Karnal bunt: a major concern for the U.S. wheat industry

On March 8 Karnal bunt, a smut disease of wheat, was detected in durum wheat in southwestern Arizona. This was the first occurrence of this disease in the United States, and its detection is having serious implications on U.S. wheat exports and the interstate movement of wheat. Since its initial discovery in Arizona, Karnal bunt has been detected in New Mexico, Texas and California.

Department of Agriculture Secretary Dan Glickman declared that the Karnal bunt situation was an “extraordinary emergency”. The USDA Animal Plant Health Inspection Service (APHIS) has placed a federal quarantine on wheat in Arizona, in four counties in New Mexico, and in two counties each in Texas and California.

Before being detected in the United States, Karnal bunt was known to occur in India, Pakistan, Nepal, Iraq, Afghanistan and Mexico. It has been in northwestern Mexico since 1982. Although federal regulations prohibited entry into the U.S. of seed, plants, unprocessed straw, chaff and milling products (other than flour) of wheat from countries where Karnal bunt is known to occur, the smut spores are soilborne and seedborne. Infested soil blowing north from Mexico could have been a source of entry into Arizona.

Karnal bunt is a smut fungus disease. In an infected plant, usually only some of the heads become infected, and in a head only a few grains are bunted. Unlike common bunt or loose smut, Karnal bunt is difficult to detect in the field. Bunted kernels are fragile, dark, and fishy smelling. The kernel usually remains whole. Cracks in the surface reveal a black powdery spore mass within the endosperm at the embryo end of the kernel or along the kernel groove.

Three other diseases of wheat seed can be mistaken for Karnal bunt: black point, common bunt and dwarf bunt. Common bunt and black point, but not dwarf bunt, occur in Nebraska. Dr. William Brown and Dr. Linnea Skoglund of Colorado State University, published the following summary of differences between Karnal bunt and common bunt:

- Common bunt can attack all small grains — Karnal bunt only attacks bread wheat and to a lesser extent durum wheat and triticale.
- Common bunt infects all kernels in a head — Karnal bunt infects only a few (“partial bunt”).
- Common bunt infects the endosperm of the kernel only, whereas Karnal bunt infects both the endosperm and the testa.

Alfalfa weevil feeding likely

Alfalfa weevils are the most serious insect pest of Nebraska alfalfa. Weevil populations may differ extensively throughout the state and fluctuate every year, but the potential for damage always exists.

Scouting for alfalfa weevil larvae feeding should begin as soon as possible. According to growing degree day (GDD) estimates (45 degree base), alfalfa weevil activity may have begun in southern Nebraska, in an area roughly south of a line from Omaha to Ogallala, and including the Panhandle. Activity may begin in the rest of the state next week. (See Table 1 for GDD accumulations at various locations as of April 21.) Noticeable damage from larvae feeding usually occurs at about 375 GDD. The current 6 to 10 day forecast is for below average temperatures, so development should be slower than normal.
Crop update

The Nebraska Agricultural Statistics Service reported that as of Sunday, winter wheat condition improved slightly from last week. It was rated at 11% very poor, 25% poor, 43% fair, and 21% good. A few fields of wind damaged wheat have been abandoned in the west. Some winter kill was apparent in the south and east.

Corn planting was 4% complete, equal to the five-year average. Planting was most advanced in southeast Nebraska.

Kansas pest update

Increasing numbers of greenbugs are being found in Kansas wheat, especially in south central Kansas, according to the Kansas Department of Agriculture Insect Pest Survey. It also reported spider mites and brown wheat mites in dryland wheat, particularly in southwest Kansas, and aphids in alfalfa in southern Kansas. Serious problems with some of these pests may occur further north as the season progresses.

Some of the worst greenbug infestations were in Sumner, Harper and Barber counties and some very serious infestations are likely present in adjacent and nearby counties. Greenbugs were found in wheat last week in central Kansas as far north as Dickinson County and significant numbers and noticeable damage to small plants in stands were found in some fields as far north as Butler, Kingman and Sedgwick counties.

"Browning down" of wheat in spots due to severe greenbug infestations was beginning to show up in parts of Sumner and Harper counties by April 17.

