Shaughnessy No: 122010

Date Out of EFGWB: JUN 27 1990

TO: Robert J. Taylor/Vicky Walters
Product Manager #25
Registration Division (H7505C)

FROM: Emil Regelman, Supervisory Chemist
Environmental Chemistry Review Section #2
Environmental Fate and Ground Water Branch, EFED (H7507C)

THRU: Henry M. Jacoby, Chief
Environmental Fate and Ground Water Branch/EFED (H7507C)

Attached, please find the EFGWB review of:

Reg./File #: 352-512; 352-435; 352-439

Common Name: Metsulfuron Methyl

Chemical Name: Methyl 2-[[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl-)-amino]carbonyl]amino]sulfonyl] benzoate

Type product: Herbicide

Product Name: Ally (Crop uses: small grains; Postemergence)

Company Name: E.I. du Pont de Nemours and Company

Purpose: Review of anaerobic aquatic metabolism study conducted with the parent material radiolabeled in the triazine ring

Date Received: 2/19/90 EFGWB #: 90-0467 thru 90-0469

Action Code: 400 Total Reviewing Time (decimal days): 2.5

Deferrals to: _____ _____ Ecological Effects Branch, EFED

_____ Science Integration & Policy Staff, EFED

_____ _____ Non-Dietary Exposure Branch, HED

_____ Dietary Exposure Branch, HED

_____ _____ Toxicology Branch I , HED

_____ Toxicology Branch II, HED

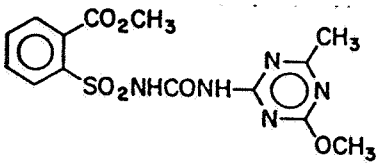
1. CHEMICAL:

Common name: Metsulfuron methyl

Chemical name: Methyl 2-[[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)-amino]carbonyl]amino]sulfonyl] benzoate

Trade name(s): Ally (crop uses)
Telar (noncrop uses)

Structure:



Physical/Chemical Properties (of active ingredient):

Molecular weight: 381.40
Physical state: white-to-pale yellow solid (technical grade)
Odor: Faint, sweet ester-like (technical)
Specific gravity: 1.47 gcm^{-3}
Melting point: 158 C
Vapor pressure (25 C): 5.8 x 10^{-5} mmHg
Solubility:
Distilled water (25 C).....109 mg/L
0.05 N sodium phosphate buffer (25 C):
pH 4.6.....270 mg/L
pH 5.4.....1750 mg/L
pH 6.7.....9500 mg/L
Organic solvents:
n-hexane.....0.79 mg/L
methylene chloride.....121,000 mg/L
acetone..... 36,000 mg/L
methanol.....7,300 mg/L
ethanol.....2,300 mg/L
xylene.....580 mg/L
pK_a: 3.5
Octanol/water partition coefficient (K_{ow}): 0.018

2. STUDY/ACTION TYPE:

Review of anaerobic aquatic metabolism study conducted with [triazine-^{14}C]-metsulfuron methyl.

3. STUDY IDENTIFICATION:

MRID #41395501
Swanson, M.B. 1988. Anaerobic aquatic metabolism of [triazine-2-^{14}C]metsulfuron methyl. Laboratory Project ID #AMR-1140-88; Completed on August 5, 1988. Performed and submitted by E.I. du Pont de Nemours and Company, Wilmington, DE.

4. REVIEWED BY:

Silvia C. Termes, Chemist
Review Section #2
OPP/EFED/EFGWB

Signature: _____

Date: June 25, 1990

5. APPROVED BY:

Emil Regelman
Supervisory Chemist
Review Section #2
OPP/EFED/EFGWB

Signature: _____

Date: JUN 27 1990

6. CONCLUSIONS:

This study (conducted with the parent material ^{14}C-labeled in the triazine ring) may be acceptable if the registrant provides the additional information listed below. If the additional information is acceptable, this study together with the one conducted with the phenyl-label material may be used to fulfill data requirements for anaerobic aquatic metabolism studies and for anaerobic soil metabolism studies (162-3 and 162-2, respectively).

a) Explain the apparent contradiction in the author's conclusion that $^{14}CO_2$ and $^{14}CH_4$ in viable samples form via opening of the triazine ring and the fact that the ring-open metabolite was only found in sterile samples and not in viable samples.

b) Indicate if there are other evidences showing that carbon dioxide and methane form from the ring open product. Or from the bridge-cleavage product triazine amine followed by ring opening. In any case, is there any evidence for another degradate containing the nitrogens of the triazine ring.

c) Clarify if other "headspace analysis samples" were analyzed besides the one at 210-days incubation. If they were analyzed, indicate if the carbon dioxide/ methane ratio was the same as for the 210-day sample.

d) Information on the microorganism population of the viable sample (type and count).

e) Indicate if there were attempts to check the anaerobicity of the systems throughout the duration of the experiment or at time of sampling (that is, if redox potential and/or dissolved oxygen content were recorded)

f) Clarify if the samples were incubated in the dark.

Summary of Results:

The study with the triazine-labeled material (conducted with pond water/ sandy loam sediment from Landenberg, PA) indicate a half-life of 35 days and

a predominant formation of polar metabolites. Formation of carbon dioxide and methane was observed in viable samples but not in sterile samples. The polar metabolites were identified as the bis-O-demethyl analog of metsulfuron methyl (BODM), the dihydroxy-methyl-triazine metsulfuron methyl and O-desmethyl triazine amine (ODTA). The "free acid" was only found in viable samples while a "ring open" metabolite was only found in sterile samples. Because of increased rate of degradation and differences in types of metabolites found in viable samples when compared to sterile ones, it was concluded that biotic degradation was the predominant mode of degradation under the experimental conditions.

In an earlier study conducted with ^{14}C-phenyl-ring labeled metsulfuron methyl (EFGWB review 12/17/84), data indicated that the parent material degraded in Landenberg pond water/silt-loam sediment with a half-life of 5-7 weeks (viable samples); in other pond water/sediment systems the reported half-lives were longer. Like in the study with the triazine-labeled material, there was formation of polar compounds. However, these polar compounds were not identified. The predominant metabolite detected was 2-aminosulfonyl benzoic acid (ca. 40% after 54 weeks); ca. 8% saccharine was detected after 54 weeks. The study with the phenyl-labeled material also suggest that formation of degradates may differ depending on the characteristics of the system (other water/sediment systems were included in the study). The Accession No. for the phenyl-label study is 072767.

Comment on the Phenyl-labeled Study:

EFGWB would like to know if the "polar metabolites" detected in this study have been identified. If they have been identified, this information should be submitted to the Agency.

7. RECOMMENDATIONS:

The registrant should be informed that additional information is being requested for both the study conducted with the triazine- and the phenyl-labeled metsulfuron methyl. The information being requested appears under the CONCLUSIONS section.

8. BACKGROUND:

ALLY is dry flowable granule containing 60% metsulfuron methyl as the active ingredient. The EPA Registration Number for this product is 352-435.

ALLY is recommended for use on land dedicated to the production of wheat (including durum) and barley. Rotation options are provided for certain other crops such as oats, proso millet, dryland grain sorghum, dryland corn, soybeans, flax, sunflower, safflower, alfalfa, hay, and dry beans. However, it is recommended that not all the wheat or barley be treated with ALLY in order to allow maximum rotational flexibility.

ALLY is also used on acreage enrolled in the Conservation Reserve Program for selective control of grasses.

ALLY may be applied by air or with ground spray equipment.

In CO, ID, Western KS and Western NE (west of highway 183), MN, MT, NM, ND, OK Pandhandle, OR, TX Pandhandle, SD, UT, WA and WY the maximum application rate is 1/10 oz/A in a 22 months period.

In Central Ks, Central NE, Central OK and North Central TX, the maximum crop use rate is 1/10 oz/A in a 10 month period.

