A New WCU Subscription Option for 2011

We hope that this first issue of Weekly Crop Update for 2011 will help you get your growing season off to a good start. The next WCU for 2011 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 in a blog format at http://agdev.anr.udel.edu/weeklycropupdate/.

For those of you who access the newsletter via the internet we offer to 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 or if you experience problems during the season with the online WCU please contact me at emmalea@udel.edu or (302)-856-7303.

New for 2011, 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

Biofumigant Mustards for Spring Vegetable Plantings - Gordon Johnson, Extension Vegetable & Fruit Specialist; gcjohnson@udel.edu

In fields with heavy vegetable rotations that have built up diseases (including nematodes), or fields known to have problems in the past, use of a biofumigant mustard crop planted in March ahead of spring planted vegetables can help reduce disease levels.

Mustard family plants produce chemicals called glucosinolates in plant tissue (roots and foliage). These glucosinolates are released from plant tissue when cut or chopped and then are further broken down by enzymes to form chemicals that behave like fumigants. The most common of these breakdown products are isothiocyanates. These are the same chemicals that are released from metam-sodium (Vapam) and metam-potassium (K-Pam), commonly used as chemical fumigants.

Three mustard varieties that have been successfully used for this purpose are Pacific Gold, Idagold, and Caliente 99.

You should plant these mustards as soon as the ground is fit in March. They take 50 days to produce full biomass. Planting rates are 10-15 lbs/ A for Pacific Gold and 15-20 lbs/A for Caliente 99 and Idagold. Add 40-80 lbs of
Nitrogen per A to grow the crop (the higher N level on sandy soils).

The goal is to produce as much biomass of the biofumigant crop as possible. This requires that you have a good stand, fertility, and sufficient growing time. The more biomass that is produced and that is incorporated, the more chemical is released.

The plant material must be thoroughly damaged so that enzymes can convert glucosinolates into isothiocyanates. This means that you need to chop the material as much as possible and work it into the soil as quickly as possible, so as not to lose the active compounds to the air. A delay of several hours can cause significant reductions in biofumigant activity. The finer the chop, the more biofumigant is released. A flail mower is ideal.

The material should be incorporated as thoroughly as practical to release the biofumigant chemical throughout the root zone of the area that is to be later planted to vegetables. Poor distribution of the biofumigant crop pieces in the soil will lead to reduced effectiveness.

Sealing with water or plastic after incorporation will improve the efficiency (as with all fumigants). Soil conditions should not be overly dry or excessively wet.

Allow 2-3 weeks after incorporation before planting the next crop.

A March 15 planting will be ready to incorporate in early May and can be planted with the vegetable crop in late May (around Memorial Day).

Fordhook Lima Bean Production - Emmalea Ernest, Extension Associate - Vegetable Crops; emmalea@udel.edu and Gordon Johnson, Extension Vegetable & Fruit Specialist; gcjohn@udel.edu

The original Fordhook lima bean was collected by Harry Fish in 1904 in Carpinteria, California. Carpinteria is a coastal town located just north of the Oxnard Plain. The Oxnard Plain, being surrounded by mountains on three sides and the Pacific Ocean on the fourth, enjoys a moderated climate with highs between 65 and 75°F and lows from 45 and 60°F year round. The Oxnard Plain continues to be the premier location for Fordhook lima bean production and yields can be upwards of 4 T/A.

Fordhook limas were introduced to the US at large by W. Atlee Burpee & Co. in the early 1900s and their popularity soon led to production for processing on the East Coast, particularly in New Jersey and Delaware. Yields of Fordhooks have historically been lower on the East Coast, probably because they are not as well adapted to the climate, and from early on, were plagued by downy mildew caused by *Phytophthora phaseoli*. Renewed interest in Fordhook production in Delaware has prompted us to produce this summary of recommended practices for Fordhook production, based on research done in the region.

The two Fordhook varieties that are available at the present time are Concentrated Fordhook (CFH) and Fordhook 242 (FH 242). Both are selections from the original Fordhook variety and have white seed. The USDA lima breeding program released a number of green seeded varieties with downy mildew resistance in the 1970s and 80s (F 1072, F 169, F 90-1), however none of these varieties are commercially available any more.

Results from Fordhook yield trials conducted over four decades at the UD Research and Education Center in Georgetown, DE are summarized in Table 1. This data represents 22 separate trials of Fordhook varieties. The average yield over all of the trials is 2521 lbs shelled beans/A. Because some trials included very poorly performing experimental varieties, this average yield is somewhat lower that what would be expected with commercial varieties. The average yield for FH 242 in the trials (7 years) was 3703 lbs/A and the average yield for CFH in the trials (3 years) was 2908 lbs/A.
Table 1. Summary of Fordhook Lima Bean Variety Trial Results 1972-2010 Including Planting Date, Days to Harvest, Yield of Shelled Beans in Lbs/A, Number of Lines Tested and Description of Trial Entries.

