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Systems Integration Group, Inc.

MAY 10 1999

Thomas J. Parsley
Novartis Crop Protection, Inc.
P.O. Box 18300
Greensboro, NC 27419

Dear Mr. Parsley;

Subject: Revised Labeling
Spirit Herbicide
EPA Registration No. 100-911
Your Submission dated April 30, 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:

a. The front panel referral statement says "See additional precautionary statements....inside booklet." 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 and is securely attached. 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.

b. On page 5 you should delete "Notes: To avoid possible illegal residues:". This is misleading since these restrictions also concern phytotoxicity and the heading "Notes" implies that it is less important than other sections. A heading such as "Use Limitations" or "Restrictions" would be acceptable.


c. In the map on page 17 "Region A", Region B" and "I-80" are missing.

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

-2-

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

Sincerely yours,


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

Enclosure

CustomPak™

Spirit™

HERBICIDE

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

Active Ingredients:

Prosulfuron: 1-(4-methoxy-6-methyl-
triazin-2-yl)-3-[2-(3,3,3-trifluoropropyl)-
phenylsulfonyl]-urea14.2%

Primisulfuron-methyl: 3-[4,6-bis
(difluoromethoxy)-pyrimidin-2-yl]-1-(2-
methoxycarbonylphenylsulfonyl) urea42.8%

Inert Ingredients:43.0%

Total:100.0%

Spirit is water-dispersible granules.

20 OUNCES
NET WEIGHT

KEEP OUT OF REACH OF CHILDREN.

CAUTION

See additional precautionary statements and directions for use inside booklet.

EPA Reg. No. 100-911

EPA Est. 100-LA-1

NCP 911A-L1(DRAFT)

**ACCEPTED
with COMMENTS
In EPA Letter Dated:**

MAY 10 1999

Under the Federal Insecticide,
Fungicide, and Rodenticide Act,
as amended, for the pesticide
registered under EPA Reg. No.
100-911

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). 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.

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

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

GENERAL INFORMATION

Spirit is a selective herbicide applied after emergence of both crop and weeds for the control of weeds in field corn (grown for grain, silage, or

seed; including white corn) and popcorn. Spirit consists of water-dispersible granules which must be thoroughly and uniformly mixed in water and applied as a spray.

Refer to Table 1 for a listing of weeds controlled when Spirit is applied at 1 oz. of product per acre. The degree of weed control resulting from application of Spirit is dependent upon weed species, weed size at application, environmental conditions, and growing conditions. Weed control is better when weeds have emerged, ample soil moisture exists, and weeds are actively growing, than when the soil is dry and weeds are under stress from lack of moisture.

Spirit provides control or partial control of many annual and perennial weeds. When reference is made to weeds partially controlled, partial control means significant activity, but not always as a level generally considered acceptable for commercial weed control. If grasses are expected, a preemergence grass herbicide (such as Dual II®, Dual II Magnum™, Bicep Lite II®, Bicep Lite II Magnum™, Bicep II®, or Bicep II Magnum™) should be applied.

Growth of susceptible weeds is inhibited soon after application of Spirit. The leaves of susceptible plants turn yellow, red, or brown after several days, followed by death of the growing point. Complete plant death occurs 1-3 weeks after application, depending upon weed species and growing conditions. Weeds not completely killed by Spirit are often stunted and are less competitive to the crop. Spirit reaching the soil surface during postemergence application may provide short-term preemergence control of certain weeds.

Spirit contains two active ingredients: primisulfuron and prosulfuron. If a combination of adverse environmental conditions occurs, the degradation of prosulfuron in soil is slowed down. These conditions include: shorter than normal growing season, low soil temperatures for extended periods during growing season, unusually dry soil, lack of rainfall/irrigation following application of Spirit, soil pH 7.8 or greater, or compacted soils. The rotational section of this label addresses these conditions. If Spirit was applied in a season where several of the above conditions occurred, mitigating measures such as deep tillage, planting crops under optimal growing conditions, or planting varieties with enhanced tolerance to sulfonyleurea herbicides (such as STS® soybeans) should be considered when rotating to broadleaf crops, such as soybeans or cotton.

This herbicide controls weeds by inhibiting a biochemical process which produces certain essential amino acids necessary for plant growth. The inhibited enzyme system is acetolactate synthase (ALS). Occurrence of weed biotypes resistant to ALS-inhibiting herbicides can be prevented or delayed by using this product in sequence or in tank mixtures with other herbicides having a different mode of action, and by using some form of mechanical control or a herbicide with a different mode of action to control weed escapes before they set seed. Both modes of action should

provide acceptable control of the specific weed, if applied alone at the rates used in tank mixture.

Spirit applied in accordance with this label rarely causes corn injury. When injury occurs, it is generally of short duration and yield potential is not affected.

