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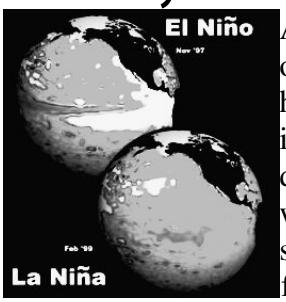
CPT Newsletter

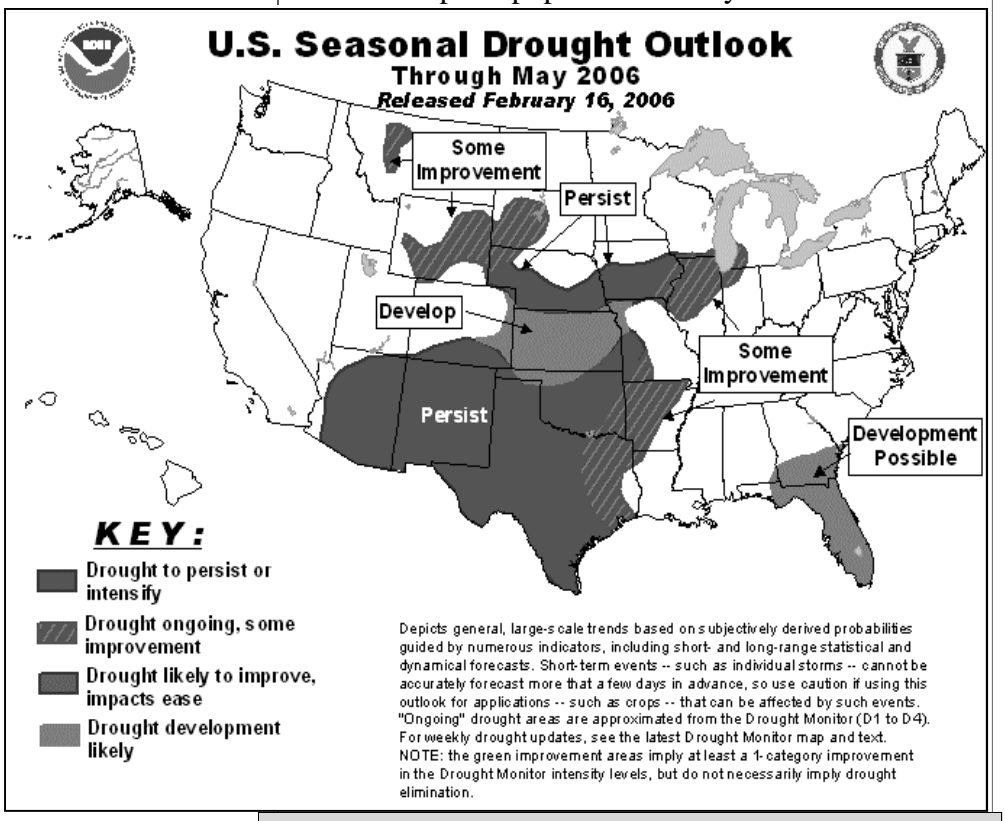
Is a Dry 2006 in the Forecast?



http://ciencia.nasa.gov/headlines/y2004/21may_drought.htm

A La Nina pattern or cooling of the Pacific Ocean surface has just recently developed in the Pacific Ocean. To date, the La Nina appears weak, but is growing stronger and is responsible for causing a warmer winter across the U.S. In another words, the tropical Pacific is one degree lower than normal and this has caused a ridge of high pressure that has shifted the jet stream north, thus stopping the outbreaks of Artic cold air that usually blow onto the middle of the country at this time of the year. La Nina effects are less understood and more difficult to predict than its opposite, the La Nino, which is the warming of the tropical Pacific. In the past 20 years, there has only been 3 La Ninas compared to 7 El Ninos. The La Nina condition can also favor hurricanes and drought, but only time will tell if the La Nina will persist and cause any problems. In the past, La Ninas in 1988 and 1998-2000 were associated with severe drought over areas of the United States.

