



**Tick all the boxes.  
It's CRUCIAL®.**

# Discover more about CRUCIAL<sup>®</sup>.



World first 600g/L high strength liquid glyphosate  
formulation powered by triple salt,  
triple surfactant technology.

## KEY BENEFITS

- ✓ **Outstanding Strength:**  
Lower application rates per hectare
- ✓ **Fast Knockdown:**  
Quicker Turnaround, 1 day for annual and 3 days for perennial weeds
- ✓ **Rainfast in 15 minutes\* with Pulse® Penetrant:**  
New industry benchmark
- ✓ **Exceptional Viscosity:**  
Fast pouring in all climatic conditions
- ✓ **Low Foam:**  
More effective use of your time
- ✓ **Excellent Compatibility:**  
Tried and tested with the widest range of tank mix partners
- ✓ **Spray once, spray right:**  
So you can execute with precision, even under challenging conditions
- ✓ **Peace of Mind:**  
Backed by the Nufarm Commercial Performance Guarantee



## WORLD FIRST FORMULATION

Eight years in the making, CRUCIAL® is a breakthrough herbicide. It is the only liquid formulation in the world which combines three glyphosate salts – potassium, monomethylamine and ammonium. That means more weed killing power per litre, using less product per hectare.

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## TRIPLE SURFACTANT TECHNOLOGY

To make sure this unprecedented load of active ingredient that equals or exceeds best in class standards of performance every time, we've created the ultimate mix of complementary on-board surfactants. This mix of surfactants allows the glyphosate molecules to stick and spread rapidly through the plant, giving you the ultimate kill.

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## RESULTS YOU CAN TRUST

With rapid brownout, excellent efficacy against target plants and a new benchmark in rainfastness, CRUCIAL is purpose-built for consistent results in our unique and often challenging conditions.

## EASY HANDLING

The world's most advanced glyphosate makes no compromise when it comes to handling and mixing. CRUCIAL pours easily with minimal foam, and tank mixes superbly with other products. You also told us you wanted a lighter, safer pack size, so we made that too – CRUCIAL comes in the all-new OHS-friendly 15L pack plus 20L, 110L, 200L, 640L and 1000L. All packs can be recycled through Agrecovery.

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## TECHNICALLY SUPERIOR

No-one in New Zealand knows glyphosate like Nufarm. We've been in this space for over 30 years, with a proud record of local R&D and product development. CRUCIAL comes fully supported by an experienced in field team of Technical Specialists and Territory Managers, there to support you no matter what.

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## SHORT DOWNTIME

With CRUCIAL, you can graze, cultivate or drill just one day after treatment for annual weeds, and three days for perennial weeds. Fast turnaround means less downtime between spraying and sowing, and more flexibility especially during spring and autumn. (Refer to label for silage).

# WHERE CAN CRUCIAL BE USED?

Refer to the CRUCIAL label for specific use recommendations

- General weed control
- Brushweed control
- Agricultural areas
- Pasture renewal
- Pasture seedhead suppression (unimproved pastures only)
- Spraying silage before cutting
- Spraying hay or silage paddocks after cutting
- Pre-harvest – wheat, barley, oats, peas
- Orchards/vines – citrus, apples, pears, stonefruit, kiwifruit, grapevines
- Industrial and non-agricultural areas
- Turfgrass and recreational areas
- Aquatic areas – drains and waterways
- Forestry
- Market Gardens
- Asparagus
- Spraying out pre and post cropping



# HOW TO GET THE BEST OUT OF CRUCIAL

- Identify target plant species and choose the required rate of CRUCIAL – for recommended rates refer to the CRUCIAL label.
- Choose an appropriate tank mixing partner if required.
- Ensure target plants are healthy and actively growing, with plenty of leaf area present. CRUCIAL is not absorbed as effectively when plants are stressed. It also needs plant tissue to land on to do its job.
- Half fill the spray tank with clean water, add the required quantity of CRUCIAL, mix and fill the tank. See the CRUCIAL label for recommended water rates.
- Add Pulse Penetrant to the full tank, and complete mixing.
- Apply as a medium even spray to completely cover target plants.
- Refer to the product label if using tank mix partners.



# RAPID TRANSLOCATION FROM LEAF TO ROOT

For superior control, glyphosate must stick to the surface of the leaf, penetrate rapidly, then move quickly into the leaves and roots of the plant. If the plant goes into defensive mode and shuts down before the herbicide is translocated through its tissue, it can survive being sprayed.

