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CROP WATCH

University of Nebraska Cooperative Extension
Institute of Agriculture and Natural Resources

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No. 2003-17, July 4, 2003

Harvesting lodged winter wheat

Combining wheat that is flat on the ground following recent storms can create challenges for producers. Several combine adjustments can help improve harvest operations and residue distribution.

The wider the combine platform and the taller the wheat was before lodging, the bigger the problem. Since most of the straw may be run through the combine, residue distribution will be particularly important. Without good residue distribution it will be almost impossible to plant and obtain a good crop stand next spring.

If you use the entire platform width, you have to go slow. A better option would be to use only part of the platform width and go faster if you don't spread the residue the full width of the platform and can keep from running the cut residue through a second time. This will result in better crop residue distribution. In some situations the lodged wheat will best be cut in only one direction while in other cases, it will work to cut it at 90^0 which will enable cutting in both directions. Start on the side where the wind will blow the residue away from the uncut wheat, again improving crop residue distribution.

It can be difficult to keep the wide platforms parallel and close to the ground unless there are sensors on the platform. Flex platforms are also helpful in trying to stay close to the ground. Often a flex head, which is used to harvest soybeans, will work well to cut wheat close to the ground. It follows the contour of the ground and usually is narrower than a platform head.

The best option, however, is a striper header since it doesn't run the straw through the combine. Crop residue distribution won't be as much of a problem, but the chaff (fines) still need to be spread.

Good crop residue distribution is

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Inside

Use of biotech crops up

Nebraska producers have embraced biotech soybeans and to a lesser extent, biotech corn, and are among the nation's top users of these new technologies, according to a June 30 USDA report.

The Agricultural Statistics Service selected farmers from across the United States in June to assess planted acres. Questions included whether farmers had planted corn or soybeans that, through biotechnology, are resistant to herbicides, insects or both. Conventionally bred, herbicide resistant varieties were excluded and the insect resistant varieties include only those containing bacillus thuringiensis (Bt).

Not surprisingly, herbicide resistant soybeans constitute the majority of soybeans planted in Nebraska this year at 86%, a slight increase from 85% in 2002.

Nebraska ranked fifth nationally in its planting of biotech varieties as a percent of all soybeans planted, behind South Dakota (91%), Mississippi (89%), Indiana (88%) and Kansas (87%). Other top users were: Arkansas (84%), Iowa (84%), Wisconsin (84%), Missouri (83%), Minnesota (79%), Illinois (77%), Ohio (74%), North Dakota (74%), and Michigan (73%). The U.S. average of soybean acres planted to biotech varieties was expected to be approximately 81%, up from 75% last year.

With corn, Nebraska producers planted 52% of this year's crop to a biotech hybrid, an increase of 6% from last year's 46%. Thirty-six percent of all Nebraska corn was planted to insect resistant (Bt) corn, a slight increase from the 34% in 2002. The use of Bt corn constituted the majority of the biotech use in

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Updates

Roger Elmore, Extension Crops Specialist: Following recent storms we found 70% or more greensnap in some hybrids in the corn hybrid trial at the South Central Ag Lab near Clay Center. Some hybrids were virtually undamaged and others were severely damaged by strong (up to 80 mph) east winds on June 22. Hybrid differences were distinct and "right to the row." Breakage occurred at about the v7 stage and plants are now at about v8 to v9. Breaks occurred right at the soil surface (node 5 or 6). We've taken stand loss data and hope to track some other information later in the season from some of the hybrids.

Thomas Hunt, Extension Entomologist, NEREC: Potato leafhoppers have reached economic thresholds in some alfalfa fields in northeast Nebraska and are at relatively high levels in many fields. Farmers should scout their fields and refer to June 20 *CropWatch* (*cropwatch.unl.edu/archives/2003/crop03-15.htm*) and NebGuide G93-1136, "Potato Leafhopper Management in Alfalfa" *http://www.ianr.unl.edu/pubs/insects/g1136.htm*) for management guidelines. Keith Glewen, Extension Educator in Saunders County, said potato leafhoppers are causing serious damage to some alfalfa fields there as well.

Keith Jarvi, Extension IPM in the NEREC agreed, adding: Most farmers are getting within a week of second cutting so are waiting to cut. Some newly seeded stands may be hurt if not scouted for leafhoppers.

Nebraska Agricultural Statistics Service: Corn stocks in all positions on June 1 totaled 357 million bushels, down 15% from June 1, 2002, according to USDA's Nebraska Agricultural Statistics Service. Of the total, 165 million bushels are stored on farms, down 25% from a year ago and the lowest total since 1996. Off-farm stocks, at 192 million bushels, are down 4% from 2002.

Soybeans stored in all positions on June 1 totaled 39 million bushels, down 28% from last year. On-farm stocks are 15 million bushels, unchanged from last year. Off-farm stocks are 24 million bushels, down 39% from 2002.

Wheat stored in all positions on June 1 totaled 16.8 million bushels, down 50% from a year ago and the lowest total since 1997. On-farm stocks of 3.2 million bushels are down 29% from 2002. Off-farm stocks at 13.6 million bushels are down 53% from last year.