ALLY is not to be used on soils with a pH greater than 7.9 because extended soil residual activity could affect crop rotation options or may cause injury to wheat and barley.

Minimum recommended rotation intervals range from 1 month (winter and spring wheat) to 34 months (soybeans in KS, NE with soil pH 7.6-7.9; alfalfa, MT; dry beans, ND [east of State Hwy 1]; and flax, safflower, sunflower in ND [east of State Hwy 1]). For other crops (see rotational crop options), field bioassays are recommended.

The information above has been taken from the current label for ALLY based on Draft Labeling dated 4/13/89.

9. DISCUSSION OF INDIVIDUAL STUDIES: See attached Data Evaluation Record.

10. COMPLETION OF ONE-LINER: No new information is being added at this time.

11. CBI APPENDIX: No CBI.

DATA EVALUATION RECORDS
STUDY #1

Shaughnessy No. 122010 Data Requirement 162-3
Chemical: Metsulfuron Methyl
Methyl 2-[[[[4-methoxy-6-methyl-1,3,5-triazin-yl)amino]carbonyl]-amino]sulfonyl] benzoate
Type of chemical: Sulfonylurea herbicide

MRID #41395501
Swanson, M.B. 1988. Anaerobic aquatic metabolism of [triazine-2-^{14}C]-metsulfuron methyl. Laboratory Project ID #AMR-1140-88; Completed on August 5, 1988. Performed and submitted by E.I. du Pont de Nemours and Company, Wilmington, DE.

Reviewed by: S.C. Termes, Chemist
OPP/EFED/EFGWB
(703)-557-2243

Date: June 25, 1990

CONCLUSIONS:

This study may be acceptable if the registrant clarifies EFGWB concerns expressed under the REVIEWER'S COMMENTS section.

SUMMARY OF REPORTED DATA:

Metsulfuron methyl incubated in viable samples under anaerobic conditions (water/sandy loam sediment) degraded with a calculated first half-life of 36-days (as compared to 139-days in sterile samples).

The type of metabolites observed in viable samples differed from those observed in sterile samples. Formation of polar metabolites was more evident in viable samples than in sterile ones. In viable samples, the predominant nonpolar metabolites were the free acid (which was the first one to show a pattern of formation/decline), reaching 0.27 ppm after 62 days and declining to 0.02 ppm by 366 days, but no free acid was detected in the sterile samples. Triazine amine reached a maximum of 0.07 ppm at 28 days and maintained that level for the duration of the study. Another nonpolar metabolite observed in viable samples was O-demethyl metsulfuron methyl (ODM) at 0.06 ppm after 62 days. A ring-open metabolite was only observed in sterile samples (maximum 0.17 ppm at 365 days); triazine amine reached a maximum at 243 days (0.17 ppm) and the level of ODM reached 0.19 ppm at 365 days (the maximum concentration of any metabolite in sterile samples).

Polar metabolites appear as early as 28 days in viable samples (0.05 ppm) and reached a maximum of 0.66 ppm at 366 days. Polar metabolites were identified as bis-O-demethyl analog of metsulfuron methyl (BODM) and dihydroxy-methyl-triazine metsulfuron methyl (DHMT). BODM reached a maximum at 243 days; DHMT reached a maximum of 0.57 ppm in the 335 sample, which declined to 0.46 ppm by 366 days. Another polar metabolite found in viable samples was O-demethyl triazine amine (ODTA), which was first noted at 124 days (0.12 ppm and reached

6

its maximum level at 184 days (0.33 ppm). In sterile samples the main polar metabolite was DHMT (0.15 ppm after 365 days)

In viable samples, formation of $^{14}CO_2$ and $^{14}CH_4$ in a 1:5 molar ratio was observed in sample incubated for 210 days (it is not clear if in the other samples and at different incubation times if volatile materials were also analyzed), but the loss in radioactivity after 124 days was attributed to carbon dioxide and methane formation based on the material balance.

MATERIALS AND METHODS:

Test Material: [Triazine-2-^{14}C]metsulfuron methyl, specific radioactivity of 21.2 uCi/mg (8.1 Ci/mol) and radiochemical purity ca. 98%.

Soil: Sediment and water were obtained from a pond in Landenberg, PA. The sediment was classified as a sandy loam and had the following characteristics: 62% sand, 27.6% silt, 10.6% clay, 2.5% OM, pH 5.9, CEC 4.6 meq/100 g.

Sample preparation:

a) Viable samples- 50 g (wet weight) of sediment were placed into 250 mL centrifuge tubes with 100 mL pond water as a substrate plus 1.5 g of wheat straw as a substrate for anaerobic metabolism. The tubes were then capped tightly and incubated (25 C) for 33-37 prior dosing.
b) Sterile samples- Media bottles (250 mL) containing 50 g of sediment and 100 mL pond water were autoclaved (121 C and 15 psi).
c) Sterility and viability were checked prior dosing.

Dosing and incubation: Viable samples were dosed by adding 0.15 mg of metsulfuron methyl in 0.6 mL of acetone to each tube (initial nominal concentration 1 ppm). Sterile samples were dosed by adding 0.13 mg (0.85 ppm) in 0.6 mL of acetone (sterilized solution). Both viable and sterilized samples were incubated at 25 C for specific periods of time up to 1 year.

Headspace analysis samples were prepared by adding about 0.15 mg (1 ppm) radiolabeled metsulfuron methyl to 100 mL of pond water over 50 g of sediment in 250 mL media bottles and purging with nitrogen. These bottles were fitted with caps and luer stopcocks to allow sampling of the head space. An exaggerated dose sample (30 mg of nonradiolabeled parent material; 200 ppm initial nominal concentration) was prepared in the same manner, but sealing the bottle with a regular cap. All samples were incubated at 25 C.

Sampling intervals:

a) Viable samples- 0, 8, 14, 28, 62, 124, 184, 243, 335, and 366 days.
b) Sterile samples- 62, 124, 184, 243, and 365 days.

Analytical methodology:

a) Extraction- Viable and sterile hydrosoil samples were filtered through a paper filter in a Buchner funnel; the water pH was measured prior filtration. Then the soil samples were extracted by resuspending the soil in water (twice) and refiltering each time. Filtrates containing 2000 dpm or more were pooled and neutralized to avoid further degradation. No distinction was made in the report between water fractions and sediment [extraction] fractions. Extracted soils were air-dried and total remaining radioactivity was determined by combustion.

b) Analyses-

HPLC (PRP-1 column; eluted with gradient of acetonitrile and phosphate buffer, pH 5; flow rate 2.0 mL/min; 40 C) was used to analyze the filtrates. To resolve a particular pair of nonpolar metabolites, a Ramona flow-through detector was used.

Thin-layer chromatography (TLC) was used to confirm the presence of metabolites identified by HPLC and separate polar metabolites that were not resolved by HPLC. To confirm the presence of metabolites, the silica gel plates were developed for 16-cm with methylene chloride, methanol, and formic acid (85;15:1, v:v:v). The polar metabolites (which eluted in a broad band; retention time 5-8 min) were collected from the HPLC by multiple injections of the aqueous extract, pooled and then deposited as 1-cm band onto silica gel plates; then developed for 16-cm in acetone-water (75:25, v:v). Radioactive peaks were detected and quantified on the Berthold; nonradioactive standards were detected by fluorescence quenching.

After 160 days of incubation, the exaggerated dose sample was used for spectral analyses of polar metabolites. After separating the aqueous phase from the sediment by filtration, 25 mL of the filtrate was extracted with an equal volume of ethyl acetate. The aqueous phase was injected into the PRP-1 HPLC system and the organic phase extract was concentrated under nitrogen at room temperature to ca. 1 mL, applied to TLC and developed with acetone/water as described above. The two peaks of radioactivity identified with the scanner were scraped from the plate, eluted with water as separate fractions SIL 1 and SIL 2. After further extraction to remove any binders, each fraction was concentrated under nitrogen, injected into an amino column (details given in the report), and each radioactive fraction was collected and further concentrated prior to MS-analyses.

