

PMA 23  
100-673 12 39

Nov 20 1995

Ms. Karen S. Stumpf  
Ciba Crop Protection  
Ciba-Geigy Corporation  
P.O. Box 18300  
Greensboro, NC 27419

Dear Ms. Stumpf:

Subject: Dual® Herbicide  
EPA Registration No. 100-673  
Letter Dated October 30, 1995, Request To Amend  
Labeling To Reflect Comments Agency Has Made  
on Labeling for Dual II, Dual 8E and Dual IIG  
Herbicides, in Regard To Control of Wild Proso  
Millet and Wolly Cupgrass

The proposed amendments to the subject pesticide product registration has been reviewed and found to be acceptable under the Federal Insecticide, Fungicide and Rodenticide Act, as amended, provided that you:

1. Revise the front panel statement below the ingredient statement to read: "Dual® herbicide contains 8 lbs metolachlor per gallon".

The use of the word "typical" is no longer acceptable in these statements.

2. Submit one (1) printed copy of the final printed label before releasing the product for shipment, under the subject label.

If these conditions are not complied with, the registration will be subject to cancellation in accordance with FIFRA, Section 6(a). Your release for shipment of the product constitutes acceptance of these conditions.

CONCURRENCES							
SYMBOL							
SURNAME							
DATE							

Future proposed labeling should be paginated for ease of copying and for referencing of comments in reviews. Requests to amend labeling must be accompanied with the EPA Application Form 8570-1 completed in required detail. Please follow the instructions in the EPA "General Information on Applying for Registration of Pesticides in the United States", Second Edition, August, 1992. One copy of the proposed labeling should be highlighted and described clearly as part of each application to amend a registration. A statement that the only changes made are identified by the highlight is appropriate. We appreciate your help in facilitating the reviews of your applications to amend labeling.

A stamped copy of the labeling is enclosed for your records.

Sincerely your,

Joanne I. Miller  
Product Manager (23)  
Fungicide-Herbicide Branch  
Registration Division (7505C)

Enclosure

Ewilson:Diskette ABC25:11-13-95

# Dual

## HERBICIDE

For weed control in corn, cotton, nonbearing citrus, nonbearing grapes, peanuts, pod crops, potatoes, safflowers, grain or forage sorghum, soybeans, stone fruits, and tree nuts

**Active Ingredient:**

Metolachlor: 2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxy-1-methylethyl)acetamide . . . . . 86.4%

**Inert Ingredients:** 13.6%

**Total:** 100.0%

Dual typically contains 8 lbs. of metolachlor active ingredient per gallon.

**2½ Gallons**  
U. S. Standard Measure

## KEEP OUT OF REACH OF CHILDREN. WARNING / AVISO

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

See additional precautionary statements and directions for use inside booklet.

EPA Reg. No. 100-673

EPA Est. 32761-MO-3<sup>®</sup>, EPA Est. 34704-MS-1<sup>®</sup>

EPA Est. 11773-IA-1<sup>®</sup>, EPA Est. 5905-QA-01<sup>®</sup>

EPA Est. 42761-MS-1<sup>®</sup>

(Superscript is first letter of lot number on jug)

Dual<sup>®</sup> trademark of Ciba-Geigy Corporation

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Ciba Crop Protection, Ciba-Geigy Corporation  
Greensboro, North Carolina 27419  
CGA 49L40P 095

ACCEPTED  
with COMMENTS  
In EPA Letter Dated

NOV 20 1995

Under the Federal Insecticide,  
Fungicide, and Rodenticide Act  
as amended, for the pesticide  
registered under EPA Reg. No.

100-673

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**DIRECTIONS FOR USE AND CONDITIONS OF SALE AND WARRANTY**

**IMPORTANT:** Read the entire Directions for Use and the Conditions of Sale and Warranty before using this product. If terms are not acceptable, return the unopened product container at once.

**Conditions of Sale and Warranty**

The Directions for Use of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with 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 Ciba-Geigy or the Seller. All such risks shall be assumed by the Buyer.

Ciba-Geigy warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes referred to in the Directions for Use subject to the inherent risks referred to above. Ciba-Geigy makes no other express or implied warranty of Fitness or Merchantability or any other express or implied warranty. In no case shall Ciba-Geigy or the Seller be liable for consequential, special, or indirect damages resulting from the use or handling of this product. Ciba-Geigy and the Seller offer this product, and the Buyer and user accept it, subject to the foregoing Conditions of Sale and Warranty, which may be varied only by agreement in writing signed by a duly authorized representative of Ciba-Geigy.

**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 12 hours. Exception: If the product is soil-injected or soil-incorporated, the Worker Protection Standard, under certain circumstances, allows workers to enter the treated area if there will be no contact with anything that has been treated.

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 over short-sleeved shirt and short pants
- Chemical-resistant gloves, such as barrier laminate or viton
- Shoes plus socks
- Protective eyewear

**FAILURE TO FOLLOW THE DIRECTIONS FOR USE AND PRECAUTIONS ON THIS LABEL MAY RESULT IN POOR WEED CONTROL, CROP INJURY, OR ILLEGAL RESIDUES.**

To avoid spray drift, do not apply under windy conditions. Avoid spray overlap, as crop injury may result.

**A. General Information**

Observe all precautions and limitations on the labels of each product used in tank mixtures. Tank mixtures are permitted only in those states where the tank mix partner is registered.

Dual is a selective herbicide recommended as a preplant surface-applied, preplant incorporated, or preemergence treatment in water, or fluid fertilizer for control of most annual grasses and certain broadleaf weeds in nonbearing citrus, corn (all types), cotton, nonbearing grapes, pinyon, pod crops, potatoes, safflowers, grain or forage sorghum, and soybeans, stone fruits, and tree nuts.

**Note:** Do not use in nurseries, turf, or landscape plantings.

Where directions specify a Dual tank mixture with AAtrex formulations, other brands of atrazine may be used. Follow the rates, recommendations, and limitations on the AAtrex or respective atrazine product label, if other brands of atrazine are used.

**Note:** Certain states may have established rate limitations for atrazine within specific geographical areas. Consult your state lead pesticide control agency for additional information. It is a violation of this label to deviate from state use regulations.

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If Dual is incorporated, any supplemental tillage before planting must not exceed the depth of incorporation.

Dry weather following preemergence application of Dual or a tank mixture may reduce effectiveness. Cultivate if weeds develop.

Where reference is made to weeds partially controlled, partial control can either mean erratic control from good to poor, or consistent control at a level below that generally considered acceptable for commercial weed control.

*Precaution: Injury may occur following the use of Dual under abnormally high soil moisture conditions during early development of the crop.*

## 1. Soil Textures and Herbicide Rates

Where rates are based on coarse-, medium-, or fine-textured soils, it is understood that soil textural classes are generally categorized as follows:

Coarse	Medium	Fine	
Sand	Loam	Silty clay loam	Sandy clay
Loamy sand	Silt	Sandy clay loam	Clay loam
Sandy loam	Silt loam	Silty clay	Clay

Within rate ranges in the rate tables and elsewhere on this label, use the lower rate on soils relatively coarse-textured or low in organic matter; use the higher rate on soils relatively fine-textured or high in organic matter.

**Note:** Dual may be applied preemergence alone, or in combination with tank mix partners specified on this label, following preplant incorporated herbicides when used according to their label recommendations, provided that such use is not prohibited on the respective labels.

Thoroughly clean sprayer or other application device before using. Dispose of cleaning solution in a responsible manner. Do not use a sprayer or applicator contaminated with any other materials, or crop damage or clogging of the application device may result.

## 2. Mixing Instructions

**Dual Alone:** Mix Dual with water or fluid fertilizer and apply as a spray. Fill the spray tank  $\frac{1}{2}$ - $\frac{3}{4}$  full with water or fluid fertilizer, add the proper amount of Dual, then add the rest of the water or fluid fertilizer. Provide sufficient agitation during mixing and application to maintain a uniform emulsion.

**Tank Mixtures:** Fill the spray tank  $\frac{1}{4}$  full with water, and start agitation; add 2,4-D, AAtrex, Balan, Banvel, Basagran, Bladex®, Broadstrike + Dual, Butyrac, Butoxone, Canopy, Caparol 4L, Command, Cotoran, Eptam, Extrazine II®, Gemini, Laxone, Lorox, Lorox Plus, Marksman, Preview, Princep, Prowl, Pursult, AAtrex + Princep, Scepter, Sencor, Sonalan, Starfire, or Treflan, and allow it to become dispersed; then add Dual; then add Gramoxone Extra, Roundup, or Landmaster BW if these products are being used; and finally the rest of the water. For tank mixtures with AAtrex, Banvel, Bladex, Broadstrike + Dual, Canopy, Caparol 4L, Command, Cotoran®, Eptam, Extrazine II®, Gemini, Laxone, Lorox, Lorox Plus, Marksman, Preview, Princep, Prowl®, Pursult, AAtrex + Princep, Scepter, Sencor, Sonalan, Starfire, or Treflan, fluid fertilizers may replace all or part of the water as carrier, except in the AAtrex postemergence and the Banvel postemergence tank mixes. For tank mixtures with AAtrex, see additional mixing instructions on the AAtrex label. For each mixture, check compatibility with fluid fertilizer, as described below, before mixing in spray tank. For all tank mixtures, agitate during mixing and application to maintain a uniform suspension.

\* See Special Mixing Instructions for tank mixtures with Bladex, Cotoran, Extrazine II, and with AAtrex or Princep plus Prowl under the appropriate tank mixture section.

For directions on how to conduct a compatibility test, see Appendix A on page

## 3. Application Procedures

### Application Timing

Dual alone or in some tank mixtures with other labeled herbicides may be applied for weed control in certain crops at various times. Refer to the given crop section of the label to determine if application timings listed below are recommended.

- Preplant Surface-Applied:** For minimum-tillage or no-tillage systems only, Dual alone and some Dual tank mixtures may be applied up to 45 days before planting certain crops. Use only split applications for treatments made 30-45 days before planting, with  $\frac{2}{3}$  the recommended broadcast rate for the crop and soil texture applied initially and the remaining  $\frac{1}{3}$  at planting. Treatments less than 30 days before planting may be made either as a split or a single application. Refer to individual crop to determine if early preplant surface application is recommended. If weeds are present at the time of treatment, apply in a tank mixture combination with a contact herbicide (for example, Gramoxone Extra or Roundup). Observe directions for use, precautions, and restrictions on the label of the contact herbicide. To the extent possible, do not move treated soil out of the row or move untreated soil to the surface during planting, or weed control will be diminished.
- Preplant Incorporated:** Apply Dual to the soil and incorporate into the top 2 inches of soil within 14 days before planting using a finishing disk, harrow, rolling cultivator, or similar implement capable of providing uniform 2-inch incorporation. Use a preplant incorporated application if furrow irrigation is used or when a period of dry weather after application is expected. If crop will be planted on beds, apply and incorporate Dual after bed formation, unless specified otherwise.
- Preemergence:** Apply Dual during planting (behind the planter) or after planting, but before weeds or crops emerge.

**Special Application Procedures**

- CA Only (Corn, Safflower, Pod Crops): Preplant Incorporated:** Broadcast Dual to the soil and thoroughly incorporate with a disk or similar implement set to till 4-8 inches deep. For more thorough incorporation, till the soil in 2 different directions (cross-till). Crops may be planted on flat surface or on beds. Caution should be used when forming the beds that only soil from the Dual treated zone is used (i.e., untreated soil should not be brought to soil surface). If the application is made to preformed beds, incorporate Dual with a tillage implement set to till 2-4 inches deep. Care should be taken during tilling to keep the tilled (Dual treated) soil on the beds. Pre-emergence: Apply Dual after planting. Water with sprinkler or flood irrigation within 7-10 days.
- Fall Application (Only in IA, MN, ND, SD, WI, North of Route 20 in the states of IL and NE):** Following crop harvest, apply to crop stubble after October 15, when the sustained soil temperature at a 4-inch depth is less than 50°F, but before ground freezes. Use on medium and fine soils with greater than 2.5% organic matter that will be planted to corn or soybeans the next spring. Ground may be tilled before or after application. Do not exceed a 2 to 3-inch incorporation depth if tilled after treatment. Note: If a spring application is made, the total rate of the fall plus spring applications must not exceed the maximum total rate for the specific crop, or illegal residues may result.

**Ground Application:** Apply Dual alone or in tank mixtures by ground equipment in a minimum of 10 gals. of spray mixture per acre, unless otherwise specified.

Use sprayers that provide accurate and uniform application. For Dual tank mixtures with wettable powder or dry flowable formulations, screens and strainers should be no finer than 50-mesh. Rinse sprayer thoroughly with clean water immediately after use.

Calculate the amount of herbicide needed for band treatment by the formula:

$$\frac{\text{band width in inches}}{\text{row width in inches}} \times \frac{\text{broadcast rate}}{\text{per acre}} = \frac{\text{amount needed}}{\text{per acre of field}}$$

For information on applying in lower volumes of carrier, see Low Carrier Application in Appendix B on page .

For application by air or through center pivot systems, see Appendices C and D on page .

For information on impregnating dry fertilizer, see Appendix E on page .

**B. Dual Applied Alone****1. Weeds Controlled**

barnyardgrass (watergrass)	giant foxtail	signalgrass	yellow foxtail	Florida pusley
bristly foxtail	goosegrass	( <i>Bracharia</i> )	yellow nutsedge	galinsoga
crabgrass	green foxtail	southwestern		pigweed
crowfootgrass	prairie cupgrass	cupgrass	carpetweed	
fall panicum	red rice	wild proso millet*	Eastern black	
foxtail millet	robust foxtails (purple, white)	witchgrass	nightshade	
		woolly cupgrass*		

\*For control of these weeds in corn only, refer to the Corn - Woolly Cupgrass and Wild Proso Millet Control Program section of this label.

**Weeds Partially Controlled\*:** common purslane, eclipta, Florida beggarweed\*\*, hairy nightshade, sandbur, seedling johnsongrass, shattercane, Texas panicum\*\*\*, volunteer sorghum, wild proso millet, and woolly cupgrass.

\*See General Information section. Control of these weeds can be erratic due partially to variable weather conditions. Control may be improved by following these suggested procedures:

- Thoroughly till moist soil to destroy germinating and emerged weeds. If Dual is to be applied preplant incorporated, this tillage may be used to incorporate Dual if uniform 2-inch incorporation is achieved as recommended under Application Procedures.
- Plant crop into moist soil immediately after tillage. If Dual is to be used pre-emergence, apply at planting or immediately after planting.
- If available, sprinkler irrigate within 2 days after application. Apply 1/2-1 inch of water. Use lower water volume (1/2 inch) on coarse-textured soils and higher volume (1 inch) on fine-textured soils. Also, refer to the section on Center Pivot Irrigation Application for this method of applying Dual.
- If irrigation is not possible and rain does not occur within 2 days after planting and incorporation, weed control may be decreased. Under these conditions, a uniform, shallow cultivation is recommended as soon as weeds emerge.

\*\*For partial control of this weed, use a minimum of 2 pts./A and apply pre-emergence.

\*\*\*For partial control of this weed, use a minimum of 2 pts./A and apply through a center pivot irrigation system.



**2. Rotational Crops: Dual Alone:** (1) If crop treated with Dual alone is lost, any crop on this label may be replanted immediately. Do not make a second broadcast application of Dual. If the original application was banded and the second crop is planted in the untreated row middles, a second banded treatment may be applied. (2) Barley, oats, rye, or wheat may be planted 4½ months following treatment; alfalfa may be planted 4 months following application. Tomatoes may be planted 6 months following application. (3) Any crop on this label, in addition to root crops, tobacco, barley, buckwheat, milo, oats, rice, rye, wheat, cabbage, peppers, stone fruits, or tree nuts, may be planted in the spring following treatment. Clover may be seeded 9 months following application. Do not graze or feed forage or fodder from cotton to livestock. All other rotational crops may be planted 12 months after application. (4) Following a lay-by treatment or multiple treatments applied the previous season, any crop on this label in addition to tobacco, cabbage, peppers, stone fruits, or tree nuts may be planted in the spring. All other rotational crops may be planted 12 months after a lay-by application. **Dual Tank Mixtures:** For Rotational Crops restrictions for Dual used in tank mixtures, refer to the statements/restrictions above for Dual and to the respective product labels of any mixing partner(s) for additional statements/restrictions.

**Important Notes:** To avoid injury to rotational alfalfa or clover, (1) Do not apply more than 3 lbs. a.i. of metolachlor per acre (3 pts. Dual) preemergence (including preplant surface, preplant incorporated, postplant incorporated, etc.). (2) Do not make lay-by or other postemergent applications of Dual.

### C. Citrus - Nonbearing - Dual Alone and Combinations

Citrus including grapefruits, lemons, limes, oranges, tangelos, citrus citron, kumquats, and hybrids of these.

Broadcast 2-4 pts./A of Dual by ground equipment to weed-free soil in a minimum of 10 gals. of water to control weeds listed in the Dual Applied Alone section of this label. Apply the lower rates on coarse-textured soils with low organic matter and where the weed infestation is expected to be low. Apply the higher rates on fine-textured soils, soils high in organic matter, and where a heavy weed infestation is expected. Use caution when applying to keep the spray off the foliage to avoid possible foliar injury.

When weeds are present at the time of treatment, Dual may be applied in tank mix combination with Gramoxone Extra or Roundup. Gramoxone Extra may be applied at rates of 2-3 pts./A. Roundup may be applied at rates ranging from 1-5 qts./A, depending on the weed species. Refer to the Roundup label for the rate to be applied for various weed species. Direct applications containing Gramoxone Extra or Roundup over the weeds, making certain to keep spray off foliage and stems of trees. Refer to the Gramoxone Extra and Roundup labels for further directions, precautions, and limitations relative to their use.

**Precaution:** Do not apply to trees transplanted in the grove less than 30 days and only after depressions around the trees have been filled in, or crop injury may occur.

**Notes:** (1) Do not apply to trees that will bear harvestable fruit within 12 months of application, and (2) Do not graze livestock in treated areas, or illegal residues may result.

