Australian Pesticides & Veterinary Medicines Authority

Product Name: Spruce Herbicide
APVMA Approval No: 93681/140159

Label Name:	Spruce Herbicide

Signal Headings:	POISON KEEP OUT OF REACH OF CHILDREN READ SAFETY DIRECTIONS BEFORE OPENING OR USING

Constituent Statements:	ACTIVE CONSTITUENTS: 250 g/L DIFLUFENICAN 200 g/L PYROXASULFONE

Mode of Action:	GROUP 12 15 HERBICIDE

Statement of Claims:	For the pre-emergence control of annual ryegrass, barley grass, annual phalaris, silver grass and toad rush and suppression of various pre-emergent grass and broadleaf weeds in wheat (not durum wheat), as specified in the DIRECTIONS FOR USE table.

Net Contents:	CONTENTS: 1 L – 1000 L

Restraints:	RESTRAINTS DO NOT apply with aircraft DO NOT plant durum wheat (Triticum durum) after the application of Spruce Herbicide (refer to Crop Rotation Recommendations for further advice). DO NOT apply if heavy rains or storms are forecast within 3 days. DO NOT irrigate to the point of field runoff for at least 3 days after application. DO NOT apply unless incorporation by sowing (IBS) can be performed within 3 days of application. DO NOT apply to waterlogged soil. DO NOT allow first irrigation tail water from land treated with Spruce to enter aquatic and wetland areas including aquacultural ponds, surface streams and rivers. SPRAY DRIFT RESTRAINTS Specific definitions for terms used in this section of the label can be found at www.apvma.gov.au/spraydrift DO NOT allow bystanders to come into contact with the spray cloud.

DO NOT apply in a manner that may cause an unacceptable impact to native vegetation, agricultural crops, landscaped gardens and aquaculture production, or cause contamination of plant or livestock commodities, outside the application site from spray drift. The buffer zones in the relevant buffer zone table below provide guidance but may not be sufficient in all situations. Wherever possible, correctly use application equipment designed to reduce spray drift and apply when the wind direction is away from these sensitive areas.
DO NOT apply unless the wind speed is between 3 and 20 kilometres per hour at the application site during the time of application.
DO NOT apply if there are hazardous surface temperature inversion conditions present at the application site during the time of application. Surface temperature inversion conditions exist most evenings one to two hours before sunset and persist until one to two hours after sunrise.
DO NOT apply by a boom sprayer unless the following requirements are met:
• spray droplets not smaller than a COARSE spray droplet size category
• minimum distances between the application site and downwind sensitive areas are observed (see 'Mandatory buffer zones' section of the following table titled 'Buffer zones for boom sprayers')

Buffer zones for boom sprayers

Application rate	Boom height above the target canopy	Bystander areas	Natural aquatic areas	Pollinator areas	Vegetation areas	Livestock areas
Up to maximum label rate	0.5 m or lower	0 m	400 m	0 m	55 m	0 m

Directions for Use:	This section contains file attachment.
Other Limitations:	
Withholding Periods:	WITHHOLDING PERIODS HARVEST: NOT REQURED WHEN USED AS DIRECTED. GRAZING/STOCKFOOD: DO NOT GRAZE OR CUT FOR STOCKFOOD FOR 8 WEEKS AFTER APPLICATION.
Trade Advice:	
General Instructions:	This section contains file attachment.
Resistance Warning:	For weed resistance management, Spruce Herbicide is both a Group 12 and a Group 15 herbicide. Diflufenican is a member of the phenyl ethera group of herbicides and acts by inhibiting carotenoid biosynthesis via inhibiting phytoene desaturase. For weed resistance management diflufenican is a Group 12 herbicide. Pyroxasulfone is a member of the isoxazoline group of herbicides and is an inhibitor of very long chain fatty acids (VLCFA inhibitors). For weed resistance management pyroxasulfone is a Group 15 herbicide. For weed resistance management, Spruce Herbicide is a Group 12/15 herbicide. Some naturally occurring weed biotypes resistant to Spruce Herbicide and other Group 12/15 herbicides may exist through normal genetic variability in any weed population. The resistant individuals can eventually dominate the weed population if these herbicides are

	used repeatedly. These resistant weeds will not be controlled by this product or other Group 12/15 herbicides. Do not rely exclusively on Spruce Herbicide for weed control. Use as part of an integrated weed management program involving herbicides with other modes of action and non-chemical methods of control. CropLife Australia resistance management strategies are available from your local agricultural chemical supplier or at the CropLife Australia website (www.croplifeaustralia.org.au). Refer to these strategies for details of how to manage the build-up of resistant weeds. For further information contact your local supplier, UPL Australia Pty Ltd representative or local agricultural department agronomist. Since occurrence of resistant weeds is difficult to detect prior to use UPL Australia Pty Ltd accepts no liability for any losses that may result from the failure of Spruce to control resistant weeds.

