Farm Views

Watch for chinch bugs in '99

Last fall, Z. B. Mayo, UNL extension entomologist, conducted a survey of over-wintering chinch bugs in bunch grasses in southeast Nebraska. Most of the samples from traditional chinch bug problem areas were low, but one location in Saline County averaged over 1300 chinch bugs per ft^2 suggesting that farmers should be on the lookout for chinch bugs in 1999. The following table gives a summary of the survey results.

Since the last chinch bug outbreak in the early 1990's, the amount of acreage planted to wheat and sorghum in southeast Nebraska has declined. To some extent, these changes in cropping patterns may be helping to keep chinch bug populations in check. However, farmers who have wheat and are planning to plant sorghum may want to leave their options open as long as possible to allow changes in their cropping plan. Farmers should inspect wheat fields in the spring for the presence of chinch bugs. Wheat that is thin or fields that have significant volunteer wheat from last year are most likely to be problem fields. If significant levels of chinch bugs are found, consider planting a non-host crop, like soybeans, in adjacent fields.

It is important to note that this survey was taken with only a few samples and care must be taken not to over interpret this data.

Data courtesy Z. B. Mayo, Department of Entomology, UNL. (BPO)

County	Location #1 bugs/ft^2	Location #2 bugs/ft^2	Location #3 bugs/ft^2	Average bugs/ft^2
Gage	42.3	23.7	171.0	79.0
Jefferson	14.0	15.6	—	14.8
Lancaster	12.0	—	—	12.0
Pawnee	0	0	—	0
Saline	153.3	1372.0	—	762.8
Saunders	0	10.6	—	5.3

Cut down on tillage with no-till or ridge-till

As producers think about another season of crop production, they should ask themselves whether they should go no-till or ridge-till instead of conventional tillage. In Nebraska, soil moisture conservation and erosion control is a concern. Tilling the ground opens the soil up and dries it out, which may interfere with crop germination. Last fall, subsoil moisture levels weren't replenished as much as usual, which also could cause a problem. Surface residue can help protect what soil moisture is available. Not tilling the ground is favorable to keep this reside in place.

For the last 20 years, whether to no-till or ridge-till has been a farming issue. An estimated 10 percent of Nebraska farmers ridge-till, while 15 to 20 percent use no-till. The rest use conventional tillage methods. Tilling the ground first makes planting time longer because it takes more time to prepare the soil. With no-till or ridge-till, tillage doesn't have to be done, making planting go faster.

No-till and ridge-till also offers better machinery management, especially when combined with crop rotation. A no-till producer can farm two to three times the number of acres because it takes less time. No-till takes less power to pull equipment, is a soil saver and is a cost-efficient way to plant.

With no-tilling or ridge-tilling, a farmer doesn't have to invest in as much tillage equipment and people to do it. Chemical use stays about the same because a producer is not letting tillage plant the weeds. No-till keeps soil from being disturbed, thus not aggravating the weed problem.

The number one long-term benefit is improved soil structure resulting in better yields. Short-term benefits are equipment savings. With no-tilling or ridge-tilling, less equipment is needed, cutting money spent on equipment in half. Although different equipment is needed, a producer sells the tillage equipment and has less to replace. Most planters can be modified to ridge- or no-till for little or no cost. The crop rotation aspect allows the farmer more acres with less equipment, and equipment can be used for a longer period of time.

For more information on tillage system comparisons, see NebGuide G91-1046 "Conservation Tillage and Planting Systems."

SOURCE: Paul Jasa, extension engineer, NU/IANR (TD)

Questions about liming acid soils

1. I have a soil sample that shows my pH is at 5.9 and my buffer pH is 6.3. What do these numbers mean?

Soil acidity can be thought of as two types: active or soil solution acidity and reserve or exchangeable acidity. The active acidity of a soil is measured directly by a pH meter in the lab. A pH of 7.0 is neutral. Lower pH values are acidic and higher pH values are basic. The scale is logarithmic. That is to say a pH of 6.0 is 10 times more acidic than a pH of 7.0 and a pH of 5.0 is 100 times more acidic than a pH of 7.0.

Reserve acidity depends on several factors, such as the amount and type of clay, amount of organic matter, and soluble aluminum concentration in the soil. Therefore, two soils can have the same pH, but different lime requirements. A chemical test, using a buffer, is performed in the laboratory to determine the amount of calcium carbonate equivalent (CCE) necessary to raise the soil pH to a desired level. This buffer solution reacts with the soil to neutralize both the active and reserve acidity. The change in the pH of the buffer can then be measured and correlated to the amount of lime needed per acre to obtain the same result in the field. This is reported on the soil test report as buffer pH. A rule of thumb for buffer pH values is for every 0.1 point below 7.0, it takes about 1,000 pounds of CCE to bring the top 7 inches of soil up to a measured pH value of 6.5. At a buffer pH of 6.3, it will take about 7,000 pounds of CCE per acre.

