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CROP WATCH

University of Nebraska Cooperative Extension
Institute of Agriculture and Natural Resources

No. 2002-11
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Plan timing, select nozzles to limit risk

Reducing pesticide spray drift

Pesticide drift is usually a lose-lose situation. The first loss is the damage the drift may cause to an off-target area such as susceptible vegetation, water supplies and wildlife. The second loss is incurred by the original target, which receives less than the intended amount of pesticide.

To avoid problems, always read and follow pesticide label recommendations for drift management. Surveys indicate that about two-thirds of drift complaints derive from applications known to be off-label.

There are two kinds of spray drift - vapor drift and particle drift.

Vapor drift is the volatilization of pesticide molecules and their movement off-target. It occurs independently from the application. The potential for vapor drift of any pesticide can be predicted by its vapor pressure, the air temperature, size of treated area and climatic conditions. Vapor drift can travel much further than particle drift.

The EPA has proposed a maximum 10 mph wind speed for pesticide applications. In this week's *CropWatch* several stories address herbicide application and drift and explore how the proposed EPA regulation might affect a Nebraska farmer applying pesticides.

Avoid vapor drift by not using pesticide formulations whose potential volatility is high, given the air temperature and climatic conditions. These include pesticides which will volatilize rapidly from moist soil or higher temperatures. (See *Table 1, page 101*)

Particle drift is the off-target movement of spray particles formed during application. It is affected by

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Inside

Is it black stem or alfalfa weevils? Know the difference before treating

Recent weather conditions have favored the development of spring black stem in alfalfa in the northern third of Nebraska. This disease is sneaky in that it can cause significant loss without being noticed. It is often confused with insect damage. Following is a description of spring black stem to help differentiate it from insect damage.

Cause

Spring black stem and leaf spot is caused by the fungus *Phoma medicaginis* var. *medicaginis*. This fungus survives the winter as pycnidia or dormant mycelium in overwintered stem lesions or fallen leaves.

Symptoms occur primarily on alfalfa stems and leaves but seedpods, crowns and upper taproots also may become infected. In spring small black spots develop on leaves, petioles and stems of new shoots. The leaf lesions are irregular, and enlarge and merge until much of the leaflet is covered. Infected leaves yellow and drop from the plant. Lesions on stems and petioles turn black. As stem lesions enlarge and merge, most of the stem becomes black. If the stem is girdled by the advancing lesions, it will die. The fungus also can invade the plant base and cause the crown and upper taproot to rot.

Conditions favoring disease

Pycnidia form in abundance in infected stems during late fall and early winter. In spring during wet weather spores are produced inside the pycnidia. As they ooze from the pycnidia, they are splashed by rain onto the leaves, petioles and stems of newly emerged shoots. The new

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IANR

Updates

Management tips May 17-31

♦ **Check first emerging soybeans for bean leaf beetles.** These beetles are strong fliers and will search out early emerging fields and concentrate there. See *The Bean Leaf Beetle in Soybeans*, available on the web at *http://www.ianr.unl.edu/pubs/insects/g974.htm* NebGuide G974, for treatment thresholds.

♦ **Check stands of corn and soybeans now while there is still time to replant.** Corn planted now should be shorter season than originally planted or consider switching to grain sorghum.

♦ **This week the Department of Agricultural Economics launched a new Web site at farmbill.unl.edu.** This web site discusses the basic provisions of the new farm bill as it applies to wheat, feedgrains, and oilseeds. Decision aids are included to help producers determine whether to reestablish their base to reflect their 1998-2001 plantings or to just add an oilseed base to their existing wheat and feedgrains base. Case studies are provided to illustrate how different situations may suggest different actions.

♦ **The May 23 "Market Journal" will feature a discussion of farm machinery management issues:** 1) Deciding when to buy, sell, or rent; 2) calculating costs into farm operations; 3) understanding integration and maintenance issues; and 4) anticipating technological advancements

The show will be webcast 8-9 p.m. May 23 and later archived at *http://marketjournal.unl.edu*

Correction

In the *Table of Postemergence Corn Herbicides* published in the May 17 *CropWatch*, the rate for Aim should be 0.5 ounces per acre.

♦ **Starter fertilizers may be especially beneficial to farmers replanting or late-planting their corn this year.** Some recent Midwest research indicates it may be profitable to use a starter fertilizer when replanting to give early plant growth a boost and to shorten the period to pollination and maturity. Research shows the response is the same in a 2 x 2 or a popup application at planting. For more on this and other ag topics, check out audio interviews with NU specialists at Ag Almanac on the IANR home page at *http://ianrhome.unl.edu/.*

Field updates

Ron Seymour, Extension Educator in Adams County: About 85% of the corn crop has been planted, of which about 40% has emerged. Emerged fields are in the one- to two-leaf stages. Many fields have a yellow or purple color indicative of cool weather stress. No insect or disease problems were noticed. About 20% of the soybean crop has been planted but plant emergence has been slow.

