

# **APPLICATION DIRECTIONS FOR USE ON COTTON CONTAINING THE LIBERTYLINK TRAIT - OPTION 1**

General Information

## **PRODUCT INFORMATION**

Cheetah is a water-soluble herbicide for application as a foliar spray for the control of a broad spectrum of emerged annual and perennial grass and broadleaf weeds in a variety of crops. Cheetah is registered for use:

- as a burndown treatment prior to planting or prior to emergence of canola, corn, cotton, sweet corn, olive, soybean and sugar beets
- post emergence weed control herbicide to be applied on crops containing LibertyLink trait, including canola, soybean, corn, sweet corn and cotton
- post emergence weed control in cotton when applied with a hooded sprayer in-crop
- post emergence weed control in listed tree, olives, vine, and berry crops
- applied for potato vine desiccation.

Many seed trade names are available under the LibertyLink trait contact the seed manufacturer or seed distributor to determine if the seed variety is designated and supported as containing the LibertyLink trait.

It is important to always follow a responsible integrated weed management program.

Contact your local agronomic advisor for more specific information on integrated weed management in your area.

Cheetah is only foliar-active with little or no activity in soil. Weeds that emerge after application will not be controlled.

Apply Cheetah to actively growing weeds as described in the WEED CONTROL FOR ROW CROPS section to get maximum weed control. Uniform, thorough spray coverage is necessary to achieve consistent weed control. Necrosis of leaves and young shoots occur within 2 to 4 days after application under good growing conditions.

- Cheetah is rainfast 4 hours after application to most weed species; therefore, rainfall within 4 hours may necessitate retreatment or may result in reduced weed control.
- Make applications between dawn and 2 hours before sunset to avoid the possibility of reduced lambsquarters and velvetleaf control.
- Consult your local Cooperative Extension Service or Nufarm, Inc. representative for guidelines on the optimum application timing for Cheetah in your region.
- Weed control may be reduced if application is made when heavy dew, fog, and mist/rain are present; or when weeds are under stress due to environmental conditions such as drought, cool temperatures, or extended periods of cloudiness.
- To maximize weed control, do not cultivate from 5 days before an application to 7 days after an application.

Many seed trade names are available under the LibertyLink trait contact the seed manufacturer or seed distributor to determine if the seed variety is designated and supported as containing the LibertyLink trait.

## WEED RESISTANCE MANAGEMENT

For resistance management, Cheetah contains a Group 10 herbicide -Glufosinate-ammonium. Any weed population may contain or develop plants naturally resistant to Cheetah and other Group 10 herbicides. The resistant biotypes may dominate the weed population if these herbicides are used repeatedly in the same field.

Appropriate resistance management strategies should be followed.

When herbicides that affect the same biological site of action are used repeatedly over several years to control the same weed species in the same field, naturally-occurring resistant biotypes may survive a correctly applied herbicide treatment, propagate, and become dominant in that field. Adequate control of these resistant weed biotypes cannot be expected. If weed control is unsatisfactory, it may be necessary to retreat the problem area using a product affecting a different site of action.

To delay herbicide resistance take one or more of the following steps:

- Rotate the use of Cheetah or other Group 10 herbicides within a growing season sequence or among growing seasons with different herbicide groups that control the same weeds in a field.
- Use tank mixtures with herbicides from a different group if such use is permitted;

where information on resistance in target weed species is available, use the less resistance-prone partner at a rate that will control the target weed(s) equally as well as the more resistance-prone partner. Consult your local extension service or certified crop advisor if you are unsure as to which active ingredient is currently less prone to resistance.

- Adopt an integrated weed-management program for herbicide use that includes scouting and uses historical information related to herbicide use and crop rotation, and that considers tillage ( or other mechanical control methods), cultural ( e.g., higher crop seeding rates; precision fertilizer application method and timing to favor the crop and not the weeds), biological (weed-competitive crops or varieties) and other management practices.

