

Before we start

A few words about Envu

Gabriela R Sandoz, Sales Manager - Denmark & Norway

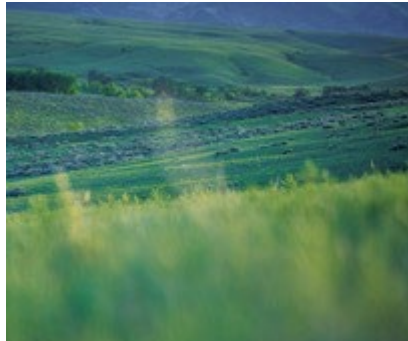
We protect the spaces society and nature share



Professional Pest Mgmt.



Industrial Vegetation Mgmt.



Range & Pasture



Forestry



Mosquito Management



Lawn & Landscape



Ornamentals



Golf

Envu Key Figures



INNOVATION

4 main R&D hubs
around the world



EMPLOYEES

975+ FTEs representing
54 nationalities

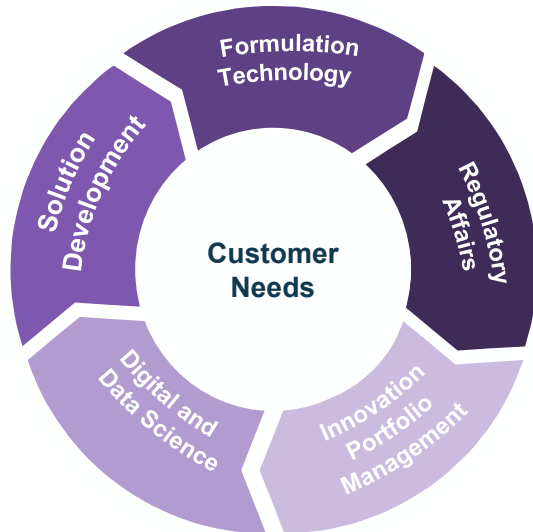


GLOBAL PRESENCE

Employees in 41 countries
and sales in nearly
100 countries

Customer-centric innovation enabled by our global footprint

Our global R&D team is organized to best address our customers' needs



~6%

Around **6 percent** of our topline is **invested in innovation**

~18%

Around **18 percent** of our global Envu team works **within our Innovation function**

~30%

Around **30 percent** of our Innovation team is made up of **top-level scientists**

4

Our **4 innovation hubs around the world** ensure focus on customers in each region

2,000+

Envu has more than **2,000 product registrations in over 100 countries**

5-10

We publish between **5-10 scientific papers** each year

Full access to innovation



>60

external technology
opportunities in active
discussion



>30

partnerships
on 4 continents



>20

new formulations
in advanced
development phases

Leveraging cutting-edge technology to help our customers

RNAi, peptides, enzymes, pheromones, bacteria, satellite imagery, on top of traditional chemistry

The background of the slide is a photograph showing a person's hands holding a large quantity of light-brown grain, possibly wheat or barley. The hands are positioned in the center-right of the frame, with the grain spilling out from the fingers. The background is a clear, bright blue sky. A large, white, semi-circular graphic element is overlaid on the left side of the image, containing the title and presenter information.

Some Common Stored Product Beetles

Richard Faulkner BSc (Hons)
Envi Biol, Hdip Envi Pest Mgmt
Skadedyrdagene 2026

Agenda

Some Common Stored Product Beetles

Where do we find them ?

What are Stored Product Insects

Primary and Secondary Stored Product Insects

SPI Beetle Life Cycle

Some SPI Beetles, ID and Biology

Any Questions ?

Where do we find Stored Product Insects ?

