

Extended Grazing – An Alternative System for Low to Moderately Stocked Farms

Tim Keady

*Animal & Grassland Research & Innovation Centre,
Teagasc, Mellows Campus, Athenry, Co. Galway.*

Reducing the costs of maintaining the ewe during pregnancy provides an opportunity of improving net margin from lamb production. Many lowland sheep farms have a low stocking rate (national average stocking rate is 8.7 ewes/ha), consequently there are opportunities to extend the grazing season. One of the main benefits of the temperate climate which prevails in Ireland is the ability to grow grass for most of the year. Recent costings have clearly illustrated that whilst grass is not a cheap feed to produce (when total costs of production are included) it still is 16% cheaper than grass silage. The aim of this paper, based on studies undertaken at Athenry is to outline the effects of extended grazing of ewes during mid pregnancy on subsequent animal performance and on grass regrowth.

Herbage for Extended Grazing

Grass dry matter growth rate declines rapidly from August to approximately 0-10 kg/ha per day from late October to mid February depending on weather conditions. Consequently, to extend the grazing season between December and March, grass must be “built up” in late summer/early autumn. The quantity of grass which must be accumulated for extended grazing depends on date of sward closure, level of nitrogen (N) fertilizer applied and date of grazing. The earlier the closing date, the higher the yield regardless of grazing date. However, it should be noted that regardless of closing date, once the swards reach peak yield, subsequent herbage yield declines. The reduction in yield is due to senescence (leaf decay) exceeding leaf production from November onwards. Date of closure and date of grazing also impact on the proportion of dead material in the sward which is negatively correlated with feed value as determined by digestibility and intake characteristics. Earlier closing together with later grazing increases the proportion of dead herbage in the sward. Consequently, the feed value of extended grazed herbage is equivalent to medium (70 DMD) and low (65 DMD) feed value grass silages after early December and mid January, respectively. At Athenry, the accumulation of herbage for extended grazing begins in early September when swards are either topped to 4 cm or after cutting for silage, and receive nitrogen fertiliser (35 to 40 kg/ha) for grazing from mid December to early February.

The Effects of Year Round Grazing On Lamb Output

A major study was undertaken for four successive years to develop and evaluate a system of mid-season prime lamb production involving year-round grazing thus removing the requirement for winter housing and forage conservation. The systems evaluated included a traditional high stocked system involving winter housing and a lower stocked system where the sheep were kept at pasture all year by extended grazing during the winter months. The effects of system on stocking rate and lamb performance are presented in Table 1. System had no effect on litter size or the numbers of lambs reared per ewe put to the ram. However, stocking rate had to be reduced by 4 ewes/ha (27%) and consequently, lamb carcass output was decreased by 120 kg/ha (26%).

Table 1. Effects of system of lamb production on animal performance

	System	
	Conventional	Year round grazing
Stocking rate (ewes/ha)	14.4	10.5
Duration of housing(days)	100	0
Mean lambing date	20 March	30 March
Litter size	2.17	2.24
Number of lambs reared/ewe to ram	1.77	1.78
Lamb carcass output (kg/ha)	469	349

(Keady et al 2009^a)

Effects of Extended Grazing In Mid Pregnancy on Ewe and Lamb Performance

Many studies have been undertaken at Athenry to evaluate the effects of extended grazing ewes during pregnancy on ewe and subsequent lamb performance. Initial studies showed that extended grazing ewes during pregnancy increased lamb birth weight. However, recent studies (Table 2) have shown that ewes shorn at housing produce lambs that have similar weights at birth and at weaning as lambs from ewes which were extended grazed throughout pregnancy. Therefore, the heavier birth weight of lambs recorded previously from ewes which were extended grazed was due to reduced heat stress relative to ewes which were housed unshorn.