Currently, the U.S. Drought monitor describes the drought intensity in Southern Iowa and Northern Illinois as "severe drought" (level D2), in Central Iowa and Central Illinois as "moderate drought" (level D1), and in areas of Northern Iowa and South Central Illinois as "abnormally dry" (level D0). The level of (D4) is the highest and (D0) is the lowest level of drought intensity. Even though we are currently experiencing dry conditions, don't give up on spring rains! The odds are in our favor that we could still receive enough moisture in the spring. But, if the drought continues into the spring, there may be some things growers can do to help conserve topsoil moisture for early crop growth. With limited topsoil moisture, there is always a potential for low plant populations and yield reduction.



In this Issue

- Tillage: A single tillage pass could cause a loss of up to one-half inch of soil moisture or more and even deeper tillage exposes more of the soil profile to drying. Fields that are not tilled in the fall may retain moisture in the top few inches. If possible, you may want to reduce tillage to help to prevent the loss of moisture. No-till may be better suited for moderate to well drained soils. A plus is that this may decrease fuel expenses. If fields were tilled last fall they may need to be leveled with a (early spring or just before planting) secondary tillage operation before planting to conserve soil moisture. The "early spring strategy" will open the soil for some drying, but any spring rain that does occur can easily soak up into the soil. The "just before planting strategy" will help conserve moisture within the soil up until right before the seed is planted.

- Variety Selection- It is wise to stick with high yielding varieties with good drought tolerance, early season vigor, and stable yield. The high population tolerance can be used as an "indirect indication of drought tolerance" of a hybrid. Early season vigor is important to promote healthy, vigorous stands that in turn will help with any stress later in the season. Stable yielding means that hybrids will hopefully yield at a relatively constant level in any environmental conditions. Performance of last year's corn hybrids may be a good indicator of what to plant in a drought year. Remember that a good root system will enable the plant to extract more moisture from the soil.

- Seeding Rate – If you think drought will hit in 2006, you may want to consider dropping the seeding rate of corn according to the production level for a particular field and hybrid. However, some experts warn if you drop your corn seeding rate and a drought does NOT occur, you are guaranteed not to attain the maximum yield potential if your yields are historically above 125 bushels per acre.

- Seedling Depth- If the soils are dry at planting, you may want to plant corn as deep as 2.75 inches if necessary so that the seed is placed in uniform, moist soil. Soybeans should not be planted deeper than 11/2 inches because seedlings will have too hard of a time emerging.

- Planting Date- Early planting, especially of corn, helps to avoid summer heat and dry stress conditions during pollination. If planting early, make sure that the fields are ready and temperatures are warm enough.

- Fertilizer- Once again, if your feel strongly that there will be a drought this year, side-dressing may be the way to go. However, if rains come in June, you may not be able to cover all of your ground if side-dressing. Also, dry weather may hinder the soil's ability to seal the crack left by ammonia knives and manure applicators.

- Herbicides- In most years, growers rely on the rain to move preemergence herbicides from the soil surface into the soil zone to eliminate germinating weeds. Depending on the soil type and existing soil moisture, most preemergence herbicides require at least ½ inch of rain for incorporation. During drought, herbicides are absorbed by the soil colloids, and thus are less available to kill weeds.

⇒ A grower may want to apply the herbicide several weeks ahead of planting because there may be a greater chance of getting rain before weeds emerge. If tillage is done after the herbicide application, you should not incorporate more than a depth of 2 inches.

⇒ Winter annuals can deplete soil moisture and increase the stress to crop growth. If you have high population of winter annuals, you may want to consider an early burndown. Winter annuals under drought stress will require higher amounts of burndown herbicides for adequate control.

⇒ Don't forget about the rotary hoe! If rotary hoeing is done at the proper time, it can help overcome the problems of preemergence herbicides during drought. It should be done after weed seeds have germinated, but before weed seedlings

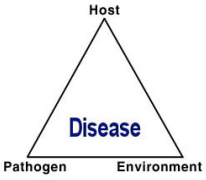
have emerged (white root stage).

