

Q&A

WHAT YOU SHOULD KNOW ABOUT TORDON HERBICIDES

Vegetation managers and foresters use Tordon* herbicides to control unwanted weeds, brush and trees beneath electrical powerlines, along railroad beds, roadsides, pipelines, in commercial forestry, and wildlife openings including grazed areas on these sites. Tordon is a trademark of Dow AgroSciences for herbicides containing picloram as the active ingredient.

The following information provides specifics on Tordon, and explores questions commonly asked by people concerning its use.

Why do you need to control vegetation in these areas?

For most rights-of-way uses, safety remains a major reason for managing vegetation. Trees, brush and weeds along these rights-of-way can create hazards.

For driver and passenger safety, vegetation must not be allowed to block traffic signs or roadside markers. It must also not conceal guardrails or overtake road shoulders. Vegetation must not obstruct driver vision at intersections or block the line of sight around curves. Excessive vegetation also prevents proper drainage, which can damage roadbeds by creating potholes and other hazards.

Trees growing into powerlines can cause electrical power outages and make maintenance difficult and dangerous. In addition, areas around utility substations and land beneath transmission towers require a vegetation-free zone to prevent fire hazards and ensure the transfer of electricity.

Railroad companies need to control weeds along their rights-of-way to maintain roadbeds. Weeds hold water around railroad ties. This causes them to rot, increasing chances for derailment accidents. Sparks from the rails can also ignite weeds and brush growing too close to the roadbed, which can create a fire hazard for neighboring residents. Brush that obstructs motorists' views at railroad crossings is especially dangerous. Controlling it can help avert car/train accidents.

Foresters control vegetation to maximize the amount of timber they can harvest resulting in more timber harvested on less land. Controlling brush also decreases the potential for forest fires, and allows young stands to get started.

Invasive plants, that affect all of the areas we have talked about, threaten to create a monoculture where one plant type dominates an area. Invasive plants choke out native plant species and wildlife habitats. Soon native grasses, flowers and other plant species, along with native animals and birds, are driven out of the area.

Selective herbicides control these invasive plant species which promotes native plants that in turn attract a wide range of wildlife. Nearly 50 years of research by Dr. William Bramble, a forest ecologist, and Dr. William Brynes, an ecologist specializing in forest soils, support the use of selective herbicides to increase biodiversity. (The Bramble and Brynes study was done in conjunction with Penn State University, Purdue University and the Pennsylvania Game Commission.)

Why do you need to use Tordon? — Can't you just cut the vegetation?

Mowing and trimming remain important parts of any vegetation maintenance program. But mechanical means alone cannot protect these areas adequately. Besides being very labor intensive, mechanical methods cause soil compaction that can lead to soil erosion. And flailing blades and moving parts pose a danger to employees, livestock and wildlife. Flying debris from mowers can potentially damage your property.

Mowing creates multiple resprouts — the plant's natural defense to the cutting. This only worsens the vegetation problem.

In some cases, mechanical methods quite simply cannot be used. Steep terrain may limit access by mowers, and in the case of railroads and substations, their crushed-stone construction makes mechanical weed control impossible.

Tordon controls unwanted brush and eliminates resprouting. Because of this improved control, crews and heavy machinery visit the area less frequently, meaning less impact on property near yours.

Who will be applying Tordon?

A vegetation manager plans Tordon herbicide treatments and oversees crew activities. Trained, professional applicators apply Tordon in designated areas using approved application techniques. Organizations may use on-staff crews or hire custom applicators. In either case, these applicators follow directions on the product label, which is reviewed by the Environmental Protection Agency.

Aerial applicators are highly trained and use specialized equipment to make applications

How do I know these applicators are trained properly?

It's in the best interest of any organization to hire qualified people to handle applications — for the good of the organization itself and its standing in the community.

