Defoliation severity during late autumn on herbage production, regrowth and N uptake of diverse pastures

GS Cun*, GR Edwards, RH Bryant
grace.cun@lincolnuni.ac.nz

Introduction

- Winter pasture management has a significant impact on the early spring feed supply and pasture growth
  - strategies to increase herbage DM production
- Nitrate leaching losses often high in the autumn/winter
- Herbs such have been suggested as a tool to reduce nitrate leaching losses
- Pastures which grow rapidly after defoliation may have greater potential to increase N uptake during the late autumn period

Objective

Determine the effect of five post grazing heights on herbage production, regrowth and N uptake of a diverse pasture mixture during the late autumn and winter season

Materials and Methods

- May-September 2015 at the Lincoln University Research Dairy Farm (LURDF) in Canterbury, New Zealand

- Site established Oct 2013-drilled with diverse pasture species following cultivation

- April 2015-plots grazed by cows to a compressed height of 35 mm
  - 25 kg N/ha as urea

- Four blocks of five plots (2x4 m) defoliated by a push mower in May to five heights (20, 30, 40, 50, 60 mm) in a RBD

Sowing rate and cultivar

Species	Common name	Cultivar	Sowing Rate (kg/ha)
Lolium perenne	Perennial ryegrass	Arrow AR1	12.0
Trifolium repens	White clover	Weka	3.0
Medicago sativa	Lucerne	Torlesse	8.0
Cichorium intybus	Chicory	Choice	1.5
Plantago lanceolata	Plantain	Tonic	1.5

