121.0 mm

121.0 mm

168.0 mm

14. TRANSPORT INFORMATION

The data provided in this section is for information only. Please apply the appropriate regulations to properly classify your shipment for transportation.

Not regulated for transport under ADR/RID, IMO, or IATA/ICAO

15. REGULATORY INFORMATION

15.1. Other regulatory information

SP1: Do not contaminate water with the product or its container.

15.2. Chemical Safety Assessment

A Chemical Safety Assessment per Regulation (EC) No. 1907/2006 is not required and has not been performed.
A Risk Assessment has been performed under Directive 91/414/EC.

16. OTHER INFORMATION

The information given here is not necessarily exhaustive but is representative of relevant, reliable data.
Follow all local/regional/national/international regulations.
Please consult supplier if further information is needed.
In this document the British spelling was applied.
ǁ Significant changes versus previous edition.
® Registered trademark.
This Safety Data Sheet has been prepared following the Regulation (EC) No. 1907/2006 (Annex II) as last amended by Regulation (EC) No. 453/2010

Classification of components

Components	Classification	
Potassium salt of glyphosate	Aquatic Chronic - Category 2 H411 Toxic to aquatic life with long lasting effects. N - Dangerous for the environment R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.	
Alkylpolyglycoside	Eye damage - Category 1 H318 Causes serious eye damage. Xi - Irritant R41 Risk of serious damage to eyes.	
Nitroryl	Acute toxicity - Category 4 Skin irritation - Category 2 Eye damage - Category 1 Aquatic Acute - Category 1 Aquatic Chronic - Category 1 H302+332 - Harmful if swallowed or if inhaled H315 Causes skin irritation. H318 Causes serious eye damage. H410 Very toxic to aquatic life with long lasting effects.	Xn - Harmful Xi - Irritant N - Dangerous for the environment R22 Harmful if swallowed. R38 Irritating to skin. R41 Risk of serious damage to eyes. R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Water and minor formulating ingredients		

Endnotes:
{a} EU label (manufacturer self-classification)
{b} EU label (Annex I)
{c} EU CLP classification (Annex VI)
{D} EU CLP (manufacturer self-classification)

Full denomination of most frequently used acronyms. BCF (Bioconcentration Factor), BOD (Biochemical Oxygen Demand), COD (Chemical Oxygen Demand), EC50 (50% effect concentration), ED50 (50% effect dose), I.M. (intramuscular), I.P. (intraperitoneal), I.V. (intravenous), Koc (Soil adsorption coefficient), LC50 (50% lethality concentration), LD50 (50% lethality dose), LDLo (Lower limit of lethal dosage), LEL (Lower Explosion Limit), LOAEC (Lowest Observed Adverse Effect Concentration), LOAEL (Lowest Observed Adverse Effect Level), LOEC (Lowest Observed Effect Concentration), LOEL (Lowest Observed Effect Level), MEL (Maximum Exposure limit), MTD (Maximum Tolerated Dose), NOAEC (No Observed Adverse Effect Concentration), NOAEL (No Observed Adverse Effect Level), NOEC (No Observed Effect Concentration), NOEL (No Observed Effect Level), OEL (Occupational Exposure Limit), PEL (Permissible Exposure Limit), PII (Primary Irritation Index), Pow (Partition coefficient n-octanol/water), S.C. (subcutaneous), STEL (Short-Term Exposure Limit), TLV-C (Threshold Limit Value-Ceiling), TLV-TWA (Threshold Limit Value - Time Weighted Average), UEL (Upper Explosion Limit)

Safety Data Sheet (SDS) Annex

Chemical Safety Report:
Read and follow label instructions.
000000046278

Roundup® ProVantage

Ⓗ - Herbicide

A soluble concentrate containing 480 g/l glyphosate, present as 588 g/l (43.8% ww) of the potassium salt of glyphosate.

MONSANTO (UK) LIMITED,
PO Box 663, Cambridge, CB1 0LD
Tel: (01954) 717550 — Tel: (01954) 717575 - Technical Enquiries
E-mail: technical.helpline.uk@monsanto.com
Website: www.monsanto-ag.co.uk

In case of emergency day or night, telephone
National Chemical Emergency Centre: (01865) 407333

RINSE CONTAINER

MAPP Number 15534

EUH401: To avoid risk to man and the environment, comply with the instruction for use
P234: Keep only in original container
SP1: Do not contaminate water with product or its container

IMPORTANT INFORMATION

FOR USE ONLY AS AN AGRICULTURAL / HORTICULTURAL / INDUSTRIAL / FORESTRY / AQUATIC HERBICIDE

Crops/situations:
All edible and non-edible crops (destruction, before sowing/planting).
Grassland.
Natural surfaces not intended to bear vegetation; permeable surfaces overlaying soil; hard surfaces.
Enclosed waters, open waters, land immediately adjacent to aquatic areas.
Forest, forest nursery (weed control, stump application and chemical thinning).
Apples, pears; plums, cherries, damsons.
Amenity vegetation.

Maximum individual dose: }
Maximum number of treatments: } Full details are given in Statutory Area
Latest time of application: } on the attached leaflet
Other specific restrictions: } (Crop Specific Information - marked #)

READ THE LABEL BEFORE USE. USING THIS PRODUCT IN A MANNER THAT IS INCONSISTENT WITH THE LABEL MAY BE AN OFFENCE. FOLLOW THE CODE OF PRACTICE FOR USING PLANT PROTECTION PRODUCTS.

SAFETY PRECAUTIONS

Operator protection

** Engineering control of operator exposure must be used where reasonably practicable in addition to the following personal protective equipment:*

* WEAR SUITABLE PROTECTIVE GLOVES when handling the concentrate and when handling contaminated surfaces.

* WEAR SUITABLE PROTECTIVE CLOTHING (COVERALLS), SUITABLE PROTECTIVE GLOVES AND RUBBER BOOTS when using hand-held sprayers, hand-held rotary atomisers, weed wiper equipment or spot gun equipment or when making cut stump treatments OR WHEN USING STEM INJECTION EQUIPMENT.

** However, engineering controls may replace personal protective equipment if a COSHH assessment shows they provide an equal or higher standard of protection.*

WASH HANDS AND EXPOSED SKIN before eating and drinking and after work.

Environmental protection

Do not contaminate water with the product or its container except when used as directed. Do not clean application equipment near surface water.

Avoid contamination via drains from farmyards and roads.

Recommendations apply to the use of this herbicide for the control of weeds growing in or by water and must be read in conjunction with the Official Code of Practice entitled "Guidelines for the Use of Herbicides on Weeds in or near Watercourses and Lakes" obtainable from Department of Environment and Rural Affairs (DEFRA publications 08459 556000), Scottish Executive, Environment and Rural Affairs Department, Department of Agriculture and Rural Development for Northern Ireland and the National Assembly for Wales Agriculture Department.