Raw Material Storage

Grain Silos, Farms, Feed Mills, Grain Collectors, Ports and Harbours

Transport

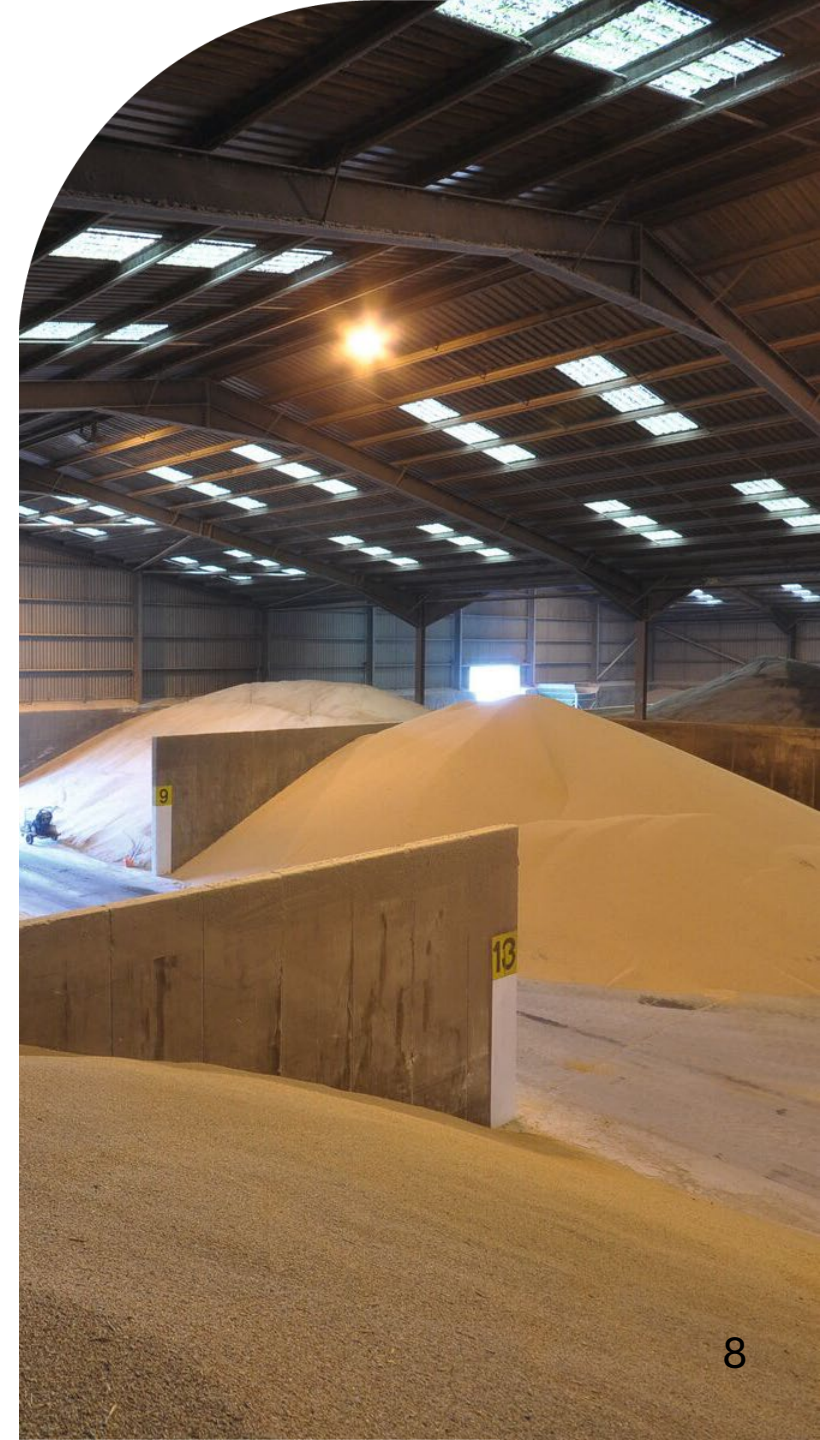
Ships, Containers, Vehicles and trailers

Processing

Mills, Bakerys, Food Processing Plants, Feed Mills and Stores / Warehousing

End Users

Shops, Supermakets and Private Households



What are Stored Product Insects ?

Most species of SPI are either small brown beetles (3 - 4 mm long) or small grey moths (10 - 15mm long)

Most Stored Product Insects originate from tropical or semi tropical climates where they generally infest dried plant-based materials.