Sorghum stored in all positions on June 1, 2003 totaled 14.5 million bushels, down 30% from 2002 and the lowest total since 1996. On-farm stocks are at 2.3 million bushels, down 47 from a year ago. Off-farm stocks at 12.2 million bushels are 26% below 2002.

Access the National publication for this release at: *http://usda.mannlib.cornell.edu/reports/nassr/field/pgs-bb/2003/grst0603.pdf*

USDA Nebraska Agricultural Statistics Service: For the week ending June 29, wheat harvest was just beginning, although a week and a half behind normal, according to USDA's Nebraska Agricultural Statistics Service. Temperatures for the previous week average 2-10 degrees below normal.

Corn condition rated 1% very poor, 2% poor, 14% fair, 58% good, and 25% excellent, above last year and average. Irrigated corn rated 83% good and excellent while dryland rated 82%, both well above the 59% and 26% of a year ago.

Soybean condition rated 2% poor, 17% fair, 63% good, and 18% excellent, above last year and average.

Sorghum condition rated 4% poor, 31% fair, 55% good, and 10% excellent, above last year and average. Ninety-seven percent of the fields had emerged. Last year emergence was complete with average at 98%.

Wheat condition rated 4% very poor, 13% poor, 27% fair, 44% good, and 12% excellent, well above last year and the five-year average. Wheat fields had turned color on 90% of the acreage, behind 94% last year and near the 89% average.

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Combine *(Continued from page 159)*

even more important in cutting lodged wheat. Make the necessary modifications and additions to improve crop residue distribution of the long straw and the chaff. If residue amounts are greater than 6,000 bu/ac, you may want to bale and remove part of the residue. This is especially true in irrigated winter wheat.

Combine platforms greater than 24 feet will probably need both straw and chaff spreaders, while some combines less than 24 feet, will or can be modified to do a satisfactory job of spreading the long straw but will need chaff spreaders. Winds also increase straw distribution problems.

Improving existing straw spreaders will not help spread the chaff since the chaff does not pass through the spreader. There are several ways to increase spreading of the long straw with the existing spreaders. These include:

If the spreader bats are worn and have rounded edges, replace them. Square edges on new rubber bats will normally increase spreading width. Try increasing the rotational speed of the spreader by changing drive sprockets or sheaves. Add more bats, longer bats, or increase the width of the bats.

If alterations are made in the mechanism, provide safety shields that will prevent accidental contact with moving machine components. Longer and angled deflector blades may improve spreading of chopper attachments. Before attempting modifications, check with the combine dealer or manufacturer to determine if these changes could have an adverse affect on the life or performance of the combine.

Improving chaff spreading often includes some method of getting the chaff back to the straw spreader and improving the spreader to handle chaff. Increased or redirected air flow may move the chaff far enough to reach the straw spreader bats, but avoid sacrificing the cleaning performance of the combine. Deflector pans or chutes may be used to move the chaff back to the straw spreader. Lowering the straw spreader may help get the chaff into the spreader. Longer bats, more bats, or a solid disk in the center of the bat assembly may improve chaff spreading by the straw spreader.

Tip

When planting in these heavy residues next spring the best time to plant is when the residue is dry. If this condition occurs earlier than the recommended planting date for corn, this would be a good time to use seed coatings which delay germination so you can take advantage of the dryer conditions.

Equipment may be purchased and added on the combine to spread straw and/or chaff. Chaff spreading concepts include horizontal spinning disks, axial fans, and other air conveyance systems. Most add-on straw spreaders use a spinning disk or blade mechanism. Longer and more angled deflector blades are available for choppers.

Many of these add-on devices will have excellent spreading performance, but carefully consider other aspects before making modifications. If hydraulically driven, does your combine have adequate hydraulic pressure, flow rate, and cooling capacity? Does it appear to be vibration-prone to cause structural damage to your combine? Will the unit consume enough power to detract from the combine capacity? Do the mounting and mechanical driven features appear to be adequate to avoid early maintenance problems? Is it detachable so it can be installed on another combine? Is it convenient to operate the combine without running or removing the spreader? Does the spreader limit access to sieve or chaffer adjustments?

Bob Klein, Extension Crops Specialist, West Central REC

Grassland Reserve Program sign-up starts

The first sign-up for the Grassland Reserve Program (GRP) began nationwide on June 30, according to a USDA Farm Services Agency press release.

Grasslands make up the largest land cover on America's private lands. Privately owned grasslands and shrublands cover more than 525 million acres in the United States. For the first time, the USDA will direct financial resources and technical expertise to help landowners protect and restore these lands. Applications for participation will be accepted on a continuous basis at local USDA service centers.

Once funding has been exhausted, eligible applicants will remain on file until additional funding becomes available. Almost $50 million in fiscal year 2003 funds will be available to implement GRP.

The program will help landowners restore and protect grassland, rangeland, pastureland, shrubland and certain other lands and provides assistance for rehabilitating grasslands. It will conserve vulnerable grasslands from conversion to cropland or other uses and help maintain viable ranching. When properly managed, grasslands and shrublands can result in cleaner water supplies, healthier riparian areas and reduced sediment loadings in streams and other water bodies. For more informationcontact your local USDA Service Center. Information, including Federal Register notices and rules, also is available at *http://www.nrcs.usda.gov/programs/farmbill/2002.*

June rains spell relief from 2002 drought conditions

Scattered areas of heavy rain during June have led to an easing of drought conditions across most of Nebraska. According to the National Drought Monitor, no area of the state is classified in the extreme or exceptional category. In addition, outside of the Panhandle and portions of southwestern Nebraska, hydrological issues are the primary concern.

