Biscuit and Cigarette Beetles

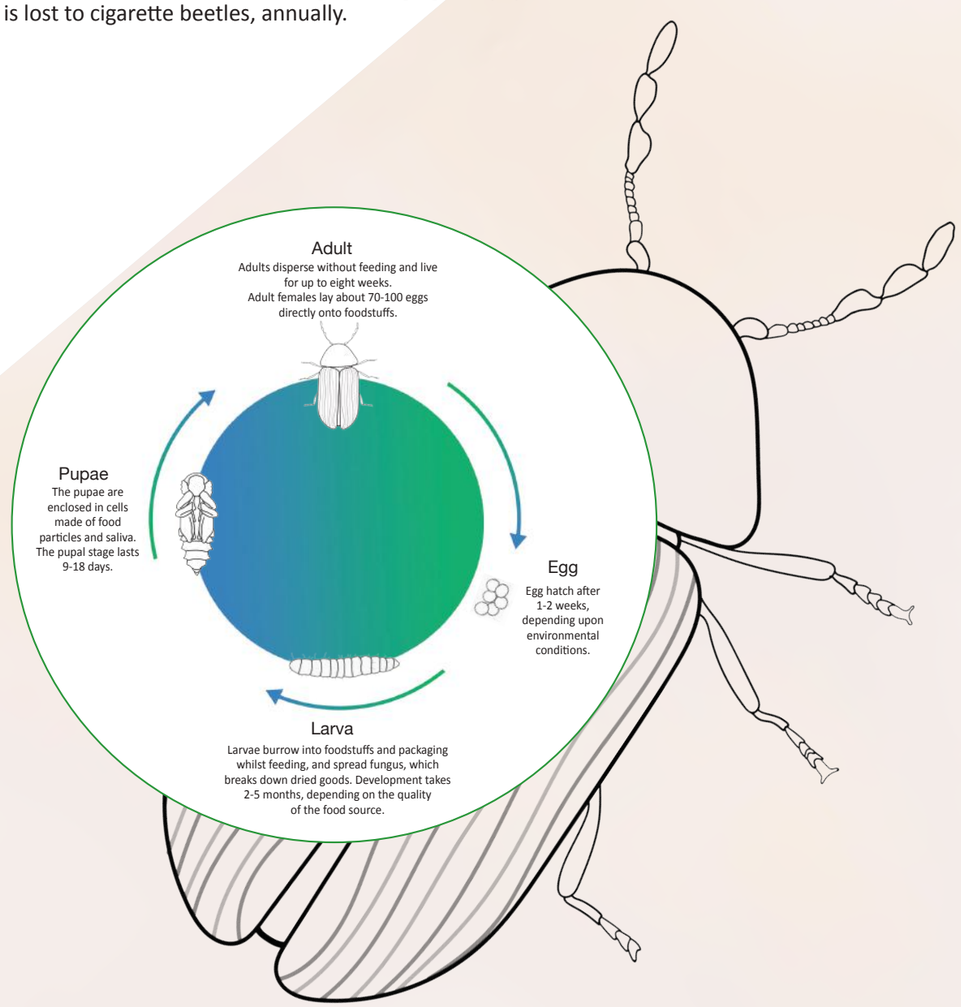
Biscuit and cigarette beetles

The biscuit beetle and the cigarette beetle are small, widespread species. They are important pests of dried plant and animal product. The biscuit beetle is found worldwide in houses, stores, warehouses and kitchens, feeding on bread, flour, spices, cereals, fruit, tobacco and pharmaceutical products. The cigarette beetle is a pest of tobacco, oilseeds, cereals, dried fruit, flour and some animal products.

Damage

The larvae of both species are voracious feeders, and infestations reduce the quality and weight of stored products. The beetles have a symbiotic relationship with yeast, which breaks down less nutritious foods. Products may be contaminated and lose value. The beetles also damage packaging and paper. It is estimated that about 1% of warehoused tobacco is lost to cigarette beetles, annually.

Life Cycle



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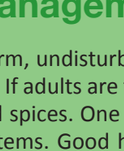
Coleoptera

Monitoring and Management

These beetles thrive in dark, warm, undisturbed places, so monitor routinely for adult beetles using Xlure MST for the presence of populations. If adults are found, look for larvae in their food source, especially in rarely used dried-produce, such as flour and spices. One good indicator of infestations is the presence of shot-like holes in the outside packaging of food items. Good hygiene is imperative; ensure that disused and old foodstuffs are removed from storage and destroyed. Birds' nests are a source of infestation, and preventing access to the attic prevents re-infestation.

