



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, DC 20460

OFFICE OF CHEMICAL SAFETY  
AND POLLUTION PREVENTION

August 31, 2017

Ms. Carrie Tackema  
Regulatory Manager  
Nufarm Americas, Inc.  
4020 Aerial Center Parkway, Suite 101  
Morrisville, NC 27560

Subject: CSF and Label Notification per PRN 98-10 – Updating CSFs and label to address changes in source purity  
Product Name: Vanquish Herbicide  
EPA Registration Number: 228-397  
Application Date: August 7, 2017  
Decision Number: 532705

Dear Ms. Tackema:

The Agency is in receipt of your Application for Pesticide Notification under Pesticide Registration Notice (PRN) 98-10. The Registration Division (RD) has conducted a review of this request for its applicability under PRN 98-10 and finds that the actions requested fall within the scope of PRN 98-10. The label and CSFs submitted with your application have been stamped “Notification” and placed in our files.

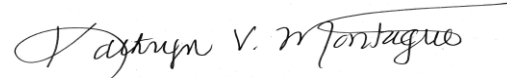
Should you wish to add/retain a reference to the company’s website on your label, then please be aware that the website becomes labeling under the Federal Insecticide Fungicide and Rodenticide Act and is subject to review by the Agency. If the website is false or misleading, the product would be misbranded and unlawful to sell or distribute under FIFRA section 12(a)(1)(E). 40 CFR 156.10(a)(5) list examples of statements EPA may consider false or misleading. In addition, regardless of whether a website is referenced on your product’s label, claims made on the website may not substantially differ from those claims approved through the registration process. Therefore, should the Agency find or if it is brought to our attention that a website contains false or misleading statements or claims substantially differing from the EPA approved registration, the website will be referred to the EPA’s Office of Enforcement and Compliance.

Please note that the record for this product currently contains the following CSFs:

- Basic CSF dated 08/07/2017
- Alternate CSF 1 dated 08/07/2017

Any CSFs other than those listed above are superseded/no longer valid. If you have any questions, please contact Kathryn Montague at 703-305-1243 or by email at [montague.kathryn@epa.gov](mailto:montague.kathryn@epa.gov)

Sincerely,

A handwritten signature in black ink that reads "Kathryn V. Montague". The signature is written in a cursive style with a long horizontal flourish extending to the right.

Kathryn Montague, Product Manager 23  
Herbicide Branch  
Registration Division (7505P)  
Office of Pesticide Programs

# VANQUISH®

## NOTIFICATION

228-397

The applicant has certified that no changes, other than those reported to the Agency have been made to the labeling. The Agency acknowledges this notification by letter dated:

08/31/2017

## Herbicide

[alternate brand name]

[Riverdale 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), utility facilities (including substations, pipelines, tankfarms, pumping stations, parking and storage areas, non-irrigation ditchbanks, and fencerows), fencerows, natural areas (including wildlife management areas, wildlife openings, wildlife habitats, recreation areas, campgrounds, trailheads and trails) and forest site preparation.

### ACTIVE INGREDIENT:

Diglycolamine® Salt of 3, 6-dichloro-o-anisic Acid\* ..... ~~56.858.1%~~

OTHER INGREDIENTS: ..... ~~43.241.9%~~

TOTAL: ..... 100.0%

By Isomer Specific Method, Equivalent to:

\*3, 6-dichloro-o-anisic Acid ..... ~~38.539.4%~~, 4.0 lbs./gal.

### KEEP OUT OF REACH OF CHILDREN CAUTION / PRECAUCION

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

SEE INSIDE BOOKLET FOR ADDITIONAL PRECAUTIONARY AND FIRST AID STATEMENTS

For Chemical Spill, Leak, Fire, or Exposure, Call CHEMTREC (800) 424-9300  
For Medical Emergencies Only, Call (877) 325-1840

EPA REG. NO. 228-397  
EPA EST. NO.

