

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

1 of 22

PM 23

10182-353

12-13-99

DEC 13 1999

Andrew A. Davidson
 Zeneca Ag Products
 P.O. Box 15458
 Wilmington, DE 19850-5458

Dear Mr. Davidson:

Subject: Revised Labeling - Revised Ingredient Statement
 Diquat Herbicide
 EPA Registration No. 10182-353
 Your Submission Dated August 9, 1999

The labeling referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, is acceptable with the following provisions:

- 1) Add a referral statement after the front panel signal word to refer users to the remaining precautionary language elsewhere on the labeling.
- 2) Revise the dermal statement, eye statement, and inhalation statement in the Statement of Practical Treatment to read as follows:

"IF ON SKIN: Wash with plenty of soap and water. Get medical attention."

"IF IN EYES: Hold eyelids open and flush with a steady, gentle stream of water for 15 minutes. Get medical attention."

"IF INHALED: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention."

We note the inclusion of the word "immediately" that currently appears in the beginning of each statement of practical treatment (e.g., "IMMEDIATELY wash with plenty of soap and water..."). This inclusion is acceptable and may be retained at your option.

DK: 305-7546: HB/PM23

CONCURRENCES

		CONCURRENCES						
SYMBOL	7505C							
SURNAME	D. KENNY							
DATE	12/13/99							

- 3) Make the following revisions to the Precautionary Statements:
 - a) Revise the first sentence to read "May be fatal if absorbed through skin."
 - b) Add the statement "Harmful if swallowed or inhaled."
 - c) Add the statement "Avoid breathing vapor or spray mist."
- 4) Revise the first sentence in the Environmental Hazards section to read "This pesticide is toxic to aquatic invertebrates."
- 5) Revise the Container Disposal statement in the Storage and Disposal block to read "Do not reuse container. Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke."
- 6) We note that the rate chart for Noncrop or Non-Planted Areas on Farms specifies an application rate of "1 - 2 quarts/100 gallons". This rate should be revised to read "1 - 2 quarts/100 gallons of water per acre" so that it applies to broadcast application as well as to spot treatment. At your option, two rates may be given, one to correspond with spot treatment and one to correspond with broadcast treatment.
- 7) Add the appropriate EPA Establishment Number.
- 8) Add the appropriate Net Contents statement.

A stamped copy is enclosed for your records. Please submit one (1) final printed copy for the referenced label, incorporating the above changes, before releasing the product for shipment.

The Agency has also reviewed your submission for the revised Confidential Statement of Formula dated August 6, 1999 for the basic formulation. It has been determined that the Confidential Statement of Formula agrees with the label claim in compliance with PR Notice 91-2 and is acceptable. The Confidential Statement of Formula has been added to your file as part of the record.

Sincerely yours,

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

Enclosure

Diquat Herbicide

TO PREVENT ACCIDENTAL POISONING, NEVER PUT INTO FOOD, DRINK OR OTHER CONTAINERS AND USE STRICTLY IN ACCORDANCE WITH ENTIRE LABEL

DO NOT USE THIS PRODUCT FOR REFORMULATION

KEEP OUT OF REACH OF CHILDREN

WARNING - AVISO

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

ACTIVE INGREDIENT:

Diquat dibromide [6,7-dihydrodipyrido (1,2-a:2',1'-c) pyrazinedium dibromide]	36.4	37.3%
INERT INGREDIENTS	63.6	62.7%
TOTAL		100.0%

Contains 2 lbs. diquat cation per gal. as 3.73 lbs. salt per gal.

EPA Reg. No.: 10182-353

**ACCEPTED
with COMMENTS
in EPA Letter Dated**

DEC 13 1999

**Under the Federal Insecticide,
Fungicide, and Rodenticide Act
as amended, for the pesticide
registered under EPA Reg. No.
10182-353**

