NSW GOVERNMENT | **Local Land Services** Hunter

Nitrogen Use Efficiency.

MCDDG Group
Feb 2nd 2016

Peter Beale,

SLSO Pastures, Taree

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Thanks too....

- Marguerite White and Dairy Australia
- NHP funding
- James Neal
- Kevin Williams and Allan Mudford
- PGGWrightsonseeds
- LLS Support
- Elders Scot Burley
- Josh Hack Dairy Australia
- Support Group – Yani, Neil, Richard etc

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Issues

- Variation in N prior to sowing ryegrass
- Impact of kikuyu on ryegrass
  - Trash
  - N rate
  - Leaching on permeable soils
  - Soil moisture on growth
- Transition Issues
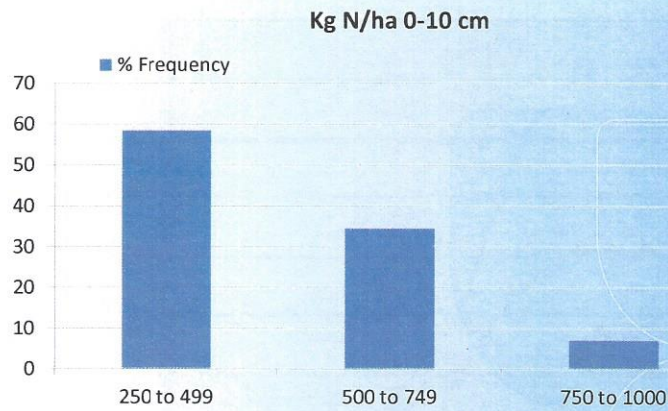 - N rates
  - Insects

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Further Issues

- How do we measure all that?

- Soil Tests
- Tissue Tests

  Optical Senses: – Urine stains to Paddock?

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Landscan 2014: Total Soil N – 0 to 10 cm
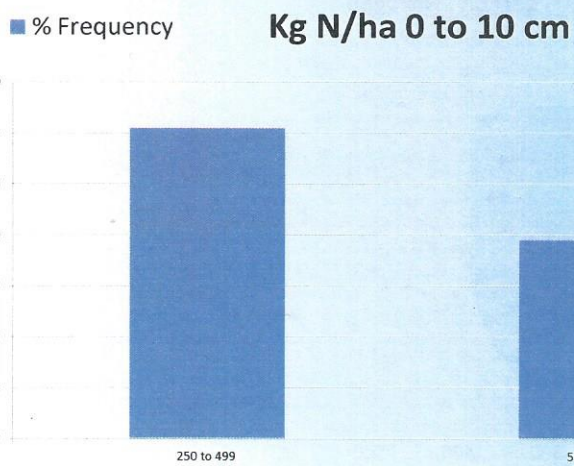
Kg N/ha 0-10 cm

■ % Frequency

Bar chart with y-axis from 0 to 70 (increments of 10). Categories on x-axis: 250 to 499 (~58%), 500 to 749 (~35%), 750 to 1000 (~7%).

113 samples taken March April 2014

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Fert$mart 2015: Total Soil N – 0 to 10 cm

■ % Frequency   **Kg N/ha 0 to 10 cm**

Bar chart with y-axis from 0 to 70 (increments of 10). Categories on x-axis: 250 to 499 (~61%), 500 to 750 (~39%).

