

DPI&F note

Grain storage – Mite pests

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Introduction

Mites are common pests in grain storages and mostly occur in damp or moist grain, residues, oilseeds and animal feeds. They are not readily seen because they are the size of specks of dust. Mites are not insects (which have six legs) but are related to ticks and spiders and have eight legs.

- When present in large numbers mites appear as a moving carpet of brown dust on the grain, silos and sheds or on stacks of commodities, sometimes emitting a damp or pungent smell. The mould mite *Tyrophagus putrescentiae* (Schrank) is the most common grain storage mite.
- The grain or flour mite, *Acarus siro* L. is also widespread and sometimes the 'straw-itch mite', *Pymotes tritici* can cause problems in storages.
- A predatory (and therefore, beneficial) species *Chelyletus malaccensis* Oudemans, is also encountered where the above species are present. Generally, 2-3 species are present in an infestation.



Mould mite, or Lemon-scented mite (*Tyrophagus putrescentiae*). Approx. length: 0.5mm.

Acknowledgement: This image from Systematic Entomology Laboratory, Agricultural Research Service, United States Department of Agriculture. (www.sel.barc.usda.gov/acari/frames/mites.html, accessed 07/07/2005.)

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Biology

Mites multiply under high humidity conditions (over 65% relative humidity) and upper temperature limit of 35-37°C. Under these conditions, the common mould mite completes its life cycle in 8-12 days and a maximum population growth of 500 times per month can occur. Because of their rapid growth in warm, moist conditions, they usually reach peak numbers during late summer.

They are more common in the higher humidity of coastal regions than in drier inland areas. Infestations of mites are generally more conspicuous in commodities with high moisture content and contaminated with mould. Heavy infestation of other stored product pests often creates favourable conditions for mite outbreaks.

Damage

Both the mould and grain mites cause direct damage by eating the germ of the grain and spreading fungi in the commodities. Heavily infested commodity becomes tainted with off-flavours caused by squashed mite bodies when it is moved or processed.

During heavy infestation from the mould mite, the dead and live mites settle as a brownish dust layer on stacks of commodities and floors of stores and emit a lemon-flavoured odour leading to the popular name 'Lemon-scented mite'. In this situation, they can cause discomfort to workers handling infested grain and packaged commodities. The 'straw-itch mite' can cause severe dermatitis and allergic conditions in people handling infested commodities. Infested feedlots are also been reported to have caused feeding problems and allergic conditions in stock. The markets reject heavily infested commodities.

Recommendations for controlling mites

Control starts with hygiene

Strict hygiene practices in and around grain or produce storage and handling areas are essential for control:

- Remove and destroy unwanted, infested produce by burning or burying.
- If infested produce is to be kept, fumigate as described below.
- Clean up and destroy grain dust and grain residues at least weekly.
- Clean grain storages and handling equipment before handling new uninfested produce.

Insecticide treatment

Methoprene (eg, Diacon S®, Rizacon S®, Nevweb IGR®), is currently registered as a stored grain treatment for insect control and is known to be effective against these mites. See DPI&F Note 'Grain Storage- Insect Control in Stored Grain', at www.dpi.qld.gov.au/fieldcrops/3947.html **(CHECK LINKAGE ADDRESS)**.

A pyrethrum insecticide product, PY40®, (C. RUDDUCK PTY LTD, Ph: 1800068745, Fax: 0396764455, PO Box 196, Port Melbourne, Vic. 3207) is registered for application to factories, food premises, warehouses, agricultural buildings (storage sheds, milking sheds, poultry sheds, barns etc.). Firstly, mix 1.0 litre PY40® in 9.0 litres solvent or mineral oil. Then apply 1.0 litre of this mix per 2800 cubic metres for a space spray, or 1.0 litre of the mix per 60-80 square meters for a surface spray to machinery and buildings.

A new protectant insecticide, spinosad (trade-named *Conserve® Grain Protector*), is expected to be released on the Australian market in 2007. Expected dose rate recommendation is 4.4ml of product/tonne of grain. This new product may not currently be commercially available for use on stored grains.

Commonly used protectant insecticides that are known to be *ineffective* against these mites are: pyrimiphos-methyl (eg, Actellic®), chlorpyrifos-methyl (eg, Reldan®) and fenitrothion (numerous trade names).

Manage Temperature and Moisture

Because of their need for warm, moist conditions, mite numbers can be kept low by:

- reducing temperature below 20°C, for example by aeration, or
- reducing moisture below 55% relative humidity or 12% moisture for cereal grains, for example by drying.

Disinfest with phosphine fumigation

Fumigation with phosphine will kill mites **only if it is done in a sealed, gas-tight storage**. Dosages lower than recommended on the label often allow mite eggs to survive during the fumigation. Reinfestation due to subsequent hatchings can then occur after the fumigation period is over. Refer to DPI&F Note, 'Grain Storage - insect control in stored grain', at www.dpi.qld.gov.au/fieldcrops/3947.html **(Check this address)**

Apply 1.5 tablets per cubic metre and leave the enclosure sealed for 7 days if temperature of the produce is above 25°C, or for 10 days at lower temperatures. Air the treated produce before it is handled.

Pest identification problems?

If you are in doubt about the identification of insect or mite pests in stored products, please send live specimens to Dr Manoj Nayak or Dr Pat Collins, Food Protection Team, Entomology, DPI&F, 80 Meiers Road, Indooroopilly, Qld., 4068. Please be sure to include your full contact details, and details of any treatment the pests may have had.

Refer also to DPI&F Note, 'Grain Storage – Identification of Insect Pests', at www.dpi.qld.gov.au/fieldcrops/3947.html **(CHECK LINKAGE ADDRESS)**.

Further information

For more information on:

- Fumigation – see DPI&F Note 'Grain Storage - Insect control in stored grain' **(CHECK LINKAGE ADDRESS)**
- Aeration – available in the DPI&F web site www.dpi.qld.gov.au/fieldcrops/3947.html, **(CHECK LINKAGE ADDRESS)** see DPI&F Notes 'Grain Storage – Aeration for cooling and drying' **(CHECK LINKAGE ADDRESS)**. See also GRDC Publications, 'Aeration – how aeration works', and 'Aeration – what's possible?', both available on the GRDC website <http://www.grdc.com.au/growers/as/advice.html> .
- Or, contact one of the National Grain Storage Extension Team

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