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Agronomy News

The University of Maryland Extension Agriculture and Food Systems and Environment and Natural Resources Focus Teams proudly present this publication for commercial agronomic field crops and livestock industries.

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Agronomic Crop Insect Update

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Small Grains

In most years, the potential for overwintering insects to cause crop damage is a result of both winter and spring weather conditions. Despite the cold winter weather in 2015, cereal leaf beetle caused economic damage in a number of small grain fields last season. Although we did not see any beetles while sampling small grains this past week, we should begin to see adults emerging soon. Beetle adults do not leave overwintering sites until daily high temperatures are consistently above 60°F. Treatment thresholds are not based on adult beetle counts; however, detection of the first adults can give us an idea of when egg laying will begin. Treatment decisions are based on the number of eggs and/or larvae per 100 tillers. Please see the following link for more information on insect identification, sampling and treatment thresholds at: **http://extension.udel.edu/factsheet/cereal-leaf-beetle-control-in-small-grains/**
There is also very good information from North Carolina about when it may or may not pay to tank mix an insecticide with your nitrogen application at: **http://entomology.ces.ncsu.edu/2015/03/tank-mixing-an-insecticide-for-cereal-leaf-beetle-in-wheat/?src=rss**

Timothy

Be sure to watch for an increase in 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. 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.

Alfalfa

Be sure to begin sampling for pea aphid and alfalfa weevil. When sampling for aphids and weevils, collect a minimum of 30 random stems throughout a field and place them top first in a white bucket. For aphids, you want to count the number present per plant as well as any that have dislodged from the stem into the bucket. As a general guideline, you should consider a treatment in alfalfa less than 10 inches tall if you find 40-50 aphids per stem. The treatment threshold for alfalfa 10 inches or taller in height is 75-100 per stem. Although beneficial insects can help to crash aphid populations, the recent cool temperatures have slowed their activity. As a general rule, you need one beneficial insect per every 50-100 aphids to help crash populations. For alfalfa weevil, you will want to record the number of weevil larvae per stem. 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

Field Corn

During our sampling for slugs this past week, we have observed low levels of adult marsh and grey garden slugs. We have not yet seen any signs of grey garden slug egg hatch. In general, the grey garden slug causes the majority of damage in our corn fields. Therefore, scouting for eggs and watching for egg hatch will help

identify potential problem fields. For more information on scouting for slugs eggs, please watch the following video from Ohio State University:
http://oardc.osu.edu/ag/pageview3.asp?id=2087

Soil Borne Small Grain Viruses

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Small grains are behind and the recent cool, wet weather means that you might come across early season viral diseases in some fields, specifically Wheat Soilborne Mosaic Virus and Wheat Spindle Streak Virus. These diseases are transmitted by soil borne microbes that thrive in cool, wet conditions. Infected plants typically are chlorotic and may be stunted. Often affected plants occur in low lying areas of the field or areas suffering from compaction. However, on some occasions entire fields are symptomatic. Symptoms of spindle streak include necrotic dashes that run along the venation, giving the appearance of a spindle (Figure 1).

Additional symptoms of soilborne mosaic virus are less conspicuous, but include mottling of lower foliage (Figure 2). Symptoms cease once temperatures are above 65°F and may be reduced after fertilization. Confirmation can only be made through specialized testing methods such as ELISA and PCR.

What should you keep in mind? 1) Keep track of fields with these viruses. Once the viruses are established they will be present in those fields from here on out. 2) Try to harvest or work in these fields last to prevent spread to other fields. 3) Avoid compaction. 4) Plant tolerant varieties in fields with a history of these viruses. Unfortunately many varieties are screened for these viruses as a complex, so it may be difficult to determine if you are planting a spindle streak or soilborne mosaic tolerant variety in these cases.

Figure 1. Characteristic lesions caused by wheat spindle streak virus.

Figure 2. A nursery screening wheat varieties for tolerance to soilborne mosaic virus.

Figure 3. A comparison of foliar symptoms of spindle streak (left) and soilborne mosaic (right) virus. Wheat spindle streak mosaic symptoms are typically more elongate and spindle shaped, and often contain a dark green island in the middle of chlorotic lesions.

Understanding the Lime Requirement

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The pH scale, a measure of Hydrogen (H) concentration, was created by a scientist 100 years ago to describe the acidity of beer. This scale also provides a benefit or the agricultural producer, aiding in the determination of nutrient availability and the necessity to lime their soils.

