

Soybean irrigation scheduling trials in the South Burnett

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Trials to determine the yield response of soybeans to irrigation on different soils and to promote improved irrigation scheduling techniques to growers are part of a Queensland project funded by the Oilseeds Research Council.

Trial procedures

Irrigation scheduling treatments were imposed on six row strips of Centaur soybeans in commercial blocks on black earth alluvial soils (Ug 5.15) at Byee (1986/87 and 1987/88) and Kumbia (1987/88), and on a duplex forest soil at Mondure (1986/87). Treatments were scheduled based on potential crop water use estimated by a crop factor/ Class A pan evaporation model using data from nearby weather stations.

Results and conclusions

Highest yields were achieved at all sites with the most frequently scheduled treatment (30 mm deficit - Table 1).

Table 1. Yield response to irrigation scheduling treatments

Site:	Yield - t/ha - (no. of irrigations)			
	Mondure	Byee	Byee	Kumbia
Year:	1986/87	1986/87	1987/88	1987/88
Soil Type:	Duplex	Alluvial	Alluvial	Alluvial
Treatment:				
30 mm deficit	3.0 (11)	3.7 (12)	3.9 (14)	3.8 (6)
60 mm deficit	2.5 (6)	3.5 (6)	3.7 (8)	3.4 (3)
90 mm deficit	2.1 (3)	3.5 (3)	3.9 (5)	3.2 (2)
120 mm deficit	-	-	2.9 (3)	-
Dryland	1.2	1.6	0.6	3.3

On Byee alluvials the 90 mm deficit gave yields close to the best in both years, but at 120 mm deficit the yield declined 1.0 t/ha in 1987/88. Top yields at Kumbia were similar to Byee, but the 60 mm and 90 mm deficits were no better than dryland, where 3.3 t/ha reflected a good season at Kumbia and 0.6 t/ha a poor season at Byee in 1987/88. Yields on the Mondure duplex dropped off greatly compared to the Byee alluvial with the increasing deficit due to a much lower plant available water per metre of soil (80 versus 200 mm) and shallower rooting depth (600 versus 1400 mm). The latter was demonstrated using a neutron moisture meter.

Soybean yields of 3.5 to 3.9 t/ha are possible when the soil moisture deficit does not exceed 90 mm on black earths. Yield depressions at deficits greater than 120 mm and other factors limiting yield when water is fully supplied are under study in 1988/89 e.g. cultivar, foliar trace elements and late nitrogen application. Much lower deficits are required on duplex soils to maintain yields, but in practice, workload, water availability and priority on other soil types may restrict very frequent irrigations.

Growers have used the trial results to calculate crop water requirements when applying for irrigation allocations from a new dam. During the season growers will be supported in the use of "WATERSCHED", a decision support package, to order water and irrigate on time.