

JUL 12 1999

Laura A. Sears
BASF Corporation
26 Davis Drive
P.O. Box 13528
Research Triangle Park, NC 27709-3528

Dear Ms. Sears:

Subject: Label Revisions
Frontier X2 Herbicide
EPA Registration No. 7969-156
Your Submission Dated June 2, 1999

The amendment referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), as amended is acceptable provided that you:

1. Make the labeling changes listed below before you release the product for shipment bearing the amended labeling:

- Refer to Notice 83-3 for the required Pesticide Disposal statements. If wastes from this pesticide are hazardous or acutely hazardous, the pesticide can not be disposed of on site.

2. Submit one (1) copy of your final printed labeling before you release the product for shipment.

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

Please note that 40 CFR 156.10(i)(1)(ii) only allows that the Directions For Use may appear on printed or graphic matter which accompanies the pesticide. If all of the Precautionary Statements and First Aid Statements cannot appear on the container label due to size constraints, you should formally submit a request for a size exemption from the regulations.

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We note that page 11 is blank.

Sincerely yours,



for James A. Tompkins
Product Manager (25)
Herbicide Branch
Registration Division (7505C)

Enclosure

BASF

3 of 13

RT Date: 6-1-99
Copy 3

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**ACCEPTED
with COMMENTS
In EPA Letter Dated:
JUL 12 1999**

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

Frontier® X2

herbicide

For use in corn (field, pop, seed, and sweet), dry bean, peanut,
grain sorghum, and soybean crops

Active Ingredient:*

Dimethenamid-p: 2-chloro-N-[(1-methyl-2-methoxy)ethyl]-N-(2,4-
dimethyl-thien-3-yl)-a :etamide65.2%

Inert Ingredients:**34.8%

Total100.0%

* contains 6.0 pounds of active ingredient per gallon

** contains petroleum distillates, xylene or xylene range aromatic solvent

EPA Reg. Number: 7969-156

EPA Est. Number: 68323-TX-001

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 inside booklet for complete **Precautionary Statements, Statement of
Practical Treatment, Directions For Use, and Conditions of Sale and Warranty.**

Net contents: pounds (kilograms)

Precautionary Statements

Hazards to Humans and Domestic Animals

WARNING. Causes substantial but temporary eye injury. Harmful if inhaled, swallowed, or absorbed through the skin. Do not get in eyes or on clothing. Avoid contact with skin. Avoid breathing spray mist.

Statement of Practical Treatment

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

If swallowed: Call a doctor or get medical attention. Do not induce vomiting. Drink promptly a large quantity of milk, egg whites, gelatin solution, or if these are not available, drink large quantities of water. Do not give anything by mouth to an unconscious person. Avoid alcohol.

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

If inhaled: Remove victim to fresh air. If not breathing give artificial respiration, preferably mouth to mouth. Get medical attention.

Note to physician: May pose an aspiration pneumonia hazard.

Personal Protective Equipment (PPE)

Some materials that are chemically resistant to this product are listed below. For more options, refer to category **F** on an EPA chemical resistance category selection chart.

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Chemical-resistant gloves, such as barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, polyvinyl chloride, or viton ≥ 14 mils
- 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 re-use them. Follow the manufacturer's instructions for cleaning and maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

Engineering Controls Statement

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.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

Environmental Hazards

Do not apply directly to water, areas where surface water is present, or intertidal areas below the mean high water mark. Do not contaminate water when

disposing of equipment washwaters or rinsate. Dimethenamid has properties that may result in groundwater contamination. Application in areas where soils are permeable or coarse and groundwater is near the surface could result in groundwater contamination.

Dimethenamid has properties that may result in surface water contamination via dissolved runoff and runoff erosion. Practices should be followed to minimize the potential for dissolved runoff and/or runoff erosion.

Point source contamination: To prevent point source contamination, do not mix or load this or any other pesticide product within 50 feet of wells (including abandoned wells and drainage wells), sink holes, perennial or intermittent streams and rivers, and natural or impounded lakes and reservoirs. This setback does not apply to properly capped or plugged abandoned wells and does not apply to impervious pad or properly diked mixing/loading areas as described below.

Mixing, loading, rinsing, or washing operations performed within 50 feet of a well are allowed only when conducted on an impervious pad constructed to withstand the weight of the heaviest load that may be on or move across the pad. The pad must be self-contained to prevent surface water flow over or from the pad. The pad capacity must be maintained at 110% that of the largest pesticide container or application equipment used on the pad and have sufficient capacity to contain all product spills, equipment or container leaks, equipment wash waters, and rainwater that may fall on the pad. The containment capacity does not apply to vehicles delivering pesticide shipments to the mixing/loading site. States may have in effect additional requirements regarding wellhead setbacks and operational containment.

Care must be taken when using this product to prevent 1) back siphoning into wells, 2) spills, or 3) improper disposal of excess pesticide, spray mixes, or rinsates.

Check valves or antisiphoning devices must be used on all mixing equipment.

Movement dissolved in runoff or through soil: Do not apply under conditions which favor runoff. Do not apply to impervious substrates such as paved or highly compacted surfaces or frozen soils. Groundwater contamination may occur in areas where soils are permeable or coarse and groundwater is near the surface. To minimize the possibility of groundwater contamination, carefully follow application rate recommendations as affected by soil type in the general information section of this label. Do not apply to coarse soils classified as sand with less than 3% organic matter (as determined by soil tests, if not known) and where depth to ground water is 30 feet or less.

