2000

*Crop Watch* No. 2000-14, June 23, 2000

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Recent rains provide short-term relief

Drought conditions continue to plague substantial portions of the Cornhusker state, although some areas have seen a moderation in conditions over the last 10 days. Three storm systems have crossed the state -- June 10-11, June 14-15, and June 19-20.

Although rainfall was not universal, the combination of the three events has provided significant short-term relief for east central, northeast, south central, and southeast Nebraska. Most areas within these regions have received 2-3 inches of precipitation, with isolated locations receiving 5 inches. The southwest district has not been as fortunate as its eastern counterparts, with precipitation averaging about 0.50 inches for the same period.

Extreme drought conditions across southeastern Nebraska have been temporarily reduced to severe conditions as reflected in the current U.S. Drought Monitor. It must be noted that if a return to hot, dry, windy conditions occurs during the next two weeks, this area likely will return to the "extreme" category. In addition, a continuation of dry conditions in the southwestern corner of the state may move the area in the "extreme" category.

The recent rains could not have come at a better time, as the corn crop is rapidly approaching growth stages that will determine its potential yield. Corn will need almost .33 inch of moisture a day in the next development stage, quickly negating any moisture gained from recent rains.

Forecasts

Short-term forecasts indicate that a strong upper air ridging pattern will become established over the western third of the United States. This ridge is expected to slowly build eastward over the next two weeks, with above normal temperatures moving into Nebraska as early as this weekend. Forecast models indicate the potential for scattered thunderstorms during the period.

Factors of soybean leaf cupping

(The following article is by Bob Hartzler, Extension weed management specialist at Iowa State University, and recommended by Alex Martin, NU Extension weeds specialist.)

Leaf cupping in soybean is not well understood. Growth regulator herbicides (such as 2,4-D and dicamba) will trigger this response due to drift or contaminated sprayers.

The first step in dealing with this situation is to rule out the possibility of the soybean coming in contact with a growth regulator herbicide. Undoubtedly the introduction of...
Gary Hall, Extension educator in Phelps and Gosper counties: A large portion of Phelps County was hit by hail, high winds and lots of rain Monday night. Corn and soybeans were stripped. In most cases the crop will recover, but some producers are considering other crop options.

With the fluctuations of temperatures this spring there is a sense that the weather may not allow for crop maturity. The corn was at the 6-8 leaf stage and the growing point protected in most hailed areas. The wheat crop is being harvested for forage in some cases. The wheat is very light test weight and there are reports of elevators rejecting the light wheat.

Jim Schild, extension educator in Scottsbluff County: The wheat harvest in the Scottsbluff area will probably start in early July, a good 10 to 14 days ahead of normal. Hot dry winds the last two weeks are taking a toll on the wheat crop during the seed fill time. Wheat yields will be best at 25 bushel per acre. Flag leaves on many fields have burned up due to dry conditions or disease pressure.

Paul C Hay, Extension Educator in Gage County: Wheat harvest has begun with reported yields of 4 to 25 bushel per acre and test weights of 51 to 61 pounds per bushel.

Summer fallow fields are better, but the 70% of the crop planted after beans and corn is poor.

This week we started receiving calls on swathing corn. Most dryland corn will tassel when plants are 3-4 feet tall.

Soybeans are slow growing, but hanging on for now. Most milo fields look good and haven’t run out of moisture yet. Some grasshopper spraying has been necessary.

Terry Gompert, Extension educator in Knox County: Corn is really growing. Moisture stress is visible in corn only in light soil types. There’s insect pressure on both corn and soybeans, but to a nominal degree. Range and pasture conditions vary across the county. Some of the grass is getting very brittle. In the continuously grazed pastures the cattle often break off more grass than they graze. In dry condition, grazing rotations really help encourage a higher percent of utilization (of the grass).

Many calls of trees dying, especially blue spruce. Most of these deaths are due to plants entering last winter in a very dry condition. Home owners need to water deep and often, especially in the fall.

