

CSP66C Executive Summary

Project: CSP66C Development of management options for dry season cotton production in NW Australia.

Summary

Limitations on the availability of irrigation water in eastern Australia has sparked considerable interest in the possibility of re-establishing cotton in the Ord River area of NW Australia, where extensive supplies of water and land are available. With a history of major insect problems any proposal to re-establish cotton production required a new perspective. To this end a joint CSIRO/ Agriculture WA research project was developed to make preliminary judgements concerning agronomic potential and pest management scenarios.

The major outcome planned was the development of a technical package for growing dry season cotton which could provide the basis for future work and the commitment of capital necessary for the development of irrigation and ginning infrastructure.

Agronomic Research. Over three seasons experimental yields were found to be very comparable with summer grown crops in temperate Australia. Sowing from mid March to mid April was optimal for yield and permitted harvest from mid September to early October prior to wet season rains in November. Synchronous boll opening due to rising end-of-season temperatures ensured a prompt harvest.

Good progress has been made in identifying suitably adapted varieties, sowing dates, nitrogen nutrition, in quantifying the effect of night temperatures on fiber quality, sowing densities and the management of growth regulators.

INGARD® efficacy Transgenic Bt cotton will be the foundation for pest management systems in the Ord region. Two years of field evaluations at Kununurra have demonstrated excellent efficacy of INGARD® varieties against a range of lepidopteran pests. *Helicoverpa spp* were effectively controlled for most of the season, although efficacy declined when the plants approached full boll load, thus requiring some late season *Helicoverpa* control.

IPM evaluations The development of an IPM system to complement transgenic varieties is essential to sustainable production. A series of IPM systems were evaluated. These include combinations of conventional and transgenic cotton with trap crops, beneficial nurseries and "soft" insecticides. All systems based on transgenic varieties required an average of 1.75 to 3 insecticide applications to control *Helicoverpa* compared to 7.5 sprays on conventional cotton. No conventional cotton was produced in 1997 but, in trials conducted during the preceding 3 years, 10 and 15 insecticide applications had been necessary.

Conclusions. The project successfully achieved its stated objective of 'developing a technical package for growing dry season cotton which could provide the basis for future work and the commitment of capital necessary for the development of irrigation and ginning infrastructure'.

There is a need for continued agronomic research on varietal performance, growth regulators, simulation modelling and irrigation management. New areas of research should include rotations, weed/disease management, plant compensation mechanisms, phosphorus nutrition, soil compaction.

Pest management work will expand in area with an anticipated 1000 ha to be sown in 1999. This expansion has two objectives: First, to evaluate IPM strategies at a realistic scale. Second, it provides a 'test farming' phase, which has been shown in the past to be essential for new industry development in NW Australia. The availability of two gene Bt varieties combined with reliable activity of the egg parasitoid *Trichogramma pretiosum* is critical to the sustained success of dry season cotton growing in NW Australia.