Movement by water erosion of treated soil: Do not apply or incorporate this product by flood or furrow irrigation. Ensure treated areas have received at least 0.5" of rainfall before using tailwater for subsequent irrigation of other fields.

Endangered Species Concerns

The use of any pesticide in a manner that may kill or otherwise harm an endangered species or adversely modify their habitat is a violation of federal law.

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. Unless otherwise directed in supplemental labeling, all applicable directions, restrictions, precautions and **Conditions of Sale and Warranty** are to be followed. This labeling must be in the user's possession during application.

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
- Chemical-resistant gloves such as barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, polyvinyl chloride, or viton \geq 14 mils
- Shoes plus socks
- Protective eyewear

Storage and Disposal

Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited.

Pesticide Storage: Do not use or store near heat or open flame. Store in original container in a well-ventilated area separately from fertilizer, feed, or foodstuffs and away from other pesticides. Avoid cross-contamination with other pesticides.

Groundwater contamination may be reduced by diking and flooring of permanent liquid bulk storage sites with an impermeable material.

Pesticide Disposal: Pesticide wastes are hazardous. Wastes resulting from this product may be disposed of on site or at an approved waste disposal facility. Improper disposal of excess pesticide, spray mix, or rinsate is a violation of federal law. If these wastes cannot be disposed of according to label instructions, contact the state agency responsible for pesticide regulation or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Container Disposal:

- **Plastic Containers:** Triple rinse (or equivalent) and add rinsate to spray tank. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by incineration, or if allowed by state and local authorities, by burning. If burned, stay out of smoke.
- **Bulk/Mini-bulk Containers:** Reusable containers should be returned to the point of purchase for cleaning and refilling because the container must be thoroughly cleaned before refilling.

In Case of Emergency

In case of large-scale spillage regarding this product, call:

CHEMTREC 800-424-9300
BASF Corporation 800-832-HELP

In case of medical emergency regarding this product, call:

- Your local doctor for immediate treatment.
- Your local poison control center (hospital).
- BASF Corporation (800-832-HELP)

Steps to be taken in case material is released or spilled:

Dike and contain the spill with inert material (sand, earth, etc.) and transfer liquid and solid diking material to separate containers for disposal. Remove contaminated clothing, and wash affected skin areas with soap and water. Wash clothing before re-use. Keep the spill out of all sewers and open bodies of water.

I. General Information

Frontier® X2 herbicide is a selective pre-emergence herbicide for controlling annual grasses, annual broadleaf weeds, and sedges listed in **Table 1** in field corn, popcorn, seed corn, sweet corn, soybean, grain sorghum, peanut, and dry bean crops.

Table 1. Weeds Controlled

<u>Annual Grasses</u>	<u>Sedge</u>
Barnyardgrass	Flatsedge, Rice
Beggarweed, Florida ¹	Nutsedge, Yellow ²
Crabgrass, smooth	
, large	<u>Annual Broadleaves</u>
Cupgrass, southwestern	Carpetweed
, woolly ¹	Eclipta ¹
Foxtail, giant,	Lambsquarters, common ¹
, green,	Nightshade ² , black
, yellow	, eastern black
Goosegrass	, hairy
Johnsongrass (seedling) ²	Pigweed, Amaranth, Palmer
Millet, wild proso ¹	, prostrate
Panicum, fall,	, redroot
, Texas ¹	, smooth
Red Rice	, tumble
Sandbur ¹	Purslane, common
Shattercane ¹	Pusley, Florida
Signalgrass, broadleaf	Ragweed, common ¹
Witchgrass	Spurge, nodding
	, spotted
	Waterhemp, common
	, tall

¹ Partial control or suppression only. To complement control, **Frontier X2** should be used in tank mixes or sequential applications with other herbicides that provide additional control of these weed species.

² For best control of these species, use the highest rate recommended by soil type. If dry conditions exist near application or excessive rainfall occurs early in season, a postemergence herbicide or cultivation may be required to help control these weeds.

Mode of Action

Frontier X2 is a root and shoot growth inhibitor that controls susceptible germinating seedlings before or soon after they emerge from the soil.

Cleaning Spray Equipment

Clean application equipment thoroughly by using a strong detergent or commercial sprayer cleaner according to the manufacturer's directions and then triple rinsing the equipment before and after applying this product.

II. Application Instructions

Frontier X2 will provide most effective weed control when applied by ground or aerial equipment, and is subsequently incorporated into soil by rainfall, sprinkler irrigation, or mechanical tillage prior to weed seedling emergence from soil. **Frontier X2** is recommended for preplant incorporated, preplant surface, pre-emergence, or early postemergence treatment. **Frontier X2** may be applied using either water or sprayable fluid fertilizer as the spray carrier. Additionally, **Frontier X2** may be impregnated on and applied with dry bulk fertilizer. Sprayable fluid fertilizer as a carrier is not recommended for use after crop emergence. Refer to section III. **Additives** for more information.