This June has been exceptionally wet in comparison to June 2002 and temperatures are considerably cooler. Last June, much of the state failed to receive an inch of precipitation, with most locations receiving at least 15 days of temperatures over 90°F. This year, most locations received at least 2 inches of precipitation, with some areas of central and eastern Nebraska receiving 6-12 inches. The number of days above 90°F was 30-40% of the long-term average of seven days.

Even with the heavy bouts of rainfall and severe weather, western reservoirs are still suffering the impacts of multiple drought years and insufficient snowpack. Several reservoirs in southwestern Nebraska have failed to respond to the increase in precipitation. According to the Natural Resource and Conservation Service, inflows into reservoirs are not outpacing evaporation and lake levels continue to decline. Until soil profiles are sufficiently moist, a dramatic increase in streamflow rates is not expected until the conclusion of the agricultural season.

As of June 19, the level of Lake McConaughy was 14 feet lower than at the same time last year. Fortunately, planting delays coupled with normal to slightly below normal temperatures have tempered irrigation demands. Irriga-

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Biotech *(Continued from page 159)*

corn for all states and increased or stayed the same from 2002 for all states. In Nebraska herbicide resistant corn accounted for 11% of the total, compared to 9% last year, equal to the national averages. The top 11 reporting states all increased their use of herbicide-resistant corn slightly, with the largest increase in Minnesota where use increased form 8% to 14%. The survey also indicated that 5% of Nebraska's crop had been planted in corn with a stacked gene, up from 4% in 2002.

Nebraska biotech corn plantings (52%) placed it third in the nation behind South Dakota at 75% and Minnesota at 53%. The percentages of the total corn planted to a biotech hybrid ranged from a low of 9% to 75%, a significantly broader range than with soybeans.

Percent of all corn planted to biotech hybrids for other states included: Kansas (47%), Iowa (45%); Missouri (42%), Wisconsin (32%), Illinois (28%), Michigan (35%), Indiana (16%) and Ohio (9%). In the United States, a total of 40% of the corn was planted to biotech hybrids, up from 34% in 2002.

The states represented 81% of all corn acres and 89% of all soybean acres. Regarding corn production, the insect resistant varieties include only those containing bacillus thuringiensis (Bt) and the stacked gene varieties included those with both herbicide and insect resistance.

The states for which these statistics were reported represent 81% of all corn planted acres and 89% of all soybean planted acres.

The full USDA National Agricultural Statistics Service report was released Monday (June 30) and is available on the Web at: *http://www.usda.gov/nass/PUBS/TODAYRPT/acrg0603.txt*

Lisa Jasa, CropWatch

Ag plantings report: Corn acres down, but sorghum, alfalfa and wheat acres up

Nebraska producers increased acreage devoted to sorghum, oats, millet, alfalfa hay, and winter wheat (planted last fall) this year while decreasing acreage devoted to corn, dry edible beans, sugarbeets, sunflowers, and other hay, according to USDA's Nebraska Agricultural Statistics Service.

Nebraska **corn** growers planted 8.0 million acres in 2003, down 5% from last year and 1% below 2001. **Soybean** producers planted 4.7 million acres, unchanged from the previous year. The 2003 plantings are equal to the second highest of record, but 5% below the record high of 4.95 million set in 2001.

Last fall **winter wheat** was sown on 1.8 million acres, up 9% from a year earlier and the largest acreage in four years.

Sorghum growers planted 650,000 acres, 44% more than 2002, up 18% from 2001, and the largest total in five years.

Alfalfa hay acreage for harvest, at 1.45 million, is up 7% from last year while other types of hay cut is down 3%. **Oat** seedings at 195,000 acres are up 11% from 2002. **Dry edible bean** producers planted 160,000 acres, down 14% from a year earlier. **Sugarbeet** plantings of 39,800 acres are down 30% from 2002. Sunflower acreage of 55,000 is down 5% from a year ago. **Millet** was being planted on 160,000 acres, up 23% from 2002.

For more information, see the national NASS release on this topic at *http://usda.mannlib.cornell.edu/reports/nassr/field/pcp-bba/acrg0603.pdf*

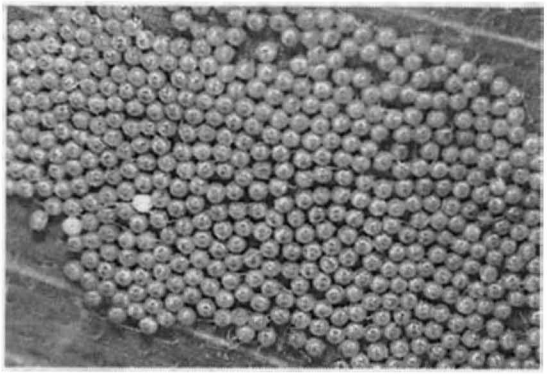
Western bean cutworm moths in flight

Western bean cutworm (WBC) moths are currently being caught in light traps throughout much of Nebraska. The occurrence of these moths will continue to increase until mid to late July and then will decrease. There have been many reports of increased numbers of these pests in the region, with infestations reported throughout northeastern Nebraska, into South Dakota, Minnesota and Iowa. Infestations can be cyclical in eastern Nebraska and at this time appear to be increasing.

