Southern Queensland Farming Systems

Information Sheet

Burgundy Bean

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Introduction

Burgundy bean (*Macroptilium bracteatum*) is a short-lived summer growing legume. It is a native to South America, occurring throughout Argentina, Bolivia, Brazil, Paraguay, Peru and Venezuela where the rainfall varies from 400 to 1600 mm.

Burgundy bean was selected for use as a short-term pasture plant on heavy-textured alkaline soils in the subtropics. It is non-bloating and capable of growth at lower temperatures than most other tropical and subtropical legumes, giving it a longer growing season. It is a subtropical equivalent of the more tropically adapted butterfly pea (*Clitoria ternatea*) because of its greater tolerance of cooler temperatures. Burgundy bean is closely related to siratro (*Macroptilium atropurpureum*) but is more cold tolerant than this species.

Use and adaptation

Burgundy bean is adapted to the northern grains belt from central NSW to central Queensland. It is drought tolerant and has shown an ability to survive periods of particularly low rainfall. Burgundy bean should be suitable for locations with an average summer-dominant rainfall between 500 and 1000 mm per annum.

The ability of burgundy bean to germinate and grow at lower temperatures than other tropical legumes (e.g. lablab) is one of its advantages. It has a longer growing season than other summer legumes and can thus be used in more southerly regions. In these colder areas, top growth will be killed by frosts, but most plants will regrow the following spring.

In Australia, burgundy bean is adapted to a variety of soils ranging from slightly acid to alkaline sandy loams to cracking clays, but is particularly adapted the heavy, alkaline clay soils found in the northern grain belt. It will not tolerate waterlogged soils.

Figure 1. First year burgundy bean production at Roma, Queensland in 2005.

Burgundy bean has shown great potential as a ley legume to provide nitrogen in cropping rotations. In Queensland trials (Whitbread et al. 2005) three years of burgundy bean increased soil nitrate levels by more than 100 kg/ha before the next wheat crop. This raised the protein content in that crop from 12.6% to 14.1%. In another trial comparing the effects of 3 years of lablab, butterfly pea and burgundy bean on the following wheat crop, the highest grain yield was after burgundy bean and the protein content was 16.5%.

Varieties

Commercial burgundy bean seed contains a mix of 2 cultivars: Cultivar ‘Cadarga’ is an upright form, which is short-lived and relies on good seed production and seedling recruitment to persist. Cultivar ‘Juanita’ is low-growing and longer-lived. The mixture of these two lines provides the benefits of good seedling regeneration and plant persistence. Commercial seed is produced by and distributed by Heritage Seeds.

Description

Burgundy bean is a twining and trailing perennial that can grow to 80 cm high. It has trifoliate leaves with the two lateral leaflets having a distinctive single lobe. Each leaflet is 3–6 cm long and 3–4 cm wide. Leaves are often hairy which confer some drought tolerance but do not affect palatability.

Burgundy bean produces dark red to burgundy coloured flowers, which give the plant its common name. The plant flowers in about 90 days after sowing, but drought conditions can reduce this to 50 days. In the first year flowering does not generally occur until late summer (about February) but in regenerating pastures flowering can occur as early as October. Seed pods are 5-10 cm long, thin and slightly curved, and contain about 9–17 almost cylindrical, light brown to dark reddish-brown mottled seeds.

Figure 2. Burgundy bean foliage

Establishment and management

Sowing

Burgundy bean should be sown at a depth less than 30 mm into a fallowed, prepared seed bed. Recommended planting rate for uncoated seed is 2–5 kg/ha and 4–8 kg/ha for coated seed.

Seed is relatively large (about three times the size of lucerne - 160 000 seeds/kg) and can establish in crusting soils. It can be planted like lucerne through a small seed box or direct drilled at row spacing less than 0.5 m – wider rows may result in weed problems in the inter-row.

Burgundy bean can be sown from October to January—the earlier sowings are preferred as it allows a longer period of production and enables greater seed set in the first year to maintain or increase stand density in subsequent years.

Seedlings grow rapidly, although they compete poorly with some weeds species and well-established grasses. In particular, spring weeds such as liverseed grass (*Urochloa panicoides*) should be controlled, as they can severely reduce established plant numbers.

Figure 3. Burgundy bean establishment after direct drilling into crop stubble

Inoculum

Burgundy bean requires specific root nodule bacteria and should be inoculated with strain CB1717 prior to sowing

Fertiliser

If effectively nodulated, burgundy bean like other legumes fixes its own nitrogen and can supply substantial nitrogen benefits for subsequent crops (up to 100 kg N/yr). If soils are low in phosphorus, applications of 10-20 kg/ha P at sowing will improve production. Molybdenum and sulphur may also be necessary in some situations.

