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As acreage and agricultural interests collide

Spray responsibly to avoid drift

It is estimated that two-thirds of pesticide spray drift problems involve mistakes which could have been avoided. Drift takes the spray solution from the intended target, making it less effective, and deposits it where it is not wanted. The pesticide then becomes an environmental pollutant, injuring susceptible plants, contaminating water, wildlife and even humans. The effects of the spray solution once it leaves the nozzle are the responsibility of the applicator. Given the threat of lawsuits, EPA fines and human health issues, you wouldn’t think drift would be allowed to be a problem. Yet each year several cases are reported involving severe crop damage and or human safety.

Applicants have a responsibility to all parties to hold human and environmental safety as their highest priority, even if that means a small loss in revenue.

One such case involved several families in a four-house neighborhood. An applicator was spraying less than one hundred yards upwind from their homes. Spray droplets were evident on their windows. Once the applicator was contacted by the affected party, he continued to spray while several people, including young children were allegedly contacted by the spray drift. This is totally unacceptable.

Another issue is the increase in people moving to small acreages in rural areas. As more people move into rural areas, more people will come in contact with agricultural operations. Producers must deal (Continued on page 97)

More showers forecast

Above normal precipitation across the central United States the last 45 days has led the Climate Prediction Center (CPC) to alter its long-lead forecasts for the remainder of the growing season. The CPC now favors a wetter than normal trend through September for most of the Corn Belt.

The long lead forecast for Nebraska indicates a strong tendency for below normal temperatures and above normal precipitation for June. CPC models indicate that Nebraska is in the statistical center of the forecasted area that extends from Oklahoma north to the Canadian border and east into Ohio River Valley.

Above normal precipitation is anticipated for June through September across the entire state, with the greatest likelihood in the western two-thirds of Nebraska. There is no forecasted tendency for temperatures. This means there is an equal chance of receiving above normal, normal, or below normal (Continued on page 98)
Ralph Anderson, Extension educator in Buffalo County: Some early planted corn fields have stands that are less than ideal, but still acceptable. (The exception would be areas visited by the Sandhill cranes. The cranes had some notable seed corn banquets in areas up to nearly thirty acres. We are checking to see if Texas or Oklahoma hunting licenses are valid in Nebraska.)

Planting is nearly complete in most of the county, although there are isolated areas which have been especially blessed with moisture this year and are still hoping to get something planted to use it. Weed control is generally as good or better than expected and significant crop injury has not been reported. There have been some seed maggots and wire worms, but numbers have been fairly insignificant.

Ray Weed, Extension educator in Kimball/Banner counties: Almost all field corn has been planted here. Now the push is beginning to plant sunflowers and then dry edible beans. Winter wheat is in good shape; however, we do have tremendous volunteer rye and blue mustard which will affect yields and wheat quality. There are isolated areas of wheat streak mosaic.

Doug Anderson, Extension educator in Valley County: A large storm with heavy rain and hail swept through parts of the county last weekend, damaging seedlings and washing out fields. Replanting was necessary in some cases. It's still too early to determine the extent of damage to alfalfa. About 90% of our corn acres are planted with about half of that emerged. About 25% of the soybeans have been planted with about 5% emerged.

Chuck Burr, Extension Educator in Clay and Webster counties: Southern Clay County received a hail storm last Saturday. Some of the corn and soybeans were mowed off and grass and some of the hay crops were damaged. Most corn was in the three- to four-leaf stage and should grow out of the damage. A few soybeans fields had already emerged and suffered more severe damage that may require replanting.

Keith Glewen, Extension educator in Saunders County: Last weekend's rain once again halted corn planting. As of Friday an estimated 80% of the corn and 10% of the soybeans were planted in Saunders County. With most of the area in a corn/soybean rotation a large land area still needs to be planted. Most of the growers will go with full season corn hybrids if they can get it planted this week. Growers pushing the window to get back into the field under wet conditions may contribute to side-wall and deep compaction. The optimum time for planting soybeans is now. Any soybeans planted earlier had little if any advantage due to the cold temperatures.

Paul Hay, Extension educator in Gage County: No-till farmers benefitted this year by have five planting days which conventional tillage farmers did not have. The rain patterns allowed no-tillers to plant when tillage was barely possible. The wheat crop is fully headed and looks very good. Rains have cost a great deal in terms of quality from the first cutting of alfalfa. Both delayed cutting and leaf diseases have been problems.
Avoiding spray drift  (Continued from page 95)

with this situation. Many people do not understand agriculture and naturally react negatively to some management practices. This does not help the situation either.