Precautions:	

Protections:	PROTECTION OF WILDLIFE, FISH, CRUSTACEANS AND ENVIRONMENT Very toxic to aquatic life. DO NOT contaminate wetlands or watercourses with this product or used containers.

Storage and Disposal:	STORAGE AND DISPOSAL Store in the closed, original container in a dry, cool, well-ventilated area out of direct sunlight. Triple-rinse containers before disposal. Add rinsings to spray tank. Do not dispose of undiluted chemicals on site. If recycling, replace cap and return clean containers to recycler or designated collection point. If not recycling, break, crush, or puncture and deliver empty packaging to an approved waste management facility. If an approved waste management facility is not available, dispose of empty container or unused product in compliance with relevant local, state or territory government regulations. Do not burn empty containers or product. DrumMUSTER Containers: This container can be recycled if it is clean, dry, free of visible residues and has the drumMUSTER logo visible. Triple-rinse container for disposal. Dispose of rinsate by adding it to the spray tank. Do not dispose of undiluted chemical on site. Wash outside of the container and the cap. Store cleaned container in a sheltered place with cap removed. It will then be acceptable for recycling at any drumMUSTER collection or similar container management program site. The cap should not be replaced, but may be taken separately. Refillable containers: Empty contents fully into application equipment. Close all valves and return to [point of supply/designated collection point] for refill or storage.

	1000L containers: Schűtz container with camlock valve connection: If tamper evident seals are broken prior to initial use then the integrity of the contents cannot be assured. The container must be vented before discharging contents. To empty connect a camlock fitted hose to the bottom valve. Remove top cap when discharging for venting purposes. When the container is empty, close all caps and valves and return the container to the point of purchase.

Safety Directions:	May irritate the eyes. Avoid contact with eyes. When opening the container and preparing spray and using the prepared spray wear cotton overalls buttoned to the neck and wrist (or equivalent clothing). Wash hands after use. After each day's use wash contaminated clothing.

First Aid Instructions:	If poisoning occurs, contact a doctor or Poisons Information Centre. Phone Australia 13 11 26, New Zealand 0800 764 766.

First Aid Warnings:	

DIRECTIONS FOR USE

CROP	WEED	RATE	CRITICAL COMMENTS
Wheat (not durum wheat)	Annual ryegrass (*Lolium rigidum*) Annual phalaris or paradoxa grass (*Phalaris paradoxa* only), Barley grass (*Hordeum leporinum*) Silver grass (*Vulpia bromoides*, *Vulpia myuros*), Toad rush (*Juncus bufonius*)	500mL/ha	Apply pre-sowing and incorporate by sowing (IBS) using knife points and press wheels, or narrow points and harrows. Use seeding systems that can ensure accurate seed placement and adequate spatial separation of seed and herbicide. For best results apply just before sowing (refer to **Interval between Application and Sowing** in **GENERAL INSTRUCTIONS**). Avoid throwing treated soil into adjacent crop rows when sowing with knife points and press wheels. To reduce the risk of crop effects refer to **Crop Safety** in **GENERAL INSTRUCTIONS.** *Cultivation:* To optimise weed control apply directly to uncultivated soil. Weed control may be greatly reduced where weed seeds have been buried by cultivation prior to sowing. *Rainfall soon after application*: • Weed control may be adversely affected by insufficient rainfall within 7 to 10 days after application. Adequate rainfall is necessary to facilitate uptake of the product by the germinating weed seeds, however the quantity of rainfall required will depend on many factors including stubble load, soil type, the existing soil moisture at sowing, the pattern of rainfall and other considerations. • In soils prone to leaching, rainfall which is sufficiently heavy to cause movement of the herbicide out of the weed seed zone may lead to reduced weed control. Other factors which may adversely affect weed control include*;* • uneven application, • application to ridged or cloddy soil, • stubble, plant residue or other ground cover particularly where this exceeds 50%, • germinated and emerged weeds that are not controlled by a knockdown herbicide, The factors above, when combined, may substantially reduce weed control. Competition provided by the crop can assist with the final weed control achieved by Spruce.
	Suppression***** of: Great brome (*Bromus diandrus, Bromus rigidus*) Wild radish (*Raphanus raphanistrum*) Wild oat (*Avena fatua*) Fumitory **(***Fumaria sp)* Skeleton Weed (*Chondrilla juncea)* Marshmallow *(Malva parviflora)* Capeweed (*Arctotheca calendula***)** *Refer **Suppression of weeds** in GENERAL INSTRUCTIONS for further Details		

NOT TO BE USED FOR ANY PURPOSE, OR IN ANY MANNER, CONTRARY TO THIS LABEL UNLESS AUTHORISED UNDER APPROPRIATE LEGISLATION.

