



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

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

Mr. Thomas Parshley
Novartis Crop Protection, Inc.
P.O. Box 18300
Greensboro, NC 27419

AUG 14 2000

Dear Mr. Parshley:

Subject: NorthStar®
EPA Registration No. 100-923
Your Letter Dated August 1, 2000, Request To Amend
Registration by Adding Labeling for Aerial Application,
Two Additional Weeds Controlled, A Ground Water Advisory
Consistent with Other Registered Dicamba Products, and
Minor Editorial Changes Throughout the Labeling

The proposed label amendments described in the your subject
letter have been reviewed. The proposed label submitted is acceptable
under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)
as amended, provided that you:

1. Submit one (1) copy of your final printed label prior
to releasing this pesticide product for shipment under
the subject label.

If this condition is not complied with, the registration
will be subject to cancellation in accordance with FIFRA, section
(e). Your release for shipment of the product constitutes
acceptance of this condition.

A stamped copy of the proposed label is enclosed for your
records.

Sincerely yours,

for *August 14, 2000*

Joanne H. Miller
Product Manager (23)
Herbicide Branch
Registration Division (7505C)

Enclosure

(Booklet Label)

CustomPak™

NorthStar™

HERBICIDE

For postemergence weed control in field corn (grown for grain, silage, or seed) and popcorn

Active Ingredients:

Primisulfuron-methyl: 3-[4,6-Bis(difluoromethoxy)-pyrimidin-2-yl]-1-(2-methoxycarbonyl-phenylsulfonyl) urea	7.5%
Sodium salt of dicamba (3,6-dichloro- <i>o</i> -anisic acid*)	43.9%
Other Ingredients:	48.6%
Total:	100.0%

*This product contains 39.9% 3,6-dichloro-*o*-anisic acid (dicamba).

NorthStar is a water-dispersible granule.

6 POUNDS 4 OUNCES
NET WEIGHT

EPA Reg. No. 100-923

EPA Est. 100-LA-1

KEEP OUT OF REACH OF CHILDREN.

CAUTION

See additional precautionary statements and directions for use inside booklet.

NCP 923A-L1C 0600

[QUARK/NORTHSTAR/NORTHSTAR-BKLT-C] - ccg - 8/1/00

ACCEPTED
with COMMENTS
In EPA Letter Dated
AUG 14 2000

**Under the Federal Insecticide,
Fungicide, and Rodenticide Act
as amended, for the pesticide
registered under EPA Reg. No.
100-923**

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 Novartis Crop Protection, Inc. or the Seller. All such risks shall be assumed by the Buyer.

Novartis 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. **Novartis makes no other express or implied warranty of Fitness or Merchantability or any other express or implied warranty. In no case shall Novartis or the Seller be liable for consequential, special, or indirect damages resulting from the use or handling of this product.** Novartis 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 Novartis.

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
- Waterproof gloves
- 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.

Observe all precautions and limitations on this label and on the labels of each product used in tank mixtures with this product.

GENERAL INFORMATION

NorthStar is a selective herbicide applied after emergence of both crop and weeds for the control of many broadleaf weeds, shattercane, sorghum-almum, johnsongrass, and quackgrass in field corn (grown for grain, silage, or seed) and popcorn. Application may be made by ground equipment to young, actively growing weeds. Refer to Tables 1-6 for lists of weeds controlled by NorthStar alone and in tank mix combinations.

The level of weed control following a NorthStar application is dependent upon weed species, weed size at time of application, and growing conditions. Weed control is better when ample soil moisture exists before and after NorthStar application, than when the soil is dry and weeds are under stress from lack of moisture.

Where reference is made to weeds partially controlled, partial control means significant activity, but not always at a level generally considered acceptable for commercial weed control.

Growth of susceptible weeds is inhibited following an application of NorthStar. The leaves turn yellow and/or red after several days followed by death of the growing point. In addition, broadleaf weeds exhibit stem and leaf twisting and bending. Complete plant death occurs 7-30 days after a NorthStar application, depending upon weed species and environmental conditions. Weeds not completely killed by NorthStar are often stunted and are less competitive to corn. NorthStar reaching the soil during a postemergence application provides preemergence control of certain weed species.

NorthStar, applied at labeled rates, rarely causes corn injury. When a crop response occurs, it is generally of short duration and yields are not affected.

Cold weather stress (prolonged cold temperatures at time of or shortly after application) may contribute to corn injury.

USE PRECAUTIONS

Follow the precautions listed below to reduce chances for crop injury and/or to avoid reduced weed control:

