Plant & Soil Sciences Extension Newsletter

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In this issue ...

Plant & Soil Science Extension

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Making informed planting decisions based on seed cost

By Chad Godsey

With seed costs continuing to rise, producers need to carefully think about seeding rate, and variety selection. With the new generation of glyphosate resistant varieties and/or stacked resistance traits seed costs can easily approach $60/acre. As a result careful attention needs to be given to variety performance and planting operations.

In the case of soybean, seed cost is determined by the cost of seed purchased, seed size (seeds per pound), and seeding rate (per acre). Soybean seed size is determined by the genetics of the variety and the environment where the seed was produced. Large-seeded varieties (<2,000 seeds per pound) usually produce larger seeds than intermediate- and small-seeded varieties grown in the same environment. However, most research studies show that if an adequate plant population is obtained, larger seed size has no advantage over planting small seed. Neither germination nor vigor tests have been able to predict field emergence under all field conditions. Temperature and rainfall are the major environmental factors that affect seed size. Regardless of seed size, always plant high quality seed.

The seeding rate for soybeans is determined by the desired harvest plant population to achieve high yield and the expected loss of plants (or seeds) between planting and harvest. In most years a stand loss from V3 to R8 ranges from 10 to 15 percent. Additional stand losses due to germination and seedling diseases prior to stage V3 probably range from 5 to 15 percent. Therefore, the planting rate should be from 15 to 30 percent above the desired harvest plant

(Continued on page 2)

Table 1. Suggested seeding rates for soybean in Oklahoma.

Row width (inches)	Feet of row per acre	Plants per foot of row	Plant Populations per acre	Seed per foot of row * Germination		
				90%	80%	70%
40	13,068	8.00	101,544	10.00	11.10	12.70
36	14,520	7.00	101,540	8.60	9.70	11.10
30	17,424	6.00	104,544	7.40	8.30	9.50
20	26,136	4.00	104,544	4.90	5.60	8.30
15	34,848	3.75	130,680	4.60	5.20	6.00
12	43,560	3.00	130,680	3.70	4.20	4.80
10	52,272	2.75	143,748	3.40	3.80	4.40
7	74,674	2.00	149,348	2.50	2.85	3.20
6	87,120	1.75	152,460	2.20	2.50	2.80

*Assuming 90 percent field emergence of the live seed.

Planting decisions (cont.)

population. Table 1 provides suggested seeding rates for different row spacing's.

A spreadsheet has been put together to help farmers, crop managers, seed salesmen, and consultants closely calculate seed costs per acre, as well as the total and average seed cost for an individual enterprise. Comparisons can be made for different row widths and to include valuable seed cost information. This tool can closely evaluate the actual cost of several different factors that influence the profitability of production systems, such as the cost for different planting populations and the value of different seed lots as they vary by size and quality. It can be used for several crops. The spreadsheet can be found at *www.oilseeds.okstate.edu.*

Chad Godsey can be reached at chad.godsey@okstate.edu.

Figure 1. Seed Cost Calculator lets you compare seeding rates, seed cost, and provides information to properly calibrate for soybean planting.

1 Enter information in shaded cells in Table 1. Make sure to enter information as it appears on the bag tag. The "number of acres" is the total number of acres you intend to plant with that

2 Enter information in shaded cells in Table 2. Please note the desired stand is in 1000/ac, so for a desired plant stand of 24,000, simply enter "24".

3 For calibration purposes, the weight of seed for a 200-ft strip (1 row) is provided in Table 2.

Table 1. Information from seed tag.

Variety	No. Seeds per lb	gm / 1000 seeds	Germ %	Purity %	Cost per bag	No. acres
Variety 1	3500	129.6	90	98.0	$28.00	125
Variety 2	3000	151.2	85	98.0	$28.50	125
Variety 3	3000	151.2	90	98.0	$30.00	125
Variety 4	2500	181.4	90	98.0	$32.00	125
					Total	500

Table 2. Compare seeding costs at two different seeding rates.

Desired stand 1000/ac	Row plants/sqft	scp'g in	Plants per ft	gm / 200 ft of row	lbs seed / acre	actual seeds / acre	No. 50 lb bags	Cost per seed lot	Cost per acre
125	2.9	7.5	1.8						
				53	40	141,723	101	$ 2,834	$ 22.68
				65	50	150,060	125	$ 3,564	$ 28.51
				61	47	141,723	118	$ 3,543	$ 28.34
				74	57	141,723	142	$ 4,535	$ 36.28
						Total	486	$ 14,477	$ 28.95

Desired stand 1000/ac	Row plants/sqft	scp'g in	Plants per ft	gm / 200 ft of row	lbs seed / acre	actual seeds / acre	No. 50 lb bags	Cost per seed lot	Cost per acre
140	3.2	7.5	2.0						
				59	45	158,730	113	$ 3,175	$ 25.40
				73	56	168,067	140	$ 3,992	$ 31.93
				69	53	158,730	132	$ 3,968	$ 31.75
				83	63	158,730	159	$ 5,079	$ 40.63
						Total	544	$ 16,214	$ 32.43

Scouting Canola for Diamondback Moth

By Tom Royer and Kris Giles

There are reports of diamondback moth infesting canola in several locations in southwest Oklahoma and Texas. Diamondback moth populations can build rapidly, and cause problems in canola when plants start to bloom. We do not currently have any research-based economic thresholds from Oklahoma for managing diamondback moth, so my suggestions are adapted from recommendations developed in spring canola in North Dakota.

Diamondback moth is a pest of many crucifer crops, including canola. This insect is found worldwide, and was introduced into the United States in 1854. The moth is a small, gray and brown moth that measures ½ inches. When resting, the wings are folded over the body in a roof like position. Male moths have three diamond-shaped markings on the forewings when they are folded together, which is how it got its name (Figure 1). Female moths lay oval flattened eggs measuring 0.44 mm in groups of 1-8 eggs which will hatch in 5-6 days. One female will lay an average of 150 eggs.

Figure 1. Diamondback moth adult.

Newly hatched larvae are light green with a green head, and become progressively darker as they mature. They develop through four instars and when full grown, a larva measures about ½ inches long. One distinct feature of this caterpillar is that they will thrash violently back and forth and drop from the plant on a silk strand when disturbed. They create a loose, silken cocoon that they attach to the plant and pupate in. They can complete a lifecycle in about 32 days, depending on temperature. Typically a scout will find all life stages at the same time within a field.

Larvae are the damaging stage. When they first hatch, larvae feed by leaf mining. As they grow they begin to feed on the outside of the leaves. Small larvae chew small irregular windowpane areas on a leaf (Figure 2). As they get larger, they chew entire leaves leaving only the veins. Although leaf feeding looks bad, it doesn't result in much yield loss. Yield loss is associated with flower and seed pod injury. When larvae feed on flowers, they cause them to abort. When they feed on seed pods, the pods may fail to produce seed. Feeding associated with flowers and pods can also cause a delay in plant maturity.

Figure 2. Diamondback moth larva and windowpaning feeding injury.