- Insect and Disease- Drought stress make crops more vulnerable to insect and disease. So, scouting will pay off!

- Crop Insurance??????????

The Word on Soybean Rust: 2006

Don't forget about rust in 2006. Just because an epidemic did not hit the Midwest, does not mean that rust won't be here in 2006. You can not afford to be complacent with this disease. So, why did we not see rust in 2005? In order for any plant disease to develop, there must be disease inoculum (spores/ bacteria/viruses) present, a susceptible host (plant), and a favorable environment. We definitely had a susceptible host plant (soybeans), but the real question was did we have rust inoculum and a favorable environment for the development of rust? One theory by some is that we just had too hot and dry of an "environment" in the Midwest for rust to infect soybeans. But, the weather did not stop other diseases from developing, such as frogeye leaf spot and bacterial blight. A few rust spores were found in the Midwest, but there was no way of knowing if they were viable. However, we did learn that rust spores are able to travel here, so we could easily have inoculum for the disease to develop. However, experts say that there just was not enough rust inoculum present.



If you look back into the history of rust in other countries, it took a while before there was a widespread infection and high severity. But, this does not mean that growers should not be alarmed. In the past, once rust did get established and there was a build up of spores, it is one of the most devastating diseases that the world has seen. Experts are speculating that soybean rust will act like other rust diseases, common rust of corn, Southern rust of corn, and wheat rust. All these rust diseases first infect in the south, build inoculum, and then spread north to the Midwest.

How will soybean rust build its inoculum supply in the U.S.? There are a lot less soybeans for soybean rust to infect in the Southern U.S compared the Midwest. However, there are a lot of alternate hosts such as Kudzu in the South for soybean rust to thrive and reproduce spores. But, another question is how much of this inoculum will overwinter in the South? Experts say that this will depend on the frost line in the U.S. Last year, the line appeared to be down at the Mexican Gulf, but where is the frost line in 2006? The "hot spots" for inoculum build up appear to be Texas, southern U.S. coastline, Yucatan peninsula in Mexico, and the Caribbean island region. We only can wait, watch, and remain prepared to know when the rust will produce an adequate supply of viable inoculum in the South and spread to the Midwestern U.S. Soybean rust can be managed but it can not be ignored.

Glyphosate Resistant Weeds: What's all the Buzz?

The introduction of "stacked traits" in corn in 2006 may lead to a large number of acres planted with Roundup Ready corn after Roundup Ready Soybeans. Some seed companies are making these stacked hybrids so economically pleasing that they are hard to refuse. On top of that, Roundup ready corn like many other Roundup ready crops, make weed control easy and inexpensive. This "buzz" has caused experts to turn there attention to glyphosate resistance weeds. Should we be worried? Experts are now saying that "it is not a question of if it will happen", because glyphosate resistance has already occurred around the globe. It is a question of how fast glyphosate resistance will spread.

Herbicide resistance happens when there is a repeated use of the same herbicide or herbicide mode of action in minimum tillage systems. Does this sound familiar? The good news is that even though glyphosate has been used on a large amount of acres for more than 30 years for control of more weed species than any other herbicide known, there have only been eight weed species develop resistance against gly-

phosate. This is a good sign that mutations leading to glyphosate resistance are rare. But, the bad news is that with the increased number of acres treated with glyphosate and the more frequent use of glyphosate, the number of weed species resistant to glyphosate will increase. Five of the eight weed species with glyphosate resistance are found in the U.S.