$^{14}CH_4$ and $^{14}CO_2$ were analyzed by GC. After 210 incubation, the headspace gas (1 mL) was removed through the luer fitting and injected to the GC. Effluent was collected as a series of traps for $^{14}CO_2$ and timed to correspond to the retention times of suspected radioactive components of the mixture. The traps were analyzed by LSC. Methane was determined by comparison of nonlabeled methane retention time.

REPORTED RESULTS

The quantity of metsulfuron methyl in viable samples declined with a first half-life of 36 days and viable samples incubated for 124 days or longer contained <0.01 ppm of parent. In sterile samples, degradation occurred more slowly, with a first half-life of 139 days (after 365 days, sterile sample contained 0.05 ppm). After incubation, pH of viable samples ranged from 5.7 to 6.7 and for sterile samples from 4.8 to 6.3 (Tables II and III; Figures 2 and 3).

Nonpolar metabolites were identified by cochromatography except for the "ring-open" compound in some sterile samples, for which no standards existed. This compound was spectrally identified in previous hydrolysis studies and a frozen hydrolysis sample known to contain this product was used as a standard.

The free acid was the first metabolite to show pattern of formation and decline; after 62 days it accounted for 0.27 ppm of the applied and declined to 0.02 ppm after 366 days. [Bridge-cleavage product] "triazine amine" reached 0.07 ppm at 28 days and remained at that level (+/- 0.03 ppm) for the rest of the study.

Formation of O-demethyl metsulfuron methyl (ODM) occurred only in the 62-day sample (0.06 ppm) and declined to <0.01 ppm after 124-days.

No "free acid" formation was detected in sterile samples. The [bridge-cleavage] degradate "triazine amine" reached its greatest level at 243 days (0.17 ppm) while ODM increased from 0.10 ppm at 62 days to 0.19 ppm at 365 days and was the highest level of any metabolite in the sterile samples. The "ring-open" compound, which was only observed in sterile samples, increased steadily from 0.02 ppm at days to 0.17 ppm at 365-days.

Polar metabolites were already detected in viable samples (0.05 ppm) after 28 days incubation and reached a maximum of 0.66 ppm after 335 days. The maximum level of polar metabolites in sterile samples was 0.18 ppm after 365 days. Spectral identification of the lesser mobility SIL 1 fraction (see Analyses) that this was the bis-O-demethyl analog of metsulfuron methyl (BODM) and that the greater mobility fraction SIL 2 was dihydroxy-methyl-triazine (DHMT). Another polar metabolite identified was O-demethyl triazine amine (ODTA).

In viable samples, the level of BODM reached a maximum of 0.23 ppm in the 243-day sample and declined to about half that level afterwards. ODTA was first noted at 124 days (0.12 ppm) and reached its highest level after 184-days (0.33 ppm), but declined to <0.01 ppm by day 243. DHMT reached a maximum of 0.57 ppm in the 355-day sample, which was the highest level of any metabolite, and declined to 0.46 ppm by 366 days.

The main polar degradate in sterile samples was DHMT (maximum 0.15 ppm after 365 days), with $\leq$ 0.03 ppm ODTA detected. However, only samples incubated for 243 and 365 days produced enough polar metabolites for identification. No BODM was detected in either sample.

Volatile metabolites- The decline in overall recovery from viable samples decline with time and was attributed to formation of volatile products (from 124 days to end of study). From the 210-day "headspace" sample $^{14}CH_4$ and $^{14}CO_2$ were identified in a molar ratio of 1:5 and thus, the loss of radioactivity was attributed to breakdown of metsulfuron methyl to methane and carbon dioxide.

It was concluded that the degradation of metsulfuron methyl under anaerobic conditions was of biotic origin rather than abiotic (hydrolysis) because the rate of degradation in sterile samples was slower than in viable samples, even though the pH of the sterile samples were lower than those of the viable samples and, therefore, faster hydrolytic degradation would have been expected. The other marked differences between viable and sterile samples were the differences in metabolites that were formed.

REVIEWER'S COMMENTS:

- There appears to be some contradiction in the author's conclusion that $^{14}CH_4$ and $^{14}CO_2$ in viable samples form via opening of the triazine ring and the observation that the ring open metabolite was formed only in the sterile samples.

- Does the author have any other evidences that carbon dioxide and methane form from the ring open product? Or from "triazine amine" (for instance, data may

be available in which the anaerobic metabolism of "triazine amine" was investigated). In any case, does the author have any evidence for any (possible volatile) degradation product containing nitrogen?

- Although it is mentioned in the report that "headspace analysis samples" were prepared, only the sample incubated at 210 days was apparently analyzed. In this case, $^{14}CO_2$ and $^{14}CO_2$ were identified in a molar ratio of about 5:1. If other samples incubated at different time periods were analyzed, was this ratio also observed or was there any variation?

- Provide information on the microorganism population of the viable samples (type and count).

- Indicate if there where attempts to check anaerobicity of the samples throughout the duration of the experiment or at time of sampling (that is, if redox potential or dissolved oxygen content were recorded).

- It is not clear from the report if samples were incubated under dark conditions.

Metsulfuron methyl environmental fate review

Page _____ is not included in this copy.

Pages 12 through 22 are not included in this copy.

The material not included contains the following type of information:

___ Identity of product inert ingredients

___ Identity of product impurities

___ Description of the product manufacturing process

___ Description of product quality control procedures

___ Identity of the source of product ingredients

___ Sales or other commercial/financial information

___ A draft product label

___ The product confidential statement of formula

___ Information about a pending registration action

X FIFRA registration data

___ The document is a duplicate of page(s) _____

___ The document is not responsive to the request

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

DUPONT

REG. U.S. PAT. & TM. OFF.

Ally®

HERBICIDE

TRADEMARK

DRY FLOWABLE

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REGISTRATION CODE 0489-001

PACKAGE SIZE
8 - 8 OZ. BOXES/CARTON

DU PONT **ALLY®** HERBICIDE

DRY FLOWABLE GRANULE

ACTIVE INGREDIENT: BY WEIGHT

Metsulfuron Methyl
Methyl 2-[[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)-amino]carbonyl]-amino]sulfonyl]benzoate.....60%

INERT INGREDIENTS.....40%

TOTAL 100%

EPA Reg. No. 352-435

U.S. Pat. 4,383,113

KEEP OUT OF REACH OF CHILDREN

CAUTION

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION! Harmful if absorbed through skin. Causes eye irritation. Avoid contact with skin, eyes or clothing. Avoid breathing dust or spray mist. Wash thoroughly with soap and water after handling. Remove and wash contaminated clothing before reuse.

STATEMENT OF PRACTICAL TREATMENT

In case of contact with eyes, immediately flush with plenty of water.
If on skin, wash with with plenty of soap and water. Get medical attention if irritation persists.

For medical emergencies involving this product, call toll-free 1-800-441-3637.

ENVIRONMENTAL HAZARDS

Do not apply directly to water or wetlands. Do not contaminate water by cleaning of equipment or disposal of wastes.

IMPORTANT INFORMATION--(READ BEFORE USING)

Injury to or loss of desirable trees or vegetation may result from failure to observe the following: Do not apply, drain or flush equipment on or near desirable trees or other plants, or on areas where their roots may extend, or in locations where the chemical may be washed or moved into contact with their roots. Do not use on lawns, walks, driveways, tennis courts or similar areas. Prevent drift of spray to desirable plants. Do not contaminate any body of water, including irrigation water that may be used on other crops.