64 samples

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Figure 3:
Predicted total and monthly nitrogen (N) release from the soil organic matter in two soils differing in organic carbon (C) contents.
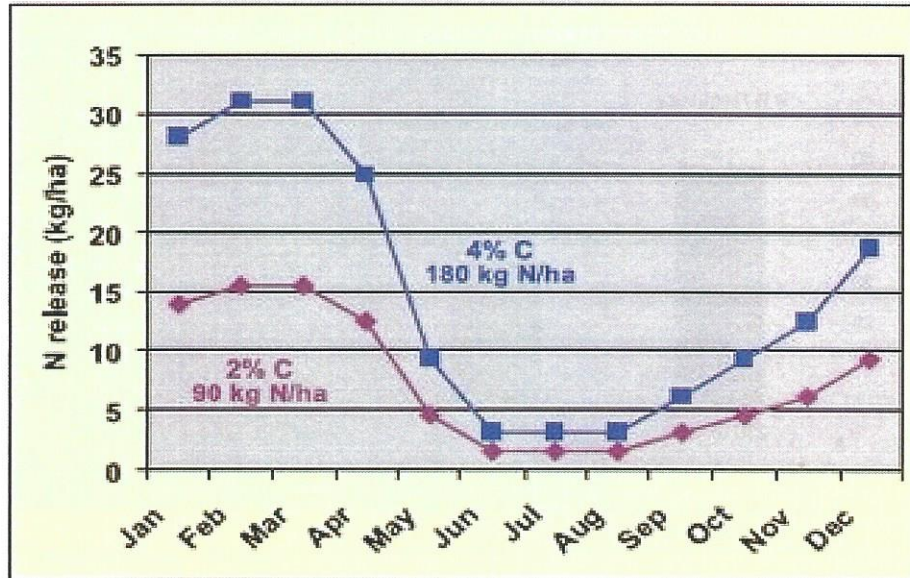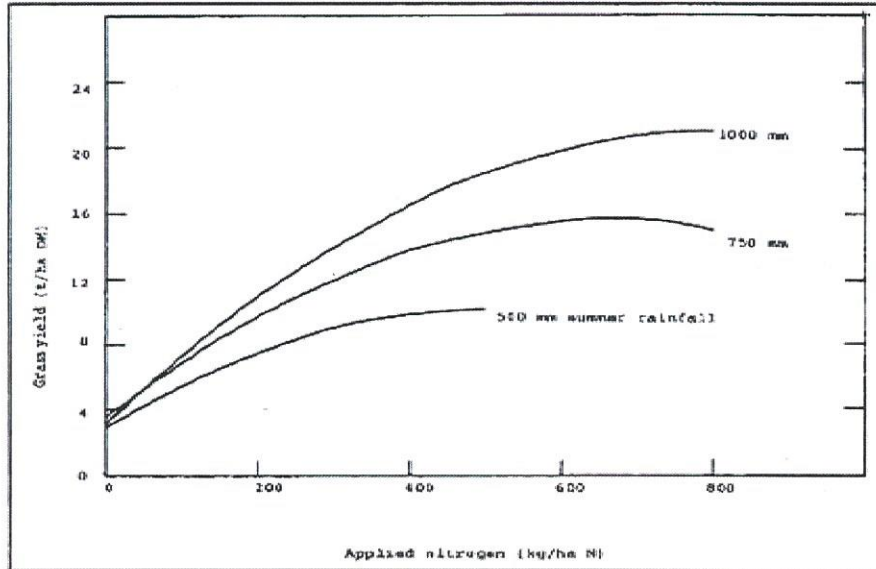