### D. Corn (All Types) - Dual Alone

Apply Dual either preplant surface, preplant incorporated, preemergence, or lay-by using the appropriate rate specified below.

**1. Preplant Surface-Applied:** Refer to instructions for use of Dual alone under Application Procedures.

**A. Fall Application (Only in IA, MN, ND, SD, WI, and North of Route 20 in the states of IL and NE):** After October 15, when the sustained soil temperature at a 4-inch depth is less than 50°F, apply to crop stubble after crop harvest. In minimum-till or no-tillage systems on soils having greater than 2.5% organic matter, use 2.5-3 pts./A on medium-textured and 3.0 pts./A on fine-textured soils. Apply before ground is frozen. A tillage operation may precede the application. A fall and/or a spring tillage may follow application, but do not exceed an incorporation depth greater than 2-3 inches. Minimize furrow and ridge formation in the tillage operations. **Note:** If a spring application is made, the total rate of the fall plus spring applications must not exceed the maximum total rate for corn, or illegal residues may result.

**B. Use on medium- and fine-textured soils with minimum-tillage or no-tillage systems in CO, IA, IL, IN, KS, KY, MN, MO, MT, ND, NE, SD, TN, WI, and WY.** Apply ½ the recommended rate of Dual (2.5 pts./A on medium soils and 3 pts./A on fine soils) as a split treatment 30-45 days before planting and the remainder at planting. Applications made less than 30 days prior to planting may be as either a split or single treatment. Apply 2 pts./A on coarse soils not more than 2 weeks prior to planting.

**C. On medium- and fine-textured soils with minimum- or no-tillage systems in CT, DE, MA, MD, ME, MI, NH, NY, OH, PA, RI, VA, VT, and WV,** preplant surface applications may be applied following the directions for use above. If the amount of rainfall results in unsatisfactory length of weed control following the earlier treatment, a postemergence application of an appropriately labeled broadleaf and/or grass weed herbicide may be used, i.e., AAttrax, Accent®, Banvel, Beacon®, Bloop®, 2,4-D, Basagran®, bromoxynil (Brominyl® or Buctril®), or Exceed®. If the postemergence treatment includes the herbicide used preplant surface applied, do not exceed the total labeled rate for corn on a given soil texture. Observe all directions for use, precautions, and limitations on the label of the postemergent herbicide.

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**2. Preplant Incorporated or Preemergence:** Follow instructions for use of Dual alone under Application Procedures. On coarse soils, apply 1.5-2 pts./A of Dual if organic matter content is less than 3%, or 2 pts./A if organic matter content is 3% or greater. On medium soils, apply 2-2.5 pts./A of Dual. On fine soils, apply 2-2.5 pts./A of Dual if organic matter content is less than 3%, or 2.5-3 pts./A if organic matter content is 3% or greater.

**Lay-by:** To extend the duration of weed control in corn, a maximum rate of 3 pts./A of Dual may be applied after corn emergence until the corn plants reach 40 inches in height following any preplant surface-applied, preplant incorporated, or preemergence herbicide application including Dual. For best results, applications should be made to soil free of emerged weeds and directed towards the base of corn plants in excess of 5 inches tall. The total Dual rate applied on corn during any one crop year should not exceed 6 pts./A, depending on soil texture.

**Note for all applications to corn:** To avoid possible illegal residues, do not graze or feed forage from treated areas for 30 days following application.

**Shattercane, Wild Proso Millet, Woolly Cupgrass, and Eclipta - Partial Control:** For more consistent partial control of shattercane, wild proso millet, woolly cupgrass, or eclipta, apply 1.5-2 pts./A of Dual preplant incorporated followed by 1.5-2 pts./A of Dual pre-emergence. Make the pre-emergence application during or after planting, but before weeds and corn emerge. Apply the 2 pts./A rate of Dual when a heavy infestation of shattercane, wild proso millet, woolly cupgrass, or eclipta is expected. A shallow cultivation may be needed to control any late emerging weeds.

**Woolly Cupgrass and Wild Proso Millet Control Program:** For control of these species, use the following 3-step program: (1) Apply Dual early preplant, preplant incorporated, or preemergence at 2.5 pts./A on medium soil and 3 pts./A on fine-textured soil up to the maximum label rate. Lightly incorporate with a rotary hoe if rainfall does not occur within 5-7 days. (2) Apply a postemergence tank mix of Beacon at 0.38 oz./A or Exceed at 1 packet per 4 acres plus Accent SP at 0.33 oz./A plus 1 qt. of crop oil concentrate plus 1 gal./A of 28% nitrogen, or the equivalent amount of ammonium sulfate, when the grasses are 2-3 inches tall and the corn is at least 4 inches tall; and (3) Cultivate 14-21 days after the postemergence application.

**Notes:** (1) Do not apply more than the labeled application rate for a given soil texture per year, either as a single or split treatment, or illegal residues may result. (2) In corn, Dual may be used up to 4 pts./A as either a preplant surface, preplant incorporated, or preemergence treatment on soils having an organic matter content between 6% and 20%. (3) In the event of escape of annual weeds following a preplant surface, preplant incorporated, or preemergence treatment of Dual, follow with a postemergence application of an appropriately labeled broadleaf and/or grass weed herbicide, i.e., AAtrex, Accent, Banvel, Basagran, Beacon, Bicep, Brominal, Buctril, 2,4-D, or Exceed. If the post-emergence treatment includes the herbicide used in the earlier treatment, do not exceed the total labeled rate for corn on a given soil texture. (4) Brominal or Buctril may be applied postemergence alone or in tank-mix combination with AAtrex. Do not exceed 1.2 lbs. a.i./A of AAtrex in tank-mix combination with Brominal or Buctril postemergence. Refer to the Brominal, Buctril, and AAtrex labels for specific rates and precautions. (5) Do not use Dual on peat or muck soils.

### E. Corn - Dual Combinations

Dual in any tank mixture for corn (except Dual + AAtrex postemergence and Dual + Banvel postemergence) may be applied in water or fluid fertilizer. Use only water in the Dual + AAtrex or the Dual + Banvel postemergence tank mixes.

**Note:** For all applications to corn, do not graze or feed forage from treated areas for 30 days following application, or possible illegal residues may result.

**IMPORTANT: FOR TANK MIXTURES WITH AATREX (OR OTHER BRANDS OF ATRAZINE) -** If applying Dual in tank mixture with AAtrex, all the restrictions and rate limitations on the AAtrex label must be followed if more restrictive/protective than those on this label. In addition, if AAtrex is/must be applied at rates lower than those recommended on this label, broadleaf weed control may be affected. Refer to the AAtrex label for weeds controlled at the reduced rates.

Chart 1: Dual Tank Mixtures for Corn - Additional Weeds Controlled and Special Instructions

	Dual + AAtrex and/or Princep (Preplant Surface, PPI, PPRE)	Dual + AAtrex (Post)	Dual + Bladex (PPI, PPRE)	Dual + AAtrex + Bladex (PPI, PPRE)	Dual + Barnvel (Field Corn)	Dual + AAtrex + Lorax	Dual + AAtrex or Princep + Prowl	Dual + Merfamen	Dual + Broadstar + Dual	Dual + Extrazine II
Section	E1	E2	E3	E4	E5	E6	E7	E11	E12	E13
Page No.										
Special Mixing Instructions			1	1			2			1
Comments	3,4,5, 8,9,10	3,4, 5,6	7,8,10	3,4,5, 6,7,9		3,4,5, 6,8	3,4, 5,6	9	9	8,9
Browntop panicum	●			●		●	●			
Cocklebur	●	○	○	○●	○	●	●	●	○●	○●
Common purslane	●			●		●	●	●	●	●
Hairy nightshade	●			●		●	●	●	●	●
Jimsonweed		●	●	●	○			●	○●	○●
Kochia		●						●	●	●
Lambsquarters	●	●	●	●	●	●	●	●	●	●
Morningglory	●	○	○	○●	○	●	●	●	○●	●
Mustard		●	●	●				●	●	●
Pigweed						●	●	●	●	●
Prickly sida		●						●	●	●
Ragweed	●	●	●	●	●	●	●	●	○●	○●
Smartweed	●	●	●	●	●	●	●	●	●	●
Velvetleaf	●	●	○	○●	○	●	●	●	●	○●

● = control; ○ = partial control; ○● = partial to full control depending on ratio of products used, or on weed population

### Comments

#### 1. Special Mixing Instructions for Dual and Bladex or Extrazine II Tank Mix

(1) Fill the spray tank  $\frac{1}{4}$  full with water and start agitation. (2) Add a compatibility agent such as Compex® or Unite® at 2-3 pts./100 gals. of spray mixture. (3) Add the Bladex or Extrazine II and allow it to disperse. (4) Add other herbicides registered for tank mix with Bladex or Extrazine II (including Dual) in the following order: dry flowables and wettable powders first, then flowables, then emulsifiable concentrates. Add contact herbicides like Gramoxone Extra and Roundup last. (5) Allow each herbicide to fully disperse before adding the rest of the water or fluid fertilizer.

Agitate during mixing and application to maintain a uniform suspension. Tank mixtures with Bladex or Extrazine II should not stand without agitation. Apply all the prepared spray solution during the spraying operation. Do not prepare more than is needed.

If fluid fertilizers are used as carriers, check the compatibility of tank mixtures containing Bladex or Extrazine II. Refer to Appendix A: Compatibility Test on page

#### 2. Special Mixing Instructions for Dual + AAtrex or Princep and Prowl

(1) Fill the spray tank  $\frac{1}{4}$  full with water or fluid fertilizer and start agitation. (2) To aid compatibility, add a compatibility agent such as Unite or X-77® at 4 pts./100 gals. of spray mixture. (3) Then add the AAtrex or Princep and allow it to become dispersed. (4) Then add Dual and Prowl 4E. (5) Add the rest of the water.

#### 3. Although a single formulation for AAtrex or Princep is listed in the rate tables, other formulations may be substituted using the following formula:

• 1 lb. of AAtrex Nine-O® or Princep Caliber 90® = 1.8 pts. of AAtrex 4L or Princep 4L.

#### 4. Although directions specify AAtrex formulations in tank mixture with Dual, other brands of atrazine may be used. Follow the rates, recommendations, and limitations on the atrazine label.

#### 5. See additional mixing instructions on the AAtrex label.

#### 6. Precaution: Do not exceed a total of 2.5 lbs. a.i. of atrazine per acre per year. However, certain states may have established rate limitations for atrazine within specific geographical areas. Consult your state lead pesticide control agency for additional information. It is a violation of this label to deviate from state use regulations.

#### 7. Although a single formulation for Bladex is listed in the rate table, other formulations may be substituted using the following formula: 1 qt. of Bladex 4L = 1.1 lbs. of 90DF.

#### 8. Other formulations of Lorax can be used: 1 lb. of Lorax DF = 1 pt. of Lorax L.

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9. In Minimum-Tillage and No-Tillage systems, mix with Gramoxone Extra for control of most emerged annual weeds and suppression of perennial weeds; or with Roundup for control of most emerged annual and perennial weeds; or with Landmaster BW for suppression of emerged field bindweed and control or suppression of annual weeds.
10. Refer to label section E9 and E10 for specific directions for 2,4-D or Barvel burndown combinations in Minimum-Tillage and No-Tillage systems.

Dual in any tank mixture for corn may be applied in water or fluid fertilizer, except as noted.

Notes: (1) For all applications to corn, do not graze or feed forage from treated areas for 30 days following application, or possible illegal residues may result. (2) When applying Dual in tank mixture with AAtrex, do not exceed a total of 2.5 lbs. a.i. of atrazine per acre per year. (3) Refer to Section D, Corn - Dual Alone, Note #3 for recommended sequential postemergence treatments if escape weeds develop.

### 1. Tank Mixture with AAtrex or Princep, or AAtrex + Princep - Preplant Surface, Preplant Incorporated, or Preemergence

In addition to the weeds controlled by Dual alone, Dual + AAtrex or Princep, or Dual + AAtrex + Princep, applied preplant surface, preplant incorporated, or preemergence, also controls the following weeds: browntop panicum, cocklebur, common purslane, hairy nightshade, lambquarters, morningglory, ragweed, smartweed, and velvetleaf.

Apply Dual + AAtrex or Princep, or Dual + AAtrex + Princep either preplant surface, preplant incorporated, or preemergence.

**Preplant Surface-Applied:** Follow instructions for use of Dual alone under Application Procedures and under application instructions for Dual alone on corn. Apply Dual + AAtrex or Princep, or Dual + AAtrex + Princep on medium soils (2.5 pts./A of Dual + 3.2-4 pts./A of AAtrex 4L or Princep 4L, or AAtrex 4L + Princep 4L combined) and on fine soils (2.5-3 pts./A of Dual + 4-5 pts./A of AAtrex 4L or Princep 4L, or AAtrex 4L + Princep 4L combined) in minimum-tillage and no-tillage systems in CO, IA, IL, IN, KS, KY, MN, MO, MT, ND, NE, SD, TN, WI, and WY. Apply the tank mixtures as a split or single treatment in those states and as indicated in the Dual Alone - Preplant Surface-Applied section of the label for corn. On coarse soils, apply 2 pts./A of Dual and 3.2 pts./A of AAtrex 4L or Princep 4L, or AAtrex 4L + Princep 4L combined.

**Preplant Incorporated or Preemergence:** Follow instructions for use of Dual alone under Application Procedures. Apply Dual + AAtrex or Princep, or Dual + AAtrex + Princep using the appropriate rates from Table 1.

Note: Do not apply more than the labeled rate for a given soil texture per year, either as a split or single treatment, or illegal residues may result.

### Shattercane and Wild Proso Millet - Partial Control

For more consistent partial control of shattercane or wild proso millet where Dual is applied in tank mixture or sequentially with other registered corn herbicides, the following applications may be made:

1. Apply 1.5-2 pts./A of Dual plus 2 lbs. a.i./A of AAtrex or Princep preplant incorporated followed by 1.5-2 pts./A of Dual preemergence. Make the preemergence application during or after planting, but before weeds and corn emerge.
2. Apply Dual at 2 pts./A alone or in tank mix combination with up to 2 lbs. a.i./A of AAtrex, Bladex, Extrazine II, or Princep, preplant incorporated. Do not exceed the total rate of triazine herbicide recommended in combination with Dual for corn grown on a given soil texture. Follow with a post-directed application of Evik® 80W at 2.5 lbs./A. Refer to the Evik 80W label for specific directions for the post-directed application.
3. Apply Eradicane® or Sutan® (or equivalent EPTC or butylate formulations) at labeled rates preplant incorporated followed by a preemergence application of Dual at 1.5-2 pts./A. Do not use Eradicane or Sutan on soils where rapid degradation has been shown to occur. Make the preemergence application during or after planting, but before weeds and corn emerge.
4. For partial control of wild proso millet only, apply Dual preemergence at 1.5-2 pts./A followed by a postemergence application of Prowl + Bladex at labeled rates. Refer to the Prowl and Bladex labels for application instructions. Postemergence applications of Prowl and Bladex may cause corn injury.

**Precaution:** When following the application regimes in numbers 1-4 above, a shallow cultivation may be needed after the preemergence or postemergence application to help control any late emerging shattercane or wild proso millet plants.

Note: Do not exceed a total of 3 lbs. a.i./A of metolachlor (3 pts. Dual) in the preplant incorporated plus preemergence application on soils with less than 6% organic matter, or crop injury may occur.

Table 1: Dual + AAtrex or Princep, or Dual + AAtrex + Princep, Preplant Incorporated or Preemergence - Corn (All Types)

Soil Texture	Broadcast Rates Per Acre			
	Less Than 3% Organic Matter		3% Organic Matter or Greater	
	Dual + AAtrex Nine-O <sup>*</sup> or Princep Caliber 90 <sup>*</sup>	Dual + AAtrex Nine-O <sup>**</sup> or Princep Caliber 90 <sup>**</sup>	Dual + AAtrex Nine-O <sup>*</sup> or Princep Caliber 90 <sup>*</sup>	Dual + AAtrex Nine-O <sup>**</sup> or Princep Caliber 90 <sup>**</sup>
<b>COARSE</b>	1.25-1.5 pts. + 1.1-2.2 lbs.	1.25-1.5 pts. + 0.6-1.1 lbs. + 0.6-1.1 lbs.	1.5 pts. + 1.3-2.2 lbs.	1.5 pts. + 0.7-1.1 lbs. + 0.7-1.1 lbs.
<b>MEDIUM</b>	1.5-2 pts. + 1.3-2.2 lbs.	1.5-2 pts. + 0.7-1.1 lbs. + 0.7-1.1 lbs.	2 pts. + 1.8-2.2 lbs.	2 pts. + 0.9-1.1 lbs. + 0.9-1.1 lbs.
<b>FINE</b>	2 pts. + 1.8-2.2 lbs.	2 pts. + 0.9-1.1 lbs. + 0.9-1.1 lbs.	2-2.5 pts. + 1.8-2.2 lbs. <sup>***</sup>	2-2.5 pts. + 0.9-1.1 lbs. <sup>***</sup> + 0.9-1.1 lbs. <sup>***</sup>
Muck or Peat (soils with more than 20% organic matter)	DO NOT USE			

\* Use Princep in preference to AAtrex when heavy infestations of crabgrass or fall panicum are expected. On soils having between 6% and 20% organic matter, Dual may be used up to 3.5 pts./A in tank mix combination with 2.2 lbs./A of AAtrex Nine-O, or equivalent rates of AAtrex 4L. Refer to the AAtrex label for weeds controlled at this reduced rate.

\*\* When using the tank mixture of Dual + AAtrex Nine-O + Princep Caliber 90, use equal rates of each as shown when heavy broadleaf weed infestations are expected. When heavy infestations of crabgrass or fall panicum are expected, use a 1:2 ratio of AAtrex + Princep instead of the 1:1 ratio given in Table 1. (Example: Total AAtrex Nine-O + Princep Caliber 90 = 1.2 lbs./A, use 0.4 lb. of AAtrex plus 0.8 lb. of Princep, respectively.) Refer to Comment No. 3 following Chart 1 for AAtrex 4L and Princep 4L conversions.