1. **Field Corn:** Apply a single postemergence NorthStar application at the standard use rate (5 oz./A) broadcast over-the-top, directed, or semi-directed when field corn height is between 4 and 20 inches tall (V2-V6). Only directed or semi-directed applications should be made when corn is between 20 and 36 inches tall. Do not apply to corn plants less than 4 inches tall or injury may occur.
 2. NorthStar should not be applied if corn shows severe stress or injury due to drought, cold weather, hail, flooding, compacted soil, saturated soil conditions, disease, insect damage, nutrient deficiency, previously applied herbicides, or other causes.
 3. If irrigation is necessary following application, delay for 24 hours to minimize injury potential, particularly on coarse-textured soils, and to maximize weed control. Rainfall occurring within 4 hours after a NorthStar application may reduce weed control.
 4. If a "normal" or IT¹ corn hybrid (not an IR or IMR² hybrid) is planted and Dyfonate®, Lorsban®, Thimet®, or other organophosphate insecticide is applied at planting or before applying NorthStar, temporary injury may occur following the NorthStar application. Do not apply NorthStar if this corn crop was previously treated with Counter® 15G (any application method) or Counter CR® applied in-furrow at planting or over the row at cultivation, as severe crop injury may occur. Application of NorthStar to corn previously treated with labeled rates of Counter CR applied in a surface band or T-band (in front of press wheel) at planting time, may result in crop injury. Novartis will not be held responsible for losses or damage resulting from such use. If an IR or IMR corn hybrid is planted, organophosphate insecticides, including terbufos (Counter), can be applied at any time according to label directions without increasing the likelihood of injury to those hybrids.
- ¹IT – Corn with enhanced imidazolinone herbicide tolerance.
- ²IR/IMR – Corn with enhanced imidazolinone herbicide resistance.
5. Do not make a foliar postemergence or soil application of any organophosphate insecticide within 10 days before or 7 days after a NorthStar application, or severe crop injury may occur.
 6. NorthStar may be applied to all field corn hybrids except the few that are classified by Novartis as not tolerant. Consult your chemical dealer, seed supplier, or Novartis representative for a current listing

of field corn hybrids classified as not tolerant to NorthStar.

- 7. **Field Corn Grown for Seed and Popcorn:** NorthStar can only be applied directed or semi-directed to inbred lines of field corn and popcorn; however, all inbred lines and all popcorn hybrids have not been tested for tolerance to NorthStar nor does Novartis have access to all seed company data. Therefore, inbred lines of field corn and popcorn hybrids must be thoroughly tested for tolerance to NorthStar in small areas before treating large acreages. To avoid crop injury, popcorn and inbred lines should not be sprayed with over-the-top applications of NorthStar. Use only semi-directed or directed applications with drop nozzles when the popcorn or inbred lines are between 10 and 36 inches tall, or 15 days before tassel emergence, whichever comes first.
- 8. Do not use NorthStar on sweet corn or ornamental (Indian) corn.
- 9. Aphids or other insects infesting johnsongrass may move to the corn following NorthStar applications for johnsongrass control. The insects may transmit viral diseases to the corn resulting in corn stunting, leaf discoloration, and yield loss. To reduce the likelihood of disease development, plant virus-resistant corn hybrids and/or control the insects.
- 10. Best weed control results will be achieved by spraying NorthStar to weeds within the height ranges listed in Tables 1-6 and by following application recommendations.
- 11. The potential for corn stunting from decaying johnsongrass rhizomes may be reduced through tillage prior to planting corn.
- 12. Do not apply NorthStar in tank mixtures with Poast® or Poast Plus® herbicides, as grass control is often reduced significantly and/or crop injury may occur.
- 13. Observe all precautions and limitations on the label of each tank mix partner used with NorthStar that is named on this label.

APPLICATION PROCEDURES

Ground Spray Equipment: Use stainless steel, aluminum, fiberglass, or polyethylene spray tanks. Spray nozzles should be uniformly spaced and of the same size, and should provide accurate and uniform application. Use spray nozzles that provide medium-coarse droplets to provide good coverage and to minimize drift. (See **Recommendations to Avoid Spray Drift** section which follows.)

To help assure accuracy, calibrate sprayer at the beginning of the season before use and recalibrate frequently. Also recalibrate any time carriers are changed. For ground application, use a minimum of 10 gals. of water per acre. Higher volumes (e.g., 20 gals./A) should be used under severe weed infestations to ensure adequate spray coverage. Always include crop oil concentrate or nonionic surfactant in the spray mixture (see **Mixing Instructions** section which follows).

Use a pump with capacity to: (1) maintain 35-40 psi pressure at nozzles, and (2) provide sufficient agitation within the tank to keep product in suspension. Lower pressures may be used with extended range or low pressure nozzles. A centrifugal pump which provides propeller shear action for dispersing and mixing the product is recommended. The pump should provide a minimum of 20 gals./minute/100 gal. tank size circulated through correctly positioned sparger tubes or jets. Agitation during both mixing and application is essential. Use screens to protect the pump and to prevent nozzles from clogging. Screens placed on the suction side of the pump should be 16-mesh or coarser. Do not place a screen in the recirculation line. Use 50-mesh or coarser screens between the pump and boom, and when required, at the nozzles. Check nozzle manufacturer's recommendations.

Good coverage of weeds with the spray mixture is essential for maximum weed control results. Observe sprayer nozzles frequently during the spraying operation to ensure that the spray pattern is uniform. Avoid any spray application under conditions when uniform coverage cannot be obtained or when excessive spray drift may occur. To reduce spray drift, do not apply when winds are in excess of 10 mph. Allow adequate distance between target area and desirable, nontarget vegetation. Avoid spray overlap, because crop injury may result. **Use a nozzle spacing and boom height arrangement that avoids applying an excessive rate of NorthStar directly over the corn rows.** Boom height for broadcast over-the-top application should be based upon the height of the corn, and should be in accordance with the nozzle manufacturer's recommendations for height above the target area.