Made in U.S.A.
 ZENECA Ag Products
 ZENECA Inc.
 Wilmington, DE 19850-5458

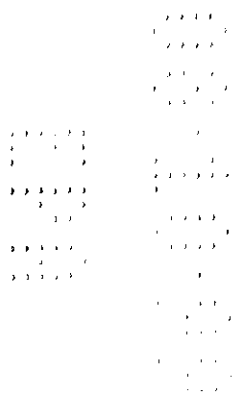
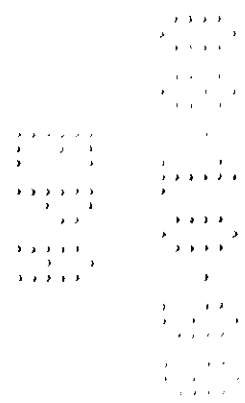


TABLE OF CONTENTS

	Page
STATEMENT OF PRACTICAL TREATMENT	
PRECAUTIONARY STATEMENTS	
HAZARDS TO HUMANS AND DOMESTIC ANIMALS	
PERSONAL PROTECTIVE EQUIPMENT	
ENVIRONMENTAL HAZARDS	
DIRECTIONS FOR USE	
DIRECTIONS	
AGRICULTURAL USE REQUIREMENTS	
REGIONAL USE MAP	
NON-AGRICULTURAL USE REQUIREMENTS	
AQUATIC USE DIRECTIONS	
STORAGE AND DISPOSAL	



STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED: IMMEDIATELY give water or milk to drink and induce vomiting by inserting finger in throat. Do not induce vomiting or give anything by mouth to an unconscious person. Take person and product container to the nearest hospital or physician fast. **PROMPT TREATMENT IS ESSENTIAL TO COUNTERACT POISONING** and should be initiated before signs and symptoms of injury appear.

IF ON SKIN: IMMEDIATELY wash with soap and water. See a doctor if diquat contacts a skin cut, abrasion or area of irritation.

IF IN EYES: IMMEDIATELY wash eyes with water for at least 15 minutes and get medical attention.

IF INHALED: IMMEDIATELY get away from spray mist. Stop and check spray procedure. See a doctor if irritation persists.

NOTE TO PHYSICIANS: Call ZENECA Medical Emergency Information Network 1-800-F-A-S-T-M-E-D (327-8633) at any hour to obtain toxicology information and a diquat analysis. To be effective, treatment for diquat poisoning must begin **IMMEDIATELY**. Treatment consists of binding diquat in the gut with suspensions of activated charcoal or bentonite clay, administration of cathartics to enhance elimination, and removal of diquat from the blood by charcoal hemoperfusion or continuous hemodialysis.

FOR 24-HOUR EMERGENCY MEDICAL ASSISTANCE CALL 1-800-F-A-S-T-M-E-D (327-8633).

FOR CHEMICAL EMERGENCY: Spill, leak, fire, exposure, or accident call CHEMTREC 1-800-424-9300.

PRECAUTIONARY STATEMENTS

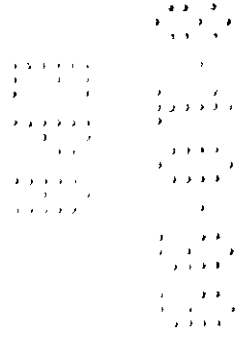
**HAZARDS TO HUMANS & DOMESTIC ANIMALS
WARNING**

MAY BE FATAL IF SWALLOWED, INHALED OR ABSORBED THROUGH THE SKIN. CAUSES SUBSTANTIAL, BUT TEMPORARY, EYE INJURY. CAUSES SKIN IRRITATION. CONTACT WITH IRRITATED SKIN, OR A CUT, OR REPEATED CONTACT WITH INTACT SKIN MAY RESULT IN POISONING. Do not get in eyes, on skin or on clothing. Do not breathe spray mist. Do not feed forage from treated crops to livestock. Keep livestock and pets out of treated fields and crop areas.

PERSONAL PROTECTIVE EQUIPMENT

Applicators and other handlers must wear:

- Coveralls over short-sleeved shirt and short pants.
- Waterproof gloves.
- Chemical-resistant footwear plus socks.
- Protective eyewear.
- Chemical-resistant headgear for overhead exposure.
- Chemical-resistant apron when cleaning equipment, mixing, or loading.



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

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. Mixers, loaders, and applicators using closed systems who meet these requirements may wear: long-sleeved shirt and long pants, protective eyewear, waterproof gloves, shoes plus socks and a chemical-resistant apron when mixing, loading or cleaning equipment. If handling tasks are performed from inside an enclosed cab or aircraft with enclosed cockpits that meet these requirements may wear: long-sleeved shirt, long pants, shoes and socks for the labeling-specified PPE. All labeling-specified PPE must be immediately available for use in an emergency. All applicable requirements as specified in 40 CFR 170.240 (d) (4-6) must be followed.