Herbicides

No herbicides are currently registered for burgundy bean. Selective herbicides to control grass, or herbicides used on siratro are likely to be safe, but should be tested before broad-scale use. These include the pre-emergence herbicide, trifluralin, and the post-emergence herbicides, acifluorfen, fluazifop-butyl and sethoxydim.

Imazethapyr (Spinnaker®) has also been used successfully in trials as pre-sowing/pre-emergent, post-sowing/pre-emergent or post-emergent herbicide (first or second trifoliate leaf). Pre-emergent application may have some effect on germination and post-emergent application may have some slight effect on seedlings though this is often short-term.

Glyphosate (Roundup®) has also been used to control winter weeds when burgundy bean is dormant and has been used at low application rates on mature plants to control emerging weeds.

Grazing

Burgundy bean is extremely palatable and is preferentially grazed. Consequently, grazing must be carefully managed to prevent it being grazed out, especially in a mixed pasture. Burgundy bean may be grazed 10-12 weeks after sowing. The first grazing should not be too severe leaving most of the stem to enable rapid regrowth.

If long-term persistence is the goal, burgundy bean pastures will require periods of spelling or lenient grazing to allow sufficient seed set each year to maintain stand density. It may also be necessary to graze the pasture heavily in early spring to allow the recruitment of legume seedlings.

Compatibility with other species

Burgundy bean can be combined with grasses in mixed pastures. However, it can be difficult to maintain in the stand for more than 3-4 years owing to its high palatability, which leads to it being selectively grazed and lost from the stand. Thus, it is considered a short-term phase legume rather than a plant for permanent pastures. The rapid growth and establishment of burgundy bean means that it might be used as a pioneer species in pastures, combined with other legumes such as butterfly pea (*C. ternatea*), desmanthus (*Desmanthus virgatus)* or caatinga stylo (*Stylosanthes seabrana*), which are comparatively low yielding in their first year but can persist for much longer.

Pests and diseases

No major pest or disease problems are yet evident in burgundy bean, although both cultivars can show leaf symptoms of bean mosaic virus. This appears to have little effect on productivity. It is susceptible to bean fly (*Ophiomyia phaseoli*), the green vegetable bug (*Nezara viridula*) and a range of flower-eating caterpillars. Insect control during flowering and seed set is critical in seed crops.

Herbage production and nutritional quality

The growth period of burgundy bean begins in September and finishes when frosted in late autumn. In good growing conditions and in pure or nearly pure swards, burgundy bean will produce 5–8 t/ha/yr of DM in the first year. Although annual lablab will produce more than an establishing stand of burgundy bean, it requires resowing in the second year. Burgundy bean yields in the second year have been measured between 2 to 6 t DM/ha.

Figure 4. Lablab often has greater production than burgundy bean in the first year.

Burgundy bean is non-bloating and highly palatable. As with other legumes herbage is high in protein (20% crude protein) and digestibility.

Despite its slightly lower quality than some other summer-growing legumes (e.g. butterfly pea and lucerne), animal growth rates on burgundy bean are good, ranging from 0.6–0.9 kg/hd/day. The latter figure is from steers grazing burgundy bean dominant pastures for 71 days. Annual live-weight production of 60 and 170 kg/ha has been measured.

Seed production

Flowering in a first year burgundy bean stand does not usually begin until February, but in regenerating pastures it may start flowering as early as October and carry on until late autumn.

Seed maturity is not uniform and the seed pod shatters easily. Hence, direct heading is feasible but inefficient in seed recovery. Even though the seed (smooth, naked and oval) is not ideally suited to suction harvesting more seed is successfully recovered by this process. In commercial seed production systems, an un-modified Horwood Bagshaw clover harvester has been used successfully. Seed production from both cultivars is approx. 1 t/ha with 80–90% recovered by suction harvesting. Seed can be harvested 6–8 months after sowing.

Figure 5. Mature seed pods of burgundy bean

Hardseed

Seeds are generally hard seeded (they will not let water through the seed coat to allow germination) when freshly harvested, but this breaks down rapidly. Thus, germinating seedlings may be a problem in the first couple of crops following the removal of the burgundy bean, but this is unlikely to persist long-term.

Seed that has been harvested and stored should be checked for germinability prior to sowing and, if it retains a high proportion of hard seed (e.g. >70%), it should be mechanically scarified.

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References and further reading

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