

OCT 20 1994

Dr. Merlyn L. Jones
DowElanco
9330 Zionsville Rd.
Indianapolis, IN 46268

Dear Dr. Jones:

Subject: Groundwater Advisory Statements
Dow/Elanco Spike 20P
EPA Reg. No. 62719-121
Your submission dated Oct. 12, 1994

The labeling referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, is acceptable and a stamped copy is enclosed for your records.

Sincerely yours,

Robert J. Taylor
Product Manager 25
Fungicide-Herbicide Branch
Registration Division (H7505C)

Enclosure

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[Front of bag]

to EPA Letter dated

20 1994

Under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, for the pesticide registered under EPA Reg. No. 62719-121

(logo) DowElanco

Spike* 20P

Range and Pasture Management

A surface applied herbicide for woody plant control in such areas as:

- Along highways
- Fence rows
- Firebreaks
- Industrial sites
- Pastureland
- Pipelines
- Railroad rights-of-way
- Rangeland
- Utility rights-of-way
- Other noncropland areas for control of woody plant species
- Clearings for wildlife habitat

Carefully read the entire label, including all use precautions, before applying to avoid inappropriate use of this product.

(EDITOR NOTE: insert graphic of tree in circle with slash through it. Copy below the tree is: Spike* 20P will kill trees and shrubs. Carefully read the precautions before using.)

Active Ingredient:

tebuthiuron: N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N,N-dimethylurea 20.0%

Inert Ingredients 80.0%

Total 100.0%

Contains 0.2 pound active ingredient per pound of product.

Keep Out of Reach of Children

CAUTION

Refer to back panel of bag for precautionary information and Directions for Use including Storage and Disposal.

Notice: Read the entire label. Use only according to label directions. Before buying or using this product, read "Warranty Disclaimer" and "Limitation of Remedies" inside label booklet.

In case of emergency endangering health or the environment involving this product, call collect 517-636-4400.

Agricultural Chemical: Keep away from food, feedstuffs and water supplies. Do not ship or store with food, feeds, drugs or clothing.

EPA Reg. No. 62719-121

EPA Est. 39578-TX-1

*Trademark of DowElanco
DowElanco • Indianapolis, IN 46268 U.S.A.

Not For Residential Use

Specialty Herbicide

Net Weight 25 lb

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Precautionary Statements**Hazards to Humans and Domestic Animals****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.)

Causes Eye Irritation • Harmful If Swallowed, Inhaled Or Absorbed Through The Skin

~~Avoid breathing dust and contact with eyes, skin or clothing. Use eye protection and protective clothing such as coveralls, a long-sleeved shirt and impermeable gloves when handling this product. Eye protection, long-sleeved shirt, long pants, shoes and socks, and waterproof gloves must be worn when handling or applying this product.~~ Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

First Aid

If in eyes: Flush eyes with plenty of water. Call a physician if irritation develops.

If swallowed: Call a physician or Poison Control Center. Drink one or two glasses of water and induce vomiting by touching back of throat with finger or, if available, by administering one to two teaspoons of syrup of ipecac. Do not induce vomiting or give anything by mouth to an unconscious person.

If inhaled: Remove individual to fresh air. If breathing difficulty occurs, get medical attention. If not breathing, provide cardiopulmonary resuscitation assistance (mouth-to-mouth) and get medical attention.

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

Environmental Hazards

Do not apply Spike® 20P herbicide near desirable trees or other woody species. Exposure of even a small part of a plant root system to Spike 20P may cause severe plant injury or death. 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 by cleaning equipment, disposing of equipment washwaters, or disposing of wastes when disposing of equipment washwaters or rinsate.

Spills: To prevent unintended damage to nontarget vegetation or contamination of ground water, cover spills with waterproof covering if in outdoor area; then carefully collect and dispose of spilled pellets, whether in storage areas, vehicles or on the soil surface. (See General Information section for remedial action after accidental application or spill.) In outdoor areas, do not cover with soil or incorporate spilled material into the soil surface.

Ground Water Advisory: This product is known to leach through soil into ground water under certain conditions as a result of registered (rangeland and non-crop) uses. Use of this product in areas where soils have rapid to very rapid permeability, particularly where the water table is shallow, may result in ground water contamination.

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Use Restrictions for Groundwater Protection

Vulnerable Sites: To minimize any movement of tebuthiuron to subsurface water, do not exceed the application rates specified below on treatment sites where soils have a sand or loamy sand texture throughout the soil profile and all of the following characteristics:

1. Rapid to very rapid permeability.
2. Absence of well-defined organic layers or a textural B-horizon (restricting layer of fine-textured soil).
3. The water table of an underlying aquifer[‡] is shallow.