Scout for diamondback moth by pulling plants from a 1-square foot area, beat the collected plants into a white bucket and count larvae. Count larvae that are dangling on the plant from silk threads as well. Take counts in at least 5 locations to get an average number of larvae per square foot.

Thresholds are: 10-15 larvae per square foot during early flowering 20-30 per foot during pod stage.

One caution: Diamondback moths are notorious for developing resistance to insecticides, particularly pyrethroids, which are the primary registered insecticides for use in canola. Therefore, I suggest that the high end of any rates should be considered to eliminate the possibility of not obtaining adequate control. Current recommendations for control of diamondback moth in canola are listed in CR-7667, Management of Insect and Mite Pests in Canola which can be obtained online at *http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-3045/CR7667web2009.pdf.*

Tom Royer can be reached at tom.royer@okstate.edu, and Kris Giles can be reached at kris.giles@okstate.edu.

Greenbugs still at work in wheat

By Tom Royer

Our own ever vigilant Area Agronomist Roger Gribble has been saying grace over numerous wheat fields in Northwest Oklahoma and reported greenbug pressure is mounting in NW Oklahoma, particularly around the Fairview area. This seems a bit later than we usually see greenbugs increasing, but our extended cold winter coupled with drier conditions in NW Oklahoma means growers should check their fields for rising greenbug pressure. Fortunately, OSU and USDA research entomologists from Stillwater conducted research that we used to develop a simple sampling method for greenbugs called Glance 'n Go, which can be found on the web within the Greenbug Management Decision Support Tool, *http://www.entoplp.okstate.edu/gbweb/index.htm.*

Greenbug on wheat

Glance 'N Go

Go the Greenbug Management Support Tool and select the Greenbug Calculator. By answering a few simple questions, you can compute an economic threshold for controlling greenbugs. This threshold is based on the estimated cost of treating the field and the estimated price of wheat. Once a threshold is determined, you can print a scouting form, take it to a field and record your sampling results. The form will help you to decide if the field needs to be treatment for greenbugs. There are several things that make Glance 'n Go a good way to make such a decision. You only have to "Glance" at a tiller to see if it has greenbugs (no counting greenbug numbers). You can make a decision to treat "on the Go" because you stop sampling once a decision is reached (no set number of samples). Finally, you can account for the activity of the greenbug's most important natural enemy, Lysiphlebus testaceipes.

Lysiphlebus testaceipes

Lysiphlebus is a tiny parasitic wasp that attacks cereal aphids. It can be very effective at controlling an outbreak. In fact, this wasp is so effective, that we incorporated their activity in our Glance 'n Go sampling forms. When scouting with the Glance 'n Go system, keep a running count of tillers that have aphid mummies and a running count of tillers that are infested with one or more greenbugs. After each set of 5 stops, the form directs you to look at your total number of infested tillers and tillers with mummies. If there is enough mummy activity, you will be directed to stop sampling and DON'T TREAT, even if you have exceeded the treatment threshold for greenbugs! Why? Because research showed that at that level of parasitism, almost all of the healthy-looking greenbugs have been "sentenced to death" and will be ghosts within 3-5 days. If they have received their "sentence" you can save the cost of an unnecessary insecticide application.

Aphid mummy

Treatment thresholds should probably fall around 3-5 greenbugs per stem, but make sure you are using the Spring (January-May) form, not the Fall (Sept-December) form. If a field needs to be treated, check with Current Report CR-7194, "Management of Insect and Mite Pests in Small Grains."

Tom Royer can be reached at tom.royer@okstate.edu.

Wheat disease update

By Bob Hunger

Since the update I sent out on Friday (02-Apr), I received the following updates that may be of interest.

Texas: Here is an excerpt from Dr. Amir Ibrahim (Wheat Breeder, Texas A&M) received on 04-Apr.

"Stripe rust has moved to the flag leaf in susceptible entries at this South Texas hot spot (College Station, TX). 'Jagalene' and 'Jagger' are 70S and 80S, respectively. TX05A001822 which ranked top in the 2009 SRPN and UVT is 100S and completely covered with rust. 'Fannin' and 'TAM 111' remain symptomless with an R rating."

Here is an excerpt from a report sent out on 02-April by James Swart (Entomologist) and Dr. Curtis Jones (Agronomist), both of Texas AgriLife Extension at Texas A&M-Commerce.

Stripe rust

"Most of the area wheat is in Feekes 7 – 8 (two nodes above ground to beginning of flag leaf emergence). Plants in most fields are reasonably well tillered, and yield potential is fair to good. Most plants are shallow rooted, as they have grown in saturated soils throughout the fall and winter months. Everything has been top dressed and we have now had adequate rainfall to move the nitrogen into the soil profile. Low levels of stripe rust were observed last week in the lower canopy in susceptible varieties (Patton SRWW in our Royse City location). We have not seen any leaf rust yet, but expect it to be present in susceptible varieties as temperatures begin to increase. There have been reports of a race change in stripe rust but we have not yet observed it here."

Louisiana: Finally, here is a report from Dr. Stephen Harrison (Oat & Wheat Breeder, Louisiana State University) received on 02-Apr.

"Stripe rust has continued to spread in Louisiana and growers are applying fungicides for control in a number of fields. Some previously resistant varieties are showing some infection while others have remained resistant. Plots at Winnsboro in Northeast Louisiana on April 1 had relatively light but active infections. Some grower fields in the Winnsboro area are at threshold level for spraying with large (10 – 30') active infection centers in fields that can be seen from a distance. Stripe rust is widely present across South Louisiana and is being sprayed with fungicides. The highest severity in variety trial plots at Crowley (southwest) was 25% on March 23rd, but that has probably doubled in the past week, as occurred at Baton Rouge. Stripe rust at Baton Rouge has doubled in severity over the past 10 days with intensities as high as 60% in the variety trials on March 30. Approximately 40% of 2,000 observation yield plots in the wheat breeding program have been discarded due to stripe rust, a reflection of the fact that we have not seen stripe rust of any consequence in several years. Most of Louisiana has been windy and relatively dry which has probably limited spread somewhat since temperatures have been favorable for

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Subscription Information

To receive an electronic copy of the OSU PASS Extension Newsletter, contact Janelle Malone at janelle.malone@okstate.edu. Please include "PASS Newsletter Subscription" and your name in the subject line.

Wheat disease (cont.)

development. Rain is forecast over much of Louisiana tonight and temperatures will remain favorable in north Louisiana for continued development over the next 10 days (forecast lows of 47 to 62 F). I suspect stripe rust incidence will increase substantially in southern and central Arkansas over the next 10 days.

Leaf rust incidence is relatively low and I am not aware of any commercial fields having been sprayed for leaf rust control. Active leaf rust is present at Baton Rouge and Winnsboro, and conditions are favorable for increase assuming we have rainfall this weekend and winds subside at night. I suspect that leaf rust will increase in severity over the next two weeks.

I have not observed any oat crown rust, wheat stem rust, or oat stem rust. The wheat crop is about 10–14 days behind normal development due to the cold winter. The average heading date across varieties and years for entries in the official wheat variety trials in Baton Rouge is about March 30. As of yesterday none of the trials had headed, although some will head by early next week."