Do not apply NorthStar as a band application directly over the corn rows. NorthStar may be applied postemergence over-the-top, directed, or semi-directed when field corn height is between 4 and 20 inches tall (V2-V6). If the corn canopy would prevent adequate coverage of weeds, apply NorthStar directed or semi-directed with drop nozzles even if the corn height is less than 20 inches. NorthStar may only be applied directed or semi-directed when field corn is between 20 and 36 inches tall (10 and 36 inches tall for inbred lines of field corn and popcorn) or 15 days before tassel emergence, whichever comes first. **Avoid all direct or indirect contact (such as spray drift) of NorthStar with crops other than those recommended for treatment on this label, since injury may occur.**

Sensitive Crop Precautions

NorthStar herbicide may cause injury to desirable trees and plants, particularly beans, cotton, flowers, fruit trees, grapes, ornamentals, peas, potatoes, soybeans, sunflowers, tobacco, tomatoes, and other broadleaf plants when contacting their roots, stems, or foliage. These plants are most sensitive to NorthStar herbicide during their development or vegetative growing stage. FOLLOW THE PRECAUTIONS LISTED BELOW WHEN USING NORTHSTAR HERBICIDE.

- Do not apply NorthStar when soybeans are growing nearby if any of these conditions exist: (1) corn is more than 24 inches tall, (2) soybeans are more than 10 inches tall, and (3) soybeans have begun to bloom.
- Do not treat areas where possible downward movement into the soil or surface washing may cause contact of NorthStar herbicide with the roots of desirable plants such as trees and shrubs.
- Avoid making applications when spray particles may be carried by air currents to areas where sensitive crops and plants are growing, or when temperature inversions exist. Do not spray near sensitive plants if wind is gusty or in excess of 5 mph and moving in the direction of adjacent sensitive crops. Coarse sprays are less likely to drift out of the target area than fine sprays.
- Also refer to the following sections of the label: **Recommendations to Avoid Spray Drift** and **Cleaning Equipment After NorthStar Application**.

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

Aerial Application: Apply NorthStar in a minimum spray volume of 5 gals./A. Avoid application under conditions where uniform coverage cannot be obtained or where excessive spray drift may occur.

Select nozzles and boom configurations that produce medium-coarse droplets (250-450 μ VMD). Make applications at a maximum spray height of 10 ft. above the crop with low-drift nozzles at a maximum pressure of 40 psi. Boom length should be a maximum of 70% of the wingspan of the aircraft when fixed-wing aircraft are used. Orient nozzles down and slightly backward. Use swath adjustment to manage wind displacement of the spray. Avoid spraying when wind speed exceeds 10 mph to help assure accurate application within the target area.

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

Restrictions

- (1) Do not make more than 1 application per year.
- (2) Do not use crop oil concentrate (COC) when making aerial applications of NorthStar.
- (3) Do not make NorthStar applications before corn is at least 4 inches tall.
- (4) Do not make aerial applications of NorthStar to field corn grown for seed or popcorn.

Recommendations to Avoid Spray Drift

As with all crop protection products, it is important to avoid off-target movement.

Do not allow spray from ground equipment to drift onto adjacent land or crops, as even small amounts may injure sensitive plants. When drift may be a problem, take steps to reduce spray drift, including:

- Do not spray if wind speed is in excess of 10 mph or if winds are gusty.
- If sensitive crops or plants are growing downwind, extreme caution must be used under all conditions. (See **Sensitive Crop Precautions** section.) Do not spray if winds are gusty or above 5 mph.
- Use extreme caution when conditions are favorable for drift (high temperatures and low relative humidity), especially when sensitive plants are located nearby.
- Drift from applications of the herbicide is likely to result in damage to sensitive plants adjacent to the treatment site. This damage can occur at levels below the concentrations that can be detected with chemical analysis.
- Do not apply when a temperature inversion exists. If an inversion condition is suspected, consult with local weather services before making an application.
- Further reductions in drift can be obtained by:
 1. Using nozzles that provide a uniform droplet size. Use nozzles that produce medium to coarse droplets (250-400 microns VMD) that are less prone to result in spray drift.
 2. Use flat fan nozzles. For example, Turbo Teejet, XR® Teejet, RF Raindrop®, or similar "low pressure" nozzles are preferred.

- 3. Recalibrate sprayer by reducing spray pressures and by increasing spray volumes to produce larger droplets when conditions favor drift.
- 4. Applying as close to target weeds as practical to obtain a good spray pattern for adequate coverage according to nozzle manufacturer's recommendations.

Mixing Instructions

IMPORTANT: Follow the correct mixing order on the label or the material may not mix properly. Poor mixing may result in crop injury or poor product performance.