User Safety Recommendations

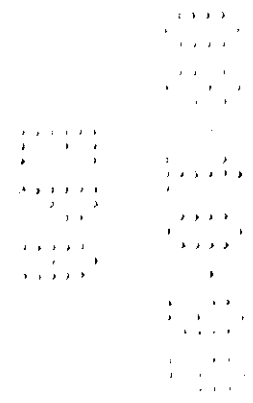
Users should:

- 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 (TERRESTRIAL AND AQUATIC USES)

This pesticide is toxic to wildlife. For **Terrestrial Uses**, do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters. For **Aquatic Uses**, do not apply directly to water except as specified on this label. Treatment of dense weed areas may result in oxygen loss from decomposition of dead weeds. This loss of oxygen may cause fish suffocation. Therefore, treat only 1/3 to 1/2 of the water body area at one time, especially if dense areas of weeds and/or algae exist and wait 14 days between treatments.

Necessary approval and/or Permits should be obtained prior to application if required. Consult the responsible State Agencies (i.e., Fish and Game agencies or Department of Natural Resources) before making applications to public waters.



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.

READ ENTIRE LABEL. USE STRICTLY IN ACCORDANCE WITH PRECAUTIONARY STATEMENTS AND DIRECTIONS, AND WITH APPLICABLE STATE AND FEDERAL REGULATIONS.

DO NOT APPLY THIS PRODUCT THROUGH ANY TYPE OF IRRIGATION SYSTEM.

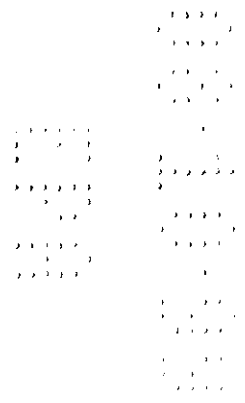
AGRICULTURAL USE REQUIREMENTS

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 24 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 over short-sleeved shirt and short pants.
- Waterproof gloves.
- Chemical-resistant footwear plus socks.
- Protective eyewear.
- Chemical-resistant headgear for overhead exposure.



STORAGE AND DISPOSAL

PROHIBITIONS: Do not contaminate water, food or feed by storage, disposal or cleaning of equipment. Open dumping is prohibited.

STORAGE: Keep pesticide in original container. Do not put concentrate or dilute into food or drink containers. Do not contaminate feed, foodstuffs or drinking water. Do not store or transport near feed or food. Store at temperature above 32°F. For help with any spill, leak, fire or exposure involving this material, call CHEMTREC (1-800-424-9300).

PESTICIDE DISPOSAL: Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

CONTAINER DISPOSAL: Triple rinse (or equivalent). Do not reuse container. Incinerate, burn, or puncture and dispose of in a sanitary landfill, or dispose of by other procedures allowed by State and local authorities. If burned, stay out of smoke.

FOR BULK AND MINI-BULK CONTAINERS:

CONTAINER DISPOSAL: Reseal container and offer for reconditioning, or triple rinse (or equivalent) and offer for recycling or reconditioning, or clean in accordance with manufacturer's instructions.

CONTAINER PRECAUTIONS: Before refilling, inspect thoroughly for damage, such as cracks, punctures, bulges, dents, abrasions and damaged or worn threads on closure devices.

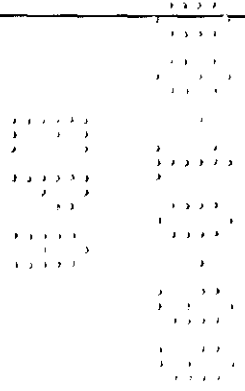
CONTAINER HANDLING: After emptying, replace valve caps and tightly re-bolt top hatch of tank car or truck. Follow ZENECA's instructions for the return of empty tank cars.

REFILL ONLY WITH DIQUAT HERBICIDE. The contents of this container cannot be completely removed by cleaning. Refilling with materials other than Diquat Herbicide will result in contamination and may weaken container.

