New fumigant offers a glimmer of hope

Alternative fumigant products are needed throughout the supply chain, and GLO2, based on naturally occurring chemicals, shows promise.

The use of two naturally occurring chemicals has resulted in a fumigant that offers considerable health, safety, and environmental advantages over currently available products, while also providing high levels of pest control. Having made the breakthrough and developed the new fumigant, CSIRO Entomology and the GRDC have founded a project to compile the comprehensive data required to achieve product registration by the Australian Pesticide and Veterinary Medicines Authority (APVMA).

Phosphine has been the mainstay of insect control in stored grain since the 1950s. However, the need to find a new fumigant has been driven by an increasing number of insects showing signs of phosphine resistance, and by other fumigants—methyl bromide and carbon disulphide—being phased out due to health and/or environmental concerns. Furthermore, changing patterns of grain handling indicate that a growing need for on-farm storage and fumigation requires a different solution to that traditionally used. This is leaving the whole grain storage and handling chain with a lack of fumigation products for grain, equipment and buildings.

CSIRO Entomology has carried out several successful GRDC projects investigating fumigant alternatives. The most promising for Australian farm use is GLO2, the working name for a GRDC–CSIRO patented product containing 95 per cent ethyl formate and five per cent of a naturally occurring synergist. GLO2 offers a suite of advantages over current fumigation products:

1. Pest control — high levels of efficacy in eradicating major grain pests at all life stages have been recorded. The different chemistry to phosphine and other registered fumigant products offers an effective alternative method of dealing with insect resistance.

2. Formulation — GLO2 is formulated as a liquid, so it can be easily transported and sprayed directly onto grain in stores or during loading. It readily vapourises and is suitable for use in both sealed and partially sealed silos. GLO2 breaks down into compounds that naturally occur in grain, leaves virtually no residues and has no effect on grain quality.

3. Speed — GLO2 is a fast fumigant. Fumigation takes overnight to a few days to complete, with a short withholding period and no need for forced aeration on smaller silos.

4. Spectrum of use — in addition to fumigation of grain on-farm and in bulk stores, GLO2 is expected to be suitable for fumigating infrastructure, such as buildings and equipment.

5. Safety — in comparison to other fumigants GLO2 is safe and simple to use, and no specialised handling skills are required.

6. Environmentally friendly — neither GLO2 nor its breakdown products contribute to greenhouse gases or deplete the ozone layer.

It is expected that GLO2 will be registered and on the market by 2011.

GRDC Research Code CSE00040
More information: Paul Meibusch, GRDC new products manager, 02 6272 5525; David Adams, business development manager, CSIRO Entomology, 02 6246 4001

Potential new registrations

A pesticide more commonly used in crop pests has been assessed for its use as a protectant for stored grain.

By Greg Daglish

A ‘soft’ insecticide used in the control of crop pests that degrades rapidly in the environment and has minimal impact on non-target species is currently being assessed as a protectant for stored grain.

Research undertaken at the Queensland Department of Primary Industries and Fisheries (QDPI&F) laboratories and funded by the GRDC showed that this naturally derived insecticide has potential as a protectant against the lesser grain borer (Rhyzopertha dominicalis), a species known to develop strong resistance to phosphine and commonly used protectants.

Developed by Dow Agroscience, it is produced from the fermentation products of a bacterium that normally lives in the soil. Laboratory experiments using resistant strains of a range of pest insects established that this insecticide was most effective against the lesser grain borer. It was confirmed that it provided long-term protection in a large-scale field trial in Victoria.

Registration of this material as a grain protectant in Australia has been delayed because some international authorities have not yet agreed to maximum residue limits (MRL) for grain and grain products.

There is a range of insecticides from newer insecticide chemical groups that are being used in agriculture. Some of these may have potential as grain protectants. Research needs to be done to examine these opportunities.

GRDC Research Codes DAQ00090, DAQ00080
More information: Dr Greg Daglish, principal entomologist, QDPI&F, 07 3896 9415, greg.daglish@dpi.qld.gov.au