

SERIOUSLY LONG WEED CONTROL IN ORCHARDS AND VINEYARDS

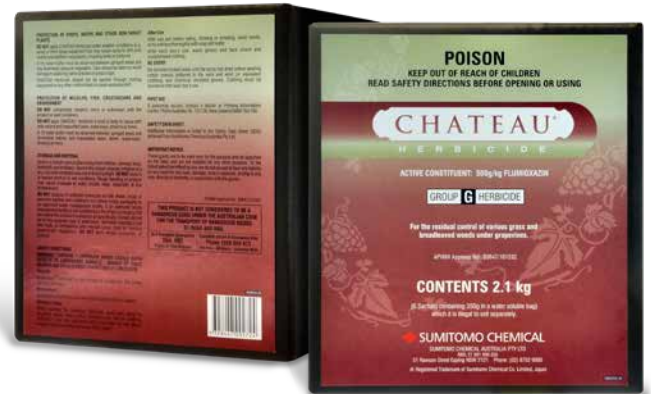
**GRAPES
POME FRUIT
STONE FRUIT
CITRUS
TREE NUTS
OLIVES
AVOCADOS
BLUEBERRIES**

CHATEAU®
H E R B I C I D E

TECHNICAL MANUAL 2019

Chateau® Herbicide is an exciting new development in weed control in orchards and vineyards. Growers now have an economic option for controlling hard to kill weeds without the need for repeated spraying operations during the growing season.

- The active ingredient in Chateau is 500 g/kg flumioxazin.
- Flumioxazin is a Group G herbicide with contact foliar and soil residual activity.
- Flumioxazin is a PPO inhibitor – involved in synthesis of chlorophyll.
- Germinating seedlings pick up flumioxazin as they grow through the treated zone. As soon as they reach the soil surface flumioxazin reacts with sunlight and causes disruption of cell membranes and death of the plant.



Commercial results



Chateau Herbicide is a proven pre-emergence residual herbicide

- **Broad spectrum:** Controls key broadleaf and grass weeds, including fleabane, mallow, Feathertop Rhodes grass and annual ryegrass.
- **Long lasting:** Controls weeds for 4-8 months. Can be applied up to 2 times per year.
- **Stays in place:** Remains in place until rainfall or irrigation releases its activity. Stays where you put it; won't leach or volatilize.
- **Proven performance:** Many years of use in Europe and US in vines and tree crops. Providing residual weed control with no detrimental effects on long term vine or tree health.
- **No residues:** When used as directed no residues are generated in fruit, or nuts.
- **Soil types:** Works well on a range of soil types, from sand to clay.
- **Convenient:** Chateau comes pre-packaged in a ½ hectare water soluble bag.

Results in the field – Vines

In a field trial located near Swan Hill in Victoria, Chateau treatments were assessed at 12 weeks, 16 weeks and 1 year after application.

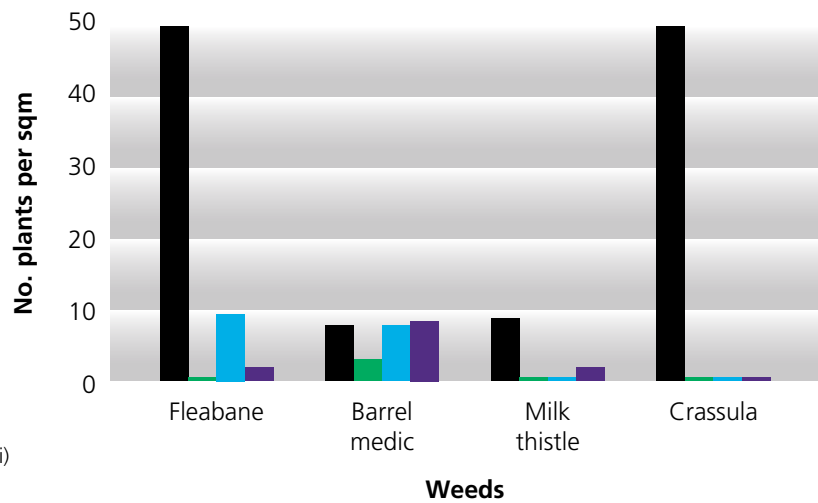
Chateau in wine grapes: Swan Hill VIC H13-013

Applied 19th May;