The Water Act, 1989, The Water Resources Act 1991, the Control of Pollution Act 1974, The Northern Ireland Water Resources Act 1992 and the Control of Pollution and Local Government (Northern Ireland) Order 1978, may apply to the act of applying Roundup® ProVantage for the control of weeds growing in or by reservoirs and water courses, e.g. rivers, streams, ditches, drains and ponds/lakes discharging into such water courses.

Storage and disposal

KEEP AWAY FROM FOOD, DRINK AND ANIMAL FEEDINGSTUFFS.
KEEP OUT OF REACH OF CHILDREN.
KEEP IN ORIGINAL CONTAINER, tightly closed, in a safe place.
RINSE CONTAINER THOROUGHLY by using an integrated pressure-rinsing device or manually rinse three times. Add washings to sprayer at time of filling and dispose of safely.
Triple rinsed containers may be disposed of as non-hazardous waste.

Medical advice

Medical guidance is avaible on a 24 hours basis by telephoning the National Chemical Emergency Centre on 01865 407333 or for doctors, from the National Poisons Information Service on 0844 8920111

MONSANTO

121.0 mm

121.0 mm

168.0 mm

DIRECTIONS FOR USE

IMPORTANT: This information is approved as part of the Product Label. All instructions within this section must be read carefully in order to obtain safe and successful use of this product.

Warnings
EXTREME CARE SHOULD BE TAKEN TO AVOID SPRAY DRIFT AS THIS CAN SEVERELY DAMAGE NEIGHBOURING CROPS OR PLANTS.

DO NOT MIX, STORE OR APPLY ROUNDUP ProVantage IN GALVANISED OR UNLINED STEEL CONTAINERS OR SPRAY TANKS.

DO NOT leave spray mixtures in tank for long periods and make sure tanks are WELL VENTED.

Restrictions
A period without rain of at least 6 hours and preferably 24 hours must follow application of Roundup ProVantage.

Do not spray onto weeds which are naturally senescent, or where growth is impaired by drought, high temperature, a covering of dust, flooding or frost at, or immediately after application, otherwise poor control may result.

Do not spray in windy conditions as drift onto desired crops or vegetation can severely damage or destroy them.

Do not tank-mix Roundup ProVantage with adjuvants, pesticides or fertilisers, except as specified in the Compatibility section.

After application, large concentrations of decaying foliage, stolons, roots or rhizomes should be dispersed or buried by thorough cultivation before crop drilling.

Applications of lime, fertiliser, farmyard manure and pesticides should be delayed until 5 days after application of Roundup ProVantage.

Keep stock out of treated areas for at least 5 days. TREATED POISONOUS PLANT SPECIES MUST BE REMOVED BEFORE REGRAZING OR CONSERVING.

Weeds controlled
Roundup ProVantage herbicide controls most emerged grasses and broad-leaved weeds. It is important that all weeds are at the correct growth stage when treated, otherwise some re-growth may occur and this will need re-treatment.

Apply Roundup ProVantage herbicide once grasses and broad-leaved weeds have emerged and they have ACTIVELY GROWING green leaves.

- PERENNIAL GRASSES must have full emergence of healthy, green leaf. (Common Couch, for example, becomes susceptible at the onset of tillering and new rhizome growth, which usually occurs when plants have 4-5 leaves, each with 10-15 cm of new growth).
- PERENNIAL BROAD-LEAVED WEEDS are most susceptible around the flowering stage.
- ANNUAL GRASSES AND BROAD-LEAVED WEEDS should have at least 5 cm of leaf, or 2 expanded true leaves, respectively. In set-aside, annual grasses are best treated at full ear emergence, or before stem elongation. Application during the stem extension phase of annual grasses e.g. Black-grass and Brome species on set-aside between the end of April and end of May, may result in poor control and require re-treatment.
- BRACKEN should be treated after frond tips are unfurled, but pre-senescence.
- OTHER SPECIES - recommendations for specific Areas of Use are given in the Recommendation Tables.
- This product will not give an acceptable level of control of Horsetails (*Equisetum arvense*)-repeat treatment will be necessaty.

Aquatic

Roundup ProVantage herbicide controls emerged and floating aquatic weeds including Common Reed, Reed Sweet-grass, Reed Canary-grass and Water- lily.

Treat when the weeds are actively growing with full emergence of green leaf, at flowering and before dieback. Best results are obtained from applications in the periods from mid-July to mid-August on Water-lilies and mid-August to mid-September on Reeds.

Following crops (*Subsequent land use following application of Roundup ProVantage*)
Upon soil adsorption the herbicidal properties of Roundup ProVantage are lost permitting the drilling of crops 48 hrs after application. Planting of trees, shrubs, etc. may take place 7 days after application.

Crop specific information #

	Maximum individual dose (litres of product per hectare):	Maximum total dose (litres of product per hectare	Latest time of application:
Permanent grassland (destruction), rotational grassland (destruction)	4.5	4.5 l/ha/year	5 days before harvest, grazing or drilling
Apple and pear orchards	3.75	3.75 l/ha/year	After harvest (post leaf-fall) but before green cluster stage
Cherry, plum and damson orchards	3.75	3.75 l/ha/year	After harvest (post leaf-fall) but before white bud stage
All edible and non-edible crops (destruction before sowing/planting)	3.75	-	-

10. STABILITY AND REACTIVITY

10.1. Reactivity
Reacts with galvanised steel or unlined mild steel to produce hydrogen, a highly flammable gas that could explode.

10.2. Stability
Stable under normal conditions of handling and storage.

10.3. Possibility of hazardous reactions
Reacts with galvanised steel or unlined mild steel to produce hydrogen, a highly flammable gas that could explode.

10.4. Incompatible materials
Incompatible materials for storage: galvanised steel, inlined mild steel
Compatible materials for storage: see section 7.2.

10.5. Hazardous decomposition
Thermal decomposition: Hazardous products of combustion: see section 5.

11. TOXICOLOGICAL INFORMATION

This section is intended for use by toxicologists and other health professionals.

Likely routes of exposure: Skin contact, eye contact

Data obtained on more concentrated products and components are summarized below.

More concentrated formulation

Acute oral toxicity
Rat, LD50: >2,000 mg/kg body weight
No mortality.

Acute dermal toxicity
Rat, LD50: >2,000 mg/kg body weight
No mortality.

