Dryland pasture production in response to environmental variables

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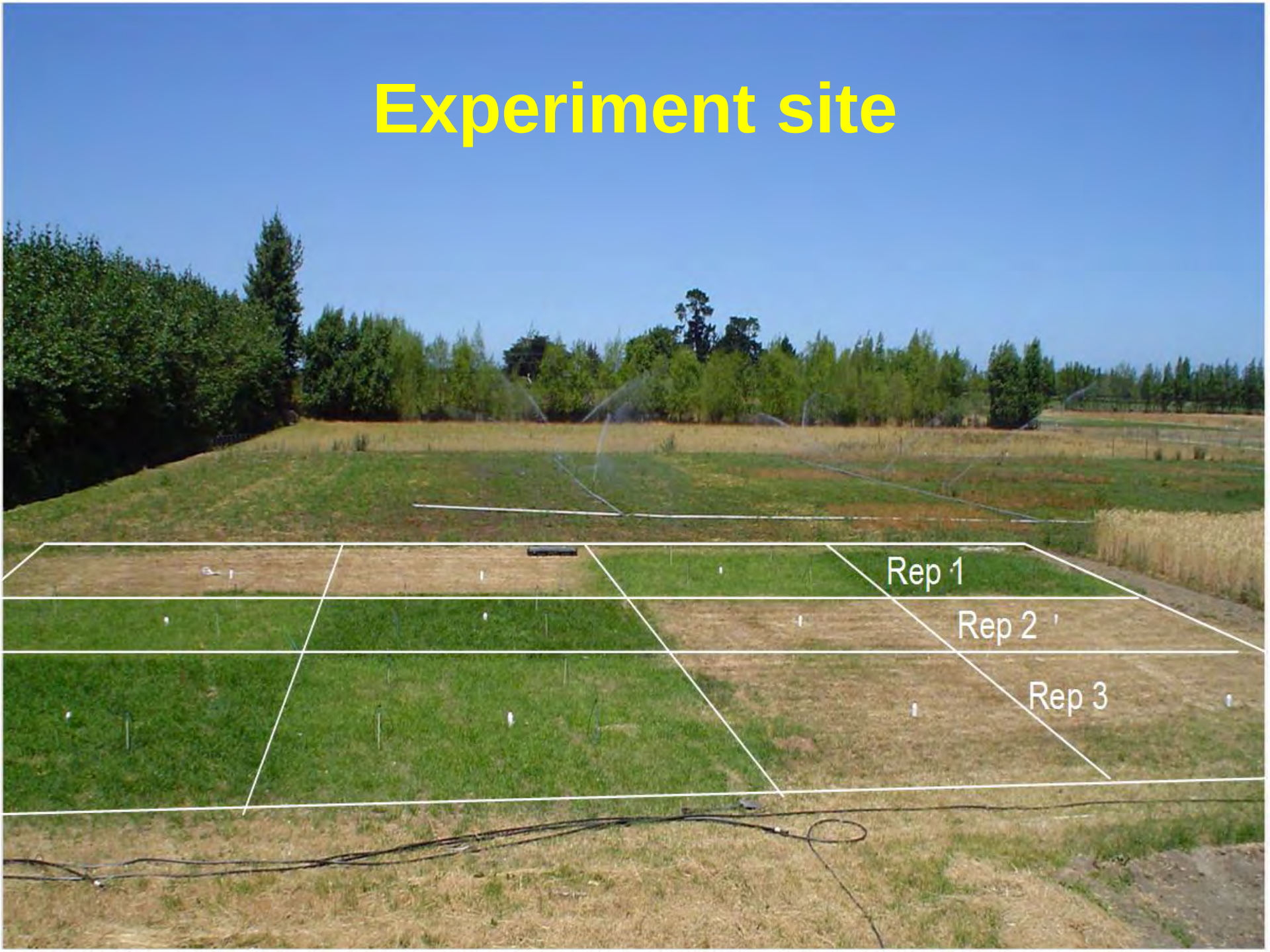
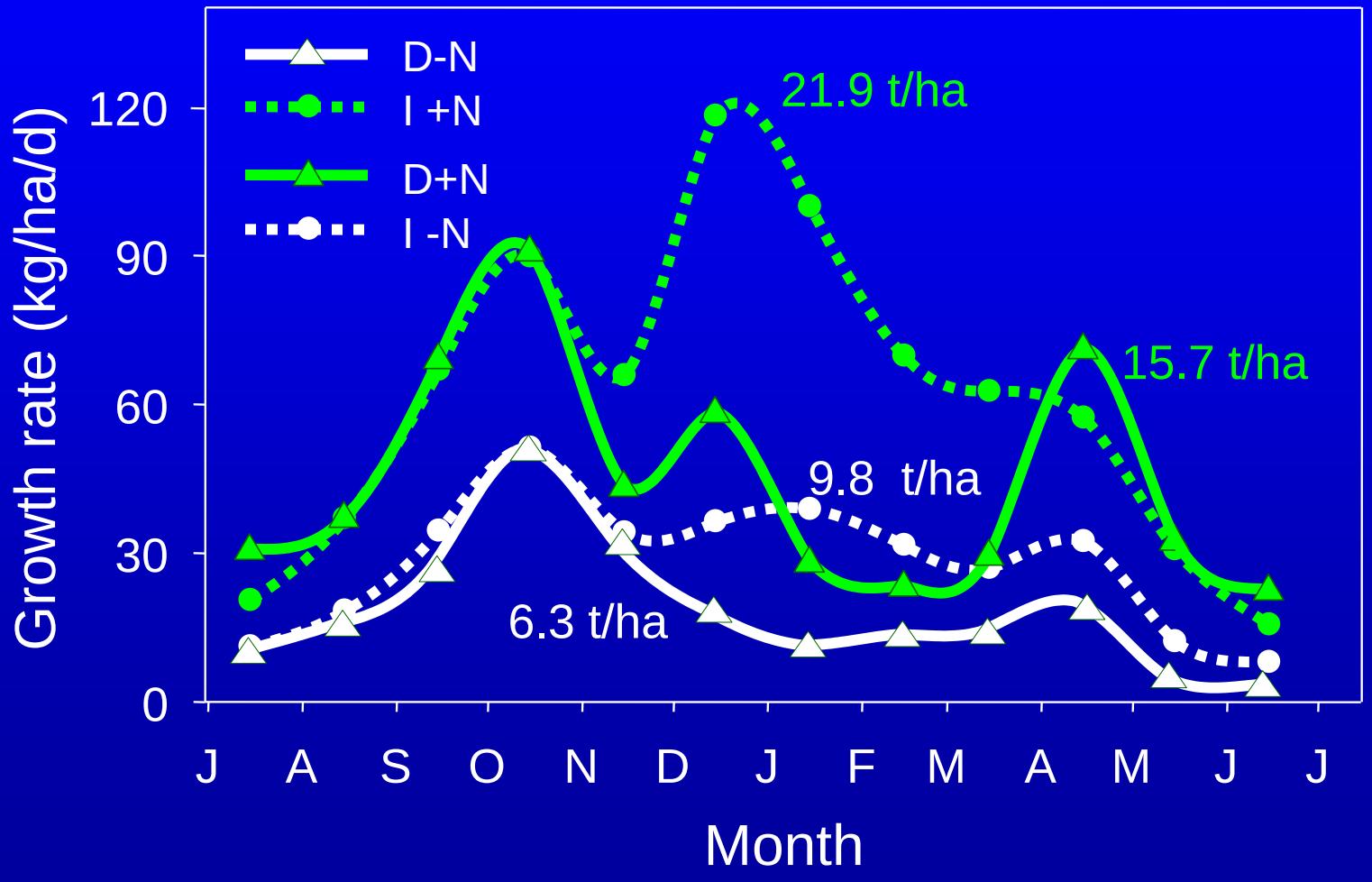
Objective