Recent rains have boosted the wheat crop condition with many fields rated as excellent. Most of the plants are 18 to 24 inches tall, and are in the boot stage with a few heads starting to emerge. Alfalfa fields have budded and the plants range in height from 12 to 18 inches. Alfalfa weevils are common, but infestations are minimal. A few pea aphids and bean leaf beetles also were found but not in a significant number. Winter pasture grasses are growing well and summer grasses are breaking dormancy.

Karen DeBoer, Extension Educator in Cheyenne County: Our overriding problem is that despite some light rains, our wheat fields are very dry. A freeze last week damaged leaves. It's difficult to determine the extent of damage to the growing point since much of the wheat was just jointing; other tillers may be able to help compensate if there is damage. Crown and root rot from the dry winter conditions can be found in most of the wheat. Conditions are very dry for planting spring and summer crops. Pastures are not greening up in some areas as they should.

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Black stem *(Continued from page 97)*

shoots become infected as they grow through the residue from the previous year's crop. Some spores may be spread by wind and insects. The foliage must be wet from dew or rain for infection to occur and spread. The disease continues to move upward in the canopy if cool, wet weather persists through spring.

The fungus also is carried in the seed. A seedling blight can occur when infected seed is planted. The disease will often spread from these seedlings to nearby healthy seedlings. Early seedling loss creates stand establishment problems.

Spring black stem and leaf spot is usually a problem only on the first cutting. Regrowth from this cutting may become infected but disease severity is generally light. If environmental conditions between mid-April and mid-June are favorable (cool and wet) for disease development, plants may become defoliated before cutting. When severe, as much as two-thirds to three-fourths leaf defoliation can occur which results in the first cutting being primarily stems. This not only reduces yield but significantly lowers hay quality.

Spring black stem is present in Wyoming each year and may be particularly severe at higher elevations. In Nebraska it becomes severe after cool, wet weather.

Control

Early cutting is recommended if spring black stem and leaf spot are prevalent on the lower portion of plants. Scout fields weekly in spring to determine the extent of disease development. Decide whether to cut early based on the results of scouting fields and weather forecasts. Don't delay the decision to cut early, otherwise most of the leaves may have been lost by harvest. Ideally, one-tenth bloom is the optimum growth stage for harvesting while maintaining forage quality and limiting premature leaf loss due to disease. If the field is recovering from winter injury, it may be necessary to delay the first cutting at the risk of foliage loss to spring black stem and leaf spot.

A few moderately resistant cultivars have been developed. Multi-resistant cultivars with a high level of resistance to spring black stem and leaf spot should soon be available.

Alfalfa stands are sometimes burned in early spring to control alfalfa weevil. This practice also has been shown to reduce the inoculum of spring black stem. Grazing the aftermath after a hard freeze in the fall, which is frequently done in Wyoming and Nebraska, also should reduce pathogen inoculum.

Using certified seed produced in arid areas will insure maximum stand establishment and reduce the chance of seedling blight caused by the spring black stem fungus.

Confusing black stem with insects

There is a tendency to confuse black stem with insect damage. Alfalfa weevils are usually the first suspect; however, a careful examination of the plant damage should help you delineate the cause of the damage so you can select the appropriate option for control.

Alfalfa weevils are small green worms with a light stripe down the back. They feed on the top of newly emerging leaves, causing a shothole appearance. Heavy damage will cause the tops to look frosted as the damaged leaf tissue turns brown. Weevils should be easily found with a sweep net or bucket.

Black stem starts on the lower portion of the plant and works its way up.

Potato leafhoppers also work on the upper leaves as well as the bottom leaves, and will leave a characteristic "v" shape feeding pattern on the leaves.

Regardless of the cause of damage, at this time the best solution is to take a cutting and scout the regrowth. It is NOT necessary to treat with an insecticide immediately after the hay is removed. Give the field time for normal greenup and look for insects. If insects are holding back regrowth, then spray.

Keith Jarvi, Extension Assistant
Integrated Pest Management
Northeast REC

Grasshoppers invade Dawson, Custer counties; 70,000 acres devastated

A severe grasshopper infestation has destroyed forage on about 70,000 acres of rangeland in south central Custer and north central Dawson counties near Eddyville. This grasshopper infestation is early and presents a serious problem.

Grasshoppers usually hatch in late June and early July, allowing time for treatment before the grasshoppers become adults. In the Eddyville grasshopper infestation, three of the grasshopper species involved overwinter as 3rd instar nymphs. They then complete their development as temperatures increase. This spring was warm enough that this group is already in the adult stage. The warm spring caused several other grasshopper species to hatch early, which creates a difficult control situation.

Currently, three insecticides are registered by the EPA for use on rangeland grasshoppers. While the registered insecticides are effective in controlling young grasshoppers, none are very effective in controlling adults.

