



## UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

OFFICE OF  
PREVENTION, PESTICIDES  
AND TOXIC SUBSTANCES

JUL 8 1998

Mr. Thomas J. Parshley  
Novartis Crop Protection, Inc.  
Post Office Box 18300  
Greensboro, NC 27419

Dear Mr. Parshley:

Subject: Amendments to Label  
Vanquish Herbicide  
EPA Reg. No. 100-884  
Your submission of June 23, 1998

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. When preparing your final printed label please ensure that the signal word (CAUTION) is the appropriate size (see attachment) and conforms to the requirements of the EPA Label Review Manual.
2. Submit two (2) copies of your final printed labeling before you release the product for shipment.

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

Sincerely,

A handwritten signature in cursive script that reads "Tobias Tompkins" followed by "for".

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

Enclosures



**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.

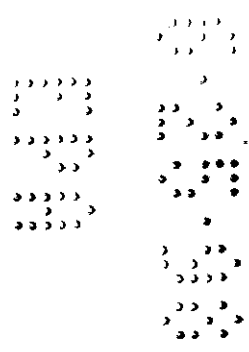
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**CONDITIONS OF SALE AND WARRANTY**

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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 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
- Waterproof gloves
- Shoes plus socks

Before applying Vanquish, read all directions and precautions appearing on the container label and in this booklet.

**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**

The following directions apply to all uses of Vanquish. Additional precautions and restrictions will be found in each specific use section.

Do not treat irrigation ditches or water used for crop irrigation or domestic uses.

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

**Sensitive Crop Precautions**

Vanquish 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 Vanquish during their development or growing stage. Injury to desirable broadleaf plants will occur if spray is allowed to contact their foliage, stems, or roots. Do not allow spray to drift away from target area. FOLLOW THE PRECAUTIONS LISTED BELOW WHEN USING VANQUISH.

Do not treat areas where either downward movement into the soil or surface washing may cause contact of Vanquish with the roots of desirable plants such as trees and shrubs.

To avoid injury to desirable plants, equipment used to apply Vanquish should be thoroughly cleaned (see **Procedure for Cleaning Spray Equipment** section) before reusing to apply any other chemicals.

**Management of Off-Site Movement**

The following spray drift management precautions should be followed to avoid off-target movement of Vanquish during applications. Avoid making applications when spray particles can be carried by wind to sensitive off-site areas. Avoid making applications in gusty wind conditions or if wind is moving in the direction of sensitive crops. The potential for injury increases with higher wind speed.

Aerial application should be avoided in the vicinity of sensitive off-site crops and plants.

Consult your local or state authorities for possible application restrictions and advice concerning these and other special local use situations. **Tank mix recommendations are for use only in states where the tank mix product and application site are registered.**

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment- and weather-related



factors determine the potential for spray drift. The applicator is responsible for considering all these factors when making decisions.

The following drift management requirements must be followed to avoid off-target drift movement from aerial applications to agricultural field crops.

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## APPLICATION PROCEDURES

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### Aerial Application

1. The distance of the outermost nozzles on the boom must not exceed  $\frac{3}{4}$  the length of the wingspan or rotor.
2. Nozzles must always point backward parallel with the air stream and never be pointed downward more than 45 degrees.

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

The applicator should be familiar with and take into account the information covered below.

### Information on 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** sections).

### Controlling Droplet Size

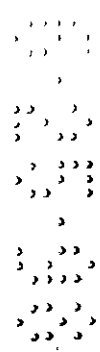
**Volume** – Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.

**Pressure** – Do not exceed the nozzle manufacturer's recommended pressures. For many nozzle types, lower pressure produces larger 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 ft. above the top of the largest 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 downward. 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.).

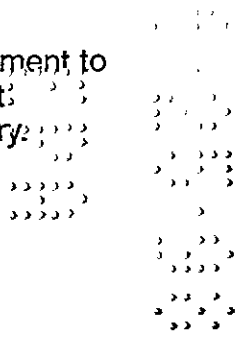
**Wind**

Drift potential is lowest between wind speeds of 3-10 mph. Do not apply Vanquish at sustained wind speeds greater than 15 mph. However, many factors, including droplet size and equipment type, determine drift potential at any given speed. Application should be avoided below 3 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;







**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.

Examples of nozzles designed to produce coarse sprays for ground applications are the Radiarc Sprayer; Delavan Raindrops, Raindrop Flood, or Flooding Spray nozzles; Spraying Systems, Drift Guard DG TeeJets, Turbo TeeJets, or Turbo FloodJet nozzles or large volume flat fan nozzles used with low pressure. Nozzles that produce a narrow angle spray pattern will generally have larger droplets.

**Boom Height**

Making applications with the boom at the lowest height that produces a uniform spray pattern will reduce exposure of droplets to evaporation and wind.