\*\*\* For cocklebur, yellow nutsedge, and velvetleaf control on fine-textured soils above 3% organic matter, apply 2.25 lbs./A of AAtrex Nine-O, or equivalent rates of AAtrex 4L, or the same total amount of AAtrex + Princep with 2-2.5 pts./A of Dual.

## 2. Tank Mixture with AAtrex - Postemergence

### Weeds Controlled

barnyardgrass (watergrass)	giant foxtail	kochia	purslane
crabgrass	green foxtail	lambequarters	ragweed
crowfootgrass	yellow foxtail	mustard	smartweed
fall panicum	ironweed	pigweed	velvetleaf
		prickly sida	

Weeds Partially Controlled: cocklebur, morningglory, yellow nutsedge.

Apply 1.5 pts./A of Dual + 1.3 lbs./A of AAtrex Nine-O<sup>\*</sup> on coarse soils, 2 pts./A of Dual + 1.8 lbs./A of AAtrex Nine-O on medium soils, or 2-2.5 pts./A of Dual + 1.8-2.2 lbs./A<sup>\*\*</sup> of AAtrex Nine-O on fine soils. Apply this tank mixture before grass and broadleaf weeds pass the 2-leaf stage and before corn exceeds 5 inches in height. Application to weeds larger than the 2-leaf stage will generally result in unsatisfactory control.

Lay-by: Apply to corn plants not more than 12 inches tall. Applications to corn in excess of 5 inches should be directed to the base of the corn plants; whereas applications to corn plants less than 5 inches tall may be made over the top. Occasionally some corn leaf burn may result, but this should not affect later growth or yield. Do not apply this postemergence tank mixture in fluid fertilizer, or severe crop injury may occur.

\* When using AAtrex 4L, use equivalent rates. One lb. of Nine-O equals 1.8 pts. of 4L.

\*\* For better control of cocklebur, morningglory, velvetleaf, and yellow nutsedge on fine-textured soils above 3% organic matter, apply 2.2 lbs./A of AAtrex Nine-O, or equivalent rate of AAtrex 4L, with 2-2.5 pts./A of Dual.

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Tank mixtures of Dual + AAtrex may be applied following use of any registered preplant surface-applied, preplant incorporated, or preemergence corn herbicide, including Dual + AAtrex.

Note: The total Dual rate should not exceed 6 pts., nor the AAtrex rate more than 2.5 lbs. active ingredient per acre during any one crop year, or illegal residues may result. Refer to the AAtrex label for geographic, soil-texture, and rotational restrictions.

### 3. Tank Mixture with Bladex - Preplant Incorporated or Preemergence

In addition to the weeds controlled by Dual alone, Dual + Bladex also controls the following broadleaf weeds: jimsonweed, lambsquarters, mustard, ragweed, smartweed, cocklebur\*, morningglory\*, and velvetleaf\*.

\*Partially controlled.

Mixing Instructions: See Comment No. 1 following Chart 1.

Preplant Incorporated or Preemergence: Apply Dual + Bladex preplant incorporated or pre-emergence using the appropriate rate from Table 2. Follow instructions for use of Dual alone under Application Procedures.

Table 2: Dual + Bladex - Preplant Incorporated or Preemergence

Soil Texture	Broadcast Rates Per Acre			
	Percent Organic Matter in Soil			
	Less Than 1%	1-2.5%	2.5-4%	Over 4%
	Pts./Dual + Qts./Bladex 4L	Pts./Dual + Qts./Bladex 4L	Pts./Dual + Qts./Bladex 4L	Pts./Dual + Qts./Bladex 4L
<b>COARSE</b> Sand, loamy sand	DO NOT USE	1.25-1.5 + 0.8-1.4	1.5-1.75 + 1.4-1.6	2 + 1.75
<b>COARSE</b> Sandy loam	1.25 + 0.8	1.25-1.5 + 1.2-1.4	1.5-1.75 + 1.4-1.75	2 + 2
<b>MEDIUM</b>	1.5 + 1.2	1.5-1.75 + 1.4-1.75	1.75-2 + 1.75-2	2.25 + 2.25
<b>FINE</b>	1.5 + 1.4	1.75-2 + 1.6-2	2-2.25 + 2-2.25	2.5 + 2.5
Muck or Peat (soils with more than 20% organic matter)	DO NOT USE			

### 4. Tank Mixture with AAtrex + Bladex - Preplant Incorporated or Preemergence

Note: See Comment No. 1 following Chart 1 for specific mixing instructions.

Apply Dual + AAtrex + Bladex to corn using the rates from Table 3. Refer to the AAtrex and Bladex labels, as well as the General Information section of this label, for all directions, precautions, and limitations.

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Table 3: Dual + AAtrex + Bladex - Preplant Incorporated or Preemergence

Soil Texture	Broadcast Rates Per Acre			
	Percent Organic Matter in Soil			
	Less Than 1%	1-2.5%	2.5-4%	Over 4%
	Pts./Dual + Lbs./ AAtrex Nine-O* + Qts./Bladex 4L	Pts./Dual + Lbs./ AAtrex Nine-O* + Qts./Bladex 4L	Pts./Dual + Lbs./ AAtrex Nine-O* + Qts./Bladex 4L	Pts./Dual + Lbs./ AAtrex Nine-O* + Qts./Bladex 4L
<b>COARSE</b> Sand, loamy sand	DO NOT USE	1.25-1.5 + 0.4-1.1 + 0.6-1	1.5-1.75 + 0.5-1.3 + 1-1.2	2 + 0.7-1.8 + 1.4-1.8
<b>COARSE</b> Sandy loam	1.25 + 0.5-1.1 + 0.6-1	1.25-1.5 + 0.7-1.3 + 1-1.2	1.5-1.75 + 0.9-1.8 + 1.2-1.8	2 + 1.1-2 + 1.8-2
<b>MEDIUM</b> Loam, silt loam, silt	1.5 + 0.7-1.3 + 1-1.2	1.5-1.75 + 0.7-1.8 + 1.2-1.8	1.75-2 + 0.9-1.8 + 1.4-1.8	2.25 + 1.1-2 + 1.8
<b>FINE</b> Sandy clay loam, silty clay loam, clay loam, sandy clay, silty clay	1.5 + 0.7-1.5 + 1.2-1.4	1.75-2 + 0.9-1.8 + 1.4-1.8	2-2.25 + 0.9-2 + 1.6-1.8	2.5 + 1.1-2.2 + 2
Muck or Peat (soils with more than 20% organic matter)	DO NOT USE			

\* Use lower rates of AAtrex in the mixture where broadleaf weeds are not a major problem. Use higher rates of AAtrex where heavy infestations of such broadleaf weeds as cocklebur, morningglory, smartweed, and velvetleaf are expected to be the dominant weeds present.

### 5. Tank Mixture with Banvel

**Preemergence:** Use this tank mixture only on field corn which is flat-planted (no furrows) in IA, IL, IN, MN, NE, OH, SD, and WI.

In addition to the weeds controlled by Dual alone, Dual + Banvel, applied preemergence, also controls lambsquarters, ragweed, smartweed, cocklebur\*, jimsonweed\*, morningglory\*, and velvetleaf\*.

\* Partially controlled.

Apply Dual + Banvel preemergence. Broadcast 1 pt./A of Banvel with 2 pts./A of Dual on *medium soils*, or with 2-2.5 pts./A of Dual on *fine soils*. Do not apply on *coarse soils* or on soils with less than 2.5% organic matter. Apply this tank mixture to the soil surface at planting, or after planting, but before corn emerges. Plant corn at least 1.5 inches deep and apply behind planting equipment avoiding incorporation by the planter wheel or other seed covering device. Do not incorporate before corn emergence. If it is necessary to rotary hoe to break the soil crust, do not disturb the soil more than 1/2 inch deep.

**Postemergence for Control of Pigweed (Mid-Atlantic states including DE, MD, PA, VA, and WV):** Apply 1.5-2.25 pts. of Dual plus 0.5-1 pt./A of Banvel or 1-2 pts./A of Banvel II by ground equipment when pigweed plants are less than 3 inches tall and before corn exceeds 5 inches in height in a minimum of 20 gals. of spray per acre. Use the lower rate on coarse-textured and low organic matter soils. Use the higher rate on fine-textured and high organic matter soils.

**Precautions:** (1) Avoid drift to sensitive nontarget plants, such as soybeans, during application, or injury may occur. (2) Do not apply with aircraft.

### 6. Tank Mixture with AAtrex and Lorox for Control of Lambsquarters and Pigweed

For prolonged control of lambsquarters and pigweed in DE, MD, NJ, NY, PA, VA, and WV, Dual may be applied preemergence in tank mix combination with AAtrex + Lorox. Apply Dual and AAtrex according to the rates in Table 1 and Lorox according to the rates below.

Soil Texture	Broadcast Rate/A
Sandy loam (1-3% organic matter)	0.57 lb. Lorox
Sandy loam (3-6% organic matter)	1.0 lb. Lorox
Medium- and fine-textured soils (1-6% organic matter)	1.0 lb. Lorox

Observe all directions for use, precautions, and limitations on the Dual, AAtrex, and Lorox labels when applying these products in tank mix combinations.

### 7. Tank Mixture with AAtrex or Princep + Prowl for Prolonged Control of Lambquarters and Pigweed in Field Corn Only (Northeast U.S., including MI, IN, KY, and States East of These)

For prolonged control of lambquarters and pigweed, in addition to a broad spectrum of annual broadleaf and grass weeds, Dual in tank mix combination with AAtrex\* or Princep + Prowl 4E may be applied after planting, but before corn or weeds emerge. Apply by ground equipment in a minimum of 10 gals. of water or 20 gals. of liquid fertilizer. Apply by air in a minimum of 5 gals. of water. Refer to Table 1 of this label for rates of Dual, AAtrex, or Princep to be applied. Apply Prowl 4E according to the following rates in Table 4.

\*Do not apply Dual in tank mix combination with AAtrex 80W + Prowl, as this combination is not compatible. Other AAtrex formulations may be used.

Mixing instructions: See Comment No. 2 following Chart 1.

Table 4: Prowl 4E - Broadcast Rates Per Acre

Soil Texture	Percent Organic Matter in Soil		
	Less Than 1.5%	1.5-3%	Over 3%
COARSE	1.5-2.0 pts.	2.0 pts.	3.0 pts.
MEDIUM	2.0 pts.	3.0 pts.	3.0 pts.
FINE	2.0 pts.	3.0 pts.	3.0 pts.

Observe all directions for use, precautions, and limitations on the respective product labels when applying these products in tank mix combination. Refer to the Prowl 4E label for replanting instructions in the event of crop loss.

### 8. Tank Mixture with AAtrex, Bladex\*, or Princep, AAtrex + Bladex or AAtrex + Princep, or Extrazine II\*, with Gramoxone Extra, Landmaster BW, or Roundup for Minimum-Tillage or No-Tillage Systems

\*See Comment No. 1 following Chart 1 for special mixing instructions.

In minimum-tillage or no-tillage systems where corn is planted directly into a cover crop, stale seed-bed, established sod, or previous crop residues, the contact herbicides Gramoxone Extra, Landmaster BW, or Roundup may be added to a tank mix of Dual + AAtrex, Bladex or Princep, Dual + AAtrex + Bladex, Dual + AAtrex + Princep, or Dual + Extrazine II. See Comment No. 9 following Chart 1. The Dual + AAtrex or Princep, or Dual + AAtrex + Princep portion of the tank mixture provides preemergence control of the weeds listed on this label in the tank mixture section for Dual + AAtrex or Princep, or Dual + AAtrex + Princep - Preplant Surface, Preplant Incorporated, or Preemergence. The Dual + Bladex or Dual + AAtrex + Bladex tank mixture provides preemergence control of weeds listed on this label in the tank mixture sections with AAtrex and Bladex. Refer to Table 3 for Bladex rates. Refer to the Dual and Extrazine II labels for rates and list of weeds controlled.

Application: Apply before, during, or after planting, but before the corn emerges, at the rates specified below. Add Gramoxone Extra, Landmaster BW, or Roundup at the following broadcast rates:

Gramoxone Extra: 1.5-2.0, 2.0-2.5, or 2.5-3.0 pts./A to 1-3 inches, 3-6 inches, or 6-inch tall weeds, respectively. Apply surfactant at 1 or 2 pts./100 gals. of spray mixture with 75% or greater or 50-74% nonionic active ingredient, respectively. This treatment will not control weeds taller than 6 inches.

Note: Do not apply combinations containing Gramoxone Extra in suspension type liquid fertilizers because the activity of paraquat will be reduced.

Landmaster BW: 27-54 oz./A depending on weed species and size. See the Landmaster BW label for weeds controlled, recommended rates for specific weeds, and other information concerning use.

Roundup: See the Roundup or Roundup RT label for weeds controlled, recommended rates, and other use directions.

Apply in 20-60 gals. of water or fluid fertilizer per acre with ground equipment.



On coarse soils, apply 1.5 pts. / A of Dual with 1.3 lbs. AAtrex Nine-O\* or Princep Caliber 90\*, or with 0.7 lb. Nine-O\*\* plus 0.7 lb. Caliber 90\*\*. On medium soils, apply 2 pts. / A of Dual with 1.8 lbs. AAtrex Nine-O or Princep Caliber 90, or with 0.9 lb. Nine-O plus 0.9 lb. Caliber 90. On fine soils\*\*\*, apply 2-2.5 pts. / A of Dual with 1.8-2.2 lbs. AAtrex Nine-O or Princep Caliber 90, or with 0.9-1.1 lbs. of Nine-O plus 0.9-1.1 lbs. Caliber 90.

\*Use Princep in preference to AAtrex when heavy infestations of crabgrass or fall panicum are expected.

\*\*When using the tank mixture of Dual + AAtrex Nine-O + Princep Caliber 90, use equal rates of AAtrex and Princep as shown when heavy broadleaf weed infestations are expected. When heavy infestations of crabgrass or fall panicum are expected, use a 1:2 ratio of AAtrex + Princep instead of the 1:1 ratio given. (Example: Total AAtrex Nine-O + Princep Caliber 90 = 1.8 lbs. / A, use 0.6 lb. of AAtrex plus 1.2 lbs. of Princep, respectively.) Refer to Comment No. 3 following Chart 1 for AAtrex 4L and Princep 4L conversions.

\*\*\* For cocklebur, yellow nutsedge, and velvetleaf control on fine-textured soils above 3% organic matter, apply 2.25 lbs. / A of AAtrex Nine-O, or equivalent rate of AAtrex 4L, or the same total amount of AAtrex + Princep, with 2-2.5 pts. / A of Dual.

### 9. Tank Mixture with AAtrex; or AAtrex + 2,4-D; or AAtrex + 2,4-D + Banvel for Minimum-Tillage or No-Tillage Systems

In minimum-tillage or no-tillage systems where corn is planted directly into a cover crop, stale seed-bed, established sod, or previous crop residues, Dual applied in combination with AAtrex will kill most emerged small annual weeds. Apply Dual + AAtrex before, during, or after planting, but before corn emerges, according to the rates in Table 1.

Where heavy crop residues exist, add 0.8-1.8 pts. / A of an appropriately labeled 3.8 lbs. a.i. / gal. 2,4-D amine (such as Weeder 64, Weeder 64A, DMA-4 Herbicide, or Formula 40) to the spray tank last and apply in a minimum of 25 gals. of carrier per acre.

As carriers, nitrogen solutions and complete liquid fertilizers, applied before corn emergence, enhance burndown of existing weeds, and therefore are recommended instead of water. Add X-77 surfactant at 1.0-2.0 qts. / 100 gals. of diluted spray, or another appropriate surfactant at its recommended rate, or add crop oil concentrate plus 28% liquid nitrogen (or equivalent). Apply before weeds exceed 3 inches in height. If alfalfa is present, add Banvel to the spray mixture at 0.33-0.5 pt. / A and apply before alfalfa exceeds 6 inches in height.

For fields with existing sod grasses (e.g., bromegrass, orchardgrass, rye, or timothy), when existing weeds exceed 3 inches in height or when very dry conditions exist, add Gramoxone Extra at the rate of 2.5 pts. / A in place of or in addition to 2,4-D as indicated above. Do not apply Gramoxone Extra in suspension-type liquid fertilizer. Observe all directions for use, precautions, and limitations on the respective product labels when applying these products in tank mix combination.

### 10. Tank Mixture with Bladex\* or Extrazine II\*; or Bladex + AAtrex + 2,4-D or Extrazine II + 2,4-D; or Bladex + AAtrex + 2,4-D + Banvel\*\* or Extrazine II + 2,4-D + Banvel\*\* for Minimum-Tillage or No-Tillage Systems

\* See Comment No. 1 following Chart 1 for special mixing instructions.

\*\* Apply the tank mixtures with Banvel to field corn only.

In minimum-tillage or no-tillage systems where corn is planted directly into a cover crop, stale seed-bed, established sod, or previous crop residues, Dual applied in combination with Bladex, Bladex + AAtrex, or Extrazine II will provide control of emerged small annual weeds, and extended control of those species on the Dual, Bladex, and Extrazine II labels.

Apply Dual in tank mix combination with Bladex according to the Tank Mixture with Bladex and Tank Mixture with AAtrex... sections of this label or the preemergence section of the Bladex and AAtrex labels. Where heavy crop residues exist at the time of treatment, follow directions for use in the Bladex Plus Dual tank mixture in the Minimum- or No-Till Weed Control section of the Bladex label. Refer to the Dual + Bladex section of this label for the Dual rate and to the Extrazine II label for its rate. Using a minimum of 25 gals. / A of carrier, add an appropriately labeled 2,4-D amine or low volatile ester to the spray tank last.

As carriers, nitrogen solutions and complete liquid fertilizers, applied before corn emergence, enhance burndown of existing weeds, and therefore are recommended instead of water. Add X-77 surfactant at 1.0-2.0 qts. / 100 gals. of diluted spray, or another appropriate surfactant at its recommended rate, or add crop oil concentrate plus 28% liquid nitrogen (or equivalent). Apply before weeds exceed 3 inches in height. If alfalfa is present, add Banvel to the spray mixture at 0.33-0.5 pt. / A and apply before alfalfa exceeds 6 inches in height.