Bob Hunger can be reached at bob.hunger@okstate.edu.

More information on how to identify and treat foliar disease of wheat can be found at www.wheat.okstate.edu.

Sandbur control with Pastora: Section 18 label approved for use in bermudagrass

By Joe Armstrong and Daren Redfearn

Pasotra™, a postemergence herbicide from DuPont for control of sandbur in bermudagrass pastures, recently received a Section 18 Emergency Exemption label for use until June 30, 2010. At the time of application, pesticide applicators must have a copy of the Section 18 label, the EPA approval letter, and EPA approval letter amendment in the possession (these documents are included at the end of the newsletter). Full registration for Pastora is expected during the second quarter of 2010.

A maximum of two broadcast applications can be made at a rate of 1.0 to 1.5 oz per acre; however, a maximum of 2.5 oz may be applied in a single cropping season. Pastora may be applied by ground or air equipment, but may not be applied through irrigation systems. Since Pastora is a postemergence herbicide, it should be applied after germination but before the sandbur reach the 2 leaf growth stage (approximately four inches in height). Pastora should only be applied to established bermudagrass pastures (at least one year old) and not to newly sprigged or planted bermudagrass. There are no haying or grazing restrictions following application. Please see the label at the end of this newsletter for more information.

In addition to postemergence herbicide applications, managing for a competitive bermudagrass stand will also help to reduce sandbur problems. Proper fertility, soil pH, and rodent management are all effective tools for controlling sandbur in pastures.

Joe Armstrong can be reached at joe.armstrong@okstate.edu, and Daren Refearn can be reached at daren.redfearn@okstate.edu.

Upcoming Events

Canola Field Day

April 22, 2010 *North Central Research Station*
Lahoma
(More details to follow.)

OSU Wheat Field Days

April 26, 2010 *Waurika - 6 p.m.*

April 28, 2010 *Granite - 10:30 a.m.*

April 30, 2010 *Hollis - 12 p.m.*

May 3, 2010 *Frederick - time TBA*

May 4, 2010
Marshall - 10 a.m.
Sentinel -11 a.m.
Minco - 11 a.m.
Billings - 2 p.m.
Bessie - 2 p.m.
Weatherford - 6 p.m.

May 6, 2010
El Reno - 10 a.m.
Foss -11 a.m.
Homestead - 6 p.m.

May 10, 2010
Elk City - 10 a.m.
Hammon - 5 p.m.

May 14, 2010
Lahoma - 8:30 a.m.
Apache - 5 p.m.
*(Note new location: 1 mile south of Apache on HWY 62, around the corner, across the railroad tracks and behind house on north side of highway.)

May 15, 2010 *Kingfisher - 7:30 a.m.*

May 17, 2010 *Cherokee - 6 p.m.*

OSU Plant Science Academy

June 6-8, 2010 *OSU Agronomy Farm*
Stillwater, Okla.
(Register by April 1.)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460-0001

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

April 6, 2010

Mr. Terry L. Peach, Secretary and Commissioner
Oklahoma Department of Agriculture
2800 North Lincoln Boulevard
P.O. Box 528804
Oklahoma City, Oklahoma 73152

DATE AMENDED:	**April 6, 2010**
DATE ISSUED:	**April 1, 2010**
EXPIRATION:	**June 30, 2010**
FILE SYMBOL:	**10-OK-01**

********** **AMENDMENT** **********

The U.S. Environmental Protection Agency (EPA) hereby amends a specific exemption previously granted under the provisions of section 18 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended, to the Oklahoma Department of Agriculture for the use of nicosulfuron on Bermudagrass fields and pastures grown for forage, hay and hazing.

This specific exemption is amended by deleting item #4 to read as follows:

4. Do not apply this product through any type of irrigation system.

All other conditions and restrictions as stated in the April 1, 2010 authorization letter still apply.

Daniel J. Rosenblatt, Chief
Risk Integration, Minor Use and Emergency
Response Branch, Registration Division

Date: 4/6/2010

cc: EPA Region #6
Johnie Dowell/R6/USEPA/US

DuPont™ Pastora™

herbicide

SECTION 18 EMERGENCY EXEMPTION FOR THE USE OF PASTORA™ HERBICIDE ON BERMUDAGRASS FOR CONTROL OF SANDBUR. SPECIFIC EXEMPTION PURSUANT TO SECTION 18 OF FIFRA AS AMENDED.

This is an unregistered product and may be used for distribution and use only in states with a valid section 18 authorization. This labeling must be in possession of the user at the time of pesticide application.

Any adverse effects resulting from the use of PASTORA™ herbicide under this emergency exemption must be immediately reported to the appropriate state lead agricultural agencies.

Any unused unregistered product must either be returned to the manufacturer or distributor (unopened containers) or disposed of in accordance with the Resource Conservation and Recovery Act regulations following the expiration of this exemption.

Active Ingredient	*By Weight*
Nicosulfuron 2-[[(4,6-dimethoxypyrimidin-2-yl)aminocarbonyl]aminosulfonyl]-N,N-dimethyl-3-pyridinecarboxamide	56.2%
Metsulfuron Methyl Methyl 2-[[[[(4-methoxy-6-methyl-1,3,5-triazin-2yl)amino]carbonyl]amino]sulfonyl]benzoate	15.0%
Inert Ingredients	28.8%
TOTAL	100.0%

EPA Est. No. _____

Nonrefillable Container
Net: _____
OR
Refillable Container
Net: _____

KEEP OUT OF REACH OF CHILDREN

CAUTION

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand this label, find someone to explain it to you in detail.)

FIRST AID

IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first five minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

IF ON SKIN OR CLOTHING: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

IF SWALLOWED: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-441-3637 for emergency medical treatment information.

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION. Causes eye irritation. Avoid contact with skin, eyes or clothing. Avoid breathing dust or spray mist. Harmful if absorbed through skin.

PERSONAL PROTECTIVE EQUIPMENT

Applicators and other handlers must wear:

Long-sleeved shirt and long pants.

Shoes plus socks.

Chemical resistant gloves Category A (such as butyl rubber, natural rubber, neoprene rubber, or nitrile rubber), all > 14 mils.

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

Engineering Control Statement: When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240 (d) (4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

USER SAFETY RECOMMENDATIONS

Users should: Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

ENVIRONMENTAL HAZARDS

Do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or when disposing of equipment washwaters. Do not apply where/when conditions could favor runoff.

IMPORTANT INFORMATION

PESTICIDE HANDLING

- Calibrate sprayers only with clean water away from the well site.
- Make scheduled checks of spray equipment.
- Assure accurate measurement of pesticides by all operation employees.
- Mix only enough product for the job at hand.
- Avoid overfilling of spray tank.
- Do not discharge excess material on the soil at a single spot in the field or mixing/loading station.
- Dilute and agitate excess solution and apply at labeled rates/uses.
- Avoid storage of pesticides near well sites.
- When triple rinsing the pesticide container, be sure to add the rinsate to the spray mix.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 4 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

Coveralls.
Shoes plus socks.
Chemical resistant gloves Category A (such as butyl rubber, natural rubber, neoprene rubber, or nitrile rubber), all > 14 mils.