Assessed 9th October

All treatments had glyphosate at 450 g ai/ha added

■ Untreated ■ Chateau 630 g/ha
■ Pendimethalin 7 L/ha ■ Oryzalin 4.5 L (225 g ai)

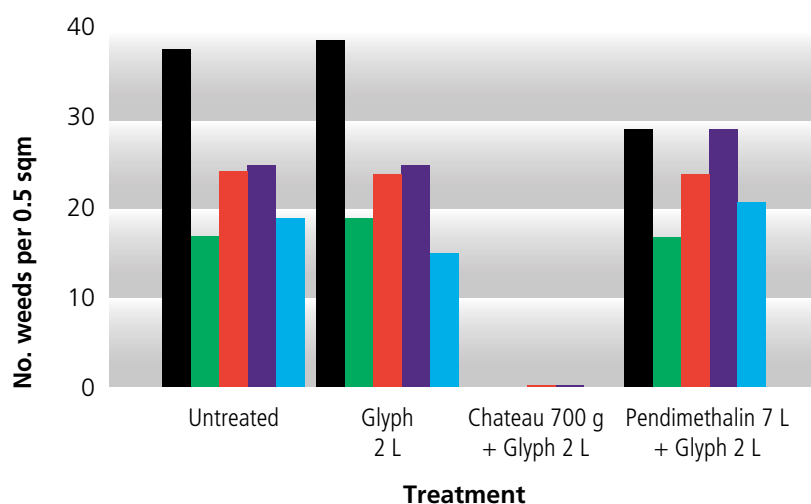


Chateau in wine grapes: Swan Hill VIC H13-013

Applied May 2013; Pictures taken May 2014



Results in the field – Orchards

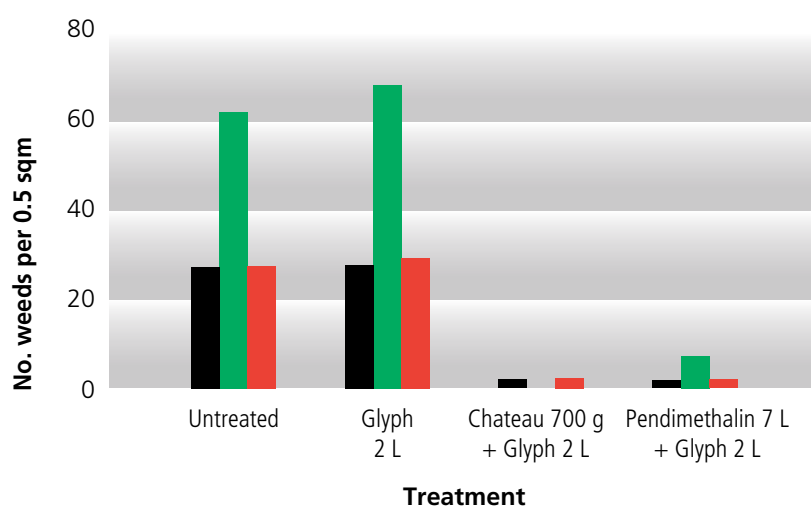
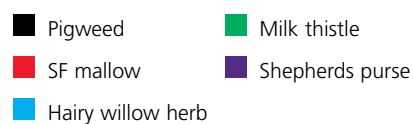


Chateau for broadleaf weed control in apples:

Shepparton VIC H14-020

Applied 2nd July 2014;

Assessed 20th November 2014

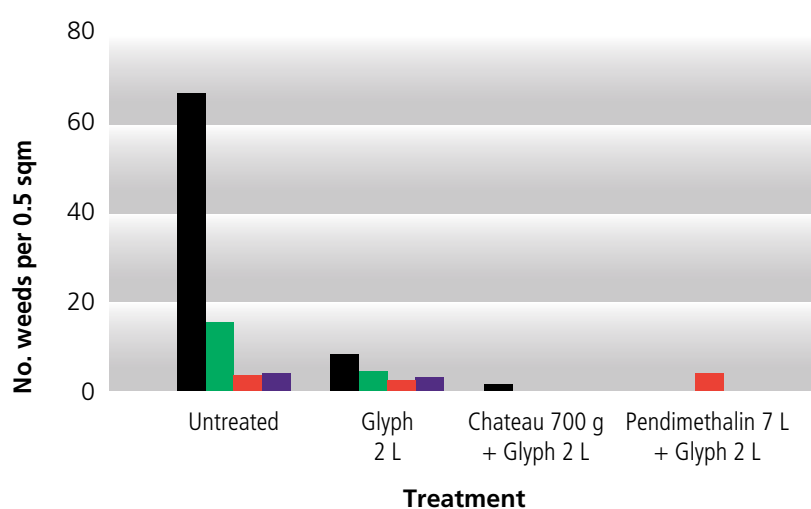


Chateau for grass weed control in apples:

