

Three heads are better than one

Vigilance, rigour and collaboration will underpin the life of phosphine and the development of new grain-hygiene management solutions

By becoming industry partners in the CRC for National Plant Biosecurity, GrainCorp, ABB Grain and the CBH Group are signalling the seriousness with which they are treating the matter of phosphine resistance.

MAINTAINING AUSTRALIA'S REPUTATION on the domestic and international market as a supplier of high-quality grain, free from insect infestation, is the key issue for all players in the grains industry. To achieve this, the right tools are required.

"Our capacity to administer effective pest-control measures using existing practices to satisfy customer demands is facing some challenges," says Neil Barker, GrainCorp's technical research manager. "At the moment the industry is finding instances of increasing insect resistance to phosphine, which is driving the use of alternative (and more costly) control measures."

These concerns are shared by the other two major bulk handlers, ABB Grain and the CBH Group.

By becoming industry partners in the Cooperative

Research Centre for National Plant Biosecurity (CRCNPB), GrainCorp, ABB Grain and the CBH Group are signalling the seriousness with which they are treating the matter of phosphine resistance. The wealth of experience up and down the value chain, and resources available to these companies, can support more complete and innovative programs of research.

One issue that grain handlers struggle with, and hopefully one that will be addressed through the CRCNPB, is the lack of rapid tests and suitable sampling systems for grain as it is delivered to the silos.

"While we can rapidly assess loads of grain for quality traits (for example, protein and screenings), it is often difficult to test for contaminants and foreign material as there is either no rapid test

available or they typically occur at such a low frequency that they may not be detectable on initial inspection," explains Geoff Masters, quality and technical services manager, ABB Grain.

An additional issue is that grain storage and handling now involves significantly more players than in previous decades, and so the risk of 'getting it wrong' becomes much greater. The system is being put under continued pressure to break vital fumigation protocols in order to access grain stores more frequently by a multitude of customers.

"Growers need to understand that just because a chemical can be used legally in Australia, this does not mean a maximum residue limit (MRL) is set by the importing country," Mr Masters says. "Using a chemical off-label escalates a residue issue to the next level of seriousness."

The bulk handlers have rigorous internal training programs and procedures relating to how chemicals are used. They also undertake extensive chemical-residue testing programs to detect previously unidentified chemicals that have been applied prior to delivery to bulk stores. Grain is regularly inspected for the presence of insects and resistance monitoring is undertaken on insects detected. Stores are regularly inspected and maintained.

If current levels of market access are to be maintained, the same level of rigour is required on-farm and at all storage and delivery facilities. Growers must ensure their silos are suitable for the proper storage of grain and that they commit the time and effort to maintain their grain. This will involve, among other things:

- ensuring the bins are clean and free of residues and are capable of being properly fumigated;
- that the grower regularly monitors the grain for insects;
- that the silo surrounds are kept clean; and
- that fumigations are monitored.

"It is a measure of our vigilance in the past that has led us to the successful development of a large export grains industry over the past 50 years," Neil Barker says. "This vigilance must continue."

Directly and through in-kind contributions, the three major bulk-handling companies are significant contributors to the CRCNPB. There are a number of critical research activities being undertaken and/or developed through the CRCNPB, including resistance management, and new and alternative chemicals and insect control mechanisms. However, all players consider the education of growers on the implications of resistance to phosphine and their role in minimising the impact to be a major issue.

The CBH Group has led the way in sharing its knowledge and experience of the use of phosphine fumigation techniques with growers through the 'Phosure' campaign.

"Operation Phosure' is delivered in Western Australia through the Better Farms IQ team by CBH to help prolong the life of phosphine in order to save growers and the industry significant costs associated with switching to alternative fumigation methods," says Ern Kostas, manager of grain protection at the CBH Group.

The program includes information and demonstrations on how to manage on-farm storage, gauge if fumigation has been effective, and free sealed-silo checks and resistance testing.

It is inevitable that the level of resistance to phosphine will make its use impractical. However, delaying this day as long as possible is logical for the whole industry as phosphine is the most cost-effective, easily used and widely accepted fumigant, and currently there is nothing on the horizon that is its equal. Working together is considered to be essential to maximise the life of phosphine and to develop new solutions for grain-hygiene management. □

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GRAIN STORAGE AND HANDLING NOW INVOLVES SIGNIFICANTLY MORE PLAYERS

IMPORTING RESISTANCE

BY ROB EMERY

Many overseas countries have grain insects with strong resistance to phosphine. Australia's intense reliance on phosphine to export insect-free grain is threatened by the importation of insects with strong resistance. The mixing of introduced resistant populations with endemic grain-storage pests in Australia presents a huge threat to the Australian grains industry, which has invested so much in managing resistance. The Australian Quarantine and Inspection Service (AQIS), working with state departments of agriculture, provides the front line of defence against such importations.

In recent years the Department of Agriculture and Food, Western Australia, has been testing grain insects from overseas intercepted at ports and at post-entry quarantine intercepts for resistance to phosphine.

One new strain of rust-red flour beetle (*Tribolium castaneum*) collected from muesli made in the UK was tested over the past year and found to have weak resistance. There was also a quarantine sample received containing rice weevils (*Sitophilus oryzae*) in wheat in a heat bag originating in China. These insects are currently in culture for resistance testing. Strongly resistant stored-grain insects have also been found in samples collected from a vacuum cleaner bag from Oman and polished rice from China.

The importation of resistant strains could threaten a huge investment by bulk handlers in phosphine fumigation infrastructure, as well as many years of work in resistance management.

