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THE EFFECT OF STOCKING RATE ON THE PROFITABILITY OF DRYLAND AND IRRIGATED PASTURE-BASED DAIRY FARMING SYSTEMS

S.C.VALENTINE and P.A.LEWIS

South Australian Research and Development Institute, Flaxley Agricultural Centre, Flaxley, SA 5153

Previous work has shown that a 50% increase in gross margin per hectare is achievable in dryland pasture-based dairy farming systems when stocking rate is increased from 1.2 to 2.3 cows per hectare and grain concentrate increased from 1.0 to 2.5 tonne/cow.year (Valentine *et al*. 2000). This finding led to the development of a 3-year program to measure the profitability of several dryland and irrigated dairy farming systems with different stocking rates. Data are reported for the first full year of the program.

Five dryland and 4 irrigated dairy farmlets were established at Flaxley Agricultural Centre (latitude 34°52'S, longitude 138°30'E, 800 mm annual rainfall) in the Adelaide Hills in South Australia. The pasture was based on perennial ryegrass with subterranean clover on the dryland farmlets and white clover on the irrigated farmlets. The dryland farmlets were stocked at 2.5, 2.9, 3.3, 3.6, and 4.1 cows/ha and the irrigated farmlets at 4.1, 5.2, 6.3 and 7.4 cows/ha. The dryland farmlets comprised 7-13, 0.67 ha paddocks and the irrigated farmlets 9-13, 0.41 ha paddocks, randomly distributed across the total dryland and irrigated farmlet areas. The irrigated farmlet paddocks were located under a centre-pivot irrigation system. The farmlet herds comprised 19-25 Holstein-Friesian cows (mean liveweight 553±53 kg).

Paddocks were blocked grazed at a target pasture yield of 2200 kg DM/ha leaving a residue of 1200 kg DM/ha. Pre- and post-grazing pasture yields were measured daily with a rising plate pasture meter. Fresh pasture was provided after each milking. All cows were fed 2300 kg DM/year of grain concentrates based on crushed barley and lupin grains and 1500 kg DM/year of purchased hay. Phosphorus fertiliser was applied at 15 kg P/cow.ha and nitrogen fertiliser at 50 kg N/ha after each grazing on the irrigated farmlets and at 50 kg N/ha in autumn and spring on the dryland farmlets. Surplus spring pasture was conserved as wilted round bale silage.

Table 1. Pasture use, milk production and gross margins

	Dryland farmlets					Irrigated farmlets			
Stocking rate (cows/ha)	2.5	2.9	3.3	3.6	4.1	4.1	5.2	6.3	7.4
Pasture use (t DM/ha)	8.2	8.4	8.7	8.0	8.1	16.5	16.5	15.7	13.1
Milk yield (L/cow)	7209	6884	6643	5802	5817	7356	6833	6570	5596
(L/ha)	18064	19670	21913	20798	24078	29640	35792	41716	41633
Fat yield (kg/cow)	285	273	271	244	225	293	265	260	215
(kg/ha)	715	781	894	873	931	1179	1388	1651	1597
Protein yield (kg/cow)	218	209	206	179	175	225	208	199	165
(kg/ha)	547	596	679	641	722	909	1087	1263	1229
Gross margin ($/cow)	614	478	445	154	67	620	522	453	209
($/ha)	1535	1355	1459	553	277	2526	2735	2864	1540

On the irrigated farmlets, pasture use was lower on the farmlet stocked at 7.4 cows/ha compared with the other three farmlets due to more severe grazing (Table 1). On the dryland farmlets, there was a tendency for higher pasture use at the medium stocking rates. Lower milk production and gross margins on the dryland farmlets stocked at 3.6 and 4.1 cows/ha and on the irrigated farmlet stocked at 7.4 cows/ha were due to shortages of fodder within the limits of the feed budget, which resulted in early drying-off of these herds.

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Email: valentine.steve@saugov.sa.gov.au