Shepparton VIC H14-020

Applied 2nd July 2014;

Assessed 20th November 2014



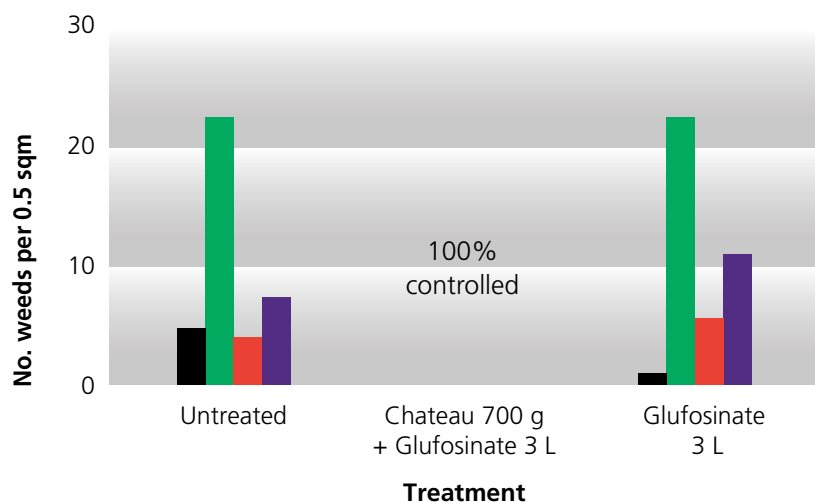
Chateau for weed control in peaches:

Tatura VIC H14-021

Applied 28th July 2014;

Assessed 12th September 2014





3 months after treatment in macadamias
in Queensland H16-001



8 months after treatment in almonds
in Victoria H14-016



Crop safety

When applied as per label directions, Chateau has been proven to be safe to both young (>1 year old) and established vines and trees.

SAFETY TO YOUNG VINES AND TREES

Recommendation is not to apply to vines or trees established in the vineyard/orchard for less than 1 year and do not apply on green bark.

Observations from trial at Piangil, Northwest Victoria, 2014:

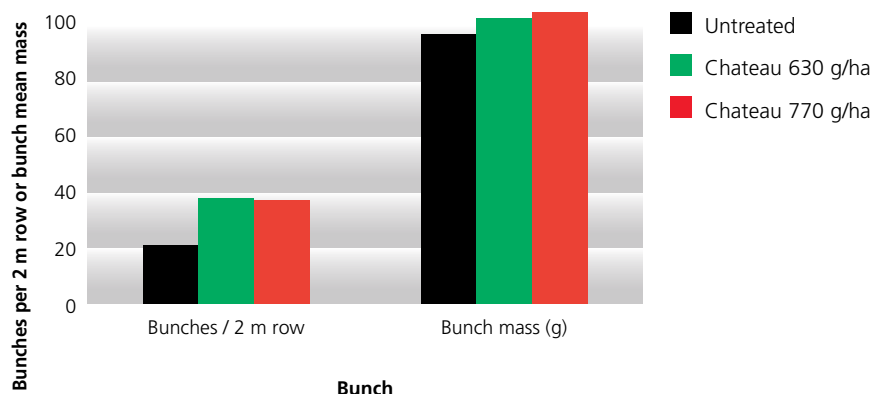
- Vines were 8 months old (since planting) Bordeaux vines.
- Chateau at 700 g/ha applied with glyphosate to rough bark and green bark.
- No phyto observed from either direct or soil uptake (bud burst numbers assessed).