Stores should be constructed to ensure they are easy to clean, maintain, well-insulated, well-ventilated and damp-proof. Products should be well packaged and externally inspected for beetles before storage. Food storage areas such as pantries and cabinets need to be vacuumed thoroughly, including the crevices between floorboards, the corners of cabinets, and areas where mice may have hoarded food. Lowering humidity levels and freezing products will also decrease the likelihood of infestation.

Russell IPM supply re-usable (MST), or disposable (Safestore) traps, baited with food attractants, kairomones and pheromones (Qlure) that offer effective monitoring of adult beetles and are used to inform control programmes.

Scientific and common name	Image	Size (mm)	Colour	Identification
Stegobium paniceum Biscuit beetle		2.2 - 4	Reddish-brown	Many fine grooves run lengthways along the wing cases (elytra). There are three flattened segments at the tip of antennae. The biscuit beetle head is partially hidden by the pronotum and the eyes are dark and large. *Stegobium paniceum* is more common in warmer climates.
Lasioderma serricone Cigarette beetle		2 - 2.5	Reddish-brown	Very similar in appearance to the biscuit beetle. However, adults of the cigarette beetle are usually smaller. In contrast to the biscuit beetle, the elytra are smooth with weak punctuation. It has uniformly serrated (like the teeth of a saw) antennae, with 11 segments.

Associated Russell IPM Products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Xlure MST


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safe store Pitfall trap


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safe store Diamond trap


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Qlure

Skin Beetles

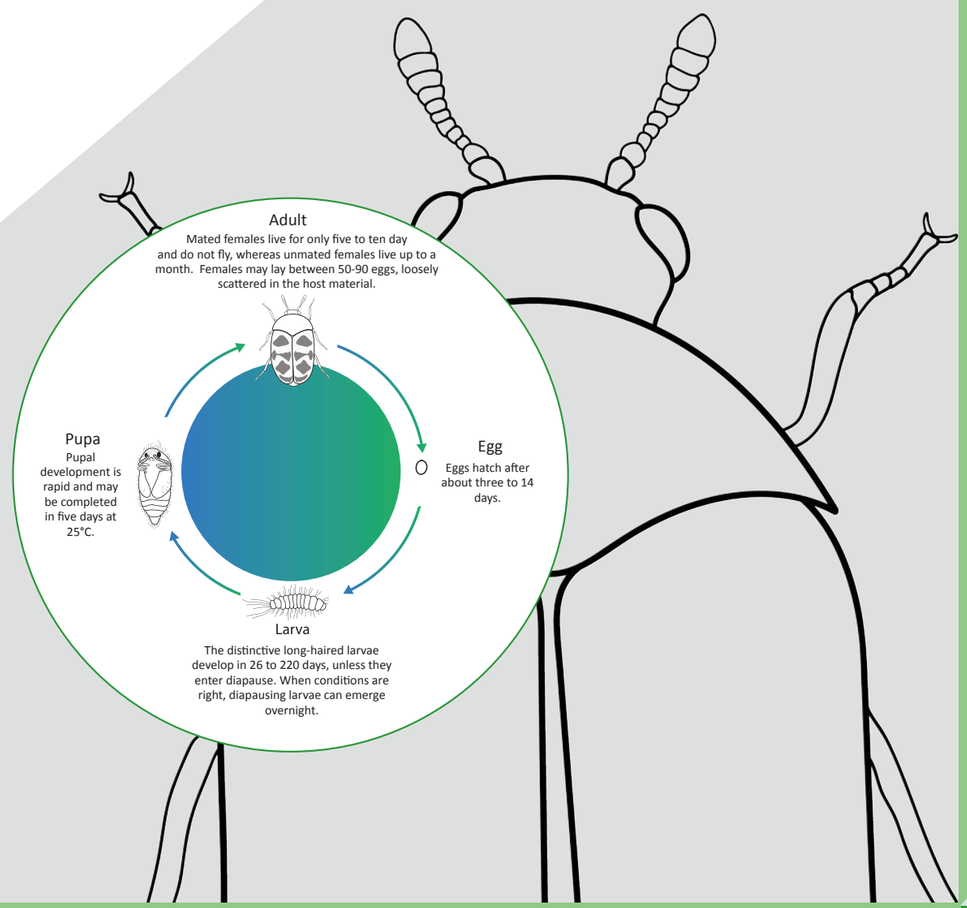
Skin Beetles

Skin beetles (genus: *Trogoderma*) are some of the most invasive and destructive insect pests of stored cereal grains and oilseed products worldwide, especially in hot dry conditions. They are difficult to control, as they are able to survive for long periods without food, in dry conditions and on foodstuffs with moisture content as low as 2%. Larvae enter reproductive diapause in adverse conditions, surviving for up to seven years. Some populations have high levels of resistance to chemical insecticides. Populations of the Khapra beetle (*Trogoderma granarium*), can expand so rapidly, that large numbers of larvae can build up on the surface of infested grain. The warehouse beetle (*T. variabile)* are more widespread and common, although they cause less damage overall. They are called skin beetles because they also eat the flesh off carcasses.

