AHDB BEEF & LAMB

Final Report

Better Returns Programme

Farmer Innovation Grant

Sponsored by AHDB Beef and Lamb

TechnoGrazing

Investigating the Potential

Project Overview – January 2017

Author: James Daniel BEng
(Director – Precision Grazing Ltd)

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Introduction

This project investigated the method of TechnoGrazing to understand its potential in the UK to increase production from pasture. TechnoGrazing was developed in the 1980s by Harry Wier, director of Kiwitech International Limited. Founded in New Zealand the company currently exports its services to many countries including Australia and South America.

TechnoGrazing Systems use bespoke electric fencing and water equipment to divide an area of land into precisely defined lanes with great efficiency. These are then sub-divided into cells to create a grazing rotation, the length of which can be quickly adjusted to suit requirements whilst maintaining access to water.

Figure 1 - View across an 8 lane TechnoGrazing System in Tasmania stocked with Dairy Heifers.

Method

Three TechnoGrazing Systems were designed and install by Precision Grazing Ltd on three farms near the Cornwall/Devon border in the South West. System size ranged from 4.77-12.2ha covering a mixture of soil and pasture types as shown in Table 1 below. Set-up cost varied from £276-£420ha including; design, equipment, installation and training.

Figure 2 - 4 lane, 64 cell TechnoGrazing System in Cornwall stocked with Dairy X heifers and steers. CAD image on left shows fence position when divided every 4 cells (0.30ha), blue lines are water laterals laid above ground, red line is power supply to lane fences.

Stocking

As shown below in Table 1 two systems were stocked with cattle, the third was stocked with ewes and lambs. System size meant that in the cattle systems animals grazed as one group through the lanes in rotation whereas in the sheep system mobs of weaned lambs were allocated 2 lanes each to rotate.

The opening pasture covers were below target for all systems so stocking rates were initially reduced, to establish a grazing wedge animals firstly grazed each lane in turn and then each ½ lane. Animals quickly adapted to the system, moving cells every 2 days on average by crossing over a "peg-down" electric fence, encouraged by the fresh grass ahead of them.

Table 1 - TechnoGrazing System Specification and Stocking Rate

	Higher Trevallett Farm	West Panson Farm	Bradstone Manor Farm
System Size	4.77	6.47	12.2
Number of Lanes	4	4	4
Number of Cells	64	64	120
Cell Area (ha)	0.075	0.101	0.102
Soil Type	Medium Loam, Free Draining	Medium to Clayey Loam	Medium Loam over Rock, Free Draining
Pasture Type	Permanent	Temporary	New Ley
Stock	Dairy Cross Heifers and Steers	Black Limousine Heifers and Steers	Romney Ewes and Lambs
Age at Turn-out	14 Months	11 Months	Mixed Age Ewes, 6 Week old Lambs
Average Stocking Rate (hd/ha)	7.47	6.09	29.69*
Average Stocking Rate (SU/ha)	5.55	3.88	3.26

*Ewe Equivalent

Recording

Animals entering or leaving the system were weighed following 4h fasting, the pasture height was measured weekly by rising platemeter and quality assessed monthly by taking a fresh grass sample. Results were sent to Precision Grazing Ltd who analysed the information and provided bespoke instructions by text message to the project member defining the allocation (number of cells per day) for that week. Additional support was provided by phone and systems were visited on a 6-8 weekly basis.

Figure 3 - Heifers and Steers in August on the Higher Trevallett TechnoGrazing System, 500kg average weight.

Results and Discussion

Pasture Management

The focus of the pasture management has been to capitalise on the periods of surplus feed to ensure animal intakes are maximised whist maintaining quality and keeping sufficient canopy to grow demand. In practical terms this meant:

- Average canopy height of the system was measured weekly and pasture quality monthly
- Height was converted to kgDMha and average growth calculated.

This was compared to the calculated animal demand provided by Farmax farm models, climatic data and other information was used to predict growth for the next week.

- Surplus was controlled by:
    - Increasing the number of cells allocated per day to reduce the rotation length and therefore reduce canopy.

32 Cells per Lane, 8 Cells Allocated Every 2 Days = 8 Days per Lane

4 Lanes = 32 Day Rotation

- Deficient was managed by:
    - Reducing the number of cells allocated each day to increase the rotation length and therefore increase canopy.