~~The Maximum use application rates for Spike 20P in such areas described above are:~~

- ~~Less than 20 inches annual precipitation: Do not apply more than 5 lb/acre Spike 20P.~~
- ~~Greater than 20 inches annual precipitation: Do not apply more than 10 lb/acre Spike 20P.~~

Refer to the "Woody Plants Controlled" section of this label for plant species controlled at these application rates.

[‡]An aquifer is defined as "an underground saturated, permeable, geologic formation capable of producing significant quantities of water to a well or spring. It is the ability of the saturated zone, or portion of that zone, to yield water which makes it an aquifer (American Chemical Society, 1983). Local agricultural agencies can provide further information on the type of soil in your area and the location of shallow ground water aquifers.

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- ~~Greater than 20 inches annual precipitation: Do not apply more than 10 lb/acre Spike 20P.~~

~~Refer to the "Woody Plants Controlled" section of this label for plant species controlled at these application rates.~~

Do not apply Spike 20P in areas where the water table is predominately shallow (5 feet or less), such as marshy or sub irrigated areas, or areas immediately adjacent to streams or lakes which are periodically flooded, unless such use is allowed under a state-approved pesticide management program. Note: Also on such areas, woody plants rooted directly in a shallow water table are minimally affected by applications of tebuthiuron and poor woody plant control will result.

Do not apply Spike 20P where bedrock is continuously exposed or in areas of bedrock overlain by soils that are shallow or discontinuous.

Do not apply Spike 20P in areas adjacent to sinkholes or depressions lacking external drainage which occur within areas of karst topography.

Do not apply Spike 20P to high shrink/swell soils (vertisols) which develop deep cracks upon drying.

Do not apply Spike 20P within areas identified by state or local authorities as protected ground water recharge zones.

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Directions for Use

It is a violation of federal law to use this product in a manner inconsistent with its labeling.
Read all Directions for Use carefully before applying.

Storage and Disposal

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

Storage: The herbicidal properties of Spike 20P require caution in handling, storage and transportation of this product. Store in original container only. In case of leak or spill, contain material and dispose as waste.

Pesticide Disposal: Open dumping is prohibited. Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Container Disposal: Completely empty bag into application equipment. Do not reuse. Then dispose of empty bag in a sanitary landfill or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Refer to label booklet in pocket of bag for additional precautionary information, Special Use Precautions and Directions for Use.

Directions Enclosed [EDITOR NOTE: Turned at a 20° angle inside a box which has all 4 sides as bold dotted lines.]

[Right Gusset of Bag]

(logo) DowElanco

Spike* 20P

[Left Gusset of Bag]

(logo) DowElanco

Spike* 20P

900-002426

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[Editor's note: Added text is underlined and deleted text denoted by ~~strike-through~~.]
[Literature Booklet -- Spike 20P]
[Front Cover of Booklet]

(logo) DowElanco

Spike* 20P

A surface applied herbicide for woody plant control in such areas as:

- Along highways
- Fence rows
- Firebreaks
- Industrial sites
- Pastureland
- Pipelines
- Railroad rights-of-way
- Rangeland
- Utility rights-of-way
- Other noncropland areas for control of woody plant species
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EPA Reg. No. 62719-121

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Specialty Herbicide

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[Page 2 of Booklet]

Active Ingredient:

tebuthiuron: N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N,N'-dimethylurea	20.0%
Inert Ingredients	80.0%
Total	100.0%

Contains 0.2 pound active ingredient per pound of product.

Precautionary Statements

Hazards to Humans and Domestic Animals

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.)

Causes Eye Irritation • Harmful If Swallowed, Inhaled Or Absorbed Through The Skin

~~Avoid breathing dust and contact with eyes, skin or clothing. Use eye protection and protective clothing such as coveralls, a long-sleeved shirt and impermeable gloves when handling this product. Eye protection, long-sleeved shirt, long pants, shoes and socks, and waterproof gloves must be worn when handling or applying this product.~~ Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

First Aid

If in eyes: Flush eyes with plenty of water. Call a physician if irritation develops.
If swallowed: Call a physician or Poison Control Center. Drink one or two glasses of water and induce vomiting by touching back of throat with finger or, if available, by administering one to two teaspoons of syrup of ipecac. Do not induce vomiting or give anything by mouth to an unconscious person.
If inhaled: Remove individual to fresh air. If breathing difficulty occurs, get medical attention. If not breathing, provide cardiopulmonary resuscitation assistance (mouth-to-mouth) and get medical attention.
If on skin: Wash with plenty of soap and water. Get medical attention if irritation develops.