Damage

The khapra beetle is a serious pest of stored products and considered one of the worst 100 invasive species worldwide. The US invest $ millions in eradicating it as a quarantine pest. It has a wide host range including wheat, barley, oats, rye, maize, rice, flour, malt, noodles, legumes, cocoa, nuts and milk powder as well as many other cereal, oilseed, animal and high-protein dried products. Its rapid rate of increase results in heavy losses.

Life Cycle



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Coleoptera

Monitoring and Management

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Scientific and common name	Image	Size (mm)	Identification
Trogoderma granarium Khapra beetle		Adults: 2 - 3 Larvae: 1.6 - 5	Adults possess a notably dark brown pronotum, fine hairs on their dorsal surfaces, distinctive clubbed antennae consisting of 3-5 segments and are oval in shape. Males are darker and females are slightly larger with lighter colours. Larvae possess a long 'tail' and are distinctly hairy. Adults are reddish-brown, larvae start yellow-whitish and become golden-brown.
Trogoderma variabile Warehouse beetle		Adults: 3 - 6.3 Larvae: 3 - 6	Adults are oval in overall shape and possess three reddish-brown, golden, or grey irregular lines across the dorsal surface of the body, as well as numerous hairs. Larvae are distinctly hairy. Adults are black or brownish-black, larvae start yellow-whitish and become reddish-brown.

Associated Russell IPM Products


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Flour Beetles

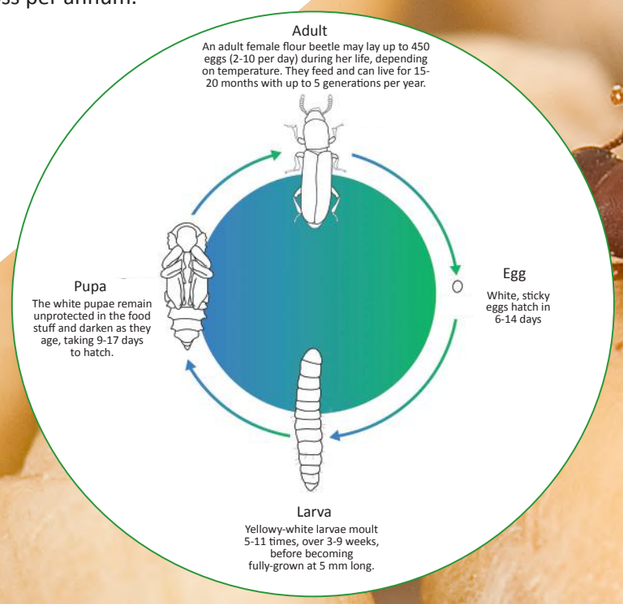
Flour Beetles

The cosmopolitan red (*Tribolium castaneum*) and confused (*T. confusum)* flour beetles are two of the most common storage pests found in cereal-based products that are found in flour mills and bakeries. They also feed on oil seed, nuts, dried fruit, spices, chocolate and animal products. The red flour beetle can fly and has the highest rate of population increase of any stored product insect, multiplying 70x per month under ideal conditions. They are not cold tolerant, so do not over winter in cold stores. The flightless confused flour beetles are long-lived (1-3 years), and more tolerant of cold and very low humidity and have a 60-fold increase in population per month in good conditions.

Damage

Economic damage is caused by direct loss of milling yield due to feeding; rejection of product due to infestation; cost of management tactics; contamination by unpleasant odours (quinones) secreted by beetles in heavy infestations; and loss of consumer trust. When present in large numbers, flour beetles make flour product prone to moulding and the product turns grey. Because flour beetles are common and widespread, they cause millions of pounds worth of loss per annum.