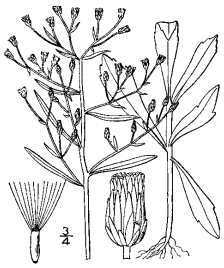
Glyphasate-resistant weeds in the United States

Common name	Scientific name	Location and Year
Rigid Ryegrass	*Lolium rigidum*	CA, 1998
Horseweed	*Conyza canadensis*	DE, 2000 KY, TN 2001 IN, MD, NJ, 2002 AR, MS, NC, OH, PA, 2003 CA, 2005
Italian Ryegrass	*Lolium multiflorum*	OR, 2004
Common Ragweed	*Ambrosia artemisiifolia*	MO, 2004
Palmer amaranth	*Amaranthus palmeri*	GA, 2005

In each case of glyphosate weed resistance, the level of resistance is fairly low if compared to other levels of resistance found in weeds resistant to triazines, ALS inhibitors, and ACCAse inhibitors. This "low level of resistance" has caused there to be more attention placed on the "definition of herbicide resistance and the criteria that should be used to decide whether a weed should be classified as resistant." The publication "Criteria for Confirmation of Herbicide Resistance" has been produced to deal with this problem. There are many weed species that are being studied at this time that are rumored to be glyphosate-resistant weeds: (lambquarters, waterhemp, and giant ragweed); however, there is still not enough evidence at this time to confirm these species as resistant to glyphosate.

There is now no doubt, that the increased use of glyphosate will produce more glyphosate-resistant weeds in the future. The real debate is does it make economic sense for growers in the Midwest to start implementing resistant management strategies to delay glyphosate resistant weed species from developing. Growers are told to rotate herbicides (sites of action) or tankmix other herbicides with glyphosate to help SLOW "the selection of glyphosate resistant weeds." Growers can always go back to the weed control programs that existed before Roundup Ready crops to manage glyphosate resistant weeds. But, the weed species that have already evolved resistance to triazines and ALS inhibitors will more likely also develop glyphosate resistance. This means that the real danger will be that weed species will likely develop **multiple** herbicide resistance or resistance to multiple herbicide modes of action. In this case, there will be no herbicides to "come back too" to control resistant weed species. Currently, there is very little research and development of new herbicide modes of action. This will mean the end to the quick, easy, and inexpensive weed control era.


Rigid Ryegrass


Horseweed

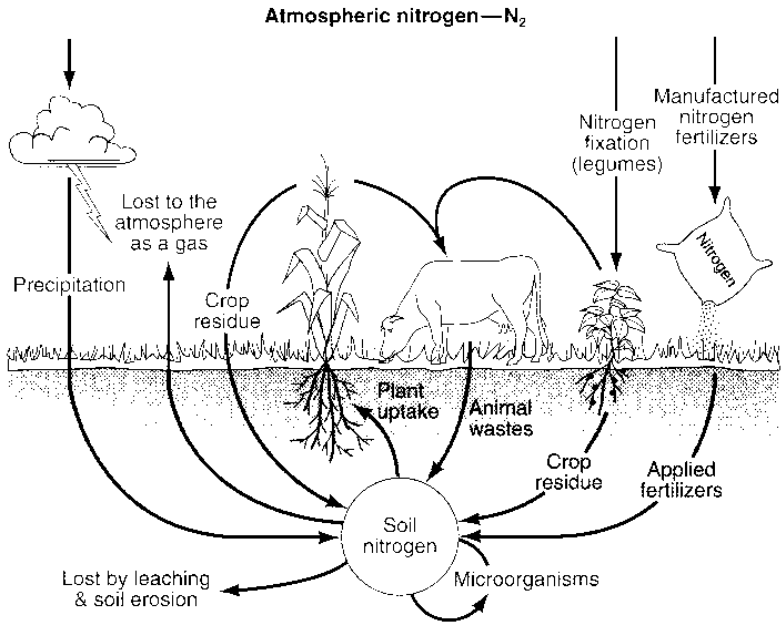

Italian Ryegrass


Common Ragweed


Palmer amaranth

Nitrogen Loss (Back to the Basics)

In the past, fertilizer costs were not usually considered to be substantial production expense, however all that has changed. High fertilizer costs have resulted from the rising cost of fossil fuels, high transportation costs, and an increased demand for fertilizers worldwide. With the rise in fertilizer cost, there has been much debate between experts and growers on how much nitrogen is really needed for a decent corn crop. Ideally a grower wants to apply just enough N to reach a maximum yield, but how much is " just enough"? Depending on your specific situation, you may be able to make a change in your N application in order to make better economical decisions.