SAFETY TO ESTABLISHED VINES

Chateau in Sauvignon Blanc grapes: Swan Hill VIC H13-013

No long term effect on vine health



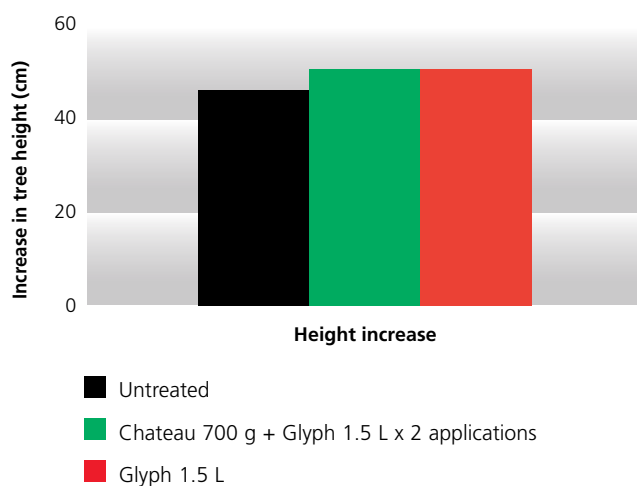
Measurement's taken to check crop safety included:

- Visual assessments of crop health.
- Visual assessments of leaves and fruit for marking / damage.
- Measurement of plant height / growth.
- Measurement of root mass.
- Early season fruit / nut counts.
- Final crop yield.

SAFETY TO YOUNG ALMONDS

Chateau in young almonds: Wemen VIC H15-007

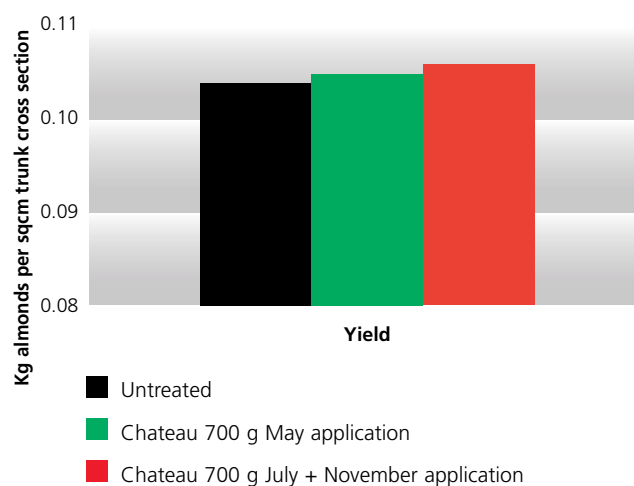
1 year old trees; 2 applications in May and July;
Assessed January; No effect on tree growth



SAFETY TO ALMONDS

Chateau in almonds: Kenley VIC H14-016

4 year old trees; Applied in May and July + November;
Harvest assessment; No effect on yield



SAFETY TO FRUIT AND NUT CROPS

Similar crop safety work has been carried out in pome fruit, stone fruit, macadamia, olives, citrus, etc. No negative effects noted when compared to untreated controls.

Chateau in the soil

In addition to being safe to the crop, Chateau poses no threat to soil health:

- Chateau does not move or leach.
- Chateau has no negative effect on earth worms.
- Chateau has no negative effects on soil microorganisms.

Best practice application to avoid crop damage when using Chateau herbicide

CROP SAFETY

Chateau has excellent crop safety when used as directed. The only way Chateau can cause damage to the crop is direct contact with roots, foliage or fruit. If Chateau is applied in accordance with the label directions this will not occur.

DUSTY SITUATIONS

The other way Chateau can come into contact with crops is through soil treated with Chateau being blown onto fruit and foliage. Under the right conditions this dust can cause spotting. Applying Chateau at the correct time in the correct conditions will ensure this does not occur.

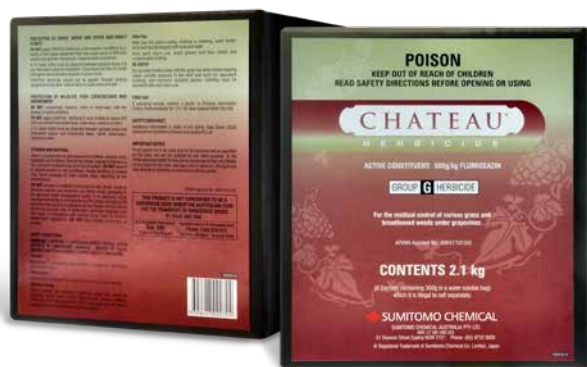
CORRECT TIMING AND SPRAYER SET UP

Chateau is not volatile, so the most likely way for contact to occur is overspray or spray drift. This can be avoided by correct timing of application and correct sprayer set up. It is important to remember that equipment that has been previously set up, calibrated and used for applying other herbicides under trees and vines may be allowing spray to drift onto foliage or fruit. As damage from spray drift may be hard to pick up visually, depending on the herbicide used (e.g. glyphosate). Whereas Chateau drift may be visible as spotting.