- Scout after herbicide application to monitor weed populations for early signs of resistance development. Indicators of possible herbicide resistance include: (1) failure to control a weed species normally controlled by the herbicide at the dose applied, especially if control is achieved on adjacent weeds; (2) a spreading patch of non-controlled plants of a particular weed species; (3) surviving plants mixed with controlled individuals of the same species. If resistance is suspected, prevent weed seed production in the affected area by an alternative herbicide from a different group or by a mechanical method such as hoeing or tillage. Prevent movement of resistant weed seeds to other fields by cleaning harvesting and tillage equipment when moving between fields, and planting clean seed.

- If a weed pest population continues to progress after treatment with this product, discontinue use of this product, and switch to another management strategy or herbicide with a different mode of action, if available.

- Contact your local extension specialist or certified crop advisors for additional pesticide resistance-management and/or integrated weed-management recommendations for specific crops and weed biotypes.

It is advisable to keep accurate records of pesticides applied to individual fields to help obtain information on the spread and dispersal of resistant biotypes. Contact your local sales representative, crop advisor, or extension agent to find out if suspected resistant weeds to this MOA have been found in your region. Do not assume that each listed weed is being controlled by this mechanisms of action. Co-formulated active ingredients are intended to broaden the spectrum of weeds that are controlled. Some weeds may be controlled by only one of the active ingredient in this product. Suspected herbicide-resistant weeds may be identified by these indicators:

- Failure to control a weed species normally controlled by the herbicide at the dose applied, especially if control is achieved on adjacent weeds;
- A spreading patch of non-controlled plants of a particular weed species; and
- Surviving plants mixed with controlled individuals of the same species.

## INTEGRATED PEST MANAGEMENT

Nufarm recommends the use of Integrated Pest Management (IPM) programs to control pests. This product may be used as part of an Integrated Pest Management (IPM) program which can include biological, cultural, and genetic practices aimed at preventing economic pest damage. Application of this product should be based on IPM principles and practices including field scouting or other detection methods, correct target pest identification, population monitoring, and treating when target pest populations reach locally determined action thresholds. Consult your state cooperative extension service, professional consultants or other qualified authorities to determine appropriate action treatment threshold levels for treating specific pest/crop or site systems in your area.

## APPLICATION PROCEDURES

Uniform, thorough spray coverage is important to achieve consistent weed control.

### Ground Application:

- Refer to the Rate Tables for proper application rates.
- Apply early, when weeds are small.
- To avoid drift and insure consistent weed control, apply Cheetah with the spray boom as low as possible while maintaining a uniform spray pattern.
- Apply Cheetah broadcast in a minimum of 15.0 gallons of water per acre. Increase to 20 gallons of water per acre if dense weed canopy exists.
- Apply at ground speed of less than 15 mph to attain adequate coverage.
- Use nozzles and pressure that generate a MEDIUM to COARSE size spray droplet. Weed control with droplet sizes larger than coarse droplet size will not provide adequate coverage and will cause unsatisfactory weed control.
- Apply when wind speeds are between 2 mph and 10 mph. Do not apply when winds are gusty, or when conditions will favor movement of spray particles off the desired spray target. See the SPRAY DRIFT MANAGEMENT section of this label for additional information on proper application of Cheetah.

### Aerial Application:

- Refer to the Rate Tables for proper application rates.
- Apply early, when weeds are small.
- Use nozzles and pressure that generate a MEDIUM to COARSE size spray droplet. Weed control with droplet sizes larger than coarse droplet size will not provide adequate coverage and will cause unsatisfactory weed control.
- Apply Cheetah by air in a minimum of 10.0 gallons of water per acre.
- See the SPRAY DRIFT MANAGEMENT section of this label for additional information on proper application of Cheetah.

#### Application and Mixing Restrictions:

- Do not use flood jet nozzles, controlled droplet application equipment, or air-assisted spray equipment.
- Do not apply when winds are gusty, or when conditions will favor movement of spray particles off the desired spray target.

