Volume 2, Issue 3

PLANT & SOIL SCIENCES DEPARTMENT

May 8, 2007

Cropping Systems Newsletter

Special points of interest:

- Waterlogged soils
- Aphids on Canola

Useful Links:

www.soybean.okstate.edu

www.canola.okstate.edu

http://alfalfa.okstate.edu

www.wheat.okstate.edu

http://forage.okstate.edu

www.peanut.okstate.edu

The difference a year makes!

Chad Godsey, Extension Cropping Systems Specialist

What a difference a year makes. Last year we were waiting for rain to plant summer crops and now we are waiting for things to dry up. Last year we had crusting problems and this year we have waterlogged problems. Due to continued rainfall in the state we are experiencing waterlogged conditions in many areas of the state. Waterlogging of a field for several days reduces the crop growth rate and can potentially reduce yield. Detrimental effects from the lack of oxygen on plant growth can be attributed to three primary things 1) lack of oxygen and a resulting decrease in root growth, 2) nitrogen deficiency due to denitrification or leaching, and/or 3) toxic compounds that build up in the plant. Waterlogged conditions reduce the crop growth rate by replacing the air in the soil with water, depriving the root system of oxygen.

Respiration is the physiological plant process most sensitive to flooding. Respiration is a necessary process that the plant uses to provide energy and building blocks for growth. In waterlogged soils oxygen diffuses more slowly through water than air, the roots become deprived of oxygen and are unable to maintain normal respiration. Waterlogged plants may display the following characteristics: chlorotic, yellow appearance; reduced growth rates; reduced photosynthesis and respiration; reduced nutrient uptake; and altered plant hormone levels.

Younger plants are more susceptible to injury compared to older plants because of fewer roots. Older plants will often times have roots that extend below the saturated zone where more oxygen is available. Soybean and sorghum plants that have just emerged in the last couple weeks will most likely show the most symptoms because of limited root growth. If soils stay waterlogged for more than 48 hours it would not be surprising to see some symptoms appear.

Even if flooding doesn't kill plants, it may have a long-term negative impact on crop performance. Excess moisture during the early vegetative stages reduces root development (Wenkert et al., 1981). As a result, plants may be subject to greater injury later during a dry summer because root systems are not sufficiently developed to reach available subsoil water.

A considerable amount of oxygen is required in the soil for mineralization of nutrient elements from organic matter by microbes. Oxygen deficiencies reduce microbe activity, decreasing the rate at which ammonium and nitrate are supplied to plants resulting in nitrogen deficiency in waterlogged soils. Flooding can

also result in losses of nitrogen through denitrification and leaching. This is a year where producers will likely see a huge benefit of the handheld sensor technology to predict side-dress N application rates in corn. We no doubt will lose nitrogen to leaching and denitrification.

In Oklahoma, yield reduction is seldom observed from waterlogged conditions because we usually dry out soon after waterlogged conditions begin. The effect on the crop from waterlogged conditions depends a lot on what the remainder of the growing season holds. Will it be hot and dry or remain wet and cool? If we get a few drying days soybean, corn, and sorghum plants should recover quickly and begin normal growth.

Soybean plants growing under waterlogged conditions. Notice the reduced growth of the plants were water is standing.

Be on the Watch for Aphids

Kris Giles, Entomologist

If you haven't had to spray for aphids on winter canola you should be closely monitoring your fields because we have seen an increase in turnip aphids and green peach aphids on the leaves. When on the leaves at this stage of growth they will likely not cause damage to maturing plants unless severely infested. In a few locations, the Grayish/waxy cabbage aphids have started to congregate on terminals near flowers and around pods. These cabbage aphids can cause significant damage if they spread throughout a field.

Cabbage aphis congregate on terminals near flowers and around pods. These cabbage aphids can cause significant damage if they spread throughout a field.

"Cabbage aphids can cause significant damage if they spread throughout a field.

Upcoming Events/Meetings

- North Central Oklahoma Research Station Wheat Tour, Lahoma, Oklahoma, May 18, 2007
    - Registration at 9:00 am, Tours Begin at 9:30 am

- The Changing Faces of Agriculture Field Day, Cimarron Valley Research Station, Perkins, Oklahoma, May 22, 2007
    - Registration 8:00 am, Tours Begin at 8:30 am

Subscription information

The *Cropping System Newsletter* is published in electronic format on an as needed basis throughout the year. To receive an electronic copy in pdf format, send an email with **subscribe** as the subject line to chad.godsey@okstate.edu

Chad Godsey, PhD
Cropping Systems Extension Specialist
368 Agricultural Hall
Stillwater, OK 74078

PLANT & SOIL SCIENCES
DEPARTMENT