Skin irritation
Rabbit, 3 animals, OECD 404 test:
Redness, induvidual EU scores: 0.3;0.0;0.0
Swelling, induvidual EU scores: 0.0;0.0;0.0
Days to heal: 5

Eye irritation

Rabbit, 3 animals, OECD 405 test:
Conjunctival redness, induvidual EU scores: 0.7;1.0;0.7
Conjunctival swelling, induvidual EU scores: 1.0;1.0;0.7
Corneal opacity, induvidual EU scores: 0.0; 0.0; 0.0
Iris lesions, induvidual EU scores: 0.0;0.0;0.0
Days to heal: 3
Slightly irritating to eyves but not sufficient for classification.

Skin sensitization
Guinea pig, 9-induction Buehler test:
Negative. No skin sensization

N-(phosphonomethyl)glycine;
{glyphosate}

Mutagenicity
Not mutagenic.

Repeated dose toxicity
Rabbit, dermal, 21 days:
NOAEL toxicity: >5,000 mg/kg body weight/day
Target organs/systems: none
Other effects: none
Rat, oral, 3 months:
NOAEL toxicity: >20,000 mg/kg diet
Target organs/systems: none
Other effects: none

Chronic effects/carcinogenicity
Rat, oral, 24 months:
NOAEL toxicity: ≈8,000 mg/kg diet
Target organs/systems: eyes
Other effects: decrease of body weight gain, histopathologic effects
NOEL tumor:> 20,000 ppm
Tumours: none

Toxicity to reproduction/fertility
Rat, oral, 2 generations:
NOAEL toxicity: 10,000 mg/kg diet
NOAEL reproduction: >30,000 mg/kg diet
Target organs/systems in parents: none
Other effects in parents: decrease of body weight gain
Target organs/systems in pups: none
Other effects in pups: decrease of body weight gain
Effects on offspring only observed with maternal toxicity.

Developmental toxicity/teratogenicity
Rat, oral, 6 - 19 days of gestation:
NOAEL toxicity: 1,000 mg/kg body weight
NOAEL development: 1,000 mg/kg body weight
Other effects in mother animal: decrease of body weight gain, decrease of survival
Developmental effects: weight loss, post-implantation loss, delayed ossification
Effects on offspring only observed with maternal toxicity.
Rabbit, oral, 6 - 27 days of gestation:
NOAEL toxicity: 175 mg/kg body weight
NOAEL development: 175 mg/kg body weight
Target organs/systems in mother animal: none
Other effects in mother animal: decrease of survival
Developmental effects: none

12. ECOLOGICAL INFORMATION

This section is intended for use by ecotoxicologists and other environmental specialists.

Data obtained on product and components are summarized below.

More concentrated formulation

Aquatic toxicity, fish
Rainbow trout (Oncorhynchus mykiss):
Acute toxicity, 96 hours, static, LC50: >1,039 mg/L

Aquatic toxicity, invertebrates
Water flea (Daphnia magna):
Acute toxicity, 48 hours, static, EC50: 243 mg/L

More concentrated formulation

Aquatic toxicity, algae/aquatic plants
Green algae (Selenastrum capricornutum):
Acute toxicity, 72 hours, static, ErC50 (growth rate): 118 mg/L

Arthropod toxicity
Honey bee (Apis mellifera):
Oral, 48 hours, LD50: >279 µg/bee
Honey bee (Apis mellifera):
Contact, 48 hours, LD50: >282 µg/bee

Soil organism toxicity, invertebrates
Earthworm (Eisenia foetida):
Acute toxicity, 14 days,
LC50: >10,000 mg/kg dry soil

Soil organism toxicity, microorganisms
Nitrogen and carbon transformation test:
27 L/ha, 28 days: Less than 25% effect on nitrogen or carbon transformation processes in soil.

N-(phosphonomethyl)glycine;
{glyphosate}

Avian toxicity
Bobwhite quail (Colinus virginianus):
Dietary toxicity, 5 days,
LC50: >4,640 mg/kg diet
Mallard duck (Anas platyrhynchos):
Dietary toxicity, 5 days,
LC50: >4,640 mg/kg diet
Bobwhite quail (Colinus virginianus):
Acute oral toxity, single dose,
LD50:> 3,851 mg/kg body weight.

Bioaccumulation
Bluegill sunfish (Lepomis macrochirus):
Whole fish: BCF: <1
No significant bioaccumulation is expected.

Dissipation
Soil, field:
Half life: 2 - 174 days
Koc: 884 - 60,000 L/kg
Adsorbs strongly to soil.
Water, aerobic:
Half life: <7 days

13. DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

13.1.1. Product
Keep out of drains, sewers, ditches and water ways. Recycle if appropriate facilities/equipment available. Dispose of as hazardous industrial waste. Burn in proper incinerator. Burn in special, controlled high temperature incinerator. Follow all local/regional/national/international regulations.

13.1.2. Container
See the individual container label for disposal information. Empty packaging completely. Triple or pressure rinse empty containers. Pour rinse water into spray tank. Ensure packaging cannot be reused. Do NOT re-use containers. Store for collection by approved waste disposal service. Recycle if appropriate facilities/equipment available. Emptied containers retain vapour and product residue. Observe all labelled safeguards until container is cleaned, reconditioned or destroyed.Follow all local/ regional/ national/international regulations.

Use handling recommendations in Section 7 and personal protection recommendations in Section 8.

5. FIRE-FIGHTING MEASURES

5.1. Extinguishing media

5.1.1. Recommended: Water, foam, dry chemical, carbon dioxide (CO_2)

5.2. Special hazards

5.2.1. Unusual fire and explosion hazards
Minimise use of water to prevent environmental contamination.
Environmental precautions: see section 6.

5.2.2. Hazardous products of combustion
Carbon monoxide (CO), phosphorus oxides (PxOy), nitrogen oxides (NOx)

5.3. Fire fighting equipment
Self-contained breathing apparatus.
Equipment should be thoroughly decontaminated after use.

5.4. Flash point
Does not flash.

6. ACCIDENTAL RELEASE MEASURES

Use handling recommendations in Section 7 and personal protection recommendations in Section 8.

6.1. Personal precautions
Use personal protection recommended in section 8.

6.2. Environmental precautions
SMALL QUANTITIES: Low environmental hazard. LARGE QUANTITIES: Minimise spread. Keep out of drains, sewers, ditches and water ways. Notify authorities.

6.3. Methods for cleaning up
SMALL QUANTITIES: Flush spill area with water. LARGE QUANTITIES: Absorb in earth, sand or absorbent material. Dig up heavily contaminated soil. Collect in containers for disposal. Refer to section 7 for types of containers. Flush residues with small quantities of water. Minimise use of water to prevent environmental contamination.

Refer to section 13 for disposal of spilled material.

7. HANDLING AND STORAGE

Good industrial practice in housekeeping and personal hygiene should be followed.

