

# Fleabane Management: Double-Knock Application Parameters

## Background

Flaxleaf fleabane (*Conyza bonariensis*) has become one of the most troublesome weeds in the northern cropping region. Rarely encountered only 15 years ago, it has become a major weed with the widespread adoption of zero and reduced tillage.

Poor control achieved from single applications of glyphosate (alone or in mixtures) has resulted in growers needing to look at different techniques to manage this weed. There is increased use of residual herbicides, both in winter crop and in fallow, whilst double-knock strategies including Sprayseed<sup>®</sup> (paraquat 135 g/L and diquat 115 g/L) or products containing paraquat 250 g/L alone are becoming more widely used for post emergent applications. For many weeds, the second 'knock' is used to control survivors from the first application, however for fleabane management the 'combined' effects of the two herbicide applications are actually needed to gain acceptable control.

Although double-knock intervals for barnyard grass management show most consistent results when the second knock is applied less than ~1 week after the glyphosate, current recommendations and commercial experience indicate longer intervals are more effective for fleabane.

## Project aims

1. Evaluate the impact of varying the interval between double-knock applications
2. Assess the impact of droplet size on Sprayseed efficacy
3. Compare the efficacy of Sprayseed and Nuquat<sup>®</sup> (paraquat 250 g/L)
4. Evaluate the impact of Surpass<sup>®</sup> 475 in first knock

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Nuquat® and Surpass® are registered trademarks of Nufarm  
Roundup® is a registered trademark of Monsanto

## **Results in a nutshell**

### **Double-knock timing:**

- *Of the three intervals examined, 10-12 day delay provided best results*
- *Useful rain event just prior to 12 day application may have improved results for final application at Edgeroi site*
- *2 day delay provided poorest weed control at both sites*

### **Double-knock droplet size:**

- *Clear improvement in control when Sprayseed applied in Fine droplets*

### **Herbicide selection:**

- *Clear improvement in control when Surpass 475 added to Roundup CT in first knock*
- *Nuquat applied in coarse droplets resulted in equivalent efficacy to Sprayseed, in fine droplets, in both trials*

### **Overall:**

- ***Delays of 10-12 days provided best fleabane control (NB this differs from barnyard grass experience where shorter delays are more consistent)***
- ***Clear benefit using Fine droplets for Sprayseed application***
- ***Paraquat alone provided effective control. If consistent, would reduce herbicide cost or allow a higher second-knock product rate to be applied***
- ***Clear benefit from addition of 2,4 D to Roundup CT in controlling this weed***

## Trial design

Two small plot trials were conducted in summer 2008/09 evaluating the double-knock technique against fleabane in fallow. Fleabane growth stages were advanced at both sites with plants generally ~10-50 cm tall and flowering. Both sites represented a very tough situation for fleabane management.

Roundup® CT (glyphosate 450g/L) was always applied at 1.5 L/ha together with 0.5 % LI700. The impact of Surpass 475 (475 g/L 2,4-D amine) in the first knock was evaluated at 1.0 L/ha in both trials. Sprayseed and Nuquat were both applied at 1.6 L/ha as the second-knock products. All treatments were applied in a total volume of ~71 L/ha with Roundup CT and Nuquat applications through AIXR110015 (coarse droplet) nozzles. Sprayseed applications were made with either coarse or fine droplets by changing from AIXR to XR110015 (fine droplet) nozzles.

### Key treatments applied

Treatments				Double-knock droplet size
Timing 1 0 DAA1	Timing 2 2 DAA1	Timing 3 5-6 DAA1	Timing 4 10-12 DAA1	
Roundup CT		Sprayseed		Coarse
Roundup CT + Surpass 475	Sprayseed			
		Sprayseed		
	Sprayseed		Sprayseed	
		Sprayseed		
			Sprayseed	Fine
		Nuquat		Coarse

DAA1 = days after application Timing 1

Roundup CT at 1.5 L/ha, Surpass 475 at 1.0 L/ha, LI700 at 0.5% was added to all Roundup CT treatments, Sprayseed and Nuquat both at 1.6 L/ha

Spray intervals of 2, 5 and 12 days were evaluated at site 1 (Edgeroi) and 2, 6 and 10 days at site 2 (Moree).