N availability related to C:N
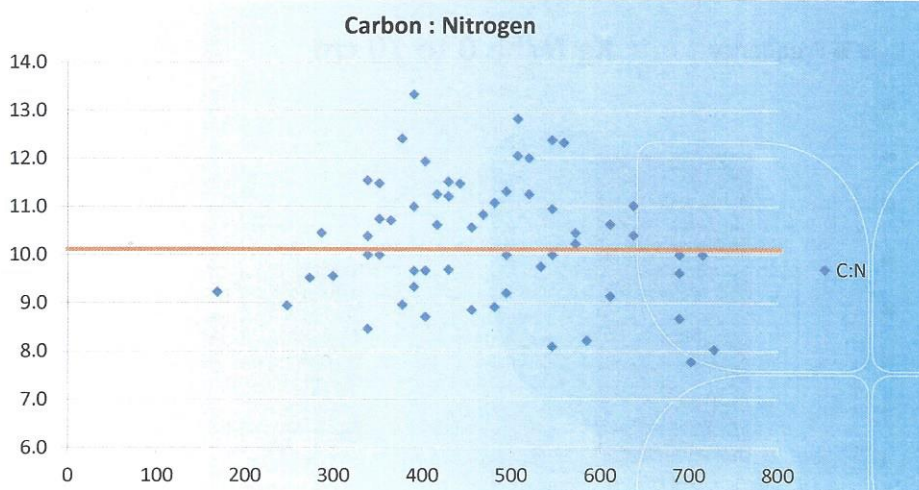
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Figure 1 Relationships between grass yield, nitrogen supply and summer rainfall in the subtropics and tropics of Queensland, Australia. (Unpublished and published data collated from 31 sites provided by the authors, D.A. Ivory, C.P. Miller, and R.T. Cowan)
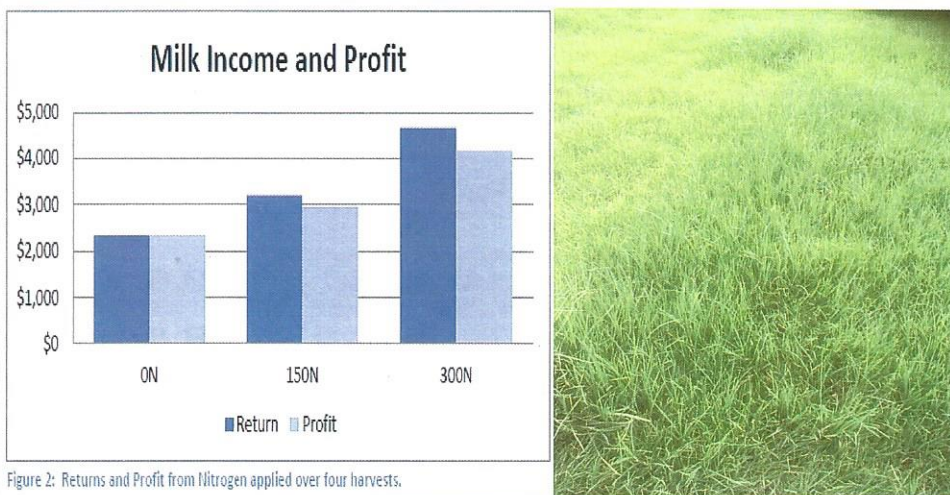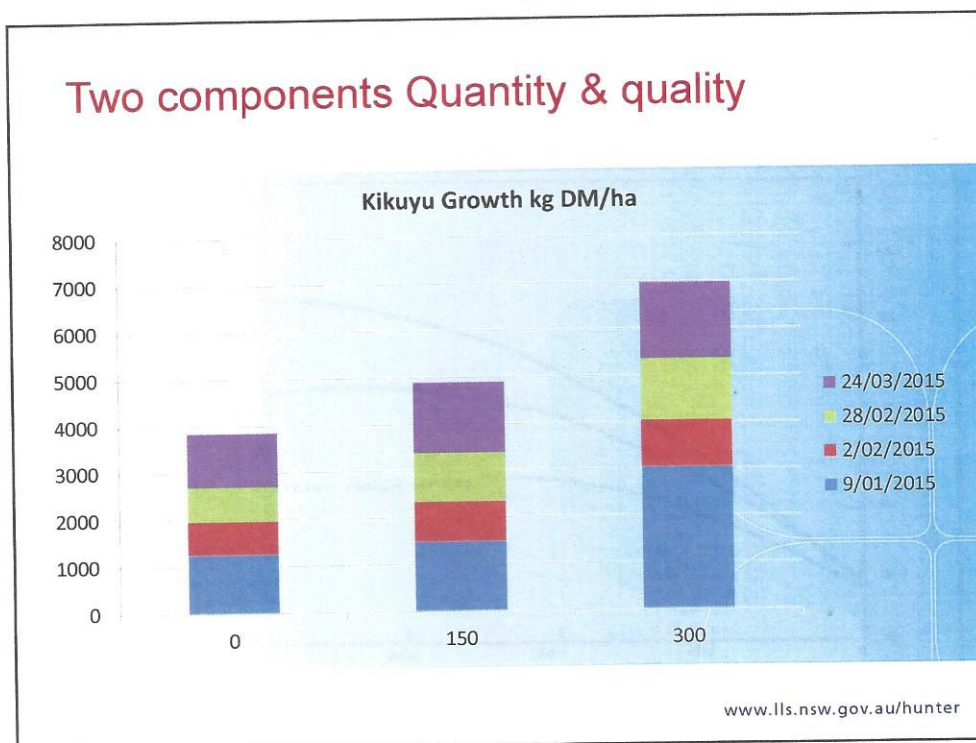

Nitrogen Rate over kikuyu phase

Figure 2: Returns and Profit from Nitrogen applied over four harvests.

