

Manipulation Of Sowing Time And Variety In Lentil And Faba Bean To Improve Modelling Capabilities And Aid In Management Of Abiotic Stress

Lachlan Lake¹

Victor Sadras¹ and Yash Chauhan²

¹ SARDI

² DAF Queensland

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Australian lentil and faba bean production is constrained by extreme temperature and drought. Crop species, variety and sowing time are the main management options for limiting the impact of these stresses. Further insight into optimal management practices can also be provided by crop modelling accounting for management and climate variables. We measured phenology in 10 lentil and 10 faba bean varieties over three seasons (2016 - 2018) and three regions in southern Australia; Hart and Roseworthy in the mid north, Minnipa on the Eyre Peninsula and Bool Lagoon and Conmurra in the South East. Within each location we used six times of sowing, spaced two weeks apart beginning mid-April. For both crops across locations, time to flowering and pod set declined linearly with sowing date. Similarly and across locations and sowing times, flowering was advanced at 3 d d⁻¹ in faba bean and 5 d d⁻¹ in lentil. The phenology data was combined with weather records and then used to optimise prediction of flowering time in the Agricultural Production System Simulator (APSIM) modelling software. Data was optimised for both lentil and faba bean ($R^2 > 0.9$); accounting for soil moisture improved the predictive power but more so for lentil than faba bean. These results have been used to model optimal sowing time across selected environments and will aid in risk management decisions to minimise exposure to frost, heat and water stress across the southern region.