They get introduced into our customers stores, factories, and other facilities via commodities. As a result, Stored Product Insects cause significant problems in raw material storage, processing, retail and domestic property.

Such tiny insects can have very costly consequences!



Categorising Stored Product Insects

PRIMARY Stored Product Insects



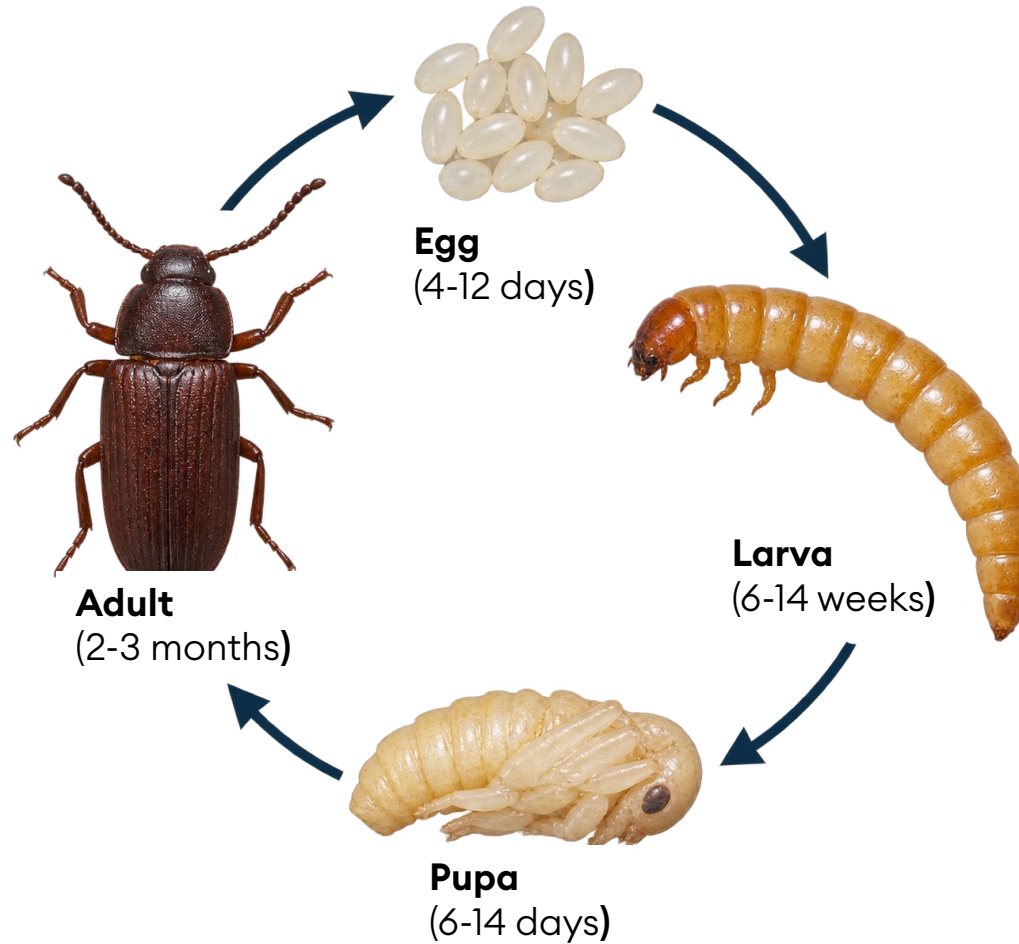
Primary Stored Product Insect
like Rice Weevil can attack the Whole Grain

SECONDARY Stored Product Insects

Secondary Stored Product Insect
like Indian Meal Moth and the Merchant Grain Beetle require the whole grain to be damaged in some way



Stored Product Beetle Life Cycles



Stored Product Insects

Common Beetle Species

***Sitophilus granarius* (Grain Weevil)**



Sitophilus granarius (Grain Weevil)

Primary Stored Product Insect as it damages whole grains

- Life Cycle - Complete Metamorphosis
- In high temperatures (21°C to 35 °C) the life cycle will take as little as 30 to 35 days
- In low temperatures (13°C to 20°C) the life cycle can take up to 6 months or more
- Female can lay between 36 and 254 eggs in her lifetime
- Adults approximately 2mm – 5mm in size