DuPont™ PASTORA™ should be used only in accordance with instructions on this label or in separate DuPont publications.

DuPont will not be responsible for losses or damages resulting from the use of this product in any manner not specified by DuPont.

Do not apply this product through any type of irrigation system.

GENERAL INFORMATION

PASTORA™ herbicide is registered for use on bermudagrass pastures and hay meadows. Check with your state extension or Department of Agriculture before use, to be certain PASTORA™ is registered in your state.

PASTORA™ is a dry-flowable granule that controls or suppresses sandbur in bermudagrass pasture. PASTORA™ is mixed in water and applied as a uniform broadcast spray. A spray adjuvant must be used in the spray mix unless otherwise specified on this label. PASTORA™ is noncorrosive, nonflammable, nonvolatile, and does not freeze.

PASTORA™ controls sandbur by postemergence activity. For best results, apply PASTORA™ to young, actively growing weeds. Weeds hardened off by cold weather or drought stress may not be controlled. The use rate depends upon the weed spectrum and size of weeds at application. The degree and duration of control may depend on the following factors:

- weed spectrum and infestation intensity
- weed size at application
- environmental condition at and following treatment

It is permissible to treat intermittently flooded low lying sites, seasonally dry flood plains and transitional areas between upland and lowland sites when no water is present. It is also permissible to treat marshes, swamps and bogs after water has receded as well as seasonally dry flood deltas. DO NOT make applications to natural or man-made bodies of water such as lakes, reservoirs, ponds, streams and canals.

Environmental Conditions and Biological Activity

PASTORA™ is absorbed through the foliage and roots of weeds, rapidly inhibiting their growth. Leaves of susceptible plants appear chlorotic from 1 to 3 weeks after application and the growing point subsequently dies. The final effects on annual weeds are evident about 4 to 6 weeks after application. The ultimate effects on perennial weeds occur in the growing season following application.

Application of PASTORA™ provides the best control in vigorously growing pastures that shade competitive weeds. Weed control in areas of thin grass may not be as satisfactory. However, a bermudagrass canopy that is too dense at application can intercept spray and reduce weed control.

In warm, moist conditions, the expression of herbicide symptoms is accelerated in weeds; in cold, dry conditions, expression of herbicide symptoms is delayed. In addition, weeds hardened-off by drought stress are less susceptible to PASTORA™.

Weed control or suppression may be reduced if rainfall, or sprinkler irrigation occurs within 4 hours after application.

Weed control should be part of an overall pasture management plan which includes good fertility, adequate moisture (rainfall, irrigation), insect and rodent control, and other agronomic

practices which maximize bermudagrass growth. Consult your state cooperative extension service, local agricultural dealer, professional consultant or other qualified authority for specific instructions regarding proper management of bermudagrass pastures.

APPLICATION INFORMATION

Application Timing

DuPont™ PASTORA™ may be applied to bermudagrass that has been established for at least one growing season. For best results, time applications to young, actively growing sandbur.

Applications of PASTORA™ may result in temporary yellowing or stunting of bermudagrass. Crop response is more likely if bermudagrass is stressed from adverse environmental conditions (such as extreme temperatures or moisture), abnormal soil conditions, or cultural practices.

Spring or summer applications of PASTORA™ may temporarily reduce grass production. Crop response is minimized by treating when bermudagrass has less than 2" of new growth during initial green-up or by treating within 7 days after cutting for hay.

Weeds may continue to germinate throughout the growing season. Also, regrowth of treated weeds may occur due to adverse environmental conditions. To control weeds under these conditions, a sequential application of PASTORA™ may be necessary.

Use Rates

Apply 1.0 to 1.5 ounces PASTORA™ per acre as a broadcast application to established bermudagrass pastures. Do not apply more than 2.5 ounces of PASTORA™ per acre per year.

For spot applications, mix 2.5 ounces of PASTORA™ per 100 gallons of water for suppression of sandbur. Spot applications may be made using equipment such as back pack, ATV, or hand sprayers. Thorough coverage of foliage and stems is necessary to optimize results.

Spray Adjuvants

Unless otherwise directed, applications of PASTORA™ must include a surfactant. In addition, an ammonium nitrogen fertilizer can be used unless specifically prohibited by tank mix partner labeling. Consult local DuPont fact sheets, technical bulletins, and service policies prior to using other adjuvant systems. If another herbicide is tank mixed with PASTORA™, select adjuvants authorized for use with both products. Products must contain only EPA-exempt ingredients (40 CFR 1001).

Nonionic Surfactant (NIS)

- NIS is the preferred surfactant under most conditions
- Apply at 0.25% v/v (1 quart per 100 gallons spray solution) or 0.5% under arid conditions.
- Surfactant products must contain at least 60% nonionic surfactant with a hydrophilic/lipophilic balance (HLB) greater than 12.

Crop Oil Concentrate (COC)

- Use of COC may increase the potential for bermudagrass injury.
- Apply at 1% v/v (1 gallon per 100 gallons spray solution) or 2% under arid conditions.
- Oil adjuvants must contain at least 80% high quality, petroleum (mineral) with at least 15% surfactant emulsifiers.

Ammonium Nitrogen Fertilizer

- Use 2 quarts/acre of a high-quality urea ammonium nitrate (UAN), such as 28%N or 32%N, or 2 pounds/acre of a spray grade ammonium sulfate (AMS). Use 4 quarts/acre UAN or 4 pounds/acre AMS under arid conditions. See "Tank Mixtures with Liquid Solution Fertilizer" for instructions on using fertilizer as a carrier in place of water.

Special Adjuvant Types

- Combination adjuvant products may be used at doses that provide the required amount of NIS, COC and/or ammonium nitrogen fertilizer. Consult product literature for use rates and restrictions. Use of combination adjuvant products may increase the potential for bermudagrass injury.
- In addition to the adjuvants specified above, other adjuvant types may be used if they provide the same functionality and have been evaluated and approved by DuPont. Consult separate DuPont technical bulletins for detailed information before using adjuvant types not specified on this label.

Antifoaming agents may be used if needed.

Do not use low rates of liquid fertilizer as a substitute for surfactant .

WEEDS CONTROLLED OR SUPPRESSED

Sandbur: Application should be made when sandbur is less than 1.5" tall and/or across and is actively growing. Make applications to bermudagrass that is less than 4" tall following initial green-up in the spring, or after cutting for hay. Tall, dense stands of bermudagrass can intercept spray and reduce sandbur control. A follow-up application of PASTORA™ may be necessary to control subsequent germination (flushes) of sandbur following the first application.

Sandbur greater than 1.5" tall may be suppressed resulting in a reduction in sandbur seedheads.

Sandbur Management should be part of an overall pasture management plan which includes good fertility, adequate moisture (rainfall, irrigation), insect and rodent control, and other agronomic practices which maximize bermudagrass growth. In contrast, sandbur control in areas with thin stands of bermudagrass may not be satisfactory.