For fields with existing sod grasses (e.g., bromegrass, orchardgrass, rye, or timothy), when existing weeds exceed 3 inches in height or when very dry conditions exist, add Gramoxone Extra at the rate of 2.5 pts. / A in place of or in addition to 2,4-D as indicated above. Do not apply Gramoxone Extra in suspension-type liquid fertilizer. Observe all directions for use, precautions, and limitations on the respective product labels when applying these products in tank mix combination.

### 11. Tank Mixture with Markman in Conservation Tillage - Field and Silage Corn

In conservation tillage systems where corn is planted directly into a cover crop or previous crop residue, Dual + Markman will kill most emerged small annual weeds. Apply Dual + Markman before, during, or after planting, but before corn emergence on medium and fine soils with greater than 2.5% organic matter. For fields with existing vegetation exceeding 3 inches in height or when very dry conditions exist, add Gramoxone Extra at its standard rate. Dual + Markman may be applied postemergence to corn less than 3 inches tall and before weedy grasses exceed the 2-leaf stage.

As carriers, nitrogen solutions and complete liquid fertilizers, applied before corn emergence, enhance burndown of existing weeds. Do not apply Gramoxone Extra in suspension-type liquid fertilizer or use on emerged corn.

Refer to the Markman label and follow all directions, limitations, precautions, and information regarding application and use in corn.

### 12. Tank Mixture with Broadstrike + Dual

For preplant surface, preplant incorporated, or preemergence application where severe grass populations are expected on medium- or fine-textured soils with relatively high organic matter content, Broadstrike + Dual may be spiked with additional Dual for optimum performance. Refer to the Broadstrike + Dual label for its use rate and the amount of Dual it contains. Dual may be added up to, but not to exceed, the maximum alone Dual label rate for the soil classification. Refer to the respective labels and follow all directions, limitations, and restrictions for each product.

### 13. Tank Mixture with Extrazine II\*

The tank mixture of Dual and Extrazine II controls all weeds controlled by Dual alone and by Extrazine II alone. Refer to the Dual Applied Alone section for weeds controlled by Dual and to the Extrazine II label for weeds controlled by Extrazine II. Refer to the respective labels for application methods, timing, restrictions, and precautions; and use in accordance with the more restrictive label. Apply Dual according to the rate specified in the Dual + Bladex section of this label and Extrazine II according to its label. Do not exceed the label rate of either product.

\* See Comment No. 1 following Chart 1 for special mixing instructions.

## F. Cotton - Dual Alone

**Application:** Apply Dual preemergence only in Area 1\* at the rate of 0.75-1.5 pts./A on sandy loams, 1.0-2.0 pts./A on medium soils, or 1.5-2 pts./A on fine soils. Apply Dual preplant incorporated or preemergence in Area 2\*\* at 1.5 pts./A on sandy loams, 1.5-2 pts./A on medium soils, or 2 pts./A on fine soils. Do not use on sands and loamy sand.

\* Area 1 = AR, LA, MS, TN, and Bootheel of MO

\*\* Area 2 = NM, OK, TX

**Preplant Incorporated (NM, OK, and TX Only):** Apply to the soil and incorporate into the top inch of soil immediately before planting, at planting, or after planting, but before crop or weeds emerge. Use a rolling cultivator or similar implement to uniformly incorporate not more than 1 inch deep. Use a preplant incorporated application if furrow irrigation is used or when a period of dry weather after application is expected. Where furrow irrigation is used, wet the top of the bed for best results. If the crop is to be planted on beds, apply and incorporate after bed formation. Cotton should be planted below the zone of incorporation; i.e., at least 1 inch on fine soils and 1.5 inches on coarse and medium soils. If incorporated prior to planting, use a planter that will result in a minimum of soil disturbance.

**Note:** For best control of yellow nutsedge and suppression of seedling johnsongrass, apply Dual preplant incorporated at the maximum rate for the soil texture, whether applied alone or mixed with Caparol 4L.

**Preemergence:** Apply to the soil surface at planting, or after planting, but before weeds or crop emerge.

**Precautions:** To avoid crop injury, (1) Do not apply Dual on sand or loamy sand soils, or in areas where water is likely to "pond" over the bed; (2) To avoid concentration in the seed furrow, do not make broadcast applications of Dual to cotton planted in furrows more than 2 inches deep. Band applications may be made to cotton planted in furrows deeper than 2 inches, but band width should not exceed the width of the bottom of the furrow; and (3) Do not apply on Teloist silt loam. (4) Do not use in Gaines County, TX.

**Note:** Do not graze or feed forage or fodder from cotton to livestock, or illegal residues may result.

## G. Cotton - Dual Combinations

### 1. Tank Mixture with Caparol 4L

Dual tank mixtures with Caparol 4L may be applied in water or fluid fertilizer. When fluid fertilizer is used as a carrier for Dual, either alone or in combination with Caparol 4L, mix only the amount that will be sprayed in one operation. These mixtures should not be allowed to stand without agitation.

In addition to those weeds controlled by Dual alone, Dual + Caparol 4L, applied preplant incorporated or preemergence, also controls the following weeds: junglerice, wild oats, annual morning-glory, groundcherry, hairy nightshade, lambequarters, mahoe, mustard, prickly sida (teaweed), purslane, ragweed, and shallow-germinating seedlings of cockspur and coffeeweed.

**Preplant Incorporated or Preemergence:** Apply Dual + Caparol 4L either preplant incorporated or preemergence using the appropriate rate from Table 5. Cotton should be planted below the zone of incorporation; i.e., at least 1.0 inch on fine soils and 1.5 inches on coarse and medium soils. If incorporated before planting, use a planter that will result in a minimum of soil disturbance.

Table 5: Dual + Caparol 4L - Cotton (NM, OK, TX)

Use Area	Soil Texture	Broadcast Rates Per Acre	
		Dual	Caparol 4L
ALL	Sand, loamy sand	DO NOT USE	
OK, and Blacklands and Gulf Coast of TX	Loams	1.25-2 pts.	2.4 pts.
	Clays	2 pts.	4.8 pts.
Rio Grande Valley of TX	Loams	1.25-2 pts.	3.2 pts.
	Clays	2 pts.	4.8 pts.
NM; High Plains, Rolling Plains, Edwards Plateau of TX; and Southwest TX	Sandy loam	1.25-1.5 pts.	1.6 pts.
	Loams	1.25-2 pts.	2.4 pts.
	Sandy clay loams	2 pts.	2.4 pts.
	Other clay soils	2 pts.	3.2 pts.

**Precautions:** (1) To avoid concentration in the seed furrow, do not make broadcast applications of Dual + Caparol 4L to cotton planted in furrows more than 2 inches deep. Band applications may be made to cotton planted in furrows deeper than 2 inches, but band width should not exceed the width of the bottom of the furrow. To avoid crop injury, (2) Do not apply on sand or loamy sand soils, or in areas where water is likely to "pond" over the bed; (3) Do not apply in cut areas of newly leveled fields, or in areas of excess salt; (4) Do not apply to glandless cotton varieties; and (5) Do not apply on Taloka silt loam. (6) Do not use in Galves County, TX.

**Note:** Do not graze or feed forage or fodder from cotton to livestock, or illegal residues may result. Refer to the Caparol 4L label for further instructions and limitations.

### 2. Tank Mixture with Cotoran DF

Dual may be applied in tank mixture with Cotoran DF pre-emergence for control of those weeds controlled by Dual alone and those as listed on the Cotoran DF label. This combination will also control spotted spurge, hyssop spurge, nodding spurge, and prostrate spurge. Apply to the soil surface at planting or after planting, but before weeds or crop emerge, using the appropriate rates from Table 6.

**Mixing Instructions:** Incompatibility may occur when tank mixing Dual and Cotoran DF. To help overcome this condition, fill the spray tank 1/4 full with water or fluid fertilizer and start agitation, add the Cotoran DF and allow it to become dispersed. Add X-77 at 0.5% volume per volume final spray (4 pts./100 gals.), then add the Dual and finally the rest of the water or fluid fertilizer. Agitate during mixing and application to maintain a uniform suspension.

Table 6: Dual + Cotoran DF - Cotton

Soil Texture	Broadcast Rates Per Acre		
	Dual (pts.)		Cotoran DF *** (lbs.)
	Area 1*	Area 2**	
Sand, loamy sand	DO NOT USE		
Sandy loam	0.75-1.5	1.25-1.5	1.2
Loam, silt, silt loam	1-2	1.5-2	1.2-1.8
Fine soil	1.5-2	2	1.8-2.4

\*Area 1 = AR, LA, MS, Bootheel of MO, and TN

\*\*Area 2 = Eastern OK, Gulf Coast, Rio Grande Valley, and Eastern TX.

\*\*\*When using Cotoran 4L, use equivalent rates. Multiply lbs. of Cotoran DF by 1.7 to get pts. of Cotoran 4L.

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**Precautions:** (1) Do not apply Dual + Cotoran on sand or loamy sand soils, or in areas where water is likely to "pond" over the bed, or crop injury may occur. (2) To avoid concentration in the seed furrow, do not make broadcast applications of Dual + Cotoran to cotton planted in furrows more than 2 inches deep. Band applications may be made to cotton planted in furrows deeper than 2 inches, but band width should not exceed the width of the bottom of the furrow. (3) The use of Cotoran following the use of a systemic insecticide at planting may result in crop injury. (4) Do not use on Taloka silt loam, or crop injury may occur. (5) Do not use in Gaines County, TX.

Refer to the Cotoran labels for further instructions, precautions, and limitations.

**Note:** To avoid possible illegal residues, do not feed treated forage or gin trash to livestock, or graze treated areas.

### 3. Tank Mixture of Dual or Dual + Cotoran with Gramoxone Extra or Roundup for Minimum-Tillage or No-Tillage Systems

In minimum-tillage or no-tillage systems where cotton is planted directly into a cover crop, stale seedbed, or previous crop residues, the contact herbicides Gramoxone Extra or Roundup may be added to a tank mix of either Dual or Dual + Cotoran. When used as directed, the Gramoxone Extra portion of the tank mixture controls most emerged weeds and suppresses many perennial weeds. Roundup combinations will control emerged annual and perennial weeds when applied as directed on the Roundup label. The Dual and Dual + Cotoran portion of the tank mixture provides pre-emergence control of the weeds listed on this label in the Dual and Dual + Cotoran sections, respectively.

Refer to the label of each product used in combination and observe the planting details, information regarding application, geographical restrictions, and all other precautions and limitations. Refer to Mixing Instructions under Tank Mixture with Cotoran DF section.

**Application:** Apply before, during, or after planting, but before the cotton emerges, at the rates specified below. Apply Dual at 1.25-1.5 pts./A on sandy loams, medium-, and fine-textured soils. Refer to Table 6 for the Cotoran DF rates.

Add Gramoxone Extra or Roundup at the following broadcast rates:

**Gramoxone Extra:** 1.5-2.0, 2.0-2.5, or 2.5-3.0 pts./A to 1-3 inches, 3-6 inches, or 6-inch tall weeds, respectively. Apply surfactant at 1 or 2 pts./100 gals. of spray mixture with 75% or greater or 50-74% nonionic active ingredient, respectively. This treatment will not control weeds taller than 6 inches.

**Note:** Do not apply combinations containing Gramoxone Extra in suspension type liquid fertilizers as the activity of paraquat will be reduced.

**Roundup:** See the Roundup label for weeds controlled, recommended rates, and other use directions.

**Note:** Do not apply Dual + Cotoran 4L + Roundup in tank mixture because of compatibility problems.

Apply in 20-60 gals. of water or fluid fertilizer per acre with ground equipment.

**Precautions:** (1) If heavy rain occurs soon after application, crop injury may result, especially in poorly drained areas where water stands for several days, or where the seeding silt has not been properly closed. (2) Refer to the Cotoran labels and the Tank Mixture with Cotoran DF section of this label for further instructions, precautions, and limitations. (3) Do not use in Gaines County, TX.

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### H. Grapes - Nonbearing - Dual Alone and Combinations

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Broadcast 2-4 pts./A of Dual by ground equipment to weed-free soil in a minimum of 10 gals. of water to control weeds listed in the Dual Applied Alone section of this label. Apply the lower rates on coarse-textured soils with low organic matter and where the weed infestation is expected to be low. Apply the higher rates on fine-textured soils, soils high in organic matter, and where a heavy weed infestation is expected. Use caution when applying to keep the spray off the foliage to avoid possible foliar injury.

When weeds are present at the time of treatment, Dual may be applied in tank mix combination with Gramoxone Extra or Roundup. Gramoxone Extra may be applied at rates of 2-3 pts./A. Roundup may be applied at rates ranging from 1-5 qts./A, depending on the weed species. Direct applications containing Gramoxone Extra or Roundup over the weeds, making certain to keep spray off grape foliage and vines. Refer to the Gramoxone Extra and Roundup labels for further directions, precautions, and limitations relative to their use.

**Precaution:** Do not apply to vines established in the vineyard less than 30 days, and only after depressions around the vines have been filled in, or crop injury may occur.

**Note:** Do not apply to vines that will bear harvestable fruit within 12 months of application, or illegal residues may result.

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### I. Peanuts - Dual Alone

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Apply Dual either preplant incorporated, postplant incorporated, preemergence, or lay-by using the appropriate rate specified below. Preplant incorporated or Preemergence: Follow Instructions for use of Dual alone under Application Procedures. Postplant incorporated: Apply and shallowly incorporate Dual into the soil after planting, but before peanut germination. Incorporation depth and incorporating implements must be kept above the seed, or seed will be damaged. Lay-by: Apply Dual to the soil immediately after the last normal cultivation.

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Apply Dual alone preplant incorporated, postplant incorporated, preemergence, or lay-by at a broadcast rate of 1.5-2 pts./A in the Southeast\* and 1.25-2 pts./A in NM, OK, and TX.

\* In the Southeast, use 2-3 pts./A and apply preemergence for partial control of Florida beggarweed.

Notes: (1) Dual alone may be applied as directed after any of the following preplant incorporated herbicides when used according to their label recommendations: Balan at 3-4 qts./A; Treflan E.C. at 1 pt./A; Vernam® at 2.33-3 pts./A; Sonalan at 1.25-3 pts./A; Pursuit at 0.25 pt./A; and Prowl at 1-2 pts./A. (2) Do not graze or feed peanut forage or fodder to livestock for 30 days following application, and (3) Do not apply within 90 days of harvest, or illegal residues may result.

## J. Peanuts - Dual Combinations

### 1. Tank Mixture with Balan L.C.

Dual + Balan tank mixture applied preplant incorporated controls those weeds listed under Dual Applied Alone and those weeds as listed on the Balan label.

Apply 1.5-2 pts./A of Dual + 3-4 qts./A of Balan in a minimum of 10 gals. of spray volume per acre for ground application or in a minimum of 5 gals. of spray volume per acre for aerial application. Follow the recommended procedures for Balan on the Balan label for soil preparation and incorporation of this tank mix. Apply and incorporate Dual + Balan up to 14 days prior to planting.

Note: Follow all restrictions and precautions on the Balan label.

### 2. Multiple Applications

Where weed pressure is heavy or where species difficult to control are expected, Dual is most effective when used as follows:

#### A. Southeast Only (AL, FL, GA, NC, SC, VA)

1st Application: Apply Dual preplant incorporated as directed under Peanuts-Dual Alone or apply Dual + Balan preplant incorporated as directed previously in this section. Refer to the respective section for weeds controlled.

2nd Application: Apply Dual any time from preemergence up to "ground cracking" at 1.5-3 pts./A for extended control of weeds not yet emerged. Refer to the Dual Applied Alone section for a list of weeds controlled.

3rd Application: Apply Dual at lay-by as directed under Peanuts-Dual Alone. Use only when late germinating weeds are expected to be a problem. Refer to the Dual Applied Alone section for a list of weeds controlled.

Notes: (1) Do not apply more than the equivalent of 6 pts. of Dual per acre during any one year, or illegal residues may result. This includes Dual, Dual 8E, Dual II®, Dual 25G, or Dual IIG (4 lbs. of Dual 25G or Dual IIG equals 1 qt. of Dual), but do not use Dual II or Dual IIG after peanuts have emerged. (2) Do not graze or feed peanut forage or fodder to livestock for 30 days following application, and (3) Do not apply within 90 days of harvest, or illegal residues may result.

#### B. Southwest Only (NM, OK, TX)

1st Application: Apply Dual preplant incorporated or preemergence or at-cracking as directed previously in this section. Refer to the respective section for weeds controlled.

2nd Application: Apply Dual at lay-by as directed under Peanuts - Dual Alone on that label. Use only when late germinating weeds are expected to be a problem. Refer to the Dual Applied Alone section for a list of weeds controlled.

Notes: (1) Do not apply more than the equivalent of 4 pts. of Dual per acre during any one year, or illegal residues may result. This includes Dual, Dual 8E, Dual II, and Dual 25G or Dual IIG (4 lbs. of Dual 25G or Dual IIG equals 1 pt. of Dual), but do not use Dual II or Dual IIG after peanuts have emerged. (2) Do not graze or feed peanut forage or fodder to livestock for 30 days following application, and (3) Do not apply within 90 days of harvest, or illegal residues may result.

### 3. Tank Mixture or Sequentially with Pursuit

The tank mixture or sequential treatment of Dual and Pursuit controls all weeds controlled by Dual alone and by Pursuit alone. Refer to the Dual Applied Alone section for weeds controlled by Dual and to the Pursuit label for weeds controlled by Pursuit.

Refer to the respective labels for application methods, timing, rates, restrictions, and precautions; and use in accordance with the more restrictive label. Do not exceed the label rate of either product. Dual will not control emerged weeds.

### 4. Tank Mixture with Sonalan

The tank mixture controls all weeds controlled by Dual alone and by Sonalan alone. Refer to the Dual Applied Alone section for weeds controlled by Dual and to the Sonalan label for weeds controlled by Sonalan.

Apply Dual + Sonalan preplant incorporated using the appropriate rate from Table 7. Follow recommended soil preparation procedures for Sonalan. Refer to the Peanut Sonalan/Dual Tank Mixture label for incorporation specifications.