Applicators have a responsibility to all parties to hold human and environmental safety as their highest priority, even if that means a small loss in revenue. Remember that when you spray a site you represent not only your company, but all applicators and a good portion of Nebraska agriculture. Irresponsibility in the field will only anger those whose only opinion of agriculture is the one you have given them.

Some herbicides are much more of a problem than others. For example, Roundup drift is potentially much more of a problem than 2,4-D drift due to its non-selective nature. Applicators need to use slightly more caution with the increased use of herbicide tolerant crops. Ester formulations of 2,4-D and occasionally Banvel can vaporize under high temperature and move to off target plant species. Minimize applications during windy days or extremely hot weather to avoid problems.

Drift

The best way to reduce drift is to understand the factors that cause it, most of which can be controlled by the applicator. It begins with knowing what drift is and how it is best managed.

There are two kinds of drift:
- **Particle drift** is off-target movement of the spray particles.
- **Vapor drift** is the volatilization of the pesticide molecules and their movement off target.

Dave Smith, a Mississippi State University ag engineer, analyzed data from over 100 studies involving particle drift from ground sprayers. Of the 16 variables he considered, three were most important.

1. **Wind Speed.** When the wind speed was doubled, there was almost a 70% increase in drift when the readings were taken 90 feet downwind from the sprayer. Spray when the wind speed is 10 mph wind or less.

2. **Boom Height.** When the boom height was increased from 18 to 36 inches the amount of drift increased 350% at 90 feet downwind.

3. **Distance Downwind.** If the distance downwind is doubled, the amount of drift decreases five-fold. If the distance downwind goes from 100 to 200 feet, you have only 20% as much drift at 200 feet as at 100 feet and if the distance goes to 400 feet, you only have 4% of the drift you had at 100 feet. Check wind direction and speed when starting to spray a field. You may want to start spraying one side of the field when the wind is lower. Also it may be necessary to only spray part of a field because of wind speed, wind direction and distance to susceptible vegetation. The rest of the field can be sprayed when conditions change.

Other important factors that must be considered in drift management are spray pressure, nozzle size, nozzle orientation, operating speed, air temperature, relative humidity, shields on sprayers and nozzles, application rate and instructions from the manufacturer of the spray product.

Drift reduction nozzles

Many new nozzles for reducing drift are now available. Many of these use a pre-orifice which controls the flow rate. The exit orifice controls the pattern formation. The result is larger spray droplets which are less susceptible to drift. Also, some of these nozzles can be used over a wider pressure range, which produces large droplets at low pressure and small droplets at high pressures. The ability of these nozzles to produce good spray patterns over a wide pressure range makes them an excellent choice to use with rate controllers which control the application rate by pressure changes.

These drift reduction nozzles can still have a problem with drift especially when the sprayer speed is increased and pressure therefore is increased, resulting in smaller spray droplets. At slow speeds the spray droplets may be too large for good coverage.

Like most things in life, there are advantages and disadvantages with nozzles that produce large spray droplets. For most postemergence contact herbicides coverage is important. (See table)

Nozzles which induce air are

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Control of volunteer wheat and triazine-resistant kochia nine days after treatment with paraquat plus atrazine at 0.31 plus 0.5 lb/A with a nonionic surfactant 0.25% v/v.

<table>
<thead>
<tr>
<th>Trt.</th>
<th>Nozzle*</th>
<th>Droplet sizeb</th>
<th>Volunteer wheat %</th>
<th>TR-kochia %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>XR11005</td>
<td>Medium</td>
<td>97 a</td>
<td>97 a</td>
</tr>
<tr>
<td>2</td>
<td>DG11005</td>
<td>Coarse</td>
<td>96 a</td>
<td>95 a</td>
</tr>
<tr>
<td>3</td>
<td>TF-VS2.5</td>
<td>Extremely coarse</td>
<td>79 c</td>
<td>80 c</td>
</tr>
</tbody>
</table>

*aAll nozzles on 30-inch spacing operated at 30 psi, 8.6 mph, delivering 10 gpa.


(Continued on page 98)
Forecast: wet (Continued from page 95)

temperatures during the period.

It should be noted that the Climate Prediction Center has had nearly a 70% prediction accuracy since the inception of its models back in 1992; however, the models have been "out to lunch" so far this year. It will be interesting to see if this trend continues through the summer. Signs indicate that the excessive precipitation events experienced over most of the state during the last 30 days are gradually ending.

