Bábolna Bio

METHOGRAIN®

GRAIN PROTECTION PRODUCTS

METHOGRAIN®
DELTA IGR
GRAIN PROTECTANT

METHOGRAIN®
Fenitrothion 1000
Insecticide

METHOGRAIN®
IGR 300
GRAIN PROTECTANT

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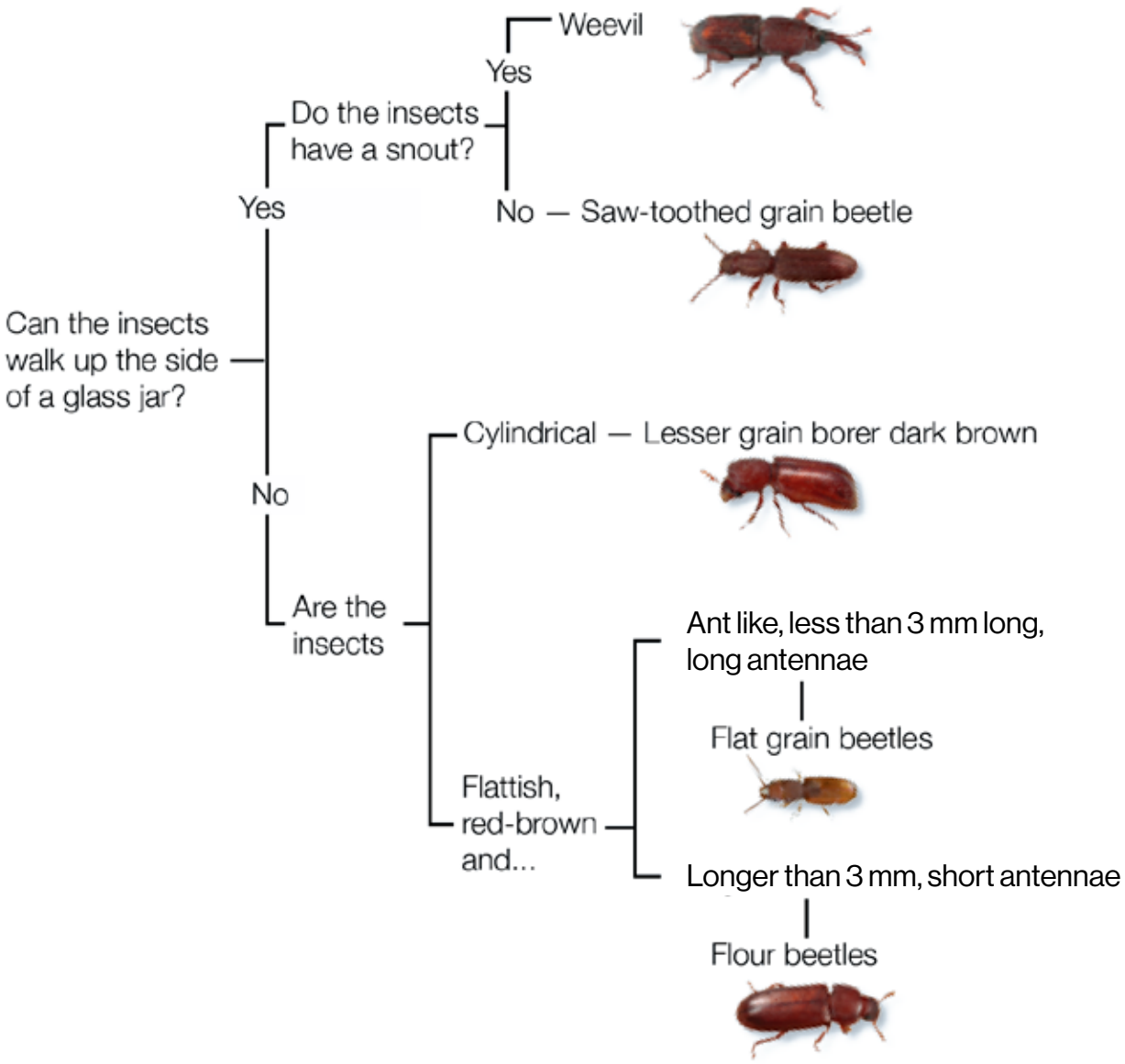
Identification of common pests of stored grain



Source: DAF Queensland, formerly DEEDI.