Quantify the effect of temperature, moisture and nitrogen on cocksfoot yields.

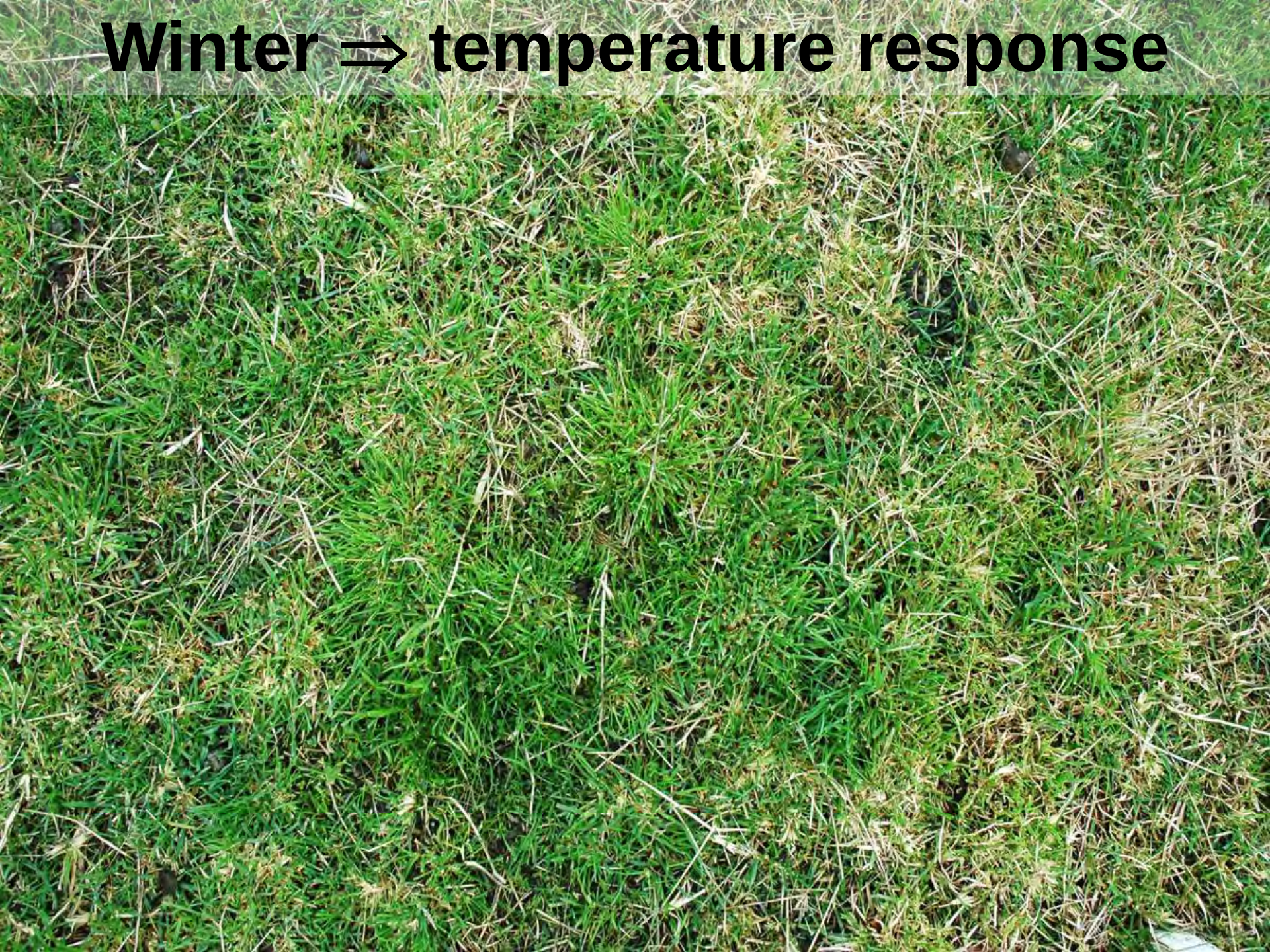