The feeding value of extended grazed herbage was evaluated in studies at Athenry. In terms of lamb weaning weight (which takes into consideration both lamb birth weight and subsequent growth rate) an allowance of 1.3 kg of extended grazed herbage dry matter in mid pregnancy had the same feed value as 0.92 kg of low and medium feed value grass silages (Table 3). Throughout pregnancy 0.8 kg silage DM intake offered to housed shorn ewes had the same feed value as 1.8 kg extended grazed herbage allowance (Table 2). These data clearly illustrate that the feed value of extended grazed herbage was no better than low or medium feed value grass silage and

consequently the improvement in lamb birth and subsequent weaning weights observed previously due to extended grazing was not due to the feed value of extended grazed herbage.

Table 2. The effects of extended grazing in mid, late and throughout pregnancy on subsequent lamb performance

	Management in mid and late pregnancy		
	Housed		Extended grazed
	Unshorn	Shorn	
Litter size	1.92	2.01	1.89
Birth weight (kg)	4.0	4.6	4.6
Weaning weight (kg)	31.9	34.1	34.0

(Keady et al 2007, Keady and Hanrahan 2009a)

Table 3. The effects of herbage allowance for extended grazing and grass silage feed value in mid pregnancy on animal performance

	Herbage DM allowance (kg/day)		Silage feed value	
	1.0	1.8	Low	Medium
	Forage intake (kg DM/day)	0.41	0.58	0.99
Herbage utilisation (%)	46	35	-	-
Ewe condition at lambing	2.83	3.07	3.14	3.07
Litter size	1.91	1.85	1.84	2.05
Lamb birth weight (kg)	4.47	4.93	4.52	4.50
Lamb growth rate (g/day to weaning)	294	311	302	315
Lamb weaning weight (kg)	33.6	35.6	34.2	34.7

(Keady and Hanrahan, 2009b)

Effect of Frequency of Grass Allocation on Ewe Performance.

One of the advantages often quoted for extended grazing is the reduced labour requirement relative to feeding ewes which are housed. Normally herbage is allocated daily which can be time consuming (particularly for large flocks) as fences (Flexinet) need to be erected ahead of the ewes and the back fences have to be moved. In order to evaluate if labour input can be reduced the effect of frequency of herbage allocation on forage intake and animal performance has been evaluated in recent studies at Athenry (Table 4). During extended grazing (mid December to 4 weeks prior to

lambing) the ewes were allocated herbage either daily or twice weekly. Frequency of herbage allocation did not alter forage intake or utilisation. Furthermore frequency of herbage allocation had no effect on lamb birth or weaning weights, or lamb growth rate from birth to weaning.

Table 4. The effects of frequency of herbage allocation in mid pregnancy on herbage utilisation and animal performance

	Frequency of herbage allocation	
	Daily	Twice weekly
Herbage utilisation rate (%)	38	41
Ewe condition score at lambing	3.0	2.9
Lamb birth weight (kg)	4.7	4.7
Lamb growth rate (g/day to weaning)	300	304
Weaning weight (kg)	34.4	34.8

(Keady and Hanrahan, 2009b, 2011)

As the national average weaning rate is about 1.3 lambs per ewe put to the ram most flocks are comprised of ewes which produce only singles and twins. As many sheep producers scan their flocks for litter size in mid pregnancy they can group ewes accordingly. An on-farm study was undertaken by Teagasc to evaluate the effects of allocating herbage daily to single and twin bearing ewes in late pregnancy, either grouped separately (according to litter size) or in a leader-follower system (twin-bearing ewes were leaders followed by the single bearing ewes). The daily herbage dry matter allowances per ewe for weeks 7 to 6, 5 to 4, 3 to 2 and prior to “spread out” for lambing were as follows: 1.3, 1.4, 1.6 and 1.6 kg for single bearing ewes grazed separately; 1.4, 1.6, 1.9 and 2.7 for twin bearing ewes grazed separately; 2.7, 3.0, 3.5 and 4.3 for the twin bearing ewes followed by single bearing ewes in the leader-follower system. Allocating grass daily to the single- and twin-bearing ewes separately or in the leader-follower system did not affect lamb birth weight, incidence of lambing assistance, lamb growth rate or weaning weight (Table 5). However, single bearing ewes in the leader-follower system had a lower condition score at lambing. The leader-follower system reduced labour requirements by decreasing the number of fences required to be erected by 50% in a flock of predominantly single and twin bearing ewes.