After filling and before transporting, check for leaks.

Do not refill or transport damaged or leaking container.

CONTAINER IS NOT SAFE FOR FOOD, FEED OR DRINKING WATER!



GENERAL INFORMATION

DIQUAT herbicide is a nonvolatile herbicide for use as a preharvest aid to desiccate certain crops in order to facilitate harvesting. DIQUAT is also recommended for use as a general herbicide to control weeds in noncrop areas, nonbearing crops and aquatic areas. DIQUAT is a contact-type herbicide and requires actively growing green plant tissue to function. Thorough coverage of all green plant tissue is essential for effective control. DIQUAT is rapidly absorbed by green plant tissue and interacts with the phytosynthetic process to produce compounds which destroy plant cells. Herbicidal activity is usually quite rapid with effects visible in a few days.

AGRICULTURAL USE DIRECTIONS

APPLICATION

Since DIQUAT is a contact-type herbicide, it is essential to obtain complete coverage of the target weed or crop to achieve effective results. Improper application technique and/or application to large, stressed or mowed weeds will generally result in unacceptable control. Complete coverage is also essential for effective performance in harvest aid applications. See details below for additional information.

Nozzle Selection: The use of flat fan nozzles will result in the most effective application of DIQUAT herbicide. The use of nozzles other than flat fans may result in reduced performance due to inadequate coverage.

Spray Volume: Follow recommended minimum spray volumes listed for each use of DIQUAT herbicide. These are minimum volumes only, and spray volumes should be increased as necessary to obtain complete coverage of the target weed or plant without runoff from the foliage. When spraying less than 20 gallons of spray carrier per acre, target weeds should not exceed 6 inches in height.

SPRAY ADJUVANTS

ALWAYS ADD ONE OF THE FOLLOWING:

Nonionic Surfactant (NIS): Add a NIS containing 75% or greater surface active agent at 0.06 to 0.5% v/v (1/2 to 4 pints per 100 gallons) of the finished spray volume.

Other Adjuvants: Adjuvants other than NIS may be used providing the product meets the following criteria:

1. Contains only EPA exempt ingredients.
2. Is compatible in mixture. Compatibility may be established through a jar test.
3. Is supported locally for use with DIQUAT herbicide through proven field trials and through university and extension recommendations.

RATES

Follow recommended rates listed with each use of DIQUAT herbicide. Use the higher labeled rates when weeds are large or dense. Also, use higher labeled rates for harvest aid when crop vegetation is dense.

APPLICATION TIMING

DIQUAT herbicide should be applied to emerged weeds when they are small. Weeds 1 inch to 6 inches in height are the easiest to control. When weeds have been grazed or mowed, thus removing much of the green foliage, allow the weeds to regrow to a height of 2 to 4 inches before spraying. For proper application timing of harvest aid applications, refer to each crop for recommendations.

Weeds emerging after application of DIQUAT Herbicide will not be controlled or suppressed.

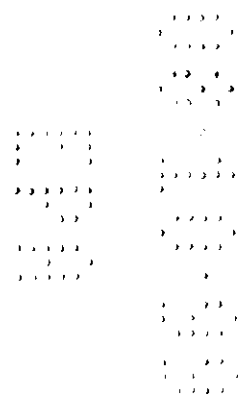
RAINFASTNESS

Because DIQUAT herbicide is rapidly absorbed by green plant tissue, rain occurring 30 minutes after application will have no effect on the activity of DIQUAT.

ENVIRONMENTAL CONDITIONS

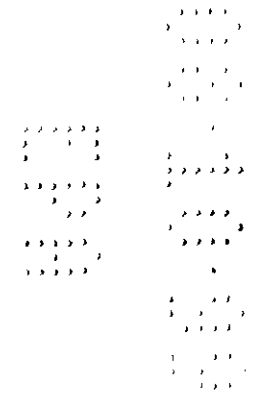
DIQUAT herbicide is active over a wide range of environmental conditions. Cool weather (below 55° F) will slow the activity of DIQUAT, as will cloudy, overcast weather, but will not affect performance.

In dry areas, dust stirred up by high winds or equipment tires can coat target surface and reduce DIQUAT activity. Avoid applying DIQUAT in extremely dusty conditions.