Short-term models through the first week of June indicate two storm systems could move across the state. The most significant system should reach Nebraska over the Memorial Day weekend, however the associated precipitation should be weaker than recent storms. There will be a continued risk of thunderstorms throughout the weekend, but they should not be as widespread.

If the short range models are accurate, producers should get a good opportunity to complete planting by the end of the first week in June. East-central and southeast Nebraska have been exceptionally wet and will need an extended period of dry weather to alleviate saturated soils and reduce the risk of lowland flooding. Precipitation since the beginning of April is running over 200% of normal in these areas. (See page 103 for maps showing this week's precipitation.)

With the heavy spring rains, precipitation shortfalls since last September have been eliminated across most of the state. Portions of the Panhandle and southwest Nebraska have received 80-100% of normal precipitation since last fall. The remainder of the state has received 100-160% of normal precipitation.

It appears that ample subsoil moisture exists to get grain crops through an extended period of dryness during the early growing season; however, planting delays have resulted in the corn crop being more vulnerable to mid-summer heat. If normal temperatures occur during the growing season, the corn crop will be in the reproductive phase during what is historically the hottest period of the summer.  

Al Dutcher  
State Climatologist  
Agricultural Meteorology

Avoiding spray drift (Continued from page 97)

also available. They also use a pre-orifice. Early research work with these nozzles on drift reduction show most of the benefit as to particle size is from the pre-orifice.

Remember, the environment and human safety are the top priority of any activity. There are no excuses for mishandled herbicides when human safety is the issue. With the larger number of people coming into contact with agriculture, we need to be sensitive to their lack of knowledge of agricultural issues. Understanding drift and knowing how others have learned to manage it will help most producers avoid problems. Bottom line, we are responsible for the injury we cause and are accountable for it.

Bob Klein, Extension Cropping Systems Specialist  
Alex Martin  
Extension Weed Specialist  
Jeff Rawlinson  
Extension Weed Science

Stevan Knezevic, a native of Yugoslavia, is the new Extension weeds specialist at the Haskell Agricultural Laboratory near Concord. Knezevic received his bachelor’s degree in plant protection from the University of Belgrade, his master’s in crop science-weeds from the University of Guelph and his doctorate degree in agronomy-weed science from Kansas State University. (See his story on purple loosestrife on pages 102-103.)

Knezevic will conduct both Extension and research weed science programs. One of his long-term goals is to develop an Integrated Weed Management program for eastern Nebraska that optimizes herbicide use and improves soil and water quality, while maintaining profitable and sustainable crop production. After work, Stevan enjoys camping, fishing and other outdoor activities with his wife and two children.

Welcome two new contributors from northeast Nebraska

Two new faculty members have joined the staff of Extension specialists and researchers at the Haskell Agricultural Laboratory near Concord, part of the University's Northeast Research and Extension Center.

Tom Hunt, a native Nebraska, conducted his doctoral research on the movement and behavior of adult European corn borer in and around corn. His master’s research examined bean leaf beetle injury to seedling soybean and economic injury levels. (See his story on bean leaf beetles on page 101.) His master's and doctorate degrees are in entomology and his bachelor's degree is in horticulture, all from UNL. An outdoor enthusiast, Hunt enjoys camping, fishing and canoeing when he's not out sampling research plots for pests.

Hunt replaces John Witkowski, who was named director of the Northeast Research and Extension Center in Norfolk.
After the rains

Catching up with weed control

Finally the rain has subsided over most of the state and producers can begin to evaluate corn crop stands and weed pressure. Many producers were unable to apply preemergence herbicides before the corn was up and now are contemplating a total postemergence weed control strategy. If corn is under 5 inches, many preemergence herbicides are labeled for application. Check labels for details.

For those who had already applied herbicides, last week's heavy rainfall may have affected herbicide placement. In hilly areas, some may have been washed down the slopes. In either case, you will likely be relying on postemergence weed control strategies.

Before deciding whether to spray, consider threshold levels, at least for the most common weeds. The table assumes that weeds emerged with corn and that no herbicide was applied previously. Weed threshold values are based on potential crop yield losses.

Producers may remember last year when many were not able to apply postemergence herbicides at the correct time due to precipitation. Many herbicide applications pushed the corn growth stage restriction limit and injured the crop. When applying postemergence herbicides this year, be aware of crop growth stage limits of individual herbicides and follow them. This will help protect you and your crop from any damage.