Weed tour to start with northeast

The 1996 Nebraska Weed Tour will begin in eastern Nebraska and end at Scottsbluff. The itinerary is:

**Monday, June 17**
1 p.m. Concord, Northeast Research and Extension Center

**Tuesday, June 18**
9 a.m. Lincoln, 84th and Havelock streets
3 p.m. Clay Center, South Central Research and Extension Center

**Wednesday, June 19**
8:30 a.m. North Platte, West Central Research and Extension Center
3 p.m. (MDT) Sidney, High Plains Agricultural Laboratory

**Thursday, June 20**
8:30 a.m. (MDT) Scottsbluff, Panhandle Research and Extension Center
Karnal bunt
(Continued from page 41)

whole kernel — Karnal bunt infects only the embryo end.

- Common bunt infects seedlings as they emerge — Karnal bunt infects individual flowers in the heads via airborne spores.
- Common bunt does not last long in the soil — Karnal bunt can last up to five years in the soil in warm climates (there are reports that the teliospores in the soil can survive freezing).

APHIS has initiated several procedures to hopefully eradicate Karnal bunt from the United States. First, the affected areas were quarantined immediately to ensure that no wheat, seeds, or soil were moved from the area. Next, an emergency team conducted delimiting surveys of the area to determine the exact location of the disease. All crops in infested fields were destroyed to eliminate Karnal bunt, and the property may be treated to kill any remaining spores. Following treatment, grain infected with Karnal bunt would be used only for nonpropagative purposes or would be destroyed. No host crop — wheat, durum, or triticale — will be planted in any contaminated field for five years from the time of infection.

In 1993 and 1995 the Nebraska State Department of Agriculture conducted intensive surveys for Karnal bunt. Similar surveys were conducted in Kansas, South Dakota and other Great Plains states. These surveys revealed no Karnal bunt in Nebraska, Kansas, South Dakota or North Dakota. This is significant because the latest news is that several trading partners have indicated that they will allow U.S. wheat from areas free of Karnal bunt. An APHIS approved survey will be conducted in Nebraska after harvest of the 1996 wheat crop.

John E. Watkins
Extension Plant Pathologist

Test herbicide compatibility with liquid fertilizers

Combining liquid nitrogen with a preemergence herbicide may save time for farmers in this spring "rush". Compatibility of liquid nitrogen with most herbicides is usually acceptable but should be checked before mixing large quantities.

Compatibility test
(Based on 25-gallon per acre application)
1. Add 1 pint of fertilizer to each of two jars.
2. To one jar add 1/4 tsp (1.2 ml) of a compatibility agent and stir.
3. To both jars add the appropriate amount of herbicide(s). Add dry herbicides first, flowables second, and emulsifiable concentrates last. Stir after adding each material.
- Dry herbicide: For each pound per acre to be applied, add 1.5 level teaspoons.
- Liquid herbicide: For each pint per acre to be applied, add 1/2 teaspoon or 2.5 ml.
4. Shake or stir the contents of each jar thoroughly and let the mixtures stand for 15 minutes.
If either mixture separates but can be readily remixed, the mixture can be sprayed with good agitation. Comparing the two jars will indicate if a compatibility agent is needed.

Compatibility of mixtures can often be improved by 1) mixing the dry fertilizer with water before adding it; 2) adding 1/2 the compatibility agent to the fertilizer and the other 1/2 to the emulsifiable or flowable herbicide before adding to the mixture.

General mixing procedure: Fill the spray tank 1/4-1/2 full with liquid fertilizer and start the agitation. Add a compatibility agent if needed. Add the dry herbicide to the spray tank. Dry herbicides and flowables often mix more readily if mixed with a small quantity of water before addition to the fertilizer. Continue filling the tank with liquid fertilizer until it is 90% full. At this point add flowable herbicide, followed by emulsifiable concentrates and oil concentrates.

John McNamara
Extension Assistant, Weeds
Alex Martin
Extension Weeds Specialist

Fallow wheat developing well in southwest Nebraska

Wheat in southwest Nebraska is entering the joint stage, leaving little or no time for herbicide applications. Generally, wheat planted in a fallow rotation is looking good and has good subsoil moisture. Topsoil moisture is still short.