- 1. Make sure the spray tank is clean before mixing. If it is contaminated with other materials, mixing problems and/or clogging may occur, or injury to the crop may result.
- 2. Fill the spray tank 1/4 - 1/2 full with clean water and begin agitation.
- 3. Make certain that the agitation system is working properly and creates a rippling or rolling action on the liquid surface. Maintain agitation throughout the mixing and spraying process.
- 4. Add any products packaged in water-soluble film to the tank first. Allow the packets to completely dissolve and the contents of the packets to fully disperse into the mix water. **Important: Water-soluble packets must always be the first material put into the spray tank after water.** For products packaged in water-soluble packaging, do not tank mix with products containing boron or mix in equipment previously used to apply a product mixture containing boron unless the tank and spray equipment has been thoroughly cleaned. (See **Cleaning Equipment After NorthStar Application.**)
- 5. Pour the required amount of NorthStar into the spray tank while continuing agitation and allowing time to fully disperse.
- 6. While maintaining agitation, continue filling the spray tank. When the tank is 3/4 full, add any tank mix partners. Add any water-dispersible granule or other dry formulations first, and allow material to disperse. Then add any emulsifiable liquid formulation.
- 7. Follow by adding either (a) a nonionic surfactant with a minimum of 80% of the constituents effective as a spray adjuvant (e.g., X-77®), at the rate of 1 qt./100 gals. of spray volume (0.25% volume/volume) or (b) a petroleum- or vegetable-based crop oil concentrate containing not less than 12% emulsifier at 1-4 pts./A as specified on the crop oil concentrate label. **Crop oil concentrate should not be used if corn is greater than 12 inches tall. Use only nonionic**

surfactant with or without liquid nitrogen fertilizer or ammonium sulfate as described below. The concentration of the crop oil concentrate should not exceed 2.5% volume/volume. In addition to crop oil concentrate or nonionic surfactant, liquid nitrogen fertilizer (28-34% nitrogen-ammonium form) may also be added at 2-4 qts./A. Instead of the liquid nitrogen fertilizer, spray grade ammonium sulfate may be used at the rate of 2-4 lbs./A. Liquid nitrogen fertilizers or ammonium sulfate should not be used as a substitute for crop oil concentrate or nonionic surfactant in the spray mixture. **Do not use liquid fertilizer as the spray carrier.**

- 8. If AAtrex® (atrazine), Accent®, Banvel®, Clarity®, Marksman®, Tough®, or Resource® is desired as a tank mix partner, add it next while continuing to agitate. When NorthStar is used alone or in tank mix combinations, either crop oil concentrate or a nonionic surfactant should be included, with or without liquid nitrogen fertilizer or ammonium sulfate, as described in item 7 above. **Do not use crop oil concentrate as the spray adjuvant when using tank mixtures with Banvel, Clarity, or Marksman.** Use a nonionic surfactant with or without liquid nitrogen fertilizer or ammonium sulfate as the additive in tank mixtures containing those products.
- 9. Complete filling the tank, maintaining sufficient agitation at all times to ensure surface action until the spray tank mixture is uniform.
- 10. An anti-foaming agent may be added to reduce excessive foaming if needed.
- 11. **Do not leave spray in the spray tank without continuous agitation.** Always maintain agitation to avoid separation and buildup of undesirable residues on the walls of the spray tank.
- 12. Although NorthStar will remain active in the spray solution for at least 48 hours, make only sufficient mixture that will be sprayed the day in which it will be mixed.

Cleaning Equipment After NorthStar Application

Because most crops other than corn are extremely sensitive to low rates of NorthStar, special attention must be given to cleaning equipment before spraying a crop other than corn. Mix only as much spray solution as needed. Immediately after spraying, clean equipment thoroughly using this procedure:

- 1. Flush tank, hoses, boom, and nozzles with clean water.
- 2. Prepare a cleaning solution of 1 gal. of household ammonia per 25 gals. of water. Many commercial spray tank cleaners may be used. Please request and read a copy of the Novartis brochure

“Clean It Up! A Guide to Cleaning Your Sprayers from Novartis” (NCP 175-00103-A 4/99) from your local Novartis representative for more information about proper tank cleaning procedures. **Do not use chlorine-based cleaners such as Clorox®.**

3. Use a pressure washer to clean the inside of the spray tank with this solution. Take care to wash all parts of the tank, including the inside top surface. If pressure washer is not available, completely fill the sprayer with the cleaning solution to ensure contact of the cleaning solution with all internal surfaces of the tank and plumbing. Start agitation in the sprayer and thoroughly recirculate the cleaning solution for at least 15 minutes. All visible deposits must be removed from the spraying system.
4. Flush hoses, spray lines, and nozzles for at least one minute with the cleaning solution.
5. Dispose of rinsate from steps 1-3 in an appropriate manner. Spray the cleaning solution on untreated corn or return to a rinsate tank for later use as make-up for spraying corn or use other approved disposal.
6. Repeat steps 2-5.
7. Remove nozzles, screens, and strainers and clean separately in the ammonia solution after completing the above procedures.
8. Rinse the complete spraying system with clean water.

Note: If the tank is equipped with the proper number of correctly mounted 360° tank washing nozzles which are attached to a dedicated rinsing system, less cleaning solution than a full tank may be used. Use sufficient cleaning solution to thoroughly rinse all surfaces. Start the sprayer agitation and recirculate the cleaning solution for at least 15 minutes. Flush the spray boom with the cleaning solution. Repeat the rinsing procedure 1-2 times.

NORTHSTAR APPLIED ALONE FOR WEED CONTROL IN CORN

Prior to all NorthStar applications, a preemergence herbicide such as Dual II®, Dual II MAGNUM®, Bicep II®, Bicep II MAGNUM®, Bicep Lite II®, Bicep Lite II MAGNUM®, or Dual II + AAtrex should be applied for grass control, and will improve control of several of the weeds listed in Tables 1-6. Consult their respective labels for directions, precautions, and limitations before applying.