Notes: To avoid possible illegal residues: (1) Do not graze or feed forage from Spirit-treated crops to livestock until 30 days after application, (2) Do not harvest silage until 40 days after application, (3) Do not harvest grain until 60 days after application, (4) Do not apply more than one application of Spirit in the cropping season, and (5) Complete all Spirit applications before corn exceeds 24 inches (2 ft.) in height.

PRECAUTIONS

Follow these precautions to reduce chances of crop injury and/or to avoid reduced weed control:

1. Spirit should not be applied if corn is under severe stress due to drought, cold weather, hail, flooding, water-logged soils, compacted soil, disease, insect damage, nutrient deficiency (especially low nitrogen levels), or other causes. If Spirit is applied when nighttime low temperatures are below 40°F, or the sum of the daytime high temperature plus the nighttime low temperature is below 110°F, corn injury may occur. Also, avoid application of Spirit to corn which is stressed due to dense populations of weeds which are taller than the optimum heights listed in Table 1. Applications of Spirit may result in reduced weed control if weeds are under severe stress due to drought or if weeds are taller than the optimum heights listed in Table 1.
2. A. If "normal" or IT corn hybrids (not an IR or IMR hybrid) are planted and Dyfonate®, Lorsban®, Thimet®, or other organophosphate insecticide is applied at planting or before applying Spirit, temporary injury may occur following the Spirit application. Do not apply Spirit if this corn crop was 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 Spirit to corn treated with Counter CR applied in a surface band or T-band at planting time, may result in crop injury. Novartis will not be held responsible for losses or damage resulting from such use.
- B. If an IR or IMR corn hybrid is planted, organophosphate insecticides, including Counter, can be applied at any time

according to label directions without increasing the likelihood of injury to those hybrids after Spirit has been applied. The interaction between organophosphate insecticides and Spirit is completely overcome by corn hybrids with IR or IMR designations, but not by IT hybrids; i.e., IT hybrids should be considered like "normal" hybrids with regard to this interaction.

*IT – Corn with enhanced imidazolinone herbicide tolerance.

*IR/IMR – Corn with enhanced imidazolinone herbicide resistance.

3. Do not make a foliar postemergence or soil application of any organophosphate insecticide within 10 days before or 7 days after a Spirit application, or severe crop injury may occur.
4. Spirit should be applied postemergence to field corn between 4 and 24 inches in height. Corn plants less than 4 inches tall are more susceptible to herbicide injury. To ensure good spray coverage of the weeds and avoid potential injury, applications made after the field corn is 20 inches tall, or exhibits more than six collars (V6), whichever comes first, should be directed using drop nozzles. **If rotating to a Spirit-sensitive broadleaf crop (i.e., soybeans, cotton) the next season, do not make applications of Spirit after June 30 to allow for ample opportunity for prosulfuron degradation.**
5. Spirit can be applied to all field corn hybrids, except a few that are classified by Novartis as potentially susceptible to injury following Spirit application. Consult your chemical dealer or Novartis representative for a current listing of field corn hybrids classified as "potentially susceptible" to Spirit.
6. **Field Corn Grown for Seed:** Spirit may be broadcast or applied with drop nozzles to field corn grown for seed from a minimum of 4" up to 20" tall (free-standing) or corn that exhibits 6 or fewer collars (V6), whichever occurs first. Drop nozzles must be used when the inbred plants are between 20 and 24 inches tall and before tassel emergence. Using drop nozzles provides the greatest crop safety when applying Spirit on seed corn. However, Novartis recommends that you thoroughly test the specific inbred for its sensitivity to Spirit before treating large acreages, particularly if you choose to make a broadcast application. Not all inbred lines have been tested for sensitivity to Spirit, nor does Novartis have access to all seed company data. **Further, Novartis is not responsible for any crop injury arising from the use of Spirit on field corn grown for seed.**

