Cotton Catchment Communities CRC

COTTON *TALES*

Darling Downs

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Kate Charleston, Regional Cotton Extension Officer, 4669 0815
Jenelle Hare, Senior Technical Development Officer (RWUE), 4669 0825
Geoff McIntyre, Principal Extension Officer Cotton, 4669 0801

Row Spacing Vs Plant Population

In years with limited water, many growers will be looking at planting cotton in skip row configurations. The following article, based on research conducted by Rose Roche from CSIRO, Narrabri, does not include skip row data but provides an update on alternative row spacings and plant population.

Cotton has been exhibiting its ability to adapt to different plant populations and row spacings in research conducted over the last six seasons.

This research aimed to determine whether yield or maturity of cotton could be optimised through changing row spacing or plant population.

Previous experiments comparing Ultra-narrow row (UNR) and conventionally spaced cotton in Hillston, Breeza and Narrabri have found no significant differences in yield, maturity or fibre quality using existing production practices. This is due to cotton's indeterminate growth that enables it to compensate in response to plant population and allows it to be grown at a wide variety of plant populations. However, numerically higher yield and boll numbers in UNR systems suggest that there is some potential and new management options may optimise this system. It was found that node production rates slow very early in growth of UNR which indicates competition for resources very early in growth (before 1st square). Lowering the plant population may reduce the competition between individual plants and increase yield or reduce time to crop maturity. Recent experiments in 05/06 & 06/07 evaluated plant population in the UNR system.

In 05/06 plant populations of 12 plants/m^2 and 24 plants/m^2 were compared across three row spacings, 1m, 38 cm and 25 cm, as well as 36 plants/m^2 for 25 cm. In 06/07 the experiment was repeated with the addition of 18 plants/m^2 for 38 cm rows. The 18 plants/m^2 was set out as 12 plants per linear row in outside rows but only 6 on the inside rows, where the plants are usually smaller and yield less.

Row spacing	Pop (plants /m^2)	Lint yield (bales/ha) 05/06	Lint yield (bales/ha) 06/07	Mean of both years
1 m	12	12.0	9.9	10.9
	24	11.3	10.2	10.8
38 cm	12	13.8	10.4	12.1
	24	12.0	11.2	11.6
	18		11.4	
25 cm	12	12.8	10.4	11.6
	24	12.5	10.8	11.7
	36	11.9	11.4	11.7

In both years, there was no statistical difference between row spacings and in 06/07 no difference in yield between different populations. There was a significant effect of population in 05/06 only; 12 plants/m^2 yielded the highest in all three row spacings.

Gin turn-out was higher in UNR spacings probably due to smaller seed size & number in the smaller bolls in the UNR spacings. There were no differences in maturity.

Across the two years, row spacing and plant population had very little effect on yield and no effect on maturity, the trend to higher yields in narrow row spacings continued in these experiments but was not statistically significant.

In these experiments and other recent experiments comparing different plant populations, cotton has had little response to plant population, except where establishment has been poor or lower plant population has led to excessive vegetative growth delaying maturity (excessive vegetative growth has been associated with yield loss in other studies).

Regional differences may influence optimum plant density and row spacing, so local research is required to develop precise recommendations. Planting rate trials (1 m spaced rows) conducted by John Marshall (CSD) near Dalby over 7 seasons found that yield was fairly stable across different plant populations with little change in yield from 7 – 13 plants/m^2. He recommends aiming for 8 – 10 plants/m^2 (seeding at 14-15 seeds/m^2 estimating 75% establishment) as that plant population was the most consistently high yielding across the 7 seasons.

Seeding rates that ensure good, even establishment, without being too low (< 6-4 plants/m^2) are recommended. As the Darling Downs can still experience a number of days with low temperatures in late September – early October, to ensure good establishment it is recommended that sowing does not occur until minimum temperatures of 14ºC at seed depth is maintained for three days.

For more information contact Rose Roche (CSIRO Plant Industry, Ph: 02 6799 1594 rose.roche@csiro.au). This research is financially supported by CSIRO, CRDC and the Cotton CRC.

PLEASE NOTE

Scheduling 1 Workshop, set for Wednesday 26 September, has been cancelled.