Herbage sampling and measurements

Regrowth

-0, 22, 41, 64, 90 and 112 days after defoliation treatments

-3 quadrats (0.2 m^2)/plot to ground level

-dried, weighed, grind and analysed for N%

Final herbage yield harvested at 35 mm

-subsample for DM content and N% by NIRS

-herbage yield (kg DM/ha) = (fresh weight x DM%)/area

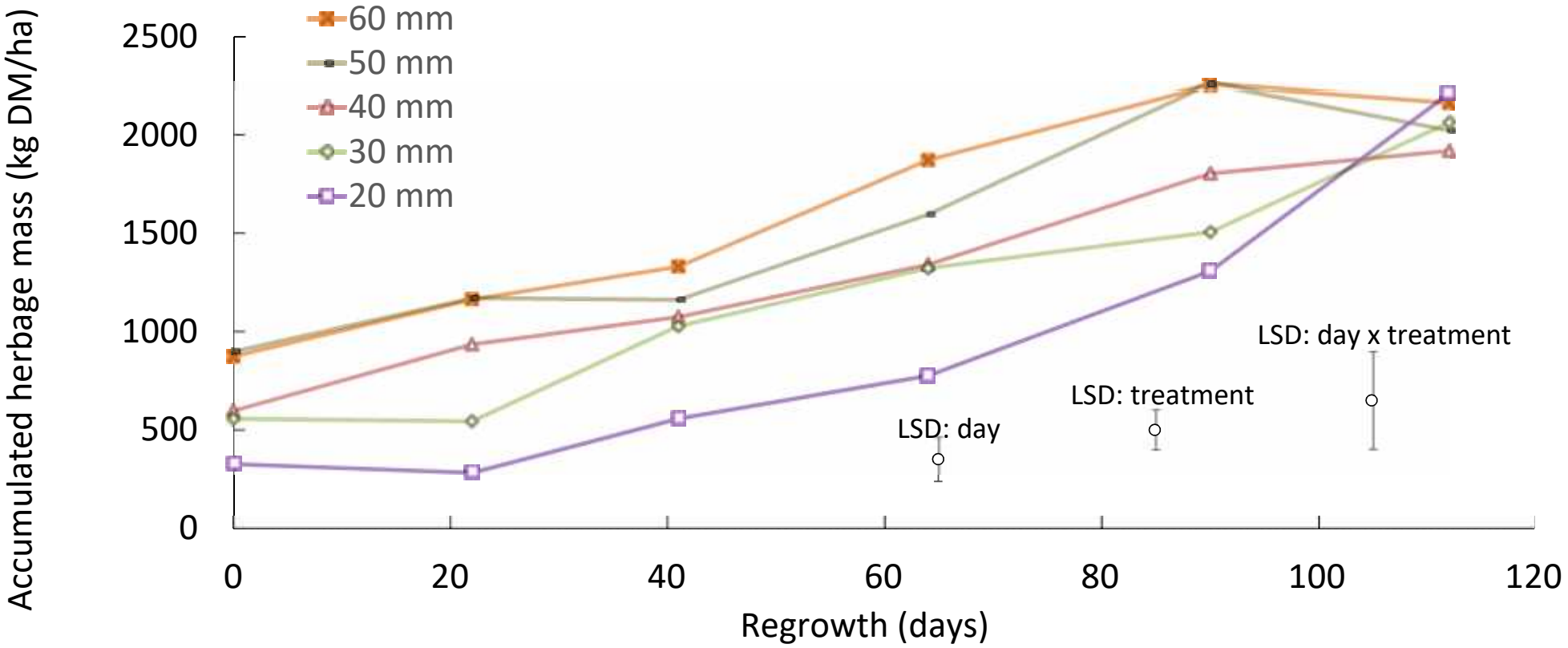
N uptake

-herbage yield x herbage N%

Weather Data

	Regrowth period				
	Days 0-22[a]	Days 22-41	Days 41-64	Days 64-90	Days 90-112
Maximum air temperature (°C)	14.1	12.3	11.7	12.6	11.8
Minimum air temperature (°C)	2.6	1.6	1.1	1.7	3.1
Radiation (MJ/m²)	5.6	4.9	5.2	7.0	7.6
Soil temperature at 100 mm (°C)	5.9	4.3	3.3	4.2	5.8
Total rainfall (mm)	17.6	55.2	25.6	36.2	15.2
[a]Regrowth beginning May 14, 2015					

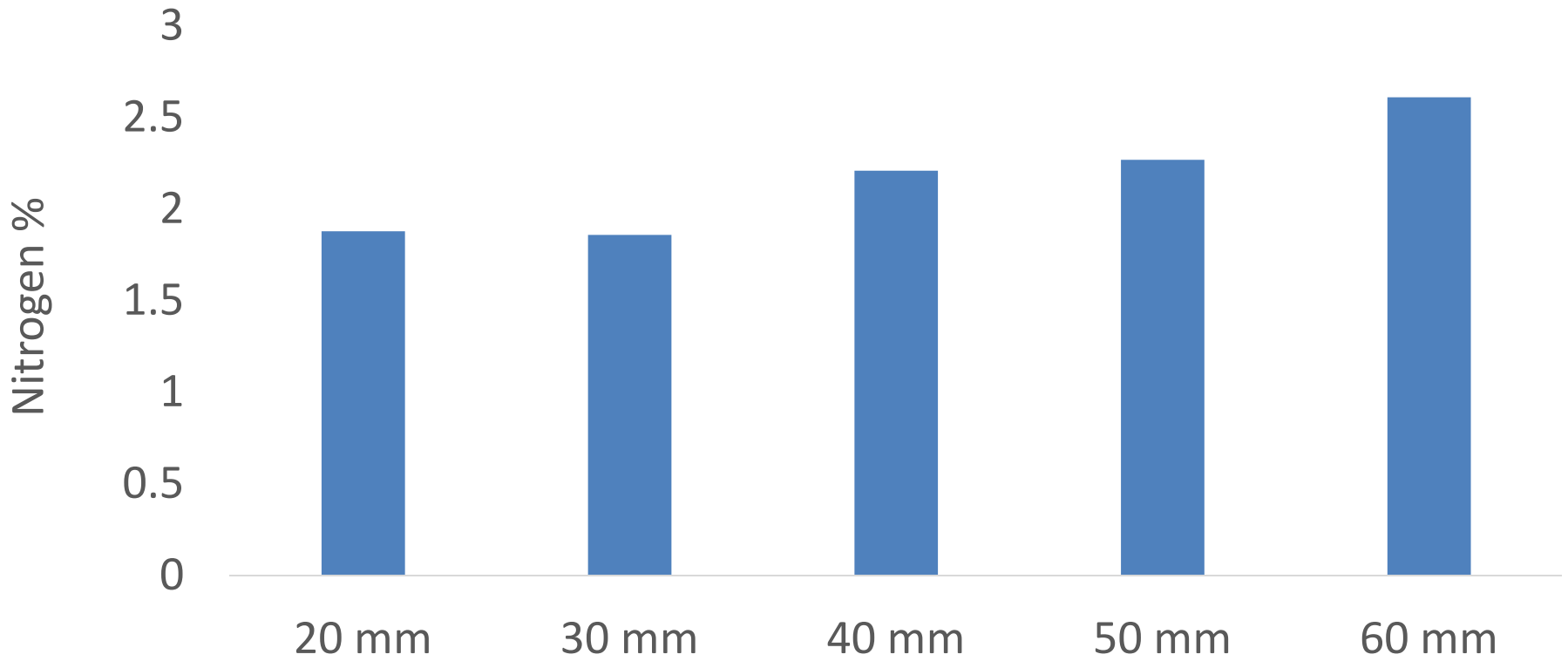
Herbage mass during regrowth of pastures initially defoliated to treatment heights