**Swath Adjustment**

When applications are made with a crosswind toward sensitive areas, the application should leave a buffer to avoid off-site movement.

**Wind**

Drift potential is lowest between wind speeds of 3-10 mph. Do not apply Vanquish at sustained wind speeds greater than 15 mph. However, many factors, including droplet size and equipment type, determine drift potential at any given speed. Application should be avoided below 3 mph due to variable wind direction and high inversion potential.

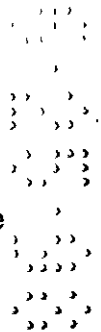
**Note:** Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

**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 potential for drift to adjacent sensitive areas (e.g., residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops) is minimal (e.g., when wind is blowing away from the sensitive areas).

Approved drift reducing agents may be used.

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**MIXING INSTRUCTIONS**

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**Compatibility Test**

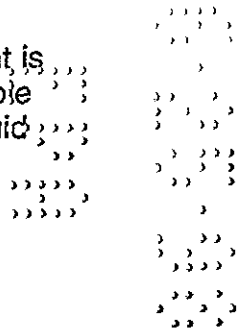
Before mixing in the spray tank, it is advisable to test compatibility by mixing all components in a small container in proportionate quantities (see following table).

**Amount of Herbicide to Add to One Pt.  
of Spray Carrier  
(Assuming Volume is 25 Gals./A)**

Herbicide Formulation	Rate Per Acre	Level Tsp.
Dry	1 lb.	1 1/2
Liquid	1 pt.	1/2

If herbicide(s) do not ball-up or form flakes, sludge, gels, oily films, layers, or other precipitates, then the tested spray mix is compatible. Usually, incompatibility in any of the above described forms will occur within 5 minutes after mixing.

If components are incompatible, the use of a compatibility agent is recommended. Rerun the above compatibility test with a suitable compatibility agent (1/4 tsp. is equivalent to 2 pts./100 gals. of fluid fertilizer).



**PROCEDURE FOR CLEANING SPRAY EQUIPMENT**

The steps listed below are suggested for thorough cleaning of spray equipment following applications of Vanquish.

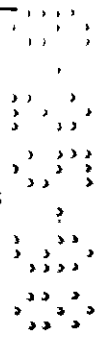
1. Hose down thoroughly the inside as well as outside surfaces of equipment while filling the spray tank half full of water. Flush by operating sprayer until the system is purged of the rinse water.
2. Fill tank with water while adding 1 qt. of household ammonia for every 25 gals. of water. Operate the pump to circulate the ammonia solution through the sprayer system for 15-20 minutes and discharge a small amount of the ammonia solution through the boom and nozzles. Let the solution stand for several hours, preferably overnight.
3. Flush the solution out of the spray tank through the boom.
4. Remove the nozzles and screens and flush the system with two full tanks of water.

The steps listed below are suggested for thorough cleaning of spray equipment used to apply Vanquish as a tank mix with wettable powders (WP), emulsifiable concentrates (EC), or other types of water-dispersible formulations. Vanquish tank mixes with water-dispersible formulations require the use of a water/detergent rinse.

5. Complete step 1.
6. Fill tank with water while adding 2 lbs. of detergent for every 40 gals. of water. Operate the pump to circulate the detergent solution through the sprayer system for 5-10 minutes and discharge a small amount of the solution through the boom and nozzles. Let the solution stand for several hours, preferably overnight.
7. Flush the detergent solution out of the spray tank through the boom.
8. Repeat step 1, and follow with steps 2, 3, and 4.

**GENERAL WEED LIST**

This is a general list of weeds which may be treated with Vanquish, in accordance with this label, as recommended under the **Rates and Timings** sections of the individual use headings. Proper usage of this product will give control or growth suppression of many annual, biennial, and perennial broadleaf weeds, and many woody brush and vine species including:



Annuals

- |                                    |                                     |       |
|------------------------------------|-------------------------------------|-------|
| Amaranth, Spiny<br>(Spiny Pigweed) | Nightshade, Black                   |       |
| Aster, Slender                     | Pennycress, Field                   |       |
| Bedstraw                           | (Fanweed, Frenchweed,<br>Stinkweed) |       |
| Beggarweed, Florida                | Pepperweed, Virginia                |       |
| Broomweed, Common                  | (Peppergrass)                       |       |
| Buckwheat, Wild                    | Pigweed, Prostrate                  |       |
| Buffalobur                         | Pigweed, Redroot                    |       |
| Burclover, California              | (Carelessweed)                      |       |
| Burcucumber                        | Pigweed, Rough                      |       |
| Buttercup, Roughseed               | Pigweed, Smooth                     |       |
| Carpeweed                          | Pigweed                             |       |
| Catchfly, Nightflowering           | (triazine resistant)                |       |
| Chamomile, Corn                    | Pigweed, Tumble                     |       |
| Chickweed, Common                  | Poorjoe                             |       |
| Clovers (Annual)                   | Puncturevine                        |       |
| Cockle, Corn                       | Purslane, Common                    |       |
| Cockle, Cow                        | Pusley, Florida                     |       |
| Cocklebur, Common                  | Radish, Wild                        |       |
| Croton, Tropic                     | Ragweed, Common                     |       |
| Croton, Woolly                     | Ragweed, Giant                      |       |
| Daisy, English                     | (Buffaloweed)                       |       |
| Eveningprimrose, Cutleaf           | Ragweed Lance-Leaf                  |       |
| Fleabane, Annual                   | Rubberweed, Bitter                  |       |
| Goosefoot, Nettleleaf              | (Bitterweed)                        |       |
| Henbit                             | Senna, Coffea                       |       |
| Jimsonweed                         | Sesbania, Hemp                      |       |
| Knotweed                           | Shepherdspurse                      |       |
| Kochia                             | Sicklepod                           |       |
| Kochia                             | Sida, Prickly (Teaweed)             |       |
| (triazine resistant)               | Smartweed, Green                    |       |
| Ladysthumb                         | Smartweed, Pennsylvania             |       |
| Lambsquarters,                     | Sneezeweed, Bitter                  |       |
| Common                             | Sowthistle, Annual                  |       |
| Lambsquarters                      | Sowthistle, Spiny                   |       |
| (triazine resistant)               | Spanishneedles                      |       |
| Lettuce, Prickly                   | Spikeweed, Common                   |       |
| Mallow, Common                     | Spurge                              |       |
| Mallow, Venice                     | Spurry, Corn                        |       |
| Marestail (Horseweed)              | Starbur, Bristly                    |       |
| Mayweed                            | Sumpweed, Rough                     | ..... |
| Medic, Black                       | Sunflower, Common                   | ..... |
| Morningglory, Ivyleaf              | (Wild)                              | ..... |
| Morningglory, Tall                 | Sunflower, Volunteer                | ..... |
| Mustard, Tansy                     | Thistle, Russian                    | ..... |
| Mustard, Wild                      | Velvetleaf                          | ..... |
| Mustard (Yellowtops)               | Waterhemp                           | ..... |
|                                    | Waterprimrose, Winged               | ..... |
|                                    | Wormwood, Annual                    | ..... |



## Perennials

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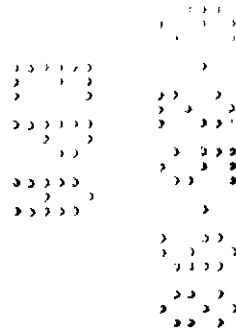
Alfalfa*	Ragweed, Western
Artichoke, Jerusalem	Sericia Lespedeza
Aster, Spiny	Redvine
Aster, Whiteheath	Smartweed, Swamp
Bedstraw, Smooth	Snakeweed, Broom
Bindweed, Field	Sorrel, Red* (Sheep Sorrel)
Bindweed, Hedge	Sowthistle
Blueweed, Texas	Sowthistle, Perennial
Bursage* (Bur Ragweed,	Spurge, Leafy
Lakeweed,	Sundrop, Halfshrub
Povertyweed)	(Eveningprimrose)
Bursage, Woollyleaf	Thistle, Canada
(Lakeweed)	Toadflax, Dalmatian
Buttercup, tall	Tropical Soda Apple
Campion, Bladder	Trumpet creeper (Buckvine)
Chickweed, Field	Vetch
Chickweed, Mouseear (Canada)	Violet, Wild
Chicory	Waterhemlock
Clover, Hop*	Waterprimrose, creeping
Dandelion, Common*	Woodsorrel, Creeping*
Dock, Broadleaf* (Bitterdock)	(Common Yellow)
Dock, Curly*	Wormwood, Common
Dogbane, Hemp	Wormwood, Louisiana
Dogfennel* (Cypressweed)	Yankeeweed*
Fern, Bracken	Yarrow, Common
Garlic, Wild	
Goldenrod, Canada	
Goldenrod, Missouri	
Goldenweed, Common	
Hawkweed	
Henbane, Black	
Horsenettle, Carolina	
Ironweed	
Ivy, Ground	
Knapweed, Black	
Knapweed, Russian	
Milkweed, Climbing	
Milkweed, Common	
Milkweed, Honeyvine	
Milkweed, Western Whorled	
Nettle, Stinging	
Nightshade, Silverleaf	
(White Horsenettle)	
Onion, Wild	
Plantain, Broadleaf*	
Plantain, Buckhorn	
Pokeweed	

\*Noted perennials may be controlled using Vanquish at rates lower than those recommended for other listed perennial weeds. (See Rates and Timings section.)