<table>
<thead>
<tr>
<th>Year</th>
<th>Planting Date</th>
<th>DTH</th>
<th>Yield Lbs/A</th>
<th># Lines Tested</th>
<th>Description of Trial Entries</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>28-Jun</td>
<td>98</td>
<td>3628</td>
<td>1</td>
<td>CFH</td>
</tr>
<tr>
<td>2009</td>
<td>11-Jun</td>
<td>97</td>
<td>1234</td>
<td>1</td>
<td>CFH</td>
</tr>
<tr>
<td>2008</td>
<td>13-Jun</td>
<td>94</td>
<td>3863</td>
<td>1</td>
<td>CFH</td>
</tr>
<tr>
<td>2002</td>
<td>13-Jun</td>
<td>89</td>
<td>1909</td>
<td>2</td>
<td>F 90-1 + breeding lines</td>
</tr>
<tr>
<td>2000</td>
<td>12-Jun</td>
<td>93</td>
<td>1525</td>
<td>7</td>
<td>1072 + breeding lines</td>
</tr>
<tr>
<td>1997</td>
<td>25-Jun</td>
<td>93</td>
<td>3267</td>
<td>4</td>
<td>F 1072 + breeding lines</td>
</tr>
<tr>
<td>1996</td>
<td>26-Jun</td>
<td>85</td>
<td>1584</td>
<td>5</td>
<td>F 1072 + breeding lines</td>
</tr>
<tr>
<td>1995</td>
<td>21-Jun</td>
<td>93</td>
<td>4152</td>
<td>7</td>
<td>F 1072, F 90-1 + breeding lines</td>
</tr>
<tr>
<td>1994</td>
<td>1-Jun</td>
<td>101</td>
<td>1429</td>
<td>6</td>
<td>F 1072, F 90-1 + breeding lines</td>
</tr>
<tr>
<td>1993</td>
<td>18-Jun</td>
<td>?</td>
<td>1480</td>
<td>4</td>
<td>F 90-1 + breeding lines</td>
</tr>
<tr>
<td>1992</td>
<td>27-May</td>
<td>140</td>
<td>1282</td>
<td>4</td>
<td>F 1072 + breeding lines</td>
</tr>
<tr>
<td>1991</td>
<td>28-Jun</td>
<td>115</td>
<td>2393</td>
<td>3</td>
<td>F 1072 + breeding lines</td>
</tr>
<tr>
<td>1990</td>
<td>5-Jun</td>
<td>92</td>
<td>1882</td>
<td>1</td>
<td>F 1072</td>
</tr>
<tr>
<td>1989</td>
<td>23-Jun</td>
<td>90</td>
<td>1747</td>
<td>3</td>
<td>F 1072 + breeding lines</td>
</tr>
<tr>
<td>1987</td>
<td>?</td>
<td>?</td>
<td>2853</td>
<td>8</td>
<td>F 1072 + breeding lines</td>
</tr>
<tr>
<td>1984</td>
<td>4-Jun</td>
<td>78</td>
<td>1079</td>
<td>4</td>
<td>FH 242, F 1072 + breeding lines</td>
</tr>
<tr>
<td>1979</td>
<td>5-Jul</td>
<td>88</td>
<td>4651</td>
<td>10</td>
<td>FH 242, F 169, + breeding lines</td>
</tr>
<tr>
<td>1976</td>
<td>7-Jul</td>
<td>86</td>
<td>3742</td>
<td>2</td>
<td>FH 242, F 169</td>
</tr>
<tr>
<td>1975</td>
<td>2-Jul</td>
<td>94</td>
<td>2289</td>
<td>4</td>
<td>FH 242, F 169, F 1072 + breeding lines</td>
</tr>
<tr>
<td>1974</td>
<td>10-Jun</td>
<td>73</td>
<td>3612</td>
<td>6</td>
<td>FH 242, F 169, F 1072 + breeding lines</td>
</tr>
<tr>
<td>1973</td>
<td>6-Jun</td>
<td>77</td>
<td>4177</td>
<td>4</td>
<td>FH 242, F 169 + breeding lines</td>
</tr>
<tr>
<td>1972</td>
<td>26-May</td>
<td>?</td>
<td>1686</td>
<td>4</td>
<td>FH 242, F 169 + breeding lines</td>
</tr>
<tr>
<td>Overall Average</td>
<td></td>
<td>93</td>
<td>2521</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

One oft-air complaint about Fordhook lima beans is that they yield inconsistently in Delaware. The range of yields reported in the above table, 1079-4177 lbs/A, would seem to attest to this. There are however, some management practices that can be used to reduce the potential for yield variability.

Sites and Soils
Historically, much of the Fordhook lima bean production in the region has been done close to the coast (Delaware Bay, Atlantic Ocean) because of the moderating effect of the water on temperature. Inland sites will have greater temperature fluctuations and as a result more variable yields. Coastal sites also have heavy dews, fogs, and higher humidity that will improve pod set. However, this can create an environment favorable for downy mildew. Fordhooks will grow well on a range of soil types from loamy sands to silt loams but require good drainage. Higher moisture holding capacity soils such as silt loams or those with high organic matter content will provide for better performance.

Planting Date
Fordhook lima beans are more heat sensitive than baby limas. They should be planted at the end of June or very beginning of July so that they are not exposed to high temperatures during flowering. They can also not be planted as late in the season as baby limas, because they require, on average, 93 days to harvest, versus the 75-85 days required by baby limas. Based on the trials summarized above, the average yield for trials planted before June 20 was 2096 lbs/A, while the average yield of those planted after June 20 was 3050 lbs/A - a difference of almost 1000 lbs. Risk of split sets or delayed sets is higher with early plantings. This narrow ideal planting window often leads to a narrow harvest window which can affect plant scheduling with high volumes in a short period of time.
**Stand Establishment**
Fordhook lima bean seeds are large and rough handling before or during planting can cause reduced viability and stand loss. Set up planters to limit bounce in seed drop and plant at slower speeds. Ensure good soil to seed contact with proper press wheel adjustment. Plant at a 1 ½ inch depth. Soil crusting during emergence can also have a devastating effect if the cotyledons are trapped in the soil and the hypocotyl breaks in half. The resulting “headless” seedlings will not recover. Similarly, if only one of the two cotyledons emerges intact, the plant will be stunted. The large seeds are also susceptible to attack by insects and pathogens. Use high quality, treated seed and handle it gently. Make sure soil conditions are optimal for germination and emergence in terms of moisture (temperature should not be an issue in the ideal planting window) so that seedlings emerge quickly and are not exposed to excessive insect and disease pressure. Be prepared to irrigate to maximize germination and to limit the effect of crusting. Lima beans compensate well for stand loss, however, the resulting larger plants will be slower to mature and are more difficult to harvest mechanically.

**Irrigation**
Fordhook lima beans should not be grown without irrigation. Adequate irrigation can mitigate stress induced by heat. Peak water usage will be from flowering through early pod set where plants will be using from 0.25 to 0.33 inches of water a day.

**Fertility**
Fertilizing Fordhook lima beans will be similar to baby lima beans. However, because of the longer season, the higher Nitrogen (N) rate should be used, especially on sandier soils. Apply 40 lbs of N preplant or at planting and follow with a sidedressing at final cultivation of an additional 40 lbs of N. This will be 80 lbs of total N. When following peas, 20-30 lbs of total N will be adequate. Phosphorus (P) and potassium (K) requirements are the same as for baby lima beans. See the [Delaware Commercial Vegetable Production Recommendations](#) for specific P and K recommendations according to soil test levels.

**Diseases and Insects**
Neither FH 242 nor CFH have resistance to downy mildew. Late June and early July planting dates mean that Fordhooks will be setting pods during the cooler part of the season when downy mildew and white mold are most problematic. Effective controls are available for both of these diseases in lima bean and should be employed if necessary.

Also be aware that Fordhook limas maturing in the fall will also have more exposure to worm pests that attack pods. Stinkbugs and Lygus bugs are another concern for pod and seed damage. The large pods are very attractive to these pests at a young stage.

See the [Delaware Commercial Vegetable Production Recommendations](#) for specific guidance on lima bean disease and insect management.