Crop	Use Pattern	DIQUAT Rate per Acre	Minimum Total Spray Volume Per Acre	Preharvest Interval (Days)	Precautions, Restrictions and Comments
POTATO	Preharvest desiccation broadcast	1-2 pints	Ground: 20 gal. Air: 5 gal.	7	<ul style="list-style-type: none">• Do not apply to drought stressed potatoes.• Make a second application if necessary to obtain additional desiccation where vine growth is dense. For improved vine coverage, a 5 day interval is recommended between applications.• Do not exceed a total of 4 pints per acre.
SORGHUM, GRAIN (seed crop only)	Preharvest desiccation broadcast	1 ½ to 2 pints	Ground: 15 gal. Air: 5 gal.	-	<ul style="list-style-type: none">• Apply within 1 to 2 weeks of harvest and when seeds have not more than 30% moisture.• Do not graze or feed treated forage to livestock.• Do not use seed from treated plants for food, feed, or oil purposes.

Crop	Use Pattern	DIQUAT Rate per Acre	Minimum Total Spray Volume Per Acre	Preharvest Interval (Days)	Precautions, Restrictions and Comments
SOYBEAN (seed crop only)	Preharvest desiccation broadcast	1 ½ to 2 pints	Ground: 15 gal. Air: 5 gal.	-	<ul style="list-style-type: none">• Apply one week before harvest.• Do not graze or feed treated forage to livestock.• Do not use seed from treated plants for food, feed, or oil purposes.



Crop	Use Pattern	DIQUAT Rate per Acre	Minimum Total Spray Volume Per Acre	Preharvest Interval	Precautions, Restrictions and Comments
<p>TREE, VINE, SMALL FRUIT, VEGETABLE CROPS - NONBEARING</p> <p>Acerola (West Indian Cherry) Almonds Apple Apricots Artichokes Asparagus Avocados Bananas Blackberry Blueberry Boysenberry Cherries Coffee Conifers Crabapple Cranberry Dates Dewberry Elderberry Figs Filberts Ginseng Gooseberry Grapes Grapefruit Guava Huckleberry Jojoba Kiwi Lemons Limes Loganberry Macadamia Mango Nectarines Olives Oranges Papayas Passion Fruit</p>	<p>Directed spray</p>	<p>1 ½ to 2 pints</p>	<p>Ground: 15 gal.</p>	<p>Do not use for food or feed for one year after application.</p>	<ul style="list-style-type: none"> • DIQUAT can be used during site preparation prior to planting and up to 1 year of harvest. • Retreatment may be necessary for complete control of grasses and older established weeds. • Do not allow spray to contact green stems, foliage or fruit as injury can occur. • Use a shield or wrap plant when spraying around young trees or vines. • Do not graze treated areas.

Crop	Use Pattern	DIQUAT Rate per Acre	Minimum Total Spray Volume Per Acre	Preharvest Interval	Precautions, Restrictions and Comments
<p>TREE, VINE, SMALL FRUIT, VEGETABLE CROPS - NONBEARING</p> <p>Peaches Pears Pecans Persimmons Pistachios Plantains Plums Pomegranates Prunes Raspberry Tangelos Tangerines Walnuts</p>	<p>Directed spray</p>	<p>1 ½ to 2 pints</p>	<p>Ground: 15 gal.</p>	<p>Do not use for food or feed for one year after application.</p>	<ul style="list-style-type: none"> • DIQUAT can be used during site preparation prior to planting and up to 1 year of harvest. • Retreatment may be necessary for complete control of grasses and older established weeds. • Do not allow spray to contact green stems, foliage or fruit as injury can occur. • Use a shield or wrap plant when spraying around young trees or vines. • Do not graze treated areas.

NON-AGRICULTURAL USES:

NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Keep all unprotected persons out of operating areas or vicinity where there may be drift.

Do not allow people or pets to touch treated plants until the sprays have dried.

For terrestrial uses, do not allow entry of maintenance workers into treated areas, or allow contact with treated vegetation wet with spray, dew or rain, without appropriate protective clothing until spray has dried.

For aquatic uses, do not enter treated areas while treatments are in progress.