Experiment site



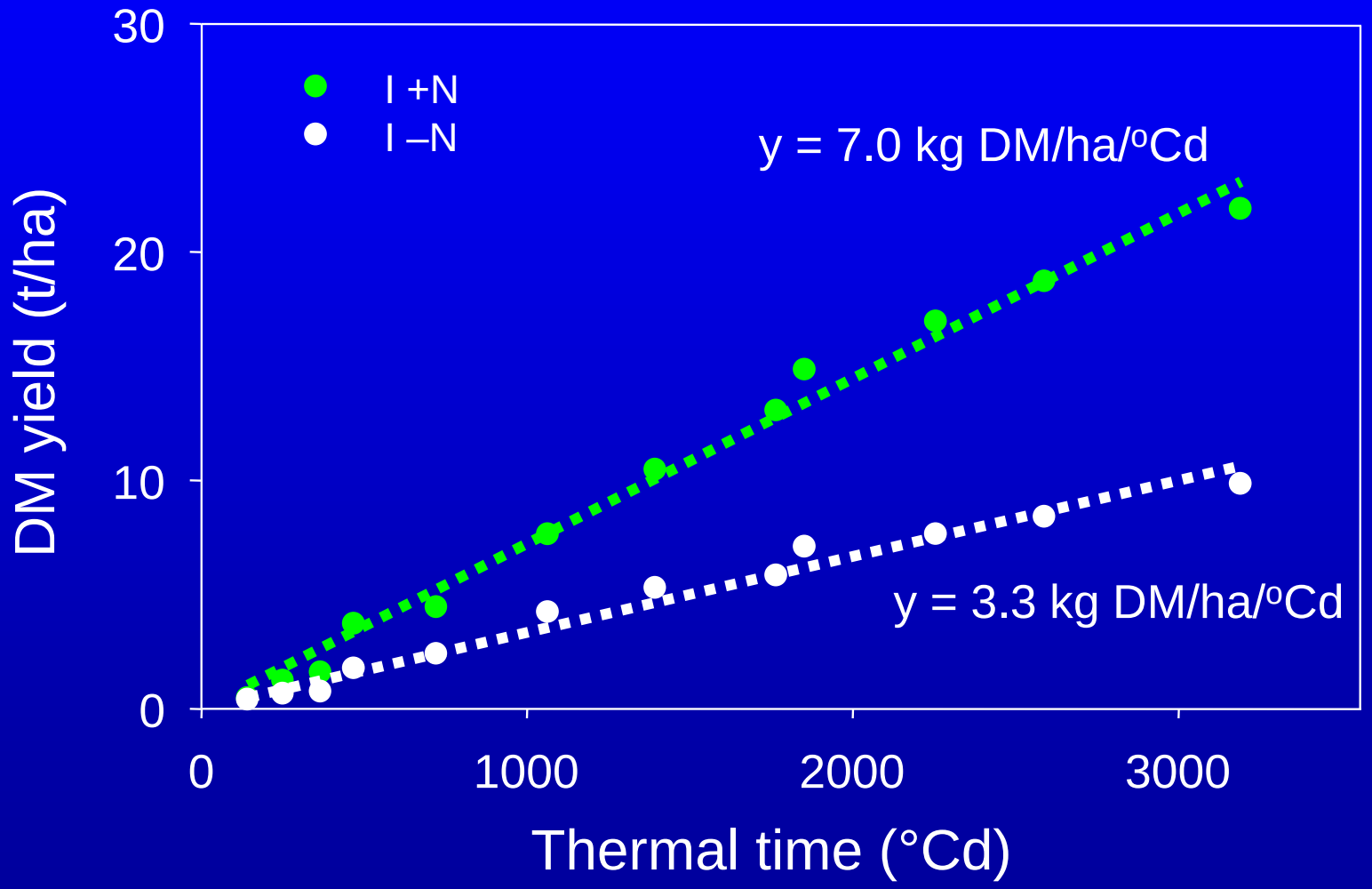
Growth rates (2 year means)



