Native scurf pea

Scientific name(s)

Cullen australasicum (Schltdl.) J.W.Grimes

Strengths

- Excellent drought tolerance
- High warm season productivity
- Deep rooted perennial legume
- Can retain leaf through extensive dry periods over summer
- Good seed production
- Good nutritive value

Limitations

- Sensitive to overgrazing and will require good management to ensure survival
- Pods readily dehisce
- Moderately sensitive to frost, especially when young
- Variation in levels of furanocoumarins
- Conflicting observations on palatability with sheep

Plant description

Plant: Herbaceous short lived (5+ years) perennial sub-shrub (habit variable between ecotypes: prostrate to erect) that can become woody at base and can grow to 0.5-2.5m in height and 0.5-1.5m in width.

Stems: Stems can become woody with a diameter of ~15 mm at the base and are usually densely covered with soft, spreading or downward-turned hairs.

Leaves: Leaves trifoliate. Leaflets ovate, the margins denticulate, glabrous to sparsely hairy above, usually pubescent below, at least on the veins. Leaves grow to around 12cm long with leaflets mostly 1-5 cm long and 1-3 cm wide.

Seedhead: Inflorescence. An axillary raceme of almost sessile flowers in groups of three initially condensed becoming widely spaced along the 5 to 30 cm-long rachis.

Flowers: Flowers small, 5 to 8 mm long. Corolla light pink, pink or purplish, clearly longer than calyx. Calyx 4-5.5 mm long, densely pubescent, the hairs black, brown, grey, white or mixed, thinning with age, the lowest lobe only slightly longer than the others, not as long as the corolla.

Pods: Pods are obliquely egg shaped, compressed and hairy, 3.5-4.5 mm long (shorter than calyx) by 1.5 mm wide. Each contains one seed and dehisces enclosed in calyx.

Seeds: light brown/brown, egg/kidney-shape; ~4 mg.

Pasture type and use

The target farming system for C. australasicum is a livestock operation in the lower rainfall zones of the wheatbelt.
Best suited as a risk management option to reduce the economic and environmental risks in cropping marginal land in a low rainfall environment or as a tool to manage herbicide resistant weeds.

Where it grows

Rainfall

C. australasicum occurs naturally in the arid zone of Australia in low rainfall environments, although predominately occurs along dry creek lines and depressions.
Best suited to agricultural areas receiving a minimum average rainfall of 250-500mm.

Soils

Occurs on loam to clay alkaline soils (Soil pHH2O: >5.5) or in depressions, rarely on sandy soils and then probably only on duplex sands. Well suited to deep heavy textured soils. Will grow on soils with pH CaCl >4.5.
Tolerates moderate waterlogging, salinity and sodic soils.

Temperature

Sensitive to frost (especially young plants).
Grows mainly during spring and summer and is dormant in winter.

Establishment

Companion species

Best used as a companion to winter active species.

Grasses: Temperate exotic and native grass species. Summer active grasses may compete when grown together and have potential to reduce productivity.

Legumes: Winter annuals such as medics and clovers.

Herbs: Chicory.

Further research is required to best determine what species will be the ideal complement to provide a balanced feed source to livestock during dry seasons.

Sowing/planting rates as single species

6-8 kg/ha (seed or scarified pods)

Sowing/planting rates in mixtures

2-3 kg/ha

Sowing time

C. australasicum can be sown in autumn in areas not affected by severe frost or early spring especially in areas where late spring and summer rains are reliable.

Inoculation

There are no commercial inoculants currently available for *C. australasicum*. Published data reports strains SRDI507 and SRDI483 to be highly effective, achieving close to maximum symbiotic potential.

Fertiliser

No information

Management

Maintenance fertliser

There is little information available on the benefits of fertiliser application or the nutritional requirements for *C. australasicum*.
Initial studies indicate that is it well adapted to low fertility soils especially soils low in phosphorus.

Grazing/cutting

Limited studies have been undertaken to determine grazing management and experience is mainly restricted to observations of grazing on natural stands. *C. australasicum* is highly palatable (especially by cattle) and will rapidly decline under set stocking or continual grazing. Initial studies suggest newly established plants should only have a light grazing and can then be rotationally grazed with high stocking rates for a short period (up to 2 weeks), followed by a 3 month recovery period. Further research is required to determine how best this species will tolerate grazing and persistence when established as a monoculture.

