

Beetles Abound:

A survey of beetles relevant to pest control professionals

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Topics Covered in Today's Presentation

1) General introduction to beetles

2) Survey of beetles relevant to the pest control industry

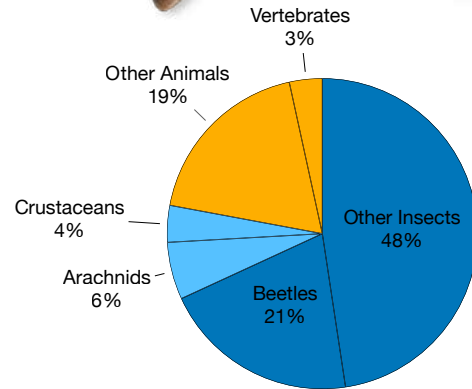
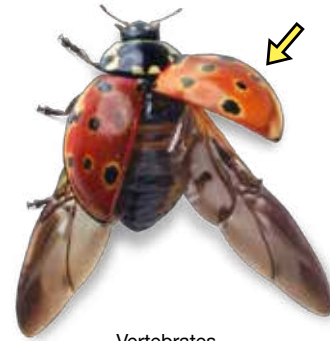
- Examined records from the UW Insect Diagnostic Lab over the last 5+ years
- Identified top ~24 beetles associated with structural pest control in Wisconsin and Upper Midwest
 - *Species in/around structures, common ID requests at IDL, and species commonly misidentified*
- Slides will emphasize diagnostics and biology of beetle species with relevant notes about management
- Detailed information on size, appearance, key ID features, biology, and look-alikes
- Slides available on UW Insect Diagnostic Lab website: insectlab.russell.wisc.edu (Resources > Presentation Notes)

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Meet the Beetles: Order Coleoptera

- First appeared ~300 MYA
- Largest order of insects (and animals) on the planet:
 - **Worldwide:** 176 Families & ~400,000 species worldwide
 - **US:** 130 Families & ~25,000 species
 - **Wisconsin:** 100+ Families & ~5,000 - 6,000 beetles species
- Nearly 1 out of every 4 extant animal species is a type of beetle!
- Undergo complete metamorphosis: egg > larva > pupa > adult
- Hard body (typically); possess protective wing covers elytra
- Can vary greatly in size and appearance!



Why are beetles tough to ID?

- So many species!
- Often tiny (<1/4")
- Many look similar

Ecological Importance: What do beetles do?

In short...lots of things

- Predators
- Pollinators
- Plant/crop pests
- Scavengers/decomposers
- Food for other animals
- Culturally important



Beetles in Structural Pest Control:

Their dark side...

- Nuisance invaders/incidentals
- Stored product pests / scavengers
- Fabric/Museum pests
- Wood borers & firewood pests



Stored product infestation

Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org



Asian lady beetles as a nuisance invader



Fabric damage

Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org



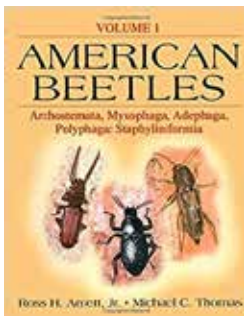
Wood Damage

John C. French Sr., Retired, Universities: Auburn, GA, Clemson and U of MO, Bugwood.org

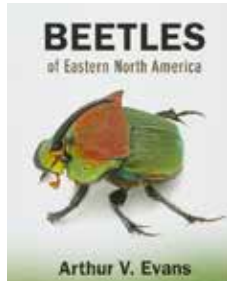
Beetle References

For Pest Control Professionals

Authoritative work!
Expensive: \$\$\$\$
Very technical
Doesn't cover biology/
management



Loaded with photos
Good value: \$\$
User friendly
Mostly covers non-pests