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Two components Quantity & quality

Kikuyu Growth kg DM/ha

Legend:
- ■ 24/03/2015
- ■ 28/02/2015
- ■ 2/02/2015
- ■ 9/01/2015

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Low N – insufficient leaf growth by 4.5 leaf

N Rate (Kg N/ha)	Metabolisible Energy Mj ME/kg DM		
	0	150	300
9/1/2015	7.7	8.1	8.5
2/2/2015	7.9	8.0	8.6
28/2/2015	8.1	8.6	8.8
24/3/2015	8.2	9.1	9.0
Ave ME	8.0	8.4	8.7

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NDF Affects

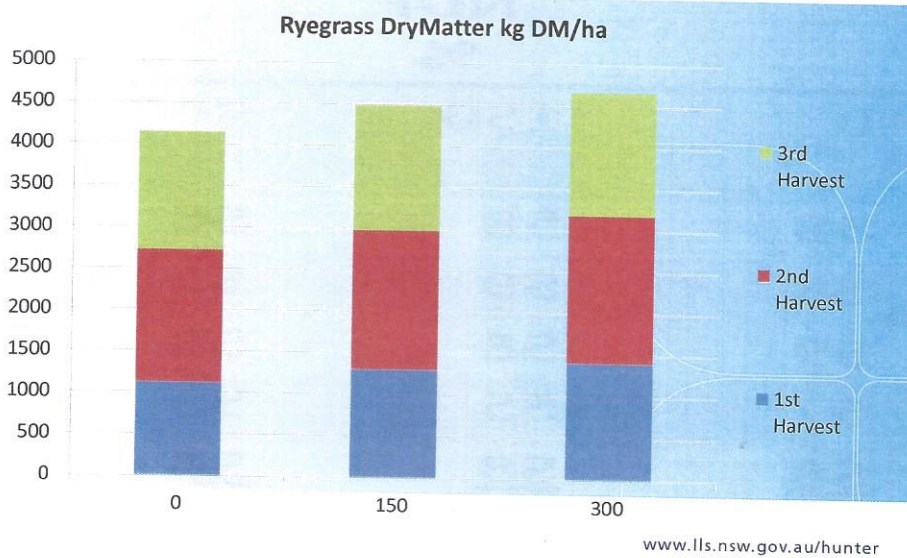| NDF %		
0	**150**	**300**
58	58	56
58	59	57
59	58	58
57	55	55
58	58	56