7. **Popcorn:** Spirit can be applied directed to popcorn; however, not all popcorn hybrids have been tested for sensitivity to Spirit. Therefore, popcorn hybrids must be thoroughly tested for potential sensitivity to Spirit before treating large acreages. To avoid crop injury, popcorn should not be sprayed with over-the-top applications of Spirit nor hooded sprayers; i.e., only directed applications using drop nozzles when the popcorn plants are between 10 and 24 inches tall, and before tassel emergence.
8. Do not use Spirit on sweet corn or ornamental (Indian) corn.
9. Do not irrigate within 4 hours after Spirit application. Rainfall or irrigation occurring within 4 hours after Spirit application may reduce weed control.
10. Soil pH may vary greatly within a field; pH variations of 1 to 2 units are not uncommon. Soil sampling techniques for fertility recommendations often use composite soil samples taken from over an entire field(s). Such sampling may not accurately reflect surface layer areas of high pH within a field. Subsampling, therefore, is recommended for areas expected to have pH values greater than the field average. Examples of where subsampling within fields may be required include: (1) areas where soil types differ within the field, and (2) where conditions may vary within the field such as:
(a) areas where iron chlorosis occurs, (b) areas bordering limestone roads, (c) low areas subject to flooding, (d) eroded hillsides, (e) drainage tile lines, (f) areas amended with sludge, manure, or other materials which may alter soil pH, and (g) areas with visible calcareous deposits. Refer to Exception 4 regarding soil pH 7.8 or higher.
11. In areas where a rotation to soybeans or other broadleaf crops will occur, do not lime such that the resulting surface pH will be equal to or higher than 7.8. The use of Spirit is not recommended in corn fields where lime will be applied prior to planting corn, or following harvest of the corn crop in the same year as the use of Spirit, or prior to planting a broadleaf crop the following year, unless the resulting soil pH is <7.8. If necessary to lime, thorough incorporation of the lime through tillage is suggested to reduce the potential for soil pH stratification. In areas where lime has not been incorporated into the soil through tillage, shallow soil sampling (i.e., upper 2 inches) may be required to accurately measure the surface pH of the soil. Refer to Exception 4 regarding soil pH 7.8 or higher.
12. Do not apply Spirit in tank mixture with any formulation of cyanazine (Bladex® or Extrazine® II), or severe crop injury may result. Do not apply Spirit in tank mixtures with Poast® or Poast Plus® herbicides, as grass control is often reduced significantly and/or crop injury may occur.

13. Do not apply Spirit to corn that exhibits injury symptoms from a previous herbicide application or other causes.
14. If Spirit is applied to johnsongrass, aphids and other insects infesting the johnsongrass may move to the corn crop. These insects may transmit viral diseases to the corn. Virus-resistant corn hybrids and/or control of the insects may be necessary to reduce the likelihood of disease development.
15. If spot spraying Spirit, be careful to not overdose the treated areas.
16. Observe all precautions and limitations on the label of each product used in tank mixture with Spirit.

APPLICATION PROCEDURES

Ground Spray Equipment: Spray nozzles should be uniformly spaced and of the same size, and should provide accurate and uniform application. Use spray nozzles which provide medium-coarse droplets to provide good coverage and minimize drift.

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

Use a pump with capacity to: (1) maintain 35-40 psi pressure at the nozzles and (2) provide sufficient agitation within the tank to keep product in uniform suspension. Lower spray pressures may be used with extended range or drift reduction flat fan nozzles. A centrifugal pump which provides shear action for dispersing and mixing the product is recommended. The pump should provide a minimum of 20 gals./minute/100 gals. tank size circulated through a correctly positioned sparger tube or jet agitators. If jet agitators are used, at least 2 agitators should be aligned on the bottom of the tank pointing towards each end. Agitation during both mixing and application is essential. Screens or strainers placed on the suction side of the pump should be 16-mesh or coarser. Do not place a screen in the recirculation line unless a roller or piston pump is used for spraying the solution. Use 50-mesh or coarser screens between the pump and boom, and when required, at the nozzles. Check nozzle manufacturer's recommendations.

Good weed coverage with the spray mixture is essential for optimum weed control results. Observe sprayer nozzles frequently during the spraying operation to ensure that the spray pattern is uniform. Avoid any

spray overlaps which result in excessive rates in the overlap areas, i.e., point rows, headlands, sprayer start-up zones, etc., and can increase the chance of direct crop injury or potential injury to rotational crops. Also, avoid 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 if sensitive plants are growing downward and in close proximity. Allow adequate distance between target area and desirable vegetation to prevent drift to non-target areas. **Avoid placing nozzles directly over the corn row or concentrating spray into the corn whorls.** Boom height for broadcast over-the-top application should be based upon the free-standing height of the crop, not height above the soil surface; and should be at least 15 inches above the corn canopy. If hooded sprayers are used, avoid spraying Spirit into the corn whorl and plug nozzles directly over the row.

Avoid all direct or indirect contact (such as drift) of Spirit with crops other than those recommended for treatment on this label, since injury may occur.

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

Aerial Application: Apply Spirit in water, using a minimum spray volume of 3 gals./A. Include a nonionic surfactant, i.e., X-77®, at 1 qt./100 gals. of spray mix (0.25% volume/volume), or a good quality crop oil concentrate at no more than 2 pts./A (see following **Mixing Instructions**). Avoid application under conditions where uniform coverage cannot be obtained or where excessive spray drift may occur. Make applications at a maximum height of 10 ft. above the corn with low-drift nozzles at a maximum pressure of 40 psi and wind speed of 10 mph or less to assure accurate Spirit 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.

Do not apply Spirit by aerial application in New York state.