GENERAL INSTRUCTIONS

Spruce® Herbicide is a residual, soil applied, pre-emergent herbicide. It is absorbed by the roots and to a lesser extent by the shoots of germinating weeds and works by inhibiting growth in the meristematic area. Weed control is optimised when Spruce is applied evenly to moist soil just prior to incorporation by sowing and there is sufficient rainfall soon after sowing to ensure uptake of the herbicide by germinating weeds. Weed control may be greatly reduced where weed seeds have been buried by cultivation prior to application. Weed control may also be reduced where there is insufficient soil moisture for herbicide uptake or in soils prone to leaching where rainfall is sufficiently heavy to cause movement of the herbicide out of the weed seed zone.

Spruce will not reliably control emerged weeds. A knockdown herbicide should be used to control emerged weeds at sowing.

Crop Safety

Spruce generally shows good crop selectivity when used as directed. The following directions will help minimise the risk of crop effects.

- Do not plant durum wheat after the application of Spruce as it may be severely damaged. Refer to **Crop Rotation Recommendations** for further advice.
- When incorporation is by sowing with knife points and press wheels avoid throwing treated soil into adjacent crop rows.
- Do not use a combination of both press wheels and a covering device such as harrows or chains when sowing.

The potential for crop damage is increased when there is substantial rainfall after the application of Spruce, especially where this leads to temporary waterlogging. Situations which lead to concentration of herbicide in the planting row, or movement of herbicide to the depth of the crop seed, may also increase the potential for crop damage. This includes the following scenarios;

- Where deep furrows are formed by the sowing operation, soil movement into the crop row may occur due to wind or heavy rainfall soon after sowing resulting in concentration of herbicide in the crop row.
- Where soil has a high potential for leaching, heavy rainfall between application and crop emergence may result in movement of herbicide into the crop seed zone.

Other circumstances which may increase the potential for crop damage include where Spruce is applied in tank mixes with other herbicides, where crop vigour is reduced due to factors such as frosts, insect attack or crop disease, when weather damaged seed is used and/or with the use of some fungicide seed treatments especially in conjunction with crop varieties with short coleoptile length. A combination of individual factors which increase the potential for crop damage may increase the extent of crop damage.

Incorporation by Sowing

Spruce should be applied prior to sowing, and incorporated by sowing using knife points and press wheels, or narrow points and harrows, or disc seeding systems that are set up to ensure sufficient separation of the crop seed from treated soil, stubble and weeds. When incorporation is by knife points and press wheels, weeds germinating in the seed row may not be controlled. Weeds germinating from depth, weeds just about to emerge, or weeds that have emerged which are not controlled by a knockdown herbicide at sowing may not be controlled by Spruce.

Interval between Application and Sowing
Incorporate by sowing as soon as practicable after the application of Spruce, but no later than 3 days after application.

Sandy Soils
Weed control may be reduced in soil prone to leaching where rainfall after application and sowing is sufficiently heavy to cause movement of the herbicide out of the weed seed zone.

Suppression of weeds (as per directions for use table)
Spruce is most effective when grass weed seeds are present on or very close to the soil surface at the time of application. For this reason, it is recommended that Spruce is applied to uncultivated soil. As the depth of weed seeds increases, control from Spruce tends to decrease. It is rare that all weed seeds will be on the soil surface at the time of Spruce application, especially considering that these seeds may remain viable in the soil for several seasons. Plants may germinate from seeds buried by the sowing operation in previous seasons, by livestock or by weed seed self-burial mechanisms particularly in some soil types (e.g., cracking clays and sand). **Therefore, only partial control or suppression of the great brome, wild oat, fumitory, skeleton weed, little mallow and capeweed populations should generally be expected**. In these situations, a follow up application with a suitable post-emergent herbicide may be required to control remaining plants.