Continuous wheat or wheat planted late last year after another crop is extremely short of moisture and will need good precipitation to make a crop.

Nebraska’s wheat crop is 10-12 days behind normal development, which may contribute to reduced yields if filling occurs during extreme heat. If temperatures for that period are below normal, as currently projected in the long range forecasts, there may be a longer filling period, bigger kernels and bigger yields.

Bob Klein, Extension Cropping Systems Specialist
**Alfalfa weevil feeding** *(Continued from page 41)*

Table 1. Growing degree days, base 48

<table>
<thead>
<tr>
<th>Location</th>
<th>GDDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ainsworth</td>
<td>273</td>
</tr>
<tr>
<td>Alliance</td>
<td>345</td>
</tr>
<tr>
<td>Arthur</td>
<td>332</td>
</tr>
<tr>
<td>Beatrice</td>
<td>377</td>
</tr>
<tr>
<td>Central City</td>
<td>317</td>
</tr>
<tr>
<td>Clay Center</td>
<td>351</td>
</tr>
<tr>
<td>Concord</td>
<td>195</td>
</tr>
<tr>
<td>Curtis</td>
<td>437</td>
</tr>
<tr>
<td>Elgin</td>
<td>223</td>
</tr>
<tr>
<td>Gordon</td>
<td>261</td>
</tr>
<tr>
<td>Grant</td>
<td>426</td>
</tr>
<tr>
<td>Holdrege</td>
<td>414</td>
</tr>
<tr>
<td>Lincoln</td>
<td>339</td>
</tr>
</tbody>
</table>

Early season damage by alfalfa weevils is due to larval feeding. Damage consists of small holes and interveinal feeding on the newest leaflets near the stem tips. Severe feeding gives the field a light colored, or “frosted” appearance. The larvae are small (1/16 to 3/8 inch in length), pale yellowish green, and become a darker green when larger. These legless worms have black heads and a white stripe the length of the back. The alfalfa weevil larvae spend nearly all their time on the plant. They curl into a C-shape when disturbed.

Once the alfalfa is 4-6 inches in height, take a bucket, carefully cut some stems at ground level (30 to 50 per field, from various spots in the field) and shake the stems against the side of the bucket. Average the number of weevil larvae per stem. Use the chart to help you decide whether to begin treatment. Each chart has been developed for a different alfalfa value.

Deciding whether to treat or resample depends on the average number of weevils per stem, stem length, and the value of the alfalfa.

Waiting to sample again in three to five days may not seem like a great option, but the extra time gives predators and other natural controls a chance to keep weevil numbers in check. Good growing conditions can allow the alfalfa to “outgrow” the damage. When considering treatment, be sure to check the harvest intervals of the insecticide. Some have waiting periods of up to two weeks. Remember that often the best choice for weevil control is to take an early cutting, particularly in northern Nebraska where weevil development tends to be a little slower in relation to alfalfa development.

**Clover leaf weevil in alfalfa**

This year’s dry conditions favor the survival of a closely related pest, the clover leaf weevil. Both the alfalfa and clover leaf weevils feed on first cutting alfalfa as larvae, and regrowth of the first cutting as adults. While research in northeastern Nebraska has shown that clover leaf weevil larvae feeding does not reduce yields of first cutting alfalfa, alfalfa weevil feeding can cause severe losses to yield and quality of the first cutting. It is important to be able to tell the difference between the two. Adults of the two species can hinder the regrowth of the second cutting.

Clover leaf weevil larvae will be in the debris around the crowns

**ALFALFA WEEVIL STEM COUNT METHOD**

**A ($35/ton)**

- Spray
- Cut Early
- Re-sample in 3-5 days
- May Need to Spray
- NO SPRAY NEEDED
- Re-sample in 7 days

**B ($70/ton)**

- Spray
- Cut Early
- Re-sample in 3-5 days
- May Need to Spray
- NO SPRAY NEEDED
- Re-sample in 7 days

**C ($105/ton)**

- Spray
- Cut Early
- Re-sample in 3-5 days
- May Need to Spray
- NO SPRAY NEEDED
- Re-sample in 7 days

**Height of Alfalfa**

Estimating alfalfa weevil economic treatment thresholds by the stem count method.
Pasture burndown may aid in renovation

Some cattle producers concerned about reduced pasture quality may pursue the use of CRP acres for grazing. So far, three Nebraska counties have applied for the exception, which requires 40% loss of feed and 40% loss of moisture. Before initiating any management changes in your CRP acres, contact your local NRCS office.