Application Rate

Recommended use rates for **Frontier X2** when used alone, in tank mix, or sequential applications are given in **Table 2**. Refer to section VI. **Crop-Specific Information** for additional rate information.

Recommended use rates of this product vary by soil type. The most accurate indicator of appropriate use rate for **Frontier X2** is the Cation Exchange Capacity (CEC) of the soil to be treated. CEC values are available in standard soil testing procedures. If CEC values are not available, the recommended use rate of **Frontier X2** may be determined using soil texture and organic matter. Soil texture groupings used in this label are coarse (sand, loamy sand, sandy loam), medium (silt, silt loam, loam, sandy clay loam), and fine (sandy clay, silty clay, silty clay loam, clay loam, and clay). Do not apply to sand-textured soil with less than 3% organic matter (as determined by soil tests, if not known) where depth to groundwater is 30 feet or less.

To determine **Frontier X2** use rates by either soil CEC values or by soil texture and organic matter, refer to **Table 2**. When use rates are expressed in ranges, use the lower rates for lower CEC values and use the higher rates for higher CEC values. If soil texture and organic matter content are used to determine use rates, use the lower rates for more coarsely textured soils low in organic matter and use the higher rates for more finely textured soils that are high in organic matter.

Application Timing

Preplant Surface Applications: For use in minimum tillage or no-tillage production systems, apply **Frontier X2** alone or in tank mixes up to 45 days before planting. When making early preplant applications (15-45 days prior to planting), use the highest rate recommended for the specific soil type. Early preplant applications are not recommended for use on coarse-textured soils or in areas where

Table 2. Frontier X2 Application Rates Per Acre^{1,2}

As determined by Cation Exchange Capacity (CEC) of the soil		
Cation Exchange Capacity (CEC) of Soil	Frontier X2 Use Rate Per Acre	
< 5	10-12 fluid ounces	
5-9	12-14 fluid ounces	
10-14	14-16 fluid ounces	
15-20	16-19 fluid ounces	
> 20	19-21 fluid ounces	

As determined by soil texture and organic matter content		
Soil Texture	Organic Matter Content	
	Less than 3%	3% or more ³
Coarse	10-14 fluid ounces	14-18 fluid ounces
Medium	14-16 fluid ounces	16-20 fluid ounces
Fine	16-18 fluid ounces	18-21 fluid ounces

See tank mix descriptions for the recommended use rate ranges of other herbicides used with **Frontier X2**.
¹ The rates listed are intended for full season control of targeted weeds. Reduced rates (6-15 ounces of **Frontier X2** per acre) may be used where partial control or reduced length of soil residual control is required, such as postemergence applications, or pre-emergence applications where cultivation or sequentially applied herbicides will be used for added control of the same targeted weed species. Use 6-9, 9-12, and 12-16 fluid ounces of **Frontier X2** per acre on coarse, medium, and fine soil, respectively.
² For all early preplant applications, use 21 fluid ounces of **Frontier X2** per acre.
³ On all soils with >8% organic matter, use 21 fluid ounces of **Frontier X2** per acre.

average annual rainfall (or rainfall + irrigation) typically exceeds 40". Early preplant applications may be applied as part of a split application program where the second application is made after planting (use 2/3 of **Frontier X2** rate early followed by 1/3 of rate after planting). A split application is recommended when the initial application is made more than 30 days prior to planting. Tank mixes with postemergence herbicides such as **Roundup® Ultra** (glyphosate), **Touchdown®** (sulfosate), or **Gramoxone® Extra** (paraquat), must be used when weeds are present at the time of application.

Preplant Incorporated Applications: Apply **Frontier X2** and incorporate into the upper (1-2") soil surface up to 2 weeks before planting. Use a harrow, rolling cultivator, finishing disk, or other implement capable of giving uniform shallow incorporation. Avoid deeper incorporation or reduced weed control or crop injury may result.

Pre-emergence Surface Applications: Broadcast treatment uniformly to the soil surface after planting and before crop emergence. Rainfall, sprinkler irrigation, or shallow mechanical incorporation after application is required to move this product into the upper soil surface where weed seeds germinate. If adequate rainfall or irrigation does not occur and weed seedling emergence begins, a shallow cultivation or rotary hoeing will improve performance.

Early Postemergence Applications: **Frontier X2** must be applied prior to weed seedling emergence or

in a tank mix with products that control the emerged weeds. Refer to section **VI. Crop-Specific Information** for specific postemergence application recommendations by crop.

Split Applications: **Frontier X2** may be used in split application programs where applications are made as part of the methods described above. If applications are less than 2 weeks apart, the total **Frontier X2** rate used must not exceed the maximum rate given for each specific soil type. If applications are 2 weeks or more apart, a total **Frontier X2** use rate of up to 32 fluid ounces per acre per year may be used on any soil type.

Fall Applications:

For use only in the following states: North Dakota, South Dakota, Minnesota, Wisconsin, Iowa, north of Highway 136 in Illinois and north of Highway 91 in Nebraska

Frontier X2 may be used in fall applications to control weeds in minimum tillage or no-till corn or soybean production systems planted the following spring. Apply up to 32 fluid ounces of **Frontier X2** per acre to medium- and fine-textured soils with greater than 2.5% organic matter. Fall applications must be made after October 1. Apply **Frontier X2** in the fall after crop harvest when soil temperatures at the 4" depth are sustained at less than 55° F and before the ground freezes. Tillage operations may be conducted before or after applying **Frontier X2**. If following an application, tillage should be no more than 2-3" deep to uniformly incorporate the herbicide into the upper soil surface.