Alfalfa is growing and a second crop appears to be coming. Many alfalfa producers have asked that CRP not be released because it will contribute to lower alfalfa prices. Alfalfa prices are just now starting to rebound. The last CRP release lowered alfalfa prices by $30 per ton. In all reality, alfalfa is the only cash crop produced in the county this year payment, since corn and soybean profit will be derived from government payments.

Ralph Anderson, Extension Educator in Buffalo County: We need to continue scouting for spider mites on corn. Although we have not seen a lot of mites in our area there have been some. We also are seeing a buildup of grasshoppers in field margins.

(Continued on page 123)
Soybean leaf cupping (Continued from page 117)

Several new package mixes containing dicamba will lead to a few problems of drift or contaminated sprayers by unsuspecting users of these products. Even though these products contain less dicamba than the stand-alone products (Banvel, Clarity), problems will still arise due to the high sensitivity of soybeans to dicamba. Thus, the same precautions need to be followed whether applying Banvel/Clarity (0.25 - 0.50 lb dicamba/acre) or Northstar (0.12 lb dicamba/acre).

The number of problems associated with leaf cupping has increased with the increase in postemergence applications in soybean. Roundup Ready soybeans seem to be as likely to develop the response as traditional varieties. While sprayer contamination with dicamba or 2,4-D often is responsible, it has become apparent that 'growthregulator type symptoms' can develop in the absence of growth regulator herbicides. Leaf cupping has been observed following applications of all types of herbicides; thus, the response does not appear to be related to the herbicide's specific mode of action. The response may be due to the inert ingredients in the herbicide formulation, the herbicide itself, or the spray additives used with the herbicide.

Soybean plants also may develop cupped leaves in the absence of herbicide applications. This most commonly occurs during conditions of rapid growth. Apparently under these conditions, the balance of naturally occurring hormones in the plant is disrupted, resulting in symptoms characteristic of growth regulator herbicide damage. When this situation develops, the entire field frequently develops symptoms and there will not be any indication of a "drift" pattern. Another thing to look for is the presence of growth regulator symptoms on susceptible weeds in the field. Velvetleaf is very responsive to low levels of dicamba. If soybeans are exhibiting cupped leaves but velvetleaf in the field appears normal there is a good likelihood that the cupping is an environmental response rather than one caused by a growth regulator herbicide.

Soybean leaf cupping near unaffected velvetleaf

According to Garren Benson, former extension corn and soybean specialist, soybeans did not develop cupped leaves in the absence of a growth regulator herbicide 15 to 20 years ago. Due to the high pH soils found in much of Iowa, dicamba has been a leading herbicide for nearly 20 years, thus an increase in dicamba usage is probably not the cause of the malformed leaves. A possible explanation is that current genetics found in soybean are prone to this response. I like to say that today's higher yielding varieties are more temperamental than older varieties, and this results in their hormones getting out of balance occasionally and creating a growth regulator herbicide-type response.

However, there are no data to support this theory. When dicamba or some other growth regulator herbicide are not involved, soybean plants typically resume normal growth shortly after the cupped leaves are observed. Frequently two or three leaves will develop symptoms and then normal growth resumes. We do not believe that soybean yield should be impacted under these situations.

The potential for a yield response is greater when a growth regulator herbicide is involved; however, it is impossible to determine the extent of yield loss by examining symptoms that develop after the exposure. The only reliable method of determining a yield response is comparing the yield of the injured soybean to an area of the same field that is unaffected by the herbicide. In many situations, a valid comparison is not available to help determine the cost of the herbicide damage.

Courtesy of Bob Hartzler, Extension weed management specialist, Department of Agronomy, Iowa State University

EPA proposes pesticide label revision

Earlier this year the EPA proposed revising the format and content of first aid advice on all pesticide product labels to make them easier to read. The revision incorporates recommendations by the medical community and the Consumer Labeling Initiative.

Changes to labels will include: section headings labeled Frist Aid instead of Statement of Practical Treatment; new format designs; and first aid advice for each pathway of exposure through the mouth, skin, inhalation, and eye. The goal is to revise all product labels by Oct. 1, 2001.