CRUCIAL beats this natural defense system through good adhesion and absorption, fast uptake and excellent translocation. A lethal dose is delivered to the foliage, stem and root system even under challenging conditions.

## UPTAKE AND TRANSLOCATION STUDY

**Trial NUNZ1867;**  
conducted by Plant Protection Chemistry New Zealand

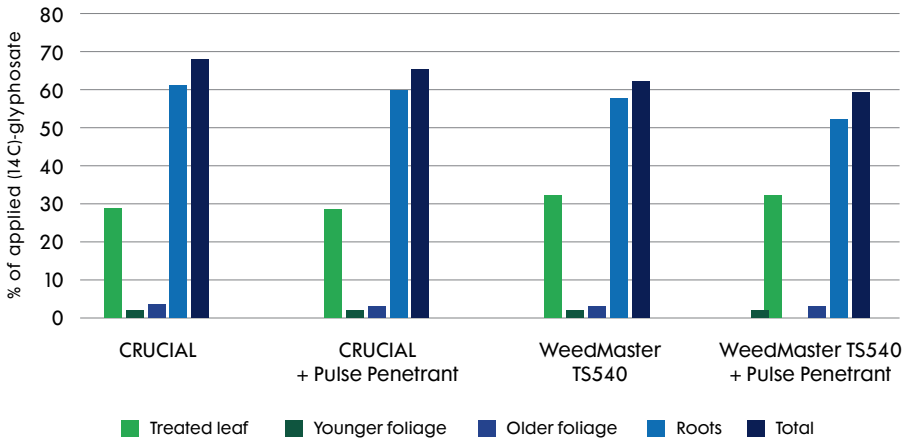
- CRUCIAL 2.4L, WeedMaster® TS540 2.7L
  - 1440g glyphosate/100L – droplets applied to simulate 100L mix/ha
  - ± Pulse Penetrant 100ml/100L
- Tabu ryegrass grown from seed, 5 replicates/treatment
- Uptake measured 30mins, 2, 6 and 24 hours after application
- Translocation measured 24 hours after application
- Autoradiograph images of plants to show distribution of glyphosate 24hours after treatment



Droplet application site  
(10 x 0.24 $\mu$ l) on adaxial surface of  
the youngest fully-expanded leaf.

# TRANSLOCATION

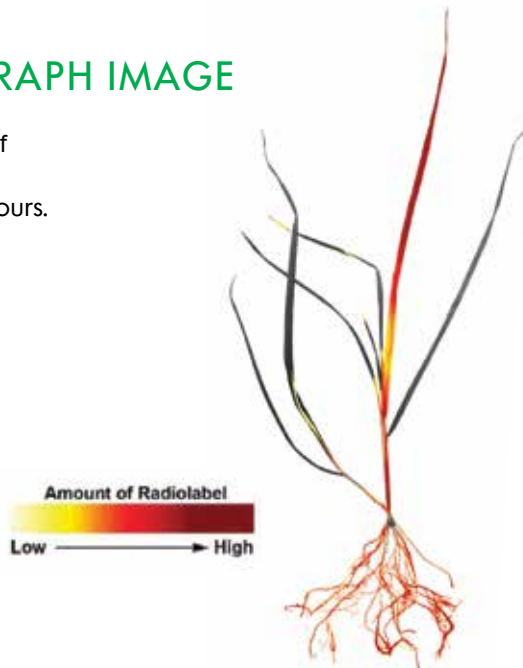
Effect of treatment on distribution of (14C)-glyphosate in ryegrass 24 hours after treatment



Both CRUCIAL and WeedMaster TS540 exhibited equivalent translocation throughout the plant. The addition of Pulse Penetrant had no effect on translocation.

## AUTORADIOGRAPH IMAGE

**CRUCIAL:** Translocation of glyphosate into the roots and new tillers after 24 hours.





# THE POWER OF PULSE PENETRANT

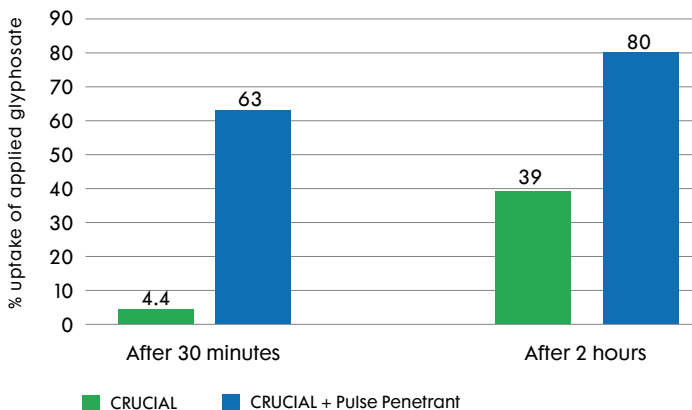
Adding Pulse Penetrant to CRUCIAL significantly speeds herbicide uptake in ryegrass. Pulse Penetrant reduces the surface tension of the spray solution to such a low level that it flows easily through stomata (tiny pores in the leaf).

