



## Role of controlled release nitrogen in improving N-efficiency



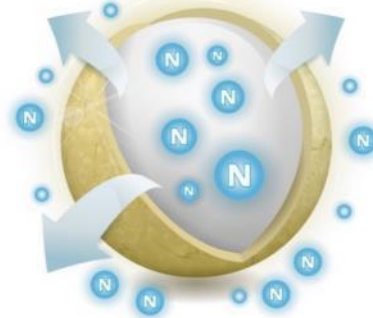
- Urea is coated with a polymer or resin;
- The coating controls (slows) the uptake of moisture from soil and controls the release of nitrogen;
- The crop is continuously fed nitrogen for 3 to 6 months (depending on product chosen).



Soil moisture  
absorbed by  
granule



Nutrients  
dissolve

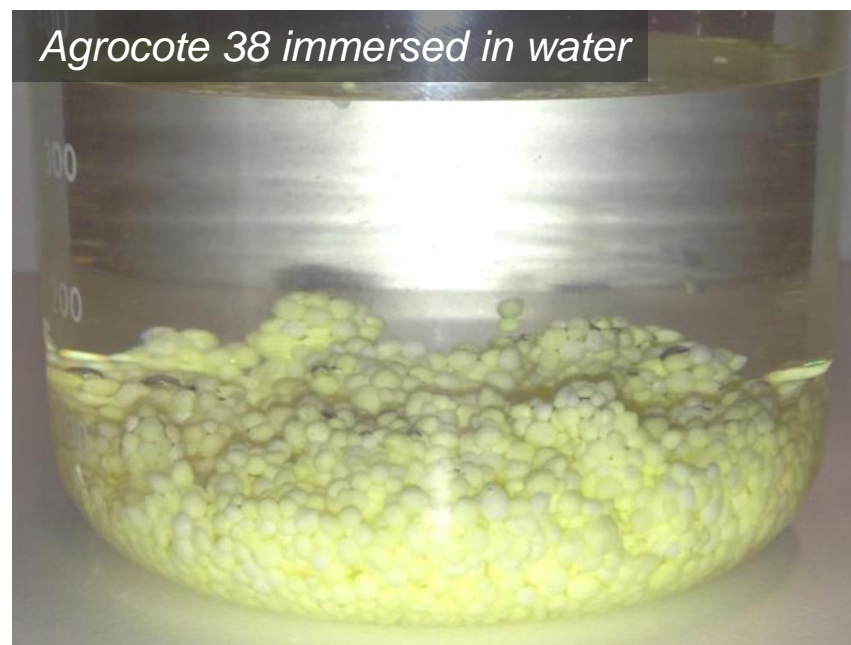


Nutrient slowly  
released to  
crops

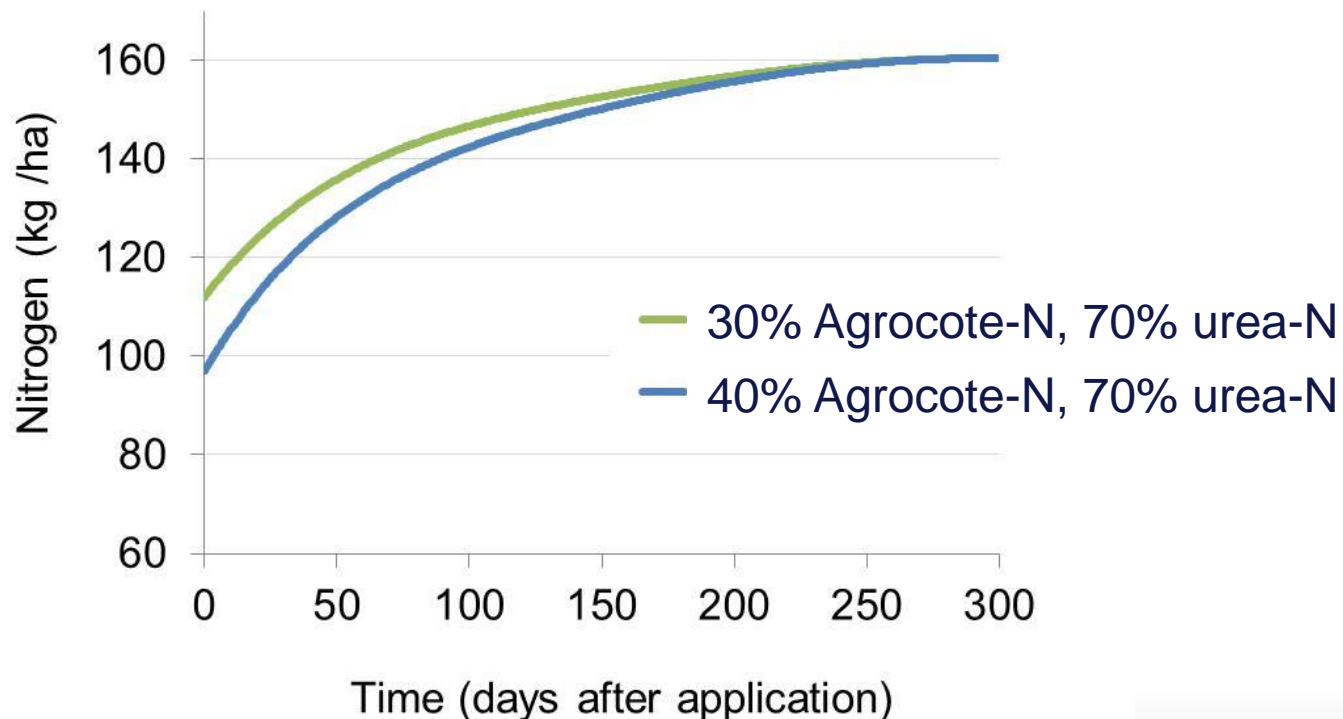
- Conventional fertiliser dissolves on contact with water