32 Cells per Lane, 4 Cells Allocated Every 2 Days = 16 Days per Lane

4 Lanes = 64 Day Rotation

Figure 4 - Cattle stocked in their cell at 200hd/ha on a 32 day rotation in August at West Panson Farm.

Pasture Production

The amount of Dry Matter (DM) produced per year on a typical farm using set-stocking is estimated at 8,500kgDMha with 50% (4,250kgDMha) being utilised (AHDB, 2016(B)). The TechnoGrazing systems have grown up to 2.5 times more DM due to the management of canopy and the use of short "on-times". Importantly the average utilisation rate has also been higher at 78%. Using the correct stocking density and management techniques meant the animals were able to consume the surplus grass which is normally wasted.

Table 2 - TechnoGrazing System Pasture Production

	Higher Trevallett Farm	West Panson Farm	Bradstone Manor Farm
Average Days Grazing	200	240	300
DM Production (kg/ha)	**21,670**	**13,260**	**14,710**
DM Utilised (kg/ha)	15,960	11,400	11,020
Percentage Utilisation	**74%**	**86%**	**75%**
Fertiliser Applied / Number of Applications	104kgNha/3	96kgNha/1	57kgNha/1
Average Quality (MJME)	**11.57**	**11.23**	**12.16**
Average Crude Protein	21.70%	21.60%	24.40%
Average DM	18.70%	15.90%	16.24%

Use of artificial fertilizer in the trial was in-line with the current farm policy to remove variance. Despite at times carrying twice the stocking rate of neighboring fields the systems have produced more DM. Pasture quality is critical to ensure the animals can reach their growth potential each day, excellent ME values have been maintained throughout the season, even with high average cover heights.

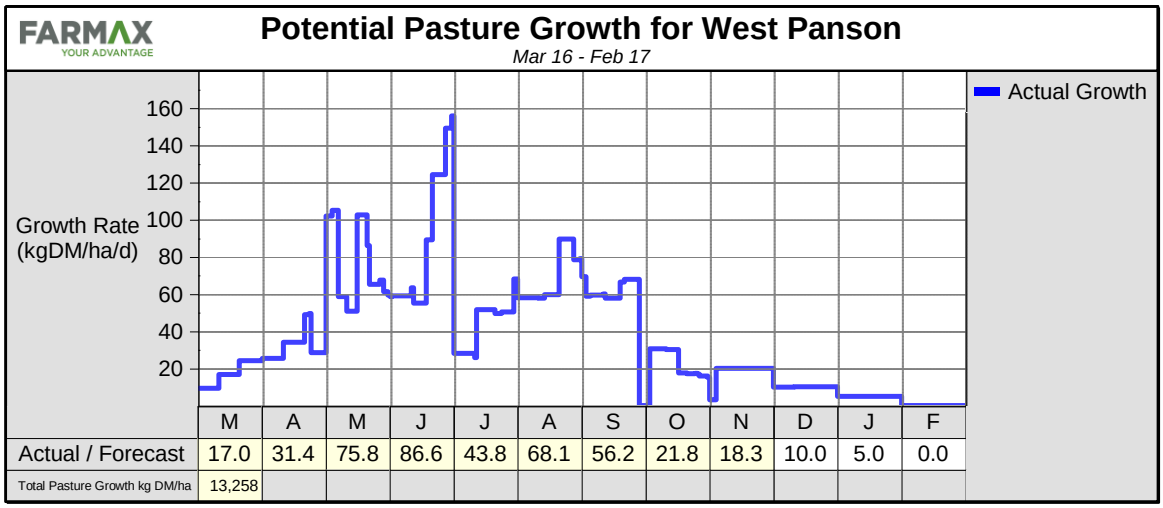

Figure 5 - Pasture growth curve for the West Panson TechnoGrazing System.

Animal Production

To utilise the high amount of DM produced the average system stocking rate (see Table 1 above) has been 2-3 times the comparable UK average (AHDB, 2016(A)). As animals grow their demand increases, this has been managed by the planned sale of the heaviest animals against pasture supply.