Table 5. Effect of grass allocation management in late pregnancy on animal performance

Litter size	Grassland system			
	Leader-follower		Separate	
	Twin	Single	Twin	Single
Ewe condition at lambing	3.12	2.93	3.00	2.93
Lamb birth weight (kg)	4.95	5.80	4.80	5.97
Lamb growth rate (g/day)	228	269	224	266
Weaning weight (kg)	27.6	32.4	27.1	32.4

(Keady and Hanrahan, 2010)



Extended winter grazing requires excellent grassland management to be successful. Extended grazing has a negative effect on sward botanical composition. A recent study at Athenry showed that delaying the date of extended grazing after early December decreased the content of perennial ryegrass whilst increasing the contents of cocksfoot and meadow grass

Effect of Extended Grazing Management on Subsequent Herbage Yield

In an all-year round grazing system grass supply will be most limiting in autumn. Grass supply is also a major concern for the first two months after lambing. Consequently, the effects of extended grazing management on herbage yield during the early part of the subsequent grazing season

impacts on potential stocking rate. The effect of extended grazing management on herbage yield early during the subsequent grazing season was evaluated at Athenry. Increasing daily herbage dry matter allowance from 1.0 to 1.8 kg/ewe at grazing increased subsequent herbage dry matter yield by 1.14 t/ha (Table 6). Frequency of herbage allocation during extended grazing did not affect subsequent herbage yield (Table 6). However, each 1 day delay in grazing date reduced herbage dry matter yield by 54.2 kg/ha (Figure 1) which is equivalent to 18 ewe grazing days. The data from this study clearly illustrated that delayed grazing had a major effect on subsequent herbage yield.

Table 6. Effects of extended grazing management of autumn saved pasture on dry matter yield in spring

	Herbage DM allowance (kg/day)		Frequency of allocation	
	1.0	1.8	Daily	Twice weekly
Dry matter yield (t/ha)	2.3	3.2	2.7	2.8

(Keady and Hanrahan, 2009b, 2011)

Effect of Extending Grazing on Pasture Damage

In extended grazed pastures which had been grazed between mid December and late January, grazing date and herbage allocation at grazing impacts on pasture damage. When assessed in early April the percentage of the sward which was categorised as bare ground varied from 3% to 22% for pastures grazed at high (1.8 kg/ewe daily) and low (1.0 kg /ewe daily) herbage dry matter allowances the previous winter. However, by mid May the percentage of bare ground was reduced to 5.5 and 8.8%, respectively. Frequency of herbage allocation has no impact on the proportion of bare ground (indication of sward damage) the following spring.

Extended grazing has a negative effect on sward botanical composition. A recent study at Athenry showed that delaying the date of extended grazing after early December decreased the content of perennial ryegrass whilst increasing the contents of cocksfoot and meadow grass (Table 7)