Much of the CRP lands have a residue of previous growth. With warm season grass CRP acres, this accumulation can add up to 8,000-12,000 pounds per acre and may have caused the grass stand to decline and lose density.

A producer who hopes to have the CRP released for haying or grazing should evaluate the pros and cons.

The residue will provide high tonnage of low value feed for hay or grazing. When mixed with new growth from the current season, it can provide a lot of grazing. Cattle will pick through it for the best feed available. With short feed supplies the abundance of this low quality feed may be desirable.

Harvesting a CRP site with this accumulation of hay may be difficult, depending on the equipment. Extra machine charges may be imposed because of the extra tonnage. This hay will include weathered mature growth from previous years and be of low feed value.

Producers may want to consider prescribed burns as a method to get rid of this accumulation and provide a higher quality feed for grazing or haying. A properly applied fire will thicken the stand of grass; however it may not be the best solution in all cases.

Before deciding to burn, producers should consider several factors. Soil moisture conditions at the time of the burn should be evaluated. Dry soil conditions will stress the grass and slow the initiation of growth and reduce the potential for growth if the weather stays dry. The top two to three feet of the soil profile should be moist before the burn is conducted to insure adequate moisture to initiate new growth in case additional rains are not received after the burn. The burn also will cause more evaporation from the soil surface until new growth shades the soil surface.

The best time to burn grass is when the new growth shoot is about one inch long. To find the new shoot dig down into the clumps of grass and look for the shoot on the desired species. Burning after this time will reduce growth and stress the grass. For Nebraska, the last week of April and the first week of May are usually the desired time to burn. Time is short to evaluate the situation and conduct a burn.

Prescribed burns on CRP sites like pastures need to follow correct safety procedures and preparation under appropriate weather conditions to reduce associated risks. Most sites will need to have the outside edge mowed or shredded to lower the height of the grass. Crews of six to ten persons will need to be assembled to safely conduct most burns.

Equipment needs will include water supply units with pumps and hose. Field sprayer units with a 75-foot hose and spray nozzles will work. Two of these units may be needed with assorted other hand tools and equipment. It's important to burn during cool, damp weather when the wind is in the correct direction.

Producers should not attempt a burn without training or having the assistance of a person experienced in prescribed burning review the plan and check procedures. Check with fire departments, NRCS and extension staff for assistance in planning and conducting a burn.

Robert Stritzke, Extension Educator, Fairbury

Alfalfa weevil feeding (Continued from page 44)

During day. Scratching in the soil around the crown and counting the number of larvae found per crown will help give a better idea of clover leaf weevil infestation. Since they overwinter as larvae, they will be larger than alfalfa weevils, which overwinter as eggs or adults. The color of clover leaf weevil larvae is more variable, ranging from green to pale brown. Their brown heads will help distinguish them from the black headed alfalfa weevil.

Keith Jarvi, Extension Assistant IPM, Northeast R&E Center

Table 2. Comparison of alfalfa weevil to clover leaf weevil.

<table>
<thead>
<tr>
<th>Alfalfa weevil</th>
<th>Clover leaf weevil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overwinter primarily as adults</td>
<td>Over winter primarily as larvae</td>
</tr>
<tr>
<td>Adults brown with dark brown stripe halfway down back, 3/16 inch long</td>
<td>Adults dark brown, pitted light brown underneath, over 1/4 inch long</td>
</tr>
<tr>
<td>Larvae prefer to feed on tips of plant</td>
<td>Larvae feed anywhere on plant</td>
</tr>
<tr>
<td>Larvae remain on plant most of time</td>
<td>Many larvae in soil or debris during daytime hours</td>
</tr>
<tr>
<td>Larvae have black heads</td>
<td>Larvae have brown heads</td>
</tr>
<tr>
<td>Adults leave fields in June</td>
<td>Adults may remain in fields</td>
</tr>
</tbody>
</table>
**Haste may waste crop yield**

**Take 5 minutes now to check planter**

Planners have to cut and handle residue, penetrate the soil to the desired seeding depth, and establish proper seed-to-soil contact. To do this correctly, the planter has to be set-up, adjusted, and operated properly. By taking five minutes in the field before filling the planter, you can evaluate your planter and make any adjustments necessary to make planting successful.