In spring, the waxy cuticle on the ryegrass leaf surface thickens. Without Pulse Penetrant glyphosate cannot effectively penetrate this thick waxy layer. Uptake is reduced which then results in poor control.

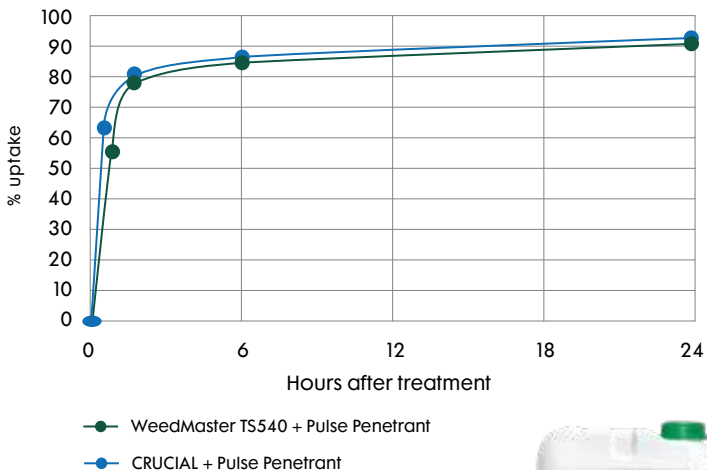


# THE EFFECT OF PULSE PENETRANT ON UPTAKE

[14C] - glyphosate uptake into ryegrass over time



Trendlines for [14C] - glyphosate uptake, into ryegrass over time



All treatments 1440g glyphosate in 100L/ha.  
Pulse Penetrant 100ml/100L. Tabu ryegrass.

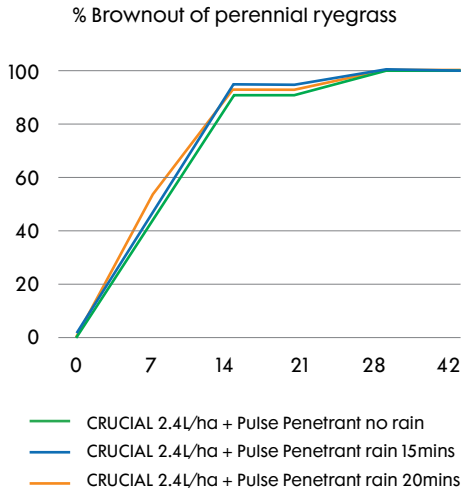


# RAINFAST IN 15 MINUTES WITH PULSE PENETRANT

CRUCIAL tank mixed with Pulse Penetrant should deliver commercially acceptable weed control even if light rain occurs just 15 minutes after spraying. No other glyphosate can match this standard. If it fails with our commercial performance guarantee, Nufarm will replace up to 100% of your initial use rate of CRUCIAL for re-treatment.

## RAINFAST STUDY

- CRUCIAL 2.4L ± Pulse Penetrant 100m/L
- Mature well-filled perennial ryegrass plants in pots
- Rainfastness measured 15 minutes and 20 minutes after application
- Sprayed 30 April 2019
- 10cm of leaf at spraying
- Foilage dry at application
- 8-10mm of simulated rain applied by sprinkler over 15 minute period



Agresearch, Ruakura (Trial NUNZ1904)



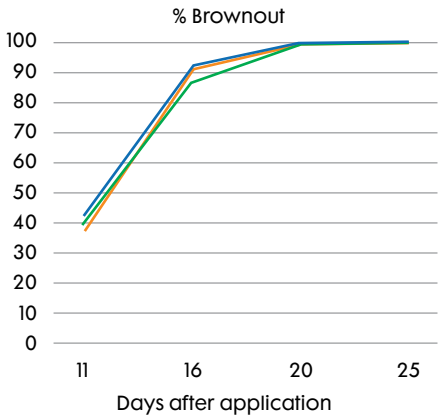
## 14 DAYS AFTER TREATMENT

From L – R on image:  
 Untreated, WeedMaster TS540 + Pulse Penetrant - rain 20 minutes, CRUCIAL + Pulse Penetrant 20 minutes, CRUCIAL + Pulse Penetrant 15 minutes & Roundup Ultra® Max + Li 1000 20 minutes.