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Nitrogen Uptake kg N/ha (= leaf N% * DM)
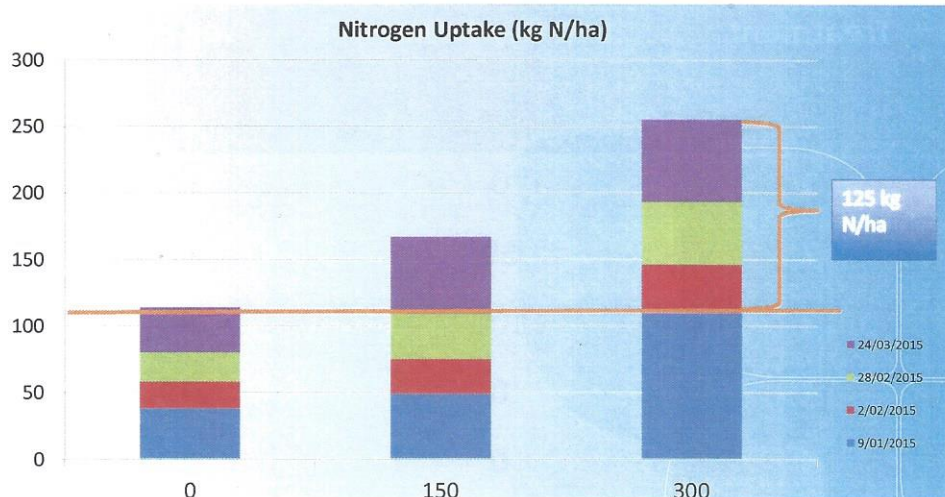
www.lls.nsw.gov.au/hunter
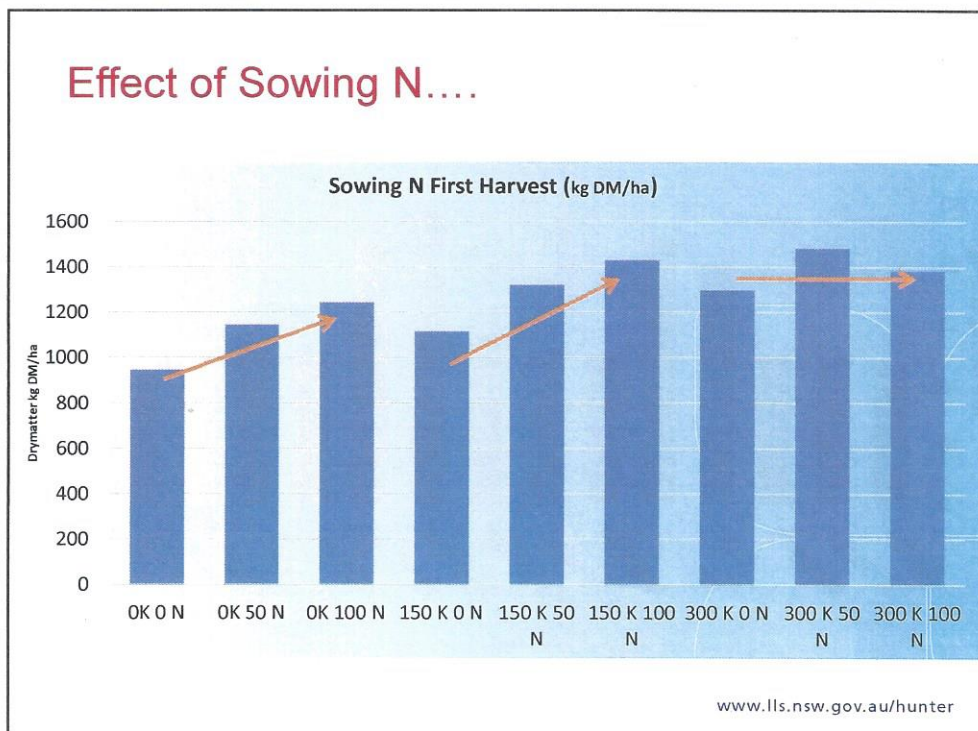