Woody

- |                            |                                     |
|----------------------------|-------------------------------------|
| Ailanthus (Tree of Heaven) | Kudzu                               |
| Alder                      | Locust, Black                       |
| Ash                        | Maple*                              |
| Aspen                      | Mesquite                            |
| Basswood                   | Oak*                                |
| Beech                      | Oak, Poison                         |
| Birch                      | Olive, Russian                      |
| Blackberry*                | Persimmon, Eastern                  |
| Blackgum*                  | Pine                                |
| Brazilian Pepper           | Plum, Sand* (Wild Plum)             |
| Cedar*                     | Poplar                              |
| Cherry                     | Rabbitbrush                         |
| Chinquapin                 | Redcedar, Eastern                   |
| Chinaberry                 | Rose, McCartney*                    |
| Chinese Tallow             | Rose, Multiflora                    |
| Cottonwood                 | Sagebrush, Fringe                   |
| Creosotebush*              | Sassafras                           |
| Cucumbertree               | Serviceberry                        |
| Dewberry*                  | Spicebush                           |
| Dogwood*                   | Spruce                              |
| Elm                        | Sumac                               |
| Gallberry                  | Sweetgum*                           |
| Grape                      | Sycamore                            |
| Hackberry                  | Tarbush                             |
| Hawthorn* (Thornapple)     | Ti Ti (Leatherwood,<br>Lizzardwood) |
| Hemlock                    | Wax Myrtle                          |
| Hickory                    | Willow                              |
| Honeylocust                | Witchhazel                          |
| Honeysuckle                | Yaupon*                             |
| Hornbeam                   | Yucca*                              |
| Huckleberry                |                                     |
| Huisache                   |                                     |
| Ivy, Poison                |                                     |

\*Tank mixtures may be needed for optimal control.



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**GENERAL FARMSTEAD, RIGHTS-OF-WAY, AND PUBLIC UTILITY  
AND INDUSTRIAL AREAS**

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Vanquish is recommended for use on general farmstead weed and brush control and for use on noncropland areas such as rights-of-way (such as roadways, rest areas, utility, railroad, highway, pipeline, and rights-of-way that run through pasture and rangeland); public utility facilities (such as substations, pipelines, tankfarms, pumping stations, parking and storage areas, fencerows, and nonirrigated ditchbanks); brush control for forest site preparation or maintenance.

Observe all **Precautions** on this label. Read and follow the **Mixing and Application** section.

**General Farmstead**

Vanquish can be used on or around farms and farmstead for control of many broadleaf weeds and brush in noncropland areas only.

**Rights-of-Way**

Vanquish can be used to control many broadleaf weeds on rights-of-way. This use includes applications to roadside, roadway and highways; to areas along utilities such as cable and powerlines; railroad track and embankment; highways, highway medians, bridge abutments, pipelines, and rights-of-way that run through pasture and rangeland. Use controlled application techniques that minimize the risk of off-target movement.

**Public Utility and Industrial Areas**

Vanquish can be used to control many broadleaf weeds and brush in noncrop areas on or surrounding substations, pipelines, tankfarms, pump stations, production facilities, and bareground situations. It may also be used on parking and storage areas (refer to **Best Stewardship Practices** to avoid direct runoff from impervious surfaces).

**Mixing and Application**

Read and observe **Management of Off-Site Movement** recommendations in this label.

Vanquish can be applied using water, oil in water emulsions including invert systems, or sprayable fluid fertilizer as a carrier. A compatibility test (see **Compatibility Test** section) should be made prior to tank mixing.

To prepare oil in water emulsions, half-fill spray tank with water, then add the appropriate amount of emulsifier. With continuous agitation, slowly add the herbicide and then the herbicidal oil or a premix of oil plus additional emulsifier to spray tank. Complete filling of spray tank with



water. Maintain vigorous agitation during spray operation to prevent oil and water from forming separate layers.

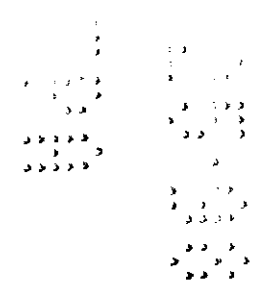
Vanquish may be applied broadcast using either ground or aerial application equipment. When using ground equipment, apply low or high volume sprays of between 3-600 gals. of diluted spray per treated acre. Volume of spray applied will depend on the height, density, and type of weeds or brush being treated and on the type of equipment being used. When using aerial equipment, apply 5-40 gals. of diluted spray per treated acre.