**Harvest**
Because of the large seed, pod and seed loss at harvest will have a large effect on crop recovery and yield. All efforts should be made to reduce harvest losses. This includes making sure fields are as level as possible, there is limited ridging from cultivation, and harvesters are operated to maximize recovery.

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**Producing and Sourcing Quality Transplants**

- **Gordon Johnson, Extension Vegetable & Fruit Specialist; gcjohn@udel.edu**

Transplant production is underway throughout the region. Cabbage, tomatoes, peppers, watermelons, cantaloupes, cucumbers, squash, lettuce, and even pole lima beans are commonly transplanted along with many other vegetables.

Producing quality transplants starts with disease free seed, a clean greenhouse and clean planting trays. Many of our vegetable disease problems including bacterial spot, bacterial speck, bacterial canker, gummy stem blight, bacterial fruit blotch, tomato spotted wilt virus, impatiens necrotic spot virus, and Alternaria blight can start in the greenhouse and be carried to the field. A number of virus diseases are transmitted by greenhouse insects.

Buy disease indexed seeds when available. To reduce bacterial seed borne diseases in some
crops such as tomatoes, peppers, and cabbages, seeds can be hot water treated. Chlorine treatment can also be useful on some seeds as a surface treatment but will not kill pathogens inside the seed. Go to this factsheet for more details: http://ohioline.osu.edu/hyg-fact/3000/3085.html.

If possible, do not grow ornamental plants in the same greenhouse as your vegetable transplants and do not overwinter any plants in areas where transplants are to be grown.

For greenhouse growing areas, remove any weeds and dead plant materials and clean floors and benches thoroughly of any organic residue. Use a disinfectant applied to surfaces to kill pathogens. Choices are: quaternary ammonium products (Qam), chlorine bleach in a 1 part bleach to 9 parts water ratio, or hydrogen dioxide products. If possible, use new planting trays. If trays are reused, then one of these products should be used to disinfect trays. Bleach and Qam products require 10 or more minutes of contact to be effective.

One of the most important considerations is managing stretch or height of transplants. The goal is to have a transplant of a size that it can be handled by mechanical transplanters without damage and that have reduced susceptibility to wind.

Managing transplant height can be a challenge. Most growth regulators that are used for bedding plants are not registered for vegetable transplants. One exception is Sumagic which is registered for use as a foliar spray on tomato, pepper, eggplant, groundcherry, pepino and tomatillo transplants. See this past WCU article for more information http://agdev.anr.udel.edu/weeklycropupdate/?p=804. Research is being conducted on ABA products for transplant management and other products may be registered in the future.

For other crops alternative methods for height control must be used. One method that is successful is the use of temperature differential or DIF, the difference between day and night temperatures in the greenhouse. In most heating programs, a greenhouse will be much warmer in the daytime than nighttime. The greater this difference, the more potential for stretch. By reducing the day-night temperature difference, or reversing it, you can greatly reduce stem elongation. The critical period during a day for height control is the first 2 to 3 hours following sunrise. By lowering the temperature during this 3-hour period plant height in many vegetables can be controlled. Drop air temperature to 50° - 55° F for 2-3 hours starting just before dawn, and then go back to 60° - 70° F. Vegetables vary in their response to DIF. For example, tomatoes are very responsive, squash is much less responsive.

Mechanical movements over transplants can also reduce size. You accomplish this by brushing over the tops twice daily with a pipe or wand made of soft or smooth material. Crops responding to mechanical height control include tomatoes, eggplant, and cucumbers. Peppers are damaged with this method.

Managing water can be a tool to control stretch in some vegetables. After plants have sufficient size, allow plants to go through some stress cycles, allowing plants to approach wilting before watering again. Be careful not to stress plants so much that they are damaged.

Managing greenhouse fertilizer programs is another tool for controlling height. Most greenhouse media comes with a starter nutrient charge, good for about 3-4 weeks. After that, you need to apply fertilizers, commonly done with a liquid feed program. Greenhouse fertilizers that are high in ammonium forms of nitrogen will cause more stretch than those with high amounts of nitrate nitrogen sources. Fertilizers that are high in phosphorus will also tend to lead to stretch.

Exposing plants to outside conditions is used for the hardening off process prior to transplanting. You can also use this for height control during the production period. Roll out benches that can be moved outside of the greenhouse for a portion of the day or wagons that can be moved into and out of the greenhouse can be used for this.

Seedless watermelons have specific requirements: germination at high temperatures
for 24 hours (to achieve even germination) then move immediately into a cooler greenhouse to grow out. See this past WCU article for more information http://agdev.anr.udel.edu/weeklycropupdate/?p=1714.

Many growers choose not to produce their own transplants but contract with greenhouse growers locally or in the South. Majorities of these transplants are of high quality and perform well in the field. However, each year, there are some shipments that have problems. The most common problem is transplants shipped before they are ready - without adequate root systems. These transplants will not perform well in the field, especially in earlier plantings. If possible, they should be placed in a greenhouse to finish growing before use.

Another issue is diseases. Bacterial diseases (such as bacterial spot), fungal blights (such as Alternaria or Gummy Stem), and viruses (such as Tomato Spotted Wilt Virus and INSV) have all been found in transplants at times. If a disease is suspected, have it quickly diagnosed and inform the Plant Industries section of the Delaware Department of Agriculture. Do not plant diseased plants in the field. Southern grown transplants are most often the source so make sure that you are dealing with a grower with a good reputation for producing disease free plants.

Plants that are shipped without trays (already pulled) or that are bare rooted that are packed tightly in boxes must be planted quickly. Delays will lead to plant deterioration, leaf loss, and potential disease buildup.

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**Pea Herbicides** - *Mark VanGessel, Extension Weed Specialist; mjv@udel.edu*

Weed control options remain limited for processing peas. Pursuit, at 1.5 to 2.0 fl oz/A, needs to be used as a pre-plant incorporated or preemergence treatment and is used primarily for broadleaf weeds. Preemergence applications of Command at 8 to 16 fl oz or Dual at 0.5 to 1 pt/A are labeled for control of annual grasses and some broadleaf weeds. Basagran and Thistrol are labeled for postemergence control of broadleaf weeds. Apply Basagran at 1.5 to 2 pt/A after peas have more than three pairs of leaves. Do not add oil concentrate. Select, Assure II, Targa, or Poast can be used for postemergence grass control.