7.1. Precautions for safe handling
Avoid contact with eyes.
When using do not eat, drink or smoke.
Wash hands thoroughly after handling or contact.
Do not contaminate drains, sewers and water ways when disposing of equipment rinse water.
Empied containers retain vapour and produce residue.
Observe all labelled safeguards until container is cleaned, reconditioned or destroyed.

7.2. Conditions for safe storage
Minimum storage temperature: -15° C
Maximum storage temperature: 50° C
Compatible materials for storage: stainless steel, fibreglass, plastic, glass lining.
Keep out of reach of children.
Keep away from food, drink and animal feed.
Keep only in the original container.
Partial crystallization may occur on prolonged storage below the minimum storage temperature.
If frozen, place in warm room and shake frequently to put back into solution.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Airborne exposure limits

Components	Exposure Guidelines
Potassium salt of glyphosate	No specific occupational exposure limit has been established.
Alkylpolyglycoside	No specific occupational exposure limit has been established.
Nitroryl	No specific occupational exposure limit has been established.
Water and minor formulating ingredients	No specific occupational exposure limit has been established.

8.2. Engineering controls
No special requirement when used as recommended.

8.3. Recommendations for personal protective equipment

8.3.1. Eye protection
If there is significant potential for contact:
Wear chemical goggles.

8.3.2. Skin protection
If repeated or prolonged contact:
Wear chemical resistant gloves. Chemical resistant gloves include those made of waterproof materials such as nitrile, butyl, neoprene, polyvinyl chloride (PVC), natural rubber and/or barrier laminate.

8.3.3. Respiratory protection
No special requirement when used as recommended.

When recommended, consult manufacturer of personal protective equipment for the appropriate type of equipment for a given application.

9. PHYSICAL AND CHEMICAL PROPERTIES

These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

Colour/colour range:		Brown
Odour:		Amino odour
Form:		Liquid
Physical form changes (melting, boiling, etc.):	Melting point:	Not applicable.
	Boiling point:	No data
Flash point:		Does not flash.
Explosive properties:		No explosive properties
Auto ignition temperature:		> 600 °C
Oxidizing properties:		No data.
Self - accelerating decomposition temperature (SADT):		No data.
Specific gravity:		1.3426 @ 20 °C / 4 °C
Vapour pressure:		No significant volatility; aqueous solution.
Vapour density:		Not applicable.
Evaporation rate:		No data.
Dynamic viscosity:		107,2 mPa·s @ 20 °C
Kinematic viscosity:		79,83 cSt @ 20 °C
Density:		1,346 g/cm³ @ 20 °C
Solubility:		Water: Completely miscible.
pH:		4.3
Partition coefficient:		log Pow: -3.2 @ 25 °C (glyphosate)

Crop specific information #

	Maximum individual dose(litres of product per hectare):	Maximum total dose (litres of product per hectare)	Latest time of application:
Natural surfaces not intended to bear vegetation, permeable surfaces overlaying soil, hard surfaces	3.75 l/ha/year	-	-
Enclosed waters, open waters, land immediately adjacent to aquatic area.	3.75 l/ha/year		- -
Forestry: Weed control	7.5 litres/hectare	-	-
Stump application	150 ml/litre of water (15% solution of product in water)	-	-
Chemical thinning (by injection)	1.5 ml per 10cm diameter (or less) of tree	-	-
Amenity vegetation	3.75 litres/hectare	-	-

Other Specific Restrictions:

Users must consult the appropriate water regulatory body (Environment Agency/Scottish Environmental Protection Agency/Natural Resources Wales) before using the product near water and must obtain their agreement before using this product to control aquatic weeds. The maximum concentration of active substance in treated water should not exceed 0.2 ppm.

When applying through rotary atomisers, the spray droplet spectra produced must be of a minimum Volume Median Diameter (VMD) of 200 microns.

Weed wipers may be used in any recommended crop where the wiper or chemical does not touch the growing crop.
When using weed wipers, the maximum concentrations used must not exceed the following:

Weed wiper Mini	1:3 dilution with water
Other Wipers	1:2 dilution with water

For stump application the maximum concentration must not exceed 200ml product per 1.0 litre water.

AMENITY, INDUSTRIAL AND GENERAL WEED CONTROL

Exclusion Times
People, pets and wildlife need not be kept out of treated areas. It is best not to walk in areas where the spray is still wet as transfer to other vegetation may lead to unwanted damage to other foliage. Once the spray is dry this cannot occur.

Area of Use
Roundup ProVantage is recommended for control of annual and perennial grasses and broad-leaved weeds in non-crop areas, for cleaning up weedy ground prior to planting or sowing and for aquatic weed control. Roundup ProVantage may also be used as a directed spray in ornamental plantings, orchards and for spot treating weeds in grassland. Roundup ProVantage must be targeted only at weed growth on hard surfaces such as roadsides and paths, (see recommendation table for details).

Application Rate
1.5 to 4.5 litres/ha – refer to Recommendation Tables

Application Guidance
Use the following guidance when spraying at a rate of 5 l/ha.
For more details of suitable nozzles see 'Mixing and spraying section.'

	Spraying with 3.75 l/ha	
HYDRAULIC SPRAYERS	**Standard volume (200 l/ha)**	**Low volume (100 l/ha)**
Boom sprayer	3.75 litres in 200 litres water covers 1 ha	3.75 litres in 100 litres water covers 1 ha
Knapsack /handheld sprayer*	188 ml in 10 litres water covers 500 m^2	375 ml in 10 litres water covers 1000 m^2
* Walking speed of 1m/second and 1m swath		

Roundup® ProVantage can also be applied using rotary atomisers and weed wipers.
See 'Mixing and Spraying' section.

RECOMMENDATION TABLES

AREA OF USE	TARGET WEEDS / USAGE	CROP	WEED INFESTATION
ALL EDIBLE AND NON- EDIBLE CROPS (DESTRUCTION, BEFORE SOWING/ PLANTING).	Vegetation management	—	Annual weeds Perennial grasses Perennial broad-leaved weeds
GRASSLAND - DESTRUCTION	GRASS	Short rotation Ryegrass, longer leys and permanent pasture	Short rotation Ryegrass with annual weeds Leys 2 - 4 years old with perennial grass weeds Long leys 4 - 7 years old with perennial broad-leaved weeds Permanent Pasture See weed table

APPLICATION RATE FOR GRASSLAND DESTRUCTION

2.25 l/ha		3.0 l/ha	
Annual Meadow-grass	Meadow Fescue	Black-bent	Creeping Soft-grass
Common Chickweed	Meadow Foxtail	Broad-leaved Dock	Curled Dock
Common Mouse-ear	Rough Meadow-grass	Cock's-foot	Perennial Rye-grass
Dock Seedlings	Speedwell species	Common Bent	Plantains
Italian Rye-grass	Timothy	Common Couch	Soft Brome
Mayweed species		Creeping Bent	Yorkshire Fog

* White clover is best cut in June and sprayed one month later
** At full frond expansion

Japanese Knotweed control

Japanese Knotweed is an invasive alien species reducing biodiversity in areas where it becomes established and propagating from tiny fragments of root, often spreading along watercourses. It is scheduled under the Wildlife and Countryside Act 1981 and all parts of the plant must be treated as Controlled Waste under the Environmental Protection Act 1990.