Gary Rohde, an Eddyville cattle producer; State Senator Jim Jones; Bruce Treffer, Dawson County extension educator; and Troy Walz, Custer County extension educator, led a delegation on a tour of the grasshopper-infested area. Federal Animal and Plant Health Inspection Service (APHIS) personnel from Iowa, Nebraska and South Dakota; University of Nebraska entomologists; aerial applicators and agricultural chemical representatives made up the delegation.

This group also met with affected ranchers May 9 at Eddyville to discuss the situation. The federal officials outlined the possibilities and require-

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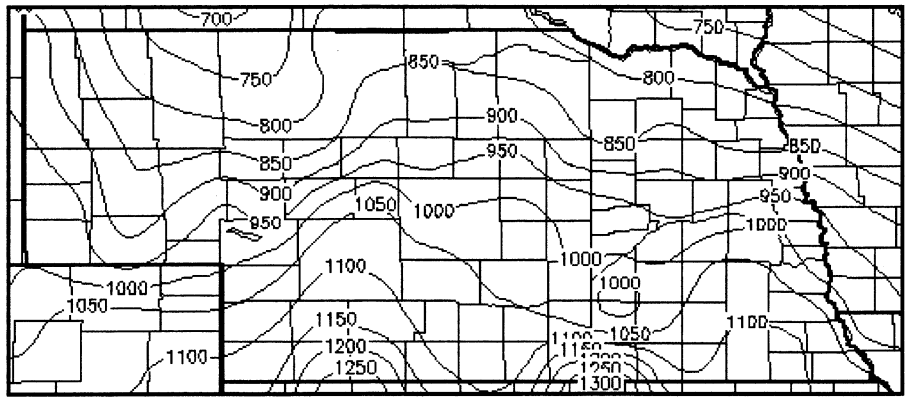
Begin scouting for stalk borers soon

The common stalk borer (*Paipema nebris*) life cycle begins in the fall when moths lay their eggs on grassy plants and ragweed. Often these are in fence rows, grass waterways or terraces bordering crop fields. These eggs hatch in late April or early May and larvae bore into the grasses or other weeds such as ragweed and begin feeding. As the stalk borers grow or if the plants are mowed or burned down with herbicides, they move into adjacent corn plants to complete their development.

Common stalk borers are rather distinctive in appearance, with three white stripes on a background brownish-purple coloration. The two stripes on the side stop just behind the three pairs of true legs, then continue about half-way down the length of the caterpillar.

Stalk borer feeding may kill the growing point if the caterpillar bores into the base of the stalk or it may produce ragged feeding holes in the leaves, if feeding starts in the whorl and then moves down into the stalk.



Accumulated growing degree days, using a 41° F base as of May 19. Producers should begin scouting for common stalk borers when 1,300 - 1,400 growing degree days have accumulated. (*Map courtesy Al Dutcher, NU State Climatologist)*

As of May 19 we have accumulated 750-1300 degree-days (base 41F) since Jan. 1 (***see map***), depending on location in the state. Based on research at Iowa State University, stalk borer egg hatch begins at about 575 degree days and should be complete by 750 degree days. Scout corn for common stalk borers when about 1,300-1400 degree days have accumulated. Updated degree day maps will be published in future issues of *Crop Watch*.

Check corn plants bordering grassy areas. Examine several sets of 10 plants. Look for feeding damage and insect damaged plants to see if live larvae are present. If weedy grasses were common throughout the field in the previous year, the whole field may need to be scouted for common stalk borers. Use the information, at left, to determine the economic injury level.

To be effective, insecticides must be applied before common stalk borer larvae enter the stalk. In cases where stalk borers begin feeding on grassy weeds or other vegetation in field edges, control is most effective if timed between 1400 and 1700 degree days, which corresponds to the first half of the period when stalk borers are migrating from weedy hosts into corn. If the infestation is restricted to the field margin, use a border treatment.

In cases where there is a history of fieldwide stalk borer damage at a site, insecticides applied to corn and timed for egg hatch may reduce damage. The disadvantage of this approach is that there is no effective way to sample for stalk borers at this time, so treatments are made without knowing whether they would be profitable that year.

Insecticides may be mixed with fast-acting herbicides being used to burn down early season weeds, or applied several days after use of slower-acting herbicides. Check the label for compatibility of different insecticide and herbicide mixtures.

A variety of foliar insecticides are labeled for control of common stalk borers in corn, including Ambush 2E (6.4-12.8 oz per acre), Asana XL (5.8-9.6 oz per acre), Lorsban 4E (2-3 pints per acre), Pounce 3.2EC (4-8 oz per acre), Capture 2EC (2.1-6.4 fl. oz per acre), Mustang (2.9-4.2 oz per acre) or Warrior 1EC (2.56-3.84 oz per acre). See *http://entomology.unl.edu/instabls/stalkbor.htm* for a complete list of products.