Environmental Hazards

Do not apply Spike® 20P herbicide near desirable trees or other woody species. Exposure of even a small part of a plant root system to Spike 20P may cause severe plant injury or death. 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 by cleaning equipment, disposing of equipment washwaters, or disposing of wastes when disposing of equipment washwaters or rinsate.

Spills: To prevent unintended damage to nontarget vegetation or contamination of ground water, cover spills with waterproof covering if in outdoor area; then carefully collect and dispose of spilled pellets, whether in storage areas, vehicles or on the soil surface. (See General Information section for remedial action after accidental application or spill.) In outdoor areas, do not cover with soil or incorporate spilled material into the soil surface.

Ground Water Advisory: This product is known to leach through soil into ground water under certain conditions as a result of registered (rangeland and non-crop) uses. Use of this product in areas where soils have rapid to very rapid permeability, particularly where the water table is shallow, may result in ground water contamination.

Use Restrictions for Groundwater Protection

Vulnerable Sites: To minimize any movement of tebuthiuron to subsurface water, do not exceed the application rates specified below on treatment sites where soils have a sand or loamy sand texture throughout the soil profile and all of the following characteristics:

1. Rapid to very rapid permeability.
2. Absence of well-defined organic layers or a textural B-horizon (restricting layer of fine-textured soil).
3. The water table of an underlying aquifer[‡] is shallow.

~~The Maximum use application rates for Spike 20P in such areas described above are:~~

- ~~Less than 20 inches annual precipitation: Do not apply more than 5 lb/acre Spike 20P.~~
- ~~Greater than 20 inches annual precipitation: Do not apply more than 10 lb/acre Spike 20P.~~

Refer to the "Woody Plants Controlled" section of this label for plant species controlled at these application rates.

[‡]An aquifer is defined as "an underground saturated, permeable, geologic formation capable of producing significant quantities of water to a well or spring. It is the ability of the saturated zone, or portion of that zone, to yield water which makes it an aquifer (American Chemical Society, 1983). Local agricultural agencies can provide further information on the type of soil in your area and the location of shallow ground water aquifers.

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Do not apply Spike 20P in areas where the water table is predominately shallow (5 feet or less), such as marshy or sub irrigated areas, or areas immediately adjacent to streams or lakes which are periodically flooded, unless such use is allowed under a state-approved pesticide management program. Note: Also on such areas, woody plants rooted directly in a shallow water table are minimally affected by applications of tebuthiuron and poor woody plant control will result.

Do not apply Spike 20P where bedrock is continuously exposed or in areas of bedrock overlain by soils that are shallow or discontinuous.

Do not apply Spike 20P in areas adjacent to sinkholes or depressions lacking external drainage which occur within areas of karst topography.

Do not apply Spike 20P to high shrink/swell soils (vertisols) which develop deep cracks upon drying.

Do not apply Spike 20P within areas identified by state or local authorities as protected groundwater recharge zones.

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Directions for Use

It is a violation of federal law to use this product in a manner inconsistent with its labeling. Read all Directions for Use carefully before applying.

Storage and Disposal

Do not contaminate water, food or feed by storage or disposal.
Storage: The herbicidal properties of Spike 20P require caution in handling, storage and transportation of this product. Store in original container only. In case of leak or spill, contain material and dispose as waste.
Pesticide Disposal: Open dumping is prohibited. Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.
Container Disposal (Bag): Completely empty bag into application equipment. Do not reuse. Then dispose of empty bag in a sanitary landfill or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.
Container Disposal (Canister): Completely empty container - do not reuse. Then dispose of empty container in a sanitary landfill or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

General Information

Spike 20P herbicide is a surface applied soil-active herbicide product for control of woody plants (trees, shrubs and vines). Treatments become effective after sufficient rainfall has occurred to move the active ingredient in Spike 20P into the root zone. Herbicidal symptoms appear most rapidly when applied just before seasonal rainfall. Treated trees and shrubs (brush) exhibit leaf chlorosis and browning followed by defoliation. Woody plants may go through several defoliation cycles before death occurs. Time required to achieve control of woody vegetation may vary from one to several years. Increased application rates and additional time is required to achieve consistent woody plant control under the following conditions: (1) the treated area contains deep, medium-to-fine textured or high organic matter soils; (2) the target species are deep-rooted; or (3) the vegetation consists of species tolerant to Spike 20P.

For best brush control results, do not disturb intact plants by such practices as wood cutting, chaining or burning for two years after application of Spike 20P. Resprouting is more likely to occur if plants are disturbed before complete woody plant control occurs.