Recommendations to Avoid Spray Drift

As with all crop protection products, it is important to avoid off-target movement. Do not allow spray 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 10 mph or greater. Do not spray if winds are gusty. If sensitive crops or plants are downwind, extreme caution must be used under all conditions.
- Use extreme caution when conditions are favorable for drift (high temperatures, drought, low relative humidity), especially when sensitive plants are located nearby.

- 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 using reduced spray pressures and increased spray volumes to produce larger droplets when conditions favor drift.
 4. Applying as close to target plants as practical to obtain a good spray pattern for adequate coverage, while maintaining a minimum boom height of 15 inches over the corn canopy for ground application.

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 using. If it is contaminated with other materials, mixing problems and/or clogging may occur, or injury to the crop may result.
2. Prepare no more spray mixture than is required for the immediate operation.
3. Fill the spray tank $\frac{1}{4}$ - $\frac{1}{2}$ full with clean water and begin agitation.
4. Make certain that the agitation system is working properly and creates a rippling or rolling action on the water surface. Maintain agitation throughout the mixing and spraying process.
5. Add any products packaged in water-soluble film to the tank at the same time. 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.
6. Pour the required amount of Spirit into the spray tank all at once.
7. While maintaining agitation, continue filling the spray tank. When the tank is $\frac{3}{4}$ full, add any tank-mix partners. Add any water-

dispersible granule or other dry formulation, and allow that material to disperse. Then add any emulsifiable liquid formulation.

8. Then add either (a) a high quality petroleum- or vegetable-based crop oil concentrate containing not less than 12% emulsifier at 1-4 pts./A as specified on the oil adjuvant label, or (b) a good nonionic surfactant with a minimum of 80% of the constituents effective as a spray adjuvant at the rate of 1-2 qts./100 gals. of spray mixture (0.25-0.5% v/v). In addition to crop oil concentrate or nonionic surfactant, liquid nitrogen fertilizer (28-34%) at 0.5-1 gal./A or 2-4 lbs./A spray grade ammonium sulfate (or equivalent AMS liquid) may also be added to enhance activity against certain weeds, e.g., velvetleaf. Liquid nitrogen should not be used as a substitute for crop oil concentrate or nonionic surfactant. **Do not use liquid fertilizer as the total spray carrier.** Do not use crop oil concentrate as the spray adjuvant when using Banvel® (more than 2 oz./A), Buctril®, Buctril + atrazine, Clarity® (more than 2 oz./A), Marksman®, or 2,4-D tank mixtures, i.e., use only nonionic surfactant. Do not add liquid nitrogen when using Buctril, Buctril + atrazine, or 2,4-D tank mixtures.
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 build-up of undesirable residues on the walls of the spray tank.
12. Make only sufficient spray mixture which can be used the day in which it will be sprayed; however, Spirit will remain active in the spray solution for at least 36 hours.

Cleaning Equipment after Application

Because most crops, other than corn, are extremely sensitive to low rates of Spirit, special attention must be given to cleaning equipment before spraying a crop other than those registered for use and on this label. 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 one gal. of household ammonia per 50 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" (NCP 175-

00088-A 3/97) 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 carrier water 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.

CORN – SPIRIT APPLIED ALONE

Spirit controls many weeds, including several triazine-resistant biotypes, when applied postemergence in corn at the rate and timings recommended in Table 1. Applications should be made to weeds in the optimum size range recommended; larger weeds may be only partially controlled. For optimum control, do not cultivate until approximately 7 days after Spirit application, if cultivation is to be used. Deep cultivation (greater than 4 inches) after application of Spirit may dilute the herbicide in the soil profile and reduce residual control.

Spirit may be applied postemergence (over-the-top or directed) to field corn between 4 and 24 inches in height. To ensure good spray coverage of the weeds and avoid potential crop injury, applications made when the field corn is 20-24 inches tall or exhibits more than six collars (V6), whichever comes first, should be directed using drop nozzles. Since Spirit offers up to 4 weeks residual weed control, it is more important to time applications to the optimum weed heights listed in Table 1, rather than corn height. In drier climates (i.e., the western Cornbelt), crop oil concentrate (COC) is the preferred additive, instead of nonionic surfactant, when applying Spirit alone. If weeds other than those listed in Table 1 are anticipated, apply an appropriately labeled preplant, preemergence, or postemergence herbicide or herbicide combination. Dual II, Dual II Magnum, Bicep II, Bicep II Magnum, Bicep Lite II, Bicep Lite II Magnum, Dual II + AAtrex are examples of herbicide treatments that can precede Spirit application. Consult their respective labels for directions, precautions, and limitations before applying.