Mixing
Agitate contents of container well, before using. Ensure sprayer and nozzle filters are clean before preparing the spray mixture. Half fill the spray tank with water and, with the agitators in motion, add the correct amount of Spruce directly to the spray tank. Complete filling the tank with agitators in motion. Agitation must continue before and during spraying. When other products are to be applied in addition to Spruce, always add Spruce to the spray tank first and ensure it is fully dispersed in the spray tank before adding other products. Apply the spray liquid immediately after mixing the product(s) into the spray tank. Do not allow the spray mixture to remain in spray equipment overnight and/or without constant agitation. Ensure the spray equipment is cleaned immediately after application.

Application
Ensure complete and even spray coverage of the soil is achieved. Poor spray coverage may result from application to ridged or excessively cloddy soil or in situations of high stubble, plant residue or other ground cover. A significant reduction in weed control may result where stubble, plant residue or other ground cover exceeds 50%, and in situations where a ‘cold’ or incomplete burn of stubble results in a mass of material which can act as a physical barrier between the herbicide and germinating weeds - this can be exacerbated in header trails where there may be greater weed seed numbers and higher levels of plant residue. Weed control can be particularly affected where Spruce is applied to a barrier of stubble, plant residue or other ground cover and there is insufficient following rainfall to transfer Spruce to the soil surface and the germinating weed seeds.

Equipment
Always ensure the sprayer is clean, using a suitable tank cleaner as directed. Defer to the most rigorous cleanout procedure if tank mixing with a partner.

Ground Sprayers – Standard boom sprayers only are recommended and must be fitted with by-pass or mechanical agitation. It is recommended that 50 to 100 L water/ha is applied with spray droplets of a COARSE droplet size category. In some situations (e.g., high stubble loads) high water volumes may give higher levels of weed control.

Incompatibility
Crop damage seen in adverse conditions, particularly wet or waterlogged conditions (refer **Crop Safety** above) may be exacerbated when Spruce is used in conjunction with other herbicides that may also cause crop damage in such conditions.

Always refer to the crop tolerance, plant back restrictions, rate recommendations and other directions for use on the label of the tank mix partner.

Refer to M**ixing** section above for advice on preparing tank mixtures with Spruce. Mixtures with products containing paraquat (e.g., Gramoxone and Spray Seed) require particular attention to these instructions, including ongoing agitation to ensure Spruce remains in suspension in the spray tank.

For advice on compatibilities, contact UPL Australia Pty Ltd.

Sprayer clean-up
Following the use of Spruce, the spraying equipment should be thoroughly cleaned before it is used for application of other products.
Cleaning should occur immediately following application of Spruce. The spray unit should first be completely emptied. The sprayer, including all filters and lines, should be thoroughly rinsed with water, to remove all traces of product.
Ensure that the sprayer clean-up is carried out in an area that is clear of waterways, desirable vegetation and tree roots. If using Spruce with a tank-mix partner, refer to the sprayer clean-up instructions for the other product, which may be more rigorous than those for Spruce.

Crop Rotation Recommendations
Spruce breaks down by microbial degradation, which is favoured by warm, moist aerobic soil. Minimum re-cropping intervals (months after Spruce application) have been established for Spruce to minimise the risk of damage to following crops (see table below). However, environmental and agronomic factors make it impossible to eliminate all risk and therefore the potential for damage to following crops exists.

Rainfall of less than the minimum interim rainfall required (see table below) may result in extended re-cropping intervals. Interim rainfall is the total rainfall between the application of Spruce and planting of the particular following crop. For re-cropping with winter crops, where a minimum of 250 mm of interim rainfall is required, if rain from application to the end of spring is less than 125 mm and isolated heavy summer and autumn falls and break rains are required to achieve the 250 mm interim rainfall, then extended re-cropping intervals may apply.

Crops	Re-cropping Recommendation	
	Minimum Re-cropping Interval	**Minimum Interim Rainfall**
Wheat (not durum wheat)	0 months	0 mm
Cotton*, maize*, mung beans*, sorghum*, soybeans* and sunflowers*	5 months	150 mm
Barley*, canola*, chickpeas*, faba beans*, field peas*, lentils*, lupins*, vetch* and subterranean clover*	9 months	250 mm
Durum wheat**, oats**, lucerne** and medic**	21 months	550 mm

*For crops sown the year after the application of Spruce, there may occasionally be some crop stunting, but no yield reductions have been measured.
**For Durum wheat, oats, lucerne and medics there may occasionally be some crop stunting or biomass reduction, but the crop growth improves as the season progresses and no yield reductions have been measured.

For advice on crops and situations not listed above, contact UPL Australia Pty Ltd.