## Assessment

1. **Weed control:** visual biomass reduction ~21 days after Timing 1 with visual % control at ~37-42 days after Timing 1



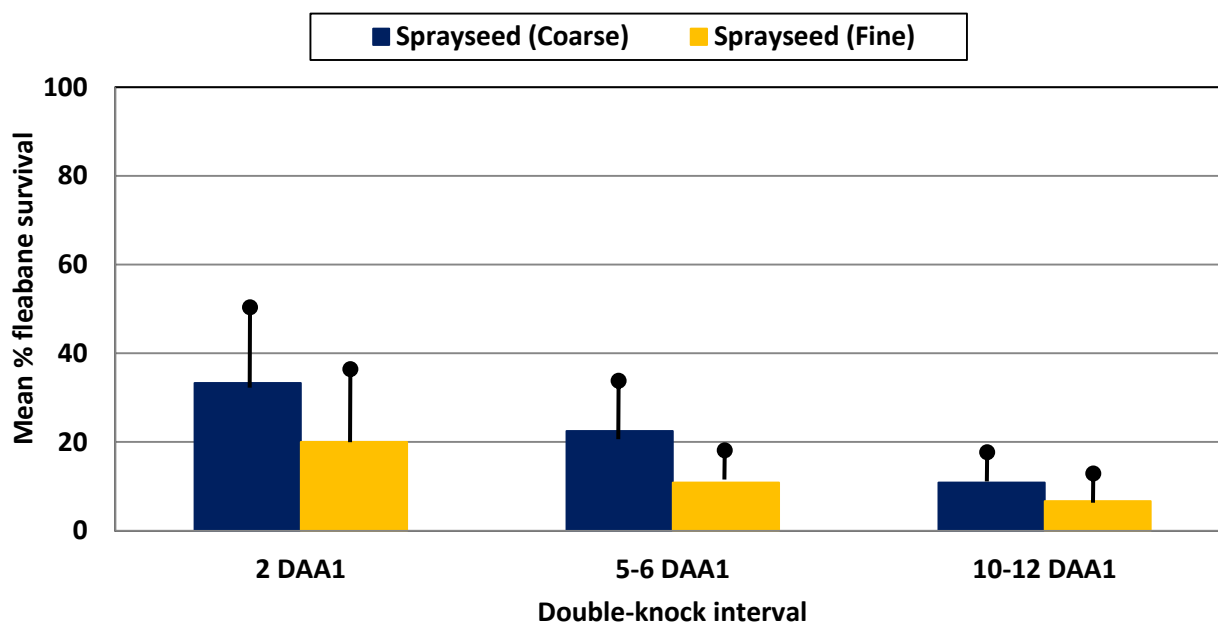
*Edgeroi, 17 Dec 2008, Untreated weed density and growth stage 0 DAA1*

## Multi-trial summary

Due to the large number of treatments applied, results are presented in two groups:

- Comparison of Sprayseed double-knock timings and the impact of droplet size
- Impact of herbicide selection in each application