**Table 1: Weeds Controlled or Partially Suppressed with Spirit
Applied Postemergence at 1 oz./A.**

Weeds Controlled	Weed Size Ranges for Optimum Control (inches)
Amaranth, Palmer (<i>Amaranthus palmeri</i>) [*]	1-4
Anoda, Spurred (<i>Anoda cristata</i>)	1-4
Artichoke, Jerusalem (<i>Helianthus tuberosus</i>)	1-6
Beggarweed, Florida (<i>Desmodium tortuosum</i>)	1-4
Bindweed, Field (<i>Convolvulus arvensis</i>) [*]	2-4
Bindweed, Hedge (<i>Calystegia sepium</i>)	1-3
Buckwheat, Wild (<i>Polygonum convolvulus</i>) [*]	2-4
Buffalobur (<i>Solanum rostratum</i>)	1-5
Burcucumber (<i>Sicyos angulatus</i>)	1-6
Carrot, Wild (<i>Daucus carota</i>)	1-3
Cocklebur, Common (<i>Xanthium strumarium</i>) [*]	2-8
Dandelion (<i>Taraxacum officinale</i>)	1-4
Devil's-Claw (<i>Proboscidea louisianica</i>)	2-6
Foxtail, Yellow (<i>Setaria glauca</i>) [*]	1-3
Horsenettle (<i>Solanum carolinense</i>) [*]	2-9
Horseweed (Marestail) (<i>Conyza canadensis</i>)	1-6
Jimsonweed (<i>Datura stramonium</i>)	1-6
Johnsongrass, Rhizome (<i>Sorghum halepense</i>) [*]	8-16
Johnsongrass, Seedling (<i>Sorghum halepense</i>) [*]	4-12
Kochia (<i>Kochia scoparia</i>) [*]	1-4
Lambsquarters, Common (<i>Chenopodium album</i>)	1-3
Mallow, Common (<i>Malva neglecta</i>) [*]	1-3
Mallow, Venice (<i>Hibiscus trionum</i>)	1-4
Morningglory, Ivyleaf (<i>Ipomoea hederacea</i>) [*]	1-4
Morningglory, Pitted (<i>Ipomoea lacunosa</i>) [*]	1-4
Morningglory, Tall (<i>Ipomoea purpurea</i>) [*]	1-4
Mustard, Wild (<i>Brassica kaber</i>)	1-6
Nightshade, Black (<i>Solanum nigrum</i>)	1-5
Nightshade, Eastern Black (<i>Solanum ptycanthum</i>)	1-5
Pigweed, Redroot (<i>Amaranthus retroflexus</i>) [*]	1-4
Pigweed, Smooth (<i>Amaranthus hybridus</i>) [*]	1-4
Pokeweed, Common (<i>Phytolacca americana</i>) [*]	2-12
Puncturevine (<i>Tribulus terrestris</i>)	1-5
Pusley, Florida (<i>Richardia scabra</i>)	1-4
Quackgrass (<i>Elytrigia repens</i>) [*]	4-8
Ragweed, Common (<i>Ambrosia artemisiifolia</i>)	2-9
Ragweed, Giant (<i>Ambrosia trifida</i>)	2-9
Sesbania, Hemp (<i>Sesbania exaltata</i>)	1-5
Shattercane (<i>Sorghum bicolor</i>) [*]	4-12
Sicklepod (<i>Cassia obtusifolia</i>)	1-3
Sida, Prickly (<i>Sida spinosa</i>) [*]	1-3
Smartweed, Pennsylvania (<i>Polygonum pennsylvanicum</i>)	1-6
Sorghum-alumum (<i>Sorghum alumum</i>) [*]	4-12
Sorghum, Volunteer (<i>Sorghum bicolor</i>) [*]	4-12
Sunflower, Common (<i>Helianthus annuus</i>)	1-12
Thistle, Canada (<i>Cirsium arvense</i>) [*]	2-9
Velvetleaf (<i>Abutilon theophrasti</i>) [*]	1-6
Waterhemp, Common (<i>Amaranthus rudis</i>) [*]	1-4
Waterhemp, Tall (<i>Amaranthus tuberculatus</i>) [*]	1-4

^{*} Partial control.

- ² Certain biotypes of this weed species are known to be resistant to this and other ALS-herbicides. Where these ALS-resistant biotypes are known to exist, an appropriate registered herbicide with another mode of action, active against that weed at the recommended use rate, should be used alone or in tank mixture with Spirit to control those biotypes.
- ³ Spray after true leaves have emerged; earlier applications may result in unacceptable control.
- ⁴ For optimum control of velvetleaf, include nitrogen in the spray mixture; refer to the **Mixing Instructions** section.

CORN – SPIRIT APPLIED IN TANK MIXTURES

Spirit may be applied postemergence in various tank mixtures: (a) for improved control of weeds not fully controlled by Spirit alone; (b) to control weeds which are larger than the optimum size range in Table 1; (c) to include a different mode of action herbicide to help control or manage resistant weed biotypes; or (d) to broaden the weed control spectrum (refer to Table 2). For all tank mixtures of Spirit with other herbicides, refer to both labels for weeds controlled and application information; and **follow all restrictions and precautions on both labels**. The tank mixtures in Table 2 will control the weeds listed in that table when treated at the growth stages recommended, plus the weeds at the weed sizes listed in Table 1. Refer to the **Mixing Instructions** section of this label.