Herbicides obviously control some weeds better than others. Several factors including herbicide, weed species and size, growing conditions and additives work together to influence the efficacy of a herbicide. Additives strongly influence the degree of weed control and crop injury from postemergence herbicides. The most common additives include oils, surfactants and fertilizers. Oils increase penetration of the spray through the cuticle or waxy layer of the leaf. Surfactants are used to reduce the surface tension of water mixtures, resulting in uniform spreading of the spray mixture on the leaf surface. Fertilizers, including UAN, AMS and 10-34-00 increase the movement of certain herbicides across the cell membrane, resulting in increased herbicide at the site of action within the plant. See page 100 for a table of postemergence corn herbicides detailing weed efficacy, application timing, use rates and additives.

Jeff Rawlinson
Extension Weed Science

Alex Martin
Extension Weed Specialist

Stevan Knezevic
Extension Weed Specialist

Crop report

Corn planting was 89% complete, equal to the long-term average but behind 98% last year. About 45% of the corn was emerged, above 18% last year, but below the average of 56%. Corn condition was 3% poor, 19% fair, 71% good, and 7% excellent. Southeastern growers were slightly behind the State average at 81% complete.

About 30% of the state’s soybeans have been planted, significantly less than the 76% of last year and an average of 51%. About 3% of the soybeans were emerged, which compared with 29% last year and 16% average.

(Continued on page 103)
Postemergence corn herbicides  *(Continued from page 99)*