Life Cycle



Monitoring and Management

Good hygiene is an essential part of managing food stores in order to find and remove the source of new infestations, flour beetles can feed and survive on the smallest amounts of grain. Stores should be easy to clean, well-insulated, well-ventilated and damp-proof. Cracks and crevices that can harbour the beetles should be filled where possible. Stored grain should be dried (<15% moisture content) and kept cool (<15°C) for long-term storage. Freezing infected stored products below -18°C/0.4°F for three days can destroy these species. Flour products should be stacked away from floors and ceilings to allow for inspection and cleaning. Maintain stock rotation. It is also advised to create robust, well-sealed packs with smooth surfaces as they can deter an insect attack. Monitor routinely with Russell IPM traps and pheromones to detect the presence flour beetles as part of your management strategy.

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Coleoptera

Scientific and Common name	Image	Size (mm)	Identification
Tribolium confusum Confused flour beetle		2.6 - 4.4	Antennae with 5 or 6 segmented club; slight ridge above the eye. Reddish -brown in colour.
Tribolium castaneum Rust-red Flour beetle		2.3 - 4.4	Antennae with distinct 3-segmented club. No ridge above the eye. Reddish-brown in colour.
Tribolium destructor Dark flour beetle		2.3 - 4.4	Distinct from other flour beetles by being larger and darker. Black or dark brown in colour.
Palorus ratzeburgii Small-eyed flour beetle		2.4 - 3	Small, round eyes with no well-marked club. Reddish -brown in colour.
Latheticus oryzae Long-headed flour beetle		4.5 - 5.8	Antennae with compact 5-segmented club. Pale yellow.
Gnathocerus cornutu Broad-horned flour beetle		3.4 - 5	Males with large, toothed mandibles, broader at base than near apex. Reddish -brown in colour.
Gnathocerus maxillosus Slender-horned beetle		2.4 - 3.0	Males with large, toothed mandibles, slender and in-curved. Reddish-brown in colour.

Associated Russell IPM Products


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Russell IPM
INTEGRATED PEST MANAGEMENT

Grain Beetles

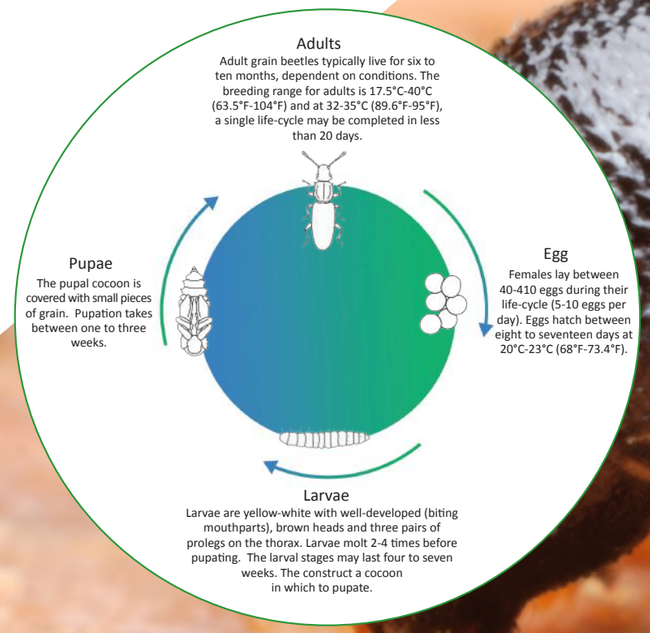
Grain Beetles

Grain beetles (Superfamily: Cucujoidea) are important pests of stored grains, cereal products, nuts, rice, drugs, oilseeds, cocoa, tobacco, dried fruits and meats. Found within homes and commercial facilities.

Damage

Grain beetles consume grains and cereals, capable of significantly reducing the quality and weight of these products. Most importantly, infestations of these species cause stored grain, cereals and fruits to heat, leading to caking, mould growth, grain germination, tainting and discolouration; rendering such foodstuffs commercially unviable. Infestations of grain beetle damage might be identified by the presence of larval moults and cocoons and mould growth.

Life Cycle



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Coleoptera

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INTEGRATED PEST MANAGEMENT

Monitoring and Management

Good hygiene is an essential part of managing food stores in order to find and remove and prevent the source of new infestations. Grain beetles and weevils commonly hide in storage fabrics and sacks, they are able to feed and survive on the smallest amounts of grain sacks. Therefore, cleaning is a crucial part of controlling these insect pests. Stores should be constructed to ensure they are easy to clean, well-insulated, well-ventilated and damp-proof. If possible stored grain should be dried (<9.5% moisture content) and kept cool (<13°C / 55.4°F) for long-term storage. Freezing infected stored products below -18°C (0.4°F) for three days can destroy these species. Xlure MST should be used to monitor grain beetle populations, informing control programmes and preventing infestations.