Farmers and crop consultants throughout Nebraska should begin to scout fields for the white dome-shaped western bean cutworm eggs. Female moths preferentially search out pre-tassel corn and later, if available, move to dry edible beans to lay their eggs. These eggs are laid in clusters of five to 200 on the top surface of the upper most leaf of a corn plant and on lower leaf surfaces of dry beans. The eggs require five to seven days to develop, during which time the egg color changes to tan and then to purple immediately before they hatch.

After the small, dark brown larvae hatch on corn plants, they move to the whorl or tassel to feed on the tender yellow leaf tissue or on the tassel itself. Once the tassel emerges or if it has already emerged when the eggs hatch, the larvae will move to the green silks. The developing larvae will feed on the green silks, moving down the silk channel until they reach the ear tip. The larvae will feed in the ear tip until they are fully developed. If the infestation on one ear tip is so great that the larvae become crowded, a few individuals may move outside the ear and begin to feed on the side of the ear. They will chew through the husks and eventually begin to feed on the developing kernels, causing extensive damage.

Western bean cutworm that hatch on dry bean plants, feed on blossoms and young, tender leaf material. The larvae will attack bean pods as they develop, eventually feeding on the developing seeds.



Western bean cutworm egg mass

In corn

Even though field scouting for western bean cutworm in field corn should begin when the first moths are caught, control decisions should be made shortly after the moth flight peaks. The moth flight usually peaks between July 10 and July 24.

When scouting for western bean cutworms in corn, check 20 plants in at least five areas of each field. Look for eggs on the top surface of the upper most leaf or look for larvae in the tassel. If 8% of field corn plants, 5% of seed corn plants or 5% of popcorn plants have egg masses or larvae, consider applying an insecticide.

Western bean cutworm moths prefer to lay eggs in corn plants that are in the late whorl stage compared to those that have completely tasseled. Pay particular attention to later planted fields or those with uneven development. Western bean cutworm eggs that hatch when corn plants are in the whorl stage of growth have a high rate of survival. The larvae are well protected in the whorl or tassel.

If an insecticide treatment is warranted in corn fields, it should be made when 95% of the plants in a field have tasseled. This timing of the application increases the chance that the worms will be exposed to the insecticide resulting in better control. It is also important to make insecticide applications before the larvae reach the silks. Once the larvae reach the silk zone they quickly move to areas under the husks where they are more protected from insecticide treatments.

In dry edible beans

Milk jug type pheromone or scent traps are recommended to monitor potential western bean cutworm infestations in dry edible beans. Mount traps on a post about 4 feet above the ground on the north and south edges of each field. The traps should be located in areas with at least some vegetation around them. The pheromone source should be pinned to the underside of the milk jug lid. A mixture of four parts water and one part antifreeze with a few drops of liquid soap should be placed in each cut out milk jug. Instructions for constructing a milk jug trap and where to buy moth pheromone may be found in the University of Nebraska NebGuide, "Western Bean Cutworm in Corn and Dry Beans" (G98-1359), available on the Web at *http://www.ianr.unl.edu/pubs/insects/*

Check traps every few days until the number of collected moths begins to decline. When the traps are checked, the moths should be removed, counted, and liquid should be added. If the number of

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Research tests spray particle size distribution with different pressures and nozzle tips

UNL research on spray particle size distribution is helping identify how selecting the right nozzle and pressure for a specific type of herbicide can improve pesticide efficacy and reduce drift. Bob Klein, extension crops specialist, and Jeff Golus, extension research technician, at the West Central Research and Extension Center at North Platte are examining spray particle size, volume and distribution using a laser light diffraction analyzer and software.

What they've found may change how some of the more popular herbicides, such as glyphosates, are applied.

Doubling the spray particle size diameter -- for example, from 300 to 600 microns -- results in 1/8 as many spray droplets. Traditionally it was thought that a medium spray droplet (volume median diameter of 242-358 microns) should be used for maximum herbicide efficacy. The UNL research, however, suggests that different droplet sizes work better with different types of herbicides, depending on the mode of action.

For example, with a contact, nontranslocated herbicide such as paraquat, a medium spray droplet size provides for maximum plant coverage. Since damage is caused where the droplet lands, with more smaller droplets dispersed over a wider plant area provided greater herbicide efficacy. However, for translocated herbicides, such as glyphosate products, a coarse droplet size (volume median diameter of 359-451 microns) was found to work better. With the larger droplet, more material was available in a given location to disrupt the cuticle and enter the plant, helping facilitate translocation of the herbicide before it could evaporate. The bigger the spray droplet, the greater its persistence or longevity.

These results should be good news to producers using translocation herbicides and wanting the benefits of reduced pesticide drift and improved herbicide efficacy.