We have shown the diagram of the "nitrogen cycle" many times in the newsletter, but what does it really mean to you as grower. As a grower you want to provide the needed amount of nitrogen for the crop and try to minimize nitrogen loss as much as possible. Plants can take up N in the inorganic forms of nitrate (NO3-) or ammonium (NH4+). But, both nitrate and ammonium are susceptible to loss by nitrate leaching, denitrification, and ammonium volatilization.

Nitrate (NO3-) is the only N form that can be lost by leaching and denitrification. Soil microbes are needed to convert ammonia into the nitrate (NO3-) form and this takes some time. Urea ammonium nitrate has 25% of the N already in the nitrate (NO3-) form at application. But, the remainder of urea ammonium nitrate requires the enzyme urease to convert to ammonia gas. If this conversion occurs below the soil surface, the ammonia is almost instantly converted it (NH4-) and will bind to soil particles. However, if the conversion takes place on the soil surface or on residue, there is a chance of ammonia volatilization into the atmosphere.

LEACHING

If rainfall is well above of the demand of the plant, nitrates can be leached down into the soil profile into tile drains or the ground water supply so that it is not available for the plant. This happens because nitrate molecules and soil clay particles have negative electrical charges. The nitrate and the clay will repel each other, the clay will not hold on to the (NO3-), and the (NO3-) is free to move with soil water.

DENITRIFICATION

We need to worry about denitrification on poorly drained soils, such as those fields that are saturated for several days in the spring. When the soils are highly saturated with water and there is low oxygen content within the soil, NO3-N is converted back into a gas into the atmosphere. The form that is released is nitrous oxide (greenhouse gas) or nitrogen gas and will depend on the level of oxygen in the soil.

VOLATILIZATION

Ammonia volatilization is highest when urea fertilizer is applied to soil that is warm (above 50 degrees), experiencing high evaporation rates, or when the pH is greater than 7. High surface residue (no-till or pasture) will increase volatilization.

If urea fertilizer is surface applied and incorporated, or .25 inches of rain occurs within a few days, volatilization losses can be minimized.

WHAT CAN WE DO TO PREVENT N LOSS?

- One suggestion may be apply fertilizer at a different time of the year. Most leaching or denitrification may occur in the fall or early spring due to high rainfall. In order to avoid this, a grower may want to side-dress later for quicker plant uptake and less (NO3-) loss.

- However, side-dressing may not be possible. If N has to be applied early, a nitrification inhibitor is recommended to help to slow the conversion of ammonium (NH4-N) to nitrate nitrogen (NO3-N) in the soil. Depending on soil conditions, a nitrification inhibitor (N-Serve) can slow the N process a few weeks. N-Serve or nitrapyrin can be used with any N fertilizer that contains or produces (when applied to the soil) (NH4-N) such as anhydrous ammonia, urea, and urea-ammonium nitrate (UAN) solutions.

- When urea fertilizers are used, volatilization losses can be reduced if a urease inhibitor (Agrotain) is used. Agrotain, NBPT can reduce the activity of the urease inhibitor for up to 14 days. Rain is necessary for the urea to enter into the soil so that it can be converted to (NH4-N) to lower the risk of volatilization.

- Other options include "coated" fertilizer products. Urea that is coated with urea with a sulfer coating and the urea dissolves through openings in the coating. The release characteristics can be controlled, but thus far sulfer-urea is not a useful agronomic product because in the past the price of the coating was high when compared to the price of the fertilizer. Thanks to "plastic" technology, we have polymer coated urea (PCU). Recently, Agrium Inc. has introduced a PCU called ESN that has been economical in the agricultural market.

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