Table 7: Dual + Sonalan - Peanuts

Soil Texture	Broadcast Rates Per Acre			
	Southeast		NM, OK, TX	
	Dual	Sonalan	Dual	Sonalan
COARSE	1.5-2 pts.	1.25-2 pts.	1.25-2 pts.	1.25-2 pts.
MEDIUM	1.5-2 pts.	1.75-2.5 pts.	1.25-2 pts.	1.75-2.5 pts.
FINE	1.5-2 pts.	2.25-3 pts.	1.25-2 pts.	2.25-3 pts.

Note: Follow all use directions, limitations, precautions, and information regarding application to peanuts on the Dual and Sonalan labels.

### 5. Tank Mixture with Prowl

Dual + Prowl applied preplant incorporated controls all weeds controlled by Dual alone plus Texas panicum, field sandbur, johnsongrass from seed, lambquarters, Kochia, annual spurge, and other species on the Prowl label. Apply Dual + Prowl by ground or by aerial equipment within 14 days before planting. Incorporate into the top 1-2 inches of soil before planting and within 7 days of application using a finishing disk or similar implement capable of providing uniform incorporation. If peanuts will be planted on beds, apply and incorporate after bed formation. Refer to the incorporation instructions of the respective labels for additional directions.

Apply Dual + Prowl preplant incorporated using the appropriate rates from Table 8.

Table 8: Dual + Prowl - Peanuts

Soil Texture	Broadcast Rates Per Acre	
	NM, OK, TX	Other Peanut Growing States
	Dual + Prowl	Dual + Prowl
Sand, loamy sand	1.25 + 1-1.5 pts.	1.5-2 + 1.5-2 pts.
Sandy loam	1.25-1.5 + 1-1.5 pts.	1.5-2 + 1.5-2 pts.
Fine soil	2 + 1-1.5 pts.	2 + 1.5-2 pts.

Note: Follow all use directions, limitations, precautions, and information regarding application to peanuts on the Dual and Prowl labels.

### 6. Tank Mixture or Sequentially with Starfire

Dual + Starfire applied at ground cracking or sequentially will control or suppress small (1-6 inch) emerged annual grass and broadleaf weeds and provide residual control of weed species listed in the Dual Applied Alone section of this label. Apply 11 fl. oz./A of Starfire with the appropriate Dual rate from the Peanuts - Dual Alone section in a minimum spray volume of 20 gals./A with ground equipment. A second application of Dual + Starfire may be made 28 days after ground cracking. (Refer to the Peanuts - Dual Combinations - Multiple Applications section of this label for geographical areas where multiple applications are recommended.) A second Starfire application may be made in all peanut growing areas, if needed. Refer to the respective labels and follow all directions, limitations, and restrictions for each product.

### 7. Tank Mixture or Sequentially with Starfire + Basagran

The addition of Basagran to the Dual + Starfire mixture will result in improved control of such problem broadleaf weeds as prickly sida, cocklebur, smartweed, and bristly starbur. Dual + Starfire + Basagran applied at ground cracking or sequentially will control or suppress small (1-6 inch) emerged annual grass and broadleaf weeds and provide residual control of weed species listed in the Dual Applied Alone section of this label. Apply 1 pt./A of Basagran + 11 fl. oz./A of Starfire with the appropriate Dual rate from the Peanuts - Dual Alone section in a minimum spray volume of 20 gals./A with ground equipment. A second application of Dual + Starfire + Basagran may be made 28 days after ground cracking. (Refer to the Peanuts - Dual Combinations - Multiple Applications section of this label for geographical areas where multiple applications are recommended.) A second Starfire + Basagran application may be made in all peanut growing areas, if needed. Refer to the respective labels and follow all directions, limitations, and restrictions for each product.

### 8. Tank Mixture or Sequentially with Starfire + Butyrac 200 or Butoxone 200

The addition of Butyrac 200 or Butoxone 200 to the Dual + Starfire mixture will result in improved control of such problem broadleaf weeds as sicklepod, morningglory, and cocklebur. Dual + Starfire + Butyrac 200 or Butoxone 200 applied at ground cracking or sequentially will control or suppress small (1-6 inch) emerged annual grass and broadleaf weeds and provide residual control of weed species listed in the Dual Applied Alone section of this label. Apply 11 fl. oz./A of Starfire + 8-16 fl. oz./A (0.125-0.25 lbs./A) of Butyrac 200 or Butoxone 200 with the appropriate Dual rate from the Peanuts - Dual Alone section in a minimum spray volume of 20 gals./A with ground equipment. A second application of Dual + Starfire + Butyrac 200 or Butoxone 200 may be made 28 days after ground cracking. (Refer to the Peanuts - Dual Combinations - Multiple Applications section of this label for geographical areas where multiple applications are recommended.) A second Starfire + Butyrac 200 or Butoxone 200 application may be made in all peanut growing areas, if needed. Refer to the respective labels and follow all directions, limitations, and restrictions for each product.

**9. Tank Mixture or Sequentially with Basagran**

Dual + Basagran applied at ground cracking or sequentially will control species on the Basagran label and provide residual control of species listed in the Dual Applied Alone section of this label. Apply 1-2 pts./A of Basagran in 20 gals./A, depending on weed species and stage of growth as specified on the Basagran label, with the appropriate Dual rate from the Peanuts - Dual Alone section. A second application of the combination may be made before peanut pegging. (Refer to the Peanuts - Dual Combinations - Multiple Applications section of this label for geographical areas where multiple applications are recommended.) A second Basagran application may be made in all peanut growing areas, if needed. Refer to the respective labels and follow all directions, limitations, and restrictions for each product.

**10. Tank Mixture or Sequentially with Basagran + Butyrac 200 or Butoxone 200**

Dual + Basagran + Butyrac 200 or Butoxone 200 applied at ground cracking or sequentially will control species on the Basagran label and on the Butyrac or Butoxone labels, especially morning-glories. Apply 1.5-2 pts./A of Basagran + 8 fl. oz./A of Butyrac 200 or Butoxone 200 in 20 gals./A, depending on weed species and stage of growth as specified on the Basagran label, with the appropriate Dual rate from the Peanuts - Dual Alone section. A second application of the combination may be made before peanut pegging. (Refer to the Peanuts - Dual Combinations - Multiple Applications section of this label for geographical areas where multiple applications are recommended.) A second Basagran + Butyrac 200 or Butoxone 200 application may be made in all peanut growing areas, if needed. Refer to the respective labels and follow all directions, limitations, and restrictions for each product.

**11. Tank Mixture or Sequentially with Storm**

Dual + Storm applied at ground cracking through 2 expanded trifoliate leaves or Dual applied according to the directions for Dual Alone and followed with an at-cracking through postemergence treatment of Storm as specified on its label will control species on the Storm label and provide residual control of species listed in the Dual Applied Alone section of this label. Dual will not control emerged weeds. Refer to the Peanuts - Dual Alone section and to the Storm label and follow all directions, limitations, and restrictions for each product.

**K. Pod Crops - Dual Alone**

Pod crops including: garbanzo, garbanzo, northern beans, kidney beans, lima beans, mung beans, navy beans, pea (English<sup>\*</sup>; southern peas, such as blackeyes, pinkeyes, crowder, etc.), pinto beans, snap beans (green, wax, string), lentils, and lupines (sweet, white, white sweet, and grain).

Apply Dual either preplant incorporated or preemergence using the appropriate rate specified below. **Preplant Incorporated or Preemergence:** Follow instructions for use of Dual alone under Application Procedures. On coarse soils with less than 3% organic matter, apply 1.5-2 pts./A of Dual or 2 pts./A if organic matter is 3% or greater. On medium soils, apply 2-2.5 pts./A of Dual. On fine soils, apply 2-2.5 pts./A of Dual if organic matter content is less than 3%, or 2.5-3 pts./A if organic matter content is 3% or greater.

<sup>\*</sup> On English peas, use only preemergence applications. Do not use on English peas in northeastern U.S., or injury may occur.

Note: Do not cut for hay within 120 days following a Dual application, or illegal residues may result.

**L. Pod Crops - Dual Combinations**

Note: When applying Dual in combination on pod crops, do not cut for hay within 120 days following application, or illegal residues may result.

**1. Tank Mixture and Sequential Applications with Eptam - Beans (Green or Dry)**

This mixture controls all weeds controlled by Dual alone and by Eptam alone. Refer to the Dual Applied Alone section of this label for weeds controlled by Dual alone and to the Eptam label for weeds controlled by Eptam.

**Preplant Incorporated:** Follow instructions for use of Dual alone under Application Procedures. **Sequential:** Apply Eptam alone preplant incorporated, as specified on that label. Follow with a preemergence application of Dual, at rates specified for Dual alone, during planting (behind the planter) or after planting, but before the weeds or crop emerge.

Refer to the General Information section of this label and to the Eptam label for weather, cultural practices, and all other precautions and limitations that affect performance of these products.

Apply 2.5-4.5 pts./A of Eptam 7E<sup>\*</sup> with Dual as specified. On coarse soils, apply 1.25 pts./A of Dual if organic matter content is less than 3%, or 1.5 pts./A if organic matter content is 3% or greater. On medium soils, apply 1.5 pts./A of Dual if organic matter content is less than 3%, or 2 pts./A if organic matter content is 3% or greater. On fine soils, apply 2 pts./A of Dual if organic matter is less than 3%, or 2-2.5 pts./A if organic matter is 3% or greater.

<sup>\*</sup> Refer to the Eptam label for rate limitations depending on geographical area, and for species and varietal restrictions.

Precaution: Do not exceed 3.5 pts./A Eptam 7E on small white beans or green beans grown on coarse-textured soils.

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## 2. Tank Mixture with Treflan - Beans (Dry - Kidney, Navy, Pinto, etc.; Lima; and Snap)

Dual + Treflan tank mix applied preplant incorporated controls those weeds listed under Dual Applied Alone and those weeds listed for Treflan alone on the Treflan label. Dual + Treflan may be applied by ground or by aerial equipment and incorporated up to 14 days prior to planting. Follow the recommended procedures on this label and on the respective Treflan label using equipment that provides uniform 2-inch incorporation.

Apply Dual + Treflan tank mix using the appropriate Dual rate specified for Dual alone, and the Treflan rate from the Dry Beans, and the Lima and Snap Beans sections of the respective Treflan label. Choose the product rate for the specific soil texture / organic matter classification and weed species expected.

**Note:** Follow all restrictions and precautions on the respective Treflan label and in the Pod Crops - Dual Alone section of this label.

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## M. Potatoes - Dual Alone

Apply Dual either incorporated, preemergence, or after hilling/lay-by according to directions specified below for control of weeds listed under the General Information section. Within a rate range, use the lower rate on soils relatively coarse-textured or low in organic matter; use the higher rate on soils relatively fine-textured or high in organic matter. Effectiveness will be reduced if later cultural practices expose untreated soil.

**Incorporated:** Apply Dual at 1.5-3 pts./A to the soil and incorporate into the top 3 inches before planting using a finishing disk, harrow, rolling cultivator, or similar implement. Planting and later cultural practices should not bring untreated soil to the surface. Postplant incorporated application may be made any time after planting to drag-off, but before potato emergence. Use an implement that evenly distributes Dual in the top 2 inches of soil. Do not damage potato seed pieces or sprouts with incorporation equipment.

**Preemergence:** Apply Dual at 1.5-3 pts./A either after planting as a preemergence, delayed pre-emergence, after drag-off or hilling treatment, but before weeds emerge. Up to 4 pts./A of Dual alone may be used where soil organic matter is between 6% and 20%.

**After Hilling/Lay-by:** Apply 2.5 pts./A of Dual after hilling/at lay-by to control Dual-sensitive species for remainder of the growing season. This application will not control emerged weeds. It may be applied over a previous Dual application, but do not apply more than 5.5 pts./A of Dual in a single crop season.

**Precautions:** (1) Do not use on muck or peat soils. If cool, wet soil conditions occur after application, Dual may delay maturity and/or reduce yield of Superior and other early maturing potato varieties. To avoid crop injury, (2) Do not use on sweet potatoes or yams; (3) Do not apply both as a preemergence and an incorporated treatment; and (4) Do not use in Kern County, CA.

**Note:** Potatoes treated with Dual should not be harvested within 60 days after the at-planting to drag-off application, or within 40 days after a lay-by application, or illegal residues may result.

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## N. Potatoes - Dual Combinations

### 1. Tank Mixture with Sencor or Loxone

In addition to those weeds controlled by Dual alone, Dual applied in tank mix combination with, or sequentially with, any of the registered Sencor or Loxone formulations, also controls the following broadleaf weeds: cocklebur\*, hairy nightshade\*, hemp sesbania, jimsonweed\*, lambsquarters, prickly sida, ragweed, smartweed, velvetleaf, Venice mallow, and wild mustard.

\*Partially controlled.

Dual at 1.5-3 pts./A plus the labeled Sencor/Loxone use rate may be used preemergence through after last hilling. Apply 1.5-2 pts./A of Dual on coarse soils and 2-3 pts./A on other soil textures. Within this rate range, use the lower rate on soils relatively coarse-textured or low in organic matter; use the higher rate on soils relatively fine-textured or high in organic matter. Effectiveness will be reduced if later cultural practices expose untreated soil. Dual will not control emerged weeds.

Refer to the Sencor or Loxone labels for precautionary statements, restrictions, application information, and weeds controlled.

**Precautions:** (1) Postemergence applications to potatoes should be made only as a directed or semi-directed spray to avoid chlorosis, minor necrosis, or leaf distortion. To avoid crop injury, (2) Do not use Dual + Sencor or Loxone on potatoes in Kern County, CA, and (3) Do not apply to sweet potatoes or yams. (4) Do not use this tank mixture on muck or peat soils.

**Notes:** (1) Potatoes treated with Dual in tank mixture with Sencor or Loxone cannot be harvested within 60 days after application, or illegal residues may result. (2) Potatoes may not be harvested within 40 days after a lay-by application of Dual, or illegal residues may result.

### 2. Dual + Lorax Tank Mixture (East of Rocky Mountains)

Dual may be applied in a tank mix combination with any of the registered Lorax formulations as a preemergence broadcast application to potatoes. Apply to the soil surface after planting and before emergence of the crop or after final drag-off according to the rates specified in Table 9.



Table 9: Dual + Lorox - Potatoes (East of Rocky Mountains)

Soil Texture	Broadcast Rates Per Acre			
	1 to Less Than 3% Organic Matter		3 to 5% Organic Matter	
	Dual	Lorox*	Dual	Lorox*
COARSE Sandy loam	1.5 pts.	1-1.5 lbs.	2 pts.	1.5-2 lbs.
MEDIUM Loam, silt loam, silt	2 pts.	1.5-2 lbs.	2.5-3 pts.	2-2.5 lbs.

\*When using Lorox L or Lorox DF, use equivalent rates. One pt. of Lorox L equals 1 lb. of Lorox DF.

Precautions: To avoid crop injury, (1) Do not use on sands or loamy sands, and (2) Do not incorporate or spray over the top of emerged potatoes.

Refer to the General Information section of this label and to the Lorox label for precautionary statements, restrictions, application information, and weeds controlled.

### 3. Tank Mixture with Prowl 4E

In addition to the weeds controlled by Dual alone, the tank mixture with Prowl 4E controls such problem species as Kochia, lambsquarters, purslane, annual spurge, stinging nettle, and others specified on the Prowl 4E Alone label. Apply Dual + Prowl 4E preemergence, preemergence incorporated, or early postemergence according to the specific directions on the Prowl 4E label, using the rates in Table 10.

Table 10: Dual + Prowl 4E - Potatoes

Soil Texture	Broadcast Rates Per Acre	
	Less Than 3% Organic Matter	More Than 3% Organic Matter
	Dual + Prowl 4E*	Dual + Prowl 4E*
COARSE	1.5-2 pts. + 1-1.5 pts.	1.5-2 pts. + 1-1.5 pts.
MEDIUM	2 pts. + 1.5-2 pts.	2-2.5 pts. + 2-3 pts.
FINE	2-2.5 pts. + 2-3 pts.	2.5-3 pts. + 3 pts.

\*When using other formulations of Prowl, use equivalent rates of active ingredient.

Refer to the Dual and Prowl 4E labels and observe all directions, timings, limitations, precautions, and restrictions concerning the use of these products on potatoes and follow the most restrictive.

### 4. Tank Mixture with Prowl 4E + Eptam

In addition to the weeds controlled by Dual alone, this tank mixture will control those species on the Prowl 4E and Eptam labels. Refer to the Dual + Prowl 4E labels for rates of those products and add Eptam 7E at 3.5-7 pts./A depending on geographical area. Refer to the respective Dual, Prowl 4E, and Eptam labels and observe all directions, limitations, precautions, and restrictions concerning the use of these products on potatoes and follow the most restrictive.

### O. Safflowers - Dual Alone

Preplant Incorporated or Preemergence: Follow instructions for use of Dual alone under Application Procedures.

On coarse soils, apply 1.5-2 pts./A of Dual if organic matter content is less than 3%, or 2 pts./A if organic matter is 3% or greater. On medium soils, apply 2-2.5 pts./A of Dual. On fine soils, apply 2-2.5 pts./A of Dual if organic matter content is less than 3%, or 2.5-3 pts./A if organic matter content is 3% or greater.

### P. Grain or Forage Sorghum (Seed treated with Concep or Screen) - Dual Alone

Apply Dual either preplant surface, preplant incorporated, or preemergence using the appropriate rate specified below. Apply Dual alone only when the sorghum seed has been properly treated by the seed company with Concep or Screen.

Preplant Surface-Applied: Refer to instructions for use of Dual under Application Procedures. For minimum-tillage or no-tillage systems only, Dual may be applied up to 45 days before planting in CO, IA, IL, KS, MO, NE, and SD. Use only split applications for treatments made 30-45 days prior to planting, with 2/3 of the broadcast rate applied initially and the remaining 1/3 at planting. Apply 2.25 pts./A of Dual on medium soils or 2.5 pts./A on fine soils. Treatments less than 30 days prior to planting may be made either as a split or single application. Apply 2 pts./A of Dual on coarse soils not more than 2 weeks prior to planting.

