Practical grazing management for lucerne in NSW western wheat belt

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Productive lucerne pastures are the foundation of profitable and sustainable wheat and sheep farms of western New South Wales. Productive lucerne stands allow farmers to run more stock, produce more wool per head, lambs per ewe and of a higher quality per hectare; than achieved on an annual legume based pastures. Productive lucerne stands enhance the cropping phase by increasing crop yields and improving grain quality.

Farmers recognise the potential for lucerne to enhance their crop and stock enterprises, but failure to correctly establish and manage lucerne stands means the augmentation of crop and stock enterprises may not be realised.

Eastern experts for many years have espoused, that lucerne is most productive and persistent in a 6 to 8 paddock rotational grazing system with grazing periods of 7 days to 21 days and spelling periods of 35 days or more.

On the Western Plains the rotational grazing system is not practical due to large paddocks. Paddocks range from 40 hectares on a well subdivided property, to over 400 hectares in size. A paddock size of 100 hectares is common throughout the western wheat belt. Extensive subdivision is too expensive and would impede the use of large cultivators during the cropping phase. Also, most large paddocks have only one watering point in a lower corner.

Lucerne is most productive and more easily established on the best wheat producing paddocks. Consequently the standlife of lucerne is generally 3 to 5 years on western wheat farms.

These practical problems and constraints placed upon western wheat belt farmers simply means that the rotational grazing of lucerne is not practised.

Some local farmers have obtained both productivity and persistence from lucerne stands, from a predominantly set-stock grazing system. High levels of productivity and persistance can be achieved, provided farmers observe some fundamental rules in accordance with the season, plant development/growth and grazing pressure (Figure 1).

Most productive lucerne stands (with at least 10 established plants per square metre) have been set stocked at 5 DSE/ha from June to November. Over the summer period grazing must be judicious. During the summer (in an "average" year) lucerne stands may be grazed for 21 days at 5 DSE then grazing is deferred for 42 days and the stock are

Table 1. Western lucerne grazing system and average annual rainfall (85 year average measured in mm) for West Walong.

Months											
J	J	A	S	O	N	D	J	F	M	A	M
43	40	39	36	46	35	42	46	38	38	38	41
Set stocking						Deferred stocking					

Figure 1. Lucerne grazing management.

GRAZING A SEEDLING LUCERNE STAND

- Delay grazing until the stand has the crown formed (10% flower) and is well anchored - 14 weeks.
- Graze the stand quickly to prevent selective overgrazing of the lucerne seedlings but do not graze lucerne down below 50 mm.
- Allow the stand 35 days to recover and fully flower in the spring to build up carbohydrate reserves in the tap root.

GRAZING A MATURE LUCERNE STAND

- Graze the lucerne down, but ensure at least 50 mm of stalk remains, to ensure the crowns are not damaged by grazing.
- By retaining some stalk the plant is able to quickly produce new leaves to hasten recovery and regrowth with less depletion of tap root reserves.

SPELLING TIME

- After a harsh grazing a minimum rest period for 35 days between grazing is required. This will allow the plants to replenish tap root reserves to ensure the stands persistence.

TIMING GRAZING

- When the lucerne plant is at the 10% flower stage, the stand has the optimum combination of feed yield and quality.
- The 10% flower stage occurs about a week after the first few flowers begin to appear.
- Tap root reserves are 40% to 60% of maximum capacity at the 10% flower stage.

RECOVERY MANAGEMENT

- To ensure the lucerne stand persists allow it to reach full flower in late autumn and/or early spring.
- Lucerne reaches full flower about two weeks after the 10% flower stage.
- Tap root reserves are replenished to maximum capacity at full flower. The accumulation of carbohydrates in the tap root provides a reserve for the plants to endure grazing stress during winter and summer.

placed on annual legume based pastures or crop stubble paddocks.

The management of the tap root carbohydrate content is fundamental to productivity and persistence of lucerne. After a harsh grazing, the plant draws on the carbohydrate reserves for the new growth. Approximately 14 days after regrowth there may be 100 mm of foliage produced, but root reserves are at their lowest level.

Grazing should be delayed for an additional 14 days so the plant can recruit sufficient carbohydrate reserves to ensure plant survival. Premature grazing may result in stand failure.

Injudicious grazing may sacrifice the stand for a small quantity of feed for a short period of time. A full drought ration of grain costs approximately $0.24/DSE per week. Deferring grazing for 14 days costs $2.40/ha, while the cost of re-establishing lucerne is around $80.00/ha. Do not sacrifice a lucerne stand simply because hand feeding is tedious.

An autumn deferment is also fundamental to lucerne stand persistence. The stand should be quickly defoliated after the autumn break and the sheep removed leaving the bulk of the stalks only partly grazed. When the stand reaches 10% flower recommence grazing at 5 DSE/ha or less. The stand should still achieve full flower in two weeks under this low grazing pressure and replenish carbohydrate reserves.

Climate and the nature of the lucerne plant during autumn influences the level of carbohydrate accumulated in the tap root. It is the carbohydrate reserve that enables the lucerne plant to endure

Table 2. Persistence of lucerne measured in the West Wyalong area on properties participating in the "Pastures Pay" GRDC-funded project.

Name	Paddock identity	Area (ha)	Pasture component	Density (plants/m^2) measured in: 1992	1993	1994	1995	1996
Mal Mangelsdorf "Corran", Clear Ridge	Hospital	7	Lucerne	86	34	28	22	18
			Burr medic		365	8	180	102
	Strip	2	Lucerne		50	45	16	18
	Trial	1	Aurora[1]		53	55	16	16
		1	Aquarius[1]		27	33	13	15
		1	Hunterfield[1]		20	15	9	11
Richard Maslin "Minoru", Marsden	A	64	Lucerne		41	33	24	21
			Burr medic		18	5	125	18
Col McIntosh	160	64	Lucerne	72	33	25	15	13
			Oats	2	0	0	0	0
			Subclover	0	0	0	120	36
	Shear Shed	16	Lucerne		82	55	43	28
			Burr medics				65	31
Steve Rutledge	+Crop	15	Lucerne		16	20	11	10
			Subclover		4	1	146	62
			Oats		62			
	-Crop	8	Lucerne		25	25	15	13
			Subclover		3	3	96	40
			Oats		35			

[1]Lucerne cultivars

grazing and climatic stress, exerted during winter and summer. Prudent (grazing) management of the carbohydrate reserves is crucial to stand persistence in the unforgiving western environment.

Local farmers involved in the Pastures Pay project (funded by GRDC) have successfully employed this predominantly set-stock system. Through judicious grazing management they have lucerne stands with 10 to 25 lucerne plants/m^2 after 4 years of grazing (Table 2), and note 1994 was a severe statewide drought year. This practical grazing system also parallels the results obtained from research trials conducted by Roger Southwood and Geoff Robards at Temora Agricultural Research Station, 1975.