If a sequential application program (fall application followed by spring application of **Frontier X2**) is used, the maximum combined rate of **Frontier X2** that may be applied is 32 fluid ounces per acre, per crop season.

Managing Off-target Movement

Spray Drift: Drift from applying this product may result in damage to sensitive plants adjacent to the treatment area. High or gusty winds, high temperatures, low humidity, and temperature inversions increase the likelihood of spray drift from intended targets. Do not apply when these conditions exist. To minimize spray drift:

- Make application when conditions are favorable for even spray deposition (approximately 3-10 mph) on the soil surface. Do not apply when wind or wind gusts exceed 15 mph.
- Use low pressure, properly calibrated, application equipment as possible to produce large spray droplets and sufficient spray volume to ensure uniform application. Do not use nozzles producing a mist droplet spray.
- Keep ground driven spray boom as low as possible above the target surface.

Wind erosion of treated soil: Avoid treating powdery dry or light sandy soils when conditions are favorable for wind erosion. Under these conditions, the soil surface should first be settled by rainfall or irrigation.

Aerial Application Methods and Equipment

Water Volume: Use 2 or more gallons of water per acre. The actual minimum spray volume per acre is determined by the spray equipment used. Adequate

spray volume must be used to provide accurate and uniform distribution of spray particles over the treated area and to avoid drift of spray particles to nontarget areas.

The applicator must follow the most restrictive use cautions to avoid drift hazards, including those found in this labeling as well as applicable state and local regulations and ordinances.

Ground Application (Banding)

When applying **Frontier X2** by banding, determine the amount of herbicide and water volume needed using the following formula:

$$\frac{\text{Bandwidth in inches}}{\text{Row width in inches}} \times \frac{\text{Broadcast rate}}{\text{per acre}} = \frac{\text{Banding herbicide}}{\text{rate per acre}}$$

$$\frac{\text{Bandwidth in inches}}{\text{Row width in inches}} \times \frac{\text{Broadcast volume per acre}}{\text{volume per acre}} = \frac{\text{Banding water}}{\text{volume per acre}}$$

Ground Application (Broadcast)

Water Volume: Use 2 or more gallons of water per acre. The actual minimum spray volume per acre is determined by the spray equipment used. Adequate spray volume must be used to provide accurate and uniform distribution of spray particles over the treated area and to avoid drift of spray particles to nontarget areas.

Ground Application (Dry Bulk Fertilizer)

Frontier X2 may be impregnated or coated onto dry bulk granular fertilizer carriers for preplant surface, preplant incorporated, or pre-emergence applications. Impregnation or coating may be conducted by either the in-plant bulk system or the on-board system. When impregnated onto some dry fertilizer blends, **Frontier X2** may exhibit a strong odor. Perform the mixing operation in well-ventilated areas.

Frontier X2 may also be applied in herbicide tank mixes where the tank mix companion product is also registered for these application systems. Individuals or agents selling **Frontier X2** in these application systems are responsible for following all state and local regulations regarding fertilizer and herbicide blending.

Addition of a drying agent may be necessary if the fertilizer and herbicide blend is too wet for uniform application due to high humidity, high urea concentration, or low fertilizer use rate. Slowly add the drying agent to the blend until a flowable mixture is obtained. Drying agents are not recommended for use with on-board impregnation systems.

Under some conditions, fertilizer impregnated with **Frontier X2** may clog air tubes or deflector plates on pneumatic application systems. Mineral oil may be added to **Frontier X2** before blending with fertilizer to reduce plugging. Do not use drying agents when mineral oil is used. To avoid separation of **Frontier X2** and mineral oil mixes in cold temperatures, either keep mixture heated or agitated prior to blending with fertilizer. Mineral oil may be used at in-plant blending stations or on-board injection systems.

Apply 200-750 pounds of the fertilizer and herbicide blend per acre. Application must be made uniformly to the soil to prevent possible crop injury and offer satisfactory weed control. Impregnated fertilizer spread at half rate and overlapped to obtain a full rate will offer a more uniform distribution. For granular fertilizer application, to protect small birds and

mammals, soil incorporation of the granules is required. A shallow (1-2") incorporation is desirable for improved weed control. Deeper incorporation may result in unsatisfactory weed control.

Formula to determine the herbicide rate when using dry bulk fertilizer applications:

$$\frac{\text{Fluid ounces or pounds of herbicide per acre}}{\text{pounds of fertilizer per acre}} \times 2,000 = \frac{\text{Fluid ounces or pounds of herbicide}}{\text{per ton of fertilizer}}$$

Incompatible Mixtures

DO NOT impregnate **Frontier X2** or **Frontier X2** mixes on ammonium nitrate, potassium nitrate, or sodium nitrate fertilizers or fertilizer blends. Single superphosphate (0-20-0) and triple superphosphate (0-46-0) may be impregnated only with **Frontier X2** alone.