Lesser Grain Borer *(Rhyzopertha dominica)*

Description	Dark brown cylindrical beetle (2.5–3 mm long). The head is hidden under the round neck-shield, with mouthparts and eyes only visible from the side.
Distribution	Cosmopolitan, occurs in both temperate and tropical regions. In Australia, it is found in all grain-growing regions.
Pest status	Major, widespread and regular. It is a primary pest of stored grain.
Host range	Both an internal and external feeder and a serious pest of both whole kernel stored grain and cereal products. Primarily a pest of stored wheat and corn but can infest tobacco, nuts, beans, birdseed, biscuits, cassava, cocoa beans, dried fruit, peanuts, spices, rodenticide baits, and dried meat and fish.
Damage	Damage caused by this pest is quite prominent and heavy. Adults and larvae bore into undamaged kernels reducing them to hollow husks. They are also able to survive and develop in the accumulated ´debris´ produced as the seeds are chewed up.
Risk period	All year.
Life cycle	Adults are strong fliers and live for 2–3 months. Females lay eggs singly or in groups of up to 30. The eggs are laid on the outside of the grain and a female can lay from 300–500 eggs. Young larvae initially feed on the outside of the grain but later stages bore into the grain and remain there. When fully developed, the larvae pupate and adults subsequently bore their way out. A life cycle takes four weeks at 35ºC and 7 weeks at 22ºC. Development ceases below 18ºC. The optimum temperature is about 31ºC. It develops in grain of lower moisture content than most other important pest species and can survive in grain with a moisture content as low as 8 or 9%.
Control	**Chemical control** Fumigation in sealed storage, grain protectants. **Cultural control** This insect does not occur in standing crops. Therefore, good hygiene with storage and handling equipment should minimise infection. Aeration cooling is effective in reducing activity and breeding.

Rice Weevil *(Sitophilus oryzae)*

Description	Adult is 3–4 mm in length with a snout. Varies from reddish-brown to nearly black with four light reddish or yellowish spots on its back.
Distribution	Cosmopolitan, established in all regions except the coolest temperate regions. In Australia, this pest occurs in all grain-growing regions.
Pest status	Major, widespread, regular. A primary pest of stored grain.
Host range	A major pest of whole cereal grains but also infests cereal products such as pasta.
Damage	Larval feeding leaves large cavities inside grain and emerging adults leave large emergence holes. Adults feed on the damaged grains and large numbers produce heat and moisture, encouraging mould growth and mites, both of which reduce quality.
Risk period	All year.
Life cycle	Adult weevils live 2–4 months, do not readily fly but will climb vertical surfaces. Each female lays 300–400 eggs during its lifetime. Eggs are laid singly in holes dug in grain and covered with a waxy plug by the female; larva grows inside the grain, excavating a cavity as it grows and pupates inside it. The total development from egg to adult takes about 25 days at optimal conditions of 30ºC and 70% relative humidity but this period is greatly prolonged during cold weather.
Control	**Chemical control** Fumigation in sealed storage, grain protectants. **Cultural control** Good hygiene with storage and handling equipment should minimise infections.

Rust-Red Flour Beetle *(Tribolium castaneum)*

Description	The adult beetles (3–4 mm long), are flattened, reddish-brown with club-shaped segments on antennae ends. The larvae are elongate and light brown.
Distribution	Cosmopolitan. Thought to have originated in India, but now found throughout all tropical, subtropical and warm temperate regions of the world. It is found in all grain-growing states of Australia.
Pest status	Major, widespread, regular.
Host range	Is considered a secondary pest because it cannot damage sound grain. Mainly a pest of milled cereals and a common pest in stored cereal grain and processed grain products. Can also infest oilseeds, nuts and dried fruits.
Damage	Both larvae and adults are general feeders and the damage caused by them is not readily identifiable. A heavy infestation in commodities discolours grain and emits a foul odour due to a secretion from the abdominal glands of the adult.
Life cycle	Adults are strong fliers and live for 200 days to 2 years under temperate conditions. The adult female lays 2–10 eggs each day during its life and larvae are quite active. Development of egg to adult takes up to 21 days under optimal conditions of 35ºC and 75% relative humidity.
Control	**Chemical control** Fumigation in sealed storage, grain protectants. **Cultural control** This insect does not occur in standing crops. Therefore, good hygiene with storage and handling equipment should minimise infection.