TANK MIXTURES

With Insecticides and Fungicides

PASTORA™ may be tank mixed or used sequentially with insecticides and fungicides registered for use on pastures.

However, under certain conditions (drought stress or cold weather), tank mixes or sequential applications of PASTORA™ with organophosphate insecticides (such as parathion) may produce temporary grass yellowing or, in severe cases, grass injury.

The potential for grass injury is greatest when wide fluctuations in day/night temperatures occur just prior to or soon after application.

Test these mixtures in a small area before treating large areas.

Do not use DuPont™ PASTORA™ plus Malathion, as grass injury will result.

With Herbicides

PASTORA™ may be tank mixed with other suitable registered herbicides to control weeds listed as suppressed, weeds resistant to PASTORA™, or weeds not listed under **Weeds Controlled**. Read and follow all manufacturer's label directions for the companion herbicide. If those directions conflict with this label, do not tank mix the herbicide with PASTORA™. Some herbicide tank mixes may antagonize grass weed control.

Other Herbicides: For postemergence control of the following weeds in pastures:

Carolina horsenettle	Giant ragweed
Common milkweed	Western ragweed
Common ragweed	

Apply PASTORA™ at 1.0 to 1.5 ounces per acre in a tank mix with one of the following products. Refer to companion herbicide labels to confirm that the product is labeled for control of the weeds listed above and is registered for use in your state.

Product	Rate (ounce product/A)
"Grazon" P+D	8 to 32
"Tordon" 22K	4 to 16
"Weedmaster"	8 to 32
"Remedy"	8
"Amber"	0.35*

* For suppression of Western Ragweed In Phenoxy Restricted and Herbicide Regulated Counties

Product	Rate (ounce A.I./A)
2,4-D	8 to 16
Dicamba (such as "Banvel" or "Clarity")	2 to 16
2,4-D + Dicamba	1 + 2.87 to 4 + 11.48

With Liquid Nitrogen Solution Fertilizer

Liquid nitrogen fertilizer solutions may be used as a carrier in place of water. Run a tank mix compatibility test before mixing PASTORA™ in fertilizer solution.

PASTORA™ must first be slurried with water and then added to liquid nitrogen solutions (e.g., 28-0-0, 32-0-0). Ensure that the agitator is running while the PASTORA™ is added. Use of this mixture is likely to result in temporary grass yellowing or burn.

If using low rates of liquid nitrogen fertilizer (between 5% and 50% of the spray solution volume) in the spray solution, the addition of a non-ionic surfactant is necessary. Add surfactant at 1/4 pint per 100 gallons of spray solution (0.03% v/v).

Do not use a spray adjuvant other than non-ionic surfactant.

When using high rates of liquid nitrogen fertilizer (greater than or equal to 50% of the spray solution volume) in the spray solution, adding spray adjuvant(s) increases the risk of grass injury. Consult your agricultural dealer, consultant, fieldman, or DuPont representative for a specific recommendation before adding an adjuvant to these tank mixtures.

If 2,4-D or MCPA is included with PASTORA™ and liquid nitrogen fertilizer mixture, ester formulations tend to be more compatible (See manufacturer's label). Do not add spray adjuvants when using PASTORA™ in tank mix with 2,4-D ester and liquid nitrogen fertilizer solutions greater than 5% of the spray volume.

Do not use low rates of liquid fertilizer as a substitute for spray adjuvants.

Do not use with liquid fertilizer solutions with a pH less than 3.0.

GENERAL APPLICATION INFORMATION

Spray Equipment

For specific application equipment, refer to the manufacturer's recommendations for additional information on GPA, pressure, speed, nozzle types and arrangements, nozzle heights above the target canopy, etc.

Be sure to calibrate air or ground equipment properly before application. Select a spray volume and delivery system that will ensure thorough coverage and a uniform spray pattern with minimum drift. Use higher spray volumes to obtain better coverage when the crop canopy is dense. Avoid swath overlapping, and shut off spray booms while starting, turning, slowing, or stopping to avoid crop injury.

Do not make applications using equipment and/or spray volumes or under weather conditions that might cause spray to drift onto nontarget sites. For additional information on spray drift, refer to the **Spray Drift Management** section of the label.

Continuous agitation is required to keep PASTORA™ in suspension.

Ground Application

To obtain optimum spray distribution and thorough coverage, use flat-fan or low-volume flood nozzles.

For flat-fan nozzles, use at least 10 GPA for broadcast applications.

For flood nozzles on 30" spacings, use at least 10 gallons per acre (GPA), flood nozzles no larger than TK10 (or equivalent), and a pressure of at least 30 pounds per square inch (psi). For 40" nozzle spacings, use at least 13 GPA; for 60" spacings, use at least 20 GPA. It is essential to overlap the nozzles 100% for all spacings.

With "Raindrop RA" nozzles, use at least 30 GPA and ensure that nozzle spray patterns overlap 100%.

Use 50-mesh screens or larger.

Aerial Application

Use nozzle types and arrangements that provide optimum spray distribution and maximum coverage.

Use a minimum of 2 GPA.

When applying PASTORA™ by air in areas adjacent to sensitive crops, use solid stream nozzles oriented straight back. Adjust the swath to avoid spray drift damage to sensitive crops downwind and/or use ground equipment to treat the border edge of fields. See the **Spray Drift Management** section of this label. Aerial application is not permitted in New York state.

Product Measurement

PASTORA™ is measured using the PASTORA™ volumetric measuring cylinder. The degree of accuracy of this cylinder varies by +/- 7.5%. For more precise measurement, use scales calibrated in ounces.

Mixing Instructions

1. Fill the tank 1/4 to 1/3 full of water (If using liquid nitrogen fertilizer solution in place of water, see Tank Mixtures sections for additional details).
2. While agitating, add the required amount of DuPont™ PASTORA™.
3. Continue agitation until the PASTORA™ is fully dispersed, at least 5 minutes.
4. Once the PASTORA™ is fully dispersed, maintain agitation and continue filling tank with water. PASTORA™ should be thoroughly mixed with water before adding any other material.
5. As the tank is filling, add tank mix partners (if desired) then add the necessary volume of spray adjuvants. Always add spray adjuvants last.
6. If the mixture is not continuously agitated, settling will occur. If settling occurs, thoroughly re-agitate before using.
7. Apply PASTORA™ spray mixture within 24 hours of mixing to avoid product degradation.
8. If PASTORA™ and a tank mix partner are to be applied in multiple loads, pre-slurry the PASTORA™ in clean water prior to adding to the tank. This will prevent the tank mix partner from interfering with the dissolution of the PASTORA™.

Do not use PASTORA™ with spray additives that reduce the pH of the spray solution to below 3.0.

Sprayer Cleanup

Before Spraying PASTORA™

Spray equipment must be cleaned before PASTORA™ is sprayed. Follow the cleanup procedures specified on the labels of previously applied products. If no directions are provided, follow the six steps outlined in After Spraying PASTORA™ section of this label.