PLANTING INTO CHATEAU TREATED GROUND

Chateau will not move through the soil to contact crop roots, even in the case of feeder roots near the surface in light soils that maybe concentrated near irrigation drippers. However, contact could be made when planting new trees/vines into an area previously treated with Chateau. If replanting trees with 12 months of an application the top 3 cm of soil from a 0.5 m radius around the tree/vine must be removed before the hole is dug, and special care taken to ensure none of the surface soil ends up in the hole or contacting the new tree.

To ensure correct application of Chateau please make note of the RESTRAINTS and refer to the label for more information.



Getting the best out of Chateau Herbicide

- Application should be during the main rainfall period and before heavy weed growth. This will vary by region, from post-harvest in autumn for southern regions, to early spring before bud burst in more central areas, to post harvest in the summer rainfall areas of the north.
- Wait until significant soil wetting rain has occurred and more rain (at least 15 mm) is likely within a week, or the soil can be irrigated with sprinklers.
- Avoid heavy trash on the ground.
- Avoid soil disturbance as this will disrupt the Chateau treated zone.
- If sweeping pruning material from under the vines or trees, do this before applying Chateau.
- Don't apply over the top of mulch. If mulch is to be applied, Chateau should be applied first.
- Large weeds need to be knocked down before Chateau application as they may prevent Chateau reaching the soil.
- Apply with about 250 L water/Ha in an even band.
- Don't apply in high pH water (pH >7) or allow the spray mix to stand overnight.
- Tankmix with a knockdown if small weeds are present – Ensure rate of knockdown is sufficient to kill existing weeds.

Prior to applying Chateau Herbicide it is important to assess the ground conditions under your trees or vines.



The area under the crop here is quite clear of green weeds and also free of trash such as prunings and is the ideal situation for applying Chateau.



Here there are some small green weeds coming through and also some light trash. In this situation you can mix a knockdown herbicide with Chateau. The knockdown will take out the green weeds and the Chateau will get through the light trash to deliver residual control.



In a situation like this where you have a large number of broadleaf and grass weeds coming through already, you should burn them down with a knockdown herbicide first before applying Chateau. This will allow the Chateau to reach the soil, rather than being blocked by the green weeds.

Don't apply Chateau over excessive weed growth or trash.



Too much weed growth. Needs to be controlled with a knock down and allowed to rot down.



Too much organic matter covering the soil.



Right conditions for Chateau application. Minimal weed growth / organic matter to stop the Chateau reaching the soil surface.

