

FINAL REPORT

CSE183

Physical and biological strategies component 8: Coordination

PROJECT DETAILS

PROJECT CODE: CSE183

PROJECT TITLE: PHYSICAL AND BIOLOGICAL STRATEGIES COMPONENT 8: COORDINATION

START DATE: 01.07.2001

END DATE: 30.06.2004

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Summary

CSE183 covers itself and projects in the 'Physical and Biological Strategies' project in GRDC Program 1.8.

CSE177 'Facilitating industry adoption of adaptive discounting aeration control'.

CSE178 'Effect of chemical and physical processes on malting dormancy'.

CSE181 'Heat disinfestation engineering for grain storage - Possibility of using some of the grain dryers for heat disinfestation'.

CSE182 'Machinery for improvement of grain quality'.

CSE0004 'A quality evaluation of heat treated barley and canola, and a measure of the heat susceptibility of *Trogoderma variabile*', an adjunct to project CSE147 'An evaluation of heat-shock and heat soak for economically competitive heat disinfestation'.

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Outcomes

Opportunities for publicity from component projects were provided to GRDC and several articles resulted as reported in coordinated projects.

Interaction between researchers and steering committee members reviewed progress in year one replaced later with meetings with the value chain, program manager and commercialisation manager.

CSE177 - This project was completed successfully and a commercial controller for adaptive discount control (ADC) for aeration is licensed to several aeration equipment manufacturers. The controller uses available energy in air to efficiently cool or dry grain to target conditions and maintain targets during storage.

CSE178 - This project was completed successfully. Ethyl formate[#] was demonstrated as a chemical treatment to break dormancy and water sensitivity. Accelerated maturation and heat treatments were also effective. Percussion, though effective, would require further work to determine how much percussion could be used before damage to the germ occurred. Specific diagnostics to monitor grain characteristics could allow for successful treatment to alter out-turn specifications on demand. Viscometrical attributes, kernel colour and near infrared spectroscopy (NIRS) techniques were identified as methods worth investigating. Dormancy and water sensitivity could be overcome by matching storage conditions to the characteristics of the grain.

CSE181 - This project was completed successfully. A technical report detailing on-farm use of heat disinfestation will be a valuable resource for extending heat disinfestation as a treatment when cheaper chemical methods fail or are no longer acceptable.

Demonstration that grain dryers are suitable for and can be modified to specifications required for efficient heat disinfestation will increase the utility of drying equipment where already available on-farm and heat disinfestation becomes established as an acceptable and economically viable method of rapid disinfestation.

Attempts to commercialise the technology through several manufacturers failed when the business case as determined by the manufacturer was not attractive enough. This situation may change when cheaper chemical options fail through increased resistance.

CSE182 - This project required extensive coordination and was renegotiated after the departure of Dr Lazirev. The main change was to capture and demonstrate the usefulness of percussion as a disinfestation process. Changes in both CSIRO and GRDC combined to cause some staffing issues and the finalisation of the renegotiated contract. These have now been overcome and the project has moved to successful completion with percussion shown to be another important option for rapid disinfestation.

CSE-0004 - This project was completed successfully. Quality parameters of heat treated malting barley were determined.

Heat treatment of canola was effective and all stages of *Trogoderma variabile* were determined to be susceptible to heat. Effective use of heat to disinfest empty silos before storage was demonstrated.

Achievement/Benefit

Overall the coordination of the underlying projects was successful with good outcomes from some difficult research both in terms of changing personnel and complex negotiations with industry to achieve the commercialisation outcomes. The formal management mechanism of this type of coordination project probably needs to be reviewed in the light of new management structures both within GRDC and CSIRO.

Project conclusions, recommendations, IP information and other research opportunities are detailed within the component projects.