

FINAL REPORT

DAQ466

On-farm grain storage in the northern region - development, evaluation and implementation of best management practices.

PROJECT DETAILS

PROJECT CODE: DAQ466

PROJECT TITLE: ON-FARM GRAIN STORAGE IN THE NORTHERN REGION - DEVELOPMENT, EVALUATION AND IMPLEMENTATION OF BEST MANAGEMENT PRACTICES.

START DATE: 01.07.1999

END DATE: 30.06.2003

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Summary

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Conclusions

This project (DAQ466) complemented and integrated the outputs of several other GRDC research and extension projects, e.g. DAQ530, Moisture problems in sealed silos; DAQ00004, Resistance Monitoring; DAQ00008, Grain Protectants; DAQ00009, Grain Disinfestants; DAQ00028, Drying aeration extension; DAQ00010, Fumigation in sealed farm silos, and DAQ518, Phosphine Awareness.

The grains industry is faced with several major challenges:

- An increasing risk of resistance to both protectant insecticides and phosphine fumigant. The phosphine resistance issue has been largely the result of inappropriate use of phosphine at farm level. Proper phosphine dose rates, concentration, temperature effects and exposure times must be understood and closely managed to ensure efficacy of this key means of storage insect control. This project resulted in greatly increased effort to improve user understanding and knowledge of phosphine usage. Through this research, local scientific findings were integrated with established best practice to strengthen the case for practice change in farm use of phosphine fumigant.
- Increasing buyer resistance to under-specification grain, particularly grain with insect infestations, chemical residues, etc. This project addressed these important issues as they apply at farm level by preparing and supplying practical, science-based BMP recommendations.
- Increased regulatory pressure for urgent upgrading of phosphine and protectant usage on stored grains. This project provided an understanding of these problems for grain growers and their advisers.

Information products were produced in a highly useful format on a broad range of stored grain issues. These have been actively distributed as part of planned, targeted training programs and in normal individual dealings with clients. Their existence has also been widely publicised and they are readily accessible via the internet.

Recommendations

- (1) Growers, advisers and grain handlers need to be able to practically identify the major insect pests in grain storage in order to understand their management. This is necessary in light of increasing levels of insecticide and phosphine[#] fumigant resistances. Accurate identification of the insect will underpin decisions on the most appropriate control measures. This will result in effective withholding periods following treatment of grain and helps trace back the reasons for failures in control practices.
- (2) Grain growers need to adopt an Integrated Pest Management (IPM) approach to insect pest control in farm-stored grains. Therefore, it is necessary to understand the basic elements of their ecology and environmental requirements, particularly their responses to temperature and moisture. This better equips growers to effectively employ aeration technology in managing storage insects and to appreciate the importance of farm hygiene, effective use of phosphine, the benefits of sealed silos, the limitations of protectants for control of certain insect species, etc.
- (3) There is no quick and effective treatment for infested stored grains for urgent delivery. Stored grains must be monitored

regularly for insect infestations and moisture accumulation in order to maintain ready marketability. The current widely-used 'quick knockdown' phosphine-use practices are dangerous to personnel and livestock and ineffective against immature stages of insect life cycles. Although a 'quick' phosphine fumigation may kill some live adult insects, the infestation is simply passed along the supply chain without proper phosphine-use practices.

(4) Grain growers need an understanding of the principles of grain aeration in managing grain temperature and moisture. Recommendations for basic aeration system design parameters appropriate to cooling and drying were made and discussed, as were the benefits and limitations of automatic aeration controllers.

Additional information

A total of 14 DPI Notes were published (see www.dpi.qld.gov.au/broadacre/field_crops/grain_storage)

1. GS - Shortcuts for Insect Control
2. Organic Grain Storage
3. GS - Resistance to Protectants
4. GS - Psocids and Mites
5. Steel Mesh Silos for On-farm GS
6. GS - Identification of Insect Pests
7. GS - Resistance to phosphine
8. Temp. Storage of Grain
9. Underground Pit Storage
10. Insect Control in Farm-Stored Grain
11. Bruchids in Mungbeans
12. Early Harvest for Quality and Profit
13. GS - Aeration for Cooling & Drying
14. GS - Why Install Aeration?