Under dry conditions, irrigation after application is recommended to move Dual into the soil.

**Preplant Incorporated or Preemergence:** Refer to instructions for use of Dual under Application Procedures. Broadcast 1.5-2 pts./A of Dual on coarse soils, 2-2.25 pts./A on medium soils, or 2-2.5 pts./A on fine soils.

**Precautions:** (1) If sorghum seed is not properly treated with Concep or Screen, Dual will severely injure the crop. (2) Under high soil moisture conditions prior to sorghum emergence, injury may occur following the use of Dual. The crop will normally outgrow this effect. (3) Do not use Dual on sorghum grown under dry mulch tillage, or injury may occur. (4) Except for the split preplant surface treatment, do not make more than one application per year, or illegal residues may result.

## Q. Grain or Forage Sorghum (Seed treated with Concep or Screen) – Dual Combinations

Dual tank mixtures with AAtrex may be applied in water or fluid fertilizer. Apply Dual in tank mixtures only when the sorghum seed has been properly treated by the seed company with Concep or Screen.

**IMPORTANT: FOR TANK MIXTURES WITH AATREX (OR OTHER BRANDS OF ATRAZINE) –** If applying Dual in tank mixture with AAtrex, all the restrictions and rate limitations on the AAtrex label must be followed if more restrictive/protective than those on this label. In addition, if AAtrex is/must be applied at rates lower than those recommended on this label, broadleaf weed control may be affected. Refer to the AAtrex label for weeds controlled at the reduced rates.

**Precautions:** (1) Applications of Dual + AAtrex on highly alkaline soils or on eroded areas where calcareous subsoils are exposed may cause sorghum injury. (2) If sorghum seed is not properly treated with Concep or Screen, Dual + AAtrex may severely injure the crop. (3) Under high soil moisture conditions prior to sorghum emergence, injury may occur following the use of Dual + AAtrex. The crop will normally outgrow this effect. (4) Do not use Dual + AAtrex on sorghum grown under dry mulch tillage, or injury may occur. (5) Except for the split preplant surface treatment, do not make more than one application per year, or illegal residues may result.

### 1. Tank Mixture with AAtrex

In addition to the weeds controlled by Dual alone, Dual + AAtrex also controls the following broadleaf weeds when applied either preplant surface, preplant incorporated, or preemergence: cocklebur, common purslane, hairy nightshade, lambsquarters, morningglory, ragweed, smartweed, and velvetleaf.

**Preplant Surface-Applied:** Refer to instructions for use of Dual under Application Procedures. For minimum-tillage or no-tillage systems only, Dual + AAtrex may be applied up to 45 days prior to planting in IA, IL, eastern KS, MO, NE, and SD. Use only split applications for treatments made 30-45 days prior to planting, with 2/3 of the broadcast rate applied initially and the remaining 1/3 at planting. Apply 2.25 pts./A of Dual + 1.7-2 lbs./A of AAtrex Nine-O\* on medium soils with 1.5% organic matter or greater. Apply 2.25 pts./A of Dual + 1.7-2 lbs./A of AAtrex Nine-O on fine soils with less than 1.5% organic matter, or apply 2.5 pts./A of Dual + 2-2.2 lbs./A of AAtrex Nine-O on fine soils with 1.5% organic matter or greater. Treatments less than 30 days prior to planting may be made either as a split or single application. Under dry conditions, irrigation after application is recommended to move Dual + AAtrex into the soil.

**Precautions:** To avoid crop injury, (1) Do not use on coarse soils, and (2) Do not use on medium soils with less than 1.5% organic matter.

**Preplant Incorporated or Preemergence:** Refer to instructions for use of Dual under Application Procedures. On medium soils with 1.5% organic matter or greater, apply 1.5 pts./A of Dual + 1.3 lbs./A of AAtrex Nine-O\*. On fine soils with less than 1.5% organic matter, apply 1.5 pts./A of Dual plus 1.3 lbs./A of AAtrex Nine-O; on fine soils with 1.5% organic matter or greater, apply 1.75-2 pts./A of Dual plus 1.8-1.8 lbs./A of AAtrex Nine-O.

\*When using AAtrex 4L, use equivalent rates. One lb. of AAtrex Nine-O equals 1.8 pts. of AAtrex 4L.

**Precautions:** To avoid crop injury, (1) Do not use on coarse soils; (2) Do not use on medium soils with less than 1.5% organic matter; (3) Do not use in NM, OK, or TX, except in northeast OK and the TX Gulf Coast and Blacklands areas; and (4) Do not apply preplant incorporated in AZ or the Imperial Valley of CA.

### 2. Tank Mixture of Dual or Dual + AAtrex, with Gramoxone Extra, Landmaster BW, or Roundup for Minimum-Tillage or No-Tillage Systems

In minimum-tillage or no-tillage systems where sorghum (seed treated with Concep or Screen) is planted directly into a cover crop, stale seedbed, established sod, or previous crop residue, the contact herbicides Gramoxone Extra, Landmaster BW, or Roundup may be tank mixed with Dual or Dual + AAtrex. See Comment No. 9 following Chart 1. The Dual or Dual + AAtrex portion of the tank mixture provides preemergence control of the weeds listed on this label under the respective sections.

Refer to the label of each product used in combination and observe the planting details, restrictions, and all other precautions and limitations.

**Application:** Apply before, during, or after planting, but before sorghum emerges, at the appropriate rates listed under Grain or Forage Sorghum - Dual Alone or - Dual Combinations - Dual + AATrex, respectively. Add Gramoxone Extra, Landmaster BW, or Roundup at the following broadcast rates:

**Gramoxone Extra:** 1.5-2.0, 2.0-2.5, or 2.5-3.0 pts./A to 1-3 inches, 3-6 inches, or 6-inch tall weeds, respectively. Apply surfactant at 1 or 2 pts./100 gals. of spray mixture with 75% or greater or 50-74% nonionic active ingredient, respectively. This treatment will not control weeds taller than 6 inches.

**Landmaster BW:** 27-54 oz./A depending on weed species and size. See the Landmaster BW label for weeds controlled, recommended rates for specific weeds, and other information concerning use.

**Roundup:** See the Roundup or Roundup RT label for weeds controlled, recommended rates, and other use directions.

Apply in a minimum of 20 gals. of water per acre with conventional spray equipment.

## R. Soybeans - Dual Alone

Apply Dual either preplant surface-applied, preplant incorporated, or preemergence using the appropriate rate specified below. Preplant Surface-Applied, Preplant Incorporated, or Preemergence: Follow instructions for use of Dual alone under Application Procedures.

### Preplant Surface-Applied

**A. Fall Application (Only in IA, MN, ND, SD, WI, and North of Route 20 in the states of IL and NE):** After October 15, when the sustained soil temperature at a 4-inch depth is less than 50°F, apply to crop stubble after crop harvest. In minimum-till or no-tillage systems on soils having greater than 2.5% organic matter, use 2.5-3 pts./A on medium-textured and 3.0 pts./A on fine-textured soils. Apply before ground is frozen. A tillage operation may precede the application. A fall and/or a spring tillage may follow application, but do not exceed an incorporation depth greater than 2-3 inches. Minimize furrow and ridge formation in the tillage operations. Note: If a spring application is made, the total rate of the fall plus spring applications must not exceed the maximum total rate for soybeans, or illegal residues may result.

**B. Use on medium and fine soils with minimum-tillage or no-tillage systems in CO, CT, DE, IA, IL, IN, KS, KY, MA, MD, ME, MI, MN, MO, MT, ND, NE, NH, NY, OH, PA, RI, SD, TN, VA, VT, WI, WV, and WY.** Apply  $\frac{2}{3}$  the recommended rate of Dual (2.5 pts./A on medium soils and 3 pts./A on fine soils) as a split treatment 30-45 days prior to planting and the remainder at planting. Applications made less than 30 days before planting may be as either a split or single treatment. Apply 2 pts./A on coarse soils not more than 2 weeks prior to planting.

**Preplant Incorporated or Preemergence:** On coarse soils, apply 1.5-2 pts./A of Dual if organic matter content is less than 3%, or 2 pts./A if organic matter content is 3% or greater. On medium soils, apply 2-2.5 pts./A of Dual. On fine soils, apply 2-2.5 pts./A of Dual if organic matter content is less than 3%, or 2.5-3 pts./A if organic matter content is 3% or greater.

**Note:** On soybeans, Dual may be used up to 4 pts./A as a preplant surface-applied, preplant incorporated, or preemergence treatment on soils having an organic matter content between 6% and 20%. The total Dual rate applied to soybeans during any one crop should not exceed 4 pts./A.

## S. Soybeans - Dual Combinations

Water or fluid fertilizer may be used as carrier for Dual in combination with Sencor, Laxone, Lorox, Lorox Plus, Gemini, Cunopy, Preview, Pursuit, Scepter, Sonalan, or Command.

**Note:** For all of the following combinations, Dual may be used up to 3.5 pts./A on soils having an organic matter content between 6% and 20%. The total Dual rate applied to soybeans during any one crop year should not exceed 4 pts./A.

### 1. Tank Mixture with Sencor or Laxone

In addition to those weeds controlled by Dual alone, Dual + Sencor or Laxone, when applied as directed, also controls the following broadleaf weeds: cocklebur\*, hairy nightshade, hemp sesbania, jimsonweed\*, lambquarters, prickly sida, ragweed, smartweed, velvetleaf, Venice mallow, and wild mustard.

\*Partially controlled.

Apply Dual and Sencor or Laxone preplant incorporated or preemergence using the appropriate rates from Table 11. Preplant Incorporated or Preemergence: Follow instructions for use of Dual alone under Application Procedures.

**Sequential:** Apply Dual alone Preplant Incorporated, as specified in Table 11 for this tank mixture. Follow with a preemergence application of Sencor or Laxone during planting (behind the planter) or after planting, but before weeds or soybeans emerge.

# Dual®

Refer to the Sencor or Loxone labels for planting details and soybean variety restrictions.

Table 11: Dual + Sencor or Loxone - Soybeans

Soil Texture **	Broadcast Rates Per Acre			
	0.5% to Less Than 3% Organic Matter		3% Organic Matter or Greater	
	Dual	+ Sencor/Loxone DF*	Dual	+ Sencor/Loxone DF*
<b>COARSE</b> Loamy sand (over 2% organic matter), sandy loam	1.25-1.5 pts.	+ 0.33 lb.	1.5 pts.	+ 0.5 lb.
<b>MEDIUM</b>	1.5-2 pts.	+ 0.5 lb.	2 pts.	+ 0.67 lb.***
<b>FINE</b>	2 pts.	+ 0.67 lb.	2-2.5 pts.	+ 0.67 lb.
Mississippi Delta only Silty clay, clay	2 pts.	+ 1.0 lb.	2-2.5 pts.	+ 1.0 lb.
Muck or Peat (soils with more than 20% organic matter)	DO NOT USE			

\*When using Sencor 4 or Loxone 4L, multiply lbs. of DF by 1.5 to get pints per acre.

\*\*On all sand and on loamy sand with less than 2% organic matter, do not use this tank mixture preemergence, or the sequential treatment. Do not use the tank mixture preplant incorporated on any sand, loamy sand, or sandy loam, or crop injury may occur.

\*\*\* Use 0.5 lb./A if applied preplant incorporated.

Precautions: (1) Do not use the tank mix or sequential application on soil with less than 0.5% organic matter or on alkaline soil with a pH over 7.4, or crop injury may occur. (2) If heavy rain occurs soon after application, crop injury may result, especially in poorly drained areas where water stands for several days.

## 2. Tank Mixture with Lorox

In addition to those weeds controlled by Dual alone, Dual + Lorox, applied preemergence, also controls the following broadleaf weeds: cocklebur\*, jimsonweed\*, lambsquarters, morningglory\*, prickly sida, ragweed, smartweed, velvetleaf\*, Venice mallow, and wild mustard.

\*Partially controlled.

Preemergence: Apply during planting (behind planter) or after planting, but before weeds or soybeans emerge. Refer to the Lorox label for planting details. Apply the appropriate rates from Table 12.

Table 12: Dual + Lorox - Soybeans

Soil Texture *	Broadcast Rates Per Acre			
	0.5% to Less Than 3% Organic Matter		3% Organic Matter or Greater	
	Dual	+ Lorox DF***	Dual	+ Lorox DF***
<b>COARSE**</b>	1.25 pts.	+ 1 lb.	1.5 pts.	+ 1-1.5 lbs.
<b>MEDIUM</b>	1.5 pts.	+ 1-1.5 lbs.	2 pts.	+ 1.5-2 lbs.
<b>FINE</b>	2 pts.	+ 2 lbs.	2-2.5 pts.	+ 2.5-3 lbs.
Muck or Peat (soils with more than 20% organic matter)	DO NOT USE			

\*Do not use on sand, gravelly soils, or exposed subsoils.

\*\*Do not use on loamy sand, except in the northeastern U.S. on loamy sand with over 1% organic matter.

\*\*\* When using Lorox L or Lorox DF, use equivalent rates. One pt. of Lorox L equals 1 lb. of Lorox DF.

Precaution: Do not use on soil with less than 0.5% organic matter, or crop injury may occur.

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### 3. Tank Mixture with Treflan

Dual + Treflan tank mix applied preplant incorporated controls those weeds listed under the Dual Applied Alone section and those weeds listed for Treflan Alone on the respective Treflan label. Dual + Treflan may be applied by ground or by aerial equipment and incorporated up to 14 days before planting. Follow the recommended procedures on the Treflan and Dual labels using equipment that provides uniform 2-inch incorporation.

Apply Dual + Treflan tank mix using the appropriate rate from the Soybeans - Dual Alone section of this label and the Treflan Alone section of the Treflan label for the specific soil texture / organic matter classification and weed species expected.

To control DNA-resistant goosegrass\* and other species on the respective labels where the soil organic matter is 3% or less, apply the rate in Table 13.

Table 13: Dual + Treflan - Organic Matter Content Less Than 3%

Soil Texture	Broadcast Rates Per Acre		
	Dual	Treflan E.C. **	
		Organic Matter	
	Organic Matter Less Than 3%	Less Than 2%	2-3%
COARSE*	1.25-1.5 pts.	1 pt.	1.5 pts.
MEDIUM	1.5 pts.	1.5 pts.	1.5 pts.
FINE	2 pts.	2 pts.	2 pts.

\*Where a range of rates is given for Dual, use the minimum rate where DNA-resistant goosegrass is the predominant species.

\*\* When Treflan MTF or Treflan 5 is used, use comparable rates. Multiply pints of Treflan E.C. by 1 for Treflan MTF and by 0.8 for Treflan 5.

Note: Follow all restrictions and precautions on the respective Treflan label and in the Soybeans - Dual Alone section of this label.

### 4. Tank Mixture with Scepter

This tank mixture controls all weeds controlled by Dual alone and by Scepter alone. Refer to the Dual Applied Alone section for weeds controlled by Dual and to the Scepter label for weeds controlled by Scepter. Refer to the Scepter label for geographical locations where this tank mixture may be applied.

Apply Dual + Scepter preplant incorporated or preemergence using rates in Table 14. Follow use directions under Application Instructions on the Scepter label. For preplant incorporated applications, apply and incorporate within 30 days before planting. Observe all other precautions and limitations on the Scepter labels.

Table 14: Dual + Scepter - Soybeans

Soil Texture	Broadcast Rates Per Acre			
	Less Than 3% Organic Matter		3% or More Organic Matter	
	Dual	Scepter	Dual	Scepter
COARSE	1.25 pts.	0.67 pt.	1.5 pts.	0.67 pt.
MEDIUM	1.5 pts.	0.67 pt.	2.0 pts.	0.67 pt.
FINE	2.0 pts.	0.67 pt.	2-2.5* pts.	0.67 pt.
Muck or Peat (soils with more than 20% organic matter)	DO NOT USE			

\* Use the higher rate of Dual if heavy weed infestations are expected.

Notes: (1) Do not apply within 90 days of harvest, and (2) Do not graze or feed treated soybean forage, hay, or straw to livestock, or illegal residues may result.

### 5. Tank Mixture with Lorox Plus

This tank mixture controls all weeds controlled by Dual alone and by Lorox Plus alone. Refer to the Dual Applied Alone section for weeds controlled by Dual and to the Lorox Plus label for weeds controlled by Lorox Plus.

Apply Dual + Lorox Plus preemergence after planting, but before soybeans emerge using rates in Table 15.

Note: Follow all use directions, limitations, precautions, information regarding application to soybeans, and rotational restrictions on the Dual and Lorox Plus labels.

Table 15: Dual + Lorox Plus - Soybeans

Soil Texture	Broadcast Rates Per Acre	
	0.5-3% Organic Matter	
	Dual	Lorox Plus (80DF)
COARSE	1.25 pts.	12-14 oz.
MEDIUM	1.5 pts.	14-16 oz.
FINE	2.0 pts.	16-18 oz.

*Precaution: Do not apply to sand, or to any soil with less than 0.5% organic matter, or to any soil with pH greater than 6.8.*

### 6. Tank Mixture with Gemini

This tank mixture controls all weeds controlled by Dual alone and by Gemini alone. Refer to the Dual Applied Alone section for weeds controlled by Dual and to the Gemini label for weeds controlled by Gemini.

Apply Dual + Gemini preemergence after planting, but before soybeans emerge using rates in Table 16.

*Note: Follow all use directions, limitations, precautions, information regarding application to soybeans, and rotational restrictions on the Dual and Gemini labels.*

Table 16: Dual + Gemini - Soybeans

Soil Texture	Broadcast Rates Per Acre	
	0.5-3% Organic Matter	
	Dual	Gemini (80DF)
COARSE (Sandy loam only)	1.25 pts.	12-16 oz.
MEDIUM	1.5 pts.	16-20 oz.
FINE	2.0 pts.	20-24 oz.

*Precaution: Do not apply to sand or loamy sand, or to any soil with less than 0.5% organic matter, or to any soil with pH greater than 7.0, except as noted on the Gemini label.*

### 7. Tank Mixture with Canopy

This tank mixture controls all weeds controlled by Dual alone and by Canopy alone. Refer to the Dual Applied Alone section for weeds controlled by Dual and to the Canopy label for weeds controlled by Canopy.