Only state-certified applicators or those under their direct supervision may apply Tordon. Tordon herbicides are classified as restricted-use pesticides because of their ability to injure susceptible plants at extremely low rates. The rigorous training required for state certification helps ensure that applicators apply Tordon properly, limiting the potential for damage to nontarget vegetation.

In addition, an experienced crew foreman oversees the application process to ensure all workers follow the specified vegetation-control plan outlined by the vegetation manager.

How will they apply Tordon?

Crews apply Tordon to unwanted vegetation through a variety of application techniques. Foliar applications spray solution on the plant's leaves, while cut-stubble applications are used to keep mowed brush from resprouting.

The vegetation manager assesses plant variety and size, and environmental conditions at each site before determining the correct

application rate and technique for that location. The manager considers many factors, such as season, temperature, weather and terrain.

How do these applicators know they are applying the correct amount of Tordon?

The label indicates the rates to be used. Before an application begins, crews test the application equipment and calibrate all spray nozzles to ensure they meet these label directions.

Will Tordon harm my ornamentals or garden?

Tordon has the potential to harm any woody or broadleaf plant that comes in direct contact with the spray solution. Therefore, applicators take care to apply Tordon only on targeted vegetation specified by the vegetation manager.

Crews use extra caution to protect your ornamentals or garden, leaving untreated "buffer" zones that add an extra measure of protection. When making foliar applications, crews carefully monitor wind speed and direction to assure accuracy. Drift-control agents can also be mixed with the spray solution to produce larger, heavier droplets that aid application accuracy and reduce chances for off-target drift.

Is Tordon considered toxic?

Picloram, the active ingredient in Tordon, has been classified as Category E – "evidence of non-carcinogenicity to humans" by the EPA (the most favorable classification possible), and has been found to be "practically nontoxic" to mammals, birds, and honeybees. Toxicological studies show no evidence that the active ingredient in Tordon causes cancer, birth defects, genetic damage, genetic mutations, adverse effects on the immune system or nervous system in humans.

All pesticides sold in the U.S. must be registered by the EPA based on scientific studies showing that the pesticide will perform its intended function without unreasonable adverse effects on the environment. The EPA defines unreasonable adverse effects as any unreasonable risk to man or the environment, taking into account the economic, social and environmental costs and benefits of the use of the pesticide.

How do you know the amount of Tordon applied won't hurt animals?

Tordon affects plants only. The herbicide's active ingredient disrupts the growth process within the plant by affecting enzymes unique to plants. Tordon does not have a similar effect on animals or insects.

To ensure there are no unintended effects to pets, livestock or wildlife, the EPA requires extensive animal testing. Researchers determine the highest concentration of a product that still shows no negative effect on animals, and call this the No-Observable-Adverse-Effect Level (NOAEL).

Scientists also determine a maximum exposure level — exposure to the highest estimated concentration level that could be expected with normal use. Using these two measurements, they calculate a “safety factor” for effects on animals. This factor shows a multiple of the highest label application rate that an animal would have to be exposed to in order to reach the NOAEL.

For instance, a safety factor of 10X means that an animal would have to be exposed to ten times the maximum labeled application rate of Tordon to reach the NOAEL.

As you can see in the Safety Assessment chart, a large margin of safety exists. Safety factors for wildlife range from 24X to 715X.

In addition to the safety factor, you'll also find a relative toxicity designation. Scientists group substances together according to their toxicity level, as you see on the scale below.

SAFETY ASSESSMENT FOR WILDLIFE			
Animal	Type of Exposure	Safety Factor	Toxicity Category
Bobwhite	Diet	715X	Practically Nontoxic
Mallard	Diet	715X	Practically Nontoxic
Bluegill	Freshwater	85X	Slightly Toxic
Rainbow Trout	Freshwater	43X	Slightly Toxic
<i>Daphnia magna</i>	Freshwater	67X	Slightly Toxic
Eastern Oysters	Saltwater	24X	Slightly Toxic
Pink Shrimp	Saltwater	148X	Practically Nontoxic

TOXICITY SCALE	
LOW	Practically Nontoxic
	Slightly Toxic
HIGH	Moderately Toxic
	Highly Toxic
	Very Highly Toxic

How does this relate to my protection?