- Agrocote continuously releases nitrogen over 3-6 months

Analysis	Longevity <sup>†</sup> (months)
Agrocote 39	3
Agrocote 38	4
Agrocote 37	6

<sup>†</sup> Longevity is time to 80% N release



- Based on 160 kg N/ha with 30% and 40% coated N (Agrocote 38);
- 97 to 112 kg N immediately available from uncoated urea;
- 47 to 62 kg N released through the season from Agrocote.





- Where there is significant nitrogen loss from conventional fert:

e.g. wet soil soon after fertiliser application (December), high loss environment for conventional-N

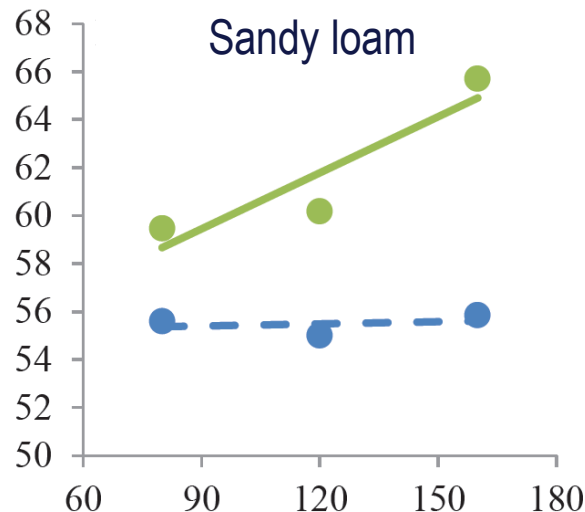
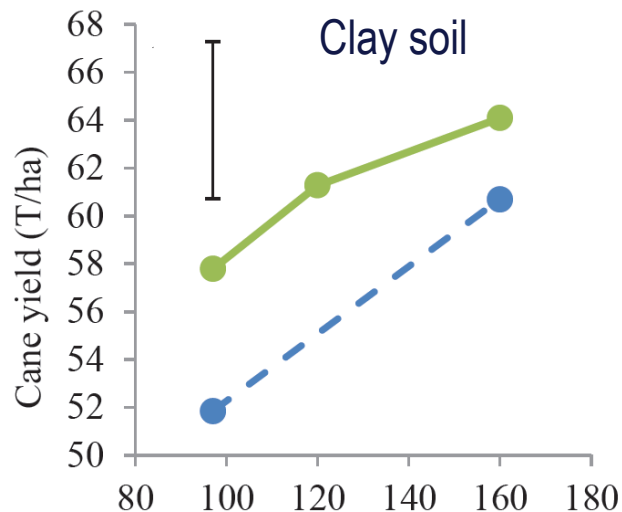