Can be found in the following commodities

- | | |
|---------|----------|
| ▪ Wheat | ▪ Barley |
| ▪ Oats | ▪ Rice |
| ▪ Rye | ▪ Maize |

***Sitophilus oryzae* (Rice Weevil)**



Sitophilus oryzae (Rice Weevil)

Primary Stored Product Insect as it damages whole grains

- Life Cycle - Complete Metamorphosis
- Optimum temperature is 30 °C the life cycle will take as little as 25 days
- In low temperatures (13°C to 20°C) the life cycle can take up to 6 months or more
- Female can lay from 300 to 400 eggs in her lifetime
- Adults approximately 3mm – 5mm in size



Can be found in the following commodities

- | | |
|---------|----------|
| ▪ Rice | ▪ Rye |
| ▪ Maize | ▪ Oats |
| ▪ Wheat | ▪ Barley |

Sitophilus oryzae vs *Sitophilus granarius*

Sitophilus oryzae



Rice Weevil

- Round pits on pronotum and elytra
- Red marks on elytra
- Can fly

Sitophilus granarius

Grain Weevil

- Oval pits on pronotum and elytra
- No markings on elytra
- Does not fly



***Stegobium panaceum* (Biscuit Beetle)**



Stegobium panaceum (Biscuit Beetle)

A member of the Subfamily *Anobiinae*

- Also known as the Drugstore Beetle
- At low temperatures (below 15 °C) there will be one generation in a year
- In high temperatures (above 23°C) there may be five generations or more
- Female can lay 100 eggs in her lifetime.
- Adults approximately 2mm – 4mm in size



Can be found in plant and animal-based commodities such as

- | | |
|-------------|--------------------------------|
| ▪ Bread | ▪ Spices |
| ▪ Biscuits | ▪ Drugs such as St John's-wort |
| ▪ Chocolate | |

***Lasiodema sericcone* (Tobacco Beetle)**



Lasiodema sericcone (Tobacco Beetle)

A member of the Subfamily *Anobiinae*

- Also known as the Cigarette Beetle
- At 37°C the life cycle takes as little as 26 days. At 20°C the life cycle takes 120 days to complete
- Female can lay 100 eggs in her lifetime
- Adults approximately 2mm – 3mm in size
- They are not tolerant of cold conditions and continued temperatures of 5°C will kill the eggs and 4°C will kill the larvae

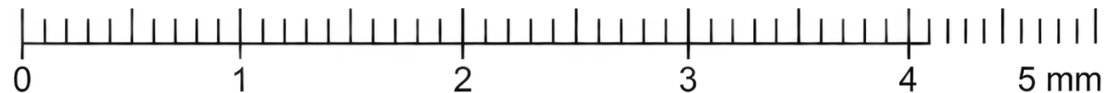


Can be found in plant and animal-based commodities such as

- | | |
|---------------|-------------------------|
| ▪ Tobacco | ▪ Cereals |
| ▪ Cigarettes | ▪ Flour |
| ▪ Flour | ▪ Oilseeds and Oilcakes |
| ▪ Dried fruit | |

***Anobium punctatum* (Common Furniture Beetle)**

Not an SPI



Anobid Identification

ca. 2-4 mm



Biscuit beetle
Stegobium paniceum

ca. 4 mm



Common furniture beetle
Anobium punctatum

ca. 2-3 mm



Tobacco beetle
Lasioderma serricorne

***Tribolium castaneum* (Rust Red Flour Beetle)**



***Tribolium castaneum* (Rust Red Flour Beetle)**

Secondary Stored Product Insect

- The life cycle can take anything from 40 to 90 days and is temperature and food dependent
- Female can lay 300 to 600 eggs in her lifetime
- Adults approximately 3mm – 4.5mm in size



Can be found in commodities such as

- | | |
|---|--|
| <ul style="list-style-type: none">▪ Flour▪ Dried fruit▪ Cereals | <ul style="list-style-type: none">▪ Spices |
|---|--|