Saw-toothed Grain Beetle *(Oryzaephilus surinamensis)*

Description	Fast moving dark brown-black beetle (3 mm long) with characteristic sawtooth-like projections on each side of the thorax. They rarely fly. The white, flattened larvae feed and develop externally but are difficult to see.
Distribution	Cosmopolitan.
Pest status	Major, widespread, regular.
Host range	Infests cereal grains, oilseeds, processed products, peanuts and dried fruits.
Damage	A secondary pest, the larvae feed on the damaged and broken kernels with a preference for germ. Larvae also attack germ in the whole cereal grains, changing the nutritional content and reducing the percentage germination.
Risk period	All year.
Life cycle	Adults live on average for 6–10 months but some may live as long as 3 years. Each female beetle lays 40–280 eggs during its lifetime, dropping them loosely among the foodstuff or inserting them into the crevice of a grain kernel. Eggs hatch in 3–5 days and the larvae feed actively. The development from egg to adult takes up to 3 weeks under optimal conditions of 33ºC and 80% relative humidity.
Control	**Chemical control** Fumigation in sealed storage, grain protectants. **Cultural control** This insect does not occur in standing crops. Therefore, good hygiene with storage and handling equipment should minimise infection.

Confused Flour Beetle *(Tribolium confusum)*

Description	Adults are a 3.5–4 mm long, shiny, flattened oval, dark reddish-brown beetle. The antennae gradually increase in size towards the tip. Viewed from the underside, the gap between the eyes is about 2.5 times the diameter of one eye. This insect does not fly.
Distribution	Cosmopolitan. Thought to have originated in India, but now found throughout all tropical, subtropical and warm temperate regions of the world. It is found in all grain-growing states of Australia
Pest status	Major, widespread, regular.
Host range	Infests most stored grain feeding on damaged grain.
Damage	A heavy infestation discolours grain and emits a foul odour due to a secretion from the abdominal glands of the pest. This pest does not attack grain in standing crops.
Life cycle	Average fecundity is 400–500 eggs per female, with peak oviposition occurring during the first week. Adults may live longer than 3 years, and females may lay eggs for more than a year. Eggs are deposited directly in flour, other food material, or attached to the surface of the container. They are white or colorless and covered by a sticky material to which flour can adhere. Eggs hatch in 3–5 days at 32–35°C. Larvae burrow into kernels of grain but may leave their burrows in search of a more favourable food.
Control	**Chemical control** Fumigation in sealed storage, grain protectants. **Cultural control** This insect does not occur in standing crops. Therefore, good hygiene with storage and handling equipment should minimise infection.