Check the double-disk seed-furrow openers for proper adjustment. The two blades should be sharp, without a gap between them. Blades mounted side-by-side should have about two inches of contact. Staggered seed-furrow openers should have the rear blade tucked in behind and just touch the leading blade.

To penetrate to desired seeding depth, downpressure springs may be needed to transfer weight from the toolbar to the row units. There must be sufficient weight on the units to keep the depth gauge wheels in firm contact with the soil. There needs to be enough total weight on the toolbar to keep the planter drive wheels from slipping since the springs are “lifting” the toolbar especially when the planter is nearly empty.

Level the planter in the field, making sure that the toolbar is at the proper height so that the parallel links connecting the row units to the toolbar are level. Also, level the planter from front-to-rear by changing the hitch height on pull-type planters or the third-link on mounted planters. Leveling the planter in the field is especially important if there are any ridges in the field from cultivation last year. Make sure that the planter is leveled or even operated slightly tail-down to improve seed-to-soil contact.

Once the planter is leveled, try planting. Evaluate if the planter has the proper weight and downpressure by planting a short distance and stopping with the planter in the ground. Check the depth gauge wheels on each planting unit to see if they are loose and you can rotate them easily. If you can, tighten the downpressure springs or add heavy-duty springs.

Check the closing of the seed furrow by evaluating the seed-to-soil contact, not the top of the seed-vee. As long as the contact is there, do not increase the closing force on the press wheels because this can over-compact the soil and reduce the stand. Also check the seeding depth and seed spacing on each row.

**Paul Jasa**  
Extension Engineer

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### Preplanting doublecheck

1. Make sure the double disk seed-furrow openers don’t have a gap between them.

2. Level the planter front-to-rear in the field. Too many planters are operated nose down.

3. Set the toolbar at the proper height in the field. The parallel links need to be level, not pulling up or down on the planter units.

4. Plant with a nearly empty planter to check downpressure and weight. Stop and check the depth gauge wheels and drive wheels. Use downpressure springs to keep the depth gauge wheels in firm contact with the soil. Add weight for the springs to act against and to keep the drive wheels from slipping.

5. Make sure any row cleaner is only moving residue not soil. Don’t create a furrow which may crust or erode.

6. Check seeding depth on all rows. You may have to set it deeper if depth gauge wheels are riding on residue.

7. Check seed spacing in the seed-vee. Population rate charts may not be accurate.

8. Check seed-to-soil contact, not the top of the seed-vee. Don’t over-compact the seed trying to close the seed-vee.

**Paul Jasa**  
Extension Engineer
Grazing restrictions for pasture herbicides

Hard to control pasture weeds such as musk thistle, leafy spurge, and spotted knapweed can be controlled with a number of herbicide treatments, once the grazing season has begun. Many of these treatments require that the animals be withheld from the treated areas for various periods of time after treatment. The following table defines these restrictions and the time frames involved with various herbicide applications.