III. Additives

Spray adjuvants have little or no influence on performance of **Frontier X2** when applications are made prior to weed emergence. However, several tank mixes with **Frontier X2** require adjuvants to improve burndown of emerged weeds. Therefore, surfactants and/or low rate fertilizer (28%, 30%, or 32% UAN or ammonium sulfate), or crop oil concentrate may be used with **Frontier X2** tank mixes applied preplant, pre-emergence, or early postemergence to the crop. Follow the adjuvant recommendations on the tank mix partner's label. Consult your local BASF representative for recommendations for your area.

Oil Concentrate

A crop oil concentrate must contain either a petroleum or vegetable oil base and must meet all of the following criteria:

- be nonphytotoxic,
- contain only EPA-exempt ingredients,
- provide good mixing quality in the jar test, and
- be successful in local experience.

The exact composition of suitable products will vary; however, vegetable and petroleum oil concentrates should contain emulsifiers to provide good mixing quality. Highly refined vegetable oils have proven more satisfactory than unrefined vegetable oils. For additional information, see **Compatibility Test for Mix Components**.

The use of adjuvants containing penetrants such as petroleum based oils after corn emergence may cause crop injury.

Nitrogen Source

- **Urea ammonium nitrate (UAN):** Use 2-4 quarts of UAN (commonly referred to as 28%, 30%, or 32% nitrogen solution) p.r acre. Do not use brass or aluminum nozzles when spraying UAN.
- **Ammonium sulfate (AMS):** AMS at 2.5 pounds per acre may be substituted for UAN. Use high-quality AMS (spray grade) to avoid plugging of nozzles. Other sources of nitrogen are not as effective as those mentioned. BASF does not recommend applying AMS if applied in less than 10 gallons per acre because of potential problems with precipitation in reduced volumes. Use AMS only if it has been demonstrated to be successful in local experience.

Nonionic Surfactant

The standard label recommendation is 1 pint of an 80% active nonionic spray surfactant per 100 gallons of water. For certain weeds, a higher spray surfactant rate is recommended.

IV. General Tank Mixing Information

Frontier® X2 herbicide may be tank mixed or applied sequentially with one or more of the following herbicide products according to the specific tank mixing instructions in this label and respective product labels. Refer to section **VI. Crop-Specific Information** to determine which tank mix products can be applied to specific crops. Read and follow the applicable **Restrictions and Limitations** and **Directions For Use** on all products involved in tank

- | | |
|--|---|
| • Accent® (nicosulfuron) | • Laddok® S-12
(bentazon + atrazine) |
| • Assure® II (quizalofop) | • Landmaster®
(glyphosate + 2,4-D) |
| • Atrazine | • Lasso® (alachlor) |
| • Authority®
(sulfentrazone) | • Lexone® (metribuzin) |
| • Balan® (bifenox) | • Liberty® (glufosinate) |
| • Balance® (isoxaflutole) | • Lightning®
(imazethapyr + imazapyr) |
| • Banvel® (dicamba) | • Lorox® (linuron) |
| • Basagran® (bentazon) | • Marksman®
(dicamba + atrazine) |
| • Beacon® (primisulfuron) | • Poast® (sethoxydim) |
| • Bladex® (cyanazine) | • Poast Plus®
(sethoxydim) |
| • Blazer® (acifluorfen) | • Princep® (simazine) |
| • Buctril® (bromoxynil) | • Prowl® (pendimethalin) |
| • Cadre®
(imazamethapyr) | • Pursuit® (imazethapyr) |
| • Canopy®
(chlorimuronethyl + metribuzin) | • Python® (flumetsulam) |
| • Canopy® XL
(sulfentrazone + chlorimuronethyl) | • Raptor® (imazamox) |
| • Celebrity®
(dicamba + nicosulfuron) | • Reliance®
(thifensulfuron methyl + chlorimuron ethyl) |
| • Clarity® (dicamba) | • Roundup® RT
(glyphosate) |
| • Classic® (chlorimuron ethyl) | • Roundup® Ultra
(glyphosate) |
| • Command®
(clomazone) | • Scepter® (imazaquin) |
| • Cyclone® (paraquat) | • Select® (clethodim) |
| • Dual® (metolachlor) | • Sencor® (metribuzin) |
| • Dual II® (metolachlor) | • Sonalan® (ethalfluralin) |
| • Eptam® (EPTC) | • Starfire® (paraquat) |
| • Eradicane® (EPTC) | • Storm® (bentazon + acifluorfen) |
| • Extrazine® II
(cyanazine + atrazine) | • Sutan+® (butylate) |
| • Fallowmaster®
(glyphosate + dicamba) | • Synchrony® STS™
(thifensulfuron methyl + chlorimuron ethyl) |
| • Far-Go® (triallate) | • Touchdown®
(sulfosate) |
| • FirstRate®
(chloransulam-methyl) | • Tough® (pyridate) |
| • Flexstar® (fomesafen) | • Treflan® (trifluralin) |
| • Fusilade®
(fluazifop-p-butyl) | • 2,4-D |
| • Fusion®
(fluazifop-p-butyl + fenoxaprop-p-ethyl) | • 2,4-DB |
| • Galaxy®
(bentazon + acifluorfen) | • Vernam® (vernolate) |
| • Gramoxone® Extra
(paraquat) | • Weedmaster®
(dicamba + 2,4-D) |
| | • Zorial® (norflurazon) |

mixing. The most restrictive labeling applies to tank mixes.

