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Phosphine: times up?

Is time nearly up for the trusted, time-honoured treatment for controlling insects in silos across the country?

With a growing population of phosphine resistant insects, farmers are urged to improve fumigant use and biosecurity practises.

Grain industry silo storage specialist, Chris Newman, DAFWA, says the risk of losing phosphine is real. "Unfortunately, we haven't helped ourselves. The widespread incorrect use of the fumigant since the 1950s has created this situation."

"A change in attitude and practice is required; after all, the phosphine label has changed." (see Phosphine Facts below)



Chris Newman says to ensure grain meets customer's specifications there needs to be more professionalism in farm grain management. "This includes effective fumigant use in gas-tight storages, use of aeration and attention to farm hygiene."

"A draw-back to highly-efficient grain transport is that resistant insects are quickly and easily spread to other farms, storages and districts."

"Everyone in the supply chain - producers, grain buyers, transporters and storage operators - has a role in using biosecurity measures to stop this spread, and ensure we can still use phosphine in the future."

For more information on Farm Biosecurity visit www.farmbiosecurity.com.au

Basic biosecurity principles include:

- Ensure grain silos are gas-tight and phosphine is used according to label specifications
- Ensure grain storage, handling and transport equipment is clean and free of insects every time grain is moved
- Check grain monthly and before outloading for live insects
- Do not transport grain with signs or evidence of live insects
- Use aeration in silos to keep reduce the number of insects – cool grain slows insect multiplication

Resistance is in the genes

The core of the resistance issue is that two genes in insect populations are becoming more frequent.

Poor fumigations select for insects with one of the two resistance genes that show a 'weak' resistance to phosphine. When a resistant insect mates with another insect carrying the second resistance gene the progeny will contain both resistance genes and show 'strong' resistance to phosphine. These new strains of insects can survive in phosphine concentrations over 250 times higher than that which would kill a normal insect.

Testing has confirmed a steady rise in grain insects showing phosphine resistance: the average across all species shows up to 48% of insects tested in WA have a weak resistance. Two cases of strong resistance have been detected so far in WA, both of which have been eradicated. In eastern Australia, 70 to 100% of insects in the Northern GRDC region, and 53 – 83% in the southern GRDC region, exhibit a weak resistance. Strong resistance has been detected in about 5% of the insect samples tested.

East versus west situation

Chris Newman believes there are several reasons why there are lower phosphine resistance levels in WA compared to eastern states. "It's most likely due to the gas-tight sealing in the central storage system by CBH, and the response by silo manufacturers to seal silos."

"Other factors have also played a part, such as the drier conditions at harvest, and that 85% of grain is held under high quality central storage conditions to meet the tough standards of export markets."

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An additional factor is grain insect type. In WA, the predominate species are Rust red flour beetles and the *Sitophilus* species (true weevils with long snouts) - both have been shown to have reduced rates of strong resistance across Australia. However, now that we have had two cases of strongly resistant Rust red's in WA, it is a warning this could occur on other farms.

He says the continued use of phosphine at the farm level, as well as in bulk storage, in Australia now depends on farmers using best management practises to slow or arrest the development of resistance in all the major grain storage insects.



[Lesser grain borer]

Grain growers wanting more information about reducing the risks of pests in their grain storage and farm management practices should contact their local Grains Biosecurity Officer (see below). The Grains Farm Biosecurity Program is delivered by Plant Health Australia and funded by growers through the Grains Council of Australia together with the Western Australian, Queensland, Victorian, South Australian and New South Wales state governments and the Cooperative Research Centre for National Plant Biosecurity.

For more information on exotic plant pest threats and biosecurity practices, including a Farm Biosecurity Manual for the Grains Industry, visit the farm biosecurity website www.farmbiosecurity.com.au. The website includes a useful tool kit of industry farm biosecurity manuals, templates and registers. You can also sign up for a monthly e-newsletter with relevant biosecurity information to keep you up-to-date.

Animal Health Australia and Plant Health Australia are working together to implement the *Farm Biosecurity* program – a national awareness and engagement program which provides information about farm biosecurity

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and the prevention of introduction and spread of animal disease and plant pests.

Phosphine facts:

- Australia is one of the few countries in the world where phosphine is available to farmers to use in their own storages.
- Phosphine has been available since the 1950's when the label recommendations included the use of the product in unsealed storages and admixture to a grain stream.
- The label has been changed recently to remove these practices - phosphine must be used in well sealed (gas tight) structures for the time and concentration listed.

Grains Biosecurity Officers

Western Australia - Lisa Sherriff 0447 851 801

Queensland - Philip Burrill 0427 696 500, or Kym McIntyre - 0429 727 690

Victoria - Jim Moran 0418 377 930

South Australia - Judy Bellati 0412 218 228

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Media contact: direct to Grains Biosecurity Officers in each state