

Project number: 5676
Funding source: Teagasc

Date: September 2012
Project dates: Jan 2007 – Dec 2011

Post-grazing height and productivity of white clover-based systems of dairy production



Key external stakeholders:

Grassland farmers, advisors, grassland research community.

Practical implications for stakeholders:

The effect of post-grazing height (PGH; 4, 5 or 6 cm) on milk production by dairy cows, sward white clover content and sward herbage production was investigated over three years. There was no significant effect of PGH treatment on milk production or sward clover content. Herbage production was higher with the 4 cm compared with the 6 cm PGH. A target PGH of 4 cm throughout the grazing season is recommended for grass-clover swards.

Main results:

- PGH of 4, 5 and 6 cm was compared over the grazing season (Feb to Nov) of three years, two of which had exceptionally high rainfall. Annual rainfall was 990, 1228 and 1296 mm in 2007, 2008 and 2009 compared to the previous ten-year average of 1009 mm (range 797 to 1150 mm)
- PGH had no effect on annual milk yield (6202 kg cow^{-1}), solids-corrected milk yield (6148 kg cow^{-1}) or contents of fat (42.9 g kg^{-1}), protein (35.9 g kg^{-1}) and lactose (46.5 g kg^{-1}).
- PGH had no effect on cow live-weight (592 kg) or body condition score (3.01).
- PGH had no effect on sward white clover content (196 g kg^{-1} of herbage DM).
- Herbage production of both grass and clover were significantly higher with 4 cm compared with 6cm PGH. Mean annual herbage yield was 11.07, 10.16 and 9.05 t organic matter ha^{-1} for the 4, 5 and 6 cm treatments, respectively.

Opportunity / Benefit:

- Potential to carry higher annual stocking densities with 4 cm PGH.
- Increase grazed grass in the diet and feed less silage and concentrates during spring and autumn

Collaborating Institutions:

Waterford Institute of Technology, Department of Chemical and Life Sciences.

Teagasc project team: Dr. James Humphreys (PL)
Mr. Paul Phelan
External collaborators: Dr. Imelda Casey (Waterford Institute of Technology)

1. Project background:

White clover is an important legume of temperate grassland that can increase the profitability of pasture-based milk production, primarily through lower dependency on fertilizer N. Previous experiments on mown grass-clover plots showed that low cutting heights increased sward clover content and herbage production. A similar response was expected under grazing and this was tested in the present experiment. Furthermore, in some previous experiments grazing to a low PGH (typically short duration experiments with perennial ryegrass) has been associated with reduced milk yields per cow.

2. Questions addressed by the project:

- The objective of this experiment was to investigate the effect of PGH on the clover content, herbage production and milk production from dairy cows on rotationally strip-grazed grass-white clover swards over three grazing seasons

3. The experimental studies:

- There were three target PGH treatments of 4, 5 and 6 cm imposed for three consecutive years (2007 to 2009).
- Each treatment had 21 Holstein-Friesian dairy cows with a mean calving date of 20 February.
- Each group of cows strip-grazed an area of 10.2 ha between February and November.
- PGH was measured twice each day with a rising plate meter and cows were moved to the next strip once the target PGH was reached.
- Annual fertiliser N input was 90 kg N ha⁻¹ for each treatment.

4. Main results:

- PGH of 4, 5 and 6 cm was compared over the grazing season (Feb to Nov) of three years, two of which had exceptionally high rainfall. Annual rainfall was 990, 1228 and 1296 mm in 2007, 2008 and 2009 compared to the previous ten-year average of 1009 mm (range 797 to 1150 mm)
- PGH had no effect on annual milk yield (6202 kg cow⁻¹), solids-corrected milk yield (6148 kg cow⁻¹) or contents of fat (42.9 g kg⁻¹), protein (35.9 g kg⁻¹) and lactose (46.5 g kg⁻¹).
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- Herbage production of both grass and clover were significantly higher with 4 cm compared with 6cm PGH. Mean annual herbage yield was 11.07, 10.16 and 9.05 t organic matter ha⁻¹ for the 4, 5 and 6 cm treatments, respectively.

5. Opportunity/Benefit:

- Potential to carry higher annual stocking densities with 4 cm PGH.
 - Increase grazed grass in the diet and feed less silage and concentrates during spring and autumn
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6. Dissemination:

International conferences

Humphreys J., Mihailescu E. and Casey I. A. (2012) An economic comparison of dairy production on N fertilized and white clover grassland. *Grassland Science in Europe*, 17, 774-776.

Humphreys, J., Keogh, B., Phelan, P., and Casey, I.A. (2010) Post grazing height and productivity of white clover-based systems of dairy production. *Grassland Science in Europe*, 15, 958-960.

International workshops and seminars

Humphreys, J. Keogh, B., Phelan, P. and Casey, I. A., 2010. Post-grazing height and productivity of white-clover based dairy production. Nordic Association of Agricultural Scientists Seminar 432, Hvanneyri, Iceland, 20- 22 June, 137 – 140.

National Conferences and seminars

Humphreys, J. (2009) Post grazing height and the productivity of white clover-based systems of dairy production. *Agricultural Research Forum*, 99.

Open Days

Burchill W., Hennessy D., Boland A. and Humphreys, J. (2012) Role of white clover in grass based milk production at Solohead. Moorepark Dairy Levy Research Update, Series No. 19, 42–46.

Hennessy, D., Phelan, P., Boland, A. and Humphreys, J. (2011) Using white clover to increase profitability - Irish Dairying Planning for 2015, Moorepark'11 Open Day (29/6/11). Teagasc IE p. 76 - 77 ISBN

Humphreys J., Keogh B., McNamara, K., Barrett D. and Boland A. (2009) Dairy Systems Research at Solohead. Moorepark Dairy Levy Research Update, Series No. 11, 9 – 15.

Farmer discussion groups

Many farmer discussion group visits to Solohead Research Farm during this experiment.

Press

Humphreys J., Keogh B., Murphy P. and Boland A. (2011) Clover helps you cope with costly N. *Today's Farm*, 22 (2)11-13.

Main publications:

Phelan P., Casey I.A, and Humphreys J. (2012) The effect of target post-grazing height treatment on herbage yields and dairy production from grass-white clover swards. *Journal of Dairy Science*, (in press)

Humphreys J., Mihailescu E. and Casey I. A. (2012) An economic comparison of systems of dairy production based on N fertilized grass and grass-white clover grassland in a moist maritime environment. *Grass and Forage Science*, (In press)

Popular publications:

Humphreys J., Keogh B., Murphy P. and Boland A. (2011) Clover helps you cope with costly N. *Today's Farm*, 22 (2)11-13.

7. Compiled by: Dr James Humphreys
