

Chickpea, Intercropping, MRZ Mid North (Hart), South Australia

Authors

Penny Roberts, Sarah Day

Aim

To evaluate mixed species cropping on harvestability and input costs, which include weed and disease management, and, harvest desiccation. This work investigates the mixed species crop combinations most grown in Canada.

Treatments

Table 1. Trial site details, including treatments and varieties at Hart 2019.

Treatments	<i>Whole plot:</i>	<i>Sub plot:</i>
	1. Sole chickpea 2. Sole linseed 3. Sole canola 4. Chickpea + linseed double skip row arrangement 5. Chickpea + canola double skip row arrangement 6. Chickpea + linseed mixed row arrangement 7. Chickpea + canola mixed row arrangement	1. Nil 2. Foliar fungicide 3. Foliar fungicide + desiccation
Varities	Chickpea: Genesis 090 Linseed: Croxton	

Results and Interpretation

- Key messages: Chickpea ascochyta blight infection was low due to dry seasonal conditions, which were not conducive for high levels of disease infection at Hart, 2019.
Harvestability, in terms of plant height, was not reduced where chickpea was intercropped with canola. However, intercropping chickpea with linseed in a mixed row arrangement decreased the plant height of chickpea.
Grain yield of chickpea as a sole crop was greater than all intercropping treatments.
Further work is required to determine if the costs of disease management, weed management and crop desiccation can be reduced by adopting mix species system.
- Disease management: Foliar fungicide strategies were included as a sub plot treatment to determine the implications intercropping arrangements on ascochyta blight management in chickpea. Disease was introduced into the trial by spreading infected stubble on the adjacent trial following seeding. However, seasonal conditions at Hart in 2019 were not favourable for high levels of disease infection. For instance, temperatures were low and rainfall was often followed by extremely windy conditions, which rapidly dissipated humidity. These conditions were not favourable for the spread of ascochyta blight. Disease was assessed at flowering by identifying the percentage of chickpea in each plot infected with ascochyta blight (data not shown). Plots that remained unsprayed (nil) had 11% ascochyta blight infection, while plots that received regular foliar fungicide applications had 2% ascochyta blight infection. Fungicide strategies did not influence grain yields. This suggests that the low level of disease infection seen in 2019, despite the adjacent trial being inoculated with ascochyta blight, was not adequate to influence grain production.
- Plant height: Average plant height of Genesis 090 chickpea as a sole crop was 35.5 cm. Intercropping chickpea with canola did not increase plant height of chickpea as expected. The average plant height of sole chickpea and chickpea+ linseed in a double skip row arrangement were similar. However, sowing chickpea and linseed in a mixed row arrangement decreased chickpea plant height compared to sole chickpea, thus reducing harvestability of chickpea.