Weed competition with corn plants can severely effect corn yields. For

best weed control and to realize the full yield potential of the corn crop, apply NorthStar at 5 oz./A plus adjuvants when corn is between 4 and 12 inches tall (V2-V4) and weeds are within the height ranges listed in Tables 1 and 2. NorthStar at 5 oz./A plus spray adjuvants may be applied postemergence over-the-top, directed, or semi-directed when weed(s) are within the height range specified for optimum control in Tables 1 and 2 and when the height of the field corn is between 4 and 20 inches (V2-V6). Good weed spray coverage is essential for optimum effectiveness of NorthStar. To ensure good spray coverage of the weeds and avoid potential crop injury, applications made after field corn is 20 inches tall (V6) up to 36 inches tall or 15 days before tassel emergence, whichever comes first, should only be directed or semi-directed with drop nozzles. Do not make over-the-top applications of NorthStar to inbred lines of field corn or popcorn. NorthStar can only be applied directed or semi-directed when inbred lines of field corn and popcorn are between 10 and 36 inches tall, or 15 days before tassel emergence, whichever comes first.

Grass and broadleaf weeds, which are controlled following postemergence application of 5 oz./A of NorthStar, are listed in Tables 1 and 2. If weeds other than those listed in Tables 1 and 2 are anticipated, make a separate application of an appropriately labeled preplant, preemergence, or postemergence herbicide or herbicide combination.

Applications of NorthStar to corn during rapid growth may result in yellowing and/or temporary leaning. Corn will usually regain color and become erect within 3-7 days. **Cultivation should be delayed until after corn is growing normally to avoid breakage.**

Field Corn Grown for Seed and Popcorn: NorthStar applications to tolerant field corn inbred lines or popcorn must be directed or semi-directed when the height of the corn is between 10 and 36 inches tall, or 15 days before tassel emergence, whichever comes first. Refer to use Precaution 7 for additional information.

Cultivation is recommended to control reinfestation that may occur from weed regrowth or late germination of weeds and to improve weed control under dry conditions. A waiting period of 7 days after a NorthStar application is recommended before making a cultivation or weed control may be reduced. Where shattercane is the target weed species, NorthStar may be applied at cultivation, but some regrowth of shattercane may occur. Apply NorthStar ahead of cultivators.

For optimum control of johnsongrass, cultivation or a follow-up application of Beacon® at 0.25 oz./A or Accent at 0.33 oz./A is recommended to control reinfestation that may occur from regrowth. The application should be made when the weed height is within the range specified for optimum control in Table 1 and when the field corn height does not exceed 20 inches. After several years use of NorthStar or Beacon or other products for johnsongrass or shattercane control, populations of

these weeds may be substantially reduced. Refer to the Beacon or Accent labels for directions for use.

Restrictions: To avoid possible illegal crop residues: (1) Do not graze or feed forage from NorthStar-treated corn to livestock within 30 days after application. (2) Do not harvest silage within 45 days after application. (3) Do not harvest grain within 60 days after application. (4) Do not make more than one NorthStar application per season at 5 oz./A. (5) All applications of NorthStar to corn should be made no later than 15 days before tassel emergence.

Table 1: Grass Weed Species Controlled or Partially Controlled with NorthStar Applied at 5 oz./A

Grass Weed Species	Weed Height Range for Optimum Control (inches)
Foxtails (<i>Setaria</i> spp.) ^{3,4}	1-3
Johnsongrass, Rhizome (<i>Sorghum halepense</i>) ^{1,3,4}	8-16
Johnsongrass, Seedling (<i>Sorghum halepense</i>) ³	4-12
Nutsedge, Yellow (<i>Cyperus esculentus</i>) ³	1-4
Panicum, Fall (<i>Panicum dichotomiflorum</i>)	1-3
Quackgrass (<i>Elytrigia repens</i>) ² (formerly <i>Agropyron repens</i>)	4-8
Ryegrass, Annual (<i>Lolium multiflorum</i>)	1-4
Sandbur (<i>Cenchrus</i> spp.) ³	1-4
Shattercane (<i>Sorghum bicolor</i>) ⁴	4-12
Sorghum-almum (<i>Sorghum almum</i>) ⁴	4-12
Sorghum, Volunteer (<i>Sorghum bicolor</i>) ⁴	4-12

¹Regrowth may occur. Control unacceptable regrowth with cultivation or a subsequent application of Accent or Beacon as described above.

²Control of quackgrass is slower compared to other grass weed species. NorthStar may only provide partial control of quackgrass under heavy infestations. Control can be improved by tank mixing NorthStar at 5 oz./A with Beacon at 0.25 oz./A.

³Partial control. Control is most effective under conditions favorable for weed growth (i.e., adequate moisture, optimum temperature conditions, etc.). Grass or sedge control may be improved by tank mixing NorthStar at 5 oz./A with Beacon at 0.25 oz./A. Do not use NorthStar to control these species if the weeds are subject to stress conditions (i.e., drought, cold temperatures, etc.), or are not actively growing. Some other means of control should be used if infestations are severe.