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Action</th>
<th>Timing</th>
<th>Rate/a</th>
<th>Additive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atrazine</td>
<td>Broadleaf + grass</td>
<td>Corn &lt;12&quot;, BL 2-6&quot;, grass &lt;1&quot;</td>
<td>1.4-2.2 lb</td>
<td>COC 1 qt</td>
</tr>
<tr>
<td>Accent</td>
<td>Broadleaf + grass</td>
<td>Corn 4-20&quot;, BL &lt;4&quot;, grass &lt;3&quot;</td>
<td>0.67 oz</td>
<td>COC 1 gal/100**</td>
</tr>
<tr>
<td>Accent Gold</td>
<td>Broadleaf + grass</td>
<td>Up to V6, weeds 1-3&quot;</td>
<td>2.9 oz</td>
<td>COC 1 gal/100 gal, 28%N 1-2 qt</td>
</tr>
<tr>
<td>Aim</td>
<td>Broadleaf</td>
<td>2 leaf to 48&quot;</td>
<td>1.5 oz</td>
<td>NIS 1 qt/100 gal, COC 1 gal/100 gal, or 28% 2-4 qt/a Not common**</td>
</tr>
<tr>
<td>Banvel</td>
<td>Broadleaf</td>
<td>Corn spike to 5&quot;</td>
<td>0.5-1.0 pt</td>
<td></td>
</tr>
<tr>
<td>Basis</td>
<td>Broadleaf + grass</td>
<td>Corn spike to 2-collar, 4-leaf</td>
<td>0.33 oz</td>
<td>COC 1-2 gal/100 + UAN 1-2 qt/100**</td>
</tr>
<tr>
<td>Basis gold</td>
<td>Broadleaf + grass</td>
<td>Up to V6, weeds 1-3&quot;</td>
<td>14 oz</td>
<td>COC 1-2 gal/100**</td>
</tr>
<tr>
<td>Beacon</td>
<td>Broadleaf + shattercane</td>
<td>Corn 4-20&quot;, BL &lt;4&quot;, grass &lt;3&quot;</td>
<td>0.38-0.76 oz</td>
<td>COC 1 qt**</td>
</tr>
<tr>
<td>Bladex DF</td>
<td>Broadleaf/some grass</td>
<td>Corn 5-leaf stage, grass up to 1&quot;</td>
<td>2.2 lb</td>
<td>NIS 1 qt**</td>
</tr>
<tr>
<td>Buctril</td>
<td>Broadleaf</td>
<td>Corn 2-leaf to V6, BL 2-6&quot;</td>
<td>1.0-1.5 pt</td>
<td></td>
</tr>
<tr>
<td>Celebrity</td>
<td>Broadleaf + grass</td>
<td>Corn 4-36&quot;</td>
<td>6.67 oz</td>
<td>NIS 1-2 qt/100 gal + UAN 2-4 qt/a**</td>
</tr>
<tr>
<td>Clarity</td>
<td>Broadleaf</td>
<td>Corn 8-24&quot;</td>
<td>0.5-1.0 pt</td>
<td>Not common**</td>
</tr>
<tr>
<td>Contour</td>
<td>Broadleaf + grass</td>
<td>Corn V6, weeds to 3&quot;</td>
<td>1.33 pt</td>
<td>COC 1.5-2 pt + UAN 1-2 qt**</td>
</tr>
<tr>
<td>Distinct</td>
<td>Broadleaf/some grass</td>
<td>Corn 4-24&quot;</td>
<td>4-6 oz</td>
<td>NIS 1 qt/100 gal + UAN 5 qt/100 gal**</td>
</tr>
<tr>
<td>Dual II</td>
<td>Broadleaf + grass</td>
<td>Layby</td>
<td>1.5-3 pt</td>
<td></td>
</tr>
<tr>
<td>Exceed</td>
<td>Broadleaf</td>
<td>Corn 4-20&quot;, BL 2-12&quot;</td>
<td>1.0 oz</td>
<td>COC 1 qt**</td>
</tr>
<tr>
<td>Extrazine II DF</td>
<td>Broadleaf + some grass</td>
<td>Corn before 5-leaf, grass 1&quot; or less</td>
<td>1.8-2.2 lb</td>
<td>NIS 1 qt**</td>
</tr>
<tr>
<td>Hornet</td>
<td>Broadleaf</td>
<td>Corn spike to 24&quot;, BL &lt;8&quot;</td>
<td>1.6-4.0 oz</td>
<td></td>
</tr>
<tr>
<td>Laddok S-12</td>
<td>Broadleaf</td>
<td>Corn &lt;12&quot;, BL 2-4&quot;</td>
<td>1.3-2.3 pt</td>
<td>COC 1 qt**</td>
</tr>
<tr>
<td>Liberty</td>
<td>Broadleaf + grass</td>
<td>Weeds 1-4&quot;</td>
<td>20-28 oz</td>
<td>AMS 3 lb</td>
</tr>
<tr>
<td>Liberty ATZ</td>
<td>Broadleaf + grass</td>
<td>Corn &lt;12&quot;</td>
<td>32-40 oz</td>
<td>AMS 3 lb</td>
</tr>
<tr>
<td>Lightning</td>
<td>Broadleaf + grass</td>
<td>Corn to 12&quot;, weeds up to 4&quot;</td>
<td>1.28 oz</td>
<td>NIS 1 qt + uan 1-2 qt</td>
</tr>
<tr>
<td>Marksmen</td>
<td>Broadleaf</td>
<td>Corn before 5- leaf stage</td>
<td>2.0-3.5 pt</td>
<td>COC 1 qt**</td>
</tr>
<tr>
<td>Northstar</td>
<td>Broadleaf/some grass</td>
<td>Corn 4-20&quot;</td>
<td>5 oz</td>
<td>NIS 1 qt/100 gal**</td>
</tr>
<tr>
<td>Permit</td>
<td>Broadleaf</td>
<td>Corn spike to 20&quot;, BL 2-6&quot;</td>
<td>0.66-1.33 oz</td>
<td>COC 1 gal/100**</td>
</tr>
<tr>
<td>Poast</td>
<td>Grass</td>
<td>Grass &lt;8&quot;</td>
<td>1.0 pt</td>
<td>COC 1 qt**</td>
</tr>
<tr>
<td>Prowl</td>
<td>Broadleaf + grass</td>
<td>Corn spike to layby, weeds &lt;4&quot;</td>
<td>1.8-3.6 pt</td>
<td></td>
</tr>
<tr>
<td>Pursuit</td>
<td>Broadleaf + grass</td>
<td>Weeds &lt;3&quot;</td>
<td>4 oz</td>
<td>COC 1.5-2 pt + UAN 1-2 qt**</td>
</tr>
<tr>
<td>Resource</td>
<td>Broadleaf + grass</td>
<td>Corn 2-10 leaf, BL &lt;4&quot;</td>
<td>5.3 oz</td>
<td>NIS 1 qt + uan 1-2 qt</td>
</tr>
<tr>
<td>Resolve SG</td>
<td>Broadleaf + grass</td>
<td>Weeds &lt;3&quot;</td>
<td>4-6 oz</td>
<td>COC 1 qt**</td>
</tr>
<tr>
<td>Roundup Ultra</td>
<td>Broadleaf + grass</td>
<td>Corn up to 24&quot;</td>
<td>24-42 oz</td>
<td></td>
</tr>
<tr>
<td>Scorpion III</td>
<td>Broadleaf</td>
<td>Corn &lt;8&quot;, BL 2-4 leaf</td>
<td>4 oz</td>
<td>NIS 1 qt**</td>
</tr>
<tr>
<td>Sencor</td>
<td>Broadleaf</td>
<td>Corn up to 8&quot;, BL 2-4&quot;</td>
<td>1.5-2 oz</td>
<td>28%N 2-4 qt</td>
</tr>
<tr>
<td>Spirit</td>
<td>Broadleaf + some grass</td>
<td>Corn 4-20&quot;</td>
<td>1 oz</td>
<td>NIS 1-2 qt/100 + 28%N .5-1 gal</td>
</tr>
<tr>
<td>Treflan</td>
<td>Grass</td>
<td>Corn 2-leaf to layby, weeds unemerged</td>
<td>1.5-2.0 pt</td>
<td></td>
</tr>
<tr>
<td>2,4-D Amine</td>
<td>Broadleaf</td>
<td>When corn is small*</td>
<td>1-2 pt</td>
<td></td>
</tr>
</tbody>
</table>

