

Green Cumin – is it a new break crop for the Eyre Peninsula?

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RESEARCH

Searching for answers



Location:

Minnipa Agricultural Centre, paddock S5

Rainfall

Av. Annual: 325 mm

Av. GSR: 241 mm

2015 Total: 333 mm

2015 GSR: 258 mm

Paddock History

2015: Vetch

2014: Wheat

Soil Type

Calcareous red sandy loam

Plot Size

2 m x 10 m x 4 reps x 4 ha block

Location:

Piednippie

Rainfall

Av. Annual: 290 mm

Av. GSR: 230 mm

2015 Total: 254 mm

2015 GSR: 212 mm

Paddock History

2015: Canola

2014: Wheat

2013: Grass free medic pasture

Soil Type

Grey highly calcareous sandy loam

Plot Size

2 m x 10 m x 4 reps

Location:

Port Kenny

Rainfall

Av. Annual: 400 mm

Av. GSR: 300 mm

2015 Total: 284 mm

2015 GSR: 241 mm

Paddock History

2015: Canola

2014: Barley

2013: Wheat

Soil Type

Calcareous loamy sand

Plot Size

2 m x 10 m x 4 reps

- It survived trials on Eyre Peninsula in 2015 sufficiently well to encourage another look.
- *Alternaria* fungal disease is a major threat.
- Its low and slow growth will complicate harvesting and weed control.

Why do the trial?

Cumin is a herb in the parsley and carrot family which is grown in northern India and the Middle East. The seed is used as a traditional spice ingredient of kormas, masalas, and soups, and forms the basis of many other spice blends. Global production is estimated at around 600,000 tonnes. Elite cumin varieties are being evaluated across a range of Australian locations because of its high value (up to \$2,000 per tonne). SARDI were approached by Blue Ribbon Seeds and Pulse Exporters Pty Ltd to investigate its viability in southern Australian environments. It is also being tested in Western Australia. Regional site selection is based on conditions that best replicate where cumin is already grown in India and the Middle East, including the following characteristics:

- Neutral to alkaline sandy loams over heavier subsoils.
- Regions with a well-defined and reliable early break to the winter season. Ideally cumin prefers most of the in-crop rainfall in the first half of the season and then a dry finish.
- Dry spring conditions to minimise *Alternaria* fungal infection.

The attraction of cumin as a potential new crop for upper Eyre Peninsula is that it has a reputation for being drought tolerant, is unrelated to other current crops or pastures, produces a high value commodity, a market is already established and, although an

entirely new plant for southern Australia, has some herbicides and pesticides already suitable for use. Its weaknesses are that it is not a tall crop (typically only 30-50 cm high) and is a poor competitor with weeds.

The agreement with Blue Ribbon Seeds was for SARDI to undertake initial evaluation of an elite cumin line at a range of locations on the upper Eyre Peninsula. Blue Ribbon would also undertake assessment of cumin quality (oil quality) attributes within their international markets.

How was it done?

Four replicated trials were established, three on the upper EP (Minnipa Ag Centre, Piednippie, Port Kenny) and one on lower EP (as a high rainfall comparison). While cumin has a reputation for being a tough crop which requires few inputs, we know little of the agronomic needs of this crop under EP conditions. For this reason, each trial was set up with 3 treatments (low, medium and high input). Medium input was a package of 23 kg/ha of pelleted seed and 50 kg/ha of DAP applied with the seed which was recommended by Blue Ribbon Seeds for a crop yielding 1 t/ha. The low input package was 15 kg/ha of seed and 25 kg/ha of DAP while the high input was 33 kg/ha of seed with 50 kg/ha of DAP plus 50 kg/ha of urea in season. Trials were sown in late April (Piednippie and Minnipa) and mid May (Port Kenny) at 1-2 cm.

Weed control was achieved with a pre-seeding application of a knock down (Sprayseed or glyphosate), 1.5 L/ha of Triflur X, in crop application of Select for grass control and 1.2 L/ha of Linuron (a horticultural herbicide) for broad leaved weeds.