⁴Certain biotypes of this weed species are known to be resistant to this and other ALS herbicides. Where these ALS resistant biotypes are known or suspected to exist, an appropriate registered herbicide, active against that weed and with another mode of action, should be used alone or in tank mix combination with NorthStar to control these biotypes.

Table 2: Broadleaf Weed Species Controlled or Partially Controlled with NorthStar Applied at 5 oz./A

Broadleaf Weed Species	Weed Height Range for Optimum Control (inches)
Alfalfa (<i>Medicago sativa</i>) ¹	1-6
Amaranth, Palmer (<i>Amaranthus palmeri</i>)	1-4
Amaranth, Powell (<i>Amaranthus powellii</i>)	1-4
Artichoke, Jerusalem (<i>Helianthus tuberosus</i>)	1-4
Beggarweed, Florida (<i>Desmodium tortuosum</i>)	1-4
Bindweed, Field (<i>Convolvulus arvensis</i>)	1-3
Bindweed, Hedge (<i>Calystegia sepium</i>) ¹	1-3
Blackberry, Wild (<i>Rubus spp.</i>) ¹	1-3
Buckwheat, Wild (<i>Polygonum convolvulus</i>)	1-3
Burcucumber (<i>Sicyos angulatus</i>)	1-4
Carpetweed (<i>Molluga verticillata</i>)	1-3
Cocklebur, Common (<i>Xanthium strumarium</i>)	1-6
Dandelion (<i>Taraxacum officinale</i>) ¹	1-3
Devilsclaw (<i>Proboscidea louisianica</i>)	1-4
Dogbane, Hemp (<i>Apocynum cannabinum</i>) ¹	6-12
Eveningprimrose, Cutleaf (<i>Oenothera laciniata</i>)	1-3
Horsenettle (<i>Solanum carolinense</i>) ¹	2-6
Horseweed (Marestail, <i>Conyza canadensis</i>) ¹	6-12
Ivy, Poison (<i>Rhus radicans</i>) ¹	1-3
Jimsonweed (<i>Datura stramonium</i>)	1-6
Kochia (<i>Kochia scoparia</i>) ²	1-4
Ladysthumb (<i>Polygonum persicaria</i>)	1-4
Lambsquarters, Common (<i>Chenopodium album</i>) ³	1-4
Morningglory (<i>Ipomoea spp.</i>) ¹	1-3
Mustard, Wild (<i>Sinapsis arvensis</i>)	1-4
Nightshade, Black (<i>Solanum nigrum</i>)	1-6
Nightshade, Eastern Black (<i>Solanum ptycanthum</i>)	1-6
Nightshade, Hairy (<i>Solanum sarrachoides</i>)	1-4
Pigweeds (<i>Amaranthus spp.</i>)	1-5
Puncturevine (<i>Tribulus terrestris</i>)	1-4
Purslane, Common (<i>Portulaca aleracea</i>)	1-3
Pusley, Florida (<i>Richardia scabra</i>)	1-3
Radish, Wild (<i>Raphanus raphanistrum</i>)	1-4
Ragweed, Common (<i>Ambrosia artemisiifolia</i>)	2-9
Ragweed, Giant (<i>Ambrosia trifida</i>)	2-9
Sesbania (<i>Sesbania exaltata</i>)	1-4
Sicklepod (<i>Cassia obtusifolia</i>)	1-3
Sida, Prickly (<i>Sida spinosa</i>)	1-4
Smartweed, Pennsylvania (<i>Polygonum pensylvanicum</i>)	1-4
Sunflowers (<i>Helianthus spp.</i>)	2-9
Thistle, Canada (<i>Cirsium arvense</i>)	1-6
Thistle, Russian (<i>Salsola iberica</i>) ¹	1-4
Velvetleaf (<i>Abutilon theophrasti</i>) ²	1-4
Waterhemp, Common (<i>Amaranthus rudis</i>)	1-4
Waterhemp, Tall (<i>Amaranthus tuberculatus</i>)	1-4

¹Partial control. Banvel or Clarity at 2-4 oz. of product per acre or Marksman at 1/2-1 pt./A can be tank mixed with NorthStar to improve the control of weeds listed as partial control. Use nonionic surfactant with or without nitrogen if Banvel, Clarity, or Marksman is added. Do not use crop oil concentrate with these tank mixes. Do not apply Marksman if corn is greater than 12 inches tall.

²Crop oil concentrate plus liquid nitrogen fertilizer or ammonium sulfate are recommended spray adjuvants when corn is less than 12 inches tall (refer to **Mixing Instructions**).

³Including triazine-resistant biotypes.

NORTHSTAR TANK MIX COMBINATIONS FOR WEED CONTROL IN CORN

Prior to all NorthStar applications, a preemergence herbicide such as Dual II, Dual II MAGNUM, Bicep II, Bicep II MAGNUM, Bicep Lite II, Bicep Lite II MAGNUM, or Dual II + AAtrex should be applied for grass control, and to improve control of several of the weeds listed in Tables 1-6.:

NorthStar may be applied postemergence in tank mix combinations for improved control of various weeds. For all tank mixtures of NorthStar with other herbicides listed on this label, refer to both labels for weeds controlled and application information; and follow all restrictions and precautions on both labels.