For more information see NebGuide G521, *Common Stalk Borer in Corn*, available on the Web at *http://www.ianr.unl.edu/pubs/insects/g521.htm*

Bob Wright
South Central REC, Clay Center

Table 1. Common stalk borer economic injury levels (% injured plants) (Assumes 80% insecticide efficacy, and $2 bu/acre grain value).

Corn leaf stage	*125 bu/acre yield potential*		
	Control costs/acre		
	$7	*$10*	*$13*
1	7	9	12
2	8	11	15
3	10	14	18
4	11	16	20
5	11	16	21
6	22	32	41
7	100	100	100

Corn leaf stage	*150 bu/acre yield potential*		
	Control costs/acre		
	$7	*$10*	*$13*
1	5	8	10
2	7	9	12
3	8	12	15
4	9	12	16
5	9	13	17
6	18	26	33
7	100	100	100

Pesticide drift (Continued from page 97)

Table 1. Relative damage to tomatoes by vapors from 2,4-D. (Baskin and Walker)

	Temperature and hours of exposure*					
	70-75 F		90 F		120 F	
2,4-D Formulation	2 hr	16 hr	2 hr	16 hr	2 hr	16 hr
Butyul ester (High volatile)	3.5	6.0	5.8	6.0	6.0	6.0
Butoxyethanol ester (Low volatile)	1.0	1.0	2.3	5.7	6.0	6.0
Dimethylamine (Non-volatile)	1.0	1.0	1.0	1.1	1.2	1.2

the environment, application equipment, and how the equipment is used. Spray particles less than 200 microns can drift considerable distances. Large spray particles may reduce drift, but may not provide the coverage needed.

Agricultural spray nozzles produce a wide range of spray droplet sizes (10 to >1000 microns). As a comparison, a pencil lead is approximately 2000 microns in diameter. A paper clip wire is 850 microns, a staple wire is 420 microns, a toothbrush bristle is 300 microns, a sewing thread is 150 microns, and a human hair is approximately 100 microns in diameter.

The key is to set up the sprayer to produce the largest droplets that will provide adequate control of the target pest. This is a balancing act between the particle size that is best for drift control and the one that is best for product efficacy. In some situations, efficacy may have to be sacrificed to avoid drift. The drift potential depends not only on the volume medium diameter (VMD), but also the total spectrum of droplet size. A VMD of 300 could mean that half the droplets were 250 micron in diameter and half were 350 microns. Or it could mean half the droplets were 50 microns (very susceptible to drift) and half were 650 microns. The VMD plus the droplet spectrum gives a more accurate estimate of the droplet size relative to drift. If you double the droplet size you have 1/8 as many spray droplets. Spray droplets leave the nozzle at a certain speed. Small droplets (<200 microns), lose momentum faster than large particles and slow to the fall of gravity; when slowed by other forces such as air movement.

Dave Smith, a Mississippi State University ag engineer, analyzed data for more than 100 studies involving drift from ground sprayers. Of the 16 variables he considered, three were the most important: wind speed, boom height, and distance downwind.

1. Wind speed. When the wind speed was doubled, there was almost a 700% increase in drift when the readings were taken 90 feet downwind from the sprayer. Hence the recommendations of spraying in 10 mph wind or less. Be aware that drift potential also may be high at low wind speeds. This is because light winds (0-3 mph) tend to be unpredictable and variable in direction. Calm or low wind conditions may indicate the presence of a temperature inversion. Drift potential is actually lowest at wind speeds of 3 to 10 mph (gentle but steady breeze) blowing away from sensitive areas.

2. Boom height. When the boom height is doubled, for example from 24 to 48 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. 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 or you may choose to only spray part of a field because of wind speed, wind direction or distance to susceptible vegetation. The rest of the field can be sprayed when conditions change.

Also consider slowing down on the passes closet to susceptible vegetation, etc. If you slow from 10 mph to 7 mph (70% of the speed) and are spraying at 40 psi with a rate controller, your pressure will drop by one-half to 20 psi. You can also make these changes manually. but be careful to not drop below the minimum recommended pressure for the nozzle tip being used.

Other important factors to consider when trying to reduce drift include 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.

The temperature and vapor pressure during a herbicide application also influence drift. Atmospheric stability is an important factor that is often ignored. Temperature inversions occur when a layer of cool air near the soil surface is

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Pesticide drift *(Continued from page 97)*

trapped under a layer of warmer air. With temperature inversions the temperature increases as you move upward. This prevents air from mixing with the air above it. This causes small-suspended droplets to form a concentrated cloud that can move long distances. If large numbers of small droplets are captured in this warm or inversion layer, the deposition control is lost. Records indicate that movement of these inversion layers may transport chemicals several miles.

The most common cause of temperature inversions close to ground level is radiant cooling of the ground -- the ground cools off quicker than the air above it. Clear skies favor radiant cooling and therefore favor the formation of surface inversions. Early morning and late afternoon are the times when surface inversions are most likely to occur. Conditions not favoring inversions include low heavy cloud cover, strong to moderate winds (greater than 5-6 mph), a temperature increase of 5 degrees, and bright sunshine.