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**Agronomic Crops**

**Update on Avipel Section 18 for Bird Management in Field Corn** - *Joanne Whalen, Extension IPM Specialist; jwhalen@udel.edu*

Many of you have probably read in the Delmarva Farmer about Virginia’s submission to EPA for a Section 18 (emergency use label) for a seed treatment for bird management in field corn. Just so you are aware, Delaware has also submitted for this emergency use label and Maryland is in the process of submitting. The Section 18 application for the use of Avipel in Virginia was recently returned for lack of sufficient economic justification for the emergency use. More information is available in the recent Virginia Ag Pest Advisory (http://www.sripmc.org/Virginia/). We will let you know more when we hear from EPA about our Delaware submission.

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**Will Your Crop Suffer from Sulfur Deficiency this Cropping Year?** - *Richard Taylor, Extension Agronomist; rtaylor@udel.edu*

Past and recent emphasis has been placed on reducing sulfur (S) emissions from power plants, diesel vehicles, and other industries. The question of whether the Clean Air Act and other programs run by the Environmental Protection Agency are accomplishing their objectives can be answered by the farm community with respect to sulfur emissions. The answer growers would likely give is that yes the air quality programs have worked, but so well that their crops are increasingly showing sulfur deficiency symptoms, especially when grown on sandy, low organic matter, non-manured soils.

Why is S critical for maximum economic yields (MEY)? Sulfur is needed by a crop when making certain amino acids such as cystine and
methionine that are vital components of many proteins. The entire factory output (yield) of a crop is dependent on proteins that make up the chlorophyll molecule, all the plant enzyme systems, the plant’s genetic material such as DNA, the assimilation function of legume rhizobia, and all the inter-related metabolic activity in the plant. The ideal nitrogen (N) to sulfur ratio in a plant is 15:1. Above that ratio, the S concentration is not adequate for MEY.

Sources for S include commercial fertilizers, atmospheric deposition, and manures or biosolids. The movement away from the old superphosphate (16 to 22% P₂O₅ and 12 to 14% S) to triple superphosphates in the late 1900s and then more recently to ammonium phosphates and ammonium polyphosphates (DAP, MAP, and others) has reduced the amount of S fertilizer applied without us consciously being aware of the trend. With the success of the Clean Air Act, atmospheric S deposition had dramatically decreased even before the very recent change over to ultra low sulfur diesel fuel. In addition, the emphasis on nutrient management planning to reduce manure application rates due to phosphorous buildup in the soil and the development of programs to help move poultry manure to areas without manure resources has also contributed to reduced S application rates.

Who should be concerned about the potential for S deficiency on their crops? The answer is that probably everyone but especially those growers with coarse textured soils, with soils low in organic matter, or with soils that have received enough rainfall or irrigation water to leach S below the crop rooting zone should be concerned. For shallow rooted crops such as wheat and barley, it is especially critical to ensure that adequate S is available during tillering and early growth and development. Growers should consider adding enough ammonium sulfate to their normal nitrogen application to provide from 20 to 30 lbs of S per A in the first N application split in the spring.

If there is adequate S accumulation in the soil clay subsoil as determined with a deep soil test, S fertilization may not be a yield limiting factor on deep rooted crops such as corn. However, this does not mean that early season growth won’t be improved with the early season addition of some type of sulfate fertilizer. Even in high yield irrigated environments, such an application could help improve yield potential or at least not limit yield.

Some growers will want to rely on soil test results to make a decision on whether to add S fertilizer. These growers should be aware that the normal soil test depth of 0 to 6 or 0 to 8 inches is not as good an indicator of soil S status as it is for phosphorus and potassium. Sulfur is taken up by plants as the sulfate (SO₄²⁻) ion and as an anion (negatively charged ion) in the soil that is similar to nitrate. It is subject to loss via leaching and anaerobic conditions (similar to denitrification).

Sulfur deficiency symptoms vaguely resemble those of N except that S, unlike N, is not mobile in the plant so symptoms occur first on new growth. Sulfur deficiency is most often described as stuntng with general yellowing or chlorosis of the plant. For examples, please review the photos at the end of this article.

The choices available for fertilizing with S include ammonium sulfate and potassium magnesium sulfate (K-PoMag) plus ammonium thiosulfate, calcium sulfate (gypsum), magnesium sulfate (Epsom salts), potassium sulfate, and elemental sulfur. Sulfate is immediately available for plant uptake whereas elemental S must be oxidized by the soil bacteria (requiring warm soil temperatures and adequate moisture) into sulfate before plants can absorb the S. Organic sources (manures, crop residues, biosolids) must undergo mineralization into inorganic sulfate before being available for plant uptake.

Other by-products such as derivatives from battery acid are sold as S sources but should be evaluated carefully by the grower to be certain that potential problems such as heavy metal contamination, non-available S forms, or injurious compounds are not present. Even then the S form in some by-products will need to be converted into plant available forms by the soil microorganisms and if S is needed immediately or if soil conditions are not favorable for this conversion yield potential could be impacted negatively. Certainly, any form other than the sulfate form is not appropriate in-season when
deficiency symptoms indicate the immediate need for S.

Photo 1. Induced sulfur deficiency in corn grown in sand culture. Note reddening of lower stem, general chlorosis or yellowing especially of new growth, and stunting of the plant.

Photo 2. Field corn showing stunting and general chlorosis or yellowing, especially of new growth on sandy soil in southern Delaware.

Is it Time to Revisit Splitting Spring N Application on Winter Wheat? - Richard Taylor, Extension Agronomist; rtaylor@udel.edu

For a number of years, the spring decision of whether to split the nitrogen (N) applied to wheat was often controlled by the price of wheat. When wheat prices were four to five dollars or less per bushel, the return on investment for split N applications was either
barely at the breakeven point or below it. Wheat prices this year could encourage growers to again consider if the yield gain, generally about 5 to 7 bu/A, and the environmental and economic impact of less N applied at a single application and subject to leaching, volatilization, and denitrification losses will be enough to incur the risk associated with trying to time and succeed in applying a second N application.

Another factor to consider is whether fall N was applied or if there was adequate residual N available following the previous year’s dryland crop. Even on irrigated ground, residual N could have been present to give the fall planted wheat an excellent start on tiller development. Where an irrigated corn crop was fertigated with N up until tasseling or in fields where a legume crop (soybean or lima bean) was grown, adequate residual N was likely present to give wheat a good start on growth and development.

For fields that didn’t receive fall N and there was unlikely enough residual N present for good fall growth and development, an early application of N at first green-up is critical to obtain maximum tiller production and good yield potential in a small grain crop. In such a case, a split application not only can improve yield potential but can also protect the grower from the loss of a large portion of a large single early application of N due to weather events.

