

Fine-tuning irrigation management of chickpeas

By John Slatter and Mike Lucy

Chickpea crops yielding over 3.5 tonnes per hectare have been successfully grown under irrigation, across a wide range of soil types and irrigation layouts.

But inundation is a severe stress on the chickpea crop and any additional stress such as flowering, pod filling, damaged root systems caused by soil cracking and disease will increase the risk of crop damage.

If they become waterlogged, for even a short period of time, crop losses can be severe. Cases of total crop failure have occurred where soils have been allowed to crack right open to depth before applying a flood or furrow irrigation.

As chickpeas are far more sensitive to waterlogging compared to winter cereals, the in-crop water scheduling also needs to be different. The common practice for irrigated wheat is to water just prior to the flowering period, when the soil has cracked open. Flood or furrow irrigations at this time will result in a period of inundation, which has little impact on wheat, but could kill a chickpea plant.

Table 1 provides a guide to the increasing risk as the clay content of a range of soil types rises and therefore the greater the risk of prolonged waterlogging.

Furrow irrigation management

- Select fields with good layout and tail water drainage. High volume beds or hills, with relatively good grades (avoid flat grades).
- Pre irrigate to fill the profile wherever possible.
- Do not allow the soil to form deep cracks particularly on high risk soils such as black earths. Deep cracking will tear the roots apart, providing the opportunity for soil borne diseases to infect during the irrigation which creates an additional stress.

TABLE 1: Increased waterlogging risk with higher clay content

Heavy black earths	70-80% clay	↑	Increasing clay content.	
Medium black earths	60-70%		↑	Increasing risk of waterlogging damage.
Heavy grey clays	50-60%			
Medium grey clays	40-50%			

TABLE 2: Salinity tolerance of various field crops

Species	ECe (dSm) causing a 50% reduction in seed yield	Increasing Tolerance in Salinity
Barley	16.0	↑
Lentil	12.8	
Field Pea	10.0	
Wheat	10.0	
Faba Bean	6.8	
Chickpea	3.0	

(K. Siddique 2000)



Chickpeas are very sensitive to salinity

- As a general rule on lower clay content soils irrigate early, before soil cracking, or use more frequent irrigations. On the higher clay content soils a quick watering prior to flowering to top up the profile, if needed, is recommended. Irrigation is not recommended once flowering has commenced. If in doubt do not water.

On the waco black earths (80 per cent clay content) of the Darling Downs, yields of up to 3.5 tonnes per hectare have been recorded through the system of pre watering and then no further irrigations once flowering has commenced. Conversely in the Glen Fresser case study in the March–April edition of *The Australian Cottongrower*, Glen has successfully irrigated during flowering on a 'box' soil with 45 per cent clay content.

- Avoid saline or sodic soils as chickpeas are extremely sensitive to salinity and unable to access water and nutrients from saline layers in the soil. Saline or sodic layers in the top 0–90cm of soil will severely limit root development and water extraction.

Irrigation techniques to reduce the period of inundation include:

- For furrow irrigation water every second furrow.
- Doubling-up syphons to speed up water flow.
- Do not irrigate if there is a likelihood of rain.

Spray irrigation

The risk of inundation is significantly reduced compared to flood systems as the amount and time of water application can be controlled.

But the risk of foliar fungal diseases is increased, particularly ascochyta blight and botrytis grey mould. Application of the recommended fungicide for the situation (mancozeb or chlorothalonil) before irrigating is strongly recommended.

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For further information contact the author 07 4635 0726 or source the latest chickpea crop management notes from your agronomist or department office. Also see Queensland Winter Crop Management Notes on CD and the NSW Agriculture Chickpea Agfact.