It's important to recognize when inversions are present. Bodies of water or well-irrigated fields both favor the formation of inversions. Under clear to partly cloudy skies and light winds, a surface inversion can form as the sun sets. Under these conditions a surface inversion will continue into the morning until the sun begins to heat the ground. Usually if you wait for a 5-degree increase in temperature after sun up the chances for an inversion decrease greatly. Inversions only affect the small pesticide droplets that don't settle quickly. There is a higher potential drift and therefore off-target effects if the application is made during a surface inversion. The small droplets can remain in a concentrated cloud until the inversion dissipates or the cloud of droplets moves out of the area where inversion conditions exist. Minimizing the production of small droplets will minimize the potential or drift under inversion conditions.

It may be illegal to start a fire to determine the presence of an inversion or wind direction. Instead smoke bombs or smoke generators are recommended.

Drift reduction nozzles

Many new spray nozzles are designed to reduce drift. 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.

While helpful these drift reduction nozzles can still create drift under some conditions, such as when the sprayer speed is increased and the resulting pressure is increased, resulting in smaller spray droplets. At slow speeds the spray droplets may be too large for good coverage.

Air induction or venturi style nozzle produces droplets with a VMD of 400 to 600 microns, practically eliminating the more driftable droplets less than 200 micron particles. However, particles larger than 400 microns are problematic because they have a tendency to bounce off vegetation and may provide minimal coverage of weed foliage. The spray pattern produced by venturi style nozzles generally was more variable than the pattern produced the XR flat fan nozzles.

Drift retardants reduce drift by increasing the viscosity or surface tension of a spray solution. The viscosity of spray mixtures can greatly influence the size of spray droplets produced by atomizers. In the 1970s water thickening additives such as swellable polymers that produce a solution of gelatinous particles were developed and used. Modern drift retardants include polyacrylamides, polyethylene oxides and polysaccharides. It has been demonstrated many times that drift retardants significantly increase the VMD of a sprayed solution when added to the water in a spray tank. After several trips through the sprayer pump some of the drift retardants lose their efficiency and the size of the spray particles is the same as before. Research shows that while some drift retardants may help under some conditions, most drift management should include nozzle selection, boom height, pressure, etc.

The environment and human safety are the top priority of any activity. We must handle pesticide safety. 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 to manage it will help most producers avoid problems. Remember, we are responsible for the injury we cause and are accountable for it.

Bob Klein, Extension Cropping Systems Specialist
West Central REC

Hot off the press

The following publication was recently released by UNL Cooperative Extension and is available from your local Cooperative Extension office. It will be available on the Web in the near future at *http://www.ianr.unl.edu/pubs*

G02-1450, Sampling Manures for Nutrient Analysis, guidelines for sampling manure for nutrient content to improve crop and soil management, including recommended methods for solid, liquid and slurry manures and anaerobic lagoons; how to submit samples; and a list of some of the Nebraska laboratories providing manure testing services.

Wind speed data models limited application window for a typical farmer in central Nebraska

The Environmental Protection Agency (EPA) has been receiving comments on a draft Pesticide Registration Notice that provides guidance on proposed drift label statements for pesticide products. Larry Schulze, UNL Extension Pesticide Coordinator, reported in the December 2001 issue of "The Label" newsletter *(http://pested.unl.edu/thelabel/tldec01.htm)* that the intention is to control pesticide drift from spray and dust applications in order to protect human health and the environment.

The proposal would limit ground and aerial applications of many agricultural pesticides to wind speeds of 10 mph or less. The proposed label language also applies to overhead chemigation application of pesticides. This proposal, as currently written, would no doubt be a regulatory challenge; it also could present a challenge to producers trying to complete their spraying operations in a timely manner.

To give us a quick look at the effect of a 10 mph restriction, Dr Ken Hubbard, Professor in the UNL School of Natural Resource Sciences, provided data on wind speeds at 10 feet above ground at Clay Center last year. (As height increases from ground level, so does wind speed. The measurement is typically taken at 10 feet so that it won't be affected by crop canopies.)

We used the period 4/15-5/20 as a window for pre-emergence herbicide application in south central Nebraska. During this period, sunrise occurs about 5 a.m. and sunset occurs about 7 p.m., leaving a window of 14 daylight hours. During this period in 2001 there were, on the average, 5.33 daylight hours per day when the wind was 10 mph or less at Clay Center (see *Table 1*) . Windows for post-emergence herbicide (5/22-6/14) and late season insecticide applications (7/15-8/7) also are characterized in *Table 1*. Some of these days it would also be too wet to enter the field. While all seven days of the week were included in *Table 1* data, precipitation or other obligations might further restrict when applications could actually be made.