# HIGH STRENGTH EFFICIENCY

CRUCIAL's high strength formulation means lower application rates per hectare; smaller volumes to purchase, transport and store; and fewer empty containers to recycle. After mixing, CRUCIAL remains stable in the tank for five days with good water quality so you don't have to start again with a new mix if the weather interferes with spraying. Note: Pulse Penetrant will break down in water, so if the mixture contained Pulse Penetrant and it has been stored overnight or longer Pulse Penetrant will need to be re-added. Tank mixes of CRUCIAL and other products should be used promptly.

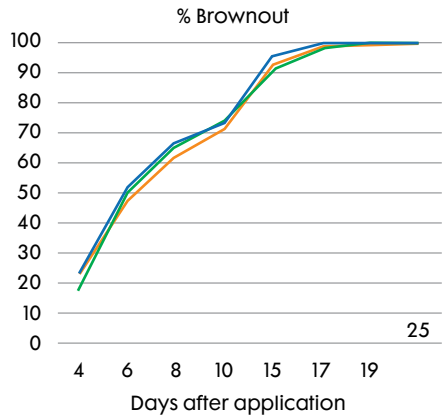
## CRUCIAL: EFFICACY – PERENNIAL RYEGRASS IN SPRING



— WeedMaster TS540 2.7L    — CRUCIAL 2.4L  
 — Roundup Ultra Max 2.5L

### Trial NUNZ1749

- No re-growth in any plot
- All with Pulse Penetrant 100ml/100L
- Established perennial ryegrass pasture, sprayed 23 Sep 2017
- Grazed 3 days after spraying



— WeedMaster TS540 2.7L    — CRUCIAL 2.4L  
 — Roundup Ultra Max 2.5L

### Trial NUNZ1750

- No re-growth in any plot
- All with Pulse Penetrant 100ml/100L
- Established perennial ryegrass pasture, sprayed 14 Oct 2017
- Not grazed after spraying

# RESISTANCE MANAGEMENT

CRUCIAL is a Group 9 (G) herbicide. Resistance to this herbicide could develop from excessive use. Consult [resistance.nzpps.org](http://resistance.nzpps.org) for further information about herbicide modes of action and appropriate resistance management strategies for weeds listed on the label.



# COMPATIBILITY

TANK MIX PARTNERS (RATE/HA)			COMPATIBILITY RATING
HERBICIDE		INSECTICIDE	
Agritone® 750			✓ ✓
Archer® Archer 750			✓ ✓
Avadex® Xtra			✓ ✓
Baton® 800WSG*			✗
Charter® 750WDG			✓ ✓
Director CS			✓ ✓
Director™ CS	Nortron®	Attack®	✓
		DEW™ 600	✓
Firebird®			✓
Kamba® 500, Kamba® 750			✓ ✓
		Kaiso® 50WG	✓
Nail® 600EC		Attack	✓
Nail® 600EC, Nail® 240EC			✓ ✓
Ombre®		Chlorpyrifos 500EC	✓
Relay® Super S			✓
Roustabout® 840	Flowable Atrazine	Kaiso 50WG	✓
Roustabout 840	Nu-trazine™	Kaiso 50WG	✓
Sero® 750WG			✓ ✓
Sprinter® 700DS			✗
Tandus® XL 1L			✓

## KEY



Compatible



Compatible on constant agitation - no retention on 150 micron sieve



Not compatible

Baton® 800WSG\* - Very fine sediment – 2,4-D crystals formed, high risk of reduced efficacy.



All products tested with 5.4L of CRUCIAL plus Pulse® Penetrant in 100L water/ha.

# CRUCIAL GLYPHOSATE CONVERSION TABLE

WeedMaster G360	WeedMaster TS470	Roundup Ultra MaX 570g/L	CRUCIAL
3.0L	2.3L	1.9L	1.8L
4.0L	3.0L	2.5L	2.4L
6.0L	4.6L	3.8L	3.6L
9.0L	6.9L	5.7L	5.4L



