Irrigated Pulse Agronomy

Drainage was the key to a successful trial.
Irrigated lentils and chickpeas could be quite profitable, assuming that the current prices are maintained.
In 2017, pre-irrigation alone was sufficient moisture to grow the crop successfully. Spring irrigations did not improve either yield or grain quality.

Growing irrigated chickpeas and lentils has potential financial rewards but their reputation for susceptibility to waterlogging and disease potentially makes them a risky proposition. Advances in irrigation technology and infrastructure may have reduced some of the risk. The ICC is attempting to quantify the risk with trials that have a combination of irrigation technologies, irrigation and fungicide strategies and variety evaluation.

Trials consisting of 4 varieties of lentils and 4 varieties of chickpeas were sown at three locations – ICC Trial Block Kerang, (border Check), Appin (subsurface drip) and Dhuragoon (near Moulamein, NSW, overhead spray). All sites were grey clays (vertosols). Each site had a combination of irrigation strategies and fungicide strategies.

Table 1: Irrigated pulse trial irrigation infrastructure and strategy.

	Irrigation Strategy		
Layout	Pre-irrigation Only	Pre-irrigation + spring to flowering	Full Irrigation
Border check	✓	✓	✓
Subsurface drip		✓	✓
Overhead Sprays		✓	✓

Overlaid on each site are 2 fungicide strategies – strategic (applied only when disease pressure is high) and blanket (regular application every 3 weeks).

Varieties used, target population (plants/m^2) and sowing rate (kg/ha) at each site:

	Variety	Target pop'n	Sowing Rate
Lentils	Bolt	120	66
	Jumbo2	120	82
	Giant	100	94
	HurricaneXT	120	53
Kabuli Chickpeas	Genesis 090	35	159
	Almaz	35	206
Desi Chickpeas	Boundary	45	135
	Slasher	45	194

Part 3. Subsurface Irrigation

The trial was sown on May 17th following pre-irrigation.
Terbyne Xtreme (1.0 l/ha) + Trifluralin (1.0 l/ha) + Glyphosate (1.5 l/ha) was used pre-sowing.
Establishment was below expectations at the site thanks to 30 mm of rain that fell shortly after sowing, then predation by mice. The chickpeas were especially targeted.
One replicate of the trial was resown on June 19th.


Mice burrowing for chickpeas

The fungicide program started on July 20th, with 1.5 kg/ha Mancozeb applied to all plots.
The “3 week” treatments then occurred on 11/8, 1/9, 22/9 and 10/10 using Chlorothalonil at 1.5 l/ha – a total of 5 fungicide applications for the season.
The “strategic” treatment was sprayed on 21/7, 1/9 (rain) and 10/10 (rain) for a total of 3 applications.
No disease was detected in any plots during the season.

The first spring irrigation occurred on September 22nd, with the first flowers starting to appear. The soil became quite wet, although no water broke out on the surface. The soil remained quite wet for several days.

After the first spring irrigation, individual plants began to yellow and progressively die. The green lentils appeared to be most susceptible to the irrigation induced waterlogging. Plots with low establishment appeared to fare worse.

Harvest occurred on December 6th.

Results

The following results presented should be viewed with caution as the data was quite variable. Plots ranged from very few plants to reasonably well vegetated plots with random bare patches.

Yields

Variety	Type	Yield t/ha
Almaz	Kabuli Chickpea	1.43
Boundary	Desi Chickpea	1.17
Genesis 090	Kabuli Chickpea	1.46
Slasher	Desi Chickpea	1.31
Bolt	Med red Lentil	2.17
Hurricane XT	Small red Lentil	2.10
Giant	Large green Lentil	-
Jumbo2	Large red Lentil	2.29

Seed size
Fungicide strategy made no significant difference to seed size.
Seed size (g/100 seeds)

Chickpeas	Almaz	Boundary	Gen 090	Slasher
g/100 seeds	29.9	15.7	24.7	24.1

Lentils	Bolt	Giant	HurricaneXT	Jumbo2
g/100 seeds	4.2	-	3.4	4.6

What does it mean?
Drainage is king. Despite only one spring irrigation, the soil remained waterlogged for an extended period post spring irrigation, probably due to the lack of plants and the subsequent low water use.
The beneficial value of the fungicide treatments were compromised by the variable establishment of the plots.
Irrigation seemed to be detrimental, particularly to the green lentil Giant, with very few plots harvestable.

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