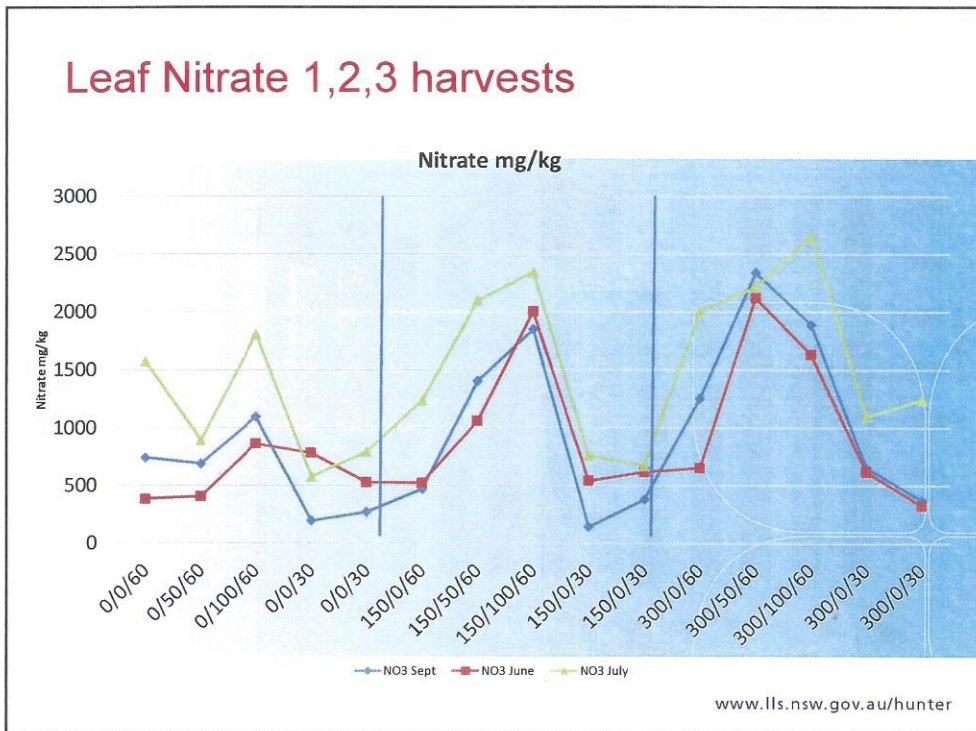
Total Yield – Cuts 1 to 3 higher in high N
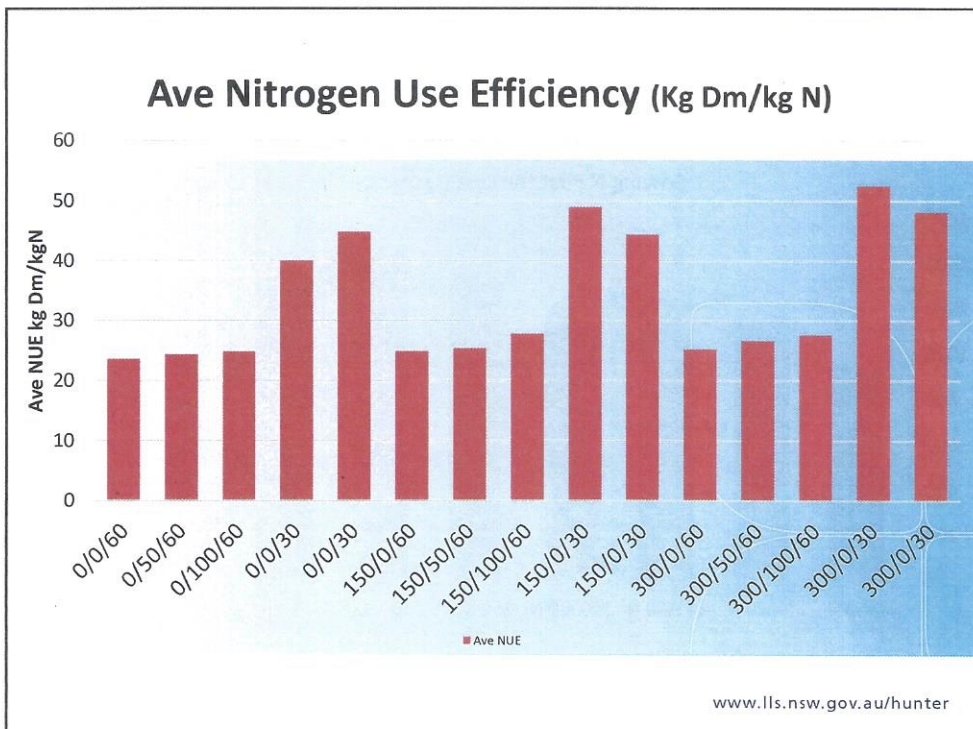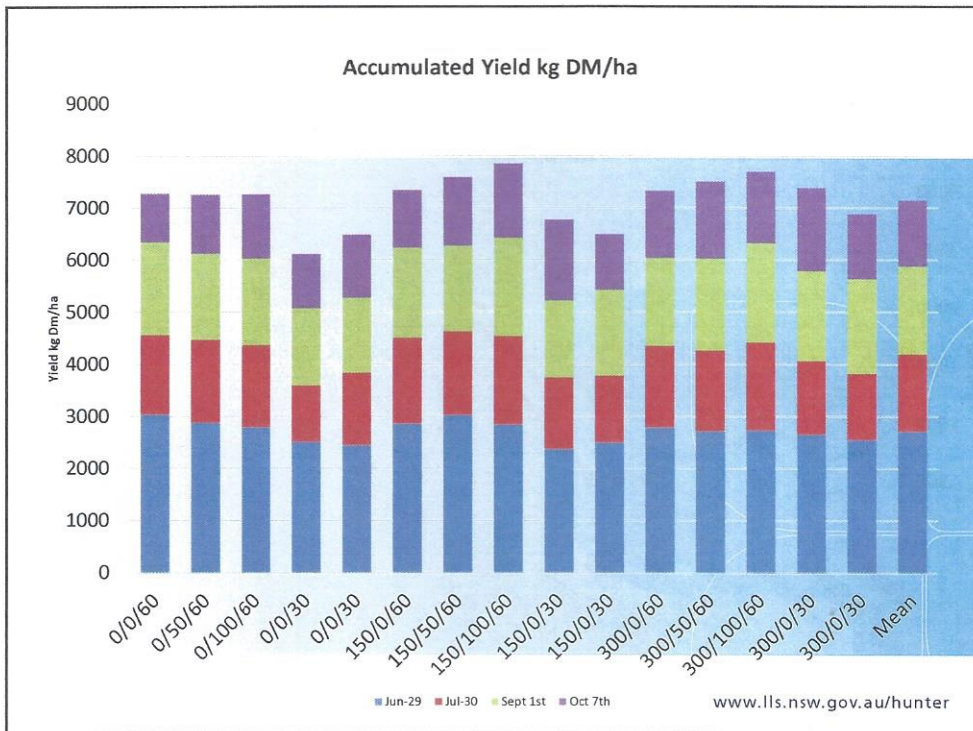
Ryegrass DryMatter kg DM/ha