For more information, please contact Amy Breedlove in the office of Pesticide Programs at (703) 308-9069, or by Email at breedlove.amy@epa.gov. For a copy of the notice, see: www.epa.gov/PR_Notices/

Larry Schulze
Extension Pesticide Coordinator
Plant response to drought

Mid-season stress most critical to corn

In recent weeks when temperatures extended into the 90s the stress to the state’s corn crop was evident. Leaves began to curl, indicating that the plant was now unable to adjust internally for the deficit of soil moisture. Leaf curl makes sense: it is an excellent way for the plant to avoid as much stress as possible. Less sunlight is absorbed by the leaves so there is less potential for the plant to dry out.

Leaf curl is not a sure sign of severe yield loss. The plants may produce less total leaf area, and may end the season shorter, but if conditions improve corn can outgrow some early season drought stress. Robert L. Shaw of the Department of Climatology and Meteorology, Iowa State University, reviewed many drought-stress experiments and summarized the data (see figure).

Roger Shaw, ISU, summarizes the effects of short-term drought stress on corn yield observed in a series of field experiments. The shaded area shows the range of yield losses possible when short-term stress occurs at different growth stages. From “Corn and Corn Improvement,” Agronomy Monograph 18, 1988.

Table 1. Summary of drought stress effects on corn.

<table>
<thead>
<tr>
<th>Time of stress</th>
<th>Visual symptom</th>
<th>Source of yield loss</th>
<th>Potential severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>At emergence</td>
<td>Dead plants, particularly if shallow seeded</td>
<td>Reduced number of ears per acre</td>
<td>Low when stand losses less than 15%</td>
</tr>
<tr>
<td>Early in vegetative growth</td>
<td>Leaf curling</td>
<td>Reduced leaf area, reduced photosynthesis</td>
<td>Normally low to moderate</td>
</tr>
<tr>
<td>Leaf stage V5 to V11</td>
<td>None immediately; at ear formation barren plants or reduced number of kernels per ear</td>
<td>Reduced number of ears per acre or kernels per ear</td>
<td>Low</td>
</tr>
<tr>
<td>At pollen shed</td>
<td>Silks come out late; kernels missing at random throughout the ear</td>
<td>Reduced number of kernels per ear</td>
<td>Moderate to complete crop failure</td>
</tr>
<tr>
<td>Pollination to two weeks afterward</td>
<td>No seed formed at the ear tip; ring of shriveled kernels next to full-sized kernels at base of ear</td>
<td>Reduced number of kernels per ear</td>
<td>Moderate to severe</td>
</tr>
<tr>
<td>During grain fill</td>
<td>None immediately; senescence may be early</td>
<td>Reduced photosynthesis leading to smaller kernels</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
Regents approve Master of Agriculture program

The University of Nebraska Board of Regents Saturday (June 17) approved a new master of agriculture degree program to be offered at the Lincoln campus. The program opens a new avenue for advanced technical education in agriculture that should be especially useful to Nebraskans already working in the industry. The proposal next goes to the Nebraska Coordinating Commission for Postsecondary Education for consideration. Donal Burns, NU associate executive vice president and provost, said he didn’t know when the commission would take up the matter.

Other universities already offer master of agriculture degrees, but the University of Nebraska-Lincoln’s would be one of the few in the nation to be available both on campus and via distance education. Steve Waller, incoming interim dean of UNL’s College of Agricultural Sciences and Natural Resources and an author of the plan, said the master of agriculture program will differ from the typical graduate degree because it will address the needs of working agricultural professionals for advanced education and offers an alternative to the research-based master of science degree program.

Such advanced instruction is important, Waller said, because of ever-changing technology and regulations in areas such as agrichemicals, crop consulting and the seed industry. The program will be flexible so that participants can tailor it to meet their specific needs, and the distance-education component will make it easier for working professionals to participate.

Implementing the new program won’t require any new faculty or new courses, at least initially.

Stress on corn (Continued from page 120)

He found a 3% reduction in yield per day of stress early in growth. In some experiments that same rate of yield loss occurred throughout the season (lowest curve), but on average (middle line) there was a pronounced increase in corn’s sensitivity to drought starting around the time of silking and continuing for about two weeks. Yield losses can jump to 8% per day of stress during that period.