Carefully observe sprayer cleanup instructions, as spray tank residue may damage crops other than wheat or barley.

INFORMATION ON RESISTANT WEEDS:

Naturally-occurring weed biotypes* resistant to this product are known to exist. To delay the development of resistant biotypes, only spray "Ally" in tank mixtures with broadleaf herbicides having a different mode of action**, such as: 2,4-D, Banvel[1]***, Buctril[2], Bronate[2], Curtail[3], MCPA, Du Pont "Karmex" Herbicide or Du Pont "Lexone" Herbicide--as specified in the "Tank Mixtures For Resistant Weed Management" section of this label.

*Biotypes are naturally-occurring individuals of the species which have a slightly different genetic makeup. Resistant biotypes may look exactly the same as susceptible biotypes. Herbicide resistant biotypes are able to survive a use rate several times higher than needed to control susceptible biotypes.

**Mode of action is the chemical interaction that interrupts a biological process necessary for plant growth and development.

***Tank mixes with "Banvel" may result in reduced control of some broadleaf weeds.

GENERAL INFORMATION

Du Pont "Ally" Herbicide is recommended for use in CO, ID, KS, MN, MT, NE, NM, ND, OK, OR, SD, TX, UT, WA and WY.

"Ally" is recommended for use on land primarily dedicated to the production of wheat (including durum) and barley. Rotation options are provided for certain other crops such as oats, proso millet, dryland grain sorghum, dryland corn, soybeans, flax, sunflower, safflower, alfalfa, hay, and dry beans. In areas having a short growing season, prolonged periods of low soil temperature and low annual rainfall, "Ally" can remain in the soil for 34 months or more and cause severe injury to certain crops other than those listed in the "Crop Rotation Guidelines" section of the label. Read and follow the "Crop Rotation Guidelines" section for the specific rotation intervals for all following crops. Before using "Ally", carefully consider your crop rotation plans and options. For maximum rotational flexibility, do not treat all your wheat or barley acres with "Ally".

"Ally" is a 60% active ingredient herbicide formulated as a dry flowable granule to be mixed in water and applied for use as a uniform broadcast spray for selective weed control in wheat (including durum), barley and in grasses on acreage enrolled in the Conservation Reserve Program (CRP). "Ally" may be applied by air or with ground spray equipment. It is noncorrosive, nonflammable, nonvolatile and does not freeze.

For application to wheat or barley, "Ally" should be applied postemergence to actively growing broadleaf weeds. Herbicide combinations may be required for certain weeds as indicated under "Tank Mixtures" in the "Weed Control in Wheat and Barley" section.

"Ally" rapidly inhibits growth of susceptible weeds; however, typical symptoms (discoloration) of dying weeds may not be noticeable for 1 to 3 weeks after application depending on growing conditions and weed susceptibility. Warm, moist conditions following treatment enhance the activity of "Ally", while cold, dry conditions delay activity. Weeds hardened-off by cold weather or drought stress may not be fully controlled or suppressed and regrowth may occur. Snow or rainfall received within 4 hours after application can reduce the level of weed control.

Degree of control and duration of effect depend on: Weed spectrum and density; weed size and variability; growing conditions prior to, at and following time of application; amount of precipitation, and spray coverage. With adequate rainfall for soil activation, short-term residual control of the more sensitive species may be obtained for a few weeks after application.

READ AND FOLLOW ALL APPROPRIATE SECTIONS OF LABEL INCLUDING PRECAUTIONS BEFORE USING THIS PRODUCT.

GRAZING

"Ally" has no grazing restrictions.

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 through any type of irrigation system.

"Ally" should be used only in accordance with recommendations on this label or in separate published Du Pont recommendations available through local dealers.

Du Pont will not be responsible for losses or damages resulting from the use of this product in any manner not specifically recommended by Du Pont. User assumes all risks associated with such nonrecommended use.

MAXIMUM USE RATE AND SOIL pH LIMITATION

In CO, ID, Western KS and Western NE (west of highway 183), MN, MT, NM, ND, OK Panhandle, OR, TX Panhandle, SD, UT, WA and WY, the maximum rate is 1/10 oz/A in a 22 month period.

In Central KS, Central NE, Central OK and North Central TX, the maximum crop use rate is 1/10 oz/A in a 10 month period.

Do not use "Ally" on soils with a pH greater than 7.9 as the extended soil residual activity could adversely affect crop rotation options beyond normal intervals and under certain conditions cause injury to wheat and barley.

NOTE: Prior to use of "Ally", take soil samples at 0-4" depth and determine soil pH by laboratory analysis using a 1:1 (soil:water) suspension. Samples should be representative of the different conditions in the field (for example, slope, soil texture, low areas, eroded areas, etc.) Consult local extension publications for recommended soil sampling procedures.

WEED CONTROL IN WHEAT AND BARLEY

For best weed control or weed suppression, apply postemergence when environmental conditions favor active growth of broadleaf weeds and when crop canopy will allow thorough coverage of target weeds. Unless otherwise directed, always include a surfactant.

Determine crop rotation plans according to "Crop Rotation Guidelines".

TIMING OF CROP APPLICATION:

For winter wheat and winter barley, apply "Ally" (1/10 oz/A) postemergence after crop is in the 2-leaf stage–**but before the boot stage.** Do not apply during boot stage or early heading as crop injury may occur.

For spring barley and spring wheat (except durum or variety Wampum), apply "Ally" (1/10 oz/A) postemergence after crop is in the 2-leaf stage–but before the boot stage. Do not apply during boot stage or early heading as crop injury may occur.

For durum spring wheat and Wampum variety of spring wheat, apply "Ally" (1/10 oz/A) postemergence only after crop is tillering (refer to 2,4-D or MCPA manufacturers' labels)–but before the boot stage and only in combination with either 2,4-D or MCPA. Do not apply during boot stage or early heading as crop injury may occur.

Irrigated Cereals (wheat/barley)–on land dedicated to cereal production which includes supplemental irrigation, delay first post treatment irrigation for at least 3 days after treatment. The first post treatment irrigation should not exceed 1". Apply "Ally" after crop tillering has begun. Do not apply "Ally" to stressed plants.

WEEDS CONTROLLED BY "ALLY"
1/10 Ounce Per Acre
(80 acres treated per 8 ounce container)

For best results, always use "Ally" in a tank mix with 2,4-D or MCPA. Unless otherwise directed, treat when weeds are less than 4" tall or in diameter and are actively growing. See "Specific Weed Problems", "Tank Mixtures For Resistant Weed Management" and "Tank Mixtures" sections for additional information.

Bur buttercup (testiculate)
Chickweed (common)
Common purslane
Conical catchfly
Cow cockle
False chamomile
Field pennycress (fanweed)
Filaree
Groundsel (common)
Henbit
Mayweed
Miners lettuce
Pigweed (redroot, smooth, tumble)
Plains coreopsis
+Prickly lettuce
Shepherdspurse
Smallseed falseflax
Smartweed
(green, ladysthumb, pale)
Snow speedwell
Tumble mustard (Jim Hill)
Volunteer sunflower
Waterpod

WEEDS SUPPRESSED[1] BY "ALLY"

Annual Ryegrass**
Canada thistle**
Common sunflower**
Corn gromwell**
Knotweed (prostrate)**
Sowthistle**
Wild buckwheat**

1 Weed suppression is a visual reduction in weed competition (reduced population and/or vigor) as compared to an untreated area. Degree of suppression will vary with rate used, size of weeds and environmental conditions following treatment.

+ Naturally-occurring resistant biotypes of these weeds are known to occur in the Central Plains and the Pacific Northwest. See "Tank Mixtures For Resistant Weed Management" section of label for additional information.