The pH scale is considered acidic between 0 to 6, neutral at 7, and alkaline (basic) from 8-14. While it may seem natural that a neutral pH is best for crop growth, there are many reasons that mildly acidic soils benefit producers.

Acidic soils have a greater concentration of H in their soil solution, but toxicity due to H is not important until you go below pH 4.5. Free aluminum (Al) in the soil water is of greater concern, picking up in concentration when your pH drops below 5.5. Aluminum has toxic effects on root growth, therefore lowering crop production. Current lime requirements take into consideration the amount needed to reduce the available Al in the soil, rather than attempting to reach a neutral pH.

Determination of lime requirement is based on both active and reserve soil acidity. Aluminum can cause additional acidity when released into the soil solution, reacting with water to release acidity (H):

$$Al^{+3} + 3H_2O \Longleftrightarrow Al(OH)_3 + 3H^+$$

When lime is applied to a soil it will neutralize any H in the soil water, but Al and H (held in reserve on your CEC) can replace that acidity. How well a soil is buffered against pH change will control the total amount of lime needed to raise soil pH.

An additional reason to be wary of a pH approaching neutrality is plant access to micronutrients. Precipitation of micronutrients (Cu, Zn, Fe) into solids occurs with higher pH. This can be compounded by the clay/sand content and so will vary across the geographic provinces of Maryland.

Due to the toxicity of Al, liming recommendations should not be ignored. However, considerations for the loss of micronutrients at greater pH should also be considered for nutrient management. In future articles we will explore the variability in pH and lime response across Maryland and how a range in soil properties may interact with pH and nutrient availability.

Beware of "Alternatives" when Purchasing Agricultural Lime

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Maintaining soil pH in the proper range is one of the most important parts of soil fertility management. Soil pH is considered the "master variable" because it influences many of the chemical and biological functions of the soil. Recall that pH is a measure of the activity or concentration of hydrogen ions (H^+), which is represented mathematically as $pH = -\log[H^+]$. The more hydrogen ions present in the soil solution the lower the pH value. Values below 7.0 are considered acidic and values above 7.0 are considered alkaline. The target soil pH for crops grown in Delaware is crop specific but, in general, is as follows:

- Grain crops (corn, soybean, small grains): 6.0
- Forages (alfalfa, corn silage, grass/legume mixtures): 6.0 to 6.8.
- Vegetable crops (beans, peas, peppers, etc.): 6.0 to 7.0

In this soil pH range, the essential mineral macro- and micro-nutrients are in a chemical form that is most available for uptake by growing plants. At pH below 5.0, soluble aluminum (Al), iron (Fe), and manganese (Mn) may be toxic to the growth of some plants and phosphorus (P) availability is decreased.

Delaware soils are naturally acidic. In addition, nitrogen (N) fertilizers that contain urea or ammonium (NH_4^+) also contribute to soil acidity when NH_4^+ is converted to nitrate (NO_3^-), releasing many H^+ ions into the soil solution. Therefore, periodic liming may be required to maintain Delaware soils in the optimum pH for grain and vegetable crops. Remember to have your soil tested before applying any lime to the soil. The lime requirement test is offered as part of the routine soil analysis by the University of Delaware soil testing lab and many private labs in the region. You need both the water pH and the lime requirement (buffer pH) test run to obtain an accurate estimate of the quantity of lime needed to raise the pH back to the target pH.

Recently, colleagues at the University of Kentucky alerted us that Kentucky growers were being marketed an "alternative" liquid lime product. After a little investigation, they identified that the material being marketed as a liquid lime was actually calcium chloride

($CaCl_2$). Unfortunately, $CaCl_2$ provides ***NO liming value*** and is in fact not "liquid lime." Calcium chloride is used for many purposes including road salt or tractor tire ballast, but it cannot be used to neutralize soil acidity.

Therefore, we thought it would be useful to provide some information on liming materials, how liming materials increase soil pH, and explain why $CaCl_2$ is not a viable alternative to agricultural lime.

What is Lime?

Liming materials are typically oxides (O^{2-}), hydroxides (OH^-), carbonates (CO_3^{2-}) or silicates (SiO_4^{4-}) of calcium (Ca) or magnesium (Mg). Some examples include calcitic lime or calcium carbonate ($CaCO_3$), dolomitic lime ($CaMg(CO_3)_2$), quick lime (CaO), and hydrated lime ($Ca(OH)_2$). The reason these materials work or "lime" a soil (i.e. neutralize acidity) is NOT due to the Ca or Mg in the material. The oxide, hydroxide, carbonate, or silicate anions in these materials are the active liming agents.