Yield loss near pollination can occur for several reasons. If soil moisture is severely limited, pollen shed can occur before silks are out. This lack of synchrony between pollen shed and silking occurs because the plant’s machinery for producing and shedding pollen is slightly less drought sensitive than the silks. A good supply of water is needed for the silks to push themselves past the ear and out through the husk. Poor pollination results in spotty kernel set. The kernels that pollinate properly often grow extra-large in the absence of neighboring kernels.

Even if pollination is 100%, drought stress can still reduce the number of kernels set by the crop.

After seeds are pollinated, plants seem to decide how many seed they can support and then abort the extra, starting with kernels at the end of the ear and moving toward the base. The rate of plant photosynthesis during that period appears to be the deciding factor. Low photosynthesis per plant leads to high kernel abortion. Other stresses also can cause corn to react in the same way: nutrient deficiencies, temperatures too high or too low, populations too high, and low solar radiation can affect yields by reducing photosynthesis and thereby increasing kernel abortion. This phenomenon has been an active area of research for crop physiologists in recent years.

The table on page 120 summarizes how drought stress at different points in the life cycle can influence corn yield. At harvest, to find out how drought stress may have shaped your yield, check the components of yield: note the stand (plants/acre), ears/plant, kernels/ear, kernels/kernel-row (spotty? or kernels lost at tip?), and weight/kernel. These yield components often reflect the plant’s stress history throughout the season.

Bob Caldwell, Extension Cropping Systems Specialist

Regents approve IANR mergers

At its June meeting the NU Board of Regents approved two mergers affecting the Institute of Agriculture and Natural Resources. The Departments of Horticulture and Agronomy will be merged effective July 1. The agronomy department now has about 50 faculty members and horticulture has 15 faculty members. Each department has about 150 undergraduate students.

The Center for Applied Rural Innovation (CARI) is the result of merging three NU centers: the Center for Rural Community Revitalization and Development, the Center for Leadership Development and the Center for Sustainable Agricultural Systems. The new Center will link training in community and economic development, leadership and sustainable agriculture and provide rural residents with practical skills to revitalize their communities.
Irrigation management, efficiency especially important this year

In a year when irrigators may need to apply more water than usual and fuel prices are as much as 65% higher, reducing irrigation energy cost is especially appealing. In many cases, pumping less water may not be an option, so irrigators may want to consider one or more other factors they can control:
- improving irrigation management;
- improving water application efficiency; and
- improving pumping plant performance

**Irrigation management**

Schedule irrigations using the checkbook method: measure soil water status (see page 123), rainfall and irrigation water applied to a field and subtract evapotranspiration (crop water use) accordingly. Balance rainfall and irrigation applications with crop water use and expected water demands. Daily ET updates are available from several sources, including some county extension offices, the Crop Watch Web site and the High Plains Climate Center (by fee). Probe soil one to two days after irrigation to determine penetration of applied water and uniformity of application.

**Water application efficiency**

Adjust set times and stream sizes during the irrigation season to what will most efficiently allow water to proceed to the end of the row. With center pivots, apply at least 1 inch of water for each revolution.

**Pumping plant performance**

Be sure to assess all three aspects that contribute to pumping plant performance -- the pump, power unit and gearhead. Use a flow meter available from your local NRD to measure pump output. Also evaluate lift, discharge pressure and fuel and energy consumption. Calculate the efficiency and compare your system to the performance standard. Several factors may contribute to poor performance: poor maintenance or excessive wear of equipment or pumping plant components mismatched to the current situation. A drop in the water table, which may occur in some areas, may necessitate an adjustment in the placement of the pump to be more efficient.

Improving irrigation efficiency will save dollars as well as water, which may be especially advantageous this year with higher energy costs. Consider the costs compared in the following example: a 750 gpm system with 100 ft lift and 45 psi discharge pressure applying 1 inch on 130 acres. Last year when diesel fuel was about $0.70 a gallon, total cost for the application was $170. This year, with fuel costing $1.02 a gallon, total cost would be $246, an increase of $76 or 45%.

For more information on irrigation management or improving the efficiency of your irrigation system, contact your local Cooperative Extension office for publications or visit the Cooperative Extension publications web site for irrigation at http://www.ianr.unl.edu/pubs/irrigation.