Table 3 – TechnoGrazing System Production

	Higher Trevallett Farm	West Panson Farm	Bradstone Manor Farm
Total Number of Animals	42	45	240 Ewes / 460 Lambs
Average Number of Days in System (per animal)	154	201	N/A
Average DLWG (kg)	0.74	0.8	0.025*
Average Total Weight Gain (kg)	4,786	7,236	6,783
Production* (kgLWha)	**1,074**	**957**	**556**
Average Feed Conversion Rate (kgDM/kgLW)	15.67:1	11.91:1	N/A

**Adjusted Values*

Cattle

Daily Live Weight Gain (DLWG) has averaged 0.74-0.8kg with a range of 0.25-1.4kg. There was less DLWG variation in the West Panson home reared suckled calves than the purchased Dairy Cross cattle at Higher Trevallett. The cold spring conditions in March and April limited intakes and reduced DLWG, there was some compensatory growth in May and above target production in August.

Overall the combination of; extended grazing period, good average DLWG and high stocking rate resulted in double the LW production per ha compared to the Stocktake 2016 16-24 month beef finishing system average (AHDB, 2016(A)).

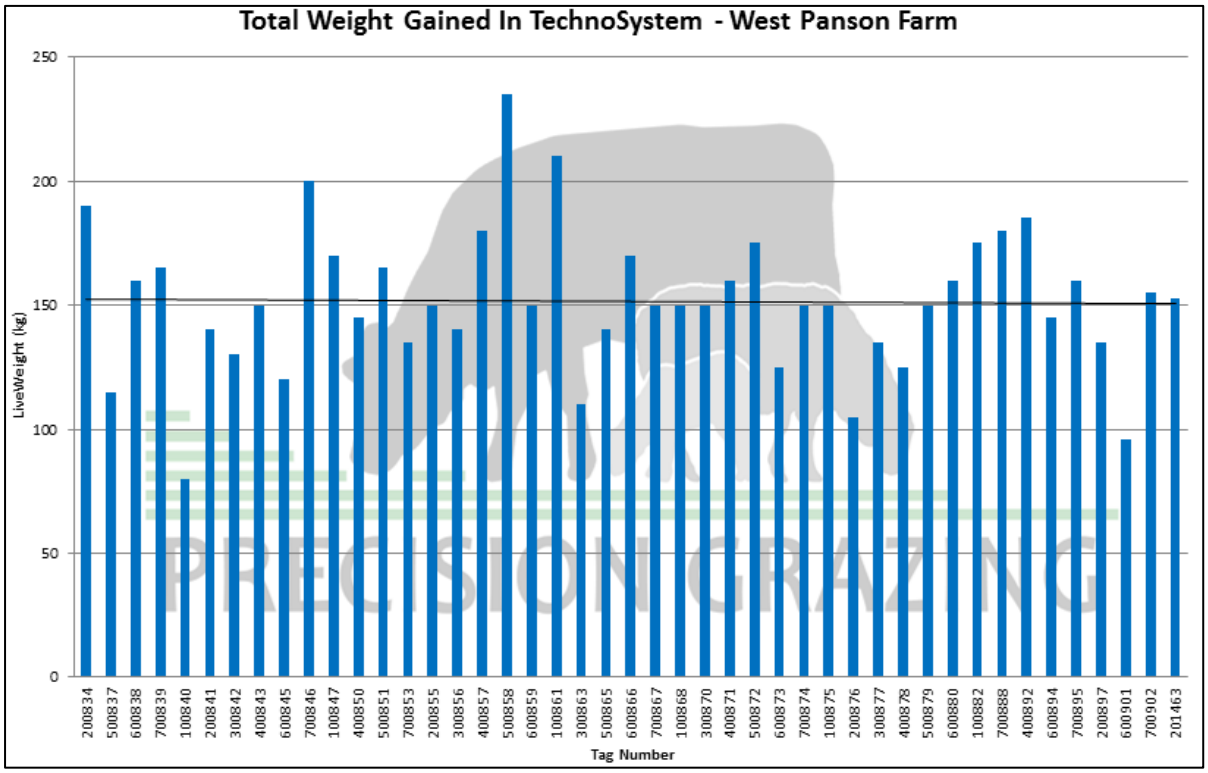

Figure 6 - Total weight gained by the cattle in the West Panson TechnoSystem.