100 kg Agrocote-N

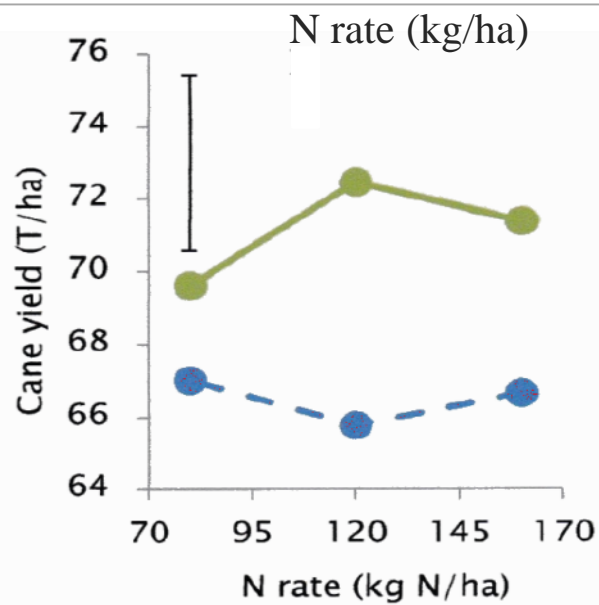
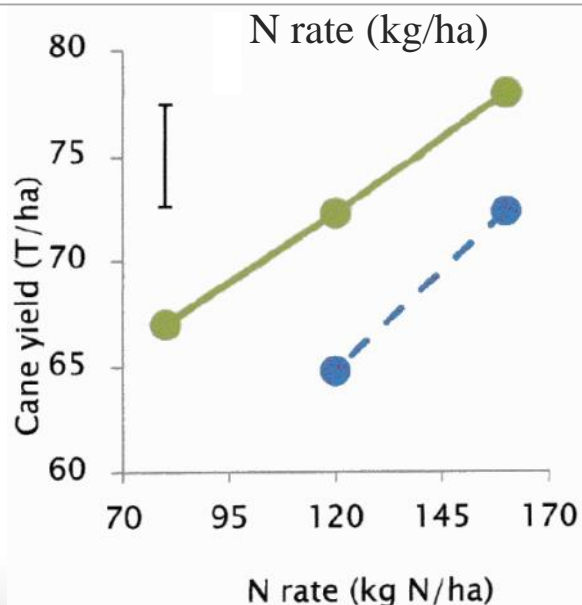
100 kg Urea-N