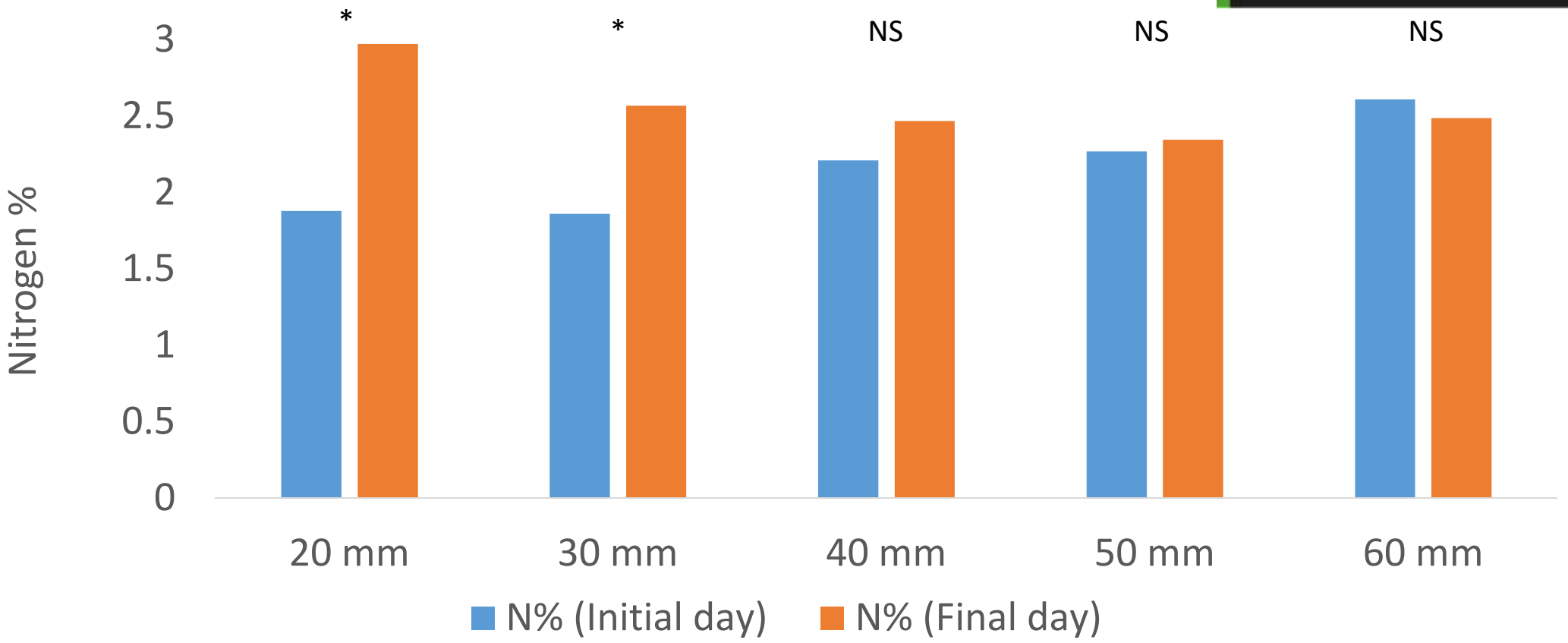
Botanical composition (%)