General Use Precautions

~~Special Use Precautions~~

Spike 20P is intended for control of unwanted woody vegetation such as trees, shrubs and vines. Spike 20P will also control herbaceous broadleaf plants such as clover or lespedeza. Grasses in the area immediately adjacent to pellets may be temporarily damaged. Dormant season application is recommended to minimize herbicidal effects on grasses and other herbaceous plants. The herbicidal activity of Spike 20P in soil may prevent the growth of trees, shrubs and other broadleaf vegetation for several years after treatment.

Do not apply Spike 20P to interior ditch banks (areas which slope toward the drainage). Do not apply to ditches used to transport irrigation water or potable water.

Use Restrictions In the State of Florida

In Broward, Collier, Dade, Hendry, Lee, Monroe and Palm Beach Counties of Florida, Spike 20P may be applied only in accordance with supplemental labeling.

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Maximum Application Rate for Grazing or Haying: If treated area is to be used for haying or grazing, do not apply more than 20 pounds per acre of Spike 20P. If treated area is to be used for grazing or haying, do not apply more than 10 pounds per acre of Spike 20P in areas receiving 20 inches or less average annual rainfall, or more than 20 pounds per acre of Spike 20P in areas receiving more than 20 inches average annual rainfall.

Haying Restriction: Do not cut hay for livestock feed for one year after a Spike 20P treatment.

Effects on Herbaceous Vegetation: Spike 20P may injure or suppress certain herbaceous vegetation in the treated area. Therefore, do not apply where such injury cannot be tolerated. Injury to most herbaceous perennial plants is reduced if Spike 20P is applied when vegetation is dormant.

Do not apply Spike 20P more than once per year.

Safe use of Spike 20P requires the following guidelines to be carefully followed:

Treatment Setback: Do not apply Spike 20P in the vicinity of desirable plants. Exposure of even a small part of a plant root system to Spike 20P may cause severe plant injury or death.

Note: Plant roots usually occupy an area much larger than the aerial portion of the plant. Treatment setback distance should be 1 to 2 times the height or width of adjacent nontarget vegetation, whichever is greater. For example, if adjacent nontarget vegetation is 25 feet tall, the treatment setback should be 25 to 50 feet.

If there is a question about appropriate setback distance, contact an Arboriculturist (tree expert) to determine if the proposed treatment area is free of roots of desirable vegetation.

Potential Product Movement: Spike 20P or soil containing Spike 20P may be moved from treated areas by flowing water, wind or mechanical means. Do not apply Spike in areas where overland flow of water might move Spike 20P or soil containing Spike 20P from the treated area. Do not apply where wind erosion may cause movement of soil containing Spike 20P from the treated area unless the surface has been stabilized with a gravel mulch or some other means. Do not apply in areas where soil may be redistributed by mechanical means to non-treated areas.

Cleaning of Equipment: Thoroughly clean all traces of Spike 20P from application equipment after use. Do not empty residues cleaned from application equipment on areas where contact with roots of desirable vegetation may occur.

Remedial Action After Accidental Application or Spill: Take action to minimize the effects of an accidental application or spill immediately. Once rainfall has moved Spike 20P into the plant root zone, the effect on woody plants is irreversible. Damage from accidental application or spill may be prevented only if soil containing Spike 20P is carefully removed before rainfall has moved Spike 20P into the root zone. Apply a waterproof covering to the affected area until cleanup is accomplished. Carefully collect Spike 20P pellets and/or soil containing Spike 20P with appropriate equipment and dispose at an approved landfill site. If rainfall has occurred, remove surface soil in the affected area to the depth of Spike 20P penetration.

Frequency of Application and Maximum Use Rates:**Broadcast Applications (Aerial or Ground Equipment):**

- The maximum use rate and frequency of application is 1 to 2 lb a.i./acre once every three years for vulnerable sites where soils are sandy and depth to water table is shallow. (Refer to Environmental Hazards section under "Use Restrictions for Ground Water Protection".)
- For all other areas, the maximum use rate and frequency of application is up to 4 lb a.i./acre once every three years and no more than two treatments totaling of 6 lb a.i./acre in any 6 year period.

Spot Treatments (Hand Application or Hand-held Equipment): May be applied at rates up to 6 lb a.i./acre when needed.