At the End of the Day

When multiple loads of PASTORA™ herbicide are applied, it is recommended that at the end of each day of spraying, the interior of the tank be rinsed with fresh water and then partially filled, and the boom and hoses flushed. This will prevent the buildup of dried pesticide deposits that can accumulate in the application equipment.

After Spraying PASTORA™ and Before Spraying Crops Other Than Bermudagrass

To avoid subsequent injury to desirable crops, thoroughly clean all mixing and spray equipment immediately following applications of PASTORA™ as follows:

1. Drain tank; thoroughly rinse spray tanks, boom, and hoses with clean water. Loosen and physically remove any visible deposits.
2. Fill the tank with clean water and 1 gallon of household ammonia* (contains 3% active) for every 100 gallons of water. Flush the hoses, boom, and nozzles with the cleaning solution. Then add more water to completely fill the tank. Circulate the cleaning solution through the tank and hoses for at least 15 min. Flush the hoses, boom, and nozzles again with the cleaning solution, and then drain the tank.
3. Remove the nozzles and screens and clean separately in a bucket containing cleaning agent and water.
4. Repeat step 2.
5. Rinse the tank, boom, and hoses with clean water.
6. If only Ammonia is used as a cleaner, the rinsate solution may be applied back to the crop(s) recommended on this label. Do not exceed the maximum labeled use rate. If other cleaners are used, consult the cleaner label for rinsate disposal instructions. If no instructions are given, dispose of the rinsate on site or at an approved waste disposal facility.

* Equivalent amounts of an alternate-strength ammonia solution or a cleaner which dissolves and removes sulfonylurea herbicide residues can be used in the cleanout procedure. Carefully read and follow the individual cleaner instructions.

Notes:

1**. Attention:** Do not use chlorine bleach with ammonia, as dangerous gases will form. Do not clean equipment in an enclosed area.
2. Steam-cleaning aerial spray tanks is recommended prior to performing the above cleanout procedure to facilitate the removal of any caked deposits.
3. When PASTORA™ is tank mixed with other pesticides, all required cleanout procedures should be examined and the most rigorous procedure should be followed.
4. In addition to this cleanout procedure, all precleanout guidelines on subsequently applied products should be followed as per the individual labels.
5. Where routine spraying practices include shared equipment frequently being switched between applications of PASTORA™ and applications of other pesticides to PASTORA™-sensitive crops during the same spray season, it is recommended that a sprayer be dedicated to PASTORA™ to further reduce the chance of crop injury.

GRAZING/HAYING

There are no grazing or haying restrictions for PASTORA™ for livestock including cattle, horses, sheep, goats, and other animals when using PASTORA™ as directed.

Coveralls, shoes plus socks must be worn if cutting within 4 hours of treatment.

CROP ROTATION

Before using PASTORA™, carefully consider your crop rotation plans and options. For rotational flexibility, do not treat all of your pasture acres at the same time.

Minimum Rotational Intervals

Minimum rotation intervals* are determined by the rate of breakdown of PASTORA™ applied. PASTORA™ breakdown in the soil is affected by soil pH, presence of soil microorganisms, soil temperature, and soil moisture. Low soil pH, high soil temperature, and high soil moisture increase PASTORA™ breakdown in soil, while high soil pH, low soil temperature, and low soil moisture slow PASTORA™ breakdown.

Of these 3 factors, only soil pH remains relatively constant. Soil temperature, and to a greater extent, soil moisture, can vary significantly from year to year and from area to area. For this

reason, soil temperatures and soil moisture should be monitored regularly when considering crop rotations.

* The minimum rotation interval represents the period of time from the last application to the anticipated date of the next planting.

Soil pH Limitations

DuPont™ PASTORA™ should not be used on soils having a pH above 7.9, as extended soil residual activity could extend crop rotation intervals beyond normal. Under certain conditions, PASTORA™ could remain in the soil for 34 months or more, injuring wheat and barley. In addition, other crops planted in high-pH soils can be extremely sensitive to low concentrations of PASTORA™.

Checking Soil pH

Before using PASTORA™, determine the soil pH of the areas of intended use. To obtain a representative pH value for the test area, take several 0" to 4" samples from different areas of the field and analyze them separately. Consult local extension publications for additional information on recommended soil sampling procedures.

Bioassay

A field bioassay must be completed before rotating to any crop or grass species/variety not listed in the Rotation Intervals Table, or if the soil pH is not in the specified range, or if the use rate applied is not specified in the table.

To conduct a field bioassay, grow test strips of the crop(s) or grass(es) you plan to grow the following year in fields previously treated with PASTORA™. Crop or grass response to the bioassay will indicate whether or not to rotate to the crop(s) or grass(es) grown in the test strips.

If a field bioassay is planned, check with your local Agricultural dealer or DuPont representative for information detailing the field bioassay procedure.

SPRAY DRIFT MANAGEMENT

The interaction of many equipment and weather-related factors determines the potential for spray drift. The applicator is responsible for considering all these factors when making application decisions.

AVOIDING SPRAY DRIFT IS THE RESPONSIBILITY OF THE APPLICATOR.

IMPORTANCE OF DROPLET SIZE

The most effective way to reduce drift potential is to apply large droplets (>150 - 200 microns). The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. The presence of sensitive species nearby, the environmental conditions, and pest pressure may affect how an applicator balances drift control and coverage. APPLYING LARGER DROPLETS REDUCES DRIFT POTENTIAL, BUT WILL NOT PREVENT DRIFT IF APPLICATIONS ARE MADE IMPROPERLY OR UNDER UNFAVORABLE ENVIRONMENTAL CONDITIONS! See **Wind**, **Temperature and Humidity**, and **Temperature Inversions** sections of this label.

Controlling Droplet Size - General Techniques

- **Volume -** Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
- **Pressure -** Use the lower spray pressures recommended for the nozzle. Higher pressure reduces droplet size and does not improve canopy penetration. WHEN HIGHER FLOW RATES ARE NEEDED, USE A HIGHER-CAPACITY NOZZLE INSTEAD OF INCREASING PRESSURE.
- **Nozzle Type -** Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles.

Controlling Droplet Size - Aircraft

- **Number of Nozzles -** Use the minimum number of nozzles with the highest flow rate that provide uniform coverage.
- **Nozzle Orientation -** Orienting nozzles so that the spray is emitted backwards, parallel to the airstream will produce larger droplets than other orientations.
- **Nozzle Type -** Solid stream nozzles (such as disc and core with swirl plate removed) oriented straight back produce larger droplets than other nozzle types.

Rotation Intervals

Location	Crop or Grass Species	Maximum PASTORA™ Rate on Pasture (ounce/acre)	Minimum Rotation Interval (months)
All areas	Alfalfa, red clover, white clover, sweet clover,	2.0	12
	bermudagrass, bluegrass, ryegrass, tall fescue	2.0	4
	Wheat (except durum)	2.0	4
	Durum, barley, oat	1.5	10
Areas with Soil pH of 7.0 or Less	STS soybeans	1.0	6
	Field corn	1.0	12

- **Boom Length -** The boom length should not exceed 3/4 of the wing or rotor length - longer booms increase drift potential.
- **Application Height -** Application more than 10 ft above the canopy increases the potential for spray drift.