* Corn over 8", use drop tips
** Other additives may be used, check label
*** Corn over 20" use drop nozzles
Bean leaf beetles on seedling soybeans: When is treatment justified?

Early planted soybeans are beginning to emerge across Nebraska and could quickly be colonized by bean leaf beetles. Because seedlings are small, the beetles and resulting defoliation are easily seen, leading to questions about how much damage is too much.

Bean leaf beetles over-winter as adults in protected sites such as grassy field edges, leaf litter, and crop residue. They become active fairly early in the year and often can be found in alfalfa prior to soybean emergence. As soybeans emerge, the beetles quickly move to the seedling plants, feeding on cotyledons and expanding leaf tissue. These over-wintered beetles, called colonizers, mate and begin laying eggs. Females live about forty days and lay from 125 to 250 eggs. After egg laying is complete, the colonizing population dwindles as the beetles die. A new generation of beetles will begin to emerge in late June to early July.

Bean leaf beetles vary in color, but are usually reddish to yellowish-tan. They are about one-fourth inch long and commonly have two black spots and a black border on the outside of each wing cover. These spots may be missing, but in all cases there is a small black triangle at the base of the wings near the thorax.

Because they move to soybean fields so soon after seedling emergence, early planted fields will usually have more beetles and suffer the most injury. Although the defoliation can appear quite severe, research in Nebraska and elsewhere has shown that it usually does not result in economic damage. Soybean plants can compensate for a lot of early tissue loss. Generally, unless insect populations are large enough to cause more than 50 to 60 percent defoliation, it is unlikely that treatment would be economically justified. This point is illustrated by the economic thresholds for bean leaf beetle on seedling soybean given in Tables 1 and 2. For example, if the value of soybeans is $5/bushel and the management costs are $6/acre, it takes three beetles per soybean seedling (stage VC) before treatment is justified. Beetle numbers this high are rare.

Although we seldom experience economically damaging populations of bean leaf beetles early in the season, they can occur. Remember that early planted soybeans are the most susceptible. If economic thresholds are reached, many insecticides are available for bean leaf beetle control. All will do an adequate job if applied according to label directions.

Tom Hunt, Extension Entomologist
Northeast REC, Haskell Agricultural Laboratory, Concord

Keith Jarvi, Extension Assistant
Integrated Pest Management
Northeast REC, Norfolk

Table 1. VC Economic thresholds (beetles per plant)

<table>
<thead>
<tr>
<th>Crop value, $/bu</th>
<th>Pest management cost, $/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>$6</td>
<td>$8</td>
</tr>
<tr>
<td>$5</td>
<td>3</td>
</tr>
<tr>
<td>$6</td>
<td>2</td>
</tr>
<tr>
<td>$7</td>
<td>2</td>
</tr>
<tr>
<td>$8</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 2. V1 Economic thresholds (beetles per plant)

<table>
<thead>
<tr>
<th>Crop value, $/bu</th>
<th>Pest management cost, $/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>$6</td>
<td>$8</td>
</tr>
<tr>
<td>$5</td>
<td>4</td>
</tr>
<tr>
<td>$6</td>
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</tr>
<tr>
<td>$8</td>
<td>2</td>
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</tbody>
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Purple loosestrife — beautiful, but deceptively destructive to wetlands

A beautiful, but deadly flowering perennial is invading Nebraska's wetlands and has the potential for seriously damaging the ecosystem and wildlife habitats of these areas, as it has already done in other states.