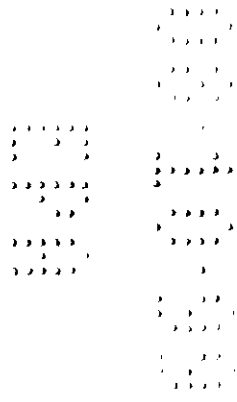
**WATER USE RESTRICTIONS FOLLOWING APPLICATIONS
WITH DIQUAT HERBICIDE (Days)**

Application Rate	Drinking	Fishing and Swimming	Livestock Consumption	Spray Tank Applications** and Irrigation to Turf and Ornamentals	Spray Tank Applications** and Irrigation to Food Crops
2 gal/surface acre	3 days	0	1 day	3 days	5 days
1 gal/surface acre	2 days	0	1 day	2 days	5 days
0.75 gal/surface acre	2 days	0	1 day	2 days	5 days
0.50 gal/surface acre	1 day	0	1 day	1 day	5 days
Spot Spray* (< 0.5 gal/surface acre)	1 day	0	1 day	1 day	5 days

* Rates refer to total surface area.

**For preparing agricultural sprays for food crops, turf or ornamentals (to prevent phytotoxicity), do not use water treated with Diquat before the specified time periods. When the contents of more than one spray tank is necessary to complete a single aquatic application, no water holding restrictions apply between the consecutive spray tanks.

No applications are to be made in areas where commercial processing of fish, resulting in the production of fish protein concentrate or fish meal, is practiced. Before application, coordination and approval of local and/or State authorities must be obtained.



Apply Diquat Herbicide in accordance with the following table:

WEED SPECIES	SUBSURFACE OR BOTTOM PLACEMENT GALS/SURFACE ACRE*	SURFACE GALS/SURFACE ACRE*
Bladderwort (<i>Utricularia</i> spp.)	1-2	2
Coontail (<i>Ceratophyllum demersum</i>)	2	2
Elodea (<i>Elodea</i> spp.)	2	2
Naiad (<i>Najas</i> spp.)	1-2	2
Pondweeds ¹ (<i>Potamogeton</i> spp.)	2	2
Watermilfoils (<i>Myriophyllum</i> spp.)	1-2	2
Hydrilla (<i>Hydrilla verticillata</i>)	2	2
Waterlettuce ² (<i>Pistia Stratiotes</i>)	NA	0.5 - 0.75
Waterhyacinth ² (<i>Eichhornia crassipes</i>)	NA	0.5 - 0.75
Pennywort ³ (<i>Hydrocotyle</i> spp.)	NA	0.5 - 0.75
Frog's Bit ⁵ (<i>Limnobium spongia</i>)	NA	0.5 - 0.75
Salvinia ² (<i>Salvinia</i> spp.)	NA	0.5 - 0.75
Duckweed ⁴ (<i>Lemna</i> spp.)	NA	1
Cattails ³ (<i>Typha</i> spp.)	NA	1-2
Algae ⁵ (<i>Spirogyra</i> spp. & <i>Pithophora</i> spp.)	1-2	2

* For water less than or equal to 2 feet in average depth of treatment area, use a maximum of 1 gallon of Diquat Herbicide per surface acre. Lowest rates should be used in shallow areas where the water depth is considerably less than the coverage depth of the entire treatment area, for example, shallow shoreline area. At water temperatures below 50°-60°F efficacy and immediacy of results may be reduced.

¹ Diquat controls *Potamogeton* species except Richardson's pondweed (*P. richardsonii*). For control of *P. robbinsii*, applications must be made when the plants are in the early stages of growth such as in Spring and early Summer.

² For salvinia, waterlettuce and waterhyacinth, use the labeled rate of Diquat Herbicide in 75-200 gallons water plus the labeled rate of a 75% or greater nonionic surfactant per acre for surface sprays and for aerial application for waterlettuce and waterhyacinth control, apply the labeled rate of Diquat Herbicide in 10 to 24 gallons water plus the labeled rate of a 75% or greater nonionic surfactant per acre.

³ For pennywort and cattail control, apply in 50-150 gallons of water plus the labeled rate of a 75% or greater nonionic surfactant per acre for full coverage and thorough weed contact. Repeat treatments may be necessary to control regrowth. For best results, apply before flowering (cattail).