** See "Specific Weed Problems".

WEEDS CONTROLLED WITH A TANK MIX OF "ALLY" PLUS 2,4-D OR MCPA
1/10 Ounce Per Acre
(80 acres treated per 8 ounce container)

For best results, add a surfactant to the "Ally" tank mix and apply when weeds are both actively growing and no larger than 4" tall or in diameter, and crop canopy will allow thorough coverage of target weeds. See "Specific Weed Problems" and "Tank Mixtures" sections for additional information.

Blue mustard (purple)**
Coast fiddleneck (tarweed)
Flixweed**
+ Kochia
Lambsquarters
(common, slimleaf)
+ Russian thistle
Tansymustard**
Treacle mustard

+Naturally-occurring resistant biotypes of these weeds are known to occur in the Central Plains and the Pacific Northwest. See "Tank Mixtures For Resistant Weed Management" section of label for additional information.

SPECIFIC WEED PROBLEMS

Annual Ryegrass (in OK, TX): To obtain the best results, a sequential treatment of Du Pont "Glean" Herbicide in the fall followed by "Ally" in the spring is recommended. Apply "Glean" at 1/2 oz/A preemergence to ryegrass. 1/2 to 1" of rainfall is needed to move "Glean" into the weed root zone prior to ryegrass emergence. Remove grazing cattle during wet (muddy) field conditions to avoid disturbing the herbicide barrier. After completion of wheat grazing but prior to boot stage of the wheat, apply "Ally" with a surfactant or with a liquid nitrogen fertilizer topdressing application. For fields not grazed, apply the sequential application of "Ally" as soon as ryegrass starts to grow after winter dormancy. Do not add a surfactant to liquid nitrogen fertilizer plus "Ally" combinations. In mixing "Ally" with liquid fertilizer, slurry "Ally" in water then thoroughly mix the slurry into the fertilizer. Run a tank mix compatibility test before mixing "Ally" in fertilizer solution. DO NOT use with fertilizers having a pH of 3.0 or less as rapid product degradation can occur. The addition of 2,4-D is not recommended for annual ryegrass suppression.

Blue Mustard, Flixweed and Tansymustard: In ID, MN, MT, ND, OR, SD, UT, WA and WY, for best results, apply "Ally" tank mixtures with 2,4-D or MCPA postemergence to mustards but before bloom.

Canada Thistle and Sowthistle: Apply either "Ally" plus surfactant or "Ally" plus 2,4-D or MCPA in the spring after majority of thistles have emerged and are small (rosette stage to 6" elongating stems) and actively growing. An application will inhibit the ability of emerged thistles to compete with the crop.

Sunflower (common/volunteer): Apply either "Ally" plus surfactant or "Ally" plus 2,4-D or MCPA after the majority of sunflowers have emerged, are 2" to 4" tall and are actively growing. Thorough coverage is important. Use minimum spray volumes of 3 gal. by air and 5 gal. by ground.

Corn Gromwell and Prostrate Knotweed: Apply "Ally" plus surfactant when weeds are actively growing, no larger than 2" tall and crop canopy will allow throough coverage. The addition of 2,4-D or MCPA may or may not improve the results.

Wild Buckwheat: For best results, apply "Ally" plus 2,4-D or "Ally" plus MCPA when plants have no more tha 3 true leaves (not counting the cotyledons). If plants are not actively growing, delay treatment until environmental conditions favoring active weed growth are p Thorough coverage is important.

TANK MIXTURES FOR RESISTANT WEED MANAGEMENT

Central Kansas, Central Nebraska, Central Oklahoma and North C

- Only apply "Ally" as a tank mix treatment with eit (amine or ester) or MCPA (amine or ester). Use 1/10 o plus 1/4 to 1/2 lb. active ingredient 2,4-D or MC formulations of 2,4-D or MCPA have provided be Surfactant may be added at one to two pints per 100 gal volume; however, the addition of surfactant may increas for crop injury. Apply "Ally" plus MCPA from 3-5 lea boot stage. Apply "Ally" plus 2,4-D after tillering (r manufacturer's label) but prior to boot stage.
- "Ally" tank mixes can be applied annually in this area.
- If resistant weeds are known to be present, conside herbicide treatment or adjust the use rate of the partner so that it alone will control the resistant speci

- Read and follow all use instructions, warnings and precautions for the companion herbicide.

- Do not apply "Ally" during fallow.

Idaho, Minnesota, Montana, North Dakota, Oregon, South Dakota, Utah, Washington and Northern Wyoming:

- Only apply "Ally" as a tank mix treatment with either 2,4-D (amine or ester) or MCPA (amine or ester). Use 1/10 oz/A of "Ally" plus 1/4 to 1/2 lb. active ingredient 2,4-D or MCPA (ester formulations of 2,4-D or MCPA have provided best results). Surfactant may be added at one to two pint per 100 gallons of spray volume; however, the addition of surfactant may increase the chance for crop injury. Apply "Ally" plus MCPA from 3-5 leaf but prior to boot stage. Apply "Ally" plus 2,4-D after tillering (refer to 2,4-D manufacturer's label) but prior to boot stage.

- Do not apply "Ally" during fallow.

- Do not apply "Ally" more often than once in a 22 month period for a given field.

- Do not apply "Ally" for 22 months before, or after a "Glean" treatment.

- If resistant weeds are known to be present, consider using another herbicide treatment or adjust the use rate of the "Ally" tank mix partner so that it alone will control the resistant species.

- Read and follow all use instructions, warnings and precautions for the companion herbicide.

Colorado, Western Kansas and Western Nebraska (west of highway 183), Eastern New Mexico, Oklahoma Panhandle, Texas Panhandle and Southeastern Wyoming:

- Only apply "Ally" as a tank mix treatment with either 2,4-D (amine or ester) or MCPA (amine or ester). Use 1/10 oz/A of "Ally" plus 1/4 to 1/2 lb. active ingredient 2,4-D or MCPA (ester formulations of 2,4-D or MCPA have provided best results). Surfactant may be added at one to two pints per 100 gallons of spray volume; however, the addition of surfactant may increase the chance for crop injury. Apply "Ally" plus MCPA from 3-5 leaf but prior to boot stage. Apply "Ally" plus 2,4-D after tillering (refer to 2,4-D manufacturer's label) but prior to boot stage.

- Do not apply "Ally" more than once in a 22 month period on a given field.

- Do not apply "Ally" during fallow.

- If resistant weeds are known to be present, consider using another herbicide treatment or adjust the use rate of the "Ally" tank mix partner so that it alone will control the resistant species.

- Read and follow all instructions, warnings and precautions for the companion herbicide.

TANK MIXTURES

2,4-D (amine or ester) or MCPA (amine or ester): Use "Ally" at 1/10 oz/A plus 1/4 to 1/2 lb. active ingredient 2,4-D or MCPA (ester formulations have provided best results). Surfactant may be added at one to two pints per 100 gallons of spray volume; however, the addition of surfactant may increase the chance of crop injury.

Always mix "Ally" in water prior to adding 2,4-D or MCPA and surfactant. Read and follow all label instructions on timing, precautions and warning for these herbicides prior to using these tank mixtures.

Other Tank Mixtures: "Ally" must be in suspension before adding the companion herbicide(s) or spray adjuvants. "Ally" will not control wild oats or other grasses. If broadleaf weeds plus wild oats and/or grasses are present, apply "Ally" with a suitable registered product either as a tank mix or sequential treatment.

Follow all use instructions, label rates, warnings, precautions and surfactant recommendations of companion herbicide(s).

DO NOT tank mix with Hoelon 3EC[4] as wild oat or green foxtail control may be reduced.

Tank mixes of "Ally" + "Banvel" may result in reduced control of some broadleaf weeds.