Manufactured For  
NUFARM AMERICAS INC.  
~~150 Harvester Drive~~ 11901 S. Austin Ave.  
~~Burr Ridge, IL 60527~~ Alsip, IL 60803



Net Contents: Gal. ( L)

000228-00397.20110913.MASTER20170830.NOTIF (HL)

**PRECAUTIONARY STATEMENT  
HAZARDS TO HUMANS AND DOMESTIC ANIMALS  
CAUTION / PRECAUCION**

Harmful if swallowed or absorbed through skin. Causes moderate eye irritation. Avoid contact with skin, eyes, or clothing.

**PERSONAL PROTECTIVE EQUIPMENT (PPE)**

Some materials that are chemical-resistant to this product are made of any waterproof material. If you want more options, follow the instructions for category A on an EPA chemical-resistance category selection chart.

**All mixers, loaders, applicators, and other handlers must wear:**

- Long-sleeved shirt and long pants,
- Shoes plus socks and
- Chemical-resistant gloves (except for pilots)

See engineering controls for additional requirements and exceptions.

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, 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 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. Pilots must use an enclosed cockpit that meets the requirements listed in the WPS for agricultural pesticides [40 CFR 170.240(d)(6)].

<b>USER SAFETY RECOMMENDATIONS</b>	
<b>Users Should:</b>	
<ul style="list-style-type: none"> <li>• Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.</li> <li>• Remove clothing/PPE 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>	

<b>FIRST AID</b>	
<b>IF SWALLOWED</b>	<ul style="list-style-type: none"> <li>• Call a poison control center or doctor immediately for treatment advice.</li> <li>• Have person sip a glass of water if able to swallow.</li> <li>• Do not induce vomiting unless told to do so by the poison control center or doctor.</li> <li>• Do not give anything by mouth to an unconscious person.</li> </ul>
<b>IF IN EYES</b>	<ul style="list-style-type: none"> <li>• Hold eye open and rinse slowly and gently with water for 15 to 20 minutes.</li> <li>• Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
<b>IF ON SKIN OR CLOTHING</b>	<ul style="list-style-type: none"> <li>• Take off contaminated clothing.</li> <li>• Rinse skin immediately with plenty of water for 15 to 20 minutes.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
<b>IF INHALED</b>	<ul style="list-style-type: none"> <li>• Move person to fresh air.</li> <li>• If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible.</li> <li>• Call a poison control center or doctor for further treatment advice.</li> </ul>
<b>HOT LINE NUMBER</b>	
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-877-325-1840 for emergency medical treatment information.	

**ENVIRONMENTAL HAZARDS**

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

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.

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

Mixing, loading, rinsing, or washing operations performed within 50 feet of a well are allowed only when conducted on an impervious pad constructed to withstand the weight of the heaviest load that may be on or move across the pad. The pad must be self-contained to prevent surface water flow over or from the pad. The pad capacity must be maintained at 110% 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 water, and rain water 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 anti-siphoning 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 Product 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.

### DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. READ ENTIRE LABEL BEFORE USING THIS PRODUCT. USE STRICTLY IN ACCORDANCE WITH LABEL PRECAUTIONARY STATEMENTS AND DIRECTIONS.

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.

Do not apply more than 2 pints of product per acre per application and no more than 2 applications per year.

#### 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 protection 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 worn over short-sleeve shirt and short pants, chemical-resistant footwear plus socks, chemical-resistant gloves made of any waterproof material, chemical-resistant headgear for overhead exposure and protective eyewear.

#### 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.

Do not enter or allow others to enter treated areas until sprays have dried.

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

### PRODUCT INFORMATION

The following directions apply to all uses of Vanquish. 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. Additional precautions and restrictions will be found in each specific use section. Tank mix recommendations are for use only in states where the tank mix product and application site are registered.

#### 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.

### **Spray Drift Management**

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.

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.

## **APPLICATION PROCEDURES**

### **Aerial Application**

1. The distance of the outermost 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 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 higher 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 feet 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 to 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, nontarget crops) is minimal (e.g., when wind is flowing away from the sensitive areas).

## **Ground Application**

### **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 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 Radiar Sprayer; Delavan Raindrops, Raindrop Flood, or Flooding Spray nozzles; Spray 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 to 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, nontarget crops) is minimal (e.g., when wind is blowing away from the sensitive areas).