BOOM HEIGHT

Setting the boom at the lowest labeled height (if specified) which provides uniform coverage reduces the exposure of droplets to evaporation and wind. For ground equipment, the boom should remain level with the crop and have minimal bounce.

WIND

Drift potential increases at wind speeds of less than 3 mph (due to inversion potential) or more than 10 mph. However, many factors, including droplet size and equipment type determine drift potential at any given wind speed. AVOID GUSTY OR WINDLESS CONDITIONS.

Note: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

TEMPERATURE AND HUMIDITY

When making applications in hot and dry conditions, set up equipment to produce larger droplets to reduce effects of evaporation.

TEMPERATURE INVERSIONS

Drift potential is high during a temperature inversion. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain close to the ground and move laterally in a concentrated cloud. Temperature inversions are characterized by increasing temperature with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

SHIELDED SPRAYERS

Shielding the boom or individual nozzles can reduce the effects of wind. However, it is the responsibility of the applicator to verify that the shields are preventing drift and not interfering with uniform deposition of the product.

WEED RESISTANCE

When herbicides that affect the same biological site of action are used repeatedly over several years to control the same weed species in the same field, naturally-occurring resistant biotypes may survive a correctly applied herbicide treatment, propagate, and become dominant in that field. Adequate control of these resistant weed biotypes cannot be expected. If weed control is unsatisfactory, it may be necessary to retreat the problem area using a product affecting a different site of action.

To better manage herbicide resistance through delaying the proliferation and possible dominance of herbicide resistant weed biotypes, it may be necessary to change cultural practices within and between crop seasons such as using a combination of retreatment, tank-mix partners and/or sequential herbicide applications that have a different site of action. Weed escapes that are allowed to go to seed will promote the spread of resistant biotypes.

It is advisable to keep accurate records of pesticides applied to individual fields to help obtain information on the spread and dispersal of resistant biotypes. Consult your agricultural dealer, consultant, applicator, and/or appropriate state agricultural extension service representative for specific alternative cultural practices or herbicide recommendations available in your area.

INTEGRATED PEST MANAGEMENT

This product may be used as part of an Integrated Pest Management (IPM) program that can include biological, cultural, and genetic practices aimed at preventing economic pest damage. IPM principles and practices include field scouting or other detection methods, correct target pest identification, population monitoring, and treating when target pest populations reach locally determined action thresholds. Consult your state cooperative extension service, professional consultants or other qualified authorities to determine appropriate action treatment threshold levels for treating specific pest/crop systems in your area.

PRECAUTIONS

- Do not apply or drain or flush equipment on or near desirable trees or other plants, or on areas where their roots extend, or in locations where the product may be washed or moved into contact with their roots, as injury or loss of desirable trees or other plants may result.
- Do not use on lawns, walks, driveways, tennis courts, golf courses, athletic fields, commercial sod operations, or other high-maintenance, fine turfgrass areas, or similar areas.
- Do not use on grasses grown for seed.
- Do not apply to irrigated land where the tailwater will be used to irrigate crops.
- Do not apply to frozen ground as surface runoff may occur.
- Do not apply to snow-covered ground.
- Grass species or varieties may differ in their response to various herbicides. DuPont recommends that you first consult your state experiment station, university, or extension agent as to sensitivity to any herbicide. If no information is available, limit the initial use of DuPont™ PASTORA™ to a small area.
- Under certain conditions such as heavy rainfall, high pH, prolonged cold weather, or wide fluctuations in day/night temperatures prior to or soon after PASTORA™ application, temporary discoloration and/or grass injury may occur. PASTORA™ should not be applied to grass that is stressed by severe weather conditions, drought, low fertility, water-saturated soil, disease, or insect damage, as grass injury may result. Severe winter stress, drought, disease, or insect damage before or following application also may result in grass injury.

- Applications of DuPont™ PASTORA™ to pastures undersown with legumes may cause injury to the legumes.
- To reduce the potential for movement of treated soil due to wind erosion, do not apply to powdery dry or light sandy soils until they have been stabilized by rainfall, trashy mulch, reduced tillage, or other cultural practices. Injury to immediately adjacent crops may occur when treated soil is blown onto land used to produce crops other than bermudagrass.
- For ground applications applied to weeds when dry, dusty field conditions exist, control of weeds in wheel track areas may be reduced. The addition of 2,4-D or MCPA should improve weed control under these conditions.
- Do not apply more than 2.5 ounces of PASTORA™ per acre per year.

STORAGE AND DISPOSAL

Pesticide Storage: Store product in original container only. Do not contaminate water, other pesticides, fertilizer, food or feed in storage.

Pesticide Disposal: Do not contaminate water, food, or feed by storage, disposal or cleaning of equipment. Waste resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

CONTAINER HANDLING:

Refer to the Net Contents section of this product's labeling for the applicable "Refillable Container" or "Nonrefillable Container" designation.

Nonrefillable Plastic and Metal Containers (Capacity Equal to or Less Than 50 Pounds): Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then, (a) for Plastic Containers, offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning; if burned, stay out of smoke, or (b) for Metal Containers, offer for recycling if available or reconditioning if appropriate or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

Nonrefillable Plastic and Metal Containers (Capacity Greater Than 50 Pounds): Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. Then, (a) for Plastic Containers, offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning; if burned, stay out of smoke, or (b) for Metal Containers, offer for recycling if available or reconditioning if appropriate or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

Nonrefillable Plastic and Metal Containers, e.g., Intermediate Bulk Containers [IBC] (Size or Shape Too Large to be Tipped, Rolled or Turned Upside Down): Nonrefillable container. Do not reuse or refill this container. Pressure rinse as follows: Empty the remaining product contents into application equipment or a mix tank. Insert pressure rinsing nozzle in the container, and rinse at about 40 PSI for at least 30 seconds. Drain rinsate for 10 seconds after the flow begins to drip. Pour or pump rinsate into application equipment or rinsate collection system. Then, (a) for Plastic Containers, offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning; if burned, stay out of smoke, or (b) for Metal Containers, offer for recycling if available or reconditioning if appropriate or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

Nonrefillable Paper or Plastic Bags, Fiber Sacks including Flexible Intermediate Bulk Containers (FIBC) or Fiber Drums With Liners: Nonrefillable container. Do not reuse or refill this container. Completely empty paper or plastic bag, fiber sack or drum liner by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application or manufacturing equipment. Then offer for recycling if available or dispose of empty paper or plastic bag, fiber sack or fiber drum and liner in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Refillable Fiber Drums With Liners: Refillable container (fiber drum only). Refill this container with DuPont™ PASTORA™ herbicide containing nicosulfuron and metsulfuron methyl only. Do not reuse this container for any other purpose. Completely empty liner by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application or manufacturing equipment. Then offer the liner for recycling if available or dispose of liner in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke. If drum is contaminated and cannot be reused, dispose of it in the manner required for its liner. Cleaning the container (fiber drum) before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container (fiber drum) before final disposal, completely empty container by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application or manufacturing equipment. Then offer the container for recycling if available or dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

All Other Refillable Containers: Refillable container. Refill this container with PASTORA™ herbicide containing nicosulfuron and metsulfuron methyl only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10 percent full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times. Then, (a) for Plastic Containers, offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning; if burned, stay out of smoke, or (b) for Metal Containers, offer for recycling if available or reconditioning if appropriate or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities. Prior to refilling, inspect carefully for damage such as cracks, punctures, abrasions, worn out threads and closure devices. Check for leaks after refilling and before transporting.