"Ally" may be tank mixed with insecticides registered for use on cereal grains. However, under certain conditions, (drought stress, crop in 2-4 leaf stage) tank mixes of "Ally" plus organophosphate insecticides (such as methyl or ethyl parathion, "Di-Syston"[5], etc.) may produce temporary crop yellowing or, in severe cases, crop injury. The potential for crop injury is greatest when there are fluctuations in day/night temperatures just prior to or soon after application. Limit first use to a small area before treating large acreage.

Do not apply "Ally" within 60 days of crop emergence where an organophosphate insecticide (such as "Di-Syston") has been applied as an in-furrow treatment, as crop injury may result.

DO NOT USE "ALLY" PLUS MALATHION AS CROP INJURY MAY RESULT.

SPRAY PREPARATION, ADDITIVES, PRODUCT MEASUREMENT, SURFACTANT AND LIQUID FERTILIZER:

Spray Preparation: Pour the proper amount of "Ally" into the necessary volume of water in the spray tank with the agitator running. Continuous agitation is required for a uniform suspension and application. "Ally" must be added first to the spray tank followed by any other tank mix chemicals and surfactant.

Use spray preparation of "Ally" within 24 hours or product degradation may occur. If spray preparation is left standing without agitation, thoroughly agitate before reusing.

Additives: Do not use with spray additives that lower the pH of the spray solution below pH 3.0, as rapid product degradation can occur.

Product Measurement: The "Ally" volumetric measuring cylinder is to be used as a guide, since the degree of accuracy varies by plus or minus 7.5%. For more precise measurement, use scales calibrated in ounces.

Surfactant: Unless directed otherwise, use a surfactant of at least 80% active ingredient and add it as the last ingredient at the rate of 1 to 2 quarts per 100 gallons of spray volume on winther wheat or 1/2 to 1 quart on spring wheat, spring or winter barley, durum spring wheat and Wampum variety of spring wheat. Antifoaming agents may be needed. DO NOT use liquid fertilizer in addition to or as a substitute for a surfactant.

Liquid fertilizer: Slurry "Ally" in water; then thoroughly mix the slurry into the liquid fertilizer. DO NOT add a surfactant. Run a tank mix compatibility test before mixing "Ally" in fertilizer solution. DO NOT use with fertilizers having a pH of 3.0 or less as rapid product degradation can occur. If 2,4-D is included in "Ally" and liquid fertilizer mixture, the ester formulations are generally more compatible.

WEED CONTROL FOR THE CONSERVATION RESERVE PROGRAM (CRP)

"Ally" is registered for CRP use in CO, Southern ID, KS, MT, NE, NM, ND, OK, SD, TX, UT and WY. Consult "Ally" supplemental label for CRP use instructions.

WEED CONTROL IN REDUCED TILLAGE FALLOW

DO NOT USE "ALLY" IN FALLOW.

EQUIPMENT--SPRAY VOLUMES

Apply using properly calibrated air or ground equipment. Select a spray volume and delivery system that will insure thorough coverage and a uniform spray pattern. Avoid overlapping, and shut off spray booms while starting, turning, slowing or stopping, or injury to the crop or following crops may result.

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

Agitation: Continuous agitation is required to keep "Ally" in suspension.

Spray Equipment: Refer to specific manufacturer's recommendations for additional information on GPA, pressure, speed, nozzle types and arrangements, nozzle heights above the target canopy, etc., for respective application equipment.

Ground Application: For optimum spray distribution and thorough coverage, use flat fan or low volume flood nozzles. For flat fan nozzles, do not use less than 3-gallon spray volume per acre (GPA).

For flood nozzles on 30-inch nozzle spacings, use not less than 10 GPA and no larger than TK10 or equivalent and not less than 30 psi. On 40-inch nozzle spacings, use not less than 13 GPA. 100% overlapping of nozzle spray pattern is recommended for 30 and 40-inch spacings.

With "Raindrop"[6] nozzles, do not use less than 30 GPA and insure for 100% overlap of nozzle spray patterns.

Use 50-mesh screens or larger.

Aerial Application: Use nozzle types and arrangements that will provide for optimum spray distribution and maximum coverage at 1 to 5 GPA. Do not apply during inversion conditions, when winds are gusty, or when other conditions will favor poor coverage and/or drift.

Caution - Avoid Spray Drift

Follow these practices to minimize drift.

Do not allow spray from either ground or aerial equipment to drift onto adjacent crops or land, as even small amounts will injure other plants. When spraying near adjacent, sensitive crops or plants, do everything possible to reduce spray drift. This includes:

- Stop spraying if wind speed becomes excessive. DO NOT SPRAY IF WIND SPEED IS 10 MPH OR GREATER. Spray drift can occur at wind speeds less than 10 MPH. If sensitive crops or plants are downwind, extreme caution must be used even in relatively low wind conditions! DO NOT SPRAY IF WINDS ARE GUSTY.

- High temperatures, drought, and low relative humidity increase the possibility of spray drift. EXTREME CAUTION MUST BE USED WHEN THESE CONDITIONS ARE PRESENT AND SENSITIVE CROPS OR PLANTS ARE NEARBY, REGARDLESS OF WIND SPEED.

- Do not apply when an inversion exists. An inversion is characterized by little or no air movement and an increase in air temperature with an increase in altitude. In humid regions, a fog or mist may form. An inversion may be detected by producing a smoke column and checking for a layering effect. Smoke-producing devices on aircraft are recommended. If not sure whether inversion conditions are present, consult with local weather services before making an application.

- Drift from aerial or ground equipment may be further reduced by:

  1. Using coarse sprays to minimize drift. DO NOT APPLY WITH HOLLOW-CONE INSECTICIDE NOZZLES ON GROUND EQUIPMENT. Do not use nozzles that produce fine droplets, such as Sprayfoil[7] or airblast-type nozzles. Nozzles should be oriented at an angle between straight down and straight back for ground applications. For aerial applications orient nozzles straight back along the windstream. If using flood-type nozzles on aircraft, orient them so spray is produced in direction of the airstream.

  2. Increasing volume of spray mix per acre (for example, minimum 5 GPA by air, 10 GPA by ground) by using higher flow rate nozzles.

  3. Reducing pressure (PSI). DO NOT EXCEED 40 PSI when applying "Ally". (Vehicle speed must also be reduced to maintain spray mix volume per acre.) Consult manufacturer's catalogs for details on correct calibration.

  4. Apply as close to target plants as possible while still maintaining a good spray pattern.

NOTE: Do not allow spray to drift onto adjacent crops, or onto agricultural land scheduled to be planted to crops other than wheat, as injury to the crop may occur. Extreme care must be taken to prevent drift to desirable plants or nontarget agricultural land.

CROP ROTATION GUIDELINES

Crop rotation plans are determined by the crop to be planted and a minimum rotation interval. Minimum rotation interval is the time from the last application of "Ally" to the anticipated date of planting. For maximum rotational flexibility, do not use "Ally" on all your wheat or barley.
Unless a Crop Rotation Interval is specified, a bioassay must be completed before rotating to any crop other than those listed below. See "Bioassay" section. Do not use on soils with a pH greater than 7.9.

Wherever "Ally" is used on land previously treated with "Glean", read the rotational guidelines on both labels and follow the one with the longest interval stated for your situation.