Figures 2, 3, 4, and 5 are spray particle size distributions of Extended Range, Turbo TeeJet, Air Induction, and Turbo FloodJet nozzle tips at various pressures. These were taken in one location just off center of the

(Continued on page 165)

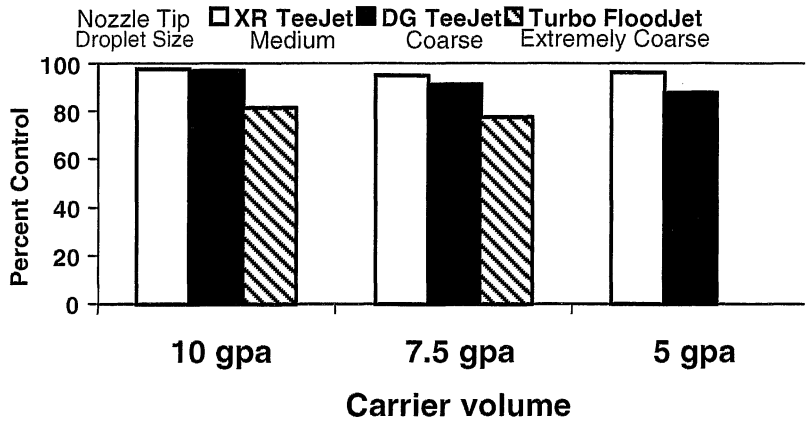

Figure 1. Volunteer wheat control 35 DAT using paraquat + atrazine at 0.31 + 0.5 lb/A with XR, DG, and TF nozzles.

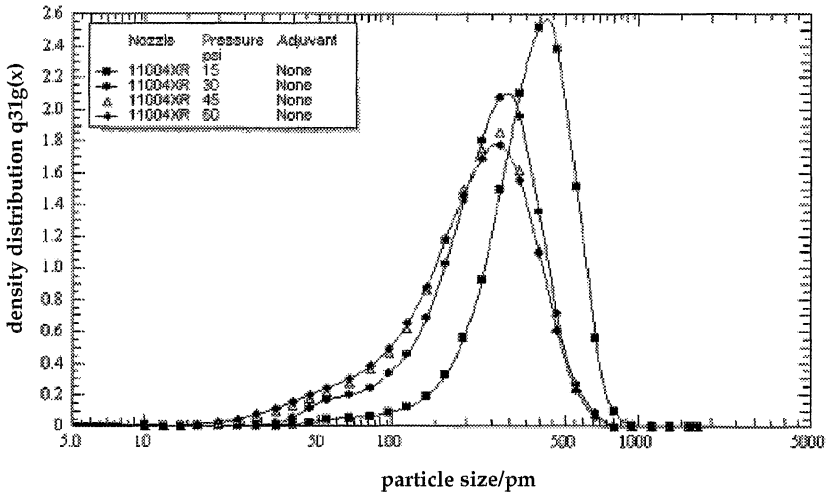

Figure 2. The spray particle distribution of 11004 extended range nozzle tip at 15, 30, 45 and 60 psi with water.

Table 1. In Roundup Ready corn plants, glyphosate applied with fine, medium, and coarse droplets. (Paul Feng, Monsanto)

Droplet size	% Retention (actual over calculated)	% Total uptake	% Root translocation
Fine	47 ± 2	30.1	9
Medium	37 ± 7	35.1	10
Coarse	38 ± 4	48.9	16

Spray particles

(Continued from page 164)

spray pattern. In *Figure 2* with the Extended Range nozzle tip the spray particle size distribution changes greatly for 15 to 30 psi with less change from 30 to 45 psi and almost no change from 45 to 60 psi. In *Figure 3* with the Turbo TeeJet nozzle tip there is change in particle size distribution within the pressure ranges. In *Figure 4* with the Air Induction nozzle tip there is less change in particle sizes than with the other nozzle tips. In *Figure 5* with the Turbo FloodJet nozzle the change in spray particle size appears to be consistent with the changes in pressure.

This research also is examining the effect of drift retardants on spray particle size. Do they make just big drops bigger or do they make all drops larger? This analyzer will help us determine which, if any, drift retardants are of value.

As this research project continues, further correlations and recommendations will be made available to Nebraska producers.

The research is partially funded by the Nebraska Wheat Board.

Bob Klein, Extension Crops Specialist
Jeff Golus, Extension Research Technician
Both at the West Central REC

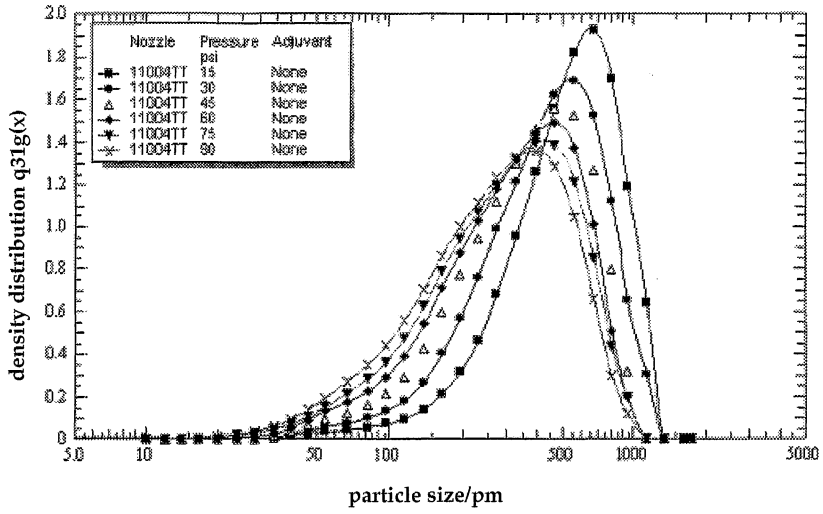

Figure 3. The spray particle size distributions of 11004 Turbo TeeJet nozzle tips at 15, 30, 45, 60, 75 and 90 psi with water.