#### MANDATORY SPRAY DRIFT MITIGATION

- When applying to crops via aerial application equipment, the spray boom must be mounted on the aircraft so as to minimize drift caused by wing tip or rotor blade vortices. The boom length must not exceed 75% of the wingspan or 90% of the rotor blade diameter.
- When applying to crops via aerial application equipment, applicators must use . swath displacement upwind at the downwind edge of the field.
- Do not apply when wind speeds exceed 10 miles per hour at the application site.
- Do not apply during temperature inversions.
- For aerial applications, do not release spray at a height greater than 10 ft above the crop canopy, unless a greater application height is necessary for pilot safety.
- For ground applications and aerial applications, select nozzle and pressure that deliver medium to coarse spray droplets as indicated in nozzle manufacturer's catalogues and in accordance with ASABE Standard 572.1.
- Spray at the appropriate boom height based on nozzle selection and nozzle spacing, but do not exceed a boom height of 24 inches above target pest or crop canopy. Set boom to lowest effective height over the target pest or crop canopy based on equipment manufacturer's directions. Automated boom height controllers are recommended with large booms to better maintain optimum nozzle to canopy height. Excessive boom height will increase the potential for spray drift.
- For non-crop vegetation management ground applications, apply with the nozzle height no more than 4 feet above the ground or target vegetation, unless

necessitated by the application equipment. Examples would include roadside, railroad, utility rights of way, forestry and other industrial vegetation management applications where safety or natural barriers obstruct application.

#### Limitations, Restrictions, and Exceptions

#### APPLICATION DIRECTIONS FOR USE ON COTTON CONTAINING THE LIBERTYLINK TRAIT

Uniform, thorough spray coverage is necessary to achieve consistent weed control. Cheetah may be applied as a broadcast, over-the-top, post-emergence spray or as a directed spray only to cotton containing the LibertyLink trait.

#### Application Timing:

Apply to small and actively growing weeds, targeting less than 3 inch weeds in height. For additional information on weed heights refer to the WEED CONTROL FOR ROW CROPS section.

Weed control may be reduced if application is made when heavy dew, fog, and mist/rain are present; or when weeds are under stress due to drought, cool temperatures, or extended periods of cloudiness.

Cheetah is a foliar-active material with little or no soil-residual activity.

Cheetah is rainfast 4 hours after application, therefore, rainfall within 4 hours may necessitate retreatment.

#### For best result:

- On lambsquarters, Palmer amaranth and velvetleaf control, make applications of Cheetah between dawn and 2 hours before sunset.
- Warm temperatures, high humidity, and bright sunlight improve the performance of Cheetah.

Apply Cheetah to cotton from emergence up to the early bloom stage at 29.0 fluid ounces per acre (0.53 lbs ai/A). Should environmental conditions prevent a timely herbicide application, a single application of up to 43.0 fluid ounces per acre (0.79 lbs ai/A) of Cheetah may be made to cotton. If more than 29.0 fluid ounces per acre (0.53 lbs ai/A) are used in any single application, the annual total may not exceed 72.0 fluid ounces per acre (1.32 lbs ai/A), including all application timings. See Restrictions to the Directions for use on Cotton Containing the LibertyLink Trait

below for additional information.

#### Application Rates:

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3 post applications

Apply 29 fluid ounces per acre (0.53 lbs ai/A) per application depending on weed species, size and density per weed chart.

If required a second application of 29 fluid ounces per acre (0.53 lbs ai/A) can be applied, followed by a third application of 29 fluid ounces per acre (0.53 lbs ai/A).

The sequential applications must be made minimum 10 days and should be made up to 14 days after each other.

The maximum annual rate of Cheetah on cotton is 87.0 fluid ounces per acre (1.59 lbs ai/A).