Outer Pouches of Water Soluble Packets (WSP): Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available or, dispose of the empty outer foil pouch in the trash as long as WSP is unbroken. If the outer pouch contacts the formulated product in any way, the pouch must be triple rinsed with clean water. Add the rinsate to the spray tank and dispose of the outer pouch as described previously.

Do not transport if this container is damaged or leaking. If the container is damaged, leaking or obsolete, or in the event of a major spill, fire or other emergency, contact DuPont at 1-800-441-3637, day or night.

NOTICE TO BUYER: Purchase of this material does not confer any rights under patents of countries outside of the United States.

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LIMITATION OF WARRANTY AND LIABILITY

NOTICE: Read this Limitation of Warranty and Liability Before Buying or Using This Product. If the Terms Are Not Acceptable, Return the Product at Once, Unopened, and the Purchase Price Will Be Refunded.

It is impossible to eliminate all risks associated with the use of this product. Such risks arise from weather conditions, soil factors, off target movement, unconventional farming techniques, presence of other materials, the manner of use or application, or other unknown factors, all of which are beyond the control of DuPont. These risks can cause: ineffectiveness of the product, crop injury, or injury to non-target crops or plants. WHEN YOU BUY OR USE THIS PRODUCT, YOU AGREE TO ACCEPT THESE RISKS.

DuPont warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for the purpose stated in the Directions for Use, subject to the inherent risks described above, when used in accordance with the Directions for Use under normal conditions.

TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, DUPONT MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS OR OF MERCHANTABILITY OR ANY OTHER EXPRESS OR IMPLIED WARRANTY. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, IN NO EVENT SHALL DUPONT OR SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT. BUYER'S OR USER'S BARGAINED-FOR EXPECTATION IS CROP PROTECTION. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, THE EXCLUSIVE REMEDY OF THE USER OR BUYER AND THE EXCLUSIVE LIABILITY OF DUPONT OR SELLER, FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY OR CONTRACT, NEGLIGENCE, TORT OR STRICT LIABILITY), WHETHER FROM FAILURE TO PERFORM OR INJURY TO CROPS OR OTHER PLANTS, AND RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, SHALL BE THE RETURN OF THE PURCHASE PRICE OF THE PRODUCT, OR AT THE ELECTION OF DUPONT OR SELLER, THE REPLACEMENT OF THE PRODUCT.

To the extent consistent with applicable law that allows such requirement, DuPont or its Ag Retailer must have prompt notice of any claim so that an immediate inspection of buyer's or user's growing crops can be made. Buyer and all users shall promptly notify DuPont or a DuPont Ag Retailer of any claims, whether based on contract, negligence, strict liability, other tort or otherwise, or be barred from any remedy.

This Limitation of Warranty and Liability may not be amended by any oral or written agreement.

For product information call: 1-888-6-DUPONT

Internet address: http://cropprotection.dupont.com/

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460-0001

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

Mr. Terry L. Peach, Secretary and Commissioner
Oklahoma Department of Agriculture
2800 N. Lincoln Blvd., P.O. Box 528804
Oklahoma City, Oklahoma 73152

Date Issued:
Expiration Date: June 30, 2010
Final Report Due: December 30, 2010
File Symbol: 10-OK-01

Attn: Mr. Ryan Williams

The U.S. Environmental Protection Agency (EPA) hereby grants a specific exemption under the provisions of section 18 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended, to the Oklahoma Department of Agriculture for the use of nicosulfuron as a foliar post-emergent treatment to control sandbur in Bermuda grass fields and pastures grown for forage, hay and grazing. This specific exemption is subject to the conditions and restrictions set forth in your application as well as the following:

1. The Oklahoma Department of Agriculture is responsible for ensuring that all provisions of this specific exemption are met. It is also responsible for providing information in accordance with 40 Code of Federal Regulations (CFR) §166.32(b). Accordingly, a report summarizing the results of this program must be submitted to EPA Headquarters and the EPA Region 6 office within six months of the above expiration or prior to requesting another specific exemption for this use. In accordance with 40 CFR 166.32(a), these offices shall also be immediately informed of any adverse effects resulting from the use of this pesticide in connection with this exemption.

2. The product Pastora™ Herbicide, (not EPA registered), manufactured by E.I. DuPont de Nemours, DuPont Crop Protection may be used. All applicable directions, restrictions, and precautions outlined in the Section 18 Emergency Exemption use directions provided with your February 23, 2010 correspondence as well as the labels of all products applied in combination with Pastora™ Herbicide must be followed. Follow the directions for the most restrictive label.

3. A maximum of two post-emergent applications may be made at a broadcast rate of 1.0 to 1.5ounces. Do not apply more than 2.5 ounces per acre per crop season. Do not apply to newly sprigged or newly planted Bermuda grass. Apply only to established Bermuda grass at least one year old.

4. Pastora™ shall be applied only by certified applicators or licensed applicators. Do not apply this product through any type of irrigation system.

5. Harvest or grazing may begin at anytime and continue periodically throughout the season. There are no grazing or haying restrictions for Pastora™ for livestock including cattle, horses, sheep, goats, or other animals when used as directed.

6. Foliar post-emergent applications may be made by ground or air equipment. Applications are made after the sand bur has emerged but before the 2 leaf stage, which is approximately 4 inches tall.

7. A maximum of 300,000 acres may be treated under this exemption.

8. Residues of nicosulfuron resulting from applications made in accordance with this exemption are not expected to exceed 10 ppm in Bermuda grass forage and 25 ppm in Bermuda grass hay. The Agency has determined that these levels are adequate to protect public health. A time-limited tolerance has been established and is in place to support this use.

9. EPA Headquarters and the EPA Region 6 offices shall immediately be informed of any adverse effects resulting from use of this pesticide in connection with this exemption.

10. Any unused unregistered product must either be returned to the manufacturer or distributor (unopened containers) or disposed of in accordance with the Resource Conservation and Recovery Act regulations following the expiration of this exemption.

11. This specific exemption expires on June 30, 2010.

This is the second year that the Oklahoma Department of Agriculture has requested this use under the emergency exemption program. Full registration is expected during the 2nd quarter 2010. Thus, progress toward registration is considered adequate for purposes of this request.

Steven P. Bradbury, Ph.D., Director
Office of Pesticide Programs

Date: 4/11/10

cc: Johnie Dowell, USEPA Region 6
Johnie Dowell/R6/USEPA/US