In a four year study in New Castle County that Bob Uniatowski, Research Scientist at the University of Delaware, and I conducted, we found that for high yield wheat a 40 to 60 lb N/A first application followed by a second 60 lb N/A application (total of 100 to 120 lb N/A) was sufficient for maximum economic yield (MEY). The first application occurred between February 15th and March 15th depending on the weather and when wheat green-up occurred. The second application occurred when the tillers assumed an erect position just prior to the first node being visible above the soil surface. For the more typical 60 to 90 bu/A yield potential crop, a split of 40 to 60 lbs N/A at green-up followed by 20 to 40 lb N/A at Feekes 4 to 5 (total of 80 lb N/A) produced MEY.

With the excellent price for wheat this year, the typical yield increase seen with the split of N into two applications, and the potential environmental benefit associated with a lower N application rate at a single point in time, I would encourage all growers to consider this option for maximizing your profitability in 2011.

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Small Grain Weed Control - Mark VanGessel, Extension Weed Specialist; mjv@udel.edu

Be sure to read the herbicide label carefully because some products can be tankmixed with nitrogen but only if the nitrogen is no more than 50% of the spray solution (nitrogen is mixed 1:1 with water). A few specifics:

- Osprey cannot be applied within 14 days of nitrogen application
- Harmony Extra can be applied with nitrogen, but use of surfactant differs depending on concentration of nitrogen and targeted weed species
- Axial XL and PowerFlex can only be applied with nitrogen if it is mixed 1:1 with water; also PowerFlex cannot be applied with nitrogen if the amount is more than 30 lbs of N/A

Axial XL and PowerFlex are two herbicides that are effective on annual ryegrass. Both of these can be double-cropped with soybeans. However, PowerFlex will injure vegetables planted after harvest.

There are reports of fields with poor chickweed control due to resistance to Harmony, Harmony Extra, or Finesse. If you are in that situation, your alternatives are quite limited. Most other small grain herbicides do not provide acceptable chickweed control. One product to suggest is Starane Ultra (from Dow AgroSciences). This product is labeled for wheat and barley and has fair to good chickweed control. However, it will not control other key species such as wild garlic. Starane Ultra can be tankmixed with Harmony Extra to broaden the spectrum of control. Starane Utra by itself does not need an adjuvant and can be applied in nitrogen. Be sure to read and follow label directions.
Finally, a reminder on timing restrictions for small grain herbicides. The timing restrictions are based on crop safety.

2,4-D - up to jointing stage (pre-jointing)  
Banvel/Clarity - up to jointing stage (pre-jointing)  
Osprey - up to jointing stage  
Buctril - up to boot stage  
Harmony Extra or Harmony GT - up to flag stage (pre-flag leaf)  
Starane Ultra - up to flag leaf emergence  
PowerFlex - jointing  
Axial XL - prior to boot

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**Time for Frost Crack Seeding of Small-Seeded Legumes** - Richard Taylor, Extension Agronomist; rtaylor@udel.edu

Many growers like to overseed with legumes into their pasture and hay fields by using a method called frost-crack seeding. An article with full details was published in the Mid-Atlantic Regional Agronomist Quarterly Newsletter in September 2006 in Issue 1, Number 3 for those who would like a more detailed description of the seeding method. This publication is available on-line at either of the following locations:

http://www.grains.cses.vt.edu/ - look for Mid-Atlantic Regional Agronomy Newsletter  
or  
www.mdcrops.umd.edu - click on Newsletter

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 in the fall prior to the seeding taking a soil sample of the chosen field. 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. 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 not having 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 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 we consider the probability very high that white, red, and alsike cover inoculating bacteria are present in all pasture and hay fields, a good habit to get in is to either buy preinoculated seed or inoculant for the seed. If preinoculated seed is past its sell by date, you should add more inoculate 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.

**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.

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**The Word is Out: Roundup Ready® Alfalfa Gains Approval for Spring Planting** - Richard Taylor, Extension Agronomist; rtaylor@udel.edu

In a press release through Reuters on Jan. 27, 2011, the word came down that the United States Department of Agriculture (USDA) has approved GMO alfalfa without restrictions and that the alfalfa can be planted as early as this spring. Surprising few in the agricultural community, Secretary Vilsack stated that there are no doubts about GMO crop safety and that
APHIS has determined that Roundup Ready alfalfa is as safe as traditionally bred alfalfa.

Many in the industry had expected that a compromise was in the works that would place limitations and restrictions on planting Roundup Ready alfalfa and that the process of defining those limits and restrictions would delay approval past spring planting time. This worry proved unnecessary as no restrictions were announced on Thursday. Many conventional and organic producers are very worried that pollen from Roundup Ready alfalfa carried by the bee pollinators will end up pollinating their conventional or organic alfalfa seed sources. Actual hay and feed producers have less to be concerned about since if they are managing their alfalfa correctly, the crop should never reach the seed set stage of growth. Also since alfalfa has its own regulatory means (autotoxicity) of preventing self-generated seed from germinating and establishing in an established stand of alfalfa, there should be minimal chance of contamination of a stand during its lifetime as a hay, greenchop, haylage, or grazing field.

Secretary Vilsack said that the USDA would promote research into how genetics could be used as a means of preventing contamination and research designed to improve detection of any contamination that might occur. The Secretary will have the USDA set up two advisory committees to help ensure the availability of high-quality seed and to set up programs to try to protect the purity of the alfalfa germplasm base.

Evaluating Alfalfa Stands in the Spring - Richard Taylor, Extension Agronomist; rtaylor@udel.edu

This season I’ve already had a couple of questions asked as to when and how to evaluate alfalfa stands. Below are descriptions of two methods that can be used to determine the viability of an alfalfa stand. An alfalfa producer should use not only one of these methods but their feel for the vigor of the particular stand they wish to evaluate, as well as the production history of that field.

The first method consists of counting the number of plants per square foot. Current research information suggests that when stand counts fall below 3 to 5 plants per square foot, it’s time to either rotate out of pure alfalfa or interseed a grass crop such as orchardgrass, festulolium, tetraploid ryegrass, or annual ryegrass or interseed another legume not hurt by the autotoxicity seen in year old or older alfalfa stands. Red clover is the legume of choice and should be planted at 6 to 8 lbs pure live seed per A either by broadcasting it on in very early spring or seeding it with a no-till drill (plant either in very early spring or in early to mid-Sept after the last harvest of the season).