***Tribolium confusum* (Confused Flour Beetle)**



Tribolium confusum (Confused Flour Beetle)

Secondary Stored Product Insect

- The life cycle can take anything from 30 to 120 days and is temperature and food dependent
- Female can lay 300 to 400 eggs in her lifetime
- Adults approximately 3mm – 4.5mm in size

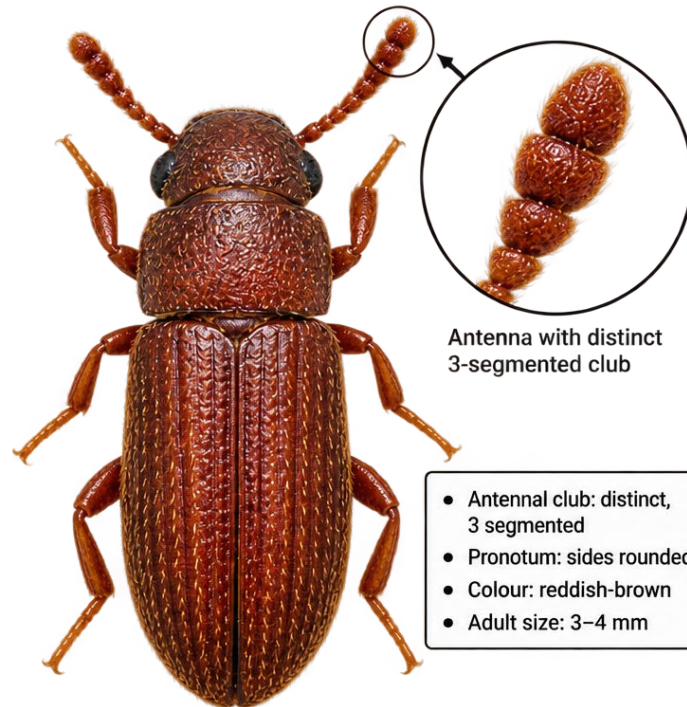


Can be found in commodities such as

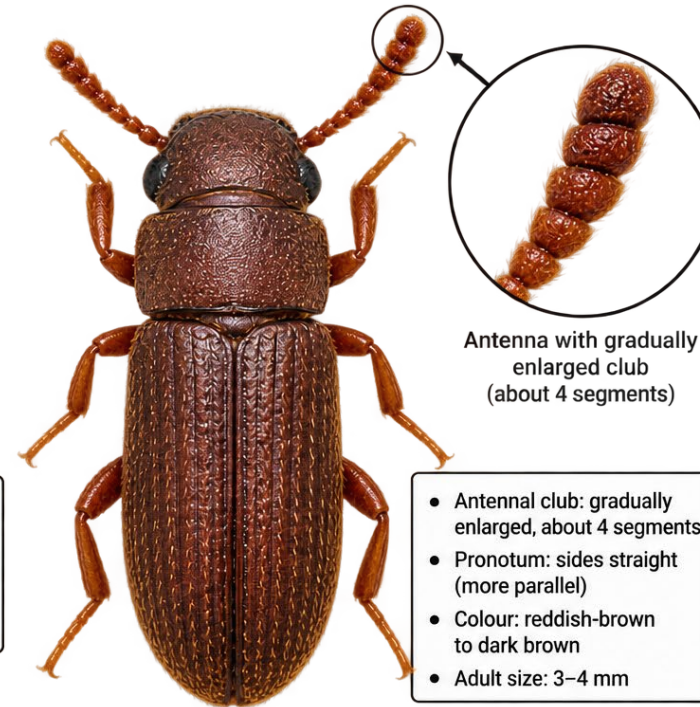
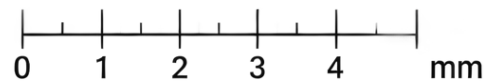
- Flour
- Cereals

They have a preference for breeding in clean flour

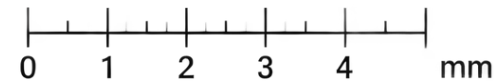
Tribolium Identification



Tribolium castaneum
(Red flour beetle)