A 10 mph restriction such as proposed by the EPA would have been particularly limiting at Clay Center in spring 2001, as indicated in *Table 1*. Additional analysis not shown in the table shows that the only time the wind was below 10 mph more than 50% of the time during daylight hours was from 5 a.m. to 7 a.m. A 10 mph restriction on spraying is less limiting during the post-emergence window (5/22-6/14), but only 5- 9 a.m. and 5-7 p.m. would have been available more than 50% of the time. For the late season insecticide window (7/15-8/7) the wind speed was below 10 mph 75% or more of the time during daylight hours.

As illustrated here, restricting spraying according to wind speeds could have a significant effect upon field operations in central Nebraska. Dr. Hubbard is seeking support from the EPA to look more closely at the wind speeds here and in sur-

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Table 1. Average hours per day that the wind speed 10 feet above ground averaged below specified levels during daylight hours (5 a.m. to 7 p.m.) at Clay Center, Nebraska for three typical pesticide application periods in 2001.

4/15 - 5/20/2001		5/22 - 6/14/2001		7/15 - 8/7/2001	
Wind (mph)	*Ave hrs/day*	*Wind (mph)*	*Ave Hrs/day*	*Wind (mph)*	*Ave Hrs/day*
Under 10	**5.33**	**Under 10**	**7.24**	**Under 10**	**11.75**
11	6.31	11	8.27	11	12.92
12	7.25	12	9.20	12	13.63
13	8.08	13	10.41	13	13.83
14	9.11	14	11.66	14	13.92
15	9.94	15	12.41	15	14.00
16	10.89	16	12.80	16	14.00
17	11.53	17	13.34	17	14.00
18	12.11	18	13.44	18	14.00
19	12.58	19	13.68	19	14.00
All wind speeds*	**14.00**	**All wind speeds***	**14.00**	**All wind speeds***	**14.00**

*All daylight hours from 5 a.m. to 7 p.m.

Use caution with growth regulator herbicides

Every year we receive many questions about products that contain growth regulator herbicides. These include 2,4-D, Banvel/Clarity, Stinger, MCPP, MCPA, Tordon and others. These herbicides are valuable in controlling many unwanted broadleaf weeds in crops, range, turf, and landscape situations; however, these products also can easily damage nearby vegetables, ornamentals, trees, shrubs, or broadleaf crops

Be sure to select the right growth regulator for the target and apply under the right conditions for the product to avoid spray drift. Following is further information on some common growth regulators.

2,4-D

2,4-D is an active ingredient in many compounds. It has been used to successfully control broadleaf weeds for many years. However, each year its misuse affects many non-target species as well.

2,4-D is available in 4 lb and 6 lb formulations. The 4lb is most common, but there is still plenty of 6 lb 2,4-D available. Make sure you understand what rate of what formulation you are going to spray since it only takes 2/3 of a pint of 6 lb 2,4-D to have the same activity as 1 pint of 4 lb 2,4-D.

In addition, 2,4-D is available in ester and amine formulations. Esters vaporize and result in vapor drift which can travel long distances. The low volatility (LV) esters reduce the amount of volatilization, but some will still likely volatilize at temperatures above 85 degrees. The amine salt formulation is non-volatile. During warm weather (temperatures above 85 degrees) only amine formulations of 2,4-D should be used.

The ester formulation tends to penetrate the foliage easier so amine use rates are usually higher than ester rates. The amine formulation typically does not volatilize, however all 2,4-D formulations are subject to particle drift.

Common products containing 2,4-D are: Amine 4, Brushmaster, Champaign, Chaser 2, Chaser Turf Herbicide, Crossbow, Curtail, D-638, DMA4 IVM, Five Star, Formula 40, Grazon P+D, Hi-DEP, Landmaster BW, MEC Amine-D, Oasis, Pathway, Range Star, Saber, Savage, Scorpion III, Shotgun, Starane + Extron, Starane + Saber, Starane + Salvo, Super Trimec, Trimec Classic, Trimec Classic DSC, Trimec Plus Quadmec, Trimec Lawn Weed Killer, Weedone LV4, Weedone 638, and Weedmaster.

Dicamba

Dicamba is the active ingredient in Banvel/Clarity. It is not as prone to vapor drift as 2,4-D, however it is subject to particle drift and each year products containing dicamba damage trees, soybeans, alfalfa and other broadleaf plants in Nebraska. Know your herbicides and the conditions in which you spray. Common products containing dicamba as one of the active ingredients are: Banvel, Banvel SGF, Brushmaster, Celebrity, Celebrity Plus, Clarity, Dicambazine, Dicamba DMA Salt, Distinct, Fallow Master, Fallow Master Broadspectrum, Fallow Star, Fuego, Marksman, Mec Amine-D, NorthStar, Op-Till, Range Star, Super Trimec Classic, Trimec Classic DSC, Trimec Lawn Weed Killer, Trimec Plus Quadmec, Rave, Resolve, Sequence, Sterling, Sterling Plus, and Weedmaster.