Directions for use

CROP SITUATION	WEED CONTROLLED	RATE g/sprayed ha	CRITICAL COMMENTS
Grapevines Pome fruit Stone fruit Citrus fruit Tree nuts Olives Avocados Blueberries For residual control of broadleaf weeds and grasses	Annual ryegrass (<i>Lolium rigidum</i>), Barnyard grass (<i>Echinochloa colona</i>), Blackberry nightshade (<i>Solanum nigrum</i>), Bluetop (<i>Ageratum houstonianum</i>), Capeweed (<i>Arctotheca calendula</i>), Crassula (<i>Crassula colorata</i>), Creeping speedwell (<i>Veronica persica</i>), Crowsfoot (<i>Eleusine indica</i>), Dwarf nettle or stinging nettle (<i>Urtica urens</i>), Fat Hen (<i>Chenopodium album</i>), Feathertop Rhodes grass (<i>Chloris virgata</i>), Fleabane (<i>Conyza bonariensis</i>), Green summer grass (<i>Brachiaria subquadriflora</i>), Hog weed (<i>Polygonum aviculare</i>), Marshmallow (<i>Malva parviflora</i>), Milk thistle (<i>Sonchus oleraceus</i>), Pigweed (<i>Portulaca oleracea</i>), Small flowered mallow (<i>Modiola caroliniana</i>), Squirreltail fescue (<i>Vulpia bromoides</i>), Summer grass (<i>Digitaria ciliaris</i>), Toadrush (<i>Juncus bufonius</i>), Wild mustard (<i>Sinapis arvensis</i>), Wild radish (<i>Raphanus raphanistrum</i>), Wild rose (<i>Cleome aculeata</i>), Wild turnip (<i>Brassica tournefortii</i>)	560 - 700	CHATEAU Herbicide needs at least 15 mm of irrigation or rain to activate, and therefore should be applied during the main rainfall period. Apply to bare soil using a directed spray at the base of the vines or tree crops. When large weeds are present use a knockdown herbicide at the full rate and ensure trash is minimal before application of CHATEAU Herbicide. CHATEAU Herbicide can be applied with a knockdown herbicide over small weeds (<10 cm ø). The best application time for CHATEAU Herbicide is during the period following final harvest up to bud break. Avoid direct or indirect spray contact to foliage and green bark (nonbarked vines, with the exception of undesirable suckers). If spray droplets containing CHATEAU are allowed to drift onto fruit or leaves, or dust from treated soil is blown on to fruit or leaves, they may cause spotting damage.
Irrigation channel banks and drainage ditches	Amaranthus spp., Balsam pear (<i>Mormordica charantia</i>), Barnyard grass (<i>Echinochloa colona</i>), Bladder ketmia (<i>Hibiscus trionum</i>), Bluetop/ Billygoat weed (<i>Ageratum houstonianum</i>), Calopo (<i>Calopogonium mucunoides</i>), Caltrop/ yellow vine (<i>Tribulus terrestris</i>), Crowsfoot (<i>Eleusine indica</i>), Feathertop Rhodes grass (<i>Chloris virgata</i>), Fleabane (<i>Conyza bonariensis</i>), Green summer grass (<i>Brachiaria subquadriflora</i>), Ipomoea spp. (Bell vine, Morning glory, Pink convolvulus, Star of Bethlehem), Milk/sow thistle (<i>Sonchus oleraceus</i>), Milkweed (<i>Euphorbia heterophylla</i>), Phyllanthus spp., Red pigweed (<i>Portulaca oleracea</i>), Sicklepod (<i>Cassia obtusifolia</i>), Summer grass (<i>Digitaria ciliaris</i>), Square weed (<i>Spemacoce latifolia</i>), Wild rose (<i>Cleome aculeata</i>)	560 - 700	CHATEAU Herbicide needs at least 15 mm of rain to incorporate/activate, and therefore should be applied during the main rainfall period when 15 mm of rain is expected within 3 weeks. Channels must be completely empty at the time of application. If the required rain has not fallen and it is necessary to use the irrigation channel, fill it with water and allow it to stand for 24 hours then drain off the water in the channel and run to waste. If existing weeds are present at >2 leaf stage then non-selective knockdown herbicides such as paraquat or glyphosate should be used to control these in mixtures with CHATEAU Herbicide. For improved burndown apply with Hasten or Kwickin Spray Adjuvant at 0.5 - 1 L/100 L (use the lower rate on smaller, actively growing weeds), or Uptake Spraying Oil at 500 mL/100 L.

WITHHOLDING PERIODS –

WINE AND TABLE GRAPES, POME FRUIT, STONE FRUIT, CITRUS FRUIT, NUT TREE CROPS (EXCEPT MACADAMIA NUTS), OLIVES, AVOCADOS AND BERRIES:

HARVEST: DO NOT HARVEST FOR 14 WEEKS AFTER APPLICATION.

MACADAMIA NUTS:

HARVEST: DO NOT HARVEST FOR 9 WEEKS AFTER APPLICATION

GRAZING: DO NOT GRAZE OR CUT TREATED WEEDS FOR STOCK FOOD FOR 4 WEEKS AFTER APPLICATION.

IRRIGATION CHANNEL BANKS AND DRAINAGE DITCHES:

GRAZING: DO NOT GRAZE OR CUT FOR STOCK FOOD FOR 8 WEEKS AFTER APPLICATION.

While no residues have been detected in harvested produce in Chateau development trials, the APVMA has established default MRLs of 0.02 mg/kg in pome fruit, stone fruit, olives, tree nuts, 0.05 mg in citrus and 0.01 for grapes. This covers the possibility of incidental contamination such as dust from treated soil.

Compatibility

Chateau Herbicide is compatible with:

- Glyphosate 450
- Roundup® Max Herbicide by Monsanto
- Nufarm Weedmaster® DST® or Nufarm Weedmaster Argo® Dual Salt Technology Herbicide
- Spray.Seed® 250 Herbicide
- Gramoxone® Herbicide
- Hasten™, Kwickin and Banjo® at 0.5 - 1 L/100 L and with Uptake™ at 0.5 L/100 L
- Glufosinate



DIRECTIONS FOR USE (Continued)

RESTRAINTS (APPLY TO ALL USE PATTERNS)

DO NOT apply by air.