Approved drift reducing agents may be used

## SPRAY EQUIPMENT

### 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 quart of household ammonia for every 25 gallons of water. Operate the pump to circulate the ammonia solution through the sprayer system for 15 to 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 wetttable 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 pounds of detergent for every 40 gallons of water. Operate the pump to circulate the detergent solution through the sprayer system for 5 to 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.

## MIXING PROCEDURES

### 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 Pint of Spray Carrier  
(Assuming Volume is 25 Gallons Per Acre)**

Herbicide Formulation	Rate Per Acre	Level Teaspoons
Dry	1 pound	1-1/2
Liquid	1 pint	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 teaspoon is equivalent to 2 pints per 100 gallons of fluid fertilizer).



## CROP USE DIRECTIONS

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

#### Biennials

Burdock, Common	Geranium, Carolina	Plantain, Bracted	Thistle, Bull
Carrot, Wild (Queen Anne's Lace)	Gromwell	Ragwort, Tansy	Thistle, Milk
Cockle, White	Knapweed, Diffuse	Starthistle, Yellow	Thistle, Musk
Eveningprimrose, Common	Knapweed, Spotted	Sweetclover	Thistle, Plumeless
	Mallow, Dwarf	Teasel	

#### Perennials

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

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

## Woody

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

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\*Tank mixtures may be needed for optimal control.

### NON-CROP AREAS, INCLUDING RIGHTS-OF-WAY, UTILITY FACILITIES, INDUSTRIAL AREAS, FENCEROWS AND NATURAL AREAS

Vanquish can be used on general farmstead weed and brush control and for use on noncrop land 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); utility facilities (such as substations, pipelines, tankfarms, pumping stations, parking and storage areas, fencerows and non-irrigation ditchbanks); brush control for forest site preparation or maintenance, conservation lands, natural areas (including wildlife management areas, wildlife openings, wildlife habitats, recreation areas, campgrounds, trailheads and trails).

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 noncrop land areas only.

#### Rights-of-Way

Vanquish may 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.

#### 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 Environmental Hazards to avoid direct runoff from impervious surfaces).

#### Fencerows

Vanquish can be used to control many broadleaf weeds and brush in fencerows.

#### Mixing and Application

Read and observe Spray Drift Management 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 pre-mix 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 between 3 to 600 gallons 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 to 40 gallons 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 runoff) 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 specified 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 (Pints)	Gallons of Spray Mixture Per Acre**	Spray Concentration for Use with Low Volume Application**** (%vol/vol)
<b>Annual</b>			
Small, Actively Growing	1/2 to 1	25 to 50	3
Established Weed Growth	1 to 1-1/2	50 to 75	3
<b>Biennial*</b> - Rosette diameter			
Less than 3"	1/2 to 1	25 to 50	3 to 4
3" or more	1 to 2	50 to 100	3 to 4
Bolting	2	100 to 150	3 to 4
<b>Perennial</b>			
Suppression or top growth control	1/2 to 1	50 to 100	4
Noted ( * ) Perennials	2	100 to 200	4
Other Perennials	2	200	5
<b>Woody Brush and Vines***</b>			
Top Growth	1/2 to 2	50 to 200	5
Stems and Roots	2	200	5

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

\*\* Assuming typical application rate of 1 quart of Vanquish per 100 gallons.

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

\*\*\*\* Low volume rates must not exceed 4 pints 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 pints (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 <sup>®</sup> ) prodiamine (Endurance <sup>®</sup> ) glufosinate (Finale <sup>®</sup> ) glyphosate (Razor <sup>®</sup> , Razor Pro) metsulfuron methyl (Patriot <sup>®</sup> , Manor <sup>®</sup> ) pendimethalin (Pendulum <sup>®</sup> ) triclopyr (Tahoe <sup>®</sup> ) clopyralid (Transline <sup>®</sup> ) bromacil (Hyvar <sup>®</sup> ) chlorsulfuron (Telar <sup>®</sup> ) diquat (Reward <sup>®</sup> ) simazine (Princep <sup>®</sup> ) diuron (Karmex <sup>®</sup> ) DSMA fosamine ammonium (Krenite <sup>®</sup> ) hexazinone (Velpar <sup>®</sup> ) imazapyr (Arsenal <sup>®</sup> ) imazameth (Plateau <sup>®</sup> ) MSMA sulfometuron methyl (Spyder <sup>®</sup> ) sulfosate (Touchdown <sup>®</sup> ) tebuthiuron (Spike <sup>®</sup> ) 2,4-D	Consult product labels for rate recommendations.