If another herbicide application is desired following the use of Spirit, do not apply Spirit a second time; i.e., make only one application of Spirit during a cropping season.

Waterhemp and other Amaranth Control Program: Common waterhemp, tall waterhemp, Palmer amaranth, smooth and redroot pigweed are prolific seed producers, and have a long germination period. ALS-resistant biotypes exist, and have become problem weeds in certain areas. The following 3-step program has provided good results for control of heavy infestations of these weeds: (1) Apply Bicep II, Bicep II Magnum, Bicep Lite II, Bicep Lite II Magnum, Dual II, or Dual II Magnum early preplant, preplant incorporated, or preemergence at the recommended rate for that soil. If weeds have emerged prior to the application of Bicep II, Bicep II Magnum, Bicep Lite II, Bicep Lite II Magnum, Dual II, or Dual II Magnum, control them with tillage or a burndown herbicide; (2) Apply a postemergence tank mixture of Spirit plus Banvel, Clarity, AAtrex (atrazine), or Marksman (refer to Table 2 regarding timings, rates, and additives for these tank mixtures); and (3) If needed, cultivate 1-3 weeks after the postemergence application. In addition to controlling waterhemp and other amaranth species, this program is also effective in controlling most other weeds common in corn.

IMPORTANT: FOR TANK MIXTURES WITH AATREX® (OR OTHER BRANDS OF ATRAZINE) – If applying Spirit in tank mixture with AAtrex (atrazine), all the restrictions and instructions on the AAtrex (atrazine) label must be followed, if more restrictive/protective than those on this label.

Table 2: Spirit Tank Mixtures – Use Spirit at 1 oz./A and add one of the mixing partners recommended below.

Weed and Recommended Size (inches) ¹	Tank-Mix Partner and Rate	Recommended Additive ³	Corn Height Range (inches)
Canada Thistle (1-8) Other Thistles (1-6) ² Field Bindweed (2-8) ² Hemp Dogbane (3-10) ² Horsenettle (2-6) Poison Ivy (1-3) ² Pokeweed (2-10) Milkweeds (2-8) ²	Banvel 1/4-1/2 pt./A or Clarity 1/4-1/2 pt./A or 2,4-D 1/4-1/2 pt./A 4EC	NIS NIS NIS	4-12 or 8-24 directed 4-12 or 8-24 directed 4-8 or 8-24 directed
Giant Ragweed (2-12 or heavy infestations)	Beacon® 0.19 oz./A	COC or NIS	4-20
Cocklebur (2-12) Lambsquarters (1-8 or heavy infestations) Morningglories (1-6 or heavy infestations) Ragweed, Common (2-12) Smartweed (1-8) Velvetleaf (1-10)	AAtrex (atrazine) ⁴ 1/4-1/2 qts./A 4L or Banvel or Clarity 1/4-1/2 pt./A (1/4-1/2 pt./A for ALS-resistant weeds) or Buctril 1/2-1 pt./A or Buctril+atrazine 1-2 1/2 pts./A or Marksman 1-2 pts./A	COC NIS ⁵ NIS NIS NIS	4-12 or 8-12 directed 4-20 or 8-24 directed 4-20 or 8-24 directed 4-12 or 8-12 directed 4-12 or 8-12 directed
Kochia (1-8 or areas with confirmed ALS resistance 1-6) Pigweeds, Palmer Amaranth, and Waterhemp (1-6 or ALS-resistant)	AAtrex (atrazine) 1-1 1/2 qts./A 4L or Banvel or Clarity 1/4-1/2 pt./A (1/4-1/2 pt./A for ALS-resistant weeds) or Marksman 1-2 pts./A or Tough® 3.75EC ⁵ 1-2 pts./A	COC NIS NIS COC or NIS	4-12 or 8-12 directed 4-20 or 8-24 directed 4-12 or 8-12 directed 4-20
Johnsongrass (3-15) Quackgrass (3-8) Shattercane (4-12)	Beacon 0.19 oz./A or Accent® 1/4 oz./A or Accent 1/4 oz./A + Banvel or Clarity 1/4-1/2 pt./A	COC or NIS COC or NIS NIS ⁵	4-20 or 8-24 4-20 or 8-24 directed 4-12 or 8-24 directed
Other Grasses – refer to Accent label	Accent 1/4-1/2 oz./A or Accent 1/4-1/2 oz./A + Banvel or Clarity 1/4-1/2 pt./A	COC or NIS NIS ⁵	4-20 or 8-24 directed 4-12 or 8-24 directed

¹Recommended weed sizes for optimum control.

²Partial control.