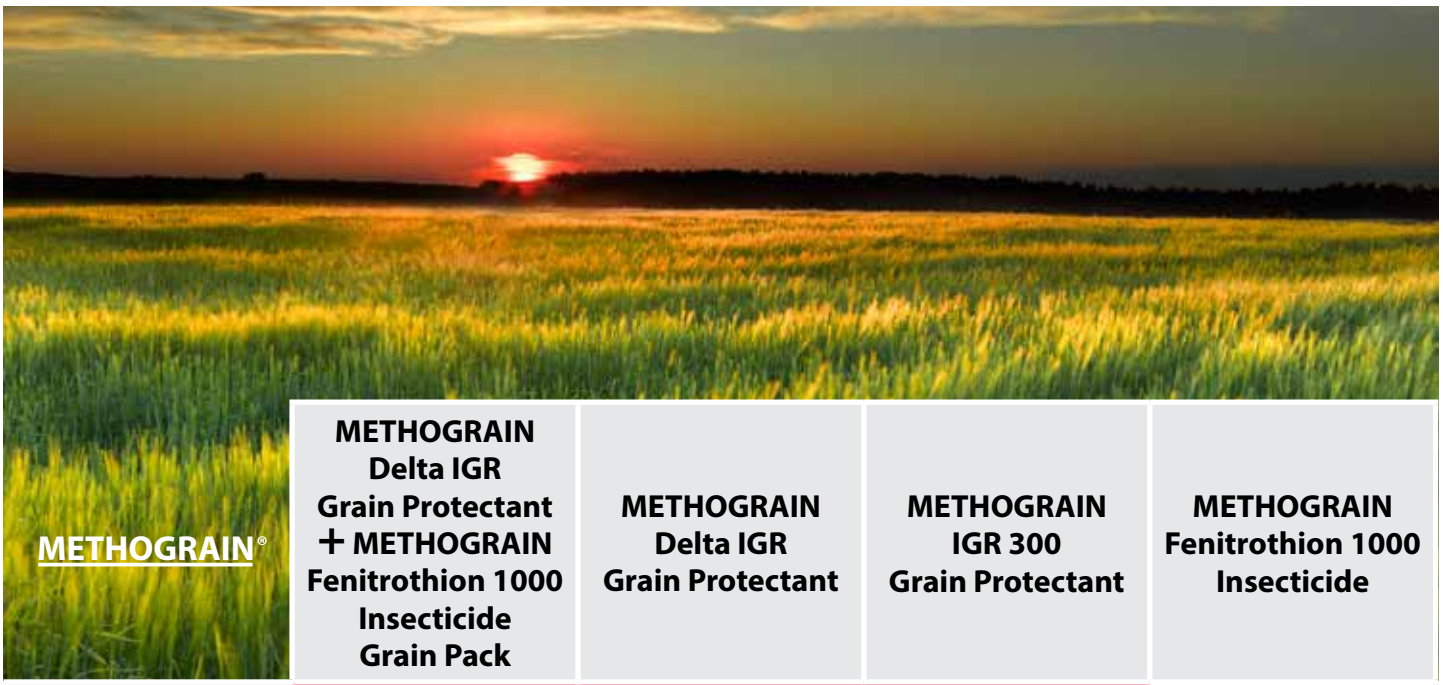
Indian Meal Moth *(Plodia interpunctella)*

Description	Adults are 8–10 mm in length with 13–20 mm wingspans. The outer half of the moth's forewings is bronze, copper, or dark grey in colour, while the upper half are yellowish-grey, with a dark band at the intersection between the two. The moth larvae are off-white with brown heads. When these larvae mature, they are usually about 17 mm long.
Distribution	Cosmopolitan with a range extending from the tropics to temperate regions.
Pest status	Major, widespread, regular.
Host range	Does not affect field grown crops, only stored cereal grain and flour.
Damage	Direct damage to grain is the result of larvae feeding on the seed germ, reducing the dry grain weight. The food they infest will often seem to be webbed together and with larvae droppings. Infestations at high level can be severely detrimental to product quality.
Life cycle	The entire life cycle of this species may take 30–300 days. Female moths lay between 60–400 eggs on a food surface, which are ordinarily smaller than 0.5 mm and not sticky. The eggs hatch in 2–14 days. The larval stage lasts from 2–41 weeks, depending on the temperature.
Control	**Chemical control** Fumigation in sealed storage, grain protectants.

Tropical Warehouse Moth *(Ephestia cautella)*

Description	The tropical warehouse moth has brown-grey forewings with a darker band running across the middle and far edges. The wingspan is approximately 15–20 mm and when at rest, its length is between 10–12 mm. The yellow-white larvae grow up to 14 mm long, have a brown head and a dark spot at the base of the back hairs.
Distribution	Cosmopolitan with a range extending from the tropics to temperate regions.
Pest status	Major, widespread, regular.
Host range	Does not affect field grown crops, only stored cereal grain, oilseeds and flour.
Damage	Commonly attacks stored grains, with larvae feeding on the grain. Heavy infestation of larvae produce very large quantities of webbing over the surface of the grain and adjacent parts of the storage structure.
Life cycle	Females lay between 100–200 eggs among or in the infested goods. The eggs hatch in around 4–8 days and begin to spin immediately. The larva pupates in a cocoon either within or around the infested material. Normally about 80 days is required from egg to adult, however the life cycle can be completed in as few as 60 days.
Control	**Chemical control** Fumigation in sealed storage, grain protectants.

