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Pushing the boundaries of irrigated crops

First year of the GRDC's 'Optimising Irrigated Grains' research project delivers some pleasing results.

Increasing productivity of irrigated crops is the intent of the Grains Research and Development Corporation's (GRDC) 'Optimising Irrigated Grains' (OIG) project, a collaborative approach spanning four states which is examining all aspects of germplasm and input management with the aim of pushing the productivity boundaries of six irrigated crops (barley, faba beans, chickpeas, canola, durum wheat and grain maize).

Last season, 26 irrigated research trials in winter crops were established at FAR Australia's Finley Irrigated Research Centre (Southern Growers Irrigation Complex) in southern NSW with a further 22 trials conducted by the Irrigated Cropping Council (ICC) at the Kerang (VIC) and Griffith (NSW) Irrigated Research Centres.

At Finley the majority of trials were set up under overhead irrigation (travelling lateral), they each received a total of 125 or 150mm of irrigation (1.25 - 1.5 Mega L/ha) applied as five or six applications of 25mm. A smaller number of identical trials were set up on a flood irrigation system, each receiving 240mm (2.4Mega L/ha) applied as three 80mm applications. These applications were in addition to a Growing Season Rainfall (GSR) of 244mm April – October.

Flood irrigation trials that received more water through the growing season were in general higher yielding than identical trials grown under the overhead irrigation system. Of the crops evaluated, all gave higher yields in identical plant population trials on the flood irrigation bays with canola yields peaking at 4.91 t/ha (cv 45Y28), durum at 8.2 t/ha (cv Vittaroi) and fabas at 7.45 t/ha (cv PBA Amberley) compared to peak yields under the overhead irrigation trials of 4.27t/ha with canola, 7.25t/ha with durum and 5.17 t/ha with faba beans using the same cultivars.

The majority of the Finley site was characterised by high fertility as a result of fallow in 2019 and a failed faba bean crop affected by drought in 2018.

At Kerang on the grey clay the reverse was the case with the majority of trials set up on a flood irrigation system and the minority under sprinkler overhead irrigation.

Trials that were conducted under flood irrigation were pre-irrigated or watered up in April, using approximately 150mm (1.5 Mega L/ha) of irrigation. Spring irrigation application varied between trials, with most receiving 2 irrigations (approximately 180mm or 1.8 Mega L/ha), with the chickpeas receiving a single irrigation (80mm) and the durums receiving 3 irrigations totalling 280mm. Overhead irrigated trials received between 4 (108mm) and 8 (208mm) irrigations in the spring. Growing season rainfall (April – October) was 250mm, with April rainfall giving a decile 10 start with 88.6mm for the month, which led into a dry winter until August and then a dry finish.

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Flood irrigation trials that received more water (300 - 430mm compared to 108 - 280mm) through the growing season, in general, produced higher biomass than identical trials grown under sprinkler overhead irrigation system. Of the crops evaluated grown on the same site under the same management, canola gave similar yields between the two systems, but flood irrigation resulted in higher yields in durum wheat and faba beans. Canola yields peaked at 4.1 t/ha (cv 45Y28), durum at 10.0 t/ha (cv Aurora) and fabas at 7.8 t/ha (cv PBA Amberley). Peak yields in the overhead irrigation trials were 4.3 t/ha in canola, 6.0 t /ha in durum and 4.6 t/ha in faba beans using the same cultivars.

At Kerang, the fertility was relatively high as a result of brown manured dryland vetch in 2019.

Nick Poole, FAR Australia's managing director and OIG project lead said these first-year results have surpassed the expectations of the project team. He says, "2020 was a difficult year with logistics being at the forefront of the many challenges we were faced with. I would like to commend my team from the Mulwala office and the ICC research team for their dedication and determination to beat these obstacles and deliver on the project's protocols. 2021 winter crop trials will be established over the next few weeks with the implementation of the treatments and assessments in the weeks to follow. The focus of 2021 trials build on our previous results and will continue to deliver locally validated, replicated field trial data which will aim to address key constraints of yield and profit in irrigated cropping systems."

For further information on the Optimising Irrigated Grains project, please visit https://irrigatedcroppingcouncil.com.au/research/optimising-irrigated-grains/

A full summary of the provisional winter crop results can be viewed at https://faraustralia.com.au/wp-content/uploads/2021/04/210224-OIG-Provisional-Report-Summary-only-FINAL.pdf

A full copy of the final grain maize 2019/20 research results can be viewed at https://faraustralia.com.au/wp-content/uploads/2021/05/210226-FINAL-RESULTS-Maize-Report.pdf

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