⁴ For duckweed control, apply as an overall spray in 50-150 gallons of water plus the labeled rate of a 75% or greater nonionic surfactant per acre. Retreatment may be necessary for plants missed in previous applications and regrowth.

⁵ For suppression of certain filamentous algae species including *Spirogyra* and *Pithophora*, apply according to the submersed use directions.

⁶ Not for use in California.

APPLICATION: In mixed weed populations, use the high rate of application as indicated by weeds present.

SUBSURFACE APPLICATIONS: Where the submersed weed growth, especially Hydrilla, has reached the water surface, apply either in a water carrier or an invert emulsion through boom trailing hoses carrying nozzle tips to apply the dilute spray below the water surface to insure adequate coverage.

BOTTOM PLACEMENT: Where the submersed weeds, especially Hydrilla, Bladderwort, and Coontail growth have reached the water surface or where water is slowly moving through the submersed weed growth that has reached the water surface, especially Hydrilla, Bladderwort, and Coontail, control may be enhanced when applied in an invert emulsion carrier injecting diluted Diquat Herbicide near the bottom with weighted hoses. The addition of a copper-based algaecide will improve control. Where algae are present along with the submersed weeds, pretreatment with copper-based algaecide at recommended rates is advised for best results.

SURFACE APPLICATION: For submerged aquatic weeds, apply Diquat Herbicide either as concentrate slowly poured directly from the container in strips or as a spray in sufficient carrier. Applications should be made to ensure complete coverage of the weed areas. In mixed weed populations, use the high rate of application as indicated by weeds present.

SPRAY DRIFT MANAGEMENT

AVOIDING SPRAY DRIFT AT THE APPLICATION SITE IS THE RESPONSIBILITY OF THE APPLICATOR AND THE GROWER.

The interaction of many equipment and weather related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.

The following drift management requirements must be followed to avoid off-target movement from aerial applications to agricultural field crops. These requirements do not apply to forestry applications, public health uses or to applications using dry formulations.

1. The distance of the outer most nozzles on the boom must not exceed 3/4 the length of the wingspan or rotor.
2. Nozzles must always point backward parallel with the air stream and never be pointed downwards more than 45 degrees.

Where states have more stringent regulations, they should be observed.

DROPLET SIZE

The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (See Wind, Temperature and Humidity, and Temperature Inversions).

Controlling Droplet Size

- **Volume** - Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
- **Pressure** - Do not exceed the nozzle manufacturer's recommended pressures. For many nozzle types lower pressure produces large droplets. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
- **Number of nozzles** - Use the minimum number of nozzles that provide uniform coverage.
- **Nozzle Orientation** - Orienting nozzles so that the spray is released parallel to the airstream produces larger droplets than other orientations and is the recommended practice. Significant deflection from horizontal will reduce droplet size and increase drift potential.
- **Nozzle Type** - Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift.

BOOM LENGTH

For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.

APPLICATION HEIGHT

Applications should not be made at a height greater than 10 feet above the top of the target plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

SWATH ADJUSTMENT

When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase, with increasing drift potential (higher wind, smaller drops, etc.).

WIND

Drift potential is lowest between wind speeds of 2-10 mph. However, many factors, including droplet size and equipment type determine drift potential at any given speed. Application should be avoided below 2 mph due to variable wind direction and high inversion potential. **NOTE:** Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

TEMPERATURE AND HUMIDITY

When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

TEMPERATURE INVERSIONS

Applications should not occur during a temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

SENSITIVE AREAS

The pesticide should only be applied when the wind is blowing away from adjacent sensitive areas (e.g. residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops).

LIMITATIONS, AND PRECAUTIONS (TERRESTRIAL AND AQUATIC USES)

Direct spray contact or drift of DIQUAT herbicide will cause severe plant injury or death. Avoid contact of desirable vegetation.

Weeds emerging after application of DIQUAT herbicide will not be controlled or suppressed.

Retreatment may be necessary to control large weeds or established weeds.

Use of dirty or muddy water for DIQUAT herbicide dilution may result in reduced control.

Application to muddy water may result in reduced control. Minimize creating muddy water during application.

Avoid applying under conditions of highwind, water flow or wave action.

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

Rinse all spray equipment thoroughly with water after use.