The second evaluation method derives from research out of Wisconsin by Dr. Dennis Cosgrove that indicates that stem number, rather than plant number, is a more accurate determination of when to plow down or interseed an alfalfa stand. Cosgrove suggests using a value of 55 or more stems per square foot to indicate that the stand will produce maximum yield. A reduction in stem number per square foot to 40 stems or less will result in a 25 percent yield reduction. At this critical level, alfalfa fields begin to lose profitability and should be rotated to another crop for one or two years.

Although you can get some idea on the potential of your alfalfa stand by counting either the number of plants or the number of tillers per square foot, you will need also to consider checking on the health of those plants to have an accurate basis for a decision on keeping or destroying an alfalfa stand. To do this, in the spring when new growth is about 4 to 6 inches tall, check a random one square foot site for each 5 to 10 As of alfalfa or at least 4 to 5 sites on small fields. Dig up several plants at each site and slice open the crown and root (longitudinally) with a sharp knife to determine the health of the crown and tap root. Healthy roots and crowns will be firm and white to slightly yellow in color. Diseased roots will have dark brown areas extending down the center, especially if crown rot is a problem. Reduce your counts of plants per square foot or tillers per square foot so only the healthy plants present are counted. Plants with roots that are mushy or soft are likely to die; and although those with a few brown spots may survive, the overall vigor of the stand will be compromised by the presence of disease.
If you must decide on whether to reseed before growth begins in the spring (and you do not plan to take a first harvest of alfalfa before planting another crop) or after a very hard winter with significant heaving or winter injury, base your decision to reseed on the number of plants per square foot (Table 1). If a decision to reseed can be made during the growing season or after about 4 to 6 inches of growth has occurred in the spring, either evaluation method can be used (Table 1). In Table 1 below, I’ve modified various estimates for good, marginal, and poor stands to give the grower possible guidelines to consider in making a decision on keeping the stand or interseeding a grass or other legume.

Table 1. Suggested plants per square foot or tillers per square foot (#) criteria for evaluating alfalfa stands on Delmarva.

<table>
<thead>
<tr>
<th>Age of stand</th>
<th>Good stand</th>
<th>Marginal stand</th>
<th>Consider replacement(^1) or renovation(^2) with interseeded grass or red clover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plants per square foot with spring tillers per square foot in parentheses</td>
<td>Plants per square foot with spring tillers per square foot in parentheses</td>
<td>Plants per square foot with spring tillers per square foot in parentheses</td>
<td></td>
</tr>
<tr>
<td>New</td>
<td>25-40 plts (&gt; 75)</td>
<td>15-25 plts (&lt; 55)</td>
<td>&lt; 15 plts (&lt; 50)</td>
</tr>
<tr>
<td>1 year old</td>
<td>&gt; 12 plts (&gt; 60)</td>
<td>8-12 plts (&lt; 55)</td>
<td>&lt; 8 plts (&lt; 45)</td>
</tr>
<tr>
<td>2 years old</td>
<td>&gt; 8 plts (&gt; 55)</td>
<td>5-7 plts (&lt; 50)</td>
<td>&lt; 5 plts (&lt; 40)</td>
</tr>
<tr>
<td>3 years old</td>
<td>&gt; 6 plts (&gt; 50)</td>
<td>4-6 plts (&lt; 45)</td>
<td>&lt; 4 plts (&lt; 40)</td>
</tr>
<tr>
<td>4 years old or older</td>
<td>&gt; 4 plts (&gt; 50)</td>
<td>3-4 plts (&lt; 40)</td>
<td>&lt; 3 plts (&lt; 40)</td>
</tr>
</tbody>
</table>

\(^1\) If the stand is to be plowed for replacement, growers often find it economically favorable to take a first cutting and then plow and plant a rotational crop that can use the nitrogen mineralized from the decomposing alfalfa plants. Rotate out of alfalfa at least until the next fall (14 to 18 months) but preferably for 2 to 4 years. This will allow time for a reduction in the potential for alfalfa diseases and provide the grower the opportunity to correct soil nutrient and pH (acidity) problems as well as make use of the residual N mineralization potential that exists in a field following an alfalfa crop.

\(^2\) If you consider renovation or extending the stand life, try no-tilling a grass crop such as orchardgrass, tetraploid annual or perennial ryegrass, or one of the new varieties of festulolium (a cross between meadow fescue and one of the ryegrasses). The grass will increase your tonnage especially if you fertilize for the grass with nitrogen fertilizer. This also has the effect of driving out alfalfa at the same time as production levels are maintained for an additional year or two. Another option for extending an alfalfa stand’s life for 1 to 2 years is to seed in 6 to 8 lbs of red clover per A. This option will maintain the higher protein production from the field.

Grain Marketing Highlights - Carl German, Extension Crops Marketing Specialist; clgerman@udel.edu

Executive Summary: USDA’s March Supply and Demand Report
The day of the release of USDA’s March 10 Supply and Demand report trader attention was said to be turning to USDA’s Grain Stocks and Planting Intentions reports to be released on March 31. The next monthly supply and demand report will be released on April 8. Today, the day after the release of the report, trader attention is turning to the stock market in anticipation of a large drop due to the earthquake that hit Japan yesterday afternoon.

The commodity markets are expected to follow the Dow.

Ending Stocks for U.S. corn and soybeans were unchanged from last month, with only minor adjustments made to the balance sheets. U.S. Corn ending stocks for the ‘10/’11 marketing year were unchanged at 675 million bushels. U.S. soybean ending stocks were unchanged at 140 million bushels. U.S. Wheat ending stocks were increased by 25 million bushels from last month due to a 25 million bushel decrease in the estimate for exports, now projected at 843 million bushels.
World corn ending stocks were increased slightly, from 122.51 MMT in February to 123.14 MMT.

World soybean ending stocks were placed at 58.33 MMT, as compared to 58.21 MMT last month. The estimate for Brazilian soybean production was increased 1.5 MMT, from 68.5 to 70.0 MMT. Argentina’s production was left unchanged at 49.5 MMT.

For world wheat, USDA increased ending stocks to 181.9 MMT from 177.77 MMT last month. Australian wheat production is now projected at 26.0 MMT, an increase of 1 MMT from a month ago. The estimate for Canadian wheat was left unchanged at 23.2 MMT.