Precautions for Tank Mix Combinations: (1) NorthStar applied alone or in tank mixtures with AAtrex/atrazine, Accent, Resource, or Tough can be applied using either a nonionic surfactant or crop oil concentrate with or without liquid nitrogen or ammonium sulfate. Refer to item 7 under **Mixing Instructions** for information on rates and timing of the various additives. (2) Do not use crop oil concentrate as the spray adjuvant when using tank mixtures with Banvel, Clarity, or Marksman. In mixtures with those products, use only a nonionic surfactant with a minimum of 80% of the constituents effective as a spray adjuvant at the rate of 1 qt./100 gals. of spray volume (0.25% volume/volume). (3) Do not apply NorthStar in tank mixture with cyanazine (Bladex® or Extrazine® II), or severe crop injury may result. (4) Novartis does not recommend tank mixtures of NorthStar with other agricultural products not listed on this label due to the possibility of reduced control, crop injury, or other undesirable interactions. When NorthStar is applied in tank mixtures with other products, follow the most restrictive labeling requirements.

For postemergence control of weeds actively growing in corn, NorthStar will control the weeds listed in:

- Table 3 when tank mixed with AAtrex (atrazine)
- Table 4 when tank mixed with Accent
- Table 5 when tank mixed with Resource
- Table 6 when tank mixed with Tough

With all tank mixtures containing atrazine, application must be made before the corn exceeds 12 inches in height and the total atrazine applied may not exceed 2.5 lbs. a.i./A per calendar year. **Do not exceed the total atrazine rate limitations specified on the AAtrex (atrazine) label.** Control of relatively large cocklebur, sunflower, and velvetleaf may be reduced when NorthStar is applied with atrazine containing products.

Table 3: Broadleaf Weeds Controlled with Tank Mixtures of NorthStar at 5 oz./A with AAtrex 4L (Atrazine) at 2-3 pts./A¹

Broadleaf Weed Species ³	Weed Height Range for Optimum Control (inches)
Cocklebur, Common	1-6
Jimsonweed	1-6
Kochia	1-4
Lambsquarters, Common	1-5
Morningglories	1-4
Nightshade, Eastern Black	1-6
Pigweed, Redroot	1-5
Pigweed, Smooth	1-5
Ragweed, Common	2-9
Ragweed, Giant	2-9
Smartweed, Pennsylvania	1-4
Sunflowers	2-9
Velvetleaf ²	1-4
Waterhemp, Common	1-4
Waterhemp, Tall	1-4

¹Tank mix applications of NorthStar and Atrazine may provide additional control of these weeds, especially where residual activity is desired. Other formulations of Atrazine may be substituted, provided the Atrazine dosage is adjusted to apply 1-1.5 lbs. a.i./A. **Do not exceed the total atrazine rate limitations specified on the AAtrex (atrazine) label.**

²Crop oil concentrate plus liquid nitrogen fertilizer or ammonium sulfate are recommended spray adjuvants for velvetleaf control. Refer to **Mixing Instructions** for additional adjuvant information.

³Atrazine will not improve control of triazine-tolerant biotypes. Refer to Table 1 and Table 2 for a complete listing of weeds controlled by NorthStar.

Table 4: Grasses Controlled with Tank Mixtures of NorthStar at 5 oz./A in Combination with Accent at One-half to Full Rate Based on the Product's Allowable Use Rate¹

Weed Species	Weed Height Range for Optimum Control (inches)
Barnyardgrass	1-4
Cupgrass, Woolly ²	1-4
Foxtails, Giant	1-4
Foxtails, Green	1-4
Foxtails, Yellow	1-4
Johnsongrass, Rhizome	8-16
Johnsongrass, Seedling	4-12
Millet, Wild-Proso ²	1-4
Oats, Wild	1-4
Panicum, Fall	1-4
Panicum, Texas	1-4
Quackgrass	4-8
Shattercane	4-12
Signalgrass, Broadleaf	1-3
Sorghum, Volunteer	4-12

¹NorthStar + Accent tank mixtures are for rescue control of escaped grasses and broadleaf weeds following preemergence treatments of a grass herbicide such as Dual or Bicep brands. Refer to Table 2 for a complete list of broadleaf weeds controlled by NorthStar. Refer to **Mixing Instructions** for adjuvant information.

²For improved control of heavy infestations, use the full labeled rate of Accent.

Table 5: Velvetleaf Control with Tank Mixtures of NorthStar at 5 oz./A with Resource at 4 oz./A¹

Broadleaf Weed Species	Weed Height Range for Optimum Control (inches)
Velvetleaf ²	1-6

¹Refer to Table 1 and Table 2 for a complete list of weeds controlled by NorthStar.

²Improved velvetleaf control may be achieved by tank mixing NorthStar and Resource. Crop oil concentrate plus liquid nitrogen fertilizer or ammonium sulfate are recommended spray adjuvants when corn is less than 12 inches tall. Refer to **Mixing Instructions** for additional adjuvant information.

Table 6: Broadleaf Weeds Controlled with Tank Mixtures of NorthStar at 5 oz./A with Tough at 1-2 Pts./A¹

Broadleaf Weed Species	Weed Height Range for Optimum Control (inches)
Jimsonweed	1-6
Kochia	1-5
Pigweeds	1-5
Lambsquarters, Common	1-5

¹Refer to Table 1 and Table 2 for a complete listing of weeds controlled by NorthStar. Improved broadleaf weed control may be obtained by applying a tank mixture of NorthStar and Tough. Refer to **Mixing Instructions** for adjuvant information.