## Double-knock timing and droplet size

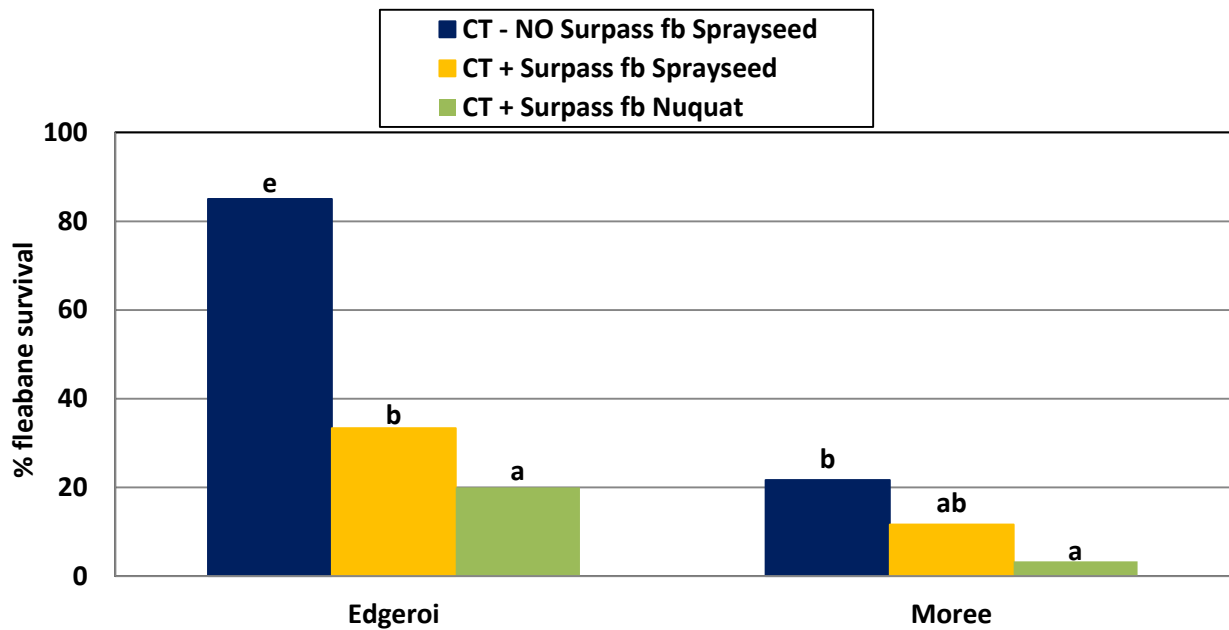


DAA1 = days after application Timing 1, Range bars show worst result  
NB 40 mm rainfall fell at site 1 between 7-11 DAA1, no rain at site 2 between applications but 80 mm 1 day after last double-knock timing

## Key messages – double-knock timing and droplet size

- Clear trend to poorer control from 2 day delay with best result at 10-12 days
- On large weeds, clear trend to **improved** control with **fine droplets**
- Good result from 10-12 day delay considering weed size

## Impact of herbicide selection



CT fb = Roundup CT 1.5 L/ha followed by Sprayseed/Nuquat at 1.6 L/ha, Surpass 475 at 1.0 L/ha

All double-knock treatments applied with Coarse droplets at 5-6 DAA1

Treatments (within each site) sharing the same letter are not significantly different

## Key messages – impact of herbicide selection

- Both trials demonstrated benefit of Surpass 475 addition to Roundup CT
- Nuquat (paraquat only) provided equal or improved efficacy compared to Sprayseed (paraquat + diquat) when both applied at 1.6 L/ha

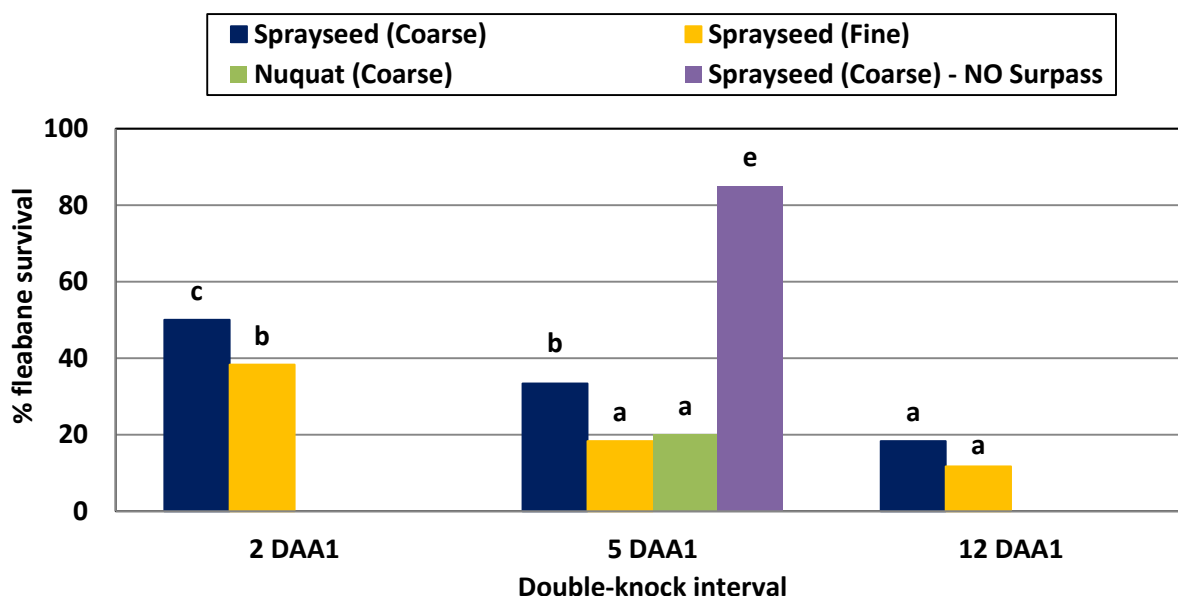
## Individual trial results 2008/09

**Trial number:** CFT0804  
**Site:** 'Old Edgeroi' Edgeroi  
**Co-operator:** Paul Owens

Timing 1: 17/12/2008  
Timing 2: 19/12/2008 (2 DAA1)  
Timing 3: 22/12/2008 (5 DAA1)  
Timing 4: 29/12/2008 (12 DAA1)