These crops can be planted on nonirrigated land following the use of "Ally" at 1/10 oz/A:

CROP TO BE PLANTED

Winter and spring wheat

Area: all[1]
Soil pH*: 7.9 or less
Cumulative Precipitation** (inches): none
Minimum Rotation Interval (months): 1

CRP grasses[2]

Area: all
Soil pH*: 7.9 or less
Cumulative Precipitation** (inches): none
Minimum Rotation Interval (months): 4

Durum wheat, barley, spring/winter oats

Area: all
Soil pH*: 7.9 or less
Cumulative Precipitation** (inches): none
Minimum Rotation Interval (months): 10

Grain sorghum, proso millet

Area: CO, KS, NE, NM, OK, TX, Southern WY
Soil pH*: 7.9 or less
Cumulative Precipitation** (inches): none
Minimum Rotation Interval (months): 10

Area: SD[3]
Soil pH*: 7.9 or less
Cumulative Precipitation** (inches): 13
Minimum Rotation Interval (months): 12

Area: MT, ND (west of State Hwy 1), Northern WY
Soil pH*: 7.9 or less
Cumulative Precipitation** (inches): none
Minimum Rotation Interval (months): 22

Area: ND (east of State Hwy 1)
Soil pH*: 7.9 or less
Cumulative Precipitation** (inches): none
Minimum Rotation Interval (months): 34

Field corn

Area: Central KS[4]
Soil pH*: 7.9 or less
Cumulative Precipitation** (inches): 25
Minimum Rotation Interval (months): 14

Area: CO, KS, NE, Southern WY[5]
Soil pH*: 7.5 or less
Cumulative Precipitation** (inches): 15
Minimum Rotation Interval (months): 12

Area: CO, KS, NE, Southern WY[5]
Soil pH*: 7.6 to 7.9
Cumulative Precipitation** (inches): 22
Minimum Rotation Interval (months): 22

Area: SD[6]
Soil pH*: 7.9 or less
Cumulative Precipitation** (inches): 15
Minimum Rotation Interval (months): 12

Area: MT, ND (west of State Hwy 1), Northern WY
Soil pH*: 7.9 or less
Cumulative Precipitation** (inches): 22
Minimum Rotation Interval (months): 22

Area: ND (east of State Hwy 1)
Soil pH*: 7.9 or less
Cumulative Precipitation** (inches): none
Minimum Rotation Interval (months): 34

Soybeans

Area: Central KS[7]
Soil pH*: 7.9 or less
Cumulative Precipitation** (inches): 25
Minimum Rotation Interval (months): 14

Area: KS, NE[8]
Soil pH*: 7.5 or less
Cumulative Precipitation** (inches): 22
Minimum Rotation Interval (months): 22

Area: KS, NE[8]
Soil pH*: 7.6 to 7.9
Cumulative Precipitation** (inches): 33
Minimum Rotation Interval (months): 34

Cotton (dryland only)

Area: OK (east of the Panhandle), North Central TX[9]
Soil pH*: 7.9 or less
Cumulative Precipitation** (inches): 25
Minimum Rotation Interval (months): 14

Area: OK Panhandle and TX Panhandle, Eastern NM
Soil pH*: 7.9 or less
Cumulative Precipitation** (inches): 30
Minimum Rotation Interval (months): 22

Alfalfa (hay only)

Area: MT
Soil pH*: 7.9 or less
Cumulative Precipitation** (inches): none
Minimum Rotation Interval (months): 34

Dry beans

Area: ND (west of State Hwy 1)
Soil pH*: 7.9 or less
Cumulative Precipitation** (inches): none
Minimum Rotation Interval (months): 22

Area: ND (east of State Hwy 1)
Soil pH*: 7.9 or less
Cumulative Precipitation** (inches): none
Minimum Rotation Interval (months): 34

Flax, Safflower, Sunflower

Area: CO, Southern ID, KS, MT, NE, NM, ND (west of State Hwy 1), OK, SD, TX, UT, WY
Soil pH*: 7.9 or less
Cumulative Precipitation** (inches): none
Minimum Rotation Interval (months): 22

Area: ND (east of State Hwy 1)
Soil pH*: 7.9 or less
Cumulative Precipitation** (inches): none
Minimum Rotation Interval (months): 34

All other crops

Area: all
Soil pH*: 7.9 or less
Cumulative Precipitation** (inches): none
Minimum Rotation Interval (months): Field Bioassay/LRB^{sm} Bioassay[10]

*Soil pH is to be determined by laboratory analysis using the 1:1; soil:water suspension method on representative soil samples taken at 0-4" depth. Consult local extension publications for recommended soil sampling procedures.

**Cumulative Precipitation equals the total amount received from the date of "Ally" application to the date of planting. Should accumulated precipitation not be sufficient to meet the indicated amounts, do not rotate to the indicated crops until the following growing season.

[1] All – CO, Southern ID, KS, MT, NE, NM, ND, OK, SD, TX, UT, WY

[2] CRP grasses –
Blue Grama
Bluestems - Big, Little, Plains, Sand, WW Spar
Buffalograss
Green Sprangletop
Indiangrass
Kleingrass
Lovegrasses - Atherstone, Sand, Weeping, Wilman
Orchardgrass
Sideoats Grama
Switchgrass - Blackwell
Wheatgrasses - Bluebunch, Crested, Intermediate, Pubescent, Siberian, Slender, Streambank, Tall, Thickspike, Western
Wildrye grass - Russian

The planting of grass and legume mixtures is not recommended as injury to the legume may occur.

[3] SD–South of state highway 212 and east of the Missouri River, and south of state highway 34 and west of the Missouri River.

[4] Central KS–Generally east of state highway 183 and west of the Flinthills.

[5] CO–Generally north of I-70.

[5] KS–Generally north of I-70 and west of state highway 183.

[5] NE–Generally west of state highway 183.

[5] WY–Counties of Goshen, Laramie, Platte.

[6] SD–East of the Missouri River and south of state highway 14 west of the Missouri River.

[7] Central KS–Generally east of state highway 183 and west of the Flinthills.

[8] KS–Generally north of I-70 and west of state highway 183.

[8] NE–Generally west of state highway 183 and east of the Panhandle.

[9] Counties of:

Archer	Baylor	Bell	Bosque	Bowie
Callahan	Camp	Cass	Clay	Collin
Cooke	Coryell	Dallas	Delta	Denton
Eastland	Ellis	Falls	Fannin	Foard
Franklin	Grayson	Hardeman	Haskell	Hill
Hood	Hopkins	Hunt	Jack	Johnson
Kaufman	Knox	Lamar	Limestone	McLennan
Milam	Montague	Morris	Navarro	Palo Pinto
Parker	Rains	Red River	Robertson	Rockwall
Shackelford	Somervell	Stephens	Tarrent	Throckmorton
Titus	Upshur	Van Zandt	Wilbarger	Wichita
Williamson	Wise	Wood	Young	

[10] IMPORTANT–Land previously treated with "Ally" at 1/10 oz/acre cannot be rotated to crops other than those listed until either a field bioassay or LRB^{sm} confirms that residues of "Ally" that could cause crop injury are not present. See "Bioassay" section for details.

SPRAYER CLEANUP

To avoid subsequent injury to crops other than wheat or barley, immediately after spraying and prior to spraying other crops, thoroughly remove all traces of "Ally" from mixing and spray equipment as follows:

1) Drain tank, then flush tank, boom and hoses with clean water for a minimum of 10 minutes.

2) Fill the tank with clean water, then add 1/2 gallon chlorine bleach (containing 5 1/4% sodium hypochlorite) per 100 gallons of water. Flush through boom and hoses, allow to sit for 15 minutes with agitation, then drain.

3) Repeat Step 2.

4) Nozzles and screens should be removed and cleaned separately. To remove traces of chlorine bleach, rinse the tank thoroughly with clean water and flush through hoses and boom.

NOTE: To reduce the amount of water required in the above procedure, see separate Du Pont bulletin, "Reduced Volume Cleanout Procedure for Large Sprayers".

CAUTION: Do not use chlorine bleach with ammonia. All traces of liquid fertilizer containing ammonia, ammonium nitrate or ammonium sulphate must be rinsed with water from the mixing and application equipment before adding chlorine bleach solution. Failure to do so will release a gas with a musty chlorine odor which can cause eye, nose, throat and lung irritation. Do not clean equipment in an enclosed area.