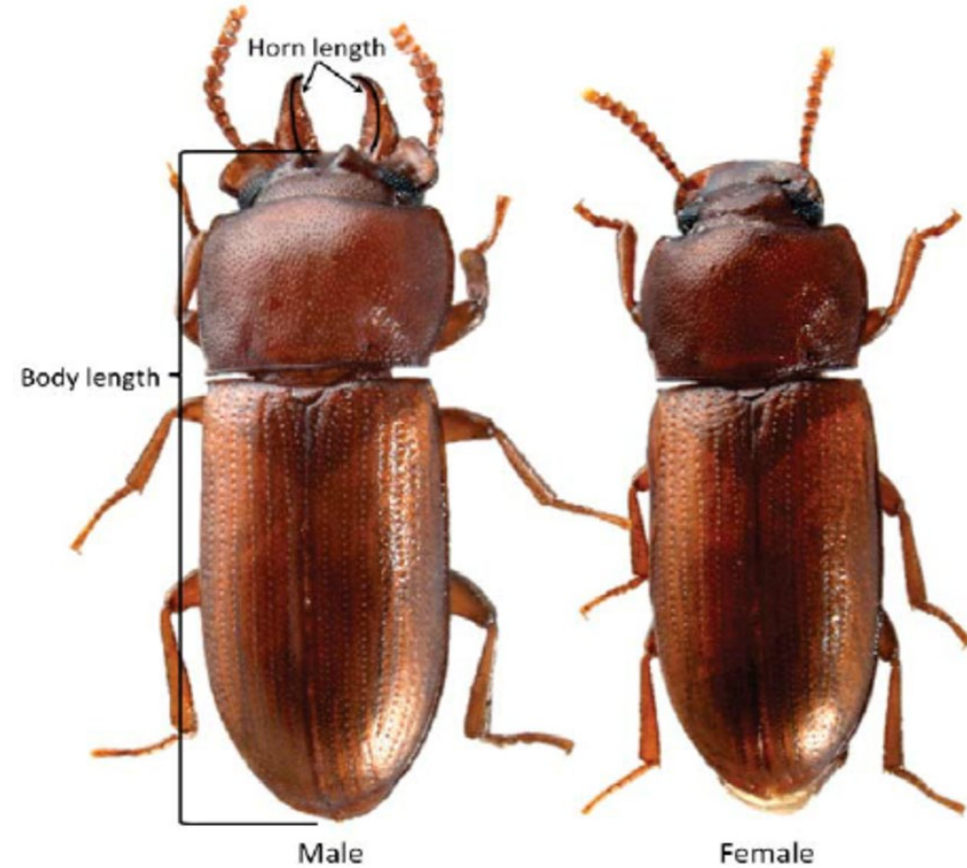
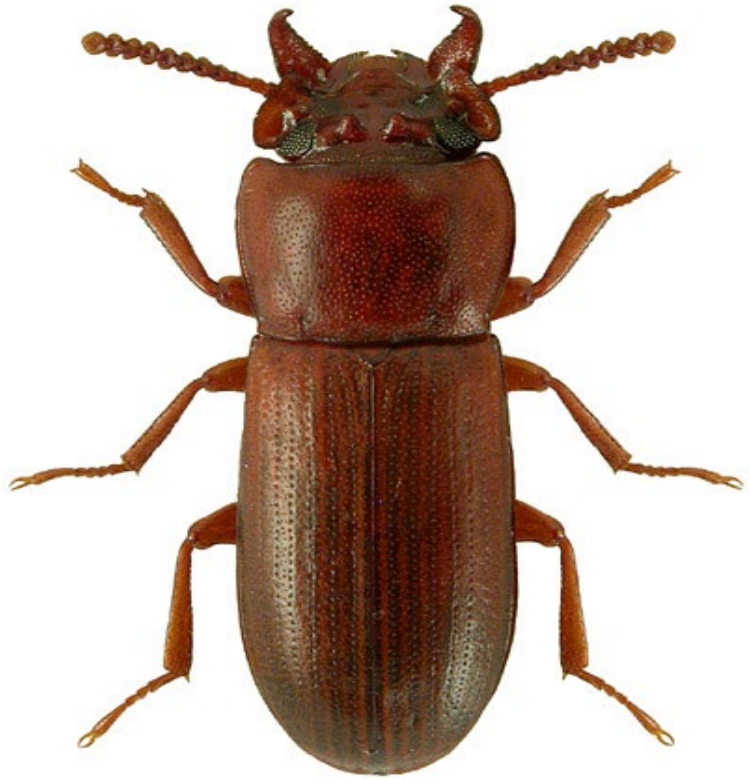
Tribolium confusum
(Confused flour beetle)