121.0 mm

Safety Data Sheet - Commercial Product

d.d. 06.06.2014

1. PRODUCT AND COMPANY IDENTIFICATION

1.1. Product identifier
Roundup® ProVantage
1.1.1. Chemical name: Not applicable.
1.1.2. Synonyms: None.
1.1.3. CLP Annex VI Index No.: Not applicable
1.1.4. C&L ID No.: Not available.
1.1.5. EC No.: Not applicable
1.1.6. REACH Reg.No.: Not applicable.
1.1.7. CAS No.: Not applicable
1.2. Product use: Herbicide
1.3. Company (Sales office): MONSANTO Europe S.A.
Haven 627, Scheldelaan 460, B-2040 Antwerp, Belgium
Telephone: +32 (0)3 568 51 11 – **Fax:** +32 (0)3 568 50 90
E-mail: safety.datasheet@monsanto.com
1.4. Emergency numbers Telephone:
Belgium +32 (0)3 568 51 23

2. HAZARDS IDENTIFICATION

2.1. Classification

2.1.1. Classification according to Regulation (EC) No. 1272/2008 [CLP] (manufacturer self-classification)
Not classified as dangerous.

2.1.2. National classification - UK
Not classified as dangerous.

EU label (manufacturer self-classification) - Classification/Labelling following the EU Dangerous Preparations' Directive 1999/45/EC.
Not classified as dangerous.
S29 Do NOT empty into drains.
S49 Keep only in the original container.
National classification/labelling - U.K.
R53 May cause long-term adverse effects in the aquatic environment.
S35 This material and its container must be disposed of in a safe way.
S57 Use appropriate containment to avoid environmental contamination.

2.2 Label elements
Labelling according to Regulation (EC) No. 1272/2008 [CLP]
2.2.1. Precautionary statement/statements
P234 Keep only in original container
2.2.2. Supplemental hazard information
EUH401 To avoid risks to human health and the environment, comply with the instructions for use.
2.2.3. Precautionary statement/statements U.K.
P234 Keep only in original container
2.3. Other hazards
0% of the mixture consist of ingredient/ingredients of unknown acute toxicity.
0% of the mixture consist of ingredient/ingredients of unknown hazards to the aquatic environment.
2.3.1. Potential environmental effects
Not expected to produce significant adverse effects when recommended use instructions are followed.
Not a persistent, bioaccumulative or toxic (PBT) nor a very persistent, very bioaccumulative (vPvB) mixture.
2.4. Appearance and odour (colour/form/odour):
Brown/Liquid/Caramel
Refer to section 11 for toxicological and section 12 for environmental information.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Active ingredient
Potassium salt of N-(phosphonomethyl)glycine; {Potassium salt of glyphosate }

Composition

Components	CAS No.	EC No.	EU Index No./ REACH Reg. No/ C&L ID No.	% by weight (approximate)	Classification
Potassium salt of glyphosate	70901-12-1	933-437-9	015-184-00-8 / -/ 02-2119694167-27- 0000	44	Aquatic Chronic - Category 2; H411;{c} N; R51/53 {b}
Alkylpolyglycoside	68515-73-1	500-220-1	-/ 01-2119488530-36 / -	>20	Eye damage - Category 1; H318; {d} Xi; R41 {a}
Nitroryl	226563-63-9		-/ -/ -	>3	Acute toxicity - Category 4, Skin irritation - Category 2, Eye damage - Category 1, Aquatic Chronic - Category 1; H302+332, 315, 318, 410Xn, Xi, N; R22, 38, 41, 50/53; {c}
Water and minor formulating ingredients			-/ -/ -	>33	

Full text of classification code: See section 16

4. FIRST AID MEASURES

Use personal protection recommended in section 8.
4.1. Description of first aid measures
4.1.1. Eye contact
Immediately flush with plenty of water.
If easy to do, remove contact lenses.
If there are persistent symptoms, obtain medical advice.
4.1.2. Skin contact
Take off contaminated clothing, wristwatch, jewellery. Wash affected skin with plenty of water. Wash clothes and clean shoes before re-use.
4.1.3. Inhalation
Remove to fresh air.
4.1.4. Ingestion
Immediately offer water to drink. Do NOT induce vomiting unless directed by medical personnel. If symptoms occur, get medical attention.
4.2. Most important symptoms and effects, both acute and delayed
4.2.1. Potential health effects
Likely routes of exposure: Skin contact, eye contact
Eye contact, short term: Not expected to produce significant adverse effects when recommended use instructions are followed.
Skin contact, short term: Not expected to produce significant adverse effects when recommended use instructions are followed.
Inhalation, short term: Not expected to produce significant adverse effects when recommended use instructions are followed.
4.3. Indication of any immediate medical attention and special treatment needed
4.3.1. Advice to doctors
This product is not an inhibitor of cholinesterase.
4.3.2. Antidote
Treatment with atropine and oximes is not indicated.

168.0 mm

General Cautions
Take extreme care to avoid drift, particularly when using near or alongside hedgerows. The use of low drift nozzles such as 'air induction' and 'pre-orifice' nozzles are recommended.

New generation weedwipers

Logic Contact 2000
Carier Rollmaster
Allman Ecowipe
Rotowiper (UK) Ltd
C-Dax™ Eliminator
Weedswiper™

Disposal
Follow the guidance on the disposal of surplus spray solution, tank washings, concentrate and containers as given in Section 5 of the DEFRA/HSC/NAW publication "Code of Practice for using Plant Protection Products" of January 2006.

Sprayer hygiene
It is essential to thoroughly clean-out spray tanks, pumps and pipelines and nozzle or disc assemblies, with a recommended detergent cleaner, between applying this product and other pesticides to avoid contamination from pesticide residues.

Environmental Information Sheet
An Environmental Information Sheet for this product is available from the CPA's Voluntary Initiative website (www.voluntaryinitiative.org.uk) or can be downloaded from www.monsanto-ag.co.uk

Trademark References
Roundup® is a Registered TradeMark of Monsanto Technology LLC.

Monsanto® and the Vine symbol are registered trademarks of Monsanto Technology LLC.

All other brand names referred to are trademarks of other manufacturers in which proprietary rights may exist.

Monsanto does not warrant that the purchase or use of equipment mentioned in this document will not infringe any patent or trademark registration.