³NIS=Nonionic Surfactant or COC = Crop Oil Concentrate; nitrogen may also be added, refer to the **Mixing Instructions** section of this label.

⁴Mixtures with AAtrex (atrazine) or premixes containing atrazine may result in some reduction in control (antagonism) on cocklebur, quackgrass, sunflower, and velvetleaf.

⁵Mixtures with Tough may result in some reduction in control (antagonism) on velvetleaf.

If 1/4 pt./A (2 oz./A) of Banvel or Clarity is used, COC may be used in place of NIS. At higher rates of Banvel or Clarity, only use NIS or NIS + fertilizer (i.e., 28% UAN, etc.). When kochia, pigweeds, Palmer amaranth, and/or waterhemp are present, the minimum rate of Banvel or Clarity recommended is 1/4 pt./A.

CROP FAILURE

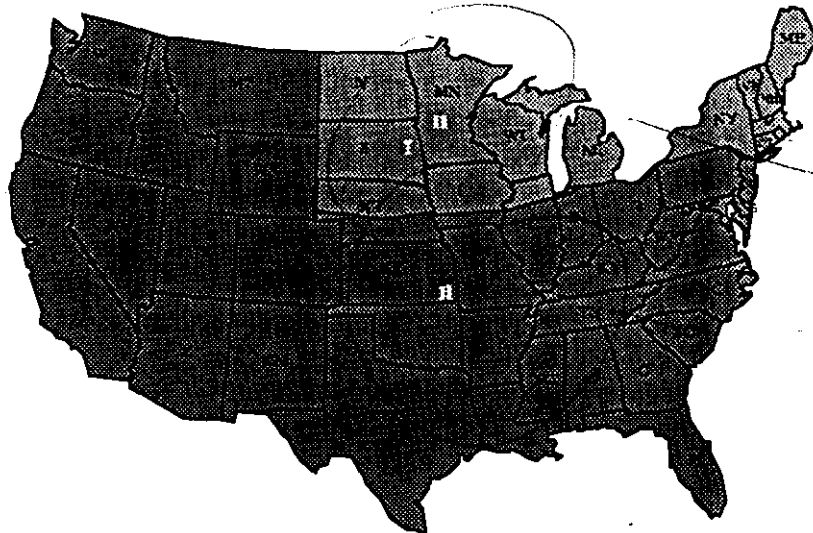
If corn treated with Spirit is lost due to a natural catastrophe, such as hail or frost, normal field corn may be replanted, but not until 4 weeks or more after application. An IR or IMR corn hybrid may be replanted immediately. For control of weeds in replanted corn, Spirit may not be applied a second time; i.e., only one application of Spirit may be applied during the cropping season.

ROTATIONAL CROPS

The following crops may be planted at the intervals indicated following an application of Spirit. Planting at shorter intervals may result in injury to the rotational crop and/or illegal residues.

Rotational Crops	Region A Minimum Plant Back Interval Where Soil pH is Below 7.8	Region B Minimum Plant Back Interval Where Soil pH is Below 7.8
Soybeans	18 mos.	10 mos.
STS Soybeans ¹	18 mos.	10 mos.
Cotton	--	10 mos.
Canola, Dry Beans, Flax, Potatoes, Sweet Potatoes, Tobacco, Tomatoes	18 mos.	10 mos.

¹STS Soybeans have enhanced tolerance to certain sulfonylurea herbicides. For soil pH at 7.8 or above, refer to Exception #4.



Note: Border between Regions A&B follow Interstate 80, unless otherwise indicated.

Rotational Crops (Region A&B)	Minimum Plant Back Interval Where Soil pH is Below 7.8	Comments
IR or IMR Field Corn Hybrids	None	Refer to Crop Failure section
Normal Field Corn	4 Weeks	Refer to Crop Failure section
Wheat, Barley, Rye, Oats, Triticale	3 Months	
Popcorn, Sweet Corn	8 Months	
Sorghums, Cabbage, Forage Grasses, Green Beans, Peas, Proso Millet, Rice, Snap Beans	10 Months	Refer to Notes below
Alfalfa, Clovers, Lentils	18 Months	Refer to Notes below
Sunflowers, Sugar Beets, Leeks, Onions	18 Months; 36 Months in the Red River Valley area of MN or ND	
All other crops	18 Months	

For soil pH at 7.8 or above, refer to Exception #4.