- 3rd Harvest
- 2nd Harvest
- 1st Harvest

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Ryegrass Treatments

Treatment	At Rye Sow	Veg Rye
1	0	60
2	50	60
3	100	60
4	0	30
5	0	30

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Leaf Nitrate 1,2,3 harvests

Nitrate mg/kg

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Effect of Sowing N....

Sowing N First Harvest (kg DM/ha)

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Accumulated Yield kg DM/ha

Ave Nitrogen Use Efficiency (Kg Dm/kg N)

Trash or stubble management

- Spraying vs Mulching
  - Decomposition of stubble releases N
  - Reduced N demand from kikuyu

- Bulk left to decompose
- C:N ratio

- Leaching on permeable soils

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Soil Moisture – N use and demand

- High rainfall - high growth – low N reserves
- Low Rainfall – low growth – excess N for Rye

Figure 1   Relationships between grass yield, nitrogen supply and summer rainfall in the subtropics and tropics of Queensland, Australia. (Unpublished and published data collated from 31 sites provided by the authors, D.A. Ivory, C.P. Miller, and R.T. Cowan)
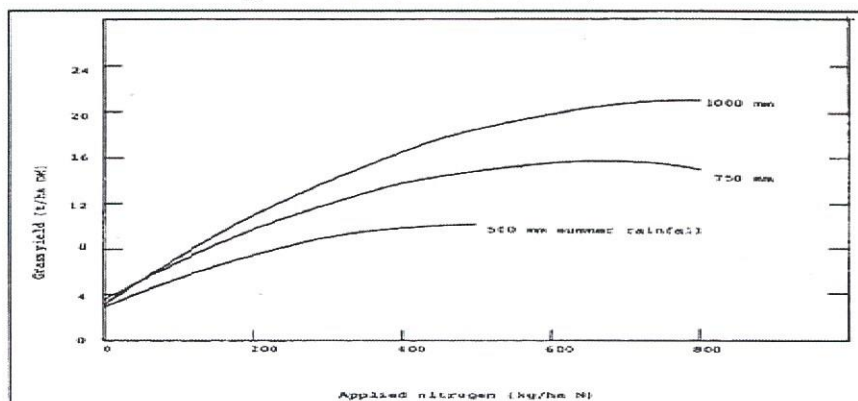
How to measure this

Urine Stains = Control

Ratio of Urine to Paddocks?????

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Transition Issues

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Concord 2 much better establishment.....

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Late Concord held back kikuyu

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