Use a minimum spray volume of 15 gallons per acre, unless there is a difficult to control situation (such as dense canopy, large weeds or unfavorable growing conditions are present). In difficult to control situations use a minimum spray volume of 20 gallons per acre.

#### Tank Mix on Cotton Containing the LibertyLink Trait:

It is the pesticide user's responsibility to ensure that all products are registered for the intended use. Read and follow the applicable restrictions and limitations and directions for use on all product labels involved in tank mixing. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.

Certain herbicide tank mixes may aid in the performance of Cheetah. Cheetah may be applied in tank mix combinations with labeled rates of other products provided these other products are labeled for the timing and method of application for the cotton to be treated. The tank mix partner must be used in accordance with the label limitations and precautions. No label dosage rates may be exceeded. Cheetah cannot be mixed with any product containing a label prohibition against such mixing.

#### Adjuvants:

Ammonium sulfate (AMS) may be used at 1.5 to 3.0 pounds per acre. Adjuvant rates are dependent on a variety of factors including tank mix partners, environmental conditions (such as temperature) and potential for leaf burn. AMS has shown to improve weed control of difficult-to-control weeds, like lambsquarters and velvetleaf, under difficult environmental conditions (such as low relative humidity) or hard water.

The use of an anti-foam agent is recommended.

#### Surfactants / Oils:

The use of additional surfactants or crop oils in tank mixes with Cheetah may increase the risk of crop response. Please refer to the surfactant label for more detailed information.

#### Nozzle Spray Quality:

Use medium to coarse nozzles.

Cheetah is a contact herbicide and requires proper nozzles with uniform thorough spray coverage to achieve optimum weed control.

See SPRAY DRIFT MANAGEMENT section for more detailed information.

#### Restrictions to the Directions For Use on Cotton Containing the LibertyLink Trait:

- DO NOT apply Cheetah to cotton containing the LibertyLink trait in Florida, South of Tampa (Florida Route 60), or in Hawaii, except for test plots or breeding nurseries.
- DO NOT apply Cheetah within 70 days prior to cotton harvest.
- Up to 3 applications of Cheetah may be made to cotton per year at a maximum application rate of 29.0 fluid ounces per acre (0.53 lb ai/A). DO NOT apply more than 87.0 fluid ounces (including all application timings) to cotton (1.59 lbs ai/A) per year under this application scenario. Sequential applications must be at least 10 days apart.
- If environmental conditions prevent timely applications resulting in large weeds or heavy infestations, a single application of Cheetah at up to 43.0 fluid ounces per acre (0.79 lb ai/A) may be made to cotton. DO NOT apply more than 43.0 fluid ounces (0.79 lb ai/A) of Cheetah in a single application under this use scenario. If a single application greater than 29.0 fluid ounces (0.53 lb ai/A) is made, a subsequent application not to exceed 29.0 fluid ounces (0.53 lb ai/A) may be made to cotton. The annual total use rate under this scenario may not exceed 72.0 fluid ounces (1.32 lb ai/A) of Cheetah. Sequential applications must be at least 10 days



apart.

- DO NOT apply Cheetah through any type of irrigation system.
- Refer to the ROTATIONAL CROP RESTRICTIONS section under the PRODUCT INFORMATION heading of this label for the appropriate rotational crop plant back intervals.

## APPLICATION DIRECTIONS FOR COTTON SEED PROPAGATION

Cotton Containing the LibertyLink Trait:

Cheetah may also be used in cotton seed propagation as a foliar spray to selectively eliminate cotton plants that do not carry the LibertyLink trait and as such, can be applied to remove susceptible segregates during cotton seed propagation. Breeding material not containing the LibertyLink trait will be severely injured or killed if treated with this herbicide.

Method

[Broadcast/Foliar Air](#)

[Broadcast/Foliar Ground](#)

Pre-Harvest Interval

70 days

Rates

[field rates 0](#)

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Restricted Entry Interval

12 hours

Timings

[Postemergence \(Weed\)](#)