

# Rumen fluid pH in lactating cows consuming irrigated annual clovers

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Annual clover-based pastures comprise about 25% of the milking area on irrigated dairy farms in northern Victoria. Changes in the availability and cost of irrigation water may lead to increased areas of annual pastures on dairy farms. In addition, consumption and utilisation of high clover pastures are greater than those of ryegrass pastures. These attributes are particularly important as the production potential of dairy cows increases.

To optimise milk production from pastures, farmers need to utilise supplements to carry more cows through periods of feed shortage and to increase milk protein and fat production per cow. However, clovers are fermented more rapidly than grasses (Williams *et al.* 2005a, b). Therefore, the increased use of annual clovers in conjunction with starch-based supplements may lead to unstable rumen fermentation and poor nutrient utilisation in grazing cows fed supplements twice daily in the dairy.

Available information on fluctuations in rumen fluid pH when cows consume irrigated persian (*Trifolium resupinatum* L.) or subterranean (*T. subterraneum* L.) clovers from experiments in northern Victoria have been reviewed as part of a study into associative effects between herbage and cereal grain based supplements in dairy cows.

Across experiments, mean rumen fluid pH and minimum pH declined as intake of persian clover increased (Table 1). In addition, the time that rumen fluid pH was below 6.0 was longer at higher intakes. The lowest observed minimum pH of around 5.5 might be expected to inhibit the fermentation of cellulose and predispose animals to acidosis, particularly if readily fermentable cereal grains are fed as supplements. Such conditions are likely to lead to high substitution rates and low rumen digestibilities of herbage structural

carbohydrates. In addition, the high digesta passage rates in animals fed annual clovers (Stockdale 1993, Williams *et al.* 2005a, b) may reduce the utilisation of nutrients from a supplement.

Strategies to optimise nutrient utilisation from annual clover based pastures may include integrating their grazing with grazing of perennial ryegrass pastures and supplementation with high quality conserved forage, such as maize silage, as an alternative to cereal grain.

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**Table 1** Intake (kg DM/cow/day), mean and minimum rumen fluid pH and time (hours) in a day for which pH was below 6.0 in dairy cows consuming Persian (p) or subterranean (s) clover herbage.

	Stockdale 1993		Stockdale 1994	Wales <i>et al.</i> 2001	Williams <i>et al.</i> 2005a		Williams <i>et al.</i> 2005b			
Intake	8	15	17	13	12	19	6	10	16	20
Mean pH	6.3	5.8	6.0	6.1	5.9	5.7	6.0	5.9	5.8	5.8
Min pH	5.8	5.6	5.6	5.8	5.5	5.5	5.8	5.6	5.6	5.6
Time	4	>15	>16	7	21	24	11	16	19	20
Clover type	p	p	p	s	p	p	p	p	p	p