Scientific and common name	Image	Size (mm)	Identification
Oryzaephilus surinamensis Sawtoothed grain beetle		2.4 - 3.1	Incapable of flight and possess characteristic “teeth”-like structures (saw-tooth) running down the side of the prothorax and a triangular head. Dark brown in colour.
Oryzaephilus Mercator Merchant grain beetle		2.4 - 2.6	Merchant grain beetle adults are similar in appearance to those of the sawtoothed grain beetle; however, this species has larger eyes, a narrower, more ovular head shape and is capable of flight. Dark brown in colour.
Cryptolestes ferrugineus The fat or rusty grain beetle (Family: Laemophloeidae) -		2	Distinctly oblong with antennae two-thirds as long as its body. Infests moulding stored grains, exacerbating damage. Reddish-brown in colour.

Associated Russell IPM Products

XlureMST *Please see page 8.*

Food Storage Mites

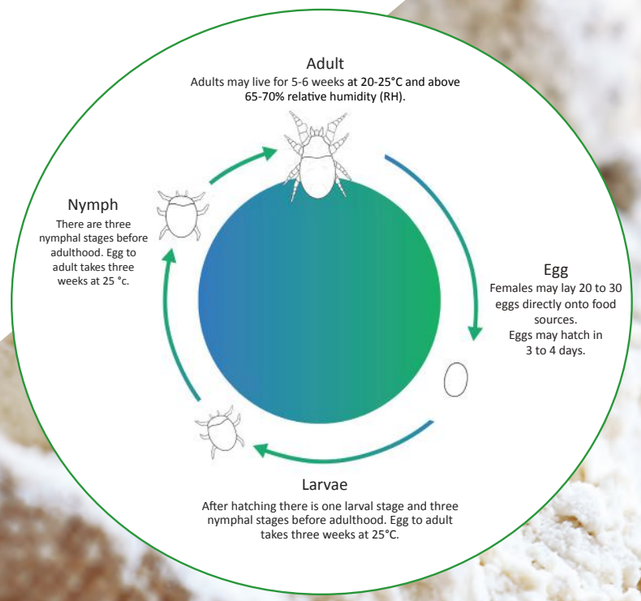
Food Storage Mites

Storage mites infest a wide range of foods, especially cereals, throughout the food chain. Their very small size (averaging 0.5 mm) and translucency makes them very difficult to detect when numbers are low. In optimum conditions (typically 60-80% RH, 20-25°C), their short development life cycle leads to rapid population growth. Many species can tolerate starvation by forming a diapause stage that is resistant to desiccation, so they can survive in cracks and machinery for several months.

Damage

The damage caused by a mite infestation can lead to financial losses through deterioration of food quality, downgrading of products, end-user complaints and rejection of stock. In addition, some species of storage mites are strongly allergenic.

Life Cycle



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Monitoring and management

Four main factors regulate mite numbers in stored products and food processing areas: Temperature (3-35°C); Moisture content (>13%); Food; Intrinsic rate of increase of the species. Controlling the storage environment and good hygiene are the first steps to good mite control.

Early detection and eradication of storage mites are essential to maintain food quality, value and reputation. The Codex standard for wheat for human consumption states that it should be “free from living insects and mites”. Informally, threshold limits in pet food are below 10 mites per kilogramme.

The Xlure MST trap has been specifically developed for monitoring of storage pests. It contains attractants and pheromones for different species and is made from non-toxic ingredients. The traps detect live mites and other storage pests allowing you to identify hidden mite infestations and refuges. Treatments can then be targeted for best effect.

Description of adult insects	Image	Outline
Acarus siro Grain mite		Cosmopolitan (inhabit all regions if not most regions of the globe). Allergenic. Feed on any food including mould. Infested food smells sickly sweet and tastes bad.
Glycyphagus domesticus *Lepidoglyphus destructor* Glycyphagus mites		Cosmopolitan. Infest a range of products. Typically colonise food before other species.
Thyreophagus entomophagus Flour mite		Commonly infest flour and cereal products.
Tyrophagus putrscentiae Cheese mite		Cosmopolitan. Infests many foods, especially those with a high fat or protein content.
Carpoglyphus sp. Dried fruit mite		Infest a wide range of foods, including milk products, dried fruits, honey, beer, wine and animal feeds.

Associated Russell IPM Products

XlureMST *Please see page 8.*