Large flowering fleabane ~10-50 cm tall, 40 mm rainfall between 7-11 DAA1

### Fleabane control in fallow (42 DAA1)



Treatments sharing the same letter are not significantly different  
Roundup CT applied at 1.5 L/ha, Surpass 475 applied at 1 L/ha, Sprayseed/Nuquat at 1.6 L/ha

- Efficacy of double knock increased with increasing spray interval
- Rain between 7-11 DAA1 may have favoured final application
- Fine droplets improved control with Sprayseed
- Poor performance of double-knock when Surpass 475 omitted
- Nuquat in coarse droplets provided similar control to Sprayseed with fine droplets



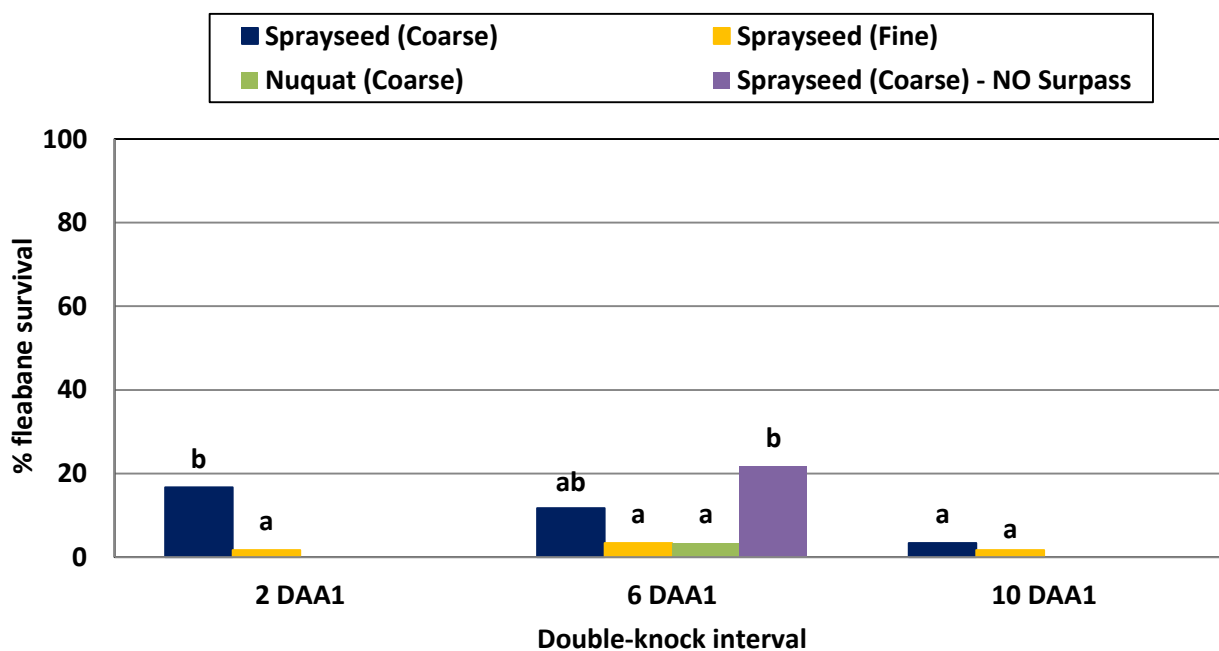


**Trial number:** CFT0805  
**Site:** 'Marlen' Moree  
**Co-operator:** Joanne Humphries

Timing 1: 3/2/2009  
Timing 2: 5/2/2009 (2 DAA1)  
Timing 3: 9/2/2009 (6 DAA1)  
Timing 4: 13/2/2009 (10 DAA1)

Large flowering fleabane ~10-60 cm tall, 140 mm rainfall between 11-14 DAA1

**Fleabane control in fallow (37 DAA1)**



Treatments sharing the same letter are not significantly different  
Roundup CT applied at 1.5 L/ha, Surpass 475 applied at 1 L/ha, Sprayseed/Nuquat at 1.6 L/ha

- Good to excellent levels of fleabane control in this trial
- Double knock efficacy improved with increasing spray interval for Sprayseed in coarse but not fine droplets
- Fine droplets improved control with Sprayseed
- Poorer performance of double-knock when Surpass 475 omitted
- Nuquat in coarse droplets provided similar control to Sprayseed with fine droplets