### U.S. ENDING STOCKS (billion bushels) 2010-2011

<table>
<thead>
<tr>
<th></th>
<th>Mar.</th>
<th>Average</th>
<th>High</th>
<th>Low</th>
<th>Feb.</th>
<th>2009-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>0.675</td>
<td>0.667</td>
<td>0.702</td>
<td>0.625</td>
<td>0.675</td>
<td>1.708</td>
</tr>
<tr>
<td>Soybeans</td>
<td>0.140</td>
<td>0.141</td>
<td>0.181</td>
<td>0.121</td>
<td>0.140</td>
<td>0.151</td>
</tr>
<tr>
<td>Wheat</td>
<td>0.843</td>
<td>0.809</td>
<td>0.843</td>
<td>0.751</td>
<td>0.818</td>
<td>0.976</td>
</tr>
<tr>
<td>Sorghum</td>
<td>0.037</td>
<td>0.037</td>
<td>0.041</td>
<td>0.032</td>
<td>0.037</td>
<td>0.041</td>
</tr>
</tbody>
</table>

### WORLD ENDING STOCKS (million metric tons) 2010-2011

<table>
<thead>
<tr>
<th></th>
<th>Mar.</th>
<th>Average</th>
<th>High</th>
<th>Low</th>
<th>Feb.</th>
<th>2009-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>123.14</td>
<td>121.63</td>
<td>122.51</td>
<td>120.00</td>
<td>122.51</td>
<td>145.16</td>
</tr>
<tr>
<td>Soybeans</td>
<td>58.33</td>
<td>59.19</td>
<td>60.00</td>
<td>122.51</td>
<td>58.21</td>
<td>60.17</td>
</tr>
<tr>
<td>Wheat</td>
<td>181.90</td>
<td>177.57</td>
<td>179.20</td>
<td>175.20</td>
<td>177.77</td>
<td>197.60</td>
</tr>
</tbody>
</table>

### WORLD PRODUCTION (Million Metric Tons)

<table>
<thead>
<tr>
<th></th>
<th>2010-2011</th>
<th>2009-2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil Corn</td>
<td>53.0</td>
<td>51.0</td>
</tr>
<tr>
<td>Argentina Corn</td>
<td>22.0</td>
<td>22.0</td>
</tr>
<tr>
<td>Brazil Soybeans</td>
<td>70.0</td>
<td>68.5</td>
</tr>
<tr>
<td>Argentina Soybeans</td>
<td>49.5</td>
<td>49.5</td>
</tr>
<tr>
<td>Australia Wheat</td>
<td>26.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Canada Wheat</td>
<td>23.2</td>
<td>23.2</td>
</tr>
</tbody>
</table>

### Market Strategy

As expected, commodity markets have opened lower this morning. The Dow, crude oil, and the dollar are also lower. We have entered an unfavorable period for commodity marketing. It is always tougher to make sales decisions in declining markets. Currently, corn, soybean, and SRW wheat are trading double digits lower with Dec ‘11 corn futures at $5.80; Nov ‘11 soybeans at $13.05; and July ‘11 SRW wheat at $7.53 per bushel. April ‘11 crude is trading at $102.70; the nearby U.S. dollar Index at 76.995; and the Dow is 11,945. Place sales decisions on hold unless needing to play catch-up.

For technical assistance on making grain marketing decisions contact Carl L. German, Extension Crops Marketing Specialist.

### General

**Insecticide Update: Endigo ZC** - Joanne Whalen, Extension IPM Specialist; jwhalen@udel.edu

*Endigo ZC* (Syngenta Crop Protection) - The following crops/crop groupings have been added to the Endigo federal label: barley, brassica cole.
crops, cucurbit vegetables, fruiting vegetables, lettuce, pome fruit, stone fruits and a few others. Please check the following link for rates, restrictions and use precautions (http://www.cdms.net/LDat/ld7T4001.pdf). In addition, you should also check the Delaware Department of Agriculture’s website to be sure these materials are labeled in Delaware http://www.kellysolutions.com/de/pesticideindex.htm. To use a material it must have both a state and federal label.

Spring Cover Crop Management - Richard Taylor, Extension Agronomist; rtaylor@udel.edu

Although it seems like ancient history, many years ago when no-till technology was first beginning, Delaware and Maryland farmers were rapid adopters of cover crops for no-till grain production. Farmers mostly used cereal crops as winter cover crops. At the time, we learned some important lessons that we should remember this year because of the weather pattern that has occurred in a number of areas in Delaware.

Because there are a number of perceived environmental benefits with cover crops, government programs, as well as many environmentally-conscious growers have moved production agriculture back into heavy reliance on cover crops. Wheat and cereal rye are two popular cover crops, although some growers are using legumes, legume-cereal combinations, and even some other broadleaf crops such as the forage or Daikon radish. These cover crops are designed to protect the soil, add in organic residues, or supplement the soil with legume-derived nitrogen (N).

For any cover crop, whether it’s the grass cereals used for ground-covering, water-conserving mulch or legumes for spring N-fixation as well as for residue, I have found that there is a tendency to allow these crops to grow as much as possible by delaying herbicide or tillage or other cover crop control method as late as possible. In years when adequate rainfall occurs or good early season rainfall keeps the crop supplied, cover crops are not very harmful to soil moisture reserves or actually may be very helpful in drying out the surface soil. However, the season to be extra cautious in is the year when winter rainfall is below normal and this is followed by a dry early spring. The combination of lower than expected subsoil moisture level and rapid cover crop growth with heavy water use by the cover crop can lead to excessively dry sub-soil conditions.

The latter weather pattern seems to be developing in many areas of Delaware since winter rainfall has been below normal or the ground has been frozen during precipitation events. Growers need to monitor their subsoil moisture levels closely this spring and be prepared to terminate their cover crops earlier than normal if the subsoil becomes too dry. Early termination of the cover crop will allow time for subsequent rainfall to percolate into the subsoil and for the killed mulch to protect the soil from excessive water loss through evapotranspiration.

Growers or their consultants can check the subsoil moisture level with either the standard soil testing probe or with one that has an extended handle to make deep probing physically easier. It still is much of a “feel method” that depends on the experience of the person testing the soil. As a general rule, if subsoil is formed into a ball by squeezing it together in one’s hand and then the hand is opened and the ball easily falls apart with the least touch and no hint of moisture is present on the hand after making the ball, then the soil is on the dry to very dry side. The cover crop should be killed before the subsoil drops to the very dry state.

Herbicide Rotation Restrictions - Mark VanGessel, Extension Weed Specialist; mjv@udel.edu

Herbicide rotational restrictions or guidelines are based on two criteria; regulatory and biological. Both of these criteria are equally important to the end user of the commodity and can be justification for rejecting the harvested product. Maximum residue levels are determined based on a range of tests and studies. Residue levels are determined to ensure that they are below a level that could cause an effect.
Biological criteria are established to ensure the succeeding crops aren’t adversely impacted. It is critical that the pesticide label is read and understood before application. It does not matter whether the rotational restrictions were determined based on regulatory or biological criteria, the label needs to be followed. Rotational restrictions are often changed on the labels with little to no publicity, so review pesticide labels every year to be sure you are in compliance with the label.

