Research Summaries 2018.2019 Season

DTT Gibson farm

Objective:

Living within the FEI – Biophysical & economic effects of supplementing grazing dairy cows with PKE or locally grown kibble maize / barley grain.

Trial design:

Two hundred and twenty-seven Friesian cows were split into three treatment groups in June 2017, Pasture only (All Grass; 69 cows - 2.9 cows/ha), PKE (79 cows - 3.3 cows/ha) and kibble maize / barley (Grain; 79 cows - 3.3 cows/ha). For the 2018.19 season the maize grain / barley was replaced by an in-shed blend consisting of 33 - 50 % PKE, 25 – 33% DDG, 12 – 15% Tapioca, 15% high starch pellet, & up to 15% soya hull pellet. The blend was formulated to be higher in starch during late winter and spring, and higher in protein during summer and autumn.

The All Grass treatment was self-contained with only pasture, and pasture silage made from spring surplus, available for the treatment.

PKE & the in shed blend were fed from mid-August to mid-November in early spring, and late lactation to fill feed deficits, based on management decision rules (grazing residuals, targeted cow intakes). The amount of supplement fed varied between 1 & 5 kg/cow/day depending on estimated pasture intakes.

Cows were dried off according to a feed budget

Results 2018.2019 season

Milk production

	All grass	PKE	In shed
Kg MS/cow	456	472	491
Kg MS/ha	1313	1553	1615
Days in milk	269	267	269

The in shed blend herd produced 35 & 19 kg MS/cow, & 302 & 240 kg MS/ha more than the All Grass and PKE herd, respectively. Days in milk were similar for all herds.

Pasture Parameters

	All grass	PKE	In shed
Purchased supplement fed (Kg DM/cow)	0	603	613
Cost of supplement ($/kg DM)	0	28.8	48.8
Pasture harvested as silage (kg DM/cow)	613	539	550
Pasture growth (t DM/ha)	16.7	16.6	16.4
Feed conversion efficiency (kg DM/kg MS)	12.0	12.0	11.4
Response to supplement purchased (kg MS/kg DM)	0	120	150

Purchased supplement fed per cow was slightly higher for the in shed herd mainly due to higher feeding rates through summer due to the FEI being & a higher rate therefore being able to be fed.

Pasture silage harvested was highest for the All Grass herd due to the lower stocking rate. The PKE & in shed herds had similar amounts of silage harvested.

Pasture grown on all farmlets was similar. Excellent feed conversion efficiency was achieved with the lowest the in shed herd. Total season Milksolids response to supplement in the PKE and in shed herds was high due to the higher stocking rate and a good feed conversion efficiency. The high supplement response in the in shed blend herd is assumed to be due to the higher ME of the feed.

Cow Liveweight (kg) & Mating results

	All grass	PKE	In shed
Start of calving	538	527	516
End of calving	484	472	481
Late May	526	540	534
Empty rate %	11.7	19.4	11.5

Liveweight loss from calving to end of calving was 54 kg for the all grass herd, 55 kg for the PKE herd and 35kg for the in shed herd. Liveweight gain from end of calving to late May was greatest for the PKE herd (+68 kg) with the in shed herd gaining 53 kg and the all grass herd least at 42 kg. Empty rate was similar for the All grass & in shed herds. The higher empty rate of the PKE herd is assumed to be due to low herd numbers rather than a treatment effect.

FEI results

The FEI of the All Grass varied between 3.8 & 5.6 (Fonterra A level). The FEI of the PKE ranged between 4.9 & 9.0 which was just in the C grading area. The FEI of the in shed blend varied between 4.1 and 8.0 which is just inside the Fonterra B level of 7.5. The FEI were lowest for all herds in spring and highest in autumn.

Economics ($/ha)

	All grass	**PKE**	**In shed**
Total Income	8,943	10,571	10,974
Expenses	4,216	5,301	5,829
EFS/ha @ $6.40/kg MS	4,727	5,270	5,145

The higher income of the in shed farmlet was offset by the higher expenses due to the in shed blend resulting in the EFS/ha being $125/ha lower than the PKE farmlet. The EFS/ha of the PKE farmlet was $543 higher than the all grass farmlet.

Summary

The trial highlighted that pasture utilisation must be kept high, and feed price must be kept low to obtain profitable response to purchased supplements. Additionally, the data indicates that any additional Milksolids from feeding a blended supplementary feed via an in-shed system, does not offset the greater cost of this feed.

DTT Kavanagh farm

Objective:

Production and profitability of autumn vs spring calving.

Trial design:

The Autumn/Spring calving trial was established in October 2017. 604 mixed aged Friesian-cross cows were randomly allocated into 2 herds with 104 ha/farmlet to give a stocking rate of 2.9 cows/ha. The spring calving cows were mated from 4 October to 20 December (11-week mating period). Autumn calving cows weren't mated in spring with mating period 10 June to 27 August 2018 (11-week mating). Spring calving cows were dried off early May according to a feed budget and BCS with calving starting 10 July. Autumn calving cows were milked through the winter of 2018 and were dried late January 2019 based on BCS, expected calving date and feed budget starting December 2018. Start of calving for the autumn herd was mid-March 2019.

Results from the 2018.2019 season

	Kg MS/cow	Kg MS/ha	Days in milk	Days in milk for the transition period	Cow LWT Feb (kg)	Empty rate
Autumn	339	908	285	530	599	5%
Spring	400	1155	275		484	13%

The results for the 2018.19 season indicate the autumn herd produced 73 kg MS/cow & 250 kg MS/ha less than the spring calving herd potentially due to the longer lactation through the transition period. The autumn cows gained on average 115 kg liveweight between August and February. The empty rate of the autumn herd was low in the transition year.