# Initial yield responses in the Herbert

Wet season  
2012



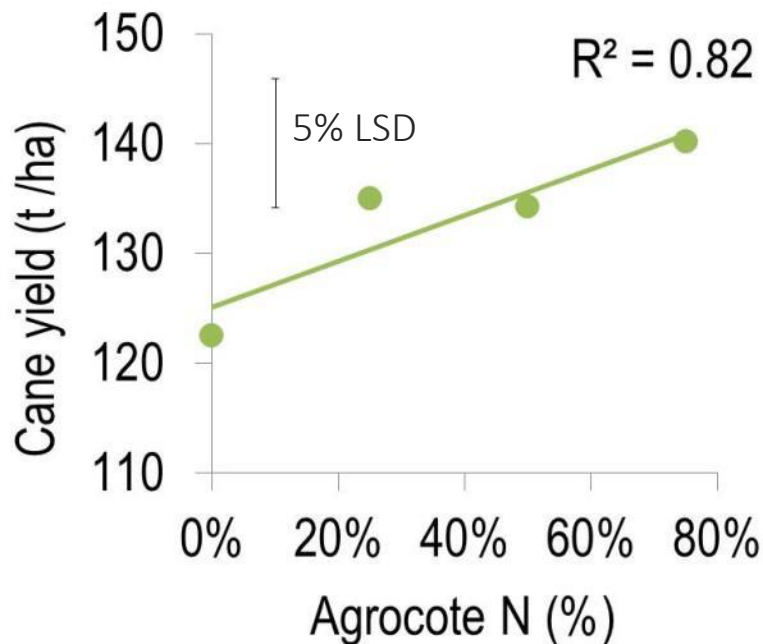
- Urea
- Agrocote



Dry first  
2 months  
2013

# Burdekin trial run by Farmacist

- 200 kg N/ha on 1<sup>st</sup> ratoon
- Flood irrigation, delta soil
- Significant ( $P \leq 0.05$ ) 18 t/ha yield increase with Agrocote blends versus urea
- Measurable response with only 25% controlled release N



Fertiliser	Net return (\$/ha)
Urea	\$3,920
Agrocote 25% blend	\$4,380
Agrocote 50% blend	<b>\$3,765</b>
Agrocote 75% blend	<b>\$3,788</b>

- Efficiency from controlled release has been well established across multiple crops and soils:

Crop	Reduced	Change in N loss	Reference
Potato*	Leaching	70% ↓	<i>J Plant Nut.</i> , 29, 1301–1313 (2006)
Potato	Leaching	50% ↓	<i>J Environ Qual.</i> 32(2), 480-9 (2003)
Rice	Denitrification	80% ↓	<i>Fertilizer Res.</i> 39: 147-152 (1994)
Citrus	Leaching	40-89%↓	<i>Soil Sci. Soc. Am. J.</i> 65:914–921 (2001)
Potato*	Surface runoff of N	31-54%↓	Worthington C, Ph.D thesis, University of Florida, (2006)
Sugarcane*	Denitrification	10 kg ↓	Moody <i>et al.</i> unpublished research
Sugarcane*	Denitrification	20 kg ↓	Moody <i>et al.</i> unpublished research