DO NOT apply by misting machines.

DO NOT disturb treated soil surface after application as this may remove CHATEAU Herbicide.

DO NOT treat weeds under poor growing or dormant conditions (such as occur in drought, waterlogging, disease, insect damage or following frosts) as reduced control may result. Weeds should be actively growing at time of treatment.

DO NOT apply in high pH water (pH >7).

DO NOT allow the spray mix to stand overnight.

DO NOT irrigate up to the point of runoff for at least 3 days after application.

SPRAY DRIFT RESTRAINTS

DO NOT apply with spray droplets smaller than a COARSE spray droplet size category according to 'APVMA Compliance Instructions for Mandatory COARSE or Larger Droplet Size Categories' located under this title in the GENERAL INSTRUCTIONS section of this label.

DO NOT apply when wind speed is less than 3 or more than 20 kilometres per hour, as measured at the application site.

DO NOT apply during surface temperature inversion conditions at the application site.

Users of this product **MUST make an accurate written record** of the details of each spray application within 24 hours following application, and must **KEEP** this record for at least 2 years. The spray application details that must be recorded are:

1 date with start and finish times of application **2** location address and paddock(s) sprayed **3** full name of this product **4** amount of product used per hectare and number of hectares applied to **5** crop or situation and weed or pest **6** wind speed and direction during application **7** air temperature and relative humidity during application

8 nozzle brand, type, spray angle, nozzle capacity and spray system pressure measured during application **9** name and address of person applying this product. (Additional record details may be required by the state or territory where this product is used.)

RESTRAINTS (ADDITIONAL)

DO NOT apply for residual weed control until the start of the main rain season when significant soil wetting rain has occurred and more rain (at least 15mm) is likely within one week, or the soil can be irrigated within one week with sprinklers or microjets that cover the entire sprayed area. Dripper irrigation will not give adequate incorporation.

DO NOT apply in areas prone to strong winds or to powdery soils or soils that are susceptible to wind displacement unless sprinkler or microjet irrigation can be applied immediately after application to cover the entire sprayed area.

DO NOT apply to apples, pears and stone fruit in the period between bud break/green tip and final harvest. Only apply to dormant trees.

DO NOT apply to berries, grapes, citrus and olives in the period between flowering and final harvest.

DO NOT apply to berries, grapes, citrus, olives, nut trees and avocados during the period after bud break, unless using shielded application equipment and applicator can ensure spray drift will not come in contact with crop fruit or foliage. Shielded applications during this time period should not be made with glyphosate or products containing glyphosate.

DO NOT apply unless trees and vines have low branches removed to prevent contact with the spray.

DO NOT operate machinery such as mowers and sprayers that may blow treated dust onto leaves and fruitlets until at least 15mm of sprinkler or microjet irrigation has been applied to the entire sprayed area or 15 mm of rain has fallen.

DO NOT mow the treated area between application and final harvest unless the operator can ensure that any dust from mowing will not drift on to foliage and fruit. Raising the mower height will reduce this risk.

DO NOT apply to farm roads or tracks where vehicle traffic may result in treated dust settling on to foliage and fruit.

DO NOT apply to berries, grapes, fruit or nut trees established in the vineyard/ orchard for less than 1 year.

DO NOT apply on bark that is still green.

DO NOT use in vineyards or orchards where the fruiting buds are below 40 cm above the soil.

DO NOT apply to grapes that are not trellised or staked unless they are free standing.

DO NOT apply for residual control if a large population of big weeds is present or large amounts of trash - as these may prevent the chemical reaching the soil. Application over light trash should be followed by at least 15 mm of rain or sprinkler/microjet irrigation over the entire sprayed area within 12 hours to ensure good incorporation.

DO NOT replant dead trees, vines or bushes within 12 months of an application unless the top 3cm of soil from a 0.5 m radius around the tree/ vine/bush to be replaced is removed before the hole is dug. Then ensure when planting not to get any of this surface soil into the hole or up against the newly planted tree/vine/bush.

DO NOT apply more than 2 applications of 700 g in one year.

RESTRAINTS (IRRIGATION CHANNEL BANKS AND DRAINAGE DITCHES)

DO NOT apply if heavy rains or storms that are likely to cause runoff are forecast within 3 days.

DO NOT make more than one application per year.

Recommendations for removal of Chateau residues from spray equipment

Equipment with Chateau residue remaining in the system may result in crop injury to the subsequently treated crop.