Winter ⇒ temperature response



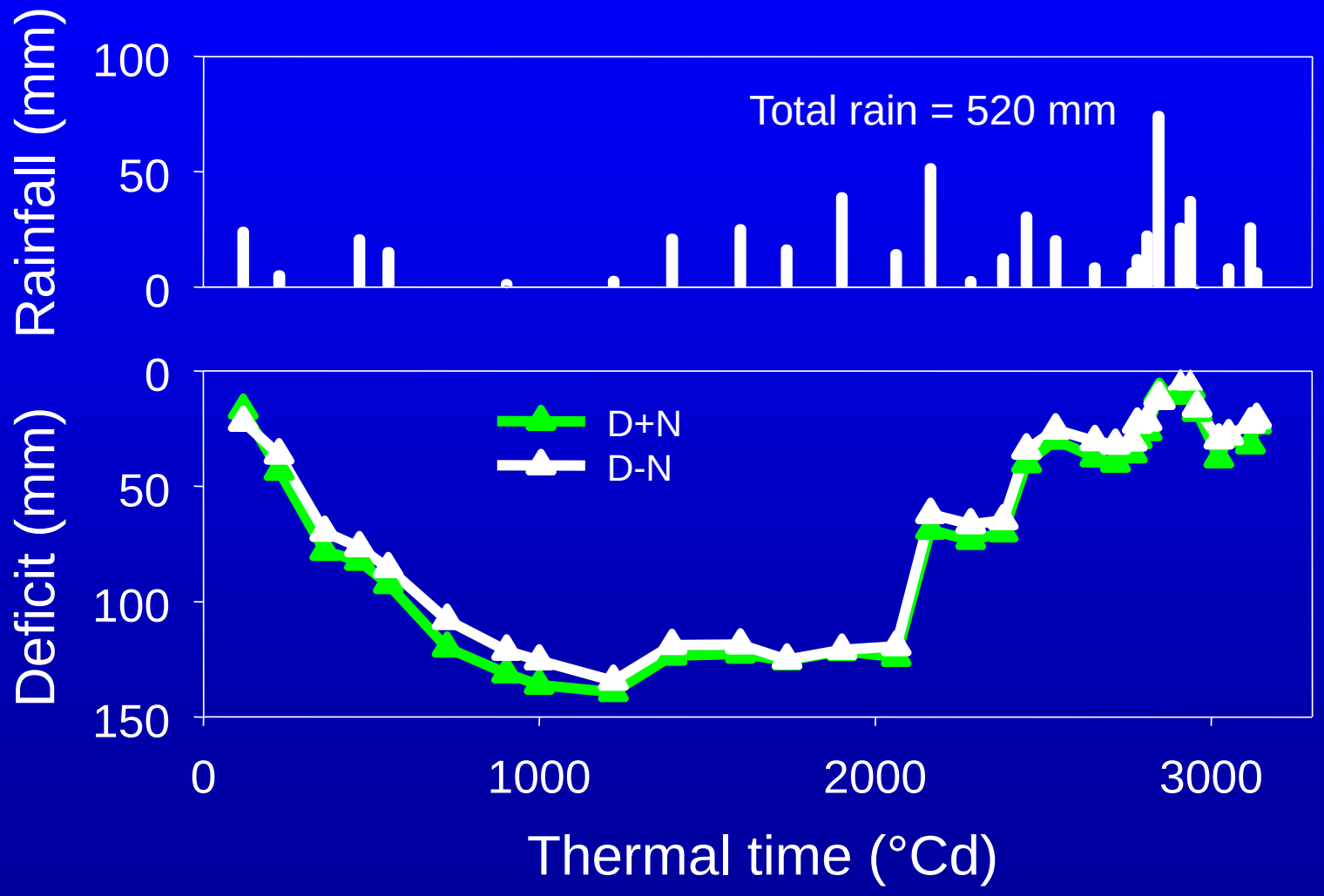
DM yield response to thermal time (Tb = 3°C)