The killer plant is purple loosestrife (Lythrum salicaria), a hardy flowering weed introduced to North America from Europe in the 1800s. Since then, purple loosestrife has slowly invaded wetlands and waterways, primarily around the Great Lakes and northeastern United States and Canada. Because this beautiful killer has no natural enemies in North America, it has expanded its range, now reaching into Nebraska. It is estimated that about 15,000 acres of Nebraska's wetlands are infested with this plant. The irony is that purple loosestrife, wand loosestrife (L. virgatum) and hybrid crosses are still innocently sold across our state as a home landscape species. The flowers of those species are beautiful, and the plant is sold as "male sterile", meaning it does not produce pollen. These plants, however can be cross-pollinated with the wild types and produce viable seeds. The Nebraska Department of Agriculture is considering naming it a noxious weed so that it would be illegal to grow and sell. Until then, homeowners are cautioned to not add to the problem by planting them in landscapes.

Identification

Purple loosestrife is a perennial identified by its beautiful purple spiky flower and its habitat -- it's usually found in marshes, rivers, ponds and lakes and along rivers. Leaves are opposite or arranged in whorls with simple blades, lanceolate in shape with sharp pointed tips. The leaves are sessile, rounded or heart-shaped at the base and are pubescent. Stems of purple loosestrife have four angles and usually lack hair. Because purple loosestrife is a prolific seed producer (over one hundred thousand seeds per spike) and rhizomes extend below the soil surface, it spreads easily. In Nebraska, purple loosestrife flowers from July to September.

Colorful silence

The overwhelming color and density of purple spiked flowers blanketing many of the Great Lakes' finest wetlands are contrasted by an unnatural silence. I have experienced the silence in these once unusually vibrant marshes and waterways in Ontario, Canada. Deer, a usual visitor to marsh edges, have disappeared, along with waterfowl, shore birds and turtles. Fishing is out of the question. You can't see or touch the water because the thick plant growth below and above the surface stops you from walking more than a few steps into the wetland. Native sedges, cattails, bulrushes and grasses are gone, as well as the original floating and submerged aquatic vegetation. These wetlands die gradually due to our failure to understand basic biology. The people of Nebraska need to be aware of this biologically threatening weed and what is at state for the state. Extreme measures need to be taken to reduce the occurrence of purple loosestrife in Nebraska lakes, ponds and wetlands.

Lost wildlife

Once loosestrife invades a wetland, the natural habitat is lost and the productivity of native plant and animal communities is severely reduced. Song birds will not feed on the loosestrife seeds. Muskrats can not use roots for food or shelter. Waterfowl are affected when dense impenetrable stands of loosestrife eliminate nesting sites and open water. Wildlife generally move on; fish or other small animals less able to move will die.

Lost water ways

By growing vigorously in irrigation canals, ditches, stream banks and reservoirs, purple loosestrife will clog waterways. The result will be less water carried to the cropland and further negative effects on wildlife, agricultural production and people.

Loss of recreational land

The loss of wetlands and wildlife directly influences our lives, especially during summer recreation time. The funds spent on controlling this weed could be more effectively spent on improving wildlife habitats, boat ramps, camping grounds, etc. With the loss of recreational land, the local communities will also lose tourism revenues.

Perfect plant

Purple loosestrife can colonize and thrive easily because it has a rhizome (perennial root system) and is a prolific seed producer. Each plant can produce up to 2 million seeds in one season. Seeds can be carried far away by water, wind, and birds, and can remain viable for many years.

This is a highly competitive plant that grows fast and quickly traps nutrients and sunlight. The soft muddy floor of wetlands becomes a woven mat of tough roots with no significant food value for many wildlife species.

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Purple loosestrife
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Few birds, fish or animals like to feed on purple loosestrife. They feed, however, on other plant species that grow around purple loosestrife. By doing this, indirectly the wildlife population "eat themselves out of house and home". As native vegetation get consumed, more space is created for purple loosestrife to spread and produce new plants.

Can we control it?

The biggest challenge now is to stop the spread of this weed from the 15,000 acres of infested Nebraska wetland. Unfortunately there is no single and sure control method, rather it requires an integrated management approach. Further research this summer will address control options. In addition, a July Crop Watch will address control methods. For now, if you’re aware of purple loosestrife in your area, note its location.

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Extension Weed Specialist
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Crop report
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Sorghum planted was at 12%, far behind 57% last year and 40% average. Only 2% had emerged.

Winter wheat condition rated 2% poor, 14% fair, 72% good and 12% excellent. Wheat jointed was at 97%, above 88% last year, and average. Wheat headed was at 30%, ahead of 26% last year and 16% average.