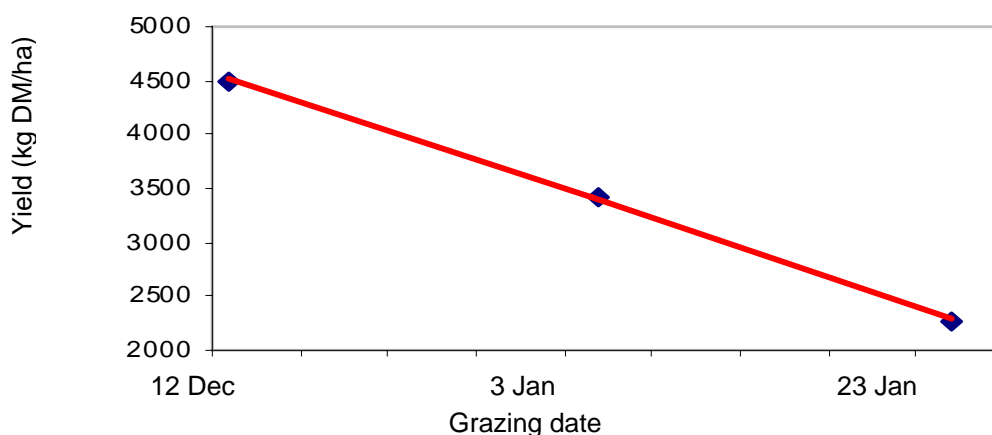


Figure 1. The effects of grazing date on herbage yield early during the subsequent.

Table 7. Effects of date of extended grazing on herbage botanical composition (%)

	Defoliation date			
	Early December	Mid December	Mid January	Mid February
Perennial ryegrass	71	67	62	59
Cocksfoot	16	18	21	22
Meadow grass	9	6	11	12
Yorkshire fog	6	8	5	6

(Keady et al., 2010)

Summary

1. It is concluded that an effective year-round grazing system can be practiced successfully. However, stocking rate is reduced significantly, consequently, dramatically reducing lamb carcass output/ha and gross margin/ha. However, to comply with the Nitrates Directive adequate slurry and/or farmyard manure storage facilities for a 6 week period is required.
2. Extended grazing
 - a. increases lamb birth weight relative to lambs from housed unshorn ewes.
 - b. limits stocking rate to a maximum of 10 ewes/ha.
 - c. requires excellent grassland management to be successful.
 - d. provides a low cost system, particularly for 'flying' flocks.
 - e. is a relatively inefficient system of utilising herbage
 - f. reduces the proportion of perennial ryegrass in swards

3. Allocating herbage twice weekly rather than daily has no effect on animal performance or subsequent herbage growth.
4. Concentrate supplementation is still required to enable the year-round grazing system to succeed.
5. The improvement in lamb birth and weaning weights due to extended grazing can be achieved indoors by shearing ewes at housing.

References

- Keady, T.W.J. and Hanrahan, J.P. (2009a). Effects of shearing at housing, grass silage feed value and extended grazing herbage allowance on ewe and subsequent lamb performance. *Animal*. 3, 143-151.
- Keady, T.W.J. and Hanrahan, J.P. (2009b). The effects of allowance and frequency of allocation of deferred herbage, and grass silage feed value, when offered to ewes in mid gestation on ewes and lamb performance and subsequent herbage yield. *Animal*. 3, 879-890.
- Keady T.W.J and Hanrahan J.P (2010). The effects of allowance of deferred herbage and concentrate supplementation when offered to ewe lambs, and system of allocation when offered to ewes in late gestation, on animal performance. *Grass and Forage Science*. 65, 227-236.
- Keady T.W.J and Hanrahan J.P (2012). The effects of allowance and frequency of allocation of autumn-saved pasture, when offered to spring lambing ewes in mid pregnancy, on ewe and lamb performance and subsequent herbage yield. *Livestock Science* 43: 15-23
- Keady, T.W.J., Hanrahan, J.P. and Flanagan, S. (2007). The effects of extended grazing during mid, late and throughout pregnancy, and winter shearing indoors, on ewe performance and subsequent lamb growth rate. *Irish Journal of Agricultural and Food Research*. 46, 169-180.
- Keady, T.W.J., Hanrahan, J.P. and Flanagan, S. (2009). An evaluation of two grassland based systems of mid season prime lamb production using prolific ewes. *Irish Journal of Agricultural and Food Research*. 48, 87-102.
- Keady, T.W.J., Moran, J. and Hanrahan, J.P. (2010). An evaluation of the effects of extended grazing with ewe lambs on sward botanical composition. *Proceedings of the British Society of Animal Science* p. 211.