Clopyralid

Clopyralid is the active ingredient in Stinger. It is used in crop and brush control situations. While not as subject to vapor drift, it can have particle drift and does have more residual with the potential to carry over into the next year's growing season.

Products that contain clopyralid include: Accent Gold, Broadstrike Plus, Chaser Ultra, Confront, Curtail, Curtail M, Hornet, Hornet WDG, Lontrel, Redeem R&P, Scorpion III, Stinger, and Transline.

Picloram

Picloram is the active ingredient in Tordon. Typically this product is used to control weeds in range and pastures. This product also can have particle drift plus it has long soil residual activity resulting in carryover. Products that contain Picloram include:Grazon P+D, Pathway, Tordon 22K, Tordon RTU, and Tordon K.

Brady Kappler
Weed Science Educator

Wind speeds

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rounding areas. Hopefully we can find ways of limiting drift that are not too costly.

For more information on the regulatory decision process, contact Larry Schulze. The draft pesticide registration notice is available online at *http://www.epa.gov/opppmsd1/pr_notices/prdraft-spraydrift801.htm* . Comments on EPA's proposed drift labeling also can be submitted at this site. As of May 15, the EPA had received over 5,000 comments on this proposal. Jim Jones, director of EPA's Registration Division, stated on May 15 that the agency welcomes comments and plans to re-propose drift labeling after considering public input. The EPA did not indicate a timeframe for a possible re-prosposal.

Roger Selley, Extension
Farm Management Specialist
South Central REC

A glyphosate by any other name . . .

may not be the same

New glyphosate products enter the marketplace every year, sometimes making it difficult to determine which is the best choice for a particular situation.

It is important to understand that all glyphosate products are not created equal. While many have a chemistry similar to that of Roundup, the formulation and use of surfactants may be quite different and affect the efficacy of the product. Remember: If the price on the generic glyphosate seems too good to be true, it probably is.

When comparing glyphosate products, check the formulation first. This is presented two ways in terms of active ingredient and acid equivalent. Glyphosate is an acid formulated as a salt to improve performance and handling. Two formulations may contain the same amount of acid equivalent, but differing amounts of active ingredients because the salts are of different weights.

Table 2. Comparison of Roundup and Toouchdown use rates

Roundup		Touchdown	
Ultra	Ultra Max	TD 5	TD IQ
1.0 qt	0.8 qt	0.8 qt	1.0 qt
1.25 qt	1.0 qt	1.0 qt	1.25 qt

Table 1. Comparision of Roundup and Touchdown formulations

Product	*Company*	*Active ingredient formulation*	*Acid equivalent formulation*
Roundup Ultra	Monsanto	4 lb/gal	3 lb/gal
Roundup UltraMax	Monsanto	5 lb/gal	3.75 lb/gal
Touchdown w/ IQ	Syngenta	3.7 lb/gal	3 lb/gal
Touchdown 5	Syngenta	5 lb/gal	3.75 lb/gal

Table 3. Comparison of common glyphosate products registered in Nebraska

Distributor	*Product*	*Form. lb/gal*	*Acid equiv. lb/gal*	*Non-ionic surfactant*
Agrilliance	Cornerstone	4	3	May be added
Agrilliance	Silhouette	4	3	May be added
Albaugh	Gly Star	4	3	May be added
Albaugh	Gly Star Plus	4	3	Not Required
Chem. Prod. Tech.	Clearout 41 Plus*	4	3	Not Required
Cheminova	Glyfos	4	3	May be added
Cheminova	Glyfos Xtra	4	3	Not Required
Dow	Glyphomax	4	3	May be added
Dow	Glyphomax Plus	4	3	Not Required
Griffin	Glyphosate Original*	4	3	May be added
Micro Flo	Gly Flo	4	3	May be added
Monsanto	Roundup Original	4	3	May be added
Monsanto	Roundup Ultra	4	3	Not required
Monsanto	Roundup UltraMax	5	3.75	Not required
Monsanto	Roundup UltraDry**	71.4%	64.9%	May be added
NuFarm	Credit systemic*	4	3	May be added
NuFarm	Debit TMF*	4	3	Required
Syngenta	Touchdown w/ IQ	3.75	3	May be added

* Not registered for use on Roundup Ready Corn

** Roundup UltraDry is a dry formulation – 1.2 lbs contains 0.75 lb of glyphosate acid and is equivalent to 1 quart of Roundup Ultra.

Three glyphosate salts are currently being marketed: isopropyl amine, ammonium and di-ammonium salt. Isopropyl amine is the salt in Roundup and other generic glyphosate products. Ammonium salt of glyphosate is the active ingredient in Roundup UltraDry. The di-ammonium salt is the active ingredient in Touchdown with IQ. Since different salts can have different weights, formulations are expressed on an acid equivalent basis. *Table 1* compares some common Roundup and Touchdown formulations.