Vanquish may be applied to individual clumps or small areas (spot treatment) of undesirable vegetation using handgun or similar types of application equipment. Apply diluted sprays to allow complete wetting (up to run-off) of foliage and stems.

Herbicide adjuvants or other spray additives (emulsifiers, spreader stickers, surfactants, wetting agents, drift control agents, or penetrants) may be used for wetting, penetration, or drift control. Spray additives must be agriculturally approved when used in pasture applications. If spray additives are used, read and follow all use recommendations and precautions on product label.

**Weeds and Brush Controlled**

Vanquish, when applied at recommended rates, will give control of many annual, biennial, and perennial broadleaf weeds, and many woody brush and vine species commonly found in noncropland areas. (Refer to **General Weed List**. Noted. (\*) perennial weeds may be controlled with lower rates of either Vanquish or Vanquish plus tank mix combinations. See **Rates and Timings** below.



**Table 1: Rates and Timings**

Application rates and timings of Vanquish are given below. Use the higher level of listed rate ranges when treating dense or tall vegetative growth.

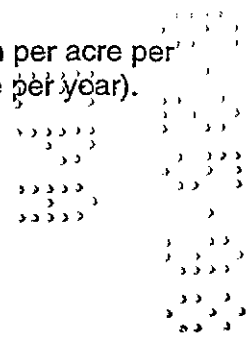
Weed Stage and Type	Amount of Product Per Acre	Gals. of Spray Mixture Per Acre**	Spray Concentration for Use with Low Volume Application**** (%vol/vol)
<b>Annual</b>			
Small, Actively Growing	1/2-1 pt.	25-50	3
Established weed growth	1-1 1/2 pts.	50-75	3
<b>Biennial – Rosette diameter</b>			
Less than 3"	1/2-1 pt.	25-50	3-4
3" or more	1-2 pts.	50-100	3-4
Bolting	2-3 pts.	100-150	3-4
<b>Perennial</b>			
Suppression or top growth control	1/2-1 pt.	50-100	4
Noted (*) Perennials	2-4 pts.	100-200	4
Other Perennials	4 pts.	200	5
<b>Woody Brush and Vines***</b>			
Top Growth	1/2-4 pts.	50-200	5
Stems and Roots	4 pts.	200	5

\* For best performance, make application when biennial weeds are in the rosette stage.

\*\* Assuming typical application rate of 1 qt. of Vanquish /100 gals.

\*\*\* Tank mixes may be required for optimal control. Refer to **General Weed List**.

\*\*\*\* Low volume rates must not exceed 4 pts. of Vanquish maximum per acre per year (5% volume/volume = 10 gals. maximum solution per acre per year).



Retreatments may be made as needed; however, do not exceed a total of 4 pts. (2 lbs. a.i.) of Vanquish per treated acre during a growing season.

**TANK MIX OPTIONS**

Vanquish may be tank mixed with other herbicides for additional weed control. The following table lists example options, but does not limit tank mix options.

READ AND FOLLOW THE LABEL OF EACH TANK MIX PRODUCT USED FOR PRECAUTIONARY STATEMENTS, DIRECTIONS FOR USE, APPLICATION RATES, AND OTHER RESTRICTIONS. Consult product labels for rate recommendations for tank mix partners.

**Table 2: Tank Mixes**

Herbicide	Rates per Treated Acre (lbs. a.i.)
norflurazon (Predict®)	Consult product labels for rate recommendations.
prodiamine (Endurance®)	
glufosinate (Finale®)	
glyphosate (Roundup®, Accord®)	
metsulfuron methyl (Escort®)	
pendimethalin (Pendulum®)	
triclopyr (Redeem®, Garlon®)	
clopyralid (Transline®)	
bromacil (Hyvar®)	
chlorsulfuron (Telar®)	
diquat (Reward®)	
simazine (Princep®)	
diuron (Karmex®)	
DSMA	
fosamine ammonium (Krenite®)	
hexazinone (Velpar®)	
imazapyr (Arsenal®)	
imazemeth (Plateau®)	
MSMA	
sulfometuron methyl (Oust®)	
sulfosate (Touchdown®)	
tebuthiuron (Spike®)	
2,4-D	

Due to the differences that may occur between specific formulated products and specific use ingredients (e.g., water supplies), a compatibility test (see **Compatibility Test** section) is recommended prior to actual tank mixing.

**CUT SURFACE TREE TREATMENTS**

Vanquish may be applied as a cut surface treatment for control of unwanted trees and prevention of sprouts of cut trees. A mix of 1 part Vanquish with 1-3 parts water should be used in application; surfactants or oil may be added to potentially enhance control. Use the lower dilution when treating difficult-to-control species. Applications work best if made within 30 minutes of cutting.

