BEEF PRODUCTION FROM TROPICAL PASTURE LEGUMES ON CROPPING SOILS

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Beef production in northern Australia is limited by pasture DM production and nutritive value. Current financial pressures are promoting increased use of legume-based pastures to increase protein intake and improve the efficiency of energy utilisation. *Stylosanthes*-based pastures on the lighter textured soils of northern Australia have had a major impact in terms of commercial application. The benefits of legumes on heavier textured soils of the cropping region are also being recognised, aided by the development of more suitable legume species and varieties. The main species released for commercial use include leucaena (*Leucaena leucocephala*), lablab (*Lablab purpureus*), caatinga stylo (*Stylosanthes seabrana*), butterfly pea (*Clitoria ternatea*), burgundy bean (*Macroptilium bracteatum*) and desmanthus (*Desmanthus virgatus*). These species differ in suitability for use as legume only or mixed legume/grass pastures, and for use as either short or long-term pastures.

Tropical legume-based pastures on cropping soils are well suited to beef finishing. They offer high annual growth rates and consequently younger turnoff and improved market opportunities, particularly in the key markets of south-east Asia and Japan. The increase in beef production attributable to legume based pastures compared with native pastures ranges between 0.2 and 0.7 kg/hd/day depending on the seasonal conditions (Table 1).

Table 1. Summary of some measured liveweight gain (LWG) from tropical legume-based pastures adapted to heavy textured cropping soils.

	Native pasture	Sown pasture	Leucaena	Lablab	Caatinga stylo	Butterfly pea	Burgundy bean	Desmanthus
Annual LWG (kg/hd/day)	0.3-0.4	0.5	0.7-0.9	0.8-1.0 (3 months only)	0.5-0.7	0.5-0.7	0.5-0.7	0.4-0.6

The variation in liveweight gain between pastures and between years has important economic implications and the ability to predict such variation would benefit producers by providing a guide for decision making. Relationships between pasture variables and liveweight gain are commonly used in predictive models of animal production. Such relationships are well documented in northern Australia for native grass pastures and stylo/native grass pastures. For example, liveweight gain was related to the green leaf proportion of native pastures near Gayndah (Ash *et al.* 1982), and to the number of green weeks in a year in stylo/grass pastures at Lansdown (Jones *et al.* 1990). For legume-based pastures on cropping soils, such relationships are not well documented in the literature, or have yet to be determined. One example is given by Graham *et al.* (1986), where liveweight gain was related to the proportion of lablab planted in a lablab/buffel grass pasture in central Queensland.

To progress the capability of predicting beef production from legume-based pastures on cropping soils it is necessary to derive relationships between pasture variables and liveweight change. To achieve this, an experiment is being carried out on mixed caatinga stylo/grass, butterfly pea/grass and grass only pastures at Brian Pastures Research Station, Gayndah, south-east Queensland. The pasture variables being measured in parallel with liveweight change include yield, legume proportion, and yield of green leaf/stem and dead leaf/stem. In addition, faecal samples are being taken to give estimates of quality, and the proportion of legume and grass in the diet selected. It is hypothesised that estimates of these parameters will provide a better understanding of the dynamics at the pasture-animal interface, and will improve the capability of predicting beef production from these pastures.

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