Be sure to inquire as to whether the product contains a surfactant. A 4 lb formulation of a generic glyphosate with no surfactants needs 0.5% volume/volume of a 70%+ active ingredient non-ionic surfactant. This will translate into approximately an additional $1 per acre. If a surfactant with less than 70% active ingredient is used, the recommended rate of non ionic surfactant increases to 1% and the cost also increases. Some companies recommend AMS while others have included AMS or equivalents in the surfactant systems. Adding 17 lbs of AMS per 100 gal of water at the 10 gallon carrier rate will cost about $0.29 per acre.

Rates are also an issue with different formulations. *Table 2* looks at the difference between the common Roundup and Touchdown formulations.

In addition, not all generic glyphosate products are labeled for Roundup Ready® crops. Remember that Touchdown with IQ is labeled

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Grasshoppers

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ments of APHIS providing assistance on a one-third cost-share basis.

APHIS officials indicated it would take time to develop a cost-share control program because they have to develop an environmental impact plan, determine the extent of the infestation by monitoring grasshopper numbers and go through a bid process from aerial applicators. APHIS officials suggested two options to ranchers—treat now without cost-share or wait until APHIS puts the cost-share control program together in about one month. The APHIS control program would be after all hatching has occurred.

After considering their options, this week some ranchers began spraying for grasshoppers. This grasshopper infestation is and will continue to be very costly for them.

Jack Campbell
Extension Entomologist
TL Meyer, Communications Specialist, West Central REC

Glyphosate

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for Round Ready^{R} corn and soybeans while Touchdown 5 is not labeled for corn but is labeled for Roundup Ready soybeans. The bottom line is to know what you are buying and what is in it including surfactants, the quality of surfactant, whether AMS is present, and if so, in what quantity.

Finally, *Table 3* lists *many* of the new glyphosate products registered for use in Nebraska on Roundup Ready corn and soybeans. The table lists the name of the product, the distributor, the formulation, the acid equivalent, and the use of surfactants. This is not an all-inclusive list, but a representative table of the products available. Remember that glyphosate herbicides respond positively to the addition of AMS, especially in hard water.

Brady Kappler
Weed Science Educator

Wheat diseases growing active

Eastern and Central Nebraska

Soil-borne mosaic continues to be the most evident wheat disease in southeast and south central Nebraska. Cool temperatures continue to promote symptom development. Affected fields show a definite yellowing in lower areas. A few fields will show symptoms over most of the field. Affected plants have a mottled, mosaic appearance and may be stunted. If it ever warms up, many of these fields will grow out of the symptoms, however, yields in severely affected fields will be reduced by slight to moderate levels, depending on the variety's susceptibility.

I received a report of wheat streak mosaic severely affecting a field in Gage County. This disease is not common to southeast Nebraska, but under the right conditions will occur. The field was in wheat last year and was hailed, resulting in volunteer wheat. The wheat curl mite and the virus survived the summer on the volunteer wheat and then moved into the current crop last fall. The extended mild fall exacerbated spread of the mite along with virus development in infected plants.

Severe crown and root rot was reported from a continuous wheat field in south central Nebraska. This is not surprising since that disease goes hand-in-hand with drought stress and loose seedbeds in the fall. That portion of the field that had been fallowed was less affected by the disease because it had more soil moisture.

Leaf rust was found on a wheat sample from Saline County this week. The severity was light on the flag and flag-1 leaves. Rust has been slow to develop in Kansas this spring, although Oklahoma is reporting severe leaf rust around Stillwater. Stripe rust has been severe in Texas, Arkansas and southern Missouri but hasn't moved into the Central Plains to any degree.

John Watkins
Extension Plant Pathologist

Western Nebraska

A recent survey of the Nebraska Panhandle and southeast Wyoming revealed more wheat streak mosaic than was expected. Pockets of the disease were found around Hemingford/Alliance and Sidney/Sunol. In several fields the incidence and severity were high. In all cases there was evidence of volunteer wheat in last year's stubble fields adjacent to the affected fields. Again, the long, mild fall exacerbated mite and disease development. We observed one field where severe volunteer wheat had developed in a sunflower field last summer, and the adjacent wheat field was severely infected with virus this spring. Observations in other sunflower fields and dryland cornfields have shown that volunteer wheat can be a significant problem in these fields.

Nothing can be done for those fields affected with wheat streak mosaic this year, but preventive measures can be taken for next year's crop. Keep track of any hail that occurs when the wheat is in the mid-dough or latter growth stages. Destroy any volunteer wheat that emerges in July as a result of the hail and encourage your neighbors to do the same.

Insect problems throughout the Panhandle were minimal. A few army cutworms were found in a few fields in the north, but these have mostly completed their life cycle. Occasionally we found Russian wheat aphids in some fields; however, no economic infestations were found in Nebraska. There have been some reports of significant infestations of Russian wheat aphid in eastern Wyoming so we may still see some serious infestations in isolated areas of the Panhandle.

Gary Hein
Extension Entomologist
Panhandle REC