Lamb

Measured lamb DLWG peaked at 0.25kg in the 6 weeks post weaning but was severely affected by an iodine deficiency. This is deemed to have been elevated by the high level of white clover in the sward which contains cyanogenetic glucosides that increase the dietary iodine requirements, similar to brassica.

Despite the iodine deficiency the total production was 36% higher than the Stocktake average for an April/May lambing flock (AHDB, 2016(A)).

Financial Output

Gross income is estimated at £1531-1718ha (cattle) and £1074/ha (ewes and lambs). Average comparable figures from AHDB Stocktake 2016 for equivalent gross income from pasture are £668/ha and £584/ha respectively (AHDB, 2016(A)).

The TechnoGrazing Systems received equal or less inputs of; fertilizer, maintenance and labour to the other grazing areas of the participant's farm, no concentrate was fed. Therefore system specific costs are; depreciation on capital equipment, interest on additional capital stock purchase and grazing management.

These were valued at £217-£242/ha to provide a system **gross margin** of:

- **£1201-£1488ha (cattle)**
- **£844ha (ewes and lambs).**

Figure 7 - Ram lambs and Store lambs in the TechnoGrazing System at Bradstone Manor, mid-August.

Trial Participant's Reviews

Andrew Jones – Higher Trevallett Farm

"The TechnoGrazing has been an enjoyable and profitable addition to our enterprise. We had some concerns about potentially the hassle the cattle might cause with electric or the extra time the system might take but this simply hasn't been the case. It is delivering what we wanted, LW gain for a very low cost per kg."

Stephen Thorne – West Panson Farm

"From our experience of rotational grazing the system made sense and I thought that it would work well however I have been pleasantly surprised how well! The system has grown more grass whilst carrying more cattle than anywhere else on the farm, grazing management has been very valuable and instructions simple to follow."

Nick Jasper – Bradstone Manor Farm

"Installing the system made sense to me, it is impossible to correctly graze big fields; you just loose quality and eventually ruin the ley which is expensive. It has been simple to manage, especially with ewes and lambs, daily checks are far quicker when they are all in a cell rather than spread over a 12ha field. We have grown a lot of excellent quality grass; most challenging thing at times was finding enough animals to eat it!"

Conclusion

TechnoGrazing has shown in this trial to substantially increase the production from pasture compared to the comparable AHDB Stocktake 2016 average figures. It has also reduced the 0£/kg Live Weight Gain compared to the trial participant's current production systems by decreasing cost per head including eliminating concentrate usage at pasture.

Pasture composition and tiller density has been improved whilst fertility evenly distributed and pugging events or surface water run-off minimized. Animals have shown high contentment and responded with good growth rates. There is clear opportunity to reduce the variability recorded through integration of the supply chain and enable a more consistent, affordable product to be provided to the consumer.

The system design and bespoke equipment has enabled the participants to implement the grazing management instructions on a weekly basis and achieve exceptional pasture production and quality. This has demonstrated that new methods can be successfully and profitably integrated into an existing business when approached with an open mind.

Grass is one of the easiest crops to grow but the hardest to manage; simply growing more of it is not profitable unless you can utilise it. The TechnoGrazing Systems, combined with grazing management have provided a sustainable production model with excellent return on investment.

Recommendations

The production output of the TechnoGrazing model is limited by the quality of the soil and livestock. Future work should investigate the management of the soil under intensive grazing systems and the factors effecting feed conversion rate in growing animals (at pasture). This must include measurement of Carbon and Greenhouse Gases to enable grazing systems to be evaluated under the context of sustainable intensification.

Future Plans - 2017

New systems for the trial participants have been designed and installed by Precision Grazing Ltd to expand the total area under management from 23.5ha to 60ha.

Figure 8 - Black Limousine Heifers and Steers grazing 11.5MJME pasture in September.

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Contact Details

AHDB Beef and Lamb

Better Returns Programme (BRP)

www.beefandlamb.ahdb.org.uk

brp@ahdb.org.uk

Precision Grazing Ltd

www.precisiongrazing.com

info@precisiongrazing.com