Apply preplant incorporated or preemergence using the appropriate rates from Table 17. Preplant incorporated: Apply within 2 weeks of planting. Uniformly incorporate into the top 1-2 inches of soil before planting soybeans. Preemergence: Apply after planting, but before soybeans emerge.

*Note: Follow all use directions, varietal restrictions, limitations, precautions, information regarding application to soybeans, and rotational restrictions on the Dual and Canopy labels.*

Table 17: Dual + Canopy - Soybeans

Soil Texture	Broadcast Rates Per Acre		
	Less Than 3% Organic Matter	3% or More Organic Matter	Canopy
	Dual	Dual	
COARSE	1.25 pts.	1.5 pts.	*
MEDIUM	1.5 pts.	2.0 pts.	*
FINE	2.0 pts.	2.0-2.5 pts.	*

\* Refer to the Canopy label for appropriate rate according to geographical location, soil and organic matter classification, and pH limitations.

*Precaution: Do not apply to sand, or to any soil with less than 0.5% organic matter, or to any soil with pH greater than 7.0, except as noted on the Canopy label.*

**8. Tank Mixture with Preview**

This tank mixture controls all weeds controlled by Dual alone and by Preview alone. Refer to the Dual Applied Alone section for weeds controlled by Dual and to the Preview label for weeds controlled by Preview.

Apply preplant incorporated or preemergence using the appropriate rates from Table 18. Preplant incorporated: Apply within 2 weeks of planting. Uniformly incorporate into the top 1-2 inches of soil before planting soybeans. Preemergence: Apply after planting, but before soybeans emerge.

Note: Follow all use directions, varietal restrictions, limitations, precautions, information regarding application to soybeans, and rotational restrictions on the Dual and Preview labels.

Table 18: Dual + Preview - Soybeans

Soil Texture	Broadcast Rates Per Acre			
	0.5-Less Than 3% Organic Matter		3-5% Organic Matter	
	Dual	Preview 75DF	Dual	Preview 75DF
COARSE	1.25 pts.	6 oz.	1.5 pts.	7 oz.
MEDIUM	1.5 pts.	7 oz.	2.0 pts.	8 oz.
FINE	2.0 pts.	8 oz.	2.0-2.5 pts.	9-10 oz.

Precaution: Do not apply to sand, or to any soil with less than 0.5% organic matter, or to any soil with pH greater than 6.8.

**9. Tank Mixture with Command\***

This tank mixture controls all weeds controlled by Dual alone and by Command alone. Refer to the Dual Applied Alone section for weeds controlled by Dual and to the Command label for weeds controlled by Command.

Apply Dual + Command preplant incorporated using rates in Table 19. Follow all Command application instructions as to incorporation interval, geographical location, equipment operation, soil moisture conditions, etc.

\*Note: Before making applications, read and strictly follow all use directions, limitations, precautions, information regarding application to soybeans, and rotational restrictions on the Dual and Command labels.

Table 19: Dual + Command - Soybeans

Soil Texture	Broadcast Rates Per Acre			
	Dual		Command 4E	
	0.5-3% Organic Matter	Greater Than 3% Organic Matter	Northern Area	Southern Area
COARSE	1.25 pts.	1.5 pts.	1.5-2 pts.	2-2.5 pts.
MEDIUM	1.5 pts.	2.0 pts.	1.5-2 pts.	2-2.5 pts.
FINE	2.0 pts.	2.0-2.5 pts.	1.5-2 pts.	2-2.5 pts.

**10. Tank Mixture with Sonalan**

This tank mixture controls all weeds controlled by Dual alone and by Sonalan alone. Refer to the Dual Applied Alone section for weeds controlled by Dual and to the Sonalan label for weeds controlled by Sonalan.

Apply Dual and Sonalan preplant incorporated using the appropriate rates from Table 20.

Preplant incorporated: Follow recommended soil preparation procedures for Sonalan. Refer to the Sonalan/Dual Tank Mixture label for incorporation specifications.

Sequential: Apply Sonalan alone preplant incorporated as specified on the Sonalan label. Follow with a preemergence application of Dual during planting (behind the planter) or after planting, but before weeds or soybeans emerge.

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Table 20: Dual + Sencor - Soybeans

Soil Texture	Broadcast Rates Per Acre			
	Less Than 3% Organic Matter		3% or More Organic Matter	
	Dual	Sencor	Dual	Sencor
COARSE	1.5-2 pts.	1.25-2 pts.	2 pts.	1.25-2 pts.
MEDIUM*	2-2.5 pts.	1.75-2.5 pts.	2-2.5 pts.	1.75-2.5 pts.
FINE*	2-2.5 pts.	2.25-3 pts.	2.5-3 pts.	2.25-3 pts.
Muck or Peat (soils with more than 20% organic matter)	DO NOT USE			

\* For eastern black nightshade on these soils, apply Sencor at 3 pts./A on medium and 3.5 pts./A on fine-textured soils, and follow with 2 incorporation passes.

Note: Follow all use directions, limitations, precautions, and information regarding application to soybeans on the Dual and Sencor labels.

### 11. Tank Mixture with Pursuit

This tank mixture controls all weeds controlled by Dual alone and by Pursuit alone. Refer to the Dual Applied Alone section for weeds controlled by Dual and to the Pursuit label for weeds controlled by Pursuit. Refer to the Pursuit label for geographical locations where this tank mixture may be applied.

Apply Dual + Pursuit early preplant, preplant incorporated, or preemergence after planting using rates in Table 21. Application can be made in water or liquid fertilizer. Follow all use directions under Soil Applications on the Pursuit label. For early preplant and preplant incorporated applications, apply within 30 days before planting.

Note: Follow all use directions, limitations, precautions, information regarding application to soybeans, and rotational restrictions on the Dual and Pursuit labels.

Table 21: Dual + Pursuit - Soybeans

Soil Texture	Broadcast Rates Per Acre		
	Less Than 3% Organic Matter	3% or More Organic Matter	
	Dual	Dual	Pursuit
COARSE	1.25 pts.	1.5 pts.	0.25 pt.
MEDIUM	1.5 pts.	2.0 pts.	0.25 pt.
FINE	2.0 pts.	2.0-2.5 pts.	0.25 pt.

Sequential: Apply Dual early preplant, preplant incorporated, or preemergence after planting at 1.25 pts./A on coarse soils and 1.5 pts./A on medium- and fine-textured soils. Follow with a sequential postemergence application of Pursuit to control emerged weeds according to the Pursuit label. Dual will improve the consistency and level of control from Pursuit on most grass species. Refer to the Pursuit postemergence label for a listing of weeds controlled, application rate, and growth stage limitations.

### 12. Tank Mixture with Laxone, Sencor, Scepter, Lorox, Lorox Plus, Gemini, Canopy, Preview, or Pursuit, plus Gramoxone Extra or Roundup for Minimum-Tillage or No-Tillage Systems

In minimum-tillage or no-tillage systems where soybeans are planted directly into a cover crop, stale seedbed, established sod, or previous crop residues, the contact herbicides Gramoxone Extra or Roundup may be added to a tank mix of either Dual + Sencor or Laxone, Dual + Scepter, Dual + Lorox, Dual + Lorox Plus, Dual + Gemini, Dual + Canopy, Dual + Preview, or Dual + Pursuit. When used as directed, the Gramoxone Extra portion of the tank mixture controls most emerged weeds and suppresses many perennial weeds. Roundup combinations will control emerged annual and perennial weeds when applied as directed on the Roundup label. The Dual + Sencor/Laxone, Scepter, Lorox, Lorox Plus, Gemini, Canopy, Preview, or Pursuit portion of the tank mixture provides preemergence control of the weeds listed on this label in the tank mixture section for Dual + Sencor/Laxone, Dual + Scepter, Dual + Lorox, Dual + Lorox Plus, Dual + Gemini, Dual + Canopy, Dual + Preview, and Dual + Pursuit, respectively.

Refer to the label of each product used in combination and observe the planting details, soybean variety restrictions, information regarding application to soybeans, geographical restrictions, and all other precautions and limitations.

Refer below for rates of Gramoxone Extra or Roundup, Dual + Sencor/Laxone, Dual + Scepter, Dual + Lorox, Dual + Lorox Plus, Dual + Gemini, Dual + Canopy, Dual + Preview, and Dual + Pursuit, respectively.



**Application:** Apply before, during, or after planting, but before the soybeans emerge, at the rates specified below. Add Gramoxone Extra or Roundup at the following broadcast rates:

**Gramoxone Extra:** 1.5-2.0, 2.0-2.5, or 2.5-3.0 pts./A to 1-3 inches, 3-6 inches, or 6-inch tall weeds, respectively. Apply surfactant at 1 or 2 pts./100 gals. of spray mixture with 75% or greater or 50-74% nonionic active ingredient, respectively. This treatment will not control weeds taller than 6 inches.

**Note:** Do not apply combinations containing Gramoxone Extra in suspension type liquid fertilizers as the activity of paraquat will be reduced.

**Roundup:** See the Roundup or Roundup RT label for weeds controlled, recommended rates, and other use directions.

Apply in 20-60 gals. of water or fluid fertilizer per acre with ground equipment.

#### Dual + Laxone/Sencor + Gramoxone Extra or Roundup

On loamy sand with over 2% organic matter, apply 1.5 pts./A of Dual + 0.33-0.5 lb./A of Sencor or Laxone DF. On medium soils, apply 2 pts./A of Dual + 0.5-0.67 lb./A of Sencor or Laxone DF. On fine soils, apply 2-2.5 pts./A of Dual + 0.67 lb./A of Sencor or Laxone DF.

\*When using Sencor 4 or Laxone 4L, multiply lbs. of DF by 1.5 to get pts./A.

**Precautions:** To avoid crop injury, (1) Do not use this tank mixture on soil with less than 0.5% organic matter, on alkaline soil with a pH over 7.4, or on all sand and on loamy sand with less than 2% organic matter. (2) If heavy rain occurs soon after application, crop injury may result, especially in poorly drained areas where water stands for several days, or where the seeding slit has not been properly closed.

#### Dual + Scepter + Gramoxone Extra or Roundup

On coarse soils, apply 1.5 pts./A of Dual + 0.67 pt./A of Scepter. On medium soils, apply 2 pts./A of Dual + 0.67 pt./A of Scepter. On fine soils, apply 2.5 pts./A of Dual + 0.67 pt./A of Scepter.

**Notes:** (1) Do not apply within 90 days of harvest, and (2) Do not graze or feed treated soybean forage, hay, or straw to livestock, or illegal residues may result.

#### Dual + Lorox + Gramoxone Extra or Roundup

On coarse soils\*, apply 1.5 pts./A of Dual + 1-1.5 lbs./A of Lorox DF\*\*. On medium soils, apply 2 pts./A of Dual + 1-2 lbs./A of Lorox DF. On fine soils, apply 2-2.5 pts./A of Dual + 2-3 lbs./A of Lorox DF.

\*Do not use on loamy sand, except in the northeastern U.S. on loamy sand with over 1% organic matter, or injury may occur. Do not use on sand, gravelly soils, or exposed subsoils, or injury may occur.

\*\* When using Lorox L or Lorox DF, use equivalent rates. One pt. of Lorox L equals 1 lb. of Lorox DF.

**Precaution:** Do not use on soil with less than 0.5% organic matter, or crop injury may occur.

#### Dual + Lorox Plus + Gramoxone Extra or Roundup

Use only where soils have 0.5-3% organic matter. On coarse soils, apply 1.5 pts./A of Dual + 12-14 oz./A of Lorox Plus 80DF. On medium soils, apply 2 pts./A of Dual + 14-16 oz./A of Lorox Plus. On fine soils, apply 2-2.5 pts./A of Dual + 16-18 oz./A of Lorox Plus.

**Precaution:** Do not apply to sand or to any soil with pH greater than 6.8.

#### Dual + Gemini + Gramoxone Extra or Roundup

Use only where soils have 0.5-3% organic matter. On coarse soils (sandy loam only) apply 1.5 pts./A of Dual + 12-16 oz./A of Gemini 80DF. On medium soils, apply 2 pts./A of Dual + 16-20 oz./A of Gemini. On fine soils, apply 2-2.5 pts./A of Dual + 20-24 oz./A of Gemini.

**Precaution:** Do not apply to sand or loamy sand, or to any soil with less than 0.5% organic matter, or to any soil with pH greater than 7.0, except as noted on the Gemini label.

#### Dual + Canopy + Gramoxone Extra or Roundup

Use only where soils have 0.5-5% organic matter. On coarse soils (except sand), apply 1.5 pts./A of Dual, on medium soils, apply 2 pts./A of Dual, and on fine soils, apply 2-2.5 pts./A of Dual. Refer to the Canopy label for appropriate rate according to geographical location, soil and organic matter classification, pH limitations, and all other use directions.

**Precaution:** Do not apply to sand, or to any soil with less than 0.5% organic matter, or to any soil with pH greater than 7.0, except as noted on the Canopy label.

#### Dual + Preview + Gramoxone Extra or Roundup

Use only where soils have 0.5-5% organic matter. On coarse soils (except sand), apply 1.5 pts./A of Dual + 6-7 oz./A of Preview 75DF. On medium soils, apply 2 pts./A of Dual + 7-8 oz./A of Preview. On fine soils, apply 2-2.5 pts./A of Dual + 8-9 oz./A of Preview.

\*Use this rate where the soil organic matter is in the 0.5 to less than 3.0% range.

**Precaution:** Do not apply to sand, or to any soil with less than 0.5% organic matter, or to any soil with pH greater than 6.8.

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**Dual + Pursuit + Gramoxone Extra or Roundup**

On coarse soils, apply 1.5 pts./A of Dual + 0.25 pt./A of Pursuit. On medium soils, apply 2 pts./A of Dual + 0.25 pt./A of Pursuit. On fine soils, apply 2.5 pts./A of Dual + 0.25 pt./A of Pursuit.

**13. Tank Mixture with Broadstrike + Dual**

For preplant surface, preplant incorporated, or preemergence application where severe grass populations are expected on medium- or fine-textured soils with relatively high organic matter content, Broadstrike + Dual may be spiked with additional Dual for optimum performance. Refer to the Broadstrike + Dual label for its use rate and the amount of Dual it contains. Dual may be added up to, but not to exceed, the maximum alone Dual label rate for the soil classification. Refer to the respective labels and follow all directions, limitations, and restrictions for each product.

**T. Stone Fruits - Dual Alone and Combinations**

Stone fruits including apricots, cherries (sweet, sour), nectarines, peaches, plums (chickasaw, damson, Japanese), and prunes.

Broadcast 2-4 pts./A of Dual by ground equipment to weed-free soil in a minimum of 10 gals. of water to apricots, cherries, nectarines, peaches, plums, or prunes to control weeds listed in the Dual Applied Alone section of this label. Apply the lower rates on coarse-textured soils with low organic matter and where the weed infestation is expected to be low. Apply the higher rates on fine-textured soils, soils high in organic matter, and where a heavy weed infestation is expected. Use caution when applying to keep the spray off the foliage of the tree crops to avoid excessive residues or possible foliar injury.

For control of browntop panicum, cocklebur, common purslane, hairy nightshade, lambsquarters, annual morningglory, ragweed, smartweed, and velvetleaf, tank mix Dual at rates indicated above with 1.1 to 4.4 lbs./A, depending on the crop, of Princep Caliber 90 (or 1-4 qts./A of Princep 4L) and apply to weed-free soil in a minimum of 10 gals. of water, keeping the spray off the foliage of the tree crops. Refer to the rate of Princep Caliber 90 or Princep 4L for a given crop on the respective Princep label.

When weeds are present at the time of treatment, Dual alone or in tank mixture with Princep Caliber 90 (or 4L) may sequentially follow an application of Gramoxone Extra or Roundup, or Dual alone or in tank mixture with Princep may be applied in tank mix combination with Gramoxone Extra or Roundup. Gramoxone Extra may be applied at rates of 2-3 pts./A. Roundup may be applied at rates ranging from 1-5 qts./A, depending on the weed species. Refer to the Roundup label for rates for various weed species. Direct applications containing Gramoxone Extra or Roundup over the weeds, making certain to keep spray off foliage and stems of trees. Refer to the Princep Caliber 90 (or 4L), Gramoxone Extra, and Roundup labels for other details relative to their individual use.

Notes: (1) Do not graze livestock in treated areas, and (2) Do not feed or graze cover crops grown in treated orchards, or illegal residues may result. (3) To avoid crop injury, do not apply tank mixtures with Princep on nectarines or apricots, and (4) Do not apply Dual to nonbearing trees transplanted in the orchard less than 30 days or before depressions around the trees have been filled in.

**U. Tree Nuts - Dual Alone and Combinations**

Tree nuts including almonds, beech nuts, Brazil nuts, butternuts, cashews, chestnuts, chinquapins, filberts (hazel nuts), hickory nuts, Macadamia nuts, pecans, and walnuts (black and English).

Broadcast 2-4 pts./A of Dual by ground equipment to weed-free soil in a minimum of 10 gals. of water to tree nuts to control weeds listed in the Dual Applied Alone section of this label. Apply the lower rates on coarse-textured soils with low organic matter and where the weed infestation is expected to be low. Apply the higher rates on fine-textured soils, soils high in organic matter, and where a heavy weed infestation is expected. Use caution when applying to keep the spray off the foliage of the tree crops to avoid excessive residues or possible foliar injury.

For control of browntop panicum, cocklebur, common purslane, hairy nightshade, lambsquarters, annual morningglory, ragweed, smartweed, and velvetleaf, tank mix Dual at rates indicated above with 1.1 to 4.4 lbs./A, depending on the crop, of Princep Caliber 90 (or 1-4 qts./A of Princep 4L) and apply to weed-free soil in a minimum of 10 gals. of water, keeping the spray off the foliage of the tree crops. Refer to the rate of Princep Caliber 90 or Princep 4L for a given crop on the respective Princep label.