General Information

~~Spike 20P is a surface applied soil-active herbicide for control of woody plants (trees, shrubs and vines). Treatments become effective after sufficient rainfall has occurred to move the active ingredient in Spike 20P into the root zone. Herbicidal symptoms appear most rapidly when applied just before seasonal rainfall. Treated trees and shrubs (brush) exhibit leaf chlorosis and browning followed by defoliation. Woody plants may go through several defoliation cycles before death occurs. Time required to achieve control of woody vegetation may vary from one to several years. Increased application rates and additional time is required to achieve consistent woody plant control under the following conditions: (1) the treated area contains deep, medium-to-fine textured or high organic matter soils; (2) the target species are deep-rooted; or (3) the vegetation consists of species tolerant to Spike 20P.~~

~~For best brush control results, do not disturb intact plants by such practices as wood cutting, chaining or burning for two years after application of Spike 20P. Resprouting is more likely to occur if plants are disturbed before complete woody plant control occurs.~~

General Use Precautions

~~Do not apply Spike 20P to interior ditch banks (areas which slope toward the drainage). Do not apply to ditches used to transport irrigation water or potable water.~~

~~**Maximum Application Rate for Grazing or Haying:** If treated area is to be used for haying or grazing, do not apply more than 20 pounds per acre of Spike 20P. If treated area is to be used for grazing or haying, do not apply more than 10 pounds per acre of Spike 20P in areas receiving 20 inches or less average annual rainfall, or more than 20 pounds per acre of Spike 20P in areas receiving more than 20 inches average annual rainfall.~~

~~**Haying Restriction:** Do not cut hay for livestock feed for one year after a Spike 20P treatment.~~

~~**Effects on Herbaceous Vegetation:** Spike 20P may injure or suppress certain herbaceous vegetation in the treated area. Therefore, do not apply where such injury cannot be tolerated. Injury to most herbaceous perennial plants is reduced if Spike 20P is applied when vegetation is dormant.~~

~~Do not apply Spike 20P more than once per year.~~

[Editor's note: The above "deleted" text moved to the General Use Precautions section.]

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Factors in Herbicidal Response

Soil Texture, Soil Depth and Organic Matter

Poor control or erratic results are likely to occur when Spike 20P is applied to soils containing more than 5% organic matter or more than 30% clay. Do not apply to "blackland" or other heavy clay soils which crack extensively upon drying. Other deep, medium and fine-textured soils supporting deep-rooted woody plant species require increased application rates for consistent control. The susceptibility of woody plants occurring on shallow, coarse or rocky soils with low organic matter is normally increased due to increased soil availability of Spike 20P and shallow rooting depth. Therefore, use application rates at the low end of the rate range in these situations.

Woody Plant Size and Density

The height and density of woody vegetation is a reliable indicator of soil conditions. Woody vegetation is generally taller and more dense where soils are deeper and/or of medium to fine texture and where soil moisture conditions are more favorable. Higher rates in the rate range are required on such sites. On sites with coarse, shallow or rocky conditions with less favorable soil moisture conditions, woody vegetation will be smaller and less dense. Lower rates in the rate range are required for control on such sites. Where a high level of woody plant control is required and application rates cannot be adjusted for changes in soils, plant size or density, apply Spike 20P at a rate sufficient to control the tallest and most dense woody vegetation in the treatment area.

Application Timing

Spike 20P may be applied anytime except when the soil is frozen or is saturated with moisture. For optimum results, applications should be made prior to the resumption of active seasonal growth in the spring or before expected seasonal rainfall. In areas receiving greater than 25 inches of annual rainfall, late summer and fall applications may require a higher application rate in the indicated rate range to achieve consistent control.

Spike 20P is recommended for control of brush regrowth after dozing or shredding, provided the regrowth has reached an average height of five feet or more prior to application. Spike 20P works best when there is an abundance of active leaf area to stimulate water and herbicide uptake during the season following application. Taller regrowth will tend to provide faster and more consistent brush control.

Spike 20P may cause temporary herbicidal symptoms to appear on perennial grasses. Dormant season application is recommended to minimize herbicidal effects on desirable forage grasses.

Effect of Shallow Groundwater on Woody Plant Control: Do not apply Spike 20P to areas where the water table is predominately shallow (5 feet or less), such as marshy or sub irrigated areas, or areas immediately adjacent to streams or lakes which are periodically flooded. On such sites, where roots extend directly to a shallow water table, woody plants are minimally affected by applications of tebuthiuron and poor control will result.

Rangeland and Pasture Management Information

There are no label restrictions which require livestock grazing to be delayed following an application of Spike 20P. Spike 20P is a pelleted formulation and does not adhere to plants. Therefore, significant plant residues do not occur as a result of application. However, at the time of application forage species may be sparsely distributed and in a low state of vigor due to competition from woody plants. Under such circumstances, the density and vigor of forage species may be enhanced by deferment of grazing following application of Spike 20P.

