



RESEARCH SUMMARY

CAS4822

FAST FACTS

PROBLEM

Growers need better understanding of mechanisms behind improved early crop vigour and increased grain yields from on or near row sowing in coastal areas of Yorke Peninsula.

PROJECT

Trials across two contrasting seasons investigated yield benefits of on-row sowing in barley and lentil.

PARTICIPANTS

Central Ag Solutions: Sam Holmes

Agronomy Solutions: Dr Sean Mason

DATES

Start: 1 Jul 2022

Finish: 30 Jun 2024

ON-ROW SOWING BENEFITS ON YORKE PENINSULA - WHAT ARE THE DRIVERS?

Trials showed that on-row sowing benefits are mainly attributed to lower levels of surface salts in the soil at the on-row position. Both lentil and barley recorded significant yield gains associated with on-row sowing compared to inter-row in both seasons which translated to large partial gross margin returns. Soil surveys across coastal areas of YP demonstrated that approximately 40 per cent of paddock zones would benefit from on-row sowing.

BACKGROUND

Yield benefits have been reported with on or near row sowing in coastal areas of Yorke Peninsula. The mechanisms behind improved early crop vigour that lead to increased grain yield were not well understood.

RESEARCH AIMS

The core objectives of the project were to:

- Demonstrate yield benefits from on or near row sowing of previous crop stubble lines under different phosphorus management programs through replicated trials.
- Use on-farm demonstration trials to assess variations in soil type within paddocks.
- Survey soil conditions for 2022 on-row sowing vs near row sowing.

IN THE FIELD

Replicated trials were conducted at Anna Binna, a moderately saline site and Thiepvale, a highly saline site across two seasons to assess the response of barley and lentil to phosphorus applied with the seed in the on-row or inter-row position.

Soil surveys were conducted in 50 paddocks prior to the 2022 growing season, primarily along the western and eastern coasts of YP. Samples were taken either on previous year's sowing lines or in the inter-row at a depth of 0-10cm and fully characterised.

Demonstration sites were established in 2022 and 2023 where growers were encouraged to run strips of crop sown in previous stubble lines adjacent to crops sown in the inter-row. All sites were characterised using previous season NDVI or yield maps.

RESULTS

In replicated trials, soil salinity was significantly higher in the off-row sowing position which hinders crop uptake and the utilisation of applied P in P deficient soils. The increase in salt around the seed causes emergence and early vigour effects which translates to reduced grain yields.

Over two seasons of replicated trials at the Anna Binna site, there was a combined yield increase in barley and lentil of 1.42t/ha in the on-row position at the optimum phosphorus rate of 20kg/ha compared to no phosphorus.

Trends were similar over two seasons at the higher salinity Thiepvale site, with strong yield responses to phosphorus in the barley phase in the on-row position. Lentils recorded no yield gain from applied phosphorus in either sowing position.

Lentils are more sensitive to induced salt from applying fertiliser with the seed, with both sites recording reduced germination and biomass when moderate to high fertiliser rates were applied with the seed.

At both sites significant yield improvements at the optimal phosphorous rate translated into an increase in partial gross margin of over \$800/ha in the on-row position compared to off-row over the two seasons.

Soil surveys demonstrated in the on-row sowing position nitrate N was lower, Colwell P was higher, and salinity was lower. A significant increase in soil moisture in the on-row position compared to inter-row was not recorded consistently across all 50 paddocks.

Results from demonstration sites were similar to replicated trials and paddock surveys. Moisture was higher in the on-row position, particularly at the surface (0-5cm). Nitrate N was higher in the inter-row and concentrated at the surface. Soil salinity was concentrated at the surface but decreased in the on-row position. Low production zones were linked to higher soil salinity and lower available phosphorus.

VALUE FOR GROWERS

Previously, on-row sowing benefits in coastal areas of YP were attributed to higher soil moisture levels aiding establishment. This research demonstrated that lower surface salinity in the on-row position was the main factor driving improved crop performance. While the soil survey also identified higher starting soil moisture and lower surface nitrate levels in the on-row position, trial results confirmed salinity as the significant factor influencing yield. Benefits were observed in barley and lentils, leading to substantial increases in partial gross margin returns.

Where phosphorus is deficient, background and elevated soil salinity in the inter-row position hinders crop uptake and utilisation of applied phosphorus. Salinity levels generated inherently, or with fertiliser applications, were a bigger issue with lentils than barley, where the full benefit of applying P to overcome deficiency was not able to be achieved.

The detailed soil survey across coastal areas of YP demonstrated that approximately 48 per cent of paddock zones would benefit from on-row sowing based on lentil salinity thresholds.

MORE INFORMATION:

Sam Holmes, Central Ag Solutions

T: 0427 700 219

E: sam@centralagsolutions.com.au



Sam Holmes from Central Ag Solutions at lentil field trial site, 2024



SAGIT DISCLAIMER

Any recommendations, suggestions or opinions contained in this communication do not necessarily represent the policy or views of the South Australian Grain Industry Trust (SAGIT). No person should act on the basis of the contents of this communication without first obtaining specific, independent, professional advice. The Trust and contributors to this communication may identify products by proprietary or trade names to help readers identify particular types of products. We do not endorse or recommend the products of any manufacturer referred to. Other products may perform as well as or better than those specifically referred to. SAGIT will not be liable for any loss, damage, cost or expense incurred or arising by reason of any person using or relying on the information in this communication.

CAUTION: RESEARCH ON UNREGISTERED AGRICULTURAL CHEMICALS USE. Any research with unregistered pesticides or of unregistered products reported in this communication does not constitute a recommendation for that particular use by the authors or the author's organisations. All pesticide applications must accord with the currently registered label for that particular pesticide, crop, pest and region. Copyright © All material published in this communication is copyright protected and may not be reproduced in any form without written permission from SAGIT.