Oats planted was at 100% complete. Oats emerged was at 99%. Oats condition rated 12% fair, 67% good, and 21% excellent.

Alfalfa condition rated 1% poor, 13% fair, 64% good, and 22% excellent. Alfalfa first cutting was 2% completed.

Precipitation

From May 17-23

From Sept. 1 to May 23

Common stalk borer

Scout for common stalk borer larvae in corn when about 1300-1400 degree days have accumulated. Control is most effective if timed between 1400 and 1700 degree days.
Identify and eliminate pine wilt

Recently pine wilt has been confirmed on several trees in southeastern Nebraska. Pine wilt nematode has been found on Scots and Austrian pines as far north as Omaha and as far west as Lincoln. It is considered a potentially serious problem of Scots and Austrian pine trees in windbreaks, landscape settings, Christmas tree farms, and recreational plantings.

Symptoms for pine wilt usually appear from August through December and result in a sudden death of mature pines (usually within three months of infestation). In general, trees wilt and die rapidly, but some trees may survive for more than one year. As the trees die, the needles turn yellow/brown and remain attached to the tree.

Pine wilt is caused by the pinewood nematode *Bursaphelenchus xylophilus*. This nematode is transmitted from pine to pine by the pine sawyer beetle. Pine sawyers are wood borers and emerge in May or June as adults from infested or uninfested pine trees and fly to new trees and feed under the bark of young pine shoots. Adult beetles feed, mate, and reproduce on the new host. Immature beetles develop beneath the bark and within woody tissue of dying trees and recently cut logs and emerge as adults in late spring. If the beetle is carrying the pinewood nematode, healthy trees may become infested as the beetles feed. The nematodes migrate from the beetle to the water-conducting tissue via feeding wounds caused by the beetle.

In the tree, nematode populations build up rapidly and block the vascular tissue. Within four to five weeks, trees start showing initial signs of a wilting. The needles turn brown and the tree rapidly dies. After the tree dies, nematodes continue to reproduce for several months while they feed on fungi that invade the dead trees. As the wood dries, the nematode goes through four molts to a stage known as dauer larvae. As many as 100,000 dauer larvae enter the trachea of newly formed adult beetles just prior to their emergence. Dauer larvae are transported to new trees by the pine sawyer adults, where the disease cycle starts over.

**Diagnosis**

It is important to confirm the presence of the pinewood nematode if pine wilt is suspected. Early confirmation will allow the owner to act quickly to prevent the spread of the pinewood nematode to neighboring trees. Samples for the nematode assay should be either a branch sample, at least two inches in diameter, collected near the trunk of the tree, or a wedge of wood from the lower portion of the trunk. The best time to sample is late summer/early fall due to high nematode populations. Pinewood nematode samples should be placed in a plastic bag as soon as collected and sent through the County Extension office or mailed directly to the Plant and Pest Diagnostic Lab at UNL.

**Management**

In established plantings such as windbreaks, landscape settings, and Christmas tree farms, the only control measure is to remove affected trees and burn the wood before May 1. Trees should be removed to ground level. No stumps should be left. This prevents further spread of the nematode and its beetle vector before emergence from the dead infested trees in the spring. If you missed tree removal time this year you should still destroy the trees as the beetles can emerge later and are not synchronous in their emergence.

The beetles are attracted to stressed trees, so practice good cultural, disease and insect control practices to minimize stress. Plant less susceptible Austrian or Ponderoosa pines or deciduous trees in areas where pine wilt has been a problem.

Loren Giesler, Coordinator
Plant and Pest Diagnostic Clinic

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**You asked about it:**

**Cool season herbicide damage**

**Andy Christiansen, Extension Educator in Hamilton County:** We are seeing corn injury possibly caused by Balance herbicide. One person says it is actually killing some corn. What's your experience been with this?

**Fred Roeth, Extension weeds specialist at the South Central REC near Clay Center:** Given the rain and cool weather, I'm not surprised that we're seeing some herbicide injury. It's not likely that Balance will kill corn unless it was applied at higher than recommended rates or on sandy soils.

Balance injury is very visible and may appear at first glance to be more damaging than it actually is. Balance is very water soluble. With excess soil moisture, more of the herbicide became available to the plant's roots for a longer time since plant growth was slowed considerably during this cool period. A whitening of the leaf and collar areas may develop, but normally the plant will grow out of it once the roots extend and above-ground growth takes off. Warmer weather will help considerably.