**Frill or Girdle Treatments:** Make a continuous cut or a series of overlapping cuts using an axe to girdle tree trunk. Spray or paint cut surface with the Vanquish/water mix.

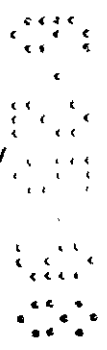
**Stump Treatments:** Spray or paint freshly cut surface with the water mix. The area adjacent to the bark should be thoroughly wet.

**DORMANT APPLICATIONS FOR CONTROL OF MULTIFLORA ROSE**

Vanquish can be applied when plants are dormant as an undiluted **Spot-Concentrate** directly to the soil or as a **Lo-Oil Basal Bark** treatment using an oil-water emulsion solution.

**Spot-Concentrate** applications of Vanquish should be applied directly to the soil as close as possible to the root crown, but within 6-8 inches of the crown. On sloping terrain, application should be made to the uphill side of the crown. Do not make application when snow or water prevents applying Vanquish directly to the soil. The use rate of Vanquish is dependent on the canopy diameter of the multiflora rose. Examples: Use Vanquish at 1/4, 1, or 2 1/4 fl. oz. of product respectively, for 5, 10, or 15 ft. canopy diameters. Do not exceed a total of 2 qts. of Vanquish per acre per year.

**Lo-Oil Basal Bark** applications of Vanquish should be applied to the basal stem region from the ground line up to a height of 12-18 inches. Spray until runoff, with special emphasis on covering the root crown. For best results, make application when plants are dormant. Do not make application after bud break or when plants are showing signs of active growth. Do not make application when snow or water prevents applying Vanquish to the ground line. Refer to the **Mixing and Application** section for method of preparing oil-in-water emulsion. Example for making approximately 2 gals. of a Lo-Oil spray solution mixture: combine 1 1/2 gals. of water plus 1 oz. of emulsifier plus 1 pt. of Vanquish plus 2 1/2 pts. of No. 2 diesel fuel. Adjust amounts of materials used proportionately to the amount of final spray solution desired. Do not exceed 8 gals. of spray solution mix applied per acre per year.



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## FOREST SITE PREPARATION

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### General Information

Vanquish may be used for control of undesirable conifers as well as many broadleaf weeds, vines, brambles, hardwood brush, and trees in forest site preparation. Vanquish may be applied as broadcast foliar sprays from ground or aerial equipment. Vanquish is absorbed through the leaf surfaces quickly after spraying and will also be absorbed from the soil by the roots. Translocation through the leaves, stems, and roots provides control of undesirable young conifer and broadleaf species. Woody plants, brush, and trees may not display the full extent of herbicide efficacy until several months following treatment. Vanquish provides application flexibility for extended windows of application and tank mix options (refer to **Mixing and Application Instructions** and **Tank Mix Options**).

### Mixing and Application Instructions

#### Ground Operated Spray Equipment

Thoroughly mix and apply the recommended amount of Vanquish (2 qts./A maximum) in a minimum of 15 gals. of water per acre. Spray solution should uniformly cover undesirable foliage for best results. A suitable nonionic surfactant should be added to the spray solution to enhance foliage wetting, spreading, and solution absorption. Drift control and foam reducing agents may be added at recommended rates, if needed. Spray pattern indicator agents may also be added at recommended rates, if desired. **DO NOT** spray under windy or gusty conditions. Maintain proper buffer zones to ensure drift does not reach off-target vegetation.

#### Aerial Spray Equipment

Thoroughly mix the recommended amount of Vanquish (2 qts./A maximum) in a minimum of 10 gals. of water per acre and uniformly apply with properly calibrated aerial equipment. A suitable nonionic surfactant should be added to the spray solution to enhance wetting, spreading, and solution absorption. All precautions should be taken to minimize or eliminate spray drift. Drift control and foam control agents may be added at recommended rates, if needed.

#### Tank Mix Options

For extended range of species control, tank mix Vanquish with other forest site preparation products such as Arsenal, Garlon, Accord, etc. Observe all precautions and restrictions on the product labels. Always follow the most restrictive label in a tank mix.

**TURF AND LAWNS**

**Including Golf Course (Fairways, Aprons, Tees, and Rough), Parks, Recreational areas, Lawn care application, Sod farms**

**IMPORTANT:** Observe all **Precautions** on this label. Read and follow **Mixing and Application** instructions.

Established grass stands growing under stress can exhibit various injury symptoms that may be more pronounced if herbicides are applied. To avoid injury to newly seeded grasses, application of Vanquish should be delayed until after the second mowing. Furthermore, application rates in excess of 1 pt. (1/2 lb. a.i.) per treated acre may cause noticeable stunting or discoloration of sensitive grass species such as bentgrass, carpet-grass, buffalograss, and St. Augustinegrass.