Exceptions to the above tables:

1. **In Region A of the northern U.S.** (i.e., north of Interstate 80, including CT, IA, IL, MA, ME, MI, MN, ND, NE, NH, NY, RI, SD, VT, and WI (see county listings below) rotate only to field corn, popcorn, sweet corn, sorghum, wheat, barley, rye, oats, triticale, proso millet, or forage grasses the next year, or crop injury may occur. The following IA counties and all those located to the north are included in **Region A**: Harrison, Shelby, Audubon, Guthrie, Dallas, Polk, Jasper, Poweshiek, Iowa, Johnson, Muscatine, Cedar, and Scott. All NE counties intersected by I-80 are included in **Region B** except for the following northern counties which are included in **Region A**: Deuel, Cheyenne, and Kimball. The following NE counties located North of I-80 are included in **Region B**: Saunders, Butler, Polk, and Merrick. The following IL counties are included in **Region A**: Whiteside, Carroll, Joe Daviess, Stephenson, Lee, Ogle, Winnebago, Boone, DeKalb, Kane, McHenry, Cook, DuPage, and Lake.
2. **In the Red River Valley area of MN or ND or areas adjacent to the Red River Valley with the same soil type**, use this product only when field corn or small grain cereals will be the only crop grown the following year.
3. **In west TX, western OK, NM, AZ, CO, WY, the panhandle of NE, ID, UT, and the intermountain areas of WA and OR**, use this product only when corn, sorghum, small grain cereals, proso millet, cotton, dry beans, or peas will be the only crop grown the following year. Note pH and rainfall/irrigation restrictions in exceptions 5 and 6 below.
4. **For the entire U.S., in areas with very high pH soils (7.8 or higher)**, such as areas where iron chlorosis occurs or where calcareous deposits are visible in the soil, stunting or injury of soybeans or other broadleaf crops may occur the year following a Spirit application. In these areas, use Spirit only if field corn, sorghum, small grain cereals, or proso millet will be planted the next year. This restriction does not apply to MS, LA, AR and southern and eastern TX, including South Texas, the Lower Rio Grande Valley, the Coastal Bend, and the Blacklands. In these areas, cotton or soybeans can be planted on all soils (at least 10 months after application) provided there are at least 12 inches of rainfall or irrigation during the first 5 months after application of Spirit. Caution: Irrigation with alkaline water can result in elevated soil pH. Refer also to Precaution Statement 6.
5. **For the entire U.S., if severe drought conditions develop** (less than 12 inches of rainfall/irrigation within the first 5 months following application of Spirit and/or less than 1 inch within the first 4 weeks

after application) rotate only to field corn, sorghum, wheat, barley, rye, oats, triticale, proso millet, forage grasses, cotton, or STS soybeans (if not located in Region A), which have enhanced tolerance to certain sulfonylurea herbicides the next year, or crop injury may occur.

6. For rotational crop restrictions **when Spirit is used in tank mixtures or sequentially with other herbicides registered**, refer to the rotational intervals and exceptions above for Spirit and to the respective product label of any mixing partner for additional restrictions and use the longest interval.

STORAGE AND DISPOSAL

Pesticide Storage

Store in a cool, dry place. Do not store this product under wet conditions. Handle outer bag carefully to avoid breakage of inner soluble packets.

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

Do not reuse outer bag. Dispose of outer bag in a sanitary landfill, or by incineration, 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

Causes eye irritation. Harmful if swallowed, inhaled, or absorbed through skin. Avoid contact with eyes, skin, or clothing. Avoid breathing vapor or spray mist.

Statement of Practical Treatment

If in eyes: Flush eyes with plenty of water. Get medical attention if irritation persists.

If inhaled: Remove victim to fresh air.

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. Do not induce vomiting or give anything by mouth to an unconscious person.

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

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

Engineering Control Statements

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

User Safety Recommendations

Users should:

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

Environmental Hazards

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 waters or rinsate.

This chemical demonstrates the properties and characteristics associated with chemicals detected in ground water. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in ground water contamination.

AAtrex®, CustomPak™, Beacon®, Bicep II®, Bicep II Magnum™, Bicep Lite II®, Bicep Lite II Magnum™, Dual II®, Dual II Magnum™, Spirit™, and Tough® trademarks of Novartis
U.S. Patent Nos. 4,478,635; 4,671,819

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Novartis Crop Protection, Inc.
Greensboro, North Carolina 27419

NCP 911A-L1(DRAFT)

[QUARK\SPIRIT\SPIRIT-A] - ccg - 4/30/99

(Booklet Back Cover)

CustomPak™

Spirit™

HERBICIDE

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

Active Ingredients:

Prosulfuron: 1-(4-methoxy-6-methyl-
triazin-2-yl)-3-[2-(3,3,3-trifluoropropyl)-
phenylsulfonyl]-urea14.2%

Primisulfuron-methyl: 3-[4,6-bis
(difluoromethoxy)-pyrimidin-2-yl]-1-(2-
methoxycarbonylphenylsulfonyl) urea42.8%

Inert Ingredients:43.0%

Total:100.0%

Spirit is water-dispersible granules.

20 OUNCES
NET WEIGHT

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.

EPA Reg. No. 100-911

EPA Est. 100-LA-1

Product ID. 12553

Precautionary Statements

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U.S. Patent No. 4,671,819

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