When these liming materials dissolve in water, the acidity (H^+) reacts with the negatively charged anions (O^{2-}, OH^-, CO_3^{2-}, or SiO_4^{4-}), thereby reducing the concentration of acid (H^+) in the soil solution. The Ca or Mg cation does nothing to reduce soil acidity. Land application of Ca and/or Mg liming agents does, however, serve as a source of these macronutrients to growing plants.

Available Liming Materials

Many common liming materials are available in solid form. It is important to know the liming ability of any material, which is expressed as calcium carbonate equivalents (CCE), because some materials are more effective at neutralizing acidity. High quality solid limes have a small particle size allowing them to dissolve in water more readily.

Liquid lime products are also available. Liquid lime is simply a very finely ground solid liming product that is dissolved in water. Liquid lime usually has a high relative neutralizing ability allowing it to modify soil pH quickly.

However, since lime is dissolved in water, it typically consists of approximately 50% lime and 50% water by weight. Therefore, one ton of liquid lime would be equivalent to applying ½ ton of solid lime. If you need 2 tons per acre of 100% CCE lime (based on request of a lime requirement soil test), you would likely need to apply over 4 tons per acre of the liquid lime, which is well in excess of 700 gallons per acre. This large volume of water would require multiple applications of liquid lime throughout the year to get the amount of effective lime on the field as recommended by the soil test.

However, because liquid lime is very fast acting (you don't have to wait for the rain to dissolve the lime), in some cases it may be a good option for growers when only a small amount of lime is required.

Buyer Beware

If purchasing "liquid lime", read the label to be sure that the material is actually an oxide (O^{2-}), hydroxide (OH^-), carbonate (CO_3^{2-}), or silicate (SiO_4^{4-}) form of calcium (Ca) or magnesium (Mg). The $CaCl_2$ being marketed to growers in Kentucky is not liquid lime and has no liming ability. Remember, the Ca (and or Mg in some liming materials) is not responsible for neutralizing soil acidity. And while $CaCl_2$ can provide plant available Ca to the soil, Ca deficiencies are not common in grain or vegetable crops grown in Delaware when proper pH management practices are followed.

If you do need Ca or Mg, a calcitic or dolomitic limestone source is a great way to meet those needs. Be a savvy customer when purchasing liming materials and don't forget to get your soil tested before applying lime.

Killing Cover Crops

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It is important to be sure cover crops are dead prior to planting, since those plants still alive at planting are injured and/or larger after planting and can much more challenging to control. Furthermore, once the crop has emerged there are fewer options for killing the cover crop. The cool, overcast weather has further complicated terminating cover crops. All herbicides need actively growing plants to be effective, and the recent weather has slowed (or reduced) herbicide activity.

Allow 7 to 10 days for glyphosate to achieve maximum effectiveness and scout to be sure burndown programs were successful. Tank mixtures with triazine herbicides can reduce glyphosate effectiveness under poor growing conditions. On the other hand, tank mixing a triazine with paraquat can improve overall effectiveness. When tank mixing analyze each component herbicide to avoid a reduction in effectiveness.

Ag Law Publications & Videos

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New Ag Law publications and videos available On-Line:

When Can the Government Enter Your Farm? by Sarah Everhart

Using a Business Organization Structure to Limit Your Farm's Liability by Ashley Newhall and Paul Goeringer

Legal Liability of Saving Seeds in an Era of Expiring Patents by Paul Goeringer

Model CSA Contract

In addition to the publications, we are adding short YouTube videos over legal issues at:

http://umaglaw.org/videos.html

Right now we have videos on leasing, contracting, and what is a law/regulation. We should have some additional ones available in the future over premise liability, defenses to negligence, and adverse possession.

Along with that we continue to post shorter pieces at: www.aglaw.umd.edu, many of which are cross posted on the UME website as well.

Job Posting: Agronomy Program Manager

University of Maryland, Wye Research and Education Center, Queenstown, MD. Duties: Working with scientists, coordinate and implement research, demonstration and educational projects for agronomic crops.

Min. Qual.: BS in Agronomy or related field, 5 years of farm-related experience including research plot design and staff supervision. Salary commensurate w/experience, with base salary $55,200.

Details/Apply: **https://ejobs.umd.edu/** Position #103087. Best consideration /closing date: May 8, 2015. Contact: Barbara South (410) 827-6202. EEO/AA.

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