Soil probes

We encourage every farmer to have a good soil probe for checking subsoil moisture.

Two sources are: Clements Associates at Newton, Iowa, which makes a conventional 'T' handle probe with a 15-inch coring tube (for a 12-inch core) for about $120 plus shipping; and Oakfield Apparatus Co. at Oakfield, Wisconsin.

(Mention of commercial products does not indicate endorsement or discrimination.)

Richard DeLoughery,
Water Quality Education Coor.
Field updates (Continued from page 118)

Rootworm larvae continue to be present in many corn fields and treatment decisions will need to be made before final cultivation to be most effective. While the larger rootworms are nearing maturity and will soon pupate, many younger ones also are coming on. We may have producers who decide that the rootworm beetle treatment is not adequate with the high numbers of beetles and the wide window of beetle emergence. We have not positively identified resistant beetles, but suspect that we may be getting some.

We are also seeing army worms feeding in isolated grassy areas of the corn fields.

Ron Seymour, Extension educator in Adams County: Irrigated crops are in good condition, as are dryland crops where moisture conservation has been a priority.

Corn plants are in 8- to 9-leaf stages, with hilling complete in most areas. Water applications are being made in a number of furrow- and pivot-irrigated fields. Rootworm beetle larvae were found in the third instar, (final feeding stage) with some report of field damage. Banks grass mite colonies were found on the edges and interior of some fields. The colonies were generally found on the lower leaves, but some plants had colonies as high as the fifth leaf.

Spider mite predators were also noted feeding in the colonies. Stalk borer damage was noticed on the edges of fields with the larvae in the third instar. European corn borer larvae were found in the second to third instar, (medium-sized larvae) but only a few infested plants have been noticed. The European corn borer moth flight was very minimal. A few corn earworm moths were caught in a light trap located south of Hastings.

Soybean plants are in the third to fifth trifoliate stage, with the plants beginning to bloom in a few fields. Cultivation is completed in most fields. Herbicide has been applied to much of the Round-up ready crop. No pest problems were noticed.

Wheat fields are ripening with the kernels in the soft to hard dough stages

Alfalfa fields are in the 10% bloom stage and second cutting is underway on a few irrigated fields. The dryland fields are very short, 2 to 6 inches, particularly where moisture is limited. Grasshoppers were found in the first and second instar (recently hatched).

Sorghum plants are in the 4- to 5-leaf stages. The fields look good with adequate soil moisture, generally with soil moisture depletion of 20-30%. No insect pests were found.

Winter annual pasture grasses are starting to dry down. There was a report of grub damage in a small pasture.

Measuring soil moisture

Evaluating soil moisture is one of an irrigator’s most important management tools. Determining the status of the soil moisture reservoir guides the decision of not only how much to irrigate, but also when to irrigate. The "appearance and feel" method of monitoring soil moisture using a soil probe is still a valid procedure no matter how sophisticated the irrigation scheduling system.

A University of Nebraska NebGuide offers information on the procedure as well as photos of moisture levels for various soil types. The publication, Estimating Soil Moisture by Appearance and Feel (G84-690) is available from your local Extension office or on the Web at http://www.ianr.unl.edu/pubs/irrigation/G690.htm

In addition to indicating how much moisture is in the soil, this method also reveals where that moisture is located in the profile. This information is important to the irrigator as well as the dryland farmer. The depth of water penetration from irrigation or rainfall is useful in planning and making management decisions. Soil texture, the relative amounts of sand, silt or clay contained in a soil, is an indicator of the amount of water a soil will hold. Available water capacity is the maximum amount of moisture the soil will hold that plants can use. The values of available water for four basic textural classes are listed in the table.

The textural classification of a soil is important not only for knowing how much water potentially can be held for crop use, but also for visual inspection. The textural classification of a soil is important not only for knowing how much water potentially can be held for crop use, but also for visual inspection to determine the soil moisture. Knowing your soil texture can help you more accurately determine soil moisture when comparing your soil to photographs of soil in the publication. The county soil survey, which can be obtained through your Cooperative Extension Service office or the Soil Conservation Service, discusses soil texture of your soils.