\* *Trials tested Agrocote specifically*



# Denitrification testing, DSITIA

Measurement chambers



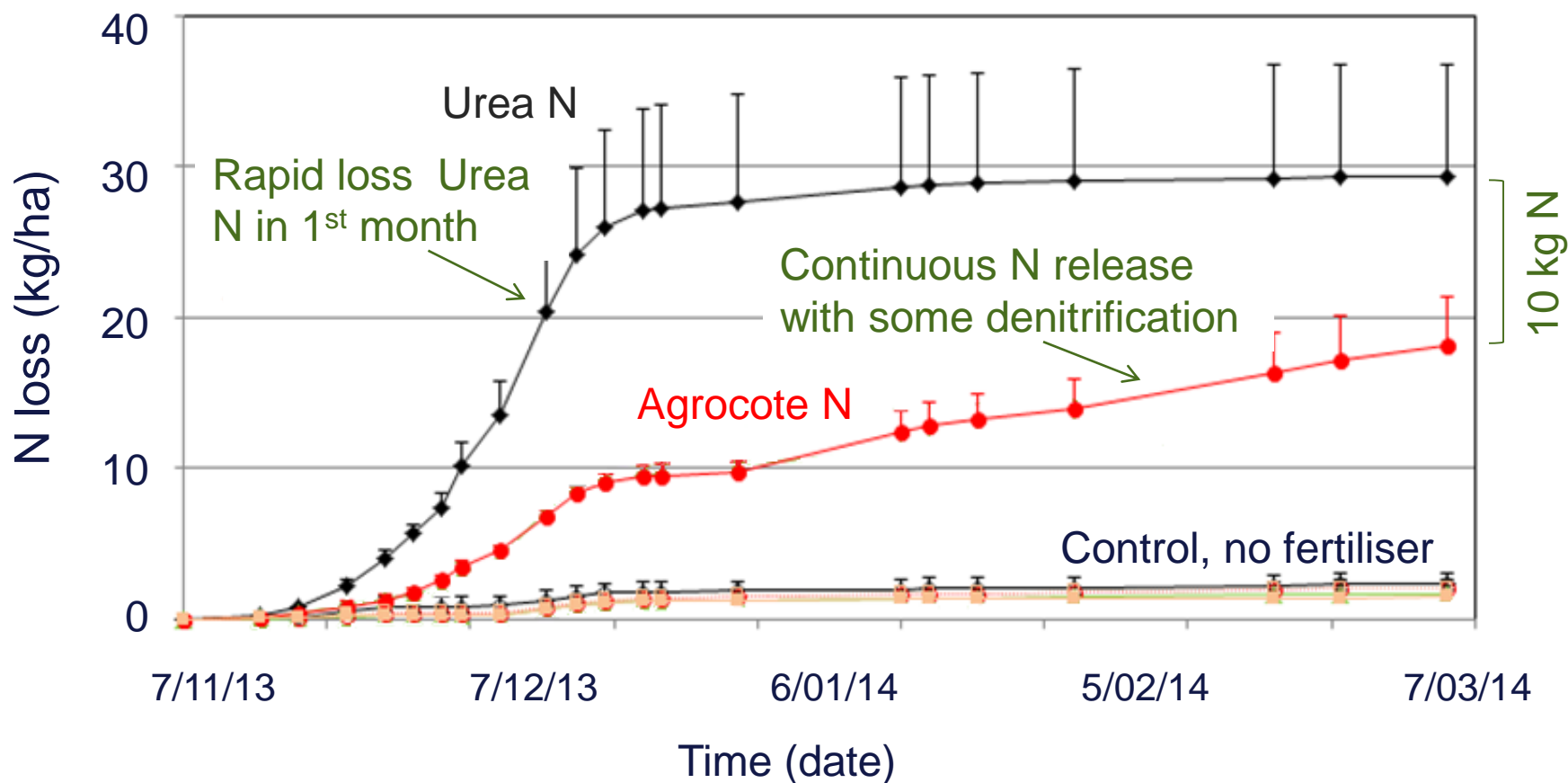
Autosampler



