

Register of Australian Herbage Plant Cultivars

B. Legumes

25. *Biserrula*

Biserrula pelecinus L. (*biserrula*) cv. Casbah

Reg. No. B-25a-1

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Origin

Biserrula pelecinus was one of the most outstanding legume species identified by the CLIMA P3 pasture research program in its search for alternative legumes to subterranean clover and annual medics (1992–97). The basis for selection of the cultivar Casbah was high herbage yield and seed production, good regeneration despite a high level of hardseed and an acid tolerant microsymbiont. Casbah was developed by single plant selection among 29 genotypes of *biserrula* in evaluations conducted by A. Loi, J. G. Howieson and S. J. Carr (Howieson *et al.* 1995; Loi *et al.* 1996, 1997a). The original seed (MOR99) was collected near Oued Zem, in Morocco by P. Beale, A. Lahlou and M. Bounejmate in 1988 (Beale *et al.* 1991).

Field evaluation and the selection for the specific *biserrula* microsymbiont were conducted in Western Australia at CLIMA and Agriculture Western Australia.

Casbah has been approved for registration by the CLIMA Commercialisation Committee and has provisional protection under Plant Breeders Rights legislation (Loi *et al.* 1997b).

Morphological description

Biserrula pelecinus an annual ± pilose herb up to 40 cm tall. Leaves imparipinnate; stipules rather papery, ovate-lanceolate, entire, up to 4 mm long and 2.5 mm wide; rachis up to 12 cm long; leaflets usually opposite in 5–9 pairs, elliptic-oblong, up to 10 mm long and 5 mm wide, cuneate at the base, notched at the apex, pilose beneath, glabrous above. Racemes axillary, rather dense, shorter than the subtending leaf, 1–11 flowered, the peduncle up to 3 cm

long; bracts linear-lanceolate, 1–2 mm long; pedicels 1 mm long, spreading in fruit. Corolla bluish or reddish, glabrous, standard elliptic-oblong, ± 5 mm long, and 3 mm wide; blade of wing ± 3 × 1 mm; claw 1.5 mm long; blade of keel ± 3 × 1.5 mm, auricle ± 1 mm long. Only 5 stamens fertile. Pod shortly (± 1 mm) stipitate, glabrous or appressed pubescent, brown, indehiscent, oblong, flat, with a crest at each side which is usually coarsely toothed, up to 35 mm long and 7 mm across from crest to crest, narrower at the septum (which is only 0.3 mm wide) than on each side (± 1 mm). Seed yellowish-brown, ± sculptured, deeply and narrowly notched at the hilum, ± 1.8 × 1.8 mm (Gillet *et al.* 1971).

Casbah is a diploid ($2n = 16$) annual herb, with a prostrate to semi erect growth habit up to 30 cm in height, with lateral branches up to 70 cm in length. Leaves imparipinnate; stipules rather papery, ovate lanceolate; there are 3 leaflets on the first leaf increasing to 23 leaflets at maturity, elliptic-oblong, about 9.0 mm long and 5.0 mm wide, cuneate at the base, notched at the apex, pilose beneath, glabrous above. Racemes axillary, rather dense, shorter than the subtending leaf, beginning with 5 flowers per raceme and increasing to 7 flowers. Corolla violet (88D), glabrous; standard elliptic-oblong, cuneate at the base without appendages. Pod glabrous, brown, indehiscent, oblong, flat, with crest at each side, which is usually coarsely toothed, 34 mm long and 8–9 mm wide. Each pod contains about 20 seeds. Seeds yellowish, deeply and narrowly notched at the hilum, 1.2 mg (Loi *et al.* 1997a, 1997b).

Agronomic characteristics

Casbah is an early to mid-maturing cultivar, commencing flowering between 100 and 105 days at Perth, Western Australia, after a mid-May sowing. It is well adapted to a wide range of soil types and pH levels, but does not tolerate waterlogging and deep infertile sands, where serradella cultivars are the only current legume option. Casbah can be used as a mixture with either subterranean clover and serradellas in acid soils or medics on neutral to alkaline soils. It is very important to sow Casbah no deeper than 2 cm to obtain optimal establishment. *Biserrula* seedlings appear to survive short periods of drought much better than most other temperate annual pasture legume species. It has a deep root system (over 2 m) (Carr *et al.* 1999), which is very important for plant survival during long periods of drought and to provide green feed for a longer period in the spring and summer.

Spring herbage yields of ungrazed and grazed Casbah in Western Australia range from 2.5 to 10 t DM/ha, which compares favourably with pink serradella, yellow serradella and subterranean clover (Carr *et al.* 1999; Loi *et al.* 2000). Casbah has very good quality forage in terms of dry matter digestibility (80.2%), metabolisable energy (11.5 MJ/kg DM) and crude protein (20.7%) compared with subterranean clover cv. Trikkala (74.5, 10.6 and 15.2, respectively) and pink serradella cv. Cadiz (69.1, 9.8 and 16.3, respectively) when grown under the same conditions.

Experience has shown Casbah to be as tolerant as subterranean clover to heavy grazing, and to provide green feed for an extra 2–4 weeks compared with subterranean clover in a normal year.

This is because of a combination of deeper roots and inherent drought tolerance in association with a semi-determinate growth habit. It is a prolific seed producer, with seed yields ranging from 300 kg to 1500 kg/ha, and because of its very small seed size (one-sixth of the size of subterranean clover) this translates to very high seed numbers (Nutt and Loi 1999; Loi *et al.* 2000). In 1999 at Tincurrin, Western Australia, with 370 mm rainfall, when biserrula was subjected to a heavy stocking rate of 35 sheep/ha for 3 weeks, followed by 12 sheep/ha from mid-October to the mid-January, it was able to set almost 400 kg seed/ha, whilst the ungrazed control plots reached over 1 t seed/ha (A. Loi and B. J. Nutt pers. comm.). The prostrate growth habit and the small seed size (1 mg) provide very good persistence under both heavy winter and spring grazing (Loi *et al.* 1999a). About 40% of the seed can survive ingestion by sheep (Edward *et al.* 1998). Therefore, summer grazing is unlikely to harm stand density or long-term persistence.

Casbah has an acid tolerant microsymbiont (*Mesorhizobium* spp.) (Nandasena *et al.* 2001) which can persist and give excellent nodulation on soils with pH (CaCl₂) as low as 4.0 (Howieson *et al.* 1995; Loi *et al.* 1999b). Although slow to nodulate in the first growing season, nodulation of Casbah in the second and subsequent year is excellent.

The hardseededness of Casbah and its pattern of softening suggest that it is ideal for ley farming systems (Loi *et al.* 1999a). Several advantages may accrue from the inclusion of biserrula in the rotation. First, because of the ability of large seed numbers to survive ingestion, Casbah does not need to be managed as carefully as annual medics during summer grazing. Second, the hardseeds of Casbah become germinable over the end of summer–autumn, allowing a large proportion of the seed bank to escape false breaks, which are the main cause of poor regeneration of subterranean clover. Finally, high seed yield and hardseededness suggest that Casbah will survive in the seed bank for many years. If so, Casbah can be used as a tool to control herbicide resistant weeds (e.g. ryegrass) by chemical fallowing in the spring, as seed set is not required in every pasture year. Therefore, spraytopping, which can seriously limit the persistence of softer seeded species in crop rotations, can be applied to Casbah pastures without jeopardising long-term persistence.

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