<table>
<thead>
<tr>
<th>Available water capacity for soils.</th>
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</thead>
<tbody>
<tr>
<td>Soil texture</td>
</tr>
<tr>
<td>Fine sand or loamy sand</td>
</tr>
<tr>
<td>Sandy loam</td>
</tr>
<tr>
<td>Loam or silt loam</td>
</tr>
<tr>
<td>Silty clay or clay loam</td>
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</tbody>
</table>
Grazing CRP may not be a cure-all

Many drought stressed counties in Nebraska, Iowa, Kansas, and Missouri have received permission to graze CRP acres, and many other counties have applied. The reason for requesting permission to graze is that it will relieve some of the grazing shortage due to the prolonged drought.

Or will it? CRP forage is not the panacea many people might think. There is a cost to graze CRP, beginning with forfeiture of a portion of the CRP payment (25% in Nebraska). Since many of these acres are in the $60 to $80 range, most folks will forfeit $15-$20 per acre to graze their CRP. Compared to pasture rents, this is equal to about three weeks of grazing.

Is it worth it? Consider these other factors and costs — the CRP grass has been stunted by the drought just like other pastures and hay fields. So growth this year probably is only half of normal, maybe less.

Add to this the challenge of sorting through all the dead plant material remaining from growth during previous years and cattle might not be able to get the kind of nutrition the cows and calves need. Plus, many CRP fields lack adequate fences or water. Any expenses to make the CRP field suitable for grazing also must considered in the costs.

Another hidden cost could be the lower returns due to poor calf gains if pairs graze CRP that contains more old dead growth than good, green feed. Cows won't milk as well and calves can't easily pick the good grass out of the old growth.

All these costs — forfeited payments, fence and water, poorer animal performance, lower grass yield — start to add up.

The best way to graze CRP is to first wean the calves. Although it will cost more to feed them without the cow, they can perform very well without milk. Then, once the cows are bred, they can rough it through the summer on low quality CRP forage if they don't need to produce milk to nurse their calf. As green growth starts to become a small part of the cows' diet, some protein supplement might be needed.

Before committing to grazing released CRP acres, be sure it's the best choice for you.

Bruce Anderson
Extension Forage Specialist

Haying and grazing acres released


If counties outside this area are opened to CRP release they too will be opened to roadside haying. Other counties will be considered on a case-by-case basis.

Grazing: The USDA Farm Service Agency has released Conservation Reserve Program acres for grazing in 18 counties: Cass, Chase, Dundee, Fillmore, Gage, Hayes, Hitchcock, Jefferson, Johnson, Lancaster, Lincoln, Logan, McPherson, Nemaha, Otoe, Richardson, Saline, and Thayer.

Application for several other counties are pending review at the national USDA FSA Office in Washington, D.C.

In Iowa 24 counties have been approved for grazing CRP. The last time CRP acres were released in Nebraska was in 1997.

June 27 satellite conference features drought, cattle issues

Stiff, brittle wheat straw doesn't sound very appetizing; yet wheat straw treated with anhydrous ammonia may provide supplemental forage needed to help salvage a cow/calf herd looking for forage in drought-dried pastures. This will be one of the topics to be discussed on a 7:30 p.m. June 27 NU satellite conference.

"Cow/Calf Drought Management Tips" is set up specifically to answer cattle producer questions on the best cost-saving measures to survive the drought. Many of the state's 2 million cows and their calves face grazing shortages this year due to the worst nine-month drought in the state's history.

Presenters will include Bruce Anderson, extension forage specialist; Dick Clark, farm management specialist; and Rick Rasby, beef specialist.

Topics will include cull cow marketing; tax implications of culling cows; haying or grazing CRP acres; grazing opportunities; forage annuals to consider if rain comes; grazing if rain comes; nitrates in feeds; supplementing pasture; if pasture is available; cow rations if pasture is unavailable; early weaning; and the economic and cash flow implications of selling breeding livestock vs. keeping and feeding.

Viewing and discussion sites will be available throughout the state. Contact your local Cooperative Extension Office for more details or check the Web site ruralroutes.unl.edu.