In areas where roots of sensitive plants extend, do not apply in excess of 1/4 pt. (1/8 lb. a.i.) of Vanquish per treated acre on coarse-textured (sand-type) soils, or in excess of 1/2 pt. (1/4 lb. a.i.) per treated acre on fine-textured (clay-type) soils. Do not make repeat applications in these areas for 30 days and until previous applications of Vanquish have been activated in the soil by rain or irrigation.

**Weeds Controlled**

Vanquish, when applied at recommended rates, will give control of many annual, biennial, and noted (\*) perennial broadleaf weeds commonly found in turf. Vanquish will also give growth suppression of many other listed perennial broadleaf weeds and woody brush and vine species. (Refer to **General Weed List**.)

**Mixing and Application**

Apply 30-200 gals. of diluted spray per treated acre (3 qts.-4 1/4 gals./1,000 sq. ft.), depending on density or height of weeds treated and on the type of equipment used.

**Rates and Timings**

Use the higher level of listed rate ranges when treating dense vegetative growth.

**Table 3: Vanquish Broadcast Application Rates**

<b>Weed Stage and Type</b>	<b>Pts. per Treated Acre</b>	<b>Lbs. a.i. per Treated Acre</b>	<b>Tsp. per 1,000 sq ft.</b>
<b>Annual</b> Small, actively growing Established weed growth	$\frac{1}{2}$ -1 pt. 1-1 $\frac{1}{2}$ pts.	$\frac{1}{4}$ - $\frac{1}{2}$ $\frac{1}{2}$ - $\frac{3}{4}$	1-2 $\frac{1}{4}$ 2 $\frac{1}{4}$ -3 $\frac{1}{4}$
<b>Biennial* – Rosette diameter</b> Less than 3 inches 3 inches or more	$\frac{1}{2}$ -1 pt. 1-2 pts.	$\frac{1}{4}$ - $\frac{1}{2}$ $\frac{1}{2}$ -1	1-2 $\frac{1}{4}$ 2 $\frac{1}{4}$ -4 $\frac{1}{2}$
<b>Perennial, Woody Brush, and Vines</b>	1-2 pts.	$\frac{1}{2}$ -1	2 $\frac{1}{4}$ -4 $\frac{1}{2}$

\*For best performance, make application when biennial weeds are in the rosette stage.

For best performance, apply when weeds are emerged and actively growing.

Retreatments may be made as needed; however, do not exceed a total of 2 pts. (1 lb. a.i.) of Vanquish per treated acre during a growing season.

**Tank Mix Treatments**

READ AND FOLLOW THE LABEL OF EACH TANK MIX PRODUCT USED FOR PRECAUTIONARY STATEMENTS, DIRECTIONS FOR USE, APPLICATION RATES AND TIMINGS, AND OTHER RESTRICTIONS. Consult product labels for rate recommendations for tank-mix partners. OBSERVE ALL PRECAUTIONS AND RESTRICTIONS ON THE PRODUCT LABELS. ALWAYS FOLLOW THE MOST RESTRICTIVE LABEL IN A TANK MIX.

Tank mix treatments of Vanquish may be made with 2,4-D, MCPA, MCPP, Confront®, or bromoxynil for control of additional weeds listed on the tank mix product label.

Apply  $\frac{1}{5}$ - $\frac{1}{2}$  pt. ( $\frac{1}{10}$ - $\frac{1}{4}$  lb. a.i.) of Vanquish per treated acre with  $\frac{1}{2}$ -1 $\frac{1}{2}$  lbs. acid equivalent of 2,4-D, MCPA, or MCPP, or with 1-2 pts. of Confront, or with  $\frac{3}{8}$ - $\frac{1}{2}$  lb. a.i. of bromoxynil. Use the higher level of the listed rate ranges when treating established weeds. Repeat treatments may be made as needed; however, do not exceed 2 pts. (1 lb. a.i.) of Vanquish per treated acre during the growing season.

**STORAGE AND DISPOSAL**

**Prohibitions**

Do not contaminate water, food, or feed by storage or disposal.

**Storage**

Store in original container in a well-ventilated area separately from fertilizer, feed, and foodstuffs. Avoid cross-contamination with other pesticides. Spillage or leakage should be contained and absorbed with clay granules, sawdust, or equivalent material for disposal.

**Pesticide Disposal**

Triple rinse pesticide from containers and use rinsates in the pesticide application. Wastes which cannot be used according to label instructions may be disposed of on site or at an approved waste disposal facility.

**Container Disposal (2.5 Gal. Plastic)**

Triple rinse container (or equivalent) and offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by incineration, or by open burning, if allowed by state and local authorities. If burned, keep out of smoke.