Seed production

Prolific seeder. Yields > 5000 seeds per plant.
Grazing can limit the amount of seed produced.
Wild types shed pod readily and improved pod retention is a major focus of current breeding efforts.

Ability to spread

Recruits well from seeds in third year and is hard seeded.
No information available on survival after digestion by animals.
Contains no adaptations to adhere to coat/hooves etc of animals.
No specific adaptations to wind or water dispersal.
Does not reproduce vegetatively.
Early indications suggest it is unlikely to rapidly colonise a site.

Weed potential

The weed potential of *C. australasicum* has been assessed at low to negligible. It has low levels of invasiveness and its impact on the biodiversity of natural ecosystems would be marginal. The species is not known to inhibit the establishment of other plants but may establish under natural grasslands and become large and obvious, although it is unlikely to severely alter the strata of these ecosystems.

Major pests

Heavy infestations of the aphid *Acyrthosiphon kondoi* Shinji (bluegreen aphid) will impact on growth and together with *Halotydeus destructor* Tucker (red-legged earth mite) and *Sminthurus viridis* L. (lucerne flea) can cause significant damage to young plants, especially seedlings. Variation in resistance to bluegreen aphid has been recorded within C. australasicum and all tested populations were tolerant to *Therioaphis trifolii* Monell f. *maculate* (spotted alfalfa aphid). Widespread resistance in *C. australasicum* to pasture webworm (*Hednota* spp.) has been observed.
C. australasicum is reported to be a natural host of common pests of cotton including *Helicovera armigera* Hubner (cotton boll worm) and *H. punctigera* Wallengren (native bud worm) *C. australasicum* is also a host for the lime or chequered swallowtail butterfly (*Papilio demoleus sthenelus* W.S.Macleay and other natives including *Lampides boeticus* Linnaeus, (Long-tailed Pea-blue) and *Zizina labradus labradus* Godart (Common Grass-blue) butterfly.

Major diseases

Wilting, leaf curl and necrosis has been observed on young *C. australasicum* plants in trial plots and was verified as Alfalfa Mosaic Virus (AMV). It is probable that *C. australasicum* hosts many other pathogens. However, there has been no research conducted to identify and quantify the effect of these.

Herbicide susceptibility

There are no herbicides currently registered for weed control in C. australasicum.
From trial work, *C. australasicum* appears relatively tolerant to trifluralin (Treflan®), clethodim (Select®), pyridate (Tough®) imazamox (Raptor®), flumetsulam (Broadstrike®), fluazifop (Fusilade®), propyzamide (Kerb®), diflufenican (Brodal®), MCPA and diflufenican & MCPA (Tigrex®). Depressed root biomass has been observed with Bromoxynil and MCPA (Bromicide®). Results may vary dependent on the stage of plant development, season, soil type and rate of application and more work is required to determine the tolerance of C. australasicum to a wider range of herbicides including glyphosate.

Animal production

Feeding value

C. australasicum is relatively high in nutritive value with leaves comparable to lucerne. During vegetative growth dry matter digestibility is in the range of 78-88% for leaves and 61-71% for stems. Crude protein ranges between 22-28% and 15-27% for leaves and stems respectively and combined metabolisable energy is around 10-13 MJ/kg. Values decline during seed set.

Palatability

Palatability of *C. australasicum* is generally high but will be dynamic depending on a range of factors including the choice of other species on offer, the nutritional requirements and the experience or learned behaviour of the livestock.

Production potential

Production potential of *C. australasicum* is high, especially under favourable conditions during the warmer months, with the capacity to produce over 25 tonne dry matter per hectare. There is currently no data available on livestock performance on *C. australasicum* and it is strongly recommend that livestock managers routinely test for nutritive value and employ corrective complementary feeding strategies as required.

Livestock disorders/toxicity

Members of the Cullen genus are known to produce isoflavones and furanocoumarins, which can cause photosensitisation. Seeds may have high concentrations of these chemicals. Although there are no reports of *C. australasicum* causing damage to stock, further research is required and animals should be removed if symptoms appear.

Cultivars

There are no cultivars of Cullen australasicum currently available. The species is the focus of breeding efforts within SARDI and the CRC for Future Farm Industries.

Further information

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