

Carn2ac

Trigonella balansae Boiss. and Reuter (common name: Sickle pod fenugreek/ Trigonella)

Timeline:

SA5045 was sourced from University of Uppsala Sweden and evaluated in the late 1990s by pasture researchers in WA. During this time, seeds were only taken from the pods that were retained on the mother plant in each season, therefore selecting towards pod-retention, an essential agronomic trait. In 2019-2023 Murdoch University hosted nationwide field experiments of a selection from the original germplasm (SA5045early) for agronomic performance in the eastern wheatbelt of WA and western wheatbelt of NSW. Carn2ac was identified to be well adapted to fine-textured soils in the low to medium-rainfall zone of southern Australia (200 to 450mm annual rainfall).



Key benefits:

- Highly productive pasture legume
- Inoculant group: AL
- Rainfall 200 to 450mm
- High yielding
- Used for cover cropping, brown manuring, sheep grazing and mixed species.
- Hard seeded
- Early Flowering (76 days)
- High Nitrogen Fixation
- Crops grown after Carn2ac require less fertiliser N
- Suited to medium and fine textured alkaline -mildly acid soils
- Helps reduce root diseases in crops

Characteristics:

Trigonella (Trigonella balansae) as a wild plant is native to Eurasia. The species was found to complement medics on fine-textured soils in Australia. Compared to medics, Carn2ac has improved pod retention, better harvesting and processing, is a more obligate fixer of nitrogen and can be dormant-summer sown, a process that allows unprocessed (unscarified) seed to be sown without any external expenses of seed cleaning. This is unique to this accession of Trigonella. Carn2ac has an upright growth habit and can grow up to 60-80cm in height. It sets pods at the top of the plant, allowing harvesting by conventional open front combine harvesters, and has a root system up to 1.4m deep.

Further characteristics include:

- Black venation on the stipule
- 76 days to flowering (at Northam, WA)
- Yellow flower colour
- Orange seed colour
- Seed size 1-2mg, season dependent
- Paper sickle shaped pods containing an average of 5 seeds
- Curry smell when flowering
- Requires tripping by pollinators for seed set



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Agronomic value

Important selection criteria for Carn2ac were its ability to retain pods after maturity, the suitability of these pods for direct harvesting and its unique hardseed breakdown pattern that is suited to dormant summer sowing. These characteristics give it advantages over the traditional annual medics suited to the same soil types. Experiments through 2023 and 2024 confirmed this at Narembeen, WA, where up to 260 kg/ha of a clean seed sample was obtained.

Carn2ac also produces high levels of nitrogen fixation and biomass on fine textured soils with an alkaline reaction. Above ground biomass has reached over 5t/ha in below average seasons, with 3.5% nitrogen. At Canna, WA, wheat yields after Carn2ac were over 4t/ha (9.5% protein) in 2021, cf. wheat after wheat that yielded 2.5t/ha (6.8% protein) with 0kg/ha applied to the wheat.

Other attributes include an ability to withstand some transient waterlogging.

Evaluation of grazing potential in the wheatbelt of WA showed that it did not taint meat products after ruminant consumption.



Harvesting and Yield

Yields of 200kg/ha in 2023 (150mm annual rainfall) and in 2024 260kg/ha (280mm annual rainfall)

When Harvesting with a cereal header the pods are thrashed, releasing bare seed and therefor lowering cleaning costs.

Seed is certified

Sowing rates (pure seed stand) 4 to 5kg

Mixed Species (seed mix) 2 to 3kg

Management - for more information access the link. https://grdc.com.au/resources-and-publications/all-publications/publications/2023/pasture-legumes-manual/_nocache