Grazing Management

For optimum perennial forage grass response, desirable species should be present in the area to be treated at a minimum of 10% of normal plant density (density = plants per unit area) compared to similar rangeland or pasture sites not dominated by woody plants. To encourage forage grass response, grazing should be deferred during the entire active growing season following application. Poor vegetative vigor or inadequate rainfall, may necessitate additional grazing deferment during periods of active forage growth. Light grazing of mature forage after seed maturity will not harm grass recovery and can aid in seed

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dispersal. Forage grass production usually increases as woody plant competition for water and nutrients is reduced. However, increased forage production is also dependent on adequate rainfall and a sound grazing management program.

Precaution: The density of cool season grass stands such as fescue and crested wheatgrass may be reduced after application of Spike 20P. Factors which may contribute to the possibility of stand reduction include excessive application rates, areas of shallow or rocky soil and low brush density.

Rangeland and Pasture Overseeding: Apply Spike 20P at recommended rates. Overseeding involving burning or chaining of treated brush should not be attempted for at least two growing seasons after application. Apply seed and fertilizer at recommended rates into ash as soon as possible after burning or just prior to chaining. Cool season grasses are normally seeded in early fall and warm season grasses in the spring after the expected frost-free date. Aerial seeding without burning or chaining may be attempted in the fall or spring following an application of Spike 20P, but natural seedbed conditions must be relied upon for seedling establishment. Consult local range management specialists for recommendations on locally adapted species, seeding time and grazing management.

Application of Spike 20P

Individual Plant Treatments

Individual plants, multistem clumps or small stands of woody vegetation may be hand treated. For individual plant treatments apply Spike 20P evenly over the area occupied by the target plant(s).

Pasture and Rangeland

- In areas receiving 20 inches or less average annual rainfall: Apply Spike 20P at a rate of 3/8 oz per 100 sq ft (equivalent broadcast rate = 10 lb/acre).
- In areas receiving more than 20 inches average annual rainfall: Apply Spike 20P at a rate of 3/4 oz. per 100 sq ft (equivalent broadcast rate = 20 lb/acre).

Noncropland

- Apply Spike 20P at a rate of 3/8 oz to 1 1/8 oz per 100 sq ft (equivalent broadcast rate = 10 to 30 lb/acre).

Broadcast Treatments

Spike 20P must be applied with ground or aerial application equipment capable of accurate calibration and able to provide a uniform distribution of pellets on the soil surface. Use of equipment not capable of confining the spread of pellets to the target area may result in injury or death of vegetation outside the intended treatment area. Contact a DowElanco Sales Representative for recommendations on application equipment for different use situations.

Spike 20P may be applied by ground or air broadcast by/or under the supervision of U.S. Government Agencies.

Broadcast Application Rates

Pasture and Rangeland: Do not apply more than 10 pounds per acre Spike 20P in areas receiving 20 inches or less average annual rainfall. Do not apply more than 20 pounds per acre in areas receiving 20 inches or more average annual rainfall.

Noncropland: Spike 20P may be applied at up to 30 ~~Do not apply more than 20 pounds per acre of Spike 20P~~ on noncropland.

Note: Refer to General Information section for limitations on maximum use rates, frequency of application and total application rates allowed during a given period of time. Refer to Environmental Hazards section under "Use Restrictions for Ground Water Protection" for other rate limitations on "vulnerable" sites.

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Woody Plants Controlled by Spike 20P

Rangeland, Pastureland and Noncropland:

Apply Spike 20P at 3.75 to 5 lb per acre on the following woody plant species:

Note: On rangeland and pastureland, apply 3.75 to 5 lb/acre of Spike 20P where a higher degree of control is required (See "Factors in Herbicidal Response" in "General Information" section of this label). Spike 20P may be applied at rates as low as 2.5 per acre on sites with shallow, rocky and coarse textured soils having low organic matter content, or where partial control is desired.

<u>Common Name</u>	<u>Scientific Name</u>
burweed (Density less than 1 per sq ft)	<i>Haplopappus tenuisectus</i>
ceniza	<i>Leucophyllum frutescens</i>
creosotebush	<i>Larrea tridentata</i>
mimosa, catclaw (wait-a-minute-bush)	<i>Mimosa pigra</i>
Paloverde	<i>Cercidium</i> spp.
sagebrush, big	<i>Artemisia tridentata</i>
sagebrush, sand	<i>Artemisia filifolia</i>
snakeweed, broom (Density less than 1 per sq ft)	<i>Gutierrezia sarothrae</i>
tarbush	<i>Flourensia cernua</i>
whitethorn	<i>Acacia constricta</i>

Rangeland, Pastureland and Noncropland:

Apply Spike 20P at 2.5 to 10.0 lb per acre on the following woody plant species:

<u>Common Name</u>	<u>Scientific Name</u>
oak, sand shinnery†	<i>Quercus havardii</i>

†Note: A wide rate range is provided to accommodate the broad range of soil and climatic variation which occurs in areas occupied by sand shinnery. Use the lowest application rate only on shallow sands in southern part of species range or where partial control is desired. Use a higher dose in indicated rate range for deeper sands and dunes, and on shinnery varieties with tall and dense growth habit which become more prevalent in the mid-to-northern part of the species range (See "Factors in Herbicidal Response" in "General Information" section of this label).