Key messages

- Green cumin (*Cuminum cyminum*) is a tap-rooted herb grown extensively in India and the Middle East for its grain.

Table 1 Strengths and weaknesses of green cumin.

Strengths	Weaknesses
Very high value product	Yields in 2015 were low
Unrelated to current crops and pastures so should have different disease and pest profiles	Very vulnerable to <i>Alternaria burnsii</i> foliar disease
Survived some pretty tough periods during 2015	
Grew extremely well in some patches and looked very healthy despite calcareous soils	Despite its strong aroma, can be a target for pests late in the season
Despite being short, seeds are held near the top of the plant and stems are quite tough	It is a short crop so harvesting low enough can be an issue
Established well despite some very marginal and rough seeding conditions	Performance over a range of local seasons and soil types still unknown
There are herbicides available which will control broadleaved and grassy weeds	Slow to establish and grow so a poor competitor with weeds
A market already exists. Cumin is the second largest traded spice in the world, behind pepper	

Early pest control was achieved with a pre-seeding application of 1 L/ha of Lorsban and for Piednippie, an in crop application of 185 ml/ha of Elantra Xtreme plus 500 ml/ha of Astound Duo was also used.

A broadacre strip of cumin was also set up and managed on Minnipa Agricultural Centre by the farm staff. This strip was approximately 3 hectares in size and was sown with the Horwood Bagshaw precision bar on 24 April. The strip was sown with 15 kg/ha of pelleted seed and 60 kg/ha of DAP after a knockdown spray of 1.2 L/ha of Gramoxone 250 and 1 L/ha of Triflur X. In crop weed control was Clethodim for grasses and 1.2 L/ha of Linuron for broad leaved weeds.

What happened?

For the two sites which were sown under reasonable conditions (MAC broadacre and Wanilla), plants emerged and established well, but for the other sites emergence was slow and patchy. An even stand of plants eventually developed in the Minnipa small plot trial, but early growth at all sites was slow.

Wet conditions during August triggered an epidemic of *Alternaria burnsii* (a fungal disease which attacks the canopy and flowers) in the cumin stands. This disease is well known in cumin overseas but was not expected on EP given that this was the first time that cumin had been grown in the area. While patchy in the broad acre strip, this epidemic decimated most of

the small plot trial and only one replicate was harvested.

While slow, the remaining healthy cumin plants developed to budding at Minnipa by the beginning of September. Late in grain filling, seed in the broadacre strip was extensively chewed by a pest (SARDI entomologists are confident it was earwigs) but in the better areas cumin yielded 400 kg/ha of uncleaned seed (current contract prices for cumin are \$1,800 per tonne). The remaining replicate of the small plot trial yielded 200-300 kg/ha of uncleaned seed.

Despite the poor season at Port Kenny (GSR of 241 mm), cumin survived (just) and yielded about 150 kg/ha of uncleaned seed, regardless of management package.

The Piednippie site was always severely drought-stressed and was not harvested. The cumin at least survived the very tough conditions up until maturity.

The Wanilla trial was severely damaged by herbicide spray drift early in the season and was not continued.

A sample of grain from our trials will be assessed for quality by Blue Ribbon Seeds.

What does this mean?

Our impressions from this first year of experience with cumin is that it showed sufficient promise to justify further testing of its performance

under upper EP conditions. We are currently negotiating with Blue Ribbon Seeds for another programme of testing in 2016 and we are optimistic that further work will occur.

In summary, the strengths and weaknesses of cumin as a break crop for upper EP, including experiences from 2015 are listed in Table 1.

If work were to continue into 2016, we would improve our management based on 2015 experiences by:

- Rolling after seeding to allow lower and smoother harvesting.
- Late April planting to set up sufficient growth to support yields of 0.8-1.0 t/ha.
- Applying preventative fungicides during wet periods in August-September to minimise *Alternaria* impacts.
- Close monitoring during flowering and grain fill for pests.

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