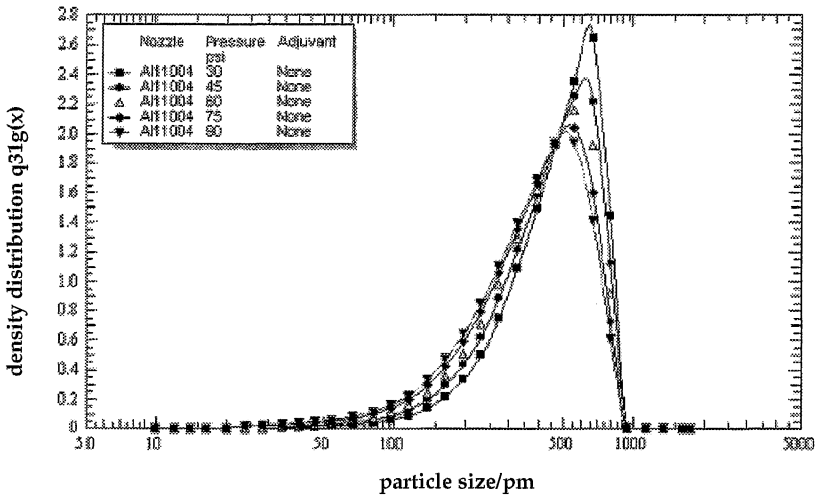

Figure 4. The spray particle size distribution of 11004 air induction nozzle tip at 30, 45, 60, 75 and 90 psi with water.

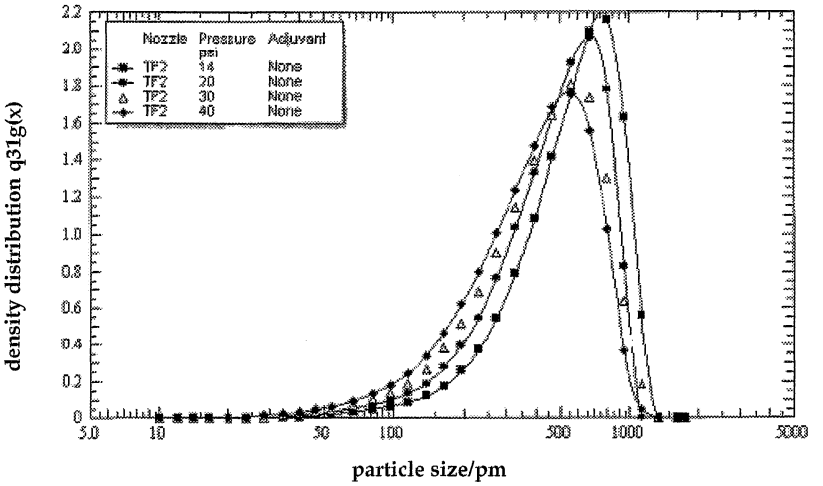

Figure 5. The spray particle distribution of Turbo FloodJet 2 nozzle tip at 14, 20, 30 and 40 psi with water.

Western bean cutworm

(Continued from page 163)

moths accumulated up to the peak of the moth flight totals less than 700, the risk of significant damage is minimal. The risk of damage is moderate if 700-1000 moths are accumulated in each trap. The risk of damage is significant if more than 1000 moths are collected from the initiation to the peak of the moth flight.

If the moth flight is moderate, use the infestation in a nearby corn field as a decision making guide. If the adjacent corn needs an insecticide treatment for western bean cutworm, the beans also should be treated. Bean fields requiring an insecticide application should be treated 10-20 days after peak moth flight.

Ronald Seymour, Extension Educator in Adams County
Gary Hein, Extension Entomologist
Panhandle REC

Weed profile

Purple loosestrife -- biology and control

Purple loosestrife (*Lythrum salicoria*), was introduced to North America from Europe in the 1800s. Since then, it has slowly invaded wetlands and waterways across the Midwest, including about 12,000 acres of Nebraska's wetlands. Once used in landscape plantings, purple loosestrife is now one of the seven noxious weeds officially targeted by the state for control efforts.

When purple loosestrife invades wetlands, the natural habitat is lost and the productivity of native plant and animal communities is severely reduced. Song birds will not feed on loosestrife seeds. Muskrats can not use roots for food or shelter. Waterfowl are affected when dense impenetrable stands eliminate nesting sites and open water. If there is no room for displaced wildlife and it can't move, it may be lost forever. Purple loosestrife will grow vigorously and clog irrigation canals, ditches, stream banks and reservoirs, resulting in less water available for crop production and recreation.

A perfect plant

Purple loosestrife can colonize and thrive easily because it is a prolific seed producer and has a strong perennial root system (rhizome). 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. The rhizome grows well in marshy soils and can help the spread the species if washed away by the river water.

Not many 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 "eats themselves out of house and home". As native vegetation get consumed, more space is created for purple loosestrife to spread and produce new plants.

