Part 5 - Plain English Summary

You must submit a Plain English Summary of yourcompleted research project that is not commercial in confidence, and that can be published by the Cotton Research & Development Corporation in print or on the world wide web. An electronic copy of the plain English summary must also be forwarded by E-mail (angela@crdc.org.au).

The discovery this season of *Fov* in many cotton districts previously thought to be free from the disease has sent shock waves throughout the industry. Districts where this disease has been confirmed now include: The Darling Downs, Goondiwindi, Talwood, Theodore, Baralaba, St George and Dirrinbandi in Queensland, and Boggabilla, Mungindi, Moree, Bourke, Boggarbri, Carroll (upper Namoi), Warren and Narromine in New South Wales. The disease has not been found in the production areas of Emerald in Queensland, Tandou and Hillston in New South Wales, Western Australia or the Northern Territory.

The monitoring of disease outbreaks and pathogen diversity indicate that, to date, only two strains of the pathogen have been identified in Australia. As a result of the work on characterisation, unique DNA sequences have been identified for both races and this work is being used as the basis of developing a diagnostic kit for the fungus in soil. This is an outcome that the industry has been requesting for some time.

As with Fusarium wilts of other crops, host plant resistance is the primary strategy for long-term management of this disease. The data from this project show that there is germplasm with significantly more resistance than the current best commercial varieties. However, indications are that a rating on plant survival alone will not suffice in selecting resistant material in this germplasm. It appears that a combination, of high plant survival and a high proportion of the surviving plants showing no or little vascular discolouration, is required for resistant germplasm selection.

The unexpected problems with resistance to *Fov* in some INGARD® varieties are partly explained by the data obtained in this project. The fact that the only varieties which have been transformed to be the carrier varieties for *Bt* and Roundup-Ready genes are very susceptible to *Fov*, indicates added problems for plant breeding programs that need to be overcome.

The issue of integrity of disease resistance in all new varieties, including transgenic breeding lines, is of major concern to the industry. Varieties such as those transformed with the *Bt* gene are understandably desirable in requiring less pesticide sprays for control of *Helicoverpa* species but the impact of the introduction of this gene on other qualities in the plant, such as resistance to diseases, is a complex issue that requires more understanding. The mechanisms and heritability of resistance to *Fov* in cotton plants are not well understood. Research projects that have just commenced, aim to better understand this issue by studying the segregation for resistance and susceptibility in transformed and untransformed breeding lines through various generations.

Information packages have been delivered, via Australian Cotton CRC information sheets, at conferences, workshops, ACGRA meetings, media interviews and the popular press. Presentations were made at 13 Grower meetings addressing Fusarium wilt problems. Locations started from Warren in the south to Theodore and Emerald in the north and Dirrinbandi and St George in the west. More than 900 growers and consultants have attended, some of them several times.