Rangeland, Pastureland and Noncropland:

Apply Spike 20P at 5 to 10 lb per acre on the following woody plant species:

<u>Common Name</u>	<u>Scientific Name</u>
oak, bigelow† (Partial control)	<i>Quercus durandi</i>
oak, mohr† (Partial control)	<i>Quercus mohriana</i>
oak, running live† (Partial control)	<i>Quercus virginiana</i>
whitebrush	<i>Aloysia lycoides</i>
wolfberry, Berlandier	<i>Lycium berlanderi</i>

†Note: Use a higher dosage in indicated rate range on tall and dense stands.

Rangeland, Pastureland and Noncropland:
 Apply Spike 20P at 10 to 20 lb per acre on the following woody plant species:

<u>Common Name</u>	<u>Scientific Name</u>
acacia, blackbrush	<i>Acacia rigidula</i>
acacia, catclaw	<i>Acacia greggii</i>
acacia, twisted	<i>Acacia tortuosa</i>
alder, speckled†	<i>Alnus rugosa</i>
apple-of-sodom	<i>Solanum sodomaeum</i>
birch, gray	<i>Betula populifolia</i>
blueberry	<i>Vaccinium</i> spp.
bluewood (Brazil)	<i>Condalia obovata</i>
buckbrush	<i>Symphoricarpos orbiculatus</i>
cherry, bitter	<i>Prunus emarginata</i>
cottonwood, eastern†	<i>Populus deltoides</i>
dogwood, roughleaf	<i>Cornus drummondii</i>
elm, American	<i>Ulmus americana</i>
elm, winged	<i>Ulmus alata</i>
fir, balsam†	<i>Abies balsamea</i>
guajillo	<i>Acacia berlanderi</i>
guava	<i>Psidium guajava</i>
hackberry, spiny (granjeno)	<i>Celtis pallida</i>
hackberry, western	<i>Celtis occidentalis</i>
hardhack†	<i>Spiraea tomentosa</i>
hawthorn	<i>Crataegus</i> spp.
huckleberry	<i>Gaylussacia</i> spp.
nursecho†	<i>Acacia farnesiana</i>
koa haole	<i>Leucaena leucocephala</i>
locust, black	<i>Robinia pseudoacacia</i>
manzanita	<i>Arctostaphylos</i> spp.
maple, sugar†	<i>Acer saccharum</i>
mulberry, red	<i>Morus rubra</i>
oak, black	<i>Quercus velutina</i>
oak, blackjack	<i>Quercus marilandica</i>
oak, blue	<i>Quercus douglasii</i>
oak, bur	<i>Quercus macrocarpa</i>
oak, post	<i>Quercus stellata</i>
oak, shrub live	<i>Quercus turbinella</i>
oak, southern red	<i>Quercus falcata</i>
oak, white	<i>Quercus alba</i>
pine†	<i>Pinus</i> spp.
poplar, balsam†	<i>Populus balsamifera</i>
rose, Meadartney†	<i>Rosa bracteata</i>
rose, multiflora	<i>Rosa multiflora</i>
sage, black	<i>Salvia melifera</i>
spruce, white†	<i>Picea glauca</i>
sumac, dwarf	<i>Rhus copallina</i>
sumac, littleleaf	<i>Rhus microphylla</i>
sumac, skunkbush	<i>Rhus trilobata</i>
sumac, smooth	<i>Rhus glabra</i>
sumac, staghorn	<i>Rhus typhina</i>
tamarack†	<i>Larix laricina</i>
thornapple, desert	<i>Datura discolor</i>
yaupon	<i>Ilex vomitoria</i>
yaupon, desert	<i>Schaefferia cuneifolia</i>

†Note: Use a higher dosage in indicated rate range on all sites.