PRECAUTIONS

Do not apply an "Ally" plus "Glean" tank mixture.

In CO, ID, Western KS and Western NE (west of highway 183), MN, NM, ND, OK Panhandle, OR, TX Panhandle, SD, UT, WA and WY, the maximum use rate is 1/10 oz/A in a 22 month period.

In Central KS, Central NE, Central OK and North central TX, the maximum use rate is 1/10 oz/A in a 10 month period.

Do not use on soils with pH greater than 7.9 (for example, highly calcareous soils) as extended soil residual activity could adversely affect minimum rotation intervals for all crops.

Wherever "Ally" is used on land previously treated with "Glean", read the rotational guidelines on both labels and follow the one with the longest interval stated for your situation.

Wherever land has been or will be treated with "Assert"[8] Herbicide and "Ally" Herbicide, plant only wheat or barley until a bioassay (see "Bioassay" section of label) demonstrates that other crops can be successfully grown. On land that is frequently rotated to crops other than wheat or barley, do not use "Ally" wherever "Assert" has been or will be used. The additive effect of soil residues from these treatments has not been determined and crop rotation guidelines and minimum rotation intervals are not known; injury to rotational crops may occur.

Do not apply to irrigated land where tail water will be used to irrigate crops other than wheat and barley.

Do not apply to frozen ground where surface runoff may occur.

Do not apply to snow covered ground.

Varieties of wheat and barley differ in their tolerance to herbicides. When using "Ally" for the first time on a particular variety, limit initial use to one 8 oz. jug. If no symptoms of crop injury occur within 14 days after treatment, balance of acreage can be treated.

Do not apply "Ally" to wheat or barley that is stressed by severe weather conditions, drought, low fertility, water saturated soil, disease or insect damage as crop injury may result. Severe winter stress, drought, disease or insect damage following application also may result in crop injury.

Under certain conditions such as heavy rainfall, prolonged cool weather (daily high temperatures less than 50 degrees F) or wide fluctuations in day/night temperatures just prior to or soon after treatment, temporary discoloration and/or crop injury may occur. Risk of injury is greatest when crop is in the 2 to 5 leaf stage.

Tank mixtures of "Ally" and organophosphate insecticides (such as methyl or ethyl parathion or "Di-Syston", etc.) may cause temporary discoloration or crop injury. The potential for crop injury is greatest when there are wide fluctuations in day/night temperatures just prior to or soon after treatment.

The combined treatment effects of "Ally" postemergence preceded by preemergence wild oat herbicides may cause crop injury to spring wheat when crop stress (soil crusting, planting too deep, prolonged cold weather or drought) causes poor seedling vigor.

To prevent cold weather-related crop injury, avoid making applications during winter months when weather conditions are unpredictable and can be severe.

Do not apply to wheat or barley undersown with legumes or grasses as injury to the forage may result.

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 adjacent crops may occur when treated soil is blown onto land used to produce crops other than cereal grains.

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.

Preplant or preemergence applications of 2,4-D or herbicides containing 2,4-D made within two weeks of planting spring cereals may cause crop injury when used in conjunction with early postemergence applications of "Ally". Under these conditions, delay "Ally" treatment until crop tillering has begun.

BIOASSAY

A bioassay (field or LRB[sm]) must be completed before rotating to crops not listed on this label or rotating at intervals shorter than those listed in the "Crop Rotation Recommendations (Noncereal Crops)" section.

FIELD BIOASSAY

"Ally" is a useful tool for weed control in wheat or barley; however, under some conditions small amounts of "Ally" can remain in the soil and injure crops other than those listed on the "Ally" label under "Crop Rotation Guidelines" for 34 months or more after application; therefore, before you use "Ally", you should carefully consider your crop rotation plans during the three (or more) year period following treatment.

A field bioassay involves growing test strips of the crop or crops you plan to grow the following year in fields previously treated with "Ally". Crop response will indicate whether or not to rotate to the crop(s) grown in the test strips.

"Ally" breaks down most rapidly in soils that have high microbial populations. Factors that favor microbial activity include having annual rainfall of 10" or more and having long growing seasons with warm soil temperatures. Factors that reduct microbial activity, hence slow the disappearance of "Ally" in soils, are low rainfall and prolonged periods of soil temperatures less than 40 degrees F.

Microbial activity, soil temperature, and to a large degree soil moisture, can vary greatly from year-to-year, and from area-to-area. Consequently, it is not always possible to accurately predict when areas treated with "Ally" can be rotated to crops other than those listed on the label.

A biological assay of your "Ally" treated field is the only sure way of determining when crops other than those listed on label can be grown and is conducted as follows:

1. The accuracy and reliability of any field bioassay is largely dependent on the location and number of strips planted. Be sure to select areas of the field previously treated with "Ally" that are representative of the various field conditions. Be sure to consider factors such as field size, soil texture, drainage, turnaround areas, eroded knolls or alkaline spots when selecting the sites that are most representative of the soil conditions in the field.

   Even in small fields, more than one test strip is required to accurately determine whether it is safe to rotate to a crop not listed on the label. On large fields, several test strips will be needed in order to obtain reliable results based on the field variables mentioned above.

2. Plant the test strips perpendicular to the direction in which the field was sprayed. Each strip should be long enough to cross the width of several spray swaths. A large test strip area is more reliable than a small one. Suggested size is 1/4 to 1/2 acre per test strip.

3. Use standard tillage and seeding equipment to plant the bioassay.

4. Prepare a seed bed and plant the crops and varieties you want the option of growing the following year. **IT IS IMPORTANT TO USE THE SAME PLANTING TIME, CONDITIONS, TECHNIQUES AND CULTURAL PRACTICES YOU NORMALLY USE TO PLANT AND GROW THE BIOASSAY CROP(S).** If possible, plant into an adjacent area not treated with "Ally" to use as a comparison.

5. Do not overspray the test strips with herbicides that may damage the bioassay crop(s).

6. If the crop(s) in the test strip(s) grow to maturity with a normal harvest, the assay is positive and you may now rotate to the new crop. However, if crop(s) in the test strips die, are stunted, or fail to yield a normal harvest, the assay is negative and you should not rotate to the new crop(s). Run the assay until positive results are obtained before rotating to the new crop(s).

7. If the bioassay indicates that "Ally" residues are still present, do not rotate to crops other than wheat, barley, oats, rye or triticale or those listed on label until bioassay results indicate that the assay crops are growing normally.

DU PONT LRB sm BIOASSAY SERVICE

In the states of ID, MT, ND, OR, SD and WA, the Du Pont LRB[sm] bioassay service is available through certain dealers and/or consultants. This service uses soil samples taken by Du Pont certified individuals for laboratory bioassay analysis. LRB[sm] results will serve as a crop rotation recommendation.

Check with your local Du Pont representative or call toll free 1-800-782-3557 for information regarding the LRB[sm] bioassay service.
With any chemical, follow labeling instructions and warnings carefully.

STORAGE AND DISPOSAL

STORAGE: Store product in original container only, away from other pesticides, fertilizer, food or feed.

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

CONTAINER DISPOSAL: Triple rinse (or equivalent) and then offer for recycling or reconditioning, 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.

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

NOTICE OF WARRANTY

Du Pont warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for purposes stated on such label only when used in accordance with directions under normal use conditions. It is impossible to eliminate all risks inherently associated with the use of this product. Crop injury, ineffectiveness, or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the manner of use or application, all of which are beyond the control of Du Pont. In no case shall Du Pont be liable for consequential, special or indirect damages resulting from the use or handling of this product. All such risks shall be assumed by the buyer. DU PONT MAKES NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESSED OR IMPLIED WARRANTY EXCEPT AS STATED ABOVE.

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