Spray equipment, including mixing vessels and nurse tanks, must be cleaned following Chateau application. After Chateau is applied, the following steps must be used to clean the spray equipment:

1 Completely drain the spray tank, rinse the sprayer thoroughly, including the inside and outside of the tank and all in-line screens.

2 Fill the spray tank with clean water and flush all hoses, booms, screens and nozzles.

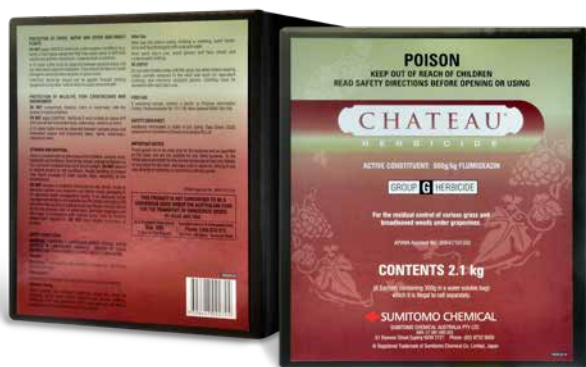
3 Top off tank, add 1 litre of 3% household ammonia for every 100 litres of water, circulate through sprayer for five minutes, and then flush all hoses, booms, screens and nozzles for a minimum of 15 minutes. If diaphragms are being used on the spray boom, loosen diaphragms before flushing the spray system, allowing cleaning solution to spray through the open diaphragm. If spray lines have any end caps, they must be loosened before flushing the system, allowing cleaning solution to spray through the loosened caps.

To enhance removal of Chateau from the spray system, add a tank cleaner such as All Clear™ DS or Kleenup™ Granular in place of ammonia. Follow the instructions on the product label for these products. All-Clear DS has very clear and detailed instructions on how to achieve effective decontamination. They can be viewed on the AgNova website here: <http://www.agnova.com.au/content/custom/products/downloads/All-Clearflowchart-AgNote.pdf>

4 Drain tank completely.

5 Add enough clean water to the spray tank to allow all hoses, booms, screens and nozzles to be flushed for 2 minutes.

6 Remove all nozzles and screens and rinse them in clean water.



QUICK REFERENCE GUIDE

Use	Residual weed control in vineyards and orchards.
Packaging	Box containing 6 x 350 g water soluble sachets.
Rate	560 - 700 g per sprayed hectare.
Water rate	250 L/ha. USE ONLY nozzles that the nozzles' manufacturer has rated to deliver a COARSE, a VERY COARSE or an EXTREMELY COARSE droplet size category.
Compatibility	Compatible with Glyphosate 450, Roundup Max Herbicide by Monsanto, Nufarm Weedmaster DST or Nufarm Weedmaster Argo Dual Salt Technology Herbicide, Spray.Seed 250 Herbicide, Gramoxone Herbicide, Hasten, Kwickin™ and Banjo at 0.5-1 L/100 L and with Uptake at 0.5 L/100 L.
Application timing	Apples, pears, stonefruit: Before greentip/budbreak or after final harvest. Berries, grapes, citrus and olives: Before flowering or after final harvest. If applying after budbreak or on non deciduous trees always use a shielded sprayer.
Rainfall or irrigation	Requires 15 mm of rain or sprinkler irrigation within a week of application.
Existing weed cover	Do not apply to significant weed or trash cover as this will prevent the product from reaching the soil. Heavy weed cover should be controlled with a knockdown herbicide and allowed to rot down, before applying Chateau.
Crop safety	If spray droplets containing CHATEAU are allowed to drift onto fruit or leaves, or dust from treated soil is blown on to fruit or leaves, they may cause spotting damage.
Keys to getting the best from Chateau	<ul style="list-style-type: none"> • Avoid soil disturbance as this will disrupt the Chateau treated zone. • Large weeds need to be knocked down before Chateau application as they may stop Chateau reaching the soil. • Tankmix with a knockdown if small weeds are present – Ensure rate of knockdown is sufficient to kill existing weeds. • Don't apply over the top of mulch. If mulch is to be applied, Chateau should be applied first. • Don't apply in high pH water (pH >7) or allow the spray mix to stand overnight. • Don't allow soil treated with Chateau to be blown onto fruit and foliage from mowing or other operations in the vineyard/orchard.

For further information on Sumitomo Chemical products, please contact:

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Chateau Herbicide**