MATERIAL SAFETY DATA SHEET

This Safety Data Sheet does not form part of the label approved under the Plant Protection Products Regulations 1995.

Following the instructions on this Product Label for the specified uses should ensure that the product is used safely and efficaciously for those uses.

The information on this Safety Data Sheet is based on the best available information at the time of going to print. Any updates to this Safety Data Sheet from the date of printing are available on request (telephone Monsanto Technical Helpline 01954 717575) or can be downloaded from the Monsanto website: www.monsanto-ag.co.uk

APPLICATION RATE l/ha	WATER VOLUME l/ha	APPLICATION TIMING AND GUIDANCE
1.0 3.0 3.75	80 - 250 l/ha* or hand-held equipment	* Rotary atomisers may be used at a water volume of 10-40 l/ha. Ensure droplet diameter falls within the range 200 - 300 microns Do not use in or alongside hedgerow
2.25 3.0 3.75 4.5	150 - 250 l/ha*	Treat EITHER before grazing/mowing in June-Oct, when growth is 30 - 60 cm, not dense and lacking mature seeds, OR regrowth after grazing/mowing. Select the application rate which controls/destroys the least susceptible weed and grass species present in the sward. Grass may be conserved or grazed by cattle, dairy cows or sheep 5+ days after spraying. REMOVE POISONOUS PLANTS BEFORE GRAZING/MOWING. ONLY direct drill grass and clover EITHER into 1 - 2 year leys without mat, 5+ days after spraying, OR long leys with some mat, in the spring following autumn application.

APPLICATION RATE for grassland destruction

3.75 l/ha		4.5 l/ha	
Bracken**	Red Clover	Common Ragwort	Nardus (Mat grass)
Common Sorrel	Sedges	Hard Rush	Red Fescue
Common Nettle	Sheep's Sorrel	Heath Rush	White Clover*
Creeping Buttercup*	Soft Rush	Jointed Rush	Yellow Rattle
Creeping Thistle	Spear Thistle	Molinia (Purple Moor-grass)	Sheep's Fescue
Daisy	Tufted Hairgrass		
Dwarf Thistle	Yarrow		
Perennial Sow-thistle			

Roundup ProVantage can be used alone as part of an eradication programme or as part of an integrated programme in conjunction with soil disturbance or removal. Dormant rhizomes will not be controlled by Roundup ProVantage, but may be stimulated to grow by soil disturbance and then sprayed. It is particularly suitable for use near water. Sites must be monitored for at least three years and re-treated as necessary.

Area of Use				
Amenity vegetation; Forestry; Natural surfaces not intended to bear vegetation, permeable surfaces overlying soil, hard surfaces; Enclosed waters, open waters, land immediately adjacent to aquatic area				
Target Weed	**Method**	**Application Rate Water Volume**	**Application Guidance**	
Japanese Knotweed	Foliar application	3.75l/ha Hydraulic sprayers 80-250 l/ha or hand-held equipment	For best results apply after the onset of flowering (usually August/September) but before dieback. Use specialist extending hand lances for stands 1-1.5m tall. Good coverage is essential; spray the underside as well as the upper surface of the leaves. Or As part of an integrated programme, spray when stems are 1-1.5m high (Usually at end of May) and repeat once re-growth reaches 1-1.5m again later in same season or the following year. (More re-growth will occur from this timing.)	
	Stem filling technique	10 ml of 15% solution per stem	See National Trust Methodology for full details*.Cut stems approx. 200mm above base of cane & 40mm above node. Rupture the central stem tissue with a screwdriver and use a spot gun to insert Roundup ProVantage into the hollow stem within 15 minutes of cutting.	Use where overall spraying is not desirable, especially near watercourses or among desirable plants. Timing: After mid-August but before leaf fall. Stems must be > 8mm diameter
	Stem injection technique	1.5 ml of neat solution per stem	Using specialist stem injection equipment, inject directly into individual stems.	
	Hand-held weed wiper	1 part Roundup ProVantage to 3 parts water	Use where overall spraying is not desirable or target plants are small or unsuitable for stem filling, (< 8mm) e.g. in re-treatment following foliar spraying.	

* Download from http://www.projects.ex.ac.uk/knotweed or contact the Monsanto Technical Helpline 01954 717575

DO NOT APPLY WITH MIXTURE B NF TO EDIBLE CROPS, GRASSLAND OR AQUATIC WEEDS.

Do not tank-mix Roundup ProVantage when using rotary atomiser sprayers.

N.B. Maintain continuous agitation when using Roundup ProVantage in a tank-mixture.

For knapsack sprayers: mix thoroughly and use immediately when using Roundup ProVantage in tank mixture.

Always consult manufacturers' recommendations before use.

COMPANY ADVISORY INFORMATION

This section is not part of the Product Label under the Plant Protection Products Regulations 1995 and provides additional advice on the product.

General Information

Roundup ProVantage herbicide is an advanced formulation containing glyphosate. Roundup ProVantage is taken up by foliage and translocated to underground roots, rhizomes and stolons, providing control of both annual and perennial grasses and broad-leaved weeds. Roundup ProVantage is rapidly adsorbed onto particulate matter in soils and water and is quickly degraded by the micro-organisms present in soil and aquatic bottom sediments. Until degraded, the active ingredient in Roundup ProVantage, glyphosate, is practically immobile in soils and is, therefore, unlikely to contaminate groundwater.

Roundup ProVantage is a glyphosate formulation which, having no hazard classification, offers a high standard of operator safety. To maximise the intrinsic safety of Roundup ProVantage to operator, consumer and environment, the label recommendations and the DEFRA/HSC/NAW publication "Code of Practice for the Using Plant Protection roducts" of January 2006, should be adhered to.

Symptoms on the weeds

Symptoms of treatment are generally first seen 7 - 14 days, or longer, if growth is slow after spraying. Leaf symptoms take the form of a reddening then yellowing of the foliage and are first seen on the grass weeds but take longer to appear on broad-leaved weeds. Reaction of nettle is slow.

For aquatic weed control, on reeds and grasses leaf symptoms usually appear within 14-21 days of spraying in the early autumn. Complete foliage desiccation usually occurs 30-40 days after spraying. At this stage the reeds can be cut and removed. During cold conditions leaf symptoms may not appear before natural dieback but no growth will occur in the season following spraying.

Effects of weather

See Directions for Use (Restrictions).

Roundup ProVantage will remain efficacious at low but not freezing temperatures however the onset of symptoms will be delayed.

A covering of dew may reduce efficacy where run-off occurs.

Reduced control is likely where weed growth is impaired by natural senescence, drought, high temperature, a covering of dust, flooding or severe/prolonged frost at, or immediately after application.

Weed resistance strategy

Glyphosate, the active ingredient in Roundup ProVantage is a Group G herbicide based on the mode of action classification system of the Herbicide Resistance Action Committee.