# COMPANION HERBICIDES FOR USE WITH CRUCIAL WHEN SPRAYING OUT



PRODUCT	RATE	MAIN BROADLEAF WEEDS TARGETED
	200-400ml/ha	Californian thistle, clovers, dandelion, hawksbeard, plantain, thistles and yarrow
	20g/ha	Buttercups, docks
<b>Goal Advanced</b>	1-3L/ha apples, stonefruit, kiwifruit and grapevines. 40mL/ha as an adjuvant to glyphosate	A wide range of weeds (refer to label) - mallow, nettle, hedge mustard, speedwell, cleavers
	400ml/ha	Clovers, dandelion, docks, willow weed, etc
	20-40 ml/ha	Mallow, nettles, wireweed and seedling storksbill
	1-2L/ha	Hemlock, ragwort, storksbill and thistles
	40g/ha	Californian thistles, clover, ragwort, sheep sorrel, yarrow, etc



<b>RAINFEST PERIOD</b>	<b>GRAZING WITHHOLDING PERIOD</b>	<b>RECOMMENDED CROP PLANT-BACK PERIODS*</b>
3 hours	Nil. Allow 3 days for CRUCIAL to be effective	Nil: brassicas, ryegrass, cereals/maize, fodder beet 12 weeks: clovers, legumes (up to 0.2L/ha) 6-12 months: clovers/legumes (over 0.2L/ha)
4 hours	7 days	14 days: brassicas, grasses, cereals/maize, clovers/legumes 6 months: fodder beet
Observe CRUCIAL instructions	For export crops refer to export spray programmes for specific information observe all CRUCIAL instructions	Observe all CRUCIAL instructions
6 hours	14 days	Nil: brassicas, grasses, cereals/maize 4-8 weeks: clovers, legumes 6-8 weeks: fodder beet
1 hour	Nil. Allow 3 days for CRUCIAL to be effective	Nil for all crops
2 hours	Nil. Allow 3 days for CRUCIAL to be effective	1-2 weeks: cereals/maize 4 weeks: brassicas, clovers, grasses 3 months: fodder beet
1 hour	Nil. Allow 3 days for CRUCIAL to be effective	14 days: brassicas, cereals/maize, grasses, clovers/legumes Note: Do not use Sero® 750WG prior to planting fodder beet. If soil pH exceeds 6.5 do NOT sow brassicas. Do NOT apply Sero 750WG within 2 months after a lime application

\*The recommended crop plant-back periods are a guide only and may vary from those listed depending on climatic conditions, soil type, soil pH and other factors. If in doubt sow a small area first to check soil residues.

# COMPANION INSECTICIDES FOR USE WITH CRUCIAL WHEN SPRAYING OUT

PRODUCT	RATE	MAIN INSECTS TARGETED
	400mL/ha	Springtails
	0.2-1.25L/ha	Springtails, Argentine stem weevil and Nysius

## TANK MIXING ORDER

1	2	3	4
Fill the tank $\frac{3}{4}$ full with water and add in the following order:	Wettable powders	Water dispersible granules Sero® 750WG Charter® 750WDG	Flowables - suspension concentrates, capsule suspensions, etc. Dew™ 600

**Note:** The information in this table is a quick reference only. Always consult the product label before use.

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©Goal is a registered trademark of Nutrichem Company Limited

™Dew is a trademark of Nufarm Ltd

™Charter is a trademark of Nufarm Australia Ltd

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CROP TO BE PLANTED	RAINFAST PERIOD	GRAZING WITHHOLDING PERIOD
Broadleaf crops - brassicas, chicory, fodder beet, legumes, plantain	3 hours	Nil.
Broadleaf crops - brassicas, chicory, fodder beet, legumes, plantain	3 hours	7 days

5	6	7
<b>Emulsifiable concentrates</b> Relay® Super Nail® 600EC Chlorpyrifos 500EC	<b>Water soluble concentrates</b> Kamba® 750 CRUCIAL Archer® 750	<b>Adjuvants, wetters, oils, penetrants</b> Pulse® Penetrant



# POWERFUL REWARDS FOR LOYALTY

Every purchase of CRUCIAL earns you valuable reward points in Priority Partnership®, the loyalty rewards programme for New Zealand growers. Reward points can be redeemed on a wide range of items for the whole family.



If you are not a member yet, find out more and join online at [nufarm.co.nz](http://nufarm.co.nz)

## OUR PROMISE

### \*COMMERCIAL PERFORMANCE GUARANTEE:

We are so confident about the superior performance of CRUCIAL, that we guarantee commercially acceptable results when it is used according to the label directions. If it fails Nufarm NZ will replace up to 100% of your initial use rate of CRUCIAL for re-treatment.



## MORE INFORMATION

Please contact your local Nufarm Territory Manager or visit us online at [nufarm.co.nz](http://nufarm.co.nz)

# NOTES:



# NOTES:

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