Defoliation height	Perennial ryegrass	White clover	Lucerne	Chicory	Plantain	Dead	Weeds
20 mm	63.2	4.7[a]	0.2	3.5	19.4	6.6[a]	2.4
30 mm	66.0	5.5[a]	0.0	0.8	14.5	12.4[b]	0.8
40 mm	55.9	13.3[b]	0.2	2.2	13.8	14.1[b]	0.5
50 mm	51.3	7.6 [ab]	1.4	5.5	13.0	19.8[c]	1.5
60 mm	50.9	4.5[a]	0.0	1.5	22.6	16.8[bc]	3.7
P-value	0.18	0.03	0.29	0.16	0.71	<.001	0.46
LSD	15.39	6.06	1.45	4.08	16.02	5.49	3.83

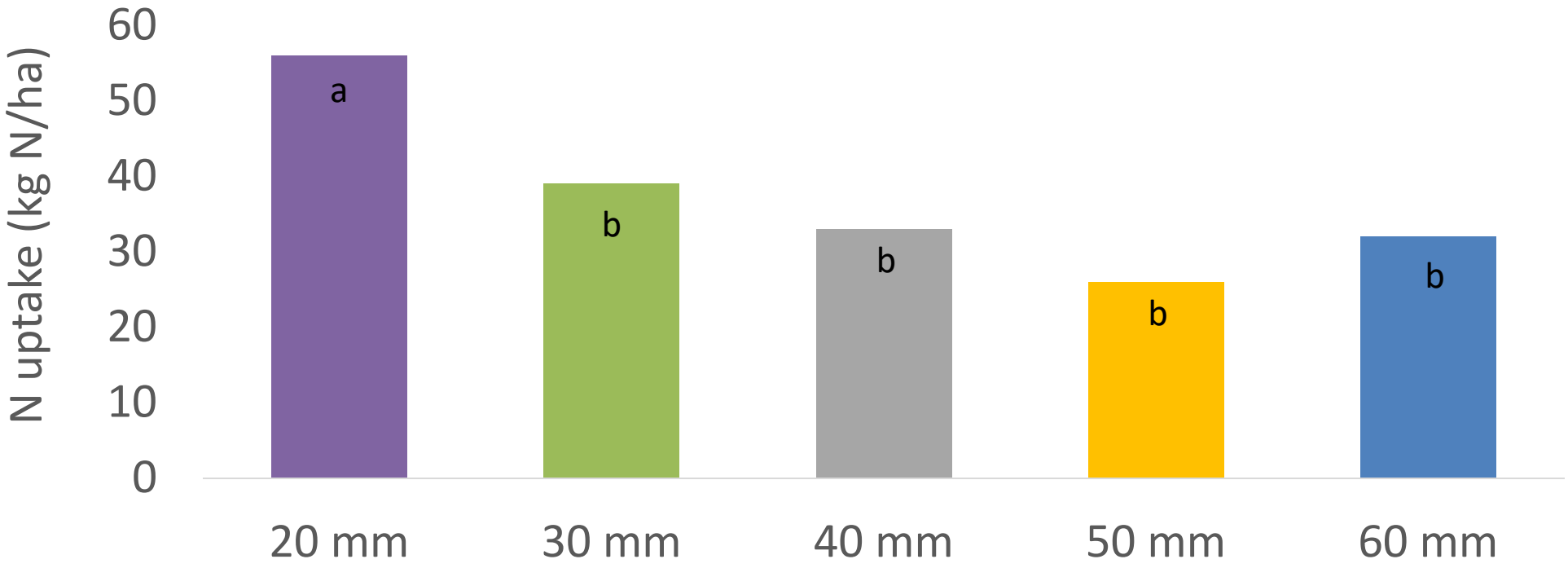
Nitrogen % above ground level on initial day



Nitrogen % above ground level



Nitrogen uptake (kg N/ha) on final day



Conclusions

- Grazing severely to post grazing heights <40 mm may improve growth and N uptake in the late autumn/winter period in diverse pastures

- Consequently minimize nitrate leaching losses with no apparent detrimental effects on herbage DM yield/ha in spring

Acknowledgements

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