  
16483 County Seat Highway, Georgetown, DE 19947

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