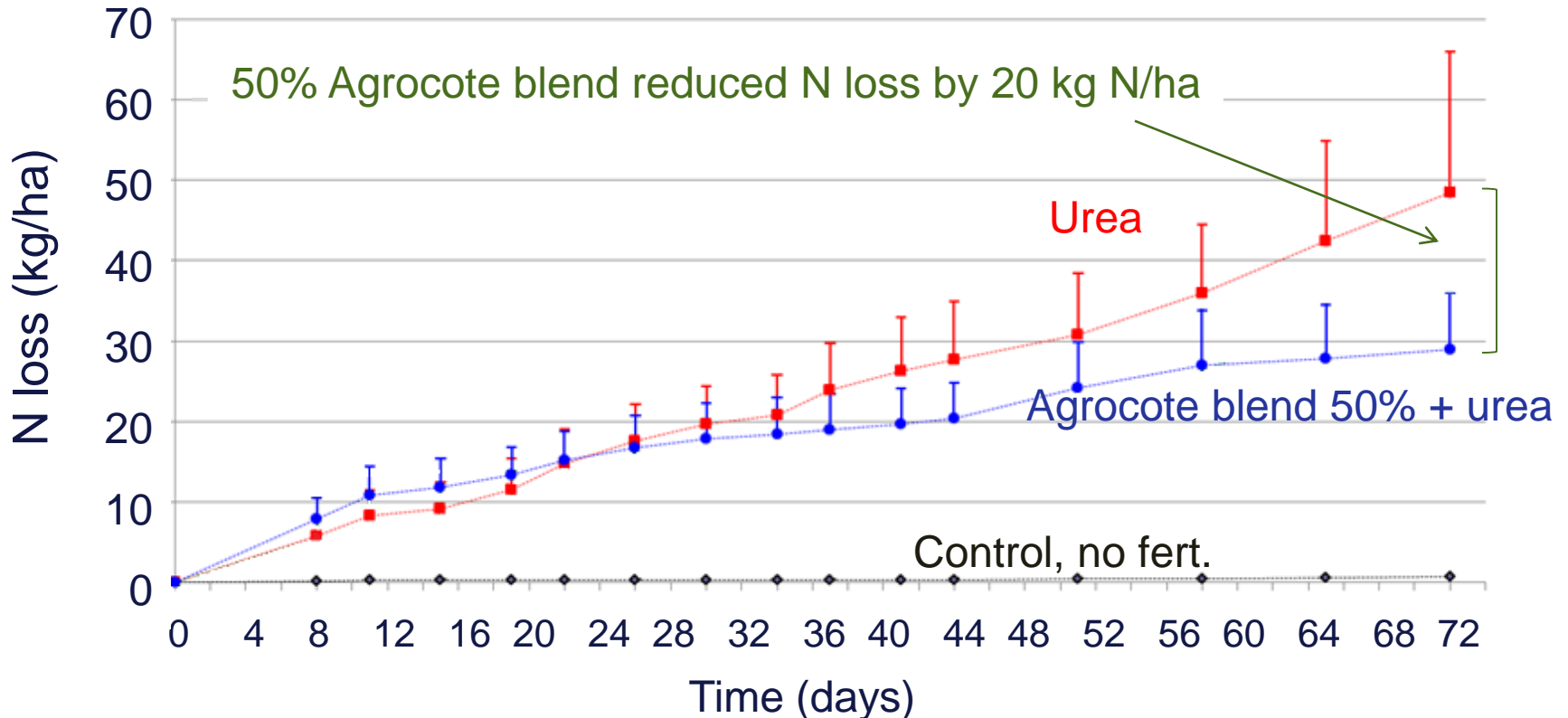


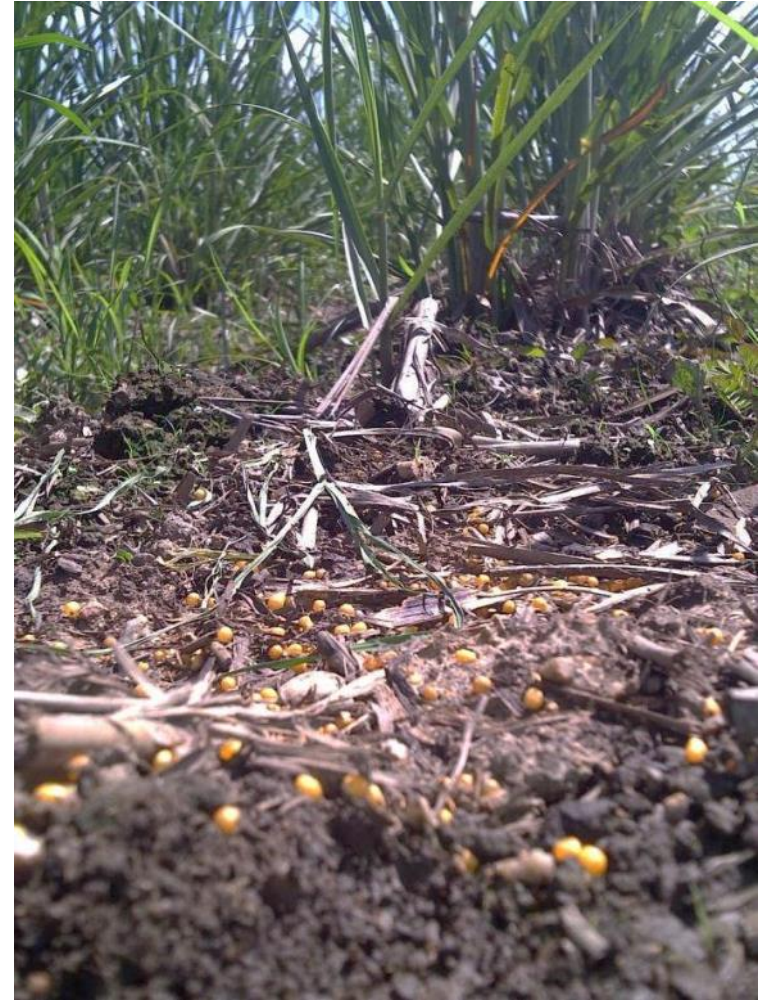


- *Moody P, Wang W & Pu G (2014), unpublished data, DSITIA.*
- 120 kg N applied.