Under Best Practice there is a low risk for the development of weed resistance to Roundup ProVantage. There are no known cases of weed resistance to glyphosate in UK.

Strains of some annual weeds have developed resistance to glyphosate in some parts of the world leading to poor control. A strategy for preventing and managing such resistance should be adopted. This should include integrating herbicides with a programme of cultural control measures and /or active ingredients with a different mode of action.

Users are encouraged to implement a weed resistance strategy based on (a) Good Agricultural Practices and (b) Good Plant Protection Practices by:

- Following label recommendations on rates and timing.
- The adoption of Integrated Weed Management practices
- Minimising the risk of spreading weed infestations
- The implementation of good spraying practice to maintain effective weed control
- Using the correct nozzles to maximise coverage
- Application only under appropriate weather conditions

Monitoring performance and reporting any unexpected results to Monsanto UK Ltd (Tel: 01954 717575).

121.0 mm

b) Knapsack sprayers

Recommended delivery range is 80 - 250 l/ha. Half fill the spray tank with clean water, add the correct amount of Roundup ProVantage and top up with water. Fill according to best practice as given on the CPA's Voluntary Initiative website:

(www.vountaryinitiative.org.uk)

When used at a walking speed of 1 metre/second to apply a swath of 1 metre width, most knapsack sprayers fitted with a Hypro AN 1.2 or similar nozzle deliver approximately 200 l/ha spray volume (or 10 l per 500 m^2). To apply 3.75 l/ha of Roundup ProVantage, therefore, use a 1.9% solution, i.e. 190ml Roundup ProVantage made up to 10 litres. Similarly, knapsack sprayers fitted with low volume nozzles such as Hypro DT 1.5 typically deliver approximately 100 l/ha spray volume. To apply 3.75 l/ha Roundup ProVantage in this case use 3.75% solution.

c) Rotary Atomisers

Hand-held machines can be used to apply a spray volume of 10-40 l/ha, e.g. Herbi and Herbaflex. Tractor-mounted rotary atomiser boom sprayers are suitable for use in amenity, industrial, forestry, orchards and aquatic areas situations to apply a spray volume of 10-40 l/ha.

When conventional rotary atomisers are used to apply Roundup ProVantage ensure that the droplet diameter falls within the range 200-300 microns for all uses.

Roundup ProVantage may be applied neat through specialised ULV applicators which have drift reducing systems or at a spray volume of 10-40 l/ha through conventional rotary atomisers.

d) Weed Wipers

For ropewick applicators use a concentration of 1 part Roundup Pro-Vantage to 3 parts of water and add a water-soluble dye if required. Care should be taken to avoid dripping onto wanted vegetation.

For new generation weed wipers, use 1part Roundup ProVantage to 10 or 20 parts of water or as directed by manufacturer's instructions. A list of machines is included in the Company Advisory section at the end of this label.

e) Cut Stump Applicators

For cut stump treatment an Enso attachment to rotary saws may be used.

This technique is specific to scrub clearance in forestry. A suitable water soluble dye may be used.

f) Stem injection

Use a hatchet to cut one notch in trees up to 10cm diameter and two to three notches in trees above 10cm diameter. Use 1.5 ml of undiluted Roundup ProVantage per notch. Specialist stem injection equipment can be used to inject 1.5 mls Roundup ProVantage into hollow stems such as Japanese Knotweed and Giant Hogweed.

g) Spot Gun Applicators

Spot gun applicators are for the treatment of individual weeds. Apply 5 ml of spray to target weed, using a narrow cone TG-3 or TG-5 nozzle.

Boat mounted sprayers

For use in aquatic situations. Prepare sprayer as for knapsack sprayers (Section b above). Calibrate and spray at the lowest speed possible. Always apply against the direction of any current.

Spot Diameter (metres)	Amount of Roundup ProVantage(ml) per 5 l spray solution for targeted dosage of:		
	2.25 l/ha	3.0 l/ha	3.75 l/ha
0.3	20	21	27
0.6	85	85	107

When used in paddocks keep livestock out of treated area until treated Ragwort or other poisonous weeds have either been removed or died down completely.

Compatibility

Roundup ProVantage is physically compatible with some other pesticides. For up to date information on compatible products contact Monsanto UK Limited (tel: 01954 717575) or visit www.monsanto-ag.co.uk.

Roundup ProVantage is compatible with Mixture B NF (ADJ 0570). Where conventional hydraulic sprayers are being used Mixture B NF may be added to the spray tank solution, at a rate of 2% of the final water volume, for all pre-plant and post-plant directed sprays only.

Area of Use	CROP	Target Weeds/Usage	Weed Infestation	Application Rate l/ha.	Water Volume	Application Guidance
AMENITY VEGETATION	Vegetation management	Ornamental areas	Annual weeds Perennial grasses and broad-leaved weeds	1.0 3.75	Hydraulic sprayers (boom and knapsack) at water volumes 80-250 l/ha or rotary atomisers* or hand-held equipment.	Do not use under polythene or glass.
HARD SURFACES (EXCLUDING RAILWAY BALLAST)	Vegetation management	Including road-sides, paths and along fences	Annual weeds Perennial grasses and broad-leaved weeds	1.0 3.75	Hydraulic sprayers (boom and knapsack) at water volumes 80-250 l/ha or rotary atomisers* or hand-held equipment.	Apply this product carefully. Ensure spraying takes place only when weeds are actively growing (normally March to October) and is confined only to visible weeds including those in the 30cm swath covering the kerb edge and road gulley – do not overspray drains
NATURAL SURFACES NOT INTENDED TO BEAR VEGETATION, PERMEABLE SURFACES OVERLYING SOIL, RAILWAY	Vegetation management	Including road-sides, paths, concrete and alongside walls	Annual weeds Perennial grasses and broad-leaved weeds	1.0 3.75	Hydraulic sprayers (boom and knapsack) at water volumes 80-400 l/ha or rotary atomisers*at water volumes 10-40 l/ha or hand-held equipment.	Do not use under polythene or glass.

* Rotary atomisers may be used at a water volume of 10-40l/ha. Ensure droplet diameter falls withiin the range 200-300 microns.