In general, purple loosestrife can grow 3-9 feet tall with several, square

Purple loosestrife

stalks per plant. Leaves are on opposite sides of stalk, thin and sharply pointed with the base rounded or heart shaped. In Nebraska, it will flower from July to September. Flowers, which range from red to rose-purple, are arranged on 1-3 foot spikes. The fruit is a small oblong capsule with two valves containing many small seeds. Each plant has several spikes and each spike can produce up to 100,000 tiny, light seeds that are readily moved by wind. Seeds are extremely viable and will easily germinate when exposed on bare soil. Root system is strong and when mature, the root branches become thick and woody.

Control

Purple loosestrife has no natural enemies or plant competitors here in North America, therefore its spreading is hard to stop. A single control measure can't provide long-term, sustainable, management; however, management practices integrated in a systematic manner can provide for improved control. Elements of an integrated plan include:

1. Prevention and Education. Educating the public is essential to preventing the spread of loosestrife. Many people are not aware of its impact and inadvertently may aid it. For example, several duck-hunters reported using plants with purple flowers to build their duck-blinds and to camouflage their boat. Of course, the boat was used to travel up and down the river. Inadvertently, the likely aided the spread of purple loosestrife. Remember, one plant can produce one to two million seeds.

2. Manual control. Pulling and digging plants can be very effective for small areas, especially with plants that are one to two years old. Loosestrife spreads vegetatively from stems, therefore, regeneration from discarded plants is likely. They should be dried and burned.

If plant pulling is not feasible, removing flower heads helps reduce spread of the seeds. Simply cut the heads in July and August (before the flower sets seed). Seed formation starts at the bottom of the flower and progresses to the tip. Before cutting the seed head off, check to see that no ripe seeds are present.

3. Cutting. Cutting can actually spread loosestrife if the cuts are not removed because the cut stalk portions can sprout. Remove and burn all cut portions. Make sure that all plant parts are in a carton or protected site so that they can dry completely without danger of being spread by wind, water, human or animal activity.

4. Herbicides: Herbicides alone can not provide economical control; however, they should be part of an integrated approach. Herbicides are especially important for 'spot spraying' and control of this weed along road sides and ditches.

Recommended herbicides include Rodeo (4-6pts), Garlon 3A (3-5pts), Escort (2-4oz/acre), and 2, 4-D (3-5pts/acre), and Arsenal under special circumstances (see further).

(Continued on page 167)

Purple loosestrife (Continued from page 166)

Before using any herbicide check the label carefully for recommended rates, appropriate additives and plant species sensitivity. Each of the recommended herbicides has benefits and risks associated with its use.

Garlon or 2,4-D or the mix of the two will prevent seed production and provide short-term suppression. Annual applications would be required for several years, but generally the cost would be low. Longer-term control, which means spraying once in several years, can be achieved with Rodeo (and other aquatic glyphosates), Escort, Arsenal and a mixture of Escort and 2,4-D. Arsenal should be used for specifically targeted and controlled sites. Due to the nonselective nature of these herbicides, they should be used as part of an integrated and site specific approach. These nonselective herbicides should not be used at the same site continuously for more than two to three years to allow native vegetation to regrow.

Of the recommended herbicides (*Table 1*), only the three (aquatic glyphosate, aquatic 2,4-D and aquatic triclopyr (Garlon)) are currently registered in Nebraska for use in aquatic sites (sites that are continuously under water). Do not use non-aquatic glyphosates (eg. Roundup-named products, and other generic glyphosates registered for use in Roundup-Ready soybeans) for spraying aquatic sites. They are toxic for aquatic wild life (eg. fish, frogs, etc).

The best time to apply herbicide is at the beginning of the flowering stage, which usually occurs from mid June to end of July. Early flowering is a preferred because plants can be more easily identified by their purple flowers at this time and this is one of its most vulnerable stages for chemical control. Herbicide solutions can be applied using a backpack, tractor-mounted or pulled sprayer or can be applied from a boat or plane in solutions ranging from 10-20 gallons per acre.

If you're 'spot spraying' with a backpack sprayer, use 1 pint of Rodeo + 3 oz NIS per 3 gallons of water. The spray solution volume is on a spray-to-wet basis. The product is nonselective, therefore, avoid injuring native vegetation. As always, read and follow the product label directions.

6. Biological control using insects does not eliminate the target weeds, but can suppress weed population to a non-significant level. Bio-control agents alone can not provide long-term control; however, they are a necessary part of an integrated approach to stop the expansion of currently infested acres. Several biological control insect species have been introduced, including root weevil (*Hylobius sp.*), two beetles (Galerucella sp.), and two flower-feeding weevils (*Nanophyes sp.*). They are highly host specific to purple loosestrife, defoliating the plant as both adults and larvae. In its native habitat in Europe, these insects played a key role in controlling purple loosestrife.