	Pasture growth (t DM/ha)	Supplements harvested (kg DM/ha)	In shed blend fed (kg DM/ha)	Silage fed (kg DM/cow)
Autumn	15.01	3255	994	865
Spring	15.06	2103	177	1472

Pasture growth was similar for both the autumn and spring calving farms. There was a trend for winter growth to be higher for the autumn herd in winter & lower in autumn. Supplements harvested & amount fed in shed was higher for the autumn herd. Pasture & maize silage fed was lower for the autumn herd with a high proportion carried over for winter 2019 feed.

A full analysis of the transitional year including production and profitability is currently been done by a DairyNZ Masters student.

DTT Waimate West farm

Objective:

To determine under autumn calving the production and profitability of forage cropping.

Trial design:

The trial is a two-herd, both herds autumn calving, with 63 Jersey cows per 17.2 ha/farmlet, stocked at 3.6 cows/ha. One farmlet is self-contained with a cropping programme, and the second farmlet having purchased supplementary feed. The 2017.2018 season was a transition year to autumn calving. The cows calved in the late winter 2017 but were not mated in spring and were mated in the winter of 2018. Cows were dried off late January 2019 with calving resuming mid-March.

Cropping

For the cropping treatment, 25% of the farmlet was planted in crops, of which 20% was maize for silage, and 5% into kale for winter feed.

Results 2018.2019

	Cropping	**Purchased**
MS/cow	271	275
MS/ha	992	1007
Cow LWT June 2018 (kg)	395	393
Cow LWT 23 Jan 2109 (kg)	456	477
Cow Lwt 30 May 2019	410	421
Pasture growth (t DM/ha)	18.3	17.5
Pasture silage conserved (kg DM/ha)	492	1852
PKE fed (kg DM/cow)	0	0
Maize silage fed (kg DM/cow)	659	521
Maize silage yield – t DM/ha	23.3	0
Cropping costs /ha	$2570 ($0.11/kg DM)	
Maize silage purchased (kg DM/cow)		613
Cost of maize silage purchased $/kg DM		0.38

The cropping herd produced slightly lower per cow & per ha production compared to the Purchased herd. Cow liveweight gain from June to January (drying off) was 61 kg for the cropping herd & 84 kg for the purchased herd.

Pasture growth on the cropping farmlet was 0.8 t DM/ha higher than the purchased farmlet. Pasture silage conserved was significantly higher on the purchased farmlet than the dropping farmlet due to 25% of the area out in the cropping farm.

The maize was harvested in mid-March for an average crop of around 23.3 tonnes DM per hectare.

Empty rates of both herds were similar at 10%.

The trial is to continue for 1 more season (2019.2020). A full economic evaluation will be completed once the trial is fully written up.

DTT Stratford farm

Objective:

To determine system performance, (cow, pasture, economic and environment) of extensive winter use of a covered wood-chip stand-off pad.

Trial design:

The trial was a continuation of the previous season (2017.18). In June 2017, two randomised herds of 83 Jersey cows were assigned to two 25 ha farmlets (stocking rate 3.25 cow/ha). Feed inputs and management were the same for each farmlet except cows in the Winter Pad herd had access to the covered wood-chip stand-off pad when required. Dry cows were fed grass silage and milking cows were fed PKE. Cows in the Winter Pad herd were stood off on the covered pad every evening during winter. Cows were on the pad for around 17 hours most days and up to 21 hours on very wet days. Cows continued using the pad during calving, and the herd were stood off in early spring and late autumn when soils were very wet. All supplements (grass silage for dry cows and PKE for milkers) were fed in the shed.

Cows in the control herd were wintered on pasture and dry cows received grass silage in the paddock. The Control herd were only stood off pasture on races/yards on very wet nights. PKE was fed to the control herd in troughs on the milking shed exit race.

The season

Winter 2018 was drier & warmer than average. Winter rainfall of 507 mm was 107 mm less than average. Soil temperature of 8 degrees C was 1.1 degrees C above average. This resulted in average pasture growth rates over winter being 17 kg DM/ha/day compared to the average of 12 kg DM/ha/day.

Results 2018.2019

	Control	**Winter pad**
MS/cow	352	355
MS/ha	1140	1150
Days in milk	252	255
Cow LWT June 2018 (kg)	406	402
Cow LWT April 2019 (kg)	420	416
Empty rate	12%	10%
Pasture growth (t DM/ha)	14.7	14.6
Supplements harvested (kg DM/ha)	680	648
Supplements purchased (kg DM/ha)	998	998

For the 2018.19 season there was no difference in Milksolids production, days in milk, cow liveweight & pasture growth between the treatments. The control herd had a slightly higher empty rate (2%) & harvested more supplements/ha.

Economics

Total annual costs of the covered pad are estimated at around $200/cow which includes wood chips, cleaning and Repairs & Maintenance & depreciation. The small increase in per cow income of $20/cow & less supplement harvested of the winter pad herd would have resulted in a loss of around $170/cow for the 2018.2019 season.

This compares to the first season where milk production was 5% greater in cows that used the Winter Pad extensively during winter, and when required during spring and autumn, but the net loss was $84/cow for season.

A full analysis of both season's including production, profitability & an overseer analysis is yet to be completed.

Debbie McCallum 7 November 2019