Physical incompatibility, reduced weed control, or crop injury may result from mixing **Frontier X2** with other pesticides (fungicides, herbicides, insecticides, or miticides), additives, or fertilizers. Local agricultural authorities may be a source of information when using other than BASF recommended tank mixes.

Compatibility Test for Mix Components

Before mixing components, always perform a compatibility jar test.

For 20 gallons per acre spray volume, use 3.3 cups (800 ml) of water. For other spray volumes, adjust rates accordingly. Only use water from the intended source at the source temperature.

Add components in the sequence indicated in the **Mixing Order** using 2 teaspoons for each pound or 1 teaspoon for each pint of recommended label rate per acre.

Always cap the jar and invert 10 cycles between component additions.

When the components have all been added to the jar, let the solution stand for 15 minutes. Evaluate the solution for uniformity and stability. The spray solution should not have free oil on the surface, nor fine particles that precipitate to the bottom, nor thick (clabbered) texture. If the spray solution is not compatible, repeat the compatibility test with the addition of a suitable compatibility agent. If the solution is then compatible, use the compatibility agent as directed on its label. If the solution is still incompatible, do not mix the ingredients in the same tank.

Mixing Order

- 1) **Water.** Begin by agitating a thoroughly clean sprayer tank three-quarters full of clean water.
 - 2) **Agitation.** Maintain constant agitation throughout mixing and application.
 - 3) **Products in PVA bags.** Place any product contained in water-soluble PVA bags into the mixing tank. Wait until all water-soluble PVA bags have fully dissolved and the product is evenly mixed in the spray tank before continuing.
 - 4) **Water-dispersible products** (such as Laddok® S-12 herbicide, dry flowables, wettable powders, suspension concentrates, or suspo-emulsions). If an inductor is used, rinse it thoroughly after the component has been added.
 - 5) **Water-soluble products.** If an inductor is used, rinse it thoroughly after the component has been added.
 - 6) **Emulsifiable concentrates** (such as oil concentrate when applicable). If an inductor is used, rinse it thoroughly after the component has been added.
 - 7) **Water-soluble additives** (such as AMS or UAN when applicable). If an inductor is used, rinse it thoroughly after the component has been added.
 - 8) **Remaining quantity of water.**
- Maintain constant agitation during application.

V. Restrictions and Limitations

- **Maximum seasonal use rate:** Do not apply more than a **total of 21 fluid ounces** of **Frontier® X2 herbicide** per acre, per season.
- **Preharvest Interval (PHI):** Refer to section **VII. Crop-Specific Information** for crop-specific preharvest intervals and feeding and grazing restrictions.
- **Restricted Entry Interval (REI): 12 hours**
- The New York State Department of Environmental Conservation prohibits use in Long Island, NY.
- **Crop Rotation Restriction:**
 - If any labeled crop treated with **Frontier X2** is lost to adverse weather or for other reasons, the area treated may be replanted to any of the labeled crops immediately. If the original **Frontier X2** treatment was broadcast, do not make a second application of **Frontier X2**.
 - If the original application was banded and the second crop is planted in the row middles, a second band application may be applied.
 - Fall-seeded cereal crops may be planted 4 months or more following treatment.
 - There are no rotational crop restrictions the spring following the previous year's application of **Frontier X2**.
- **Stress:** Applications to crops under stress due to lack of moisture, hail damage, flooding, herbicide injury, mechanical injury, or widely fluctuating temperatures may result in crop injury.
- Do not apply through any type of **irrigation** equipment. Do not contaminate irrigation ditches or water used for domestic purposes.

VI. Crop-Specific Information

Corn (Field, Pop, Seed, and Sweet)

Frontier® X2 herbicide may be applied preplant surface, preplant incorporated, pre-emergence, or postemergence to corn up to 8" tall. Corn in this label refers to field corn (grown for grain, silage, or seed), sweet corn, and popcorn. Before applying to seed corn, sweet corn, or popcorn, verify with your local seed company (supplier) the **Frontier X2** selectivity on your inbred line or variety to avoid potential injury to sensitive inbreds or varieties. Corn may be grazed or fed to livestock 40 days or more after application of **Frontier X2**. Sweet corn ears may be harvested 50 days or more after application of **Frontier X2**.

Corn Tank Mixes

Frontier X2 may be tank mixed or applied sequentially in corn with one or more of the following herbicide products according to the specific tank mixing instructions in this label and respective product labels. Read and follow the applicable **Restrictions and Limitations** and **Directions For Use** on all products involved in tank mixing. The most restrictive labeling applies to tank mixes.

- | | |
|---------------------------|-------------------------------------|
| • Accent® | • Laddok® S-12 |
| • Atrazine | • Liberty®¹ |
| • Balance® | • Lightning®² |
| • Banvel® | • Marksman® |
| • Basagran® | • Princep® |
| • Beacon® | • Prowl® |
| • Bladex® | • Pursuit® |
| • Celebrity® | • Roundup® Ultra³ |
| • Clarity® | • Sutan+® |
| • Eradicane® | • Touchdown® |
| • Extrazine® II | • 2,4-D |
| • Gramoxone® Extra | |

¹ Use only in **Liberty Link** (glufosinate tolerant) corn hybrids.