2. Does liming really make sense economically?

Nutrient availability is affected by the pH of the soil in two ways. Clay and organic matter carry negative charges. Positively-charged particles (called cations) are attracted to and held by, the negatively-charged sites on the clay and organic matter particles until the plant roots exchange a hydrogen ion (H^+) for the plant nutrient which is then taken up into the plant and used.

There are a finite number of cation exchange sites in the soil. This can be measured in the laboratory and is reported on some laboratory reports as the cation exchange capacity (CEC) of the soil. As the cation exchange sites get filled up with hydrogen ions, fewer sites can be occupied by the cations that are needed for the metabolic processes in the plant. The essential plant nutrients that are held as cations in the soil include: NH_4^+, K^+, Mg^{2+}, Ca^{2+}, Cu^+, Cu^{2+}, Zn^{2+}, Mn^{2+}, Fe^{2+} and Fe^{3+}.

pH also affects the availability of the nutrients which are present in the soil. A pH of 6.0 to 7.0 is ideal because in that range most of the major plant nutrients are most available for use by plants. P, K, Ca, S, Mo, and B are all more available to plants in this range than at lower pH values.

Conversely, at very low pH values (below 5.2) aluminum enters the exchangeable ion complex. Aluminum is toxic to plants and further depresses yields if pH is allowed to get this low.

Besides the effect that pH has on the purely chemical processes in the soil, pH also affects the microbiological processes as well. Bacteria in the soil are more active between pH 6.0 and 7.0, thus mineralization of organic matter is better (increasing the availability of nitrogen and other nutrients such as phosphorus, sulfur and other nutrients). Also, the bacteria associated with nodulation and nitrogen fixation by legumes function better in the 6.0-7.0 pH range.

It is, therefore, best to maintain the soil pH at values above 6.0. A pH of 6.5 is considered ideal. However, because it is expensive to apply lime and because it takes several years for the lime to fully react in the soil, liming should be considered an eight-year investment. Remember, also, that the same things that made the soil acidic in the first place are going to continue to occur, requiring periodic applications of lime in the future.

3. Could I wait another year or two to apply lime, given low commodity prices and perhaps tight finances?

Yes. This soil pH tested 5.9. This is below the ideal range but probably not low enough to have much affect on yield in most years. However, the pH of this soil is at the point where nutrient availability is beginning to decline. Lower pH values will reduce nutrient availability even more and will have yield consequences.

Remember, the longer one waits, the more lime it will take to correct the pH. Also, due to the high cation exchange capacity of your soil, the buffer pH is already quite low, thus requiring rather large amounts of lime to correct the problem. It would be good not to get much further behind, because it will be just that much more expensive in the future.

4. Are there differences in lime quality?

There are differences in lime quality due to the chemistry and particle size distribution of the product used. The ag lime we get in eastern Nebraska is a mixture of calcium carbonate and magnesium carbonate plus impurities. Both calcium carbonate and magnesium carbonate are effective in neutralizing pH.

Limestone is not very soluble, therefore needs to have a small particle size to dissolve into the soil solution quickly enough to be considered effective. NebGuide G84-714 indicates that limestone held on an eight-mesh screen (the size of gravel) is less than 10% effective, whereas that passing an eight-mesh screen and held on a 60-mesh screen (like course to fine sand) is about 40% effective, and that passing through a 60-mesh screen (like gritty flour) is 100% effective.

Lime is tested and the neutralizing effectiveness is expressed as calcium carbonate equivalent (CCE). Most labs will recommend lime requirement as pounds per acre of CCE. Lime suppliers in Nebraska must register with the State Department of Ag and the minimum CCE value must be specified. Most ag lime in Nebraska runs between 60-65 percent CCE. Therefore, if a lab recommends 3,000 pounds of CCE to raise the pH to 6.5, and a lime source having 60% CCE is used, it would take: 3,000/ 0.60 = 5,000 pounds of that lime to meet the recommendation.

5. Could I apply less than the recommended amount of lime and still do some good?

University of Nebraska lime

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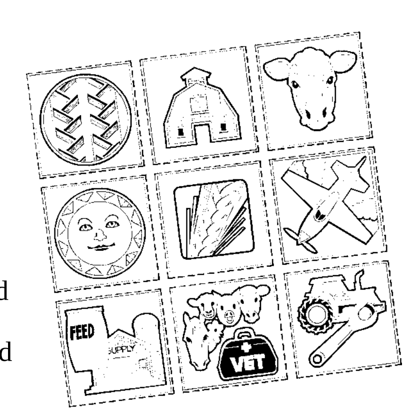
Introduction to precision agriculture



March 19th 8:30 a.m. - 4:00 p.m.
Location:
Lancaster Extension Education Center
444 Cherrycreek Road

Precision Agriculture has grown in importance and application as more agricultural producers become interested in this technology. This one-day seminar will introduce participants to the basics of this new and expanding field and provide information for future decisions. Participants will learn the principles of Precision Agriculture by both classroom instruction and hands-on examples. Topics include GPS technology, GIS technology, yield monitors and interpretation of collected data.

Cost: $15–Includes coffee, rolls, lunch and a reference manual.

Preregistration is requested, 441-7180. (DS)