

FINAL REPORT

DAV410

Doubled haploids for the Victorian node of the Coordinated Barley Improvement and Quality Program for South Eastern Australia

PROJECT DETAILS

PROJECT CODE: DAV410

PROJECT TITLE: DOUBLED HAPLOIDS FOR THE VICTORIAN NODE OF THE COORDINATED BARLEY IMPROVEMENT AND QUALITY PROGRAM FOR SOUTH EASTERN AUSTRALIA

START DATE: 01.07.1996

END DATE: 30.06.2002

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Summary

The aim of this project has been to accelerate the development of malting quality varieties for south-eastern Australia through the use of doubled haploid (DH) breeding lines. The project enabled the production of 1,500 DH breeding lines per year.

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Conclusions

The service model for the provision of DHs has proved to be very successful and has avoided the need to duplicate facilities in two locations. The success of this process is in no small part due to the cooperative nature of Dr. Davies and his staff at the South Australian Research and Development Institute (SARDI).

Recommendations

The Victorian Institute for Dryland Agriculture (VIDA) breeding program will continue to devote a proportion of its resources to the use of DHs, principally for the rapid fixing of introgressed novel genes for use again as parental material.

Outcomes

Expected Outcome (benefits)

Economic Outcomes

Increased rate of genetic gain has economic benefits to growers and processors of malting barley.

Environmental Outcomes

Development of disease resistant varieties reduces the reliance on fungicides.

Achievements/Benefits

Overview of Project Achievements

The aim of this project has been to accelerate the development of malting quality varieties for south-eastern Australia through the use of DH breeding lines. The project enabled the production of 1,500 DH breeding lines per year.

F1, BC1F1 seed or selected F2 plants produced at VIDA have been sent to Dr. Phil Davies, SARDI on an annual basis for the production of a prescribed number of DH lines per cross. Initially Dr. Davies returned 2-5gm of seed of each DH line on a biannual basis, allowing seed of these lines to be multiplied either in the winter or summer seed increase nurseries at VIDA. It has subsequently proved more efficient for small DH plantlets to be transplanted into a selection environment (either birdcage or polyhouse) at VIDA. During the course of this project, more than 6,500 DH breeding lines derived from 32 crosses have been multiplied from the seed of single plants, with seed multiplication of approximately 2,000 lines occurring in summer nurseries and the remainder in winter nurseries. During 2002, 25% of 1,426 S1 trial entries, 21% of 340 S2 trial entries, 18% of 38 S3 trial entries and 20% of 15 S4 trial entries are DH breeding lines.

The DH breeding lines have proven to save one year in the breeding process, and save considerable resources by alleviating the need for reselection. By coupling with other 'fast tracking' approaches, new characteristics can be quickly incorporated into elite breeding lines, increasing the rate of genetic gain available to growers and processors.