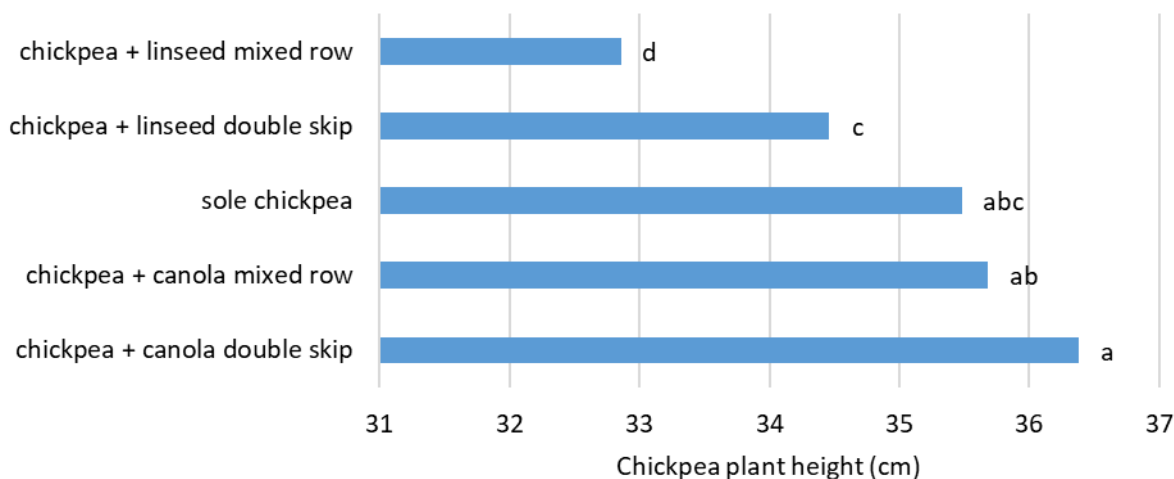


Figure 1. Plant height of Genesis 090 chickpea when intercropped with canola and linseed compared to chickpea as a sole crop, at Hart 2019. Bars labelled with the same letters are not significantly different ($P < 0.05$).

- Chickpea grain yield: Chickpea as a sole crop produced 160 kg/ha more grain yield than chickpea intercropped with canola or linseed. There was no yield benefit for chickpea when intercropped in a double skip row arrangement compared to a mixed row arrangement. There was no grain yield difference in linseed between mixed row and double skip row arrangements (data not shown). Dry down effect of linseed on chickpea was compared with chemical desiccation. Dry seasonal conditions in 2019 brought the season to a short finish. As a result, there was no grain yield difference between chickpea that was chemically desiccated and chickpea that was unsprayed to mature naturally. Further work needs to be done in different seasonal conditions to determine the effect of linseed on chickpea maturity and desiccation.

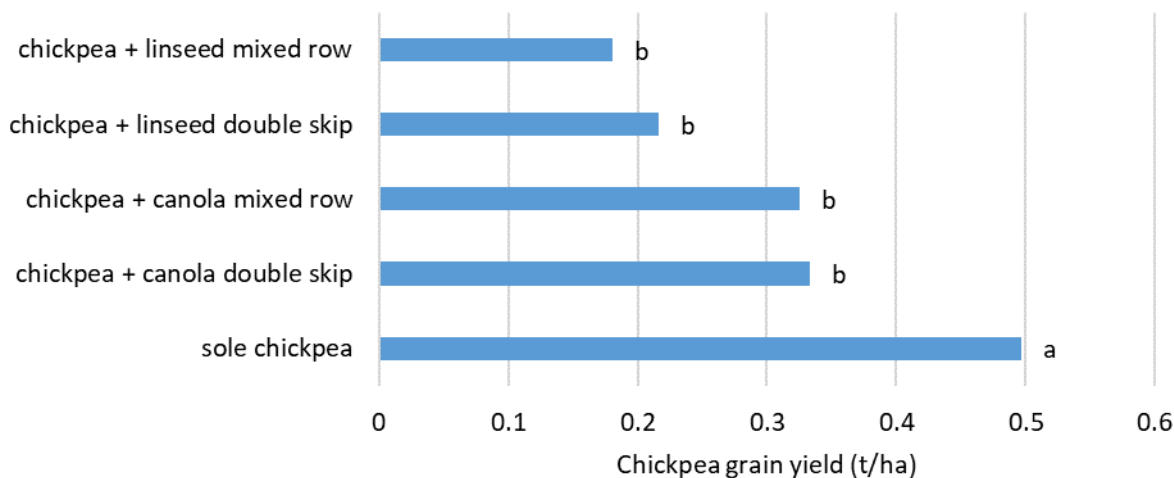


Figure 2. Grain yield of Genesis 090 chickpea when intercropped with canola and linseed compared to chickpea as a sole crop, at Hart 2019. Bars labelled with the same letters are not significantly different.

Acknowledgements

The research undertaken as part of the GRDC-funded Southern Pulse Agronomy project is made possible by the significant contributions of growers through both trial cooperation and the support of the GRDC and the authors would like to thank them for their continued support. The continued assistance in trial management from SARDI Agronomy groups at Clare, Minnipa, Struan and Port Lincoln is gratefully acknowledged and appreciated. The authors would also like to gratefully acknowledge SARDI Plant Pathology and Soil Biology groups for their scientific input and assistance, as well as advisors and grower groups involved in the project.