Area of Use	CROP	Target Weeds/Usage	Weed Infestation	Application Rate l/ha.	Water Volume	Application Guidance
ORCHARDS	APPLE, PEAR, PLUM, CHERRY, DAMSON	Perennial grasses, broadleaved weeds	All levels of most species	3.75	200-400 l/ha	Spray AFTER autumn leaf-fall and BEFORE: Apples, Pears - Green cluster stage Stone fruit - white bud stage Treat root suckers in late spring only. Trees must have been established 2+ years. Avoid contact with tree 30+ cm above ground.
		Root suckers	-	3.75		
ENCLOSED WATERS, OPEN WATERS, LAND IMMEDIATELY ADJACENT TO AQUATIC AREAS	–	Emerged Weeds - Reeds, Rushes, Sedges, Grasses and Watercress	All levels/ species	3.75	200-400 l/ha or hand-held equipment (p. 3)	Consult appropriate Environment Agency regional office before use. On water-lillies it is preferable to use a tractor or boat-mounted sprayer. During spraying do not exceed a pressure of 2.0 bars (30 p.s.i.). When using a tractor mounted sprayer do not exceed 8 kph (5 mph). Use boat-mounted sprayers at slowest practical speed. Always apply against direction of any current. When disturbed by wash, WATER-LILIES may require re-treatment.
		Floating Weeds - White water-lily - Yellow water-lily	All levels	4.5	100 - 200 l/ha or hand-held	
Grassland, Plant free areas, ornamental plantings, amenity vegetation	–	Individual weeds	All levels	1:2.25 dilution with water for wick-type weed wipers OR 1:1.5 dilution with water in hot, dry conditions. For 'new generation' wipers consult the manufacturer for guidance.		Weeds must be 10+ cm taller, and wiper 5+ cm higher, than desired vegetation. Contact Monsanto or your distributor for specific recommended weed wiper applicators. Treated POISONOUS WEEDS must be removed or allowed to completely degenerate before grazing or conserving.

Forestry weed control

Roundup ProVantage can be used for site preparation and for weed control in planted out trees.

AREA OF USE	TARGET WEEDS / USAGE	WEED INFESTATION	APPLICATION RATE l/ha	WATER VOLUME	APPLICATION GUIDANCE
Forestry: - Pre-planting	Arable land, planting, replanting, & grassland areas	Arable weeds Grassland weeds	3.0 3.75	Hydraulic sprayers: 80-250 l/ha or rotary atomisers: 10-40 l/ha*	All tree species may be planted 7 days or more after treatment *Where rotary atomisers are used their droplet diameter must fall within the range 200-300 μm.
Forestry: - Post-planting (directed) in conifers & broad-leaved trees	Clean-up around trees with knapsack applications.	Annual/perennial grasses and broad-leaves	3.0	Apply as a concentration of 1 part to 49 parts water (2%) or Weed wiper mini: 1 part to 3 parts water	It is ESSENTIAL to use a TREE GUARD for all applications made in the growing season. Treat bracken after frond tips are unfurled but before senescence. Treat heather late August to end September. All other woody weeds are treated June-August, before leaf senescence (but after new growth of crop has hardened).
		Woody weeds: Bracken/Beech Brush/Brambles Sycamore/Oak Hazel/Willow/Ash	2.25		
		Heather (peat soils) Heather (mineral soils)	3.0 4.5		
		Rhododendron (*)	7.5	250 l/ha	Cut back and treat re-growth when at least 1 metre in height throughout the entire coppice. Spray to just before point of run-off.
Forestry: - Post-planting (overall dormant season in certain conifers – conifer release)	Grass weeds - Lowland areas - Upland areas Bracken Beech & Birch Brambles	Black Bent, Cock's-foot, Common Couch, Creeping Soft-grass, False Oat-grass, Fescues, Meadow-grasses, Other Bent species, Purple Moor-grass, Sweet Vernal-grass, Tufted Hair-grass, Wavy Hair-grass, Wood Small-reed (Bush grass) All levels of all species All levels of all species All levels of all species	1.0 1.5 1.5 1.5 2.25	Hydraulic sprayers: 200-250 l/ha or Hand-held equipment - see 'Mixing and Spraying' section	Species safe to spray when fully dormant and leader growth has hardened: Corsican, Lodgepole and Scots Pines, Norway Spruce, Sitka Spruce, Lawson Cypress, Western Red Cedar. Douglas Fir and Noble Fir - safe to spray when fully dormant and leader growth has hardened but NOT in spring. If overall application takes place after the optimum timing weed control may be reduced. It is advisable to spray a limited area of forest to test crop safety under local conditions before widespread overall application in subsequent years. These recommended application rates refer to forestry usage only. Inadequate control may result if used in other areas. See Caution below
Forestry: - Stump application for chemical thinning	Deciduous trees Coniferous trees	All species All species	7.5% solution of in water 15% solution of in water		Apply the solution to saturate the rim of the newly cut surface, with a suitable adapted clearing saw, spot gun or paintbrush. Treat as soon as possible after felling, in the period November to March/April. Do not apply in the period of active sap flow in the spring/early summer. Do not cut trenches or drill holes and fill with the solution or use undiluted product. Note: for ease of identification of treated areas a suitable, commercially available, water-soluble dye may be added to the prepared spray solution.
Forestry: - Chemical thinning by injection of tree stems	Coniferous and deciduous species	-	1.5 ml neat per cut per 10 cm diameter (or less) tree		Use a hatchet to cut one notch in trees up to 10cm diameter and apply 1.5 ml of the solution to each cut. Use two or three notches in trees over 10cm diameter. Do not treat in the period of active sap flow in the spring/early summer.

(*) For improved control of Rhododendron add Mixture BNF (ADJ AO570) at a concentration of 2% final water volume to 6.0 l/ha of . Application using the weed wiper is not suitable.

Caution: The timing of hardening of leader growth varies considerably between locations and between seasons. It may occur as early as the end of July or be delayed to October or later. To avoid damage to Lammas growth, sprays should be directed away from leaders

Mixing and spraying

Roundup ProVantage mixes readily with water and can be applied in spray volumes ranging from 10 - 400 l/ha using tractor mounted, knapsack, rotary atomisers and hand-held sprayers. Specialised application equipment such as weed wipers, stem injection and spot gun applicators may be used where indicated.

Correctly calibrate all sprayers under field or use conditions prior to application.

a) Tractor mounted and powered hydraulic sprayers

These should be capable of applying accurately 80 - 400 l/ha within a pressure range of 1.5 - 2.5 bars (20 - 35 psi).

Half fill the spray tank with clean water, start gentle agitation, and then add the correct amount of Roundup ProVantage. Top up the tank with water to the required level. To avoid foaming do not use top tank agitation. Use of a defoamer may be necessary.

Medium Volume application (150 - 300 l/ha)

Avoid high water volumes (>300 l/ha) which may lead to run-off from the treated vegetation, resulting in reduced control. Low drift nozzles such as air induction and pre-orifice types producing a medium or coarse spray (BCPC definition) should be used to minimise the risk of drift.

Low Volume Application (minimum 80 l/ha)

Low volume application can be achieved by reducing pressure and the appropriate nozzle selection. Low drift nozzles which produce a medium spray quality (BCPC definition) should be used to minimise the risk of drift.