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Noncropland only:

Rangeland, Pastureland and Noncropland:

Apply Spike 20P at 20 to 30 lb per acre on the following woody plant species:

<u>Common Name</u>	<u>Scientific Name</u>
alder, red	<i>Alnus rubra</i>
alder, speckled†	<i>Alnus rugosa</i>
ash, green†	<i>Fraxinus pennsylvanica</i>
aspen, bigtooth	<i>Populus grandidentata</i>
beech, American	<i>Fagus grandifolia</i>
blackberry	<i>Rubus</i> spp.
blackberry, cutleaf†	<i>Rubus laciniatus</i>
boxelder	<i>Acer negundo</i>
chamise	<i>Adenostoma fasciculatum</i>
cherry, black	<i>Prunus serotina</i>
chokecherry, common	<i>Prunus virginiana</i>
colubrina, Texas	<i>Colubrina texensis</i>
cottonwood, eastern†	<i>Populus deltoides</i>
coyotebush†	<i>Baccharis pilularis</i>
creeper, Virginia	<i>Parthenocissus quinquefolia</i>
dogweed, flowering	<i>Cornus florida</i>
douglasfir	<i>Pseudotsuga menziesii</i>
fr. balsam†	<i>Abies balsamea</i>
guayacan	<i>Portiera angustifolia</i>
hardhack†	<i>Spiraea tomentosa</i>
hickory, bitternut	<i>Caraya cordiformis</i>
hickory, black	<i>Caraya texana</i>
hickory, pignut	<i>Caraya glabra</i>
hickory, shagbark	<i>Caraya ovata</i>
hiscashe†	<i>Acacia farnesiana</i>
kidneywood, Texas	<i>Eysenhardtia texana</i>
kudzu	<i>Pueraria lobata</i>
lantana†	<i>Lantana camara</i>
leatherstem	<i>Jatropha dioica</i>
lotebust (condalia)	<i>Ziziphus obtusifolia</i>
maple, bigleaf	<i>Acer macrophyllum</i>
maple, Norway†	<i>Acer platanoides</i>
maple, silver†	<i>Acer saccharinum</i>
maple, sugar†	<i>Acer saccharum</i>
melaleuca†	<i>Melaleuca quinquenervia</i>
mountainmahogany, birch. of	<i>Cercocarpus betuloides</i>
oak, California scrub	<i>Quercus dumosa</i>
oak, live	<i>Quercus virginiana</i>
oak, pin	<i>Quercus palustris</i>
oak, red	<i>Quercus rubra</i>
oak, white	<i>Quercus alba</i>
peppertree, Brazilian†	<i>Schinus terebinthifolius</i>
pine, Australian	<i>Casuarina</i> spp.
pine	<i>Pinus</i> spp.
poplar, balsam†	<i>Populus balsamifera</i>
raspberry, black	<i>Rubus occidentalis</i>
rose, Moccasin†	<i>Rosa bracteata</i>
salal†	<i>Gaultheria shallon</i>
spruce, white†	<i>Picea glauca</i>
sweetgum	<i>Liquidambar styraciflua</i>

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eyebrow, American†	<i>Platanus occidentalis</i>
amarac†	<i>Larix laricina</i>
trumpet creeper	<i>Campsis radicans</i>
tuliptree†	<i>Liriodendron tulipifera</i>
willow	<i>Salix</i> spp.

†Note: Use a higher dosage in indicated rate range on all sites.

Noncropland only:

Rangeland, Pastureland and Noncropland (Individual Plant Treatment Only):

Apply Spike 20P at 30 lb per acre on the following woody plant species:

<u>Common Name</u>	<u>Scientific Name</u>
ash, green	<i>Fraxinus pennsylvanica</i>
ash, white	<i>Fraxinus americana</i>
blackberry, cutleaf	<i>Rubus laciniatus</i>
ceanothus, wedgeleaf	<i>Ceanothus cuneatus</i>
chaparral, whitethorn	<i>Ceanothus leucodermis</i>
cocksbush	<i>Baccharis pilularis</i>
elm, Chinese	<i>Ulmus parvifolia</i>
elm, slippery	<i>Ulmus rubra</i>
greenbriar, roundleaf	<i>Smilax rotundifolia</i>
hawthorn, cockspur	<i>Crataegus crus-calli</i>
lantana	<i>Lantana camara</i>
manzanita, greenleaf	<i>Arctostaphylos patula</i>
maple, Norway	<i>Acer platanoides</i>
maple, silver	<i>Acer saccharinum</i>
maple, vine	<i>Acer circinatum</i>
peppertree, Brazilian	<i>Schinus terebinthifolius</i>
privet	<i>Ligustrum</i> spp.
redcedar, eastern	<i>Juniperus virginiana</i>
Russianolive	<i>Eleagnus angustifolia</i>
sala	<i>Gaultheria shallon</i>
sumac, laurel	<i>Rhus laurina</i>
sycamore, American	<i>Platanus occidentalis</i>
tallowtree, Chinese	<i>Sapium sebiferum</i>
tuliptree	<i>Liriodendron tulipifera</i>

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