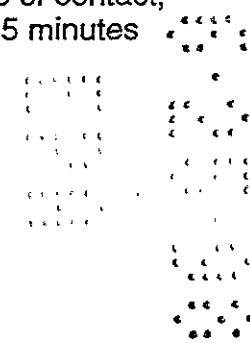
For minor spills, leaks, etc., follow all precautions indicated on this label and clean up immediately. Take special care to avoid contamination of equipment and facilities during cleanup procedures and disposal of wastes. In the event of a major spill, fire, or other emergency, call 1-800-888-8372,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

**PRECAUTIONARY STATEMENTS**

**Hazards to Humans and Domestic Animals**

**CAUTION**

Avoid contact with skin, eyes, or clothing. Harmful if swallowed. Avoid breathing spray mist. Wash thoroughly after handling. In case of contact, wash skin with soap and water; for eyes, flush with water for 15 minutes and get medical attention.





### 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 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.

<h4>User Safety Recommendations</h4> <p>Users should:</p> <ul style="list-style-type: none"> <li>• Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.</li> <li>• Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.</li> <li>• 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.</li> </ul>
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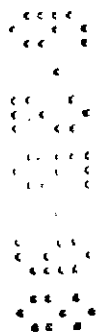


### Environmental Hazards

Keep out of lakes, streams, or ponds. 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.

### Best Stewardship Practices

Vanquish provides effective broadleaf weed and brush control when properly applied. Best stewardship practices in all mixing, loading, and



application operations not only maximize weed control, but also protect ground and surface waters and minimize off-target movement.

This chemical is known to leach through soil into ground water under certain conditions as a result of agricultural use. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in ground-water contamination.

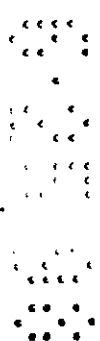
**Ground and Surface Water Protection**

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

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

Care must be taken when using this product to prevent: (a) back siphoning into wells, (b) spills, or (c) improper disposal of excess pesticide, spray mixtures, or rinsates. Check-valves or antisiphoning devices must be used on all mixing equipment.

- 2. Movement by surface runoff or through soil – Do not apply under conditions which favor runoff. Do not apply to impervious substrates such as paved or highly compacted surfaces in areas with high potential for ground water contamination. Ground water contamination may occur in areas where soils are permeable or coarse and ground water is near the surface. Do not apply to soils classified as sand with less than 3% organic matter and where ground water depth is shallow. To minimize the possibility of ground water contamination, carefully follow application rate recommendations as affected by soil type in the General Information section of this label.



- 3. Movement by water erosion of treated soil – Do not apply or incorporate this product through any type of irrigation equipment or by flood or furrow irrigation. Ensure treated areas have received at least one-half inch rainfall (or irrigation) before using tailwater for subsequent irrigation of other fields.

Apply this product only as directed on label.

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Endurance®, Predict®, Princep®, and Vanquish® trademarks of Novartis

Accord® and Roundup® trademarks of Monsanto Agricultural Products Company

Arsenal®, Pendulum®, and Plateau® trademarks of American Cyanamid Company

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Novartis Crop Protection, Inc.  
Greensboro, North Carolina 27419

NCP 884A-L1 (DRAFT) (2.5 gal.)

[QUARK/VANQUISH/VANQUISH-A] - ccg - 6/22/98

-27-

## BASE LABEL

Vanquish®

## HERBICIDE

For selective broadleaf weed and brush control on noncrop lands in the following uses: established turf grasses (including golf courses) and lawns, rights-of-way (including roadways, utility, railroad, highway, pipeline, and rights-of-way that run through pasture and rangeland), public utility facilities (including substations, pipelines, tankfarms, pumping stations, parking and storage areas, nonirrigated ditchbanks, and fencerows), and forest site preparation

## Active Ingredient:

Diglycolamine® salt of 3,6-dichloro- <i>o</i> -anisic acid . . . . .	.56.8%
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Inert Ingredients:	43.2%
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Total:	100.0%
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This product contains 38.5% 3,6-dichloro-*o*-anisic acid or 4 pounds per gallon (480 g/L).

2.5 GALLONS

U.S. Standard Measure

EPA Reg. No. 100-884

EPA Est. 11773-IA-01

See directions for use in attached booklet.

<b>AGRICULTURAL USE REQUIREMENTS</b>
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<p>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.</p>
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**KEEP OUT OF REACH OF CHILDREN.****CAUTION9****Precautionary Statements****Hazards to Humans and Domestic Animals**

Avoid contact with skin, eyes, or clothing. Harmful if swallowed. Avoid breathing spray mist. Wash thoroughly after handling. In case of contact, wash skin with soap and water; for eyes, flush with water for 15 minutes and get medical attention.

### **Personal Protective Equipment**

**Applicators and other handlers must wear:**

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

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