<table>
<thead>
<tr>
<th>Herbicides</th>
<th>Products</th>
<th>lb/ai</th>
<th>Lactating Dairy Animals</th>
<th>Beef and Non-Lactating Dairy Animals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Before Grazing</td>
<td>Before Hay Harvest</td>
</tr>
<tr>
<td>Ally (Metsulfuron)</td>
<td>0.10 to 0.30 oz</td>
<td>0.06 to 0.18</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Amber (Triasulfuron)</td>
<td>0.28 to 0.56 oz</td>
<td>.0016 to .0032</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Banvel 4S (Dicamba)</td>
<td>Up to 1 pt</td>
<td>0.5</td>
<td>7 days</td>
<td>37 days</td>
</tr>
<tr>
<td></td>
<td>Up to 2 pt</td>
<td>1.0</td>
<td>21 days</td>
<td>51 days</td>
</tr>
<tr>
<td></td>
<td>Up to 4 pt</td>
<td>2.0</td>
<td>40 days</td>
<td>70 days</td>
</tr>
<tr>
<td></td>
<td>Up to 16 pt</td>
<td>8.0</td>
<td>60 days</td>
<td>90 days</td>
</tr>
<tr>
<td>Crossbow 3S Triclopyr +2,4-D</td>
<td>1 to 6 qt</td>
<td>0.75 to 4.50</td>
<td>1 year</td>
<td>1 year</td>
</tr>
<tr>
<td>Curtail</td>
<td>2.0 to 4.0 pt</td>
<td>.595 to 1.19</td>
<td>14 days</td>
<td>30 days</td>
</tr>
<tr>
<td>Escort (Metsulfuron)</td>
<td>0.2 to 0.4 oz</td>
<td>.002 to .004</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Gramoxone Extra (Paraquat)</td>
<td>0.8 to 1.5 pt</td>
<td>0.25 to 0.47</td>
<td>1 month</td>
<td>1 month</td>
</tr>
<tr>
<td>Grazon (Picloram + 2,4-D)</td>
<td>3.0 to 4.0 pt</td>
<td>0.635 to 1.25</td>
<td>14 days</td>
<td>30 days</td>
</tr>
<tr>
<td>Roundup/Rascal (Glyphosate)</td>
<td>Spot or Wiper*</td>
<td>Any labeled rate</td>
<td>14 days</td>
<td>14 days</td>
</tr>
<tr>
<td></td>
<td>Broadcast</td>
<td>Any labeled rate</td>
<td>8 weeks</td>
<td>8 weeks</td>
</tr>
</tbody>
</table>

(Continued on page 48)
Grazing restrictions for pasture herbicides  
(Continued from page 47)

Rates

<table>
<thead>
<tr>
<th>Herbicides</th>
<th>Products</th>
<th>lb/ai</th>
<th>Lactating Dairy Animals</th>
<th>Beef and Non-Lactating Dairy Animals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Before Grazing</td>
<td>Before Hay Harvest</td>
</tr>
<tr>
<td><strong>Spike 20P</strong> (Tebuthiuron)</td>
<td>1/2 oz/45 sq ft</td>
<td>—</td>
<td>0</td>
<td>1 year²</td>
</tr>
<tr>
<td><strong>Stinger 3E</strong> (Clopyralid)</td>
<td>0.66 to 1.31 pt</td>
<td>0.25 to 0.5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Tordon 22K</strong> (Picloram³)</td>
<td>1/2 to 2 pt</td>
<td>0.125 to 0.5</td>
<td>14 days</td>
<td>14 days</td>
</tr>
<tr>
<td><strong>Weed-out 2,4-D</strong></td>
<td>—</td>
<td>1.0 to 2.0</td>
<td>7 days</td>
<td>0</td>
</tr>
<tr>
<td><strong>2,4-D/MCPA⁴</strong></td>
<td>—</td>
<td>0.5 to 2.0</td>
<td>7-14 days</td>
<td>30 days</td>
</tr>
</tbody>
</table>

¹Do not treat more than one-tenth of any given acre at one time with spot or wiper applications. Remove livestock before application.
²Restrictions are based on the degree of new seedling establishment before grazing. It’s suggested to have at least 6 inches of grass or legume seedling growth -- approximately one month’s. Late fall seeding may require three to five months before the suggested 6-inch height is reached.
³Remove livestock to untreated grass pasture for seven days before transferring livestock to broadleaf crop or pasture areas. Removal before slaughter statement only applies to animals grazing treated forage for two weeks immediately after application. Use only west of Mississippi River.
⁴Be sure to check individual product labels for restrictions and use rates due to the large number of formulations available.
⁵One year if more than 1.5 gal/A rate used.
⁶If no more than 20 lbs per acre used.
⁷Withdrawal not needed if two weeks or more time elapsed since application.
⁸Remove livestock to untreated grass pasture for seven days before transferring to broadleaf crop or pasture areas.