To avoid exposure from the application, stay away from the treated area until the vegetation has dried. Since the product degrades in a short time and is absorbed into the vegetation, you can control your exposure by using common sense and avoiding the area until the vegetation has dried. If you were to become exposed, it would happen through either accidental ingestion, like eating treated berries, or skin absorption from touching treated vegetation before it dries completely. The next two sections will address these two situations.

What if I have eaten some treated berries?

You should not consume berries that have been treated with Tordon. However, scientists have studied accidental ingestion. These studies, like the animal studies mentioned above, use the No-Observable-Adverse-Effect Level (NOAEL) as a benchmark. Based on these studies and residue levels likely to be found at the highest labeled use rate, scientists have determined that an average person (150 pounds) could accidentally consume 30 quarts of treated berries each day for the rest of his or her life without experiencing any adverse effects.

What if I walk across a treated area?

Exposure may occur from walking across an area still damp from a foliar treatment. However, the dose you'd receive from this type of activity is not likely to cause any harm. Using NOAEL figures and the maximum expected exposure, scientists have determined that an average person (150 pounds) has a safety factor of 10,000⁺ times over the exposure received when walking through an area that was sprayed

at the maximum labeled rate. Still, we do not recommend walking through a treated area until the vegetation has dried completely.

Do I need to stay indoors during the application?

No. However, it's a good idea to stay away from the application site during treatment and shortly after.

After applicators apply the foliar treatment, avoid the area until the vegetation dries.

What happens to plants after they've been treated?

The active ingredient, picloram, works like a growth regulator found only in plants. It enters treated vegetation through the leaves and stems, and uses the plant's own transportation system to move into the roots and leaves. It induces rapid growth, which disrupts food production and causes the plant to die from lack of nutrients.

Will Tordon remain in the soil?

Tordon is broken down by soil microorganisms (fungi and bacteria) and sunlight. Final breakdown products are carbon dioxide, water and other organic materials. The breakdown rate depends on rainfall, soil temperature and how these factors impact soil microorganism activity — the main cause of breakdown. The time required to break down 50 percent of the active ingredient ranges from 1 week to 4 months.

Is it likely that Tordon will seep into groundwater?

Although the potential for leaching exists, Dow AgroSciences strongly believes the chances are slight that Tordon will seep into groundwater. Should any Tordon enter the soil, organic matter and clay particles in most soils will limit its downward movement, and keep it from contaminating groundwater.

However, a limited number of application sites may lack adequate amounts of clay particles or organic material to absorb Tordon or other herbicides. In groundwater monitoring work compiled by US EPA, samples from nearly 3000 wells were analyzed for residues of picloram, with detection in only 2.5% of the wells. Much of this sampling was done in areas at potentially high risk for groundwater contamination. All detects were extremely low, (16 ppb or less); far below any of the human health guidelines.

As a precaution, and to minimize the potential for non-point source contamination, a groundwater advisory statement occurs on the product label. This statement does the following:

- directs users not to apply picloram on certain types of sites that are vulnerable to groundwater contamination.
- provides guidance on the identification of these sites.

When certified applicators avoid these two site conditions, and proper application techniques are followed, the potential for groundwater contamination can be minimized.

Who may I contact for more information?

Contact your Dow AgroSciences sales specialist or visit our Web site at www.dow-agro.com/ivm. To receive printed materials, please fax your request to Dow AgroSciences at 1-800-905-7326. If you have further questions or require technical assistance, please contact our Customer Information Center via e-mail at info@dowagro.com or call 1-800-263-1196.

[†]Margin of safety values taken from Environmental Impact Statement - USDA Forest Service - January 1989.