When weeds are present at the time of treatment, Dual alone or in tank mixture with Princep may be applied in tank mix combination with Gramoxone Extra or Roundup. Gramoxone Extra may be applied at rates of 2-3 pts./A. Roundup may be applied at rates ranging from 1-5 qts./A, depending on the weed species. Refer to the Roundup label for rates for various weed species. Direct applications containing Gramoxone Extra or Roundup over the weeds, making certain to keep spray off foliage and stems of trees. Refer to the Princep Caliber 90 (or 4L), Gramoxone Extra, and Roundup labels for other details relative to their individual use.

Notes: (1) Tank mixtures containing Princep may only be used on almonds, filberts, Macadamia nuts, pecans, or walnuts. (2) Do not graze livestock in treated orchards, or illegal residues may result. (3) Do not apply Dual to nonbearing trees transplanted in the grove less than 30 days or before depressions around the trees have been filled in, or crop injury may occur.

## V. Storage and Disposal

### Pesticide Disposal

Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited. Wastes resulting from the use of this product are toxic. Improper disposal of unused pesticide, spray mixture, or rinseate is a violation of federal law. Pesticide, spray mixture, or rinseate that cannot be used according to label instructions must be disposed of according to federal, state, or local procedures. For guidance in proper disposal methods, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office.

### Container Disposal

Do not reuse empty container. Triple rinse (or equivalent), puncture and dispose of in a sanitary landfill, or by incineration, or by open burning, if allowed by state and local authorities. Keep out of smoke from burning containers.

This product may be stored at temperatures down to 30 degrees below 0°F.

For minor spills, leaks, etc., follow all precautions indicated on this label and clean up immediately. Take special care to avoid contamination of equipment and facilities during cleanup procedures and disposal of wastes. In the event of a major spill, fire, or other emergency, call 1-800-888-8372, day or night.

## W. Appendices

### Appendix A: Compatibility Test

Since liquid fertilizers can vary, even within the same analysis, always check compatibility with herbicide(s) each time before use. Be especially careful when using complete suspension or fluid fertilizers as serious compatibility problems are more likely to occur. Commercial application equipment may improve compatibility in some instances. The following test assumes a spray volume of 25 gals./A. For other spray volumes, make appropriate changes in the ingredients. Check compatibility using this procedure:

1. Add 1 pt. of fertilizer to each of 2 one-qt. jars with tight lids.
2. To one of the jars, add ¼ tsp. or 1.2 milliliters of a compatibility agent approved for this use, such as Complex or Unite (¼ tsp. is equivalent to 2 pts./100 gals. spray). Shake or stir gently to mix.
3. To both jars, add the appropriate amount of herbicide(s). If more than one herbicide is used, add them separately with dry herbicides first, flowables next, and emulsifiable concentrates last. After each addition, shake or stir gently to thoroughly mix. The appropriate amount of herbicides for this test follows:

**Dry herbicides:** For each pound to be applied per acre, add 1.5 level teaspoons to each jar.

**Liquid herbicides:** For each pint to be applied per acre, add 0.5 teaspoon or 2.5 milliliters to each jar.

**Note:** For Dual tank mixtures with AAtrex + Princep, use ½-½ the amount of AAtrex specified above and the remainder as Princep, depending on whether the 1:2 or 1:1 ratio of AAtrex to Princep is to be applied.

4. After adding all ingredients, put lids on and tighten, and invert each jar 10 times to mix. Let the mixtures stand 15 minutes and then look for separation, large flakes, precipitates, gels, heavy oily film on the jar, or other signs of incompatibility. Determine if the compatibility agent is needed in the spray mixture by comparing the 2 jars. If either mixture separates, but can be remixed readily, the mixture can be sprayed as long as good agitation is used. If the mixtures are incompatible, test the following methods of improving compatibility: (A) slurry the dry herbicide(s) in water before addition, or (B) add ½ of the compatibility agent to the fertilizer and the other ½ to the emulsifiable concentrate or flowable herbicide before addition to the mixture. If incompatibility is still observed, do not use the mixture.

### Appendix B: Low Carrier Application

#### For Broadcast Ground Application Only

Use sprayers such as Ag-Chem RoGator®, Hagie, John Deere Hi-Cycle®, Melroe Spra-Coupe, Tyler Patriot™, or Willmar Air Ride® that provide accurate and uniform application. Only water may be used as a carrier. Screens in suction and in-line strainers should be 50-mesh. Manufacturers may require that tip screens as fine as 100-mesh be used with some nozzles. Use a pump with capacity to: (1) maintain up to 35-40 psi at the nozzle, and (2) provide sufficient agitation in tank to keep mixture in suspension. Use a minimum of 5 gals. of spray mixture per acre. Maximum recommended sprayer speed is 15 mph. Rinse sprayer thoroughly with clean water immediately after each use.

**Note:** Low pressure nozzles are recommended to reduce drift and increase application accuracy. Care should be taken when using automatic rate controlling devices to spray the material within the rated working pressure and flow ranges of the nozzles selected. Nozzle screens should be used when recommended by the manufacturer. All nozzles should be placed on 20-inch centers, except flooding types which should be placed on 40-inch centers. When Flat Fan type nozzles are used, angles of 80° or 110° are recommended. Always read and follow the manufacturer's directions for optimum setup and performance of their nozzles or tips.

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### Appendix C: Aerial Application

Apply Dual in water alone or in tank mixtures with AAtrex, Lorox, Loxone, or Sencor in a minimum total volume of 2 gals./A by aircraft. Dual may also be applied in combination with Prowl, Balan, or Treflan. Avoid application under conditions where uniform coverage cannot be obtained or where excessive spray drift may occur. In order to assure that spray will be controllable within the target area when used according to label directions, make applications at a maximum height of 10 ft., using low drift nozzles at a maximum pressure of 40 psi, and restrict application to periods when wind speed does not exceed 10 mph. To assure that spray will not adversely affect adjacent sensitive nontarget plants, apply Dual alone or Dual + AAtrex by aircraft at a minimum upwind distance of 400 ft. from sensitive plants, or apply Dual + Loxone, Sencor, or Lorox at a minimum upwind distance of 300 ft. from sensitive plants.

Avoid application to humans or animals. Flagmen and loaders should avoid inhalation of spray mist and prolonged contact with skin.

### Appendix D: Center Pivot Irrigation Application

Dual alone or in tank mixture with other herbicides on this label which are registered for center pivot application may be applied in irrigation water preemergence (after planting, but before weeds or crop emerge) at rates recommended on this label. Apply this product only through a center pivot irrigation system. Do not apply this product through any other type of irrigation system. Crop injury, lack of effectiveness, or illegal pesticide residues in the crop can result from non-uniform distribution of treated water. If you have questions about calibration, you should contact State Extension specialists, equipment manufacturers, or other experts. Do not connect an irrigation system (including greenhouse systems) used for pesticide application to a public water system unless the pesticide label-prescribed safety devices for public water systems are in place. A person knowledgeable of the chemigation system and responsible for its operation, or under the supervision of the responsible person, shall shut the system down and make necessary adjustments should the need arise.

#### Operating Instructions

1. The system must contain a functional check-valve, vacuum relief valve, and low pressure drain appropriately located on the irrigation pipeline to prevent water-source contamination from backflow.
2. The pesticide injection pipeline must contain a functional, automatic, quick-closing check-valve to prevent the flow of fluid back toward the injection pump.
3. The pesticide injection pipeline must also contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
4. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops.
5. The irrigation line or water pump must include a functional pressure switch which will stop the water pump motor when the water pressure decreases to the point where pesticide distribution is adversely affected.
6. Systems must use a metering pump, such as a positive displacement injection pump (e.g., diaphragm pump or piston pump) effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock.
7. Do not apply when wind speed favors drift beyond the area intended for treatment.
8. Prepare a mixture with a minimum of 1 part of water to 1 part herbicide(s) and inject this mixture into the center pivot system. Injecting a larger volume of a more dilute mixture per hour will usually provide more accurate calibration of metering equipment. Maintain sufficient agitation to keep the herbicide in suspension.
9. Meter into irrigation water during entire period of water application.
10. Apply in 1/2-1 inch of water. Use the lower water volume (1/2 inch) on coarse-textured soils and the higher volume (1 inch) on fine-textured soils. More than 1 inch of water at application may reduce weed control by moving the herbicide below the effective zone in the soil.

*Precaution for center pivot applications: Where sprinkler distribution patterns do not overlap sufficiently, unacceptable weed control may result. Where sprinkler distribution patterns overlap excessively, crop injury may result.*

### Appendix E: Dry Bulk Granular Fertilizers

Many dry bulk granular fertilizers may be impregnated or coated with Dual alone or selected Dual tank mixtures which are registered for preplant incorporated or preplant surface application which are used to control weeds in crops on the Dual label and are not prohibited from use on dry bulk granular fertilizers.

When applying Dual or Dual mixtures with dry bulk granular fertilizers, follow all directions for use and precautions on the respective product labels regarding target crops, rates per acre, soil texture, application methods (including timing of application), and rotational crops.

All individual state regulations relating to dry bulk granular fertilizer blending, registration, labeling, and application are the responsibility of the individual and/or company selling the herbicide/fertilizer mixture.

Prepare the herbicide / fertilizer mixture by using any closed drum, belt, ribbon, or other commonly used dry bulk fertilizer blender. Nozzles used to spray Dual and Dual mixtures onto the fertilizer must be placed to provide uniform spray coverage. Care should be taken to aim the spray directly onto the fertilizer only and to avoid spraying the walls of the blender.

If the herbicide / fertilizer mixture is too wet, add a highly absorptive material, such as Ageorb® or Celatom MP-79®, or similar granular clay or diatomaceous earth materials, to obtain a dry, free-flowing mixture. Absorptive materials should be added only after the herbicide has been thoroughly blended into the fertilizer mixture. Best application results will be obtained by using a granule of 8/30 particle size or of a size similar to that of the fertilizer material being used. Generally, less than 2% by weight of absorptive material will be needed. Avoid using more than 5% absorptive material by weight.

Calculate amounts of Dual, AAtrex, AAtrex + Princep, Bladex, Extrazine II, Princep, Sencor, Lexone, or Sonalan by the following formula:

$$\frac{2,000}{\text{lbs. of fertilizer per acre}} \times \frac{\text{pts./A of liquid or flowable product}}{\text{flowable product}} = \text{pts. of liquid or flowable product per ton of fertilizer}$$
$$\frac{2,000}{\text{lbs. of fertilizer per acre}} \times \frac{\text{lbs./A of dry product}}{\text{dry product}} = \text{lbs. of dry product per ton of fertilizer}$$

**Pneumatic (Compressed Air) Application (Dual Alone):** High humidity, high urea concentrations, low fertilizer use rates, and dusty fertilizer may cause fertilizer mixture to build up or plug the distributor head, air tubes, or nozzle deflector plates. To minimize buildup, premix Dual with Exxon Aromatic 200 at a rate of 1-4 pts./gal. of Dual. Aromatic 200 is a noncombustible / nonflammable petroleum product. Aromatic 200 may be used in either a fertilizer blender or through direct injection systems. Drying agents should not be used when using Aromatic 200.

**Notes:** (1) Mixtures of Dual and Aromatic 200 must be used on dry fertilizer only. Poor results or crop injury may result if these mixtures are used in water or liquid fertilizer solutions for spraying applications. (2) When impregnating Dual in a blender before application, a drier mixture can be attained by substituting a drying agent for Aromatic 200. The use of Ageorb FG or drying agent of 8/30 particle size are recommended. (3) Drying agents are not recommended for use with On-The-Go impregnation equipment.

**Precautions:** To avoid potential for explosion, (1) Do not impregnate Dual or Dual mixtures on ammonium nitrate, potassium nitrate, or sodium nitrate, either alone or in blends with other fertilizers. (2) Do not use Dual or Dual mixtures on straight limestones, since absorption will not be achieved. Fertilizer blends containing limestone can be impregnated.

#### Application

Apply 200-700 lbs. of the herbicide / fertilizer mixture per acre. For best results, apply the mixture uniformly to the soil with properly calibrated equipment immediately after blending. Uniform application of the herbicide / fertilizer mixture is essential to prevent possible crop injury. Non-uniform application may also result in unsatisfactory weed control. In areas where conventional tillage is practiced, a shallow incorporation of the mixture into the soil may improve weed control. On fine- or medium-textured soils in areas where soil incorporation is not planned, i.e., reduced tillage situations or in some conventional till situations, make applications approximately 30 days before planting to allow moisture to move the herbicide / fertilizer mixture into the soil. On coarse-textured soils, make applications approximately 14 days prior to planting.

**Precaution:** To avoid crop injury, do not use the herbicide / fertilizer mixture on crops where bedding occurs.

## X. Precautionary Statements

### Hazards to Humans and Domestic Animals

#### WARNING/AVISO

Causes substantial, but temporary eye injury. Do not get in eyes, on skin, or on clothing. Harmful if swallowed, inhaled, or absorbed through skin. Avoid breathing spray mist. The active ingredient, metolachlor, may cause skin sensitization reactions in certain individuals.

#### Statement of Practical Treatment

**If in eyes:** Hold eyelids open and flush with a steady, gentle stream of water for 15 minutes.

**If swallowed:** Drink promptly a large quantity of milk, egg whites, gelatin solution, or, if these are not available, large quantities of water. Avoid alcohol. Call a physician or Poison Control Center. Induce vomiting by touching back of throat with finger, or, if available, by administering syrup of ipecac. Do not induce vomiting or give anything by mouth to an unconscious person.

**If on skin:** Wash with plenty of soap and water. Get medical attention if irritation persists.

**If inhaled:** Remove victim to fresh air. Get medical attention.

**Note to Physician:** If swallowed, there is no specific antidote. Induce emesis and lavage stomach. Treat symptomatically! The use of an aqueous slurry of activated charcoal (such as Norit A) and a saline cathartic should be considered.

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**Personal Protective Equipment**

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category H on an EPA chemical resistance category selection chart.

Applicators and other handlers must wear:

- Coveralls over short-sleeved shirt and short pants
- Chemical-resistant gloves, such as barrier laminate or viton
- Shoes plus socks
- Protective eyewear

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

**Engineering Control Statements**

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the 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**

For terrestrial uses, 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 disposing of equipment wash waters or rinsate.

**Ground Water and Surface Water Advisory**

Metolachlor has been identified in limited sampling of ground water and there is the possibility that it may leach through the soil to ground water, especially where soils are coarse and ground water is near the surface. Following application and during rainfall events that cause runoff, metolachlor may reach surface water bodies, including streams, rivers, and reservoirs.

Care must be taken when using this product to prevent back siphoning into wells, spills, or improper disposal of excess pesticide, spray mixtures, or rinsates.

Check-valves or antisiphoning devices must be used on all mixing and/or irrigation equipment.

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U. S. Patent No. 4,478,835; 4,871,819; 4,818,361

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 Ciba Crop Protection  
 Ciba-Geigy Corporation  
 Greensboro, North Carolina 27419  
 CGA 49L40P 095

## Dual® HERBICIDE

For weed control in corn, cotton, nonbearing citrus, nonbearing grapes, peanuts, pod crops, potatoes, sunflowers, grain or forage sorghum, soybeans, stone fruits, and tree nuts

Active ingredient: Metolachlor: 2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxy-1-methyl-ethyl) acetamide ..... 95.4 %

Inert ingredients: ..... 3.6 %

Total: ..... 100.0 %

Dual typically contains 5 lbs. of metolachlor active ingredient per gallon.

See directions for use in attached booklet.

### AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. Refer to supplemental labeling under "Agricultural Use Requirements" in the Directions for Use section for information about this standard.

EPA Reg. No. 189-673

EPA Est. 32781-MO-3©, EPA Est. 34784-MS-1©

EPA Est. 11773-IA-1©, EPA Est. 8886-GA-81©

EPA Est. 42781-NY-1©

(Superscript is first letter of lot number on jug)

Dual® trademark of Ciba-Geigy Corporation

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Ciba Crop Protection, Ciba-Geigy Corporation

Greensboro, North Carolina 27419

CGA 49L40P 896

2½ Gallons  
U. S. Standard Measure

ciba

## KEEP OUT OF REACH OF CHILDREN. WARNING/AVISO

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

### Precautionary Statements

#### Hazards to Humans and Domestic Animals

Causes substantial, but temporary eye injury. Do not get in eyes, on skin, or on clothing. Harmful if swallowed, inhaled, or absorbed through skin. Avoid breathing spray mist. The active ingredient, metolachlor, may cause skin sensitization reactions in certain individuals.

#### Statement of First Aid Treatment

If in eyes: Hold eyelids open and flush with a steady, gentle stream of water for 15 minutes.

If swallowed: Immediately a large quantity of milk, egg whites, gelatin solution, or, if these are not available, large quantities of water. Avoid alcohol. Call a physician or Poison Control Center. Induce vomiting by touching back of throat with finger, or, if available, by administering syrup of ipecac. Do not induce vomiting or give anything by mouth to an unconscious person.

If on skin: Wash with plenty of soap and water. Get medical attention if irritation persists.

If inhaled: Remove victim to fresh air. Get medical attention.

State to Physician: If swallowed, there is no specific antidote. Induce emesis and purge stomach. Treat symptomatically. The use of an aqueous slurry of activated charcoal (such as Norit A) and a saline cathartic should be considered.

#### Environmental Hazards

For terrestrial uses, 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 disposing of equipment wash water or rinsate.

#### Ground Water and Surface Water Advisory

Metolachlor has been identified in limited sampling of ground water and there is the possibility that it may leach through the soil to ground water, especially where soils are coarse and ground water is near the surface. Following application and during rainfall events that cause runoff, metolachlor may reach surface water bodies, including streams, rivers, and reservoirs.

Care must be taken when using this product to prevent back siphoning into wells, spills, or improper disposal of excess pesticides, spray mixtures, or rinsates.

Check valves or anti-siphoning devices must be used on all drinking and / or irrigation equipment.

#### Chlorination

Refer to supplemental labeling in attached booklet for use directions for chlorination. Do not apply this product through any irrigation system unless the supplemental labeling on chlorination is followed.

#### Container Disposal

Do not reuse empty container. Triple rinse (or equivalent), puncture and dispose of in a sanitary landfill, or by incineration, or by open burning, if allowed by state and local authorities. If burned, keep out of reach.

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