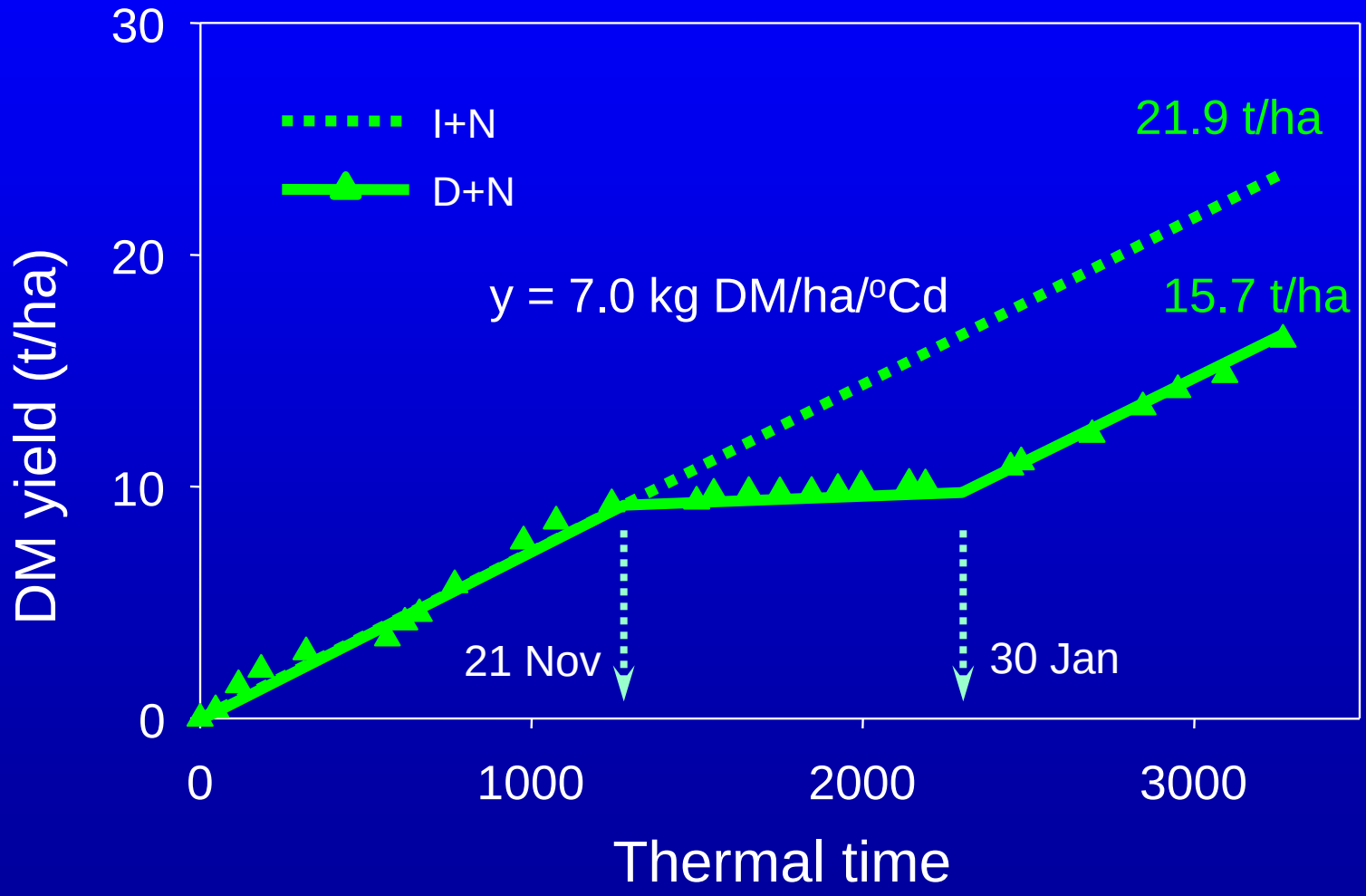
Spring ⇒ nitrogen response


Summer ⇒ moisture response

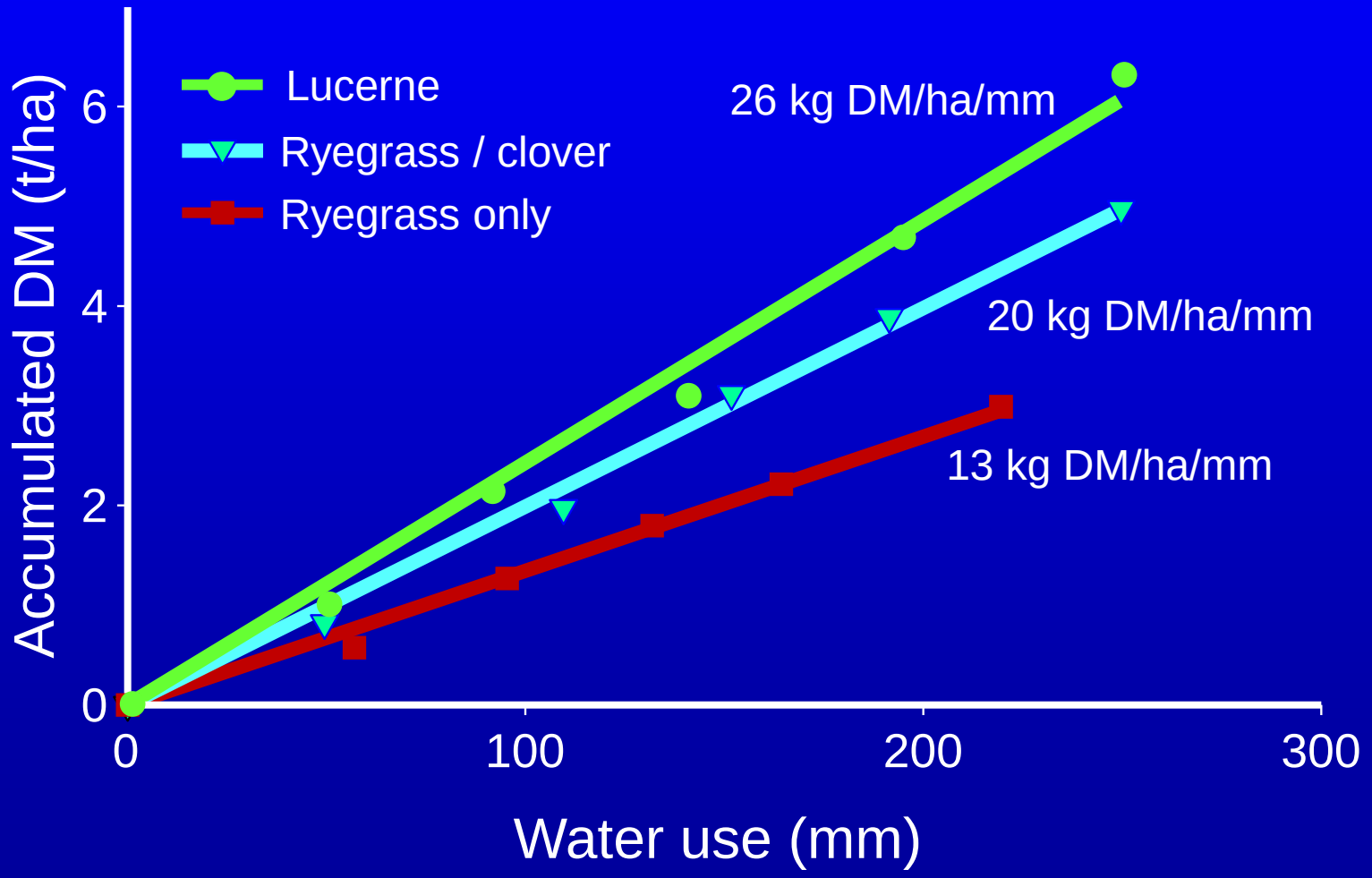
Soil moisture deficit 2003/04



Water stress effect on yield



Spring WUE


Lucerne
Ryegrass / clover
Ryegrass only
26 kg DM/ha/mm
20 kg DM/ha/mm
13 kg DM/ha/mm
Accumulated DM (t/ha)
0
2
4
6
0
100
200
300
Water use (mm)

Conclusions

- Cocksfoot pastures can produce 21.9 t/ha/y when neither water or N are limiting
- The effect of N deficiency had a greater effect than water stress
- Legumes have higher water use efficiency to exploit spring moisture conditions

References

Mills, A., Moot, D. J. and McKenzie, B. A. 2006. Cocksfoot pasture production in relation to environmental variables. *Proceedings of the New Zealand Grassland Association*, **68**, 89-94.

Moot, D. J., Brown, H. E., Pollock, K. and Mills, A. 2008. Yield and water use of temperate pastures in summer dry environments. *Proceedings of the New Zealand Grassland Association*, **70**, 51-57.

Dryland pasture production in response to environmental variables (Limits to Yield)

Professor Moot gave this presentation at:

Lincoln University, Canterbury

On:

19 November 2010

As part of the Ashley Dene Dryland Research Farm Centenary