

FINAL REPORT

CS77

Selection for resistance to cereal cyst nematode (CCN) using genetic linkage

PROJECT DETAILS

PROJECT CODE: CS77

PROJECT TITLE: SELECTION FOR RESISTANCE TO CEREAL CYST NEMATODE (CCN) USING GENETIC LINKAGE

START DATE: 01.07.1992

END DATE: 01.07.1997

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ORGANISATION:

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Summary

The grant was a preliminary investigation and, as detailed below, served to set up a number of collaborations and provided a genetic location of the Australian Cereal Cyst Nematode (CCN) resistance gene.

1. A major effort during the course of the grant was the location of the Australian CCN resistance gene within the wheat genome. Working on the assumption that the resistance was similar to one previously mapped three sets of F_2 populations were analysed in addition to some F_3 and control populations from parents. Approximately 1,400 individuals were analysed for both CCN resistance and a DNA marker. In order to carry out this experiment it was necessary to develop techniques for handling such a large number of DNA samples for assaying a specific sequence.

Studies of this magnitude have not been entertained before and a successful procedure was developed to handle sample numbers. The analysis of F_2 progeny for CCN resistance proved to be difficult due to variation in the biological assay. It is apparent from the study however that the CCN resistance locates to a specific region; this conclusion is not completely unambiguous due to the discovery of an unusual segregation behaviour of the chromosome in question. The work certainly provides a good basis for an analysis of F_2 segregating progeny from crosses between wheat cultivars which are either resistant or sensitive to CCN. These analyses are planned for 1989-1990 when more DNA markers are available for the chromosome identified.

2. A very significant result from this project was the establishment of a close and productive collaboration with PBI Cambridge at a time when this Institute was setting up pioneering studies on an RFLP genetic map for wheat. The primary research contact is returning to Australia and it is hoped his continued work will aid in achieving the actual aim

of the present grant - namely, **to isolate a DNA marker closely linked to CCN resistance which can be used as a more reliable preliminary screen for CCN resistance in breeding populations**. The CS77 grant has clearly laid the ground work for further work.

3. A search for a suitably isozyme marker was carried out as part of the CS77 grant. The isozyme sufpiaoxide bismutase is known to be located on the chromosome in question but no variation for the electrophoretic mobility of this isozyme could be found among the wheat cultivars of interest in the present study.
4. An additional result from the CS77 grant was the successful collaboration between the Horsham and Canberra laboratories. This has developed into a major area of research now funded by WRC - namely the search for new sources of CCN resistance in a collection of 450 *Triticum tauschii* lines and a study of the genetics of CCN resistance.

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