Where we seem to have the biggest issue with rotational crops is with double cropped vegetables. Products used in sweet corn, peas, or other early-season crops can limit what can be planted after harvest.

**Announcements**

**Lima Bean Update – Breakfast Meeting**
Friday, March 18, 2011  7:30-9:00 a.m.
Harrington Fire Hall
20 Clark Street, Harrington, DE 19952

**Spartan Charge Herbicide Registration for Lima Bean - what we need to know about it**

Other topics and discussions will include: brown marmorated stinkbug, Fordhook production, and other issues for upcoming lima bean season.

Breakfast provided.

**Registration:** Please call Karen Adams at (302) 856-2585 ext. 540 to register (no fee - only need registration for breakfast)

Mark VanGessel, Joanne Whalen, and Gordon Johnson

**New Castle County Field Crops Meeting**
Thursday, March 17, 2011  5:30-9:00 p.m.
Blackbird Community Center
Blackbird, DE

6:00 to 6:20
Executive Market Update
*Carl German*

6:20 to 6:50
Field Corn and Soybean Insect Update for 2011
*Joanne Whalen*

6:50 to 7:00
Questions and 7th Inning Stretch

7:00 to 7:15
Planting Dates: How Important are They
*Bob Uniatowski*

7:15 to 7:40
Why Early-Season Weed Control is Important
*Mark VanGessel*

7:40 to 7:50 Snack Break

7:50 to 8:30
Soil Fertility Management: Environment versus Production, *Greg Binford*

8:30 to 9:00
Field Crop Disease Issues/Update
*Bob Mulrooney*

9:00 Questions, Conversation, and Adjournment

Have a safe trip home!

**Produce Food Safety Training Sessions for Small Scale Growers**

Good Agricultural Practices (GAP’s) - Good Handling Practices (GHP’s)

Small scale growers who did not attend voluntary produce food safety (GAP/GHP) training sessions in 2009 or 2010 are encouraged to do so in 2011. This training program is offered by the University of Delaware Cooperative Extension, and the training certificate is issued by the Delaware Department of Agriculture. Trainings are also sponsored by the Fruit and Vegetable Growers Association of Delaware.

Smaller growers that do not market wholesale are encouraged to become trained and learn about best ways to keep produce safe from food-borne pathogens.
Please Note: Training sessions for wholesale growers were held in Kent and Sussex counties in early March.

KENT COUNTY - Kent County Extension Office, Dover (UD Paradee Building), 69 Transportation Circle, Dover, DE 19901. Call (302) 730-4000 to register. Contact Phillip Sylvester for more information.

Small growers (limited or no wholesale) – 3 hour training, April 4, 2011, 6-9 pm.

SUSSEX COUNTY - University of Delaware, Carvel Research and Education Center, 16483 County Seat Highway, Georgetown, DE 19947. Call (302) 856-7303 to register. Contact Tracy Wootten or Cory Whaley for more information.

Small Growers (limited or no wholesale) – 3 hour training, April 14, 2011, 6-9 pm.

NEW CASTLE COUNTY - New Castle County Extension Office, 461 Wyoming Road Newark, DE , 19716, Phone (302) 831-2506 to register. Contact Maria Pippidis for more information.

Small Growers (limited or no wholesale) – 3 hour training, April 26, 2011, 6-9 pm.

Sussex County Soil Health and Vegetable Production Workshop
Thursday, April 7, 2011  4:00 - 7:00 pm
University of Delaware
Carvel Research and Education Center Farm
(meet at Picnic Grove)

Commercial vegetable growers, market gardeners, crop advisors, and others interested are invited to attend a workshop dedicated to soil health and vegetable crops. With tight rotations, land limitations, and intensive cultivation, soil health is a major concern with vegetable production.

This workshop will focus on incorporating soil health principles into vegetable production as part of an integrated crop and pest management program. Participants will spend most of the workshop doing hands-on soil quality and soil health evaluations in the field (visual, chemical, physical, and biological). We will also discuss best rotations for vegetables, using soil improving cover crops and green manures, using composts and organic amendments, and biofumigant crops in vegetable rotations.

Each participant will be encouraged to develop a soil health maintenance or improvement plan for their vegetable production.

Dr. Gordon Johnson, UD Extension Fruit and Vegetable Specialist, will be conducting this workshop.

To register, contact Karen Adams at (302) 856-7303 or email adams@udel.edu. If you need additional information, or if you require special needs assistance for this meeting, please contact Cory Whaley, Agriculture Agent, whaley@udel.edu, or (302) 856-7303.

New Castle County Soil Health and Vegetable Production Workshop
Saturday, March 26, 2011  9:00 am – 12 noon
College of Agriculture and Natural Resources Farm
(meet at Fisher Greenhouse)

Commercial vegetable growers, market gardeners, crop advisors, and others interested are invited to attend a workshop dedicated to soil health and vegetable crops. With tight rotations, land limitations, and intensive cultivation, soil health is a major concern with vegetable production.

This workshop will focus on incorporating soil health principles into vegetable production as part of an integrated crop and pest management program. Participants will spend most of the workshop doing hands-on soil quality and soil health evaluations in the field (visual, chemical, physical, and biological). We will also discuss best rotations for vegetables, using soil improving cover crops and green manures, using composts and organic amendments, and biofumigant crops in vegetable rotations.

Each participant will be encouraged to develop a soil health maintenance or improvement plan for their vegetable production.

Dr. Gordon Johnson, UD Extension Fruit and Vegetable Specialist, will be conducting this workshop.
To register, if you need additional information, or if you require special needs assistance for this meeting, please contact Carrie Murphy, Horticulture Agent, cjmurphy@udel.edu, or (302) 831-2506.

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**Weather Summary**

Carvel Research and Education Center Georgetown, DE

**Week of March 3 to March 9, 2011**

**Readings Taken from Midnight to Midnight**

**Rainfall:**
- 1.09 inch: March 6
- 0.01 inch: March 7

**Air Temperature:**
- Highs ranged from 63°F on March 5 to 36°F on March 3.
- Lows ranged from 42°F on March 6 to 23°F on March 4.

**Soil Temperature:**
- 45.2°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

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

Cooperative Extension Education in Agriculture and Home Economics, University of Delaware, Delaware State University and the United States Department of Agriculture cooperating.

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