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 to 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 to 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 fluid ounces of product respectively for 5, 10 or 15 feet canopy diameters. Do not exceed a total of 2 quarts 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 to 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 gallons of a Lo-Oil spray solution mixture: combine 1-1/2 gallons of water plus 1 ounce of emulsifier plus 1 pint of Vanquish plus 2-1/2 pints of No. 2 diesel fuel. Adjust amounts of materials used proportionately to the amount of the final spray solution desired. Do not exceed 8 gallons of spray solution mix applied per acre per year.

## FOREST SITE PREPARATION

### Product 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 Procedures and Tank Mix Options).

### Mixing and Application Instructions

#### Ground Operated Spray Equipment

Thoroughly mix and apply the recommended amount of Vanquish (1 quart per acre maximum) in a minimum of 15 gallons 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 zone to ensure drift does not reach off-target vegetation.

#### Aerial Spray Equipment

Thoroughly mix the recommended amount of Vanquish (1 quart per acre maximum) in a minimum of 10 gallons 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, Razor, Razor Pro, Spyder, Tahoe, 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 Procedures.

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 second mowing. Furthermore, application rates in excess of 1 pint (1/2 lb. a.i.) per treated acre may cause noticeable stunting or discoloration of sensitive grass species such as bentgrass, carpetgrass, buffalograss, and St. Augustinegrass.

In areas where roots of sensitive plants extend, do not apply in excess of 1/4 pint (1/8 lb. a.i.) of Vanquish per treated acre on coarse-textured (sandy-type) soils, or in excess of 1/2 pint (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 to 200 gallons of diluted spray per treated acre (3 quarts to 4-1/4 gallons per 1,000 square feet), 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**

Weed Stage and Type	Pints Per Treated Acre	Pounds a.i. Per Treated Acre	Teaspoons Per 1,000 Square Feet
<b>Annual</b> Small, actively growing Established weed growth	1/2 to 1 1 to 1-1/2	1/4 to 1/2 1/2 to 3/4	1 to 2-1/4 2-1/4 to 3-1/4
<b>Biennial*</b> - Rosette diameter Less than 3 inches 3 inches or more	1/2 to 1 1 to 2	1/4 to 1/2 1/2 to 1	1 to 2-1/4 2-1/4 to 4-1/2
<b>Perennial, Woody Brush and Vines</b>	1 to 2	1/2 to 1	2-1/4 to 4-1/2

\*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 pints (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 1/4 to 1/2 pint (1/8 to 1/4 lb. a.i.) of Vanquish per treated acre with 1/2 to 1-1/2 pounds acid equivalent of 2,4-D, MCPA, or MCPP, or with 1 to 2 pints of Confront, or with 3/8 to 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 pints (1 lb. a.i.) of Vanquish per treated acre during the growing season.

### **STORAGE AND DISPOSAL**

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. If container is damaged or if pesticide has spilled, contain all spillage. Place in a closed, labeled container for proper disposal. In the event of a major spill, fire, or other emergency, call 1-800-424-9300, day or night. Wastes which cannot be used according to label instructions may be disposed of on site or at an approved waste disposal facility.

#### **CONTAINER DISPOSAL:**

**[Nonrefillable Containers 5 Gallons or Less:]** Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. **Triple rinse as follows:** Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds.

Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by State and local authorities. Plastic containers are also disposable by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

**[Nonrefillable Containers Larger than 5 Gallons:]** Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available. Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse as follows:** Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. **Pressure rinse as follows:** Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

**[Refillable Container:]** Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10% full with water and, if possible, spray all sides while adding water. Agitate vigorously or recirculate water with the pump for two minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

Or

**Refillable Container:** Refill this container with pesticide only. Do not reuse this container for any other purpose. Close all openings and replace all caps. Contact Nufarm's Customer Service Department at 1-800-345-3330 to arrange for return of the empty refillable container.

#### WARRANTY DISCLAIMER

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