² Use only in **IMI** (imidazolinone tolerant) corn hybrids.

³ includes postemergence tank mixes on **Roundup Ready** (glyphosate tolerant) corn hybrids.

Dry Bean

Frontier X2 may be applied preplant surface, preplant incorporated, pre-emergence or early postemergence (first to third trifoliate stage) to all dry bean classes (such as small whites, navy, black turtle soup, pink, pinto, great northern, red Mexican, red kidney, garbanzo, an 1 cranberry) and lentils. **Frontier X2** is not registered for use in succulent beans or cowpeas. Before applying **Frontier X2** to dry beans, verify with your local seed company (supplier) the selectivity of **Frontier X2** on your specific dry bean class and variety to help avoid potential injury to sensitive classes or varieties.

If extreme conditions of high rainfall and extended periods of water saturated soil occur during dry edible bean germination or early seedling development, **Frontier X2** use may result in temporary growth suppression. This suppression will not reduce dry edible bean yield. **Frontier X2** use postemergence may occasionally result in some temporary spotting or browning of dry bean leaves.

A single or split application program may be used. Additional recommendations specific to dry beans are to use a maximum of 12 fluid ounces of **Frontier X2** per acre on coarse soils with CEC < 5 or organic matter less than 1.5% for soil applications made prior to crop emergence. Dry beans may be harvested 70 days or more after application of **Frontier X2**.

Dry Bean Tank Mixes (w/so Corn Tank Mixes)

Frontier X2 may be tank mixed or applied sequentially in dry bean crops with one or more of the following herbicide products according to the specific tank mixing instructions in this label and respective product labels. Read and follow the applicable **Restrictions and Limitations** and **Directions For Use** on all products involved in tank mixing. The most restrictive labeling applies to tank mixes.

- | | |
|---------------------------|-------------------------|
| • Basagran® | • Prowl® |
| • Eptam® | • Pursuit® |
| • Far-Go® | • Roundup® Ultra |
| • Gramoxone® Extra | • Sonalan® |
| • Poast® | • Treflan® |

The following herbicide products may only be applied sequentially with **Frontier X2**.

- **Dual®**
- **Dual II®**
- **Lasso®**

Peanut

Frontier X2 may be applied preplant surface, preplant incorporated, pre-emergence, or postemergence (up to 80 days prior to harvest) alone or in tank mix combinations. Use higher rates (16-21 fluid ounces of **Frontier X2** per acre) for improved control or suppression of difficult weeds like yellow nutsedge, Florida beggarweed, eclipta, common ragweed, and other broadleaf species.

Frontier X2 may also be used in a split application using 1/2 to 2/3 the maximum rate initially and the remaining 1/2 to 1/3 in sequential application. Peanut hay or straw may be grazed or fed to livestock 80 days or more after application of **Frontier X2**.

Peanut Tank Mixes

Frontier X2 may be applied prior to, in tank mix with, or after use of one or more of the following herbicides in peanut according to the specific tank mixing instructions in this label and respective product labels. Read and follow the applicable **Restrictions and Limitations** and **Directions For Use** on all products involved in tank mixing. The most restrictive labeling applies to tank mixes.

- | | |
|----------------------|--------------------|
| • Balan® | • Prowl® |
| • Basagran® | • Pursuit® |
| • Blazer® | • Sonalan® |
| • Cadre® | • Starfire® |
| • Classic® | • Storm® |
| • Dual® | • Tough® |
| • Landmaster® | • Treflan® |
| • Lasso® | • 2,4-DB |
| • Poast® | • Vernam® |
| • Poast Plus® | • Zorial® |

Sorghum (grain)

Frontier X2 may be used preplant surface, preplant incorporated, or pre-emergence in either a single or split application. Do not apply to grain sorghum after crop emergence.

Frontier X2 is not registered for use on sweet or forage sorghum.

All **Frontier X2** applications must only be made to sorghum seed that has been properly treated by the seed company with an approved chloroacetamide herbicide safener or severe injury may occur.

Under high soil moisture or cool conditions, **Frontier X2** application may cause temporary stunting or leaf wrapping of sorghum. Sorghum will normally outgrow these symptoms in 10-14 days.

For best performance make pre-emergence surface applications within 5 days of the last preplant tillage. If weeds have emerged, apply **Frontier X2** with herbicides to control the emerged vegetation.

For best weed control in sorghum produced under irrigation, use a minimum of 13 fluid ounces of

Frontier X2 per acre.

Sorghum forage may be grazed or fed to livestock 60 days or more after application of **Frontier X2**. Grain and fodder may be harvested and fed 80 days or more after application of **Frontier X2**.

Sorghum Tank Mixes

Frontier X2 may be tank mixed or applied sequentially in sorghum with one or more of the following herbicide products according to the specific tank mixing instructions in this label and respective product labels. Read and follow the applicable

Restrictions and Limitations and Directions For Use on all products involved in tank mixing. The most restrictive labeling applies to tank mixes.