It is believed, however, that insects alone can not provide adequate control here. In other areas of the United States and Canada, it took 7-15 years to observe some effect of insect feeding. For more information on rearing biocontrol agents, see NebGuide (G01-1436-A), *"Rearing and Releasing Galerucella Beetles to Control Purple Loosestrife."*

Rearing and releasing insects however is just one step in the process of biocontrol. Monitoring insect establishment, spread, and impact is crucial for the success of the biological control program. Monitoring programs will determine the effectiveness of *Galerucella* beetles throughout Nebraska to optimize the beetle release program. For more information see Extension Publication (EC02-175) *"Biological Control of Purple Loosestrife: Monitoring Galerucella Establishment and Impact"* (by Hunt and Knezevic).

7. Monitoring: Monitor the sites for several years. New shoots may come up from plant remnants.

Stevan Knezevic, Integrated Weed Management Specialist

June rains (Continued from page 162)

tion water is expected to be delivered through August and into September. In addition, there should be enough water in Lake McConaughy to make it through the 2004 irrigation season. Once again, future delivery will depend on the 2003-04 Wyoming and Colorado snowpack.

Crop water demands will increase significantly over the next few weeks. If temperatures are normal the next seven days, corn is expected to use 0.20-0.25 inches of water per day based on a May 17 emergence date. Subtract 0.05 inches per day if your corn emerged on May 26. By July 14, corn will require 0.30-0.35 inches per day, regardless of what day in May the crop emerged. This value is based on receiving normal temperatures and could increase by up to 0.10 inch if temperatures approach or exceed 100°F coupled with low relative humidity.

If normal precipitation occurs during the next three weeks, there should be enough soil moisture to offset crop water demands of corn. This is especially important, since most of the corn crop is expected to be in the pollination stage during the last two weeks of July. The potential exists for a very respectable corn crop this year as long as the atmosphere cooperates. At this time last year, many eastern Nebraska dryland corn fields were exhibiting signs of severe drought stress. What a difference a year makes.

Al Dutcher
State Climatologist

Estimating the effect of drought on corn at various crop stages

Despite recent rains, dryland corn in some areas may still be short of moisture. Inadequate moisture during any period of growth can result in reduced grain yield in corn. Without sufficient water nutrient availability, uptake, and transport are impaired and plants weakened by stress will be more susceptible to disease and insects. Severe moisture stress is indicated by leaf wilting that is alleviated only when the plants receive additional water.

Vegetative growth stage

Drought stress during the vegetative stage prior to tassel and silk appearance may result in small ear size. From the 10-leaf to the 12-leaf stage (a leaf stage is indicated by the presence of the exposed leaf collar), potential kernel row number is determined in the corn plant. From the 12-leaf to the 17-leaf stage, potential kernel number per row is determined. Moisture stress during these vegetative periods may reduce both ear length and the number of potential kernels on each ear. If ear size is reduced during this period, it cannot be corrected by relieving the moisture stress later in the season. Research has shown that four consecutive days of visible wilting during the vegetative growth stage can reduce potential corn yield by 5% to 10%.

Reproductive stage

Moisture stress during pollination can result in a lack of synchronization between silking and pollen shed. Silking may be delayed in moisture-stressed plants and pollen grains do not remain viable long under drought conditions, especially when temperatures are in the mid 90s. A common result is a lack of viable pollen late in the pollination period when the silks from the tip-end of the ear are emerging, resulting in barren ear tips. Corn under moisture stress during early grain fill often will abort the last kernels to be fertilized by pollen. This also results in barren ear tips and is known as "tipping back". During silking and pollination, after four consecutive days of wilting yield can be reduced by 40-50%.

Within one to three days after a silk is pollinated and fertilization is successful, the silk will detach from the developing kernel. A preliminary estimate of the degree of pollination can be conducted in the field by carefully removing the husk leaves from an ear shoot, shaking the cob, and observing how many silks easily shake loose from the cob.

Another method to determine whether drought-stressed corn plants have been pollinated and fertilized is to look for small white blisters on the ear seven to ten days after pollen shed. To identify the blisters, take ears from several areas in the field and break them in half. Using a knife, dig out several kernels on each ear. If you find kernels that resemble blisters on the ears, you can assume that kernel fertilization occurred. If you are unsure whether fertilization has occurred, observe corn ears again in five to seven days. If the kernels were fertilized, the blisters will have rapidly increased in size compared to the earlier observation. If fertilization did not occur, kernel size will not have increased. It is also possible to tell if fertilization has occurred by slicing the kernels longitudinally through the embryo side and looking for the young embryo. Only fertilized kernels will produce embryos. Most kernels that have been fertilized will continue to develop and mature if the plants get water.

If a plant has tasseled and shed pollen but no blisters have appeared on the ears, it will be barren.

Drought stress after pollination and fertilization can result in aborted kernels or poor kernel fill, causing low test weight and reduced yield. It may also predispose the plants to development of stalk rots. Continue to assess the condition and health of the corn plants even if it appears that pollination was successful.

Alternative harvest options

If a significant portion of the ears will be barren or only sparsely pollinated or if stalk rots could hamper grain fill or harvest, consider alternative uses for the corn such as harvesting for silage or corn hay. Always check with your crop insurance agent and the Farm Service Agency before harvesting corn as forage. If you can't feed the corn forage yourself, it is a good idea to have a buyer lined up prior to harvesting as forage. For more information on utilizing drought stressed corn, including pricing formulas, consult NU NebFact NF-547 "Drought-stressed Corn"; available on the web at: *www.ianr.unl.edu/pubs/fieldcrops/nf547.htm.*

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