Stored grain pest control table



METHOGRAIN®	METHOGRAIN Delta IGR Grain Protectant + METHOGRAIN Fenitrothion 1000 Insecticide Grain Pack	METHOGRAIN Delta IGR Grain Protectant	METHOGRAIN IGR 300 Grain Protectant	METHOGRAIN Fenitrothion 1000 Insecticide
Lesser Grain Borer	■	■	■	
Red-Rust Flour Beetle	■	■	■	■
Saw-Toothed Grain Beetle	■	■	■	
Confused Flour Beetle	■	■		■
Rice Weevil	■			■
Indian Meal Moth	■			■
Tropical Warehouse Moth	■	■		■
Flat Grain Beetle	■	■		

How to use METHOGRAIN® products

METHOGRAIN®
DELTA IGR
GRAIN PROTECTANT

Instructions

1. For up to 9 months protection from Lesser Grain Borer, Rust-Red Flour Beetle, Saw-Toothed Grain Beetle, Flat Grain Beetles, Confused Flour Beetle, Tropical Warehouse Moth, mix 1 L METHOGRAIN® Delta IGR into 50 L of clean water. This volume is sufficient to treat 50 tonnes of grain.
2. During grain transfer process via auger apply the spray mixture to the grain at the rate of 1 L to 1 tonne of grain.
3. Hold grain in store and do not use for processing into food for human consumption or stock food within 24 hours of treatment.

METHOGRAIN®
IGR 300
GRAIN PROTECTANT

Instructions

1. For up to 9 months protection from Lesser Grain Borer, Rust-Red Flour Beetle, Saw-Toothed Grain Beetle, mix 100 mL METHOGRAIN® IGR 300 into 50 L of clean water. This volume is sufficient to treat 50 tonnes of grain.
2. During grain transfer process via auger apply the spray mixture to the grain at the rate of 1 L to 1 tonne of grain.
3. Hold grain in store and do not use for processing into food for human consumption or stock food within 24 hours of treatment.

METHOGRAIN®
Fenitrothion 1000
Insecticide

Instructions

1. For 3 months protection from Rust-Red Flour Beetle, Confused Flour Beetle, Rice Weevil, Indian Meal Moth, Tropical Warehouse Moth, mix 300 mL METHOGRAIN® Fenitrothion 1000 Insecticide into 50 L of clean water. This volume is sufficient to treat 50 tonnes of grain.
2. For 6 months protection from Rust-Red Flour Beetle, Confused Flour Beetle, Rice Weevil, Indian Meal Moth, Tropical Warehouse Moth, mix 600 mL METHOGRAIN® Fenitrothion 1000 Insecticide into 50 L of clean water. This volume is sufficient to treat 50 tonnes of grain.
3. During grain transfer process via auger apply the spray mixture to the grain at the rate of 1 L to 1 tonne of grain.
4. For the 6 months protection rate, hold grain in store and do not use for processing into food for human consumption or stock food within 13 weeks.

METHOGRAIN®
DELTA IGR
GRAIN PROTECTANT
+
METHOGRAIN®
Fenitrothion 1000
Insecticide

Instructions

1. Mix 1 L METHOGRAIN® Delta IGR plus 300 mL METHOGRAIN® Fenitrothion 1000 Insecticide into 50 L of clean water. This volume is sufficient to treat 50 tonnes of grain.
2. During grain transfer process via auger apply the spray mixture to the grain at the rate of 1 L to 1 tonne of grain.
3. Hold grain in store and do not use for processing into food for human consumption or stock food within 24 hours of treatment.
   This combination provides up to 9 months protection from Lesser Grain Borer, Rust-Red Flour Beetle, Saw-Toothed Grain Beetle and up to 3 months protection from Confused Flour Beetle, Rice Weevil, Indian Meal Moth, Tropical Warehouse Moth.

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References - Insect pest images have been sourced from Bugwood Image Database http://www.insectimages.org/ and DAF QLD with permission

The information provided herein may include extracts from the product label and does not constitute the complete directions for use. READ THE PRODUCT LABEL THOROUGHLY BEFORE OPENING OR USING METHOGRAIN PRODUCTS

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