CROP FAILURE

If corn treated with NorthStar is lost due to a catastrophe (for example, hailstorm), corn hybrids with tolerance to NorthStar may be replanted 14 days or more after application, unless dry weather has persisted. An IR or IMR corn hybrid may be replanted immediately. Do not make a second application of NorthStar. If any other products were applied prior to or after NorthStar, read product labels and follow the most restrictive recrop limitations.

ROTATIONAL CROPS

The following crops may be rotated at the intervals indicated following an application of NorthStar to corn.

Rotational Crop	Interval	Notes
IR or IMR Field corn hybrids	None	Refer to Crop Failure section.
Field corn	14 days	Refer to Crop Failure section.
Winter wheat, winter barley, rye	3 months	Injury may occur if dry weather prevails during much of the time between NorthStar application and seeding of winter cereals.
Alfalfa, sweet corn, popcorn, cotton, dry beans, green beans, peanuts, peas, potatoes, sorghum, soybeans, sunflowers, spring-seeded small grains, tobacco	8 months	Injury may occur to sorghum, alfalfa, or sunflowers if dry weather prevails during much of the time between NorthStar application and seeding of these crops.
All other crops	18 months	--

Notes: (1) For rotational crop restrictions when NorthStar is used in tank mixtures, refer to the rotations above for NorthStar and to the respective product labels of any mixing partner for additional restrictions. (2) **Do not use in the Red River Valley areas of Minnesota or North Dakota or in areas with similar soils, unless corn will be the only crop grown in the following two seasons.**

STORAGE AND DISPOSAL

Pesticide Storage and Disposal**Storage**

Store in a cool, dry place. Do not store this product under wet conditions.

Pesticide Disposal

Do not contaminate water, food, or feed by storage, disposal, or cleaning of equipment. Open dumping is prohibited. Wastes resulting from the use of this product are toxic. Improper disposal of unused pesticide, spray mixture, or rinsate is a violation of federal law. Pesticide, spray mixture, or rinsate 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

Triple rinse (or equivalent) and dispose of in an incinerator or landfill approved for pesticide containers, or by open burning, if allowed by state and local authorities. If burned, keep out of smoke.

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.

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals**CAUTION**

Harmful if swallowed or absorbed through skin. Causes moderate eye irritation. Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling.

Statement of Practical Treatment

If swallowed: Call a physician or Poison Control Center. Drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger. If person is unconscious, do not give anything by mouth and do

not induce vomiting.

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

If in eyes: Flush eyes with plenty of water. Call a physician if irritation persists.

Note to Physician: If ingested, induce emesis or lavage stomach. Treat symptomatically.

Personal Protective Equipment

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Waterproof gloves
- Shoes plus socks
- Protective eyewear

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.
- 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, 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 Advisory

Dicamba has been identified in ground water sampling under vulnerable conditions. There is the possibility that the dicamba in NorthStar may leach through soil to ground water, especially where soils are coarse and ground water is near the surface. Consult with the pesticide state lead agency or local agricultural agencies for information regarding soil permeability and aquifer vulnerability in your area.

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NCP 923A-L1C 0600

[QUARK/NORTHSTAR/NORTHSTAR-BKLT-C] - ccg - 8/1/00

(Booklet Back Cover)

CustomPak™

NorthStar™

HERBICIDE

For postemergence weed control in field corn (grown for grain, silage, or seed) and popcorn

Active Ingredients:

Primisulfuron-methyl: 3-[4,6-Bis(difluoromethoxy)-pyrimidin-2-yl]-1-(2-methoxycarbonyl-phenylsulfonyl) urea	7.5%
Sodium salt of dicamba (3,6-dichloro- <i>o</i> -anisic acid*)	43.9%
Other Ingredients:	48.6%
<hr/> Total:	<hr/> 100.0%

*This product contains 39.9% 3,6-dichloro-*o*-anisic acid (dicamba).

NorthStar is a water-dispersible granule.

6 POUNDS 4 OUNCES
NET WEIGHT

EPA Reg. No. 100-923

EPA Est. 100-LA-1

KEEP OUT OF REACH OF CHILDREN.

CAUTION

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.

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

Harmful if swallowed or absorbed through skin. Causes moderate eye irritation. Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling.

Statement of Practical Treatment

If swallowed: Call a physician or Poison Control Center. Drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger. If person is unconscious, do not give anything by mouth and do not induce vomiting.

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

If in eyes: Flush eyes with plenty of water. Call a physician if irritation persists.

Note to Physician: If ingested, induce emesis or lavage stomach. Treat symptomatically.

Environmental Hazards

Do not apply directly to water, 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 Advisory

Dicamba has been identified in ground water sampling under vulnerable conditions. There is the possibility that the dicamba in NorthStar may leach through soil to ground water, especially where soils are coarse and ground water is near the surface. Consult with the pesticide state lead agency or local agricultural agencies for information regarding soil permeability and aquifer vulnerability in your area.

Chemigation

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

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U.S. Patent No. 4,478,635

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