- *Moody P, Wang W & Pu G (2014), unpublished data, DSITIA.*
- 180 kg N/ha application rate as 50% Agrocoate blend

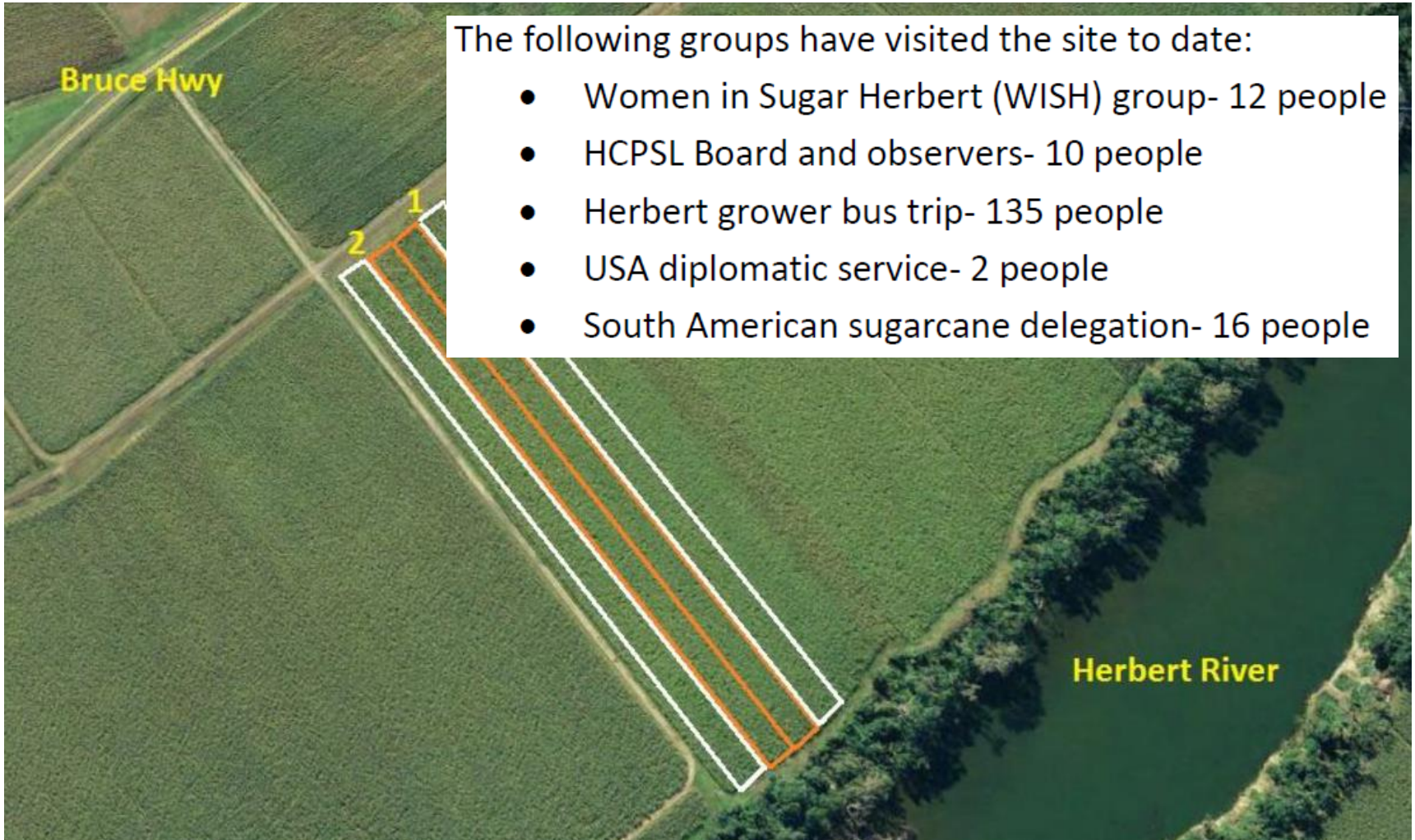






- Demonstration trial to collect surface runoff
- Measures flow rate and samples surface water N content
- Some technical difficulties but results expected April 2015







- Controlled release applied in Oct/Nov can supply N until April;
- Has increased cane productivity where N losses from conventional fertiliser are significant;
- Significant reduction in denitrification loss, e.g. 20 kg N/ha saved using a 50% AgroCote blend in the Burdekin;
- Ongoing research looking at effects on runoff and leaching of N.