***Gnatocerus cornutus* (Broad Horned Flour Beetle)**



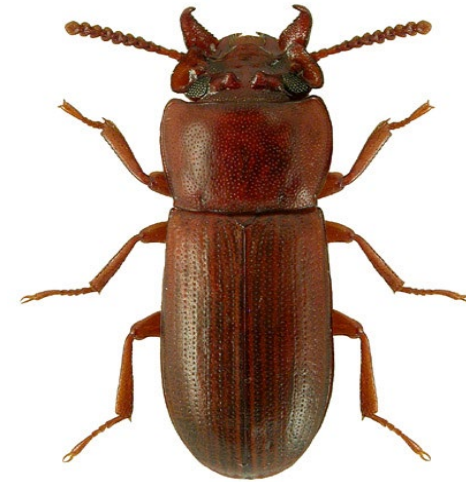
Gnatocerus cornutus (Broad Horned Flour Beetle)



***Gnathocerus cornutus* (Broad Horned Flour Beetle)**

Secondary Stored Product Insect

- Life Cycle – Complete Metamorphosis
- In optimal developmental conditions the life cycle takes 57 days at a temperature of between 22°C to 27°C.
- Female can lay anything from 250 to 1,000 eggs in her lifetime.
- Adults approximately 3mm – 4mm in size



Can be found in commodities of both animal and plant origin but prefer cereals and cereal based products

***Oryzaephilus surinamensis* (Sawtoothed Grain Beetle)**



Oryzaephilus surinamensis (Sawtoothed Grain Beetle)

Secondary Stored Product Insect

- They can breed within the temperature range of 17.5°C to 40°C
- In optimal developmental conditions the life cycle takes 20 days at a temperature of between 32°C to 35°C
- Female can lay up to 400 eggs in her lifetime.
- Adults approximately 2.5mm – 3.5mm in size



Can be found in commodities such as

- | | |
|---------------|-----------|
| ▪ Flour | ▪ Cereals |
| ▪ Grain | ▪ Rice |
| ▪ Dried fruit | |

***Oryzaephilus mercator* (Merchant Grain Beetle)**



Oryzaephilus mercator (Merchant Grain Beetle)

Secondary Stored Product Insect

- The life cycle can take anything from 27 to 50 days on average and is temperature and food dependent
- Female can lay up to 500 to 1,00 eggs in a year
- Adults approximately 2mm – 3mm in size



Can be found in commodities such as

- | | |
|-------------------|---------------------------|
| ▪ Flour | ▪ Oilseeds and Oilcakes |
| ▪ Grain | ▪ Oatmeal and Rolled Oats |
| ▪ Dried fruit | ▪ Bran |
| ▪ Cereals | ▪ Rice |
| ▪ Sunflower Seeds | |

***Cryptolestes ferrugineus* (Rusty Grain Beetle)**



Cryptolestes ferrugineus (Rusty Grain Beetle)

Secondary Stored Product Insect

- They require a temperature of 23°C or above in order to reproduce
- In optimal developmental conditions the life cycle takes 20 to 30 days at a temperature of between 30°C to 35°C
- Female can lay between 200 to 500 eggs in her lifetime
- Adults approximately 1.5mm – 2.5mm in size



Can be found in commodities such as

- | | |
|---------------|------------|
| ▪ Flour | ▪ Nuts |
| ▪ Grain | ▪ Oilseeds |
| ▪ Dried fruit | |

Thank You

Questions