- Atrazine
- Banvel®
- Clarity®
- Cyclone®
- Fallowmaster®
- Gramoxone® Extra
- Landmaster®
- Roundup Ultra
- 2,4-D

In addition to the tank mix partners listed above, **Frontier X2** can be used in sequential applications with the following:

- Basagran
- Butril®
- Laddok® S-12
- Marksman®
- Weedmaster®

Soybean

Frontier X2 may be used as a preplant surface, preplant incorporated, pre-emergence or early postemergence (up to the third true leaf stage) treatment to soybeans as a single or split application. If **Frontier X2** is applied preplant incorporated, the incorporation must be uniform and shallow (upper 1-2" of soil). Deeper incorporation may reduce weed control or increase the potential for crop injury. Preplant incorporated treatments are not recommended on soils with CEC values less than 5 (or coarse soils with less than 1.5% organic matter). If extreme conditions of high rainfall and extended periods of water saturated soil occur during soybean germination or early seedling development, **Frontier X2** use may result in temporary growth suppression.

Temporary soybean burn and stunting may occur if application of **Frontier X2**, spray adjuvants and tank mixed herbicides are applied to emerged soybeans up through the unifoliate stage. These suppressions have not resulted in reduced soybean yield potential.

Crop-Specific Restrictions and Limitations

Do not graze or feed forage, hay, or straw to livestock.

Soybean Tank Mixes

Frontier X2 may be tank mixed or applied sequentially in soybean with one or more of the following herbicide products according to the specific tank mixing instructions in this label and respective product labels. Read and follow the applicable **Restrictions and Limitations and Directions For Use** on all products involved in tank mixing. The most restrictive labeling applies to tank mixes.

- Assure® II
- Authority®
- Basagran®
- Blazer®
- Canopy®
- Canopy® XL
- Command®
- FirstRate®
- Flexstar®
- Fusilade®
- Fusion®
- Galaxy®
- Gramoxone® Extra
- Lexone®
- Liberty®
- Lorox
- Poast®
- Poast Plus®
- Prowl®
- Pursuit®
- Python®
- Raptor®
- Reliance®
- Roundup® Ultra
- Scepter®
- Select®
- Sencor®
- Sonalan®
- Storm®
- Synchrony® STS™
- Touchdown®
- Treflan®

Crops

This product can be used on the following crops:

Corn (Field, Pop, Seed, and Sweet)
Dry Bean
Peanut
Sorghum (Grain)
Soybean

Look inside for complete **Restrictions and Limitations** and **Application Instructions**.

Pests listed in this label:

Common Name	Scientific Name
Barnyardgrass	<i>Echinochloa crus-galli</i>
Beggarweed, Florida	<i>Desmodium tortuosum</i>
Carpetweed	<i>Mullugo verticillata</i>
Crabgrass, Large	<i>Digitaria sanguinalis</i>
, Smooth	<i>Digitaria ischaemum</i>
Cupgrass, Southwestern	<i>Eriochloa gracilis</i>
, Woolly	<i>Eriochloa villosa</i>
Eclipta	<i>Eclipta alba</i>
Flatsedge, Rice	<i>Cyperus iria</i>
Goattail, Giant	<i>Setaria faberi</i>
, Green	<i>Setaria viridis</i>
, Yellow	<i>Setaria glauca</i>
Goosegrass	<i>Eleusine indica</i>
Johnsongrass (seedling)	<i>Sorghum halepense</i>
Lambsquarters, Common	<i>Chenopodium album</i>
Millet, Wild Proso	<i>Panicum miliaceum</i>
Nightshade, Black	<i>Solanum nigrum</i>
, Eastern Black	<i>Solanum ptycanthum</i>
, Hairy	<i>Solanum sarrachoides</i>
Nutsedge, Yellow	<i>Cyperus esculentus</i>
Panicum, Fall	<i>Panicum dichotomiflorum</i>
, Texas	<i>Panicum texanum</i>
Pigweed: Amaranth	<i>Amaranthus palmeri</i>
, Prostrate	<i>Amaranthus blitoides</i>
, Redroot	<i>Amaranthus retroflexus</i>
, Smooth	<i>Amaranthus hybridus</i>
, Tumble	<i>Amaranthus albus</i>
Purslane, Common	<i>Portulaca oleracea</i>
Pusley, Florida	<i>Richardia scabra</i>
Ragweed	<i>Ambrosia artemisiifolia</i>
Red Rice	<i>Oryza sativa</i>
Sandbur	<i>Cenchrus incertus</i>
Shattercane	<i>Sorghum bicolor</i>
Signalgrass, Broadleaf	<i>Brachiaria platyphylla</i>
Spurge, Nodding,	<i>Euphorbia nutans</i>
, Spotted	<i>Euphorbia maculata</i>
Waterhemp, Common	<i>Amaranthus rudis</i>
, Tall	<i>Amaranthus tuberculatus</i>
Witchgrass	<i>Panicum capillare</i>

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 use of the product in a manner inconsistent with its labeling, all of which are beyond the control of BASF CORPORATION ("BASF") or the Seller. All such risks shall be assumed by the Buyer. BASF 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. BASF MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS OR MERCHANTABILITY OR ANY OTHER EXPRESS OR IMPLIED WARRANTY. IN NO CASE SHALL BASF OR THE SELLER BE LIABLE FOR CONSEQUENTIAL, SPECIAL OR INDIRECT DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT. BASF 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 BASF.

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