

Rate and depth of sowing of sulla (*Hedysarum coronarium*)

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Abstract. Sowing depth had a marked effect on the emergence of sulla (*Hedysarum coronarium*) with only 50 per cent of seedlings emerging from 4 cm depth. Sowing rate also affected the plant establishment density with the optimum rate being 5 kg of seed/ha.

Introduction

Sulla is a deep-rooted, short-lived (2–3 years), perennial legume, suited to alkaline soils of northern New South Wales (NSW), southern Queensland and South Australia. It is highly productive, with an erect growth habit and contains condensed tannins which makes it non-bloating with increased protein digestion, and also reduced worm and nematode burdens. Experience in New Zealand shows increased weight-gain, wool growth, milk production and ovulation rate in sheep grazing on sulla foliage compared with other pastures (Anon 2001).

Sulla is capable of producing more than 20 tonnes of dry matter (DM)/ha over two years which has the potential to supply up to 400 kg nitrogen (N)/ha during this time (Crocker and Hackney 2007). Sulla can grow to 1.5 m in height, although its initial growth habit is prostrate, providing better ground cover and soil protection compared to lucerne. Sulla can be grazed, but it is best suited to forage harvesting or strip grazing, and its short-term nature allows it to fit well into crop rotations.

While sulla has been available in New Zealand for about 30 years, it has not been commercially available in Australia. Three new cultivars, Wilpena[®], Moonbi[®] and Flamenco[®], have just been released in Australia and it is expected that certified seed will be readily available for 2009 autumn sowings. Due to the imminent commercial release of cultivars, key information such as sowing rate and sowing depth under Australian conditions is considered necessary information to enable successful adoption.

Methods

A glasshouse experiment with three replications examined the effects of sowing cv. Wilpena[®] sulla at 1, 2, 3, 4 and 5 cm depths in a loam soil. For each depth, five seeds were soaked for 3 days, germinated and placed in a 17 cm diameter pot and covered with the

pre-determined amount of soil and then watered. Time to emergence and total number of seedlings emerged were recorded for 21 days.

A field study using three replications was conducted in 2007 to assess the establishment of cv. Wilpena[®] sulla at 1, 2.5, 5, 7.5, 10 and 15 kg of viable seed/ha on a Chromosol (red clay) soil. Plots were 4 x 2 m in size and inoculated seed was broadcast by hand and raked in on 23 May 2007. Establishment counts were taken in July and yield was harvested in October and December 2007.

Results and discussion

Depth of sowing

Seeds of sulla are approximately 3 mm in diameter with 200,000 seeds/kg. Although sulla seed is twice the size of lucerne, emergence was dramatically affected by sowing depth (Table 1). Seeds were also slower to emerge from the greater depths, slowing growth and development and so affecting weed competition and dry matter production.

Sowing rate

Establishment densities ranged from 15–255 seedlings/m². This achieved an average establishment of 90 per cent of the viable seed sown. A target density of 25

Table 1. Effect of sowing depth on the time to emerge and emergence percentage of germinated seeds of sulla cv. Wilpena in a loam soil

Planting depth (cm)	Time to emerge (days)	Final emergence (%)
1	3–5	100
2	3–5	100
3	5–8	88
4	6–16	50
5	8–15	25

plants/m² is suggested in New Zealand (Anon 2001) and this was achieved by a sowing rate of 2.5 kg of viable seed/ha resulting in an establishment density of 36 plants/m².

Yields from the different sowing rates varied from 273–845 kg/ha in October 2007 due to dry conditions and from 1,300–3,325 kg/ha in December 2007, following good November/December rainfall (Figure 1). Although sowing at a rate of 2.5 kg/ha met the target plant density, there was a yield penalty. At a sowing rate of 5 kg/ha, yield was 65 per cent of that of the sowing rate of 15 kg/ha for both harvest times, and is considered to be about the optimum sowing rate. Seed price, the need for early feed and ground cover will determine the sowing rates used during the early adoption phase.

Conclusions

Sowing depth and seeding rate had a marked effect on the seedling emergence and plant density of sulla which will influence dry matter production, at least in the first year, of this new promising legume.

Acknowledgments

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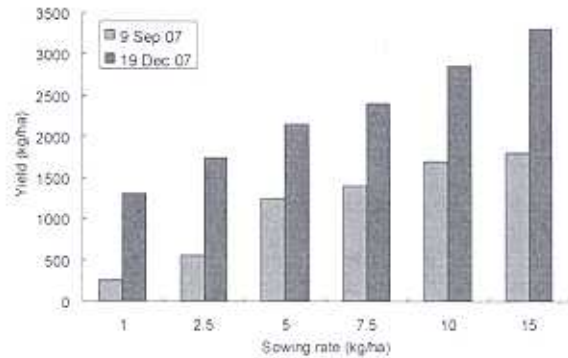


Figure 1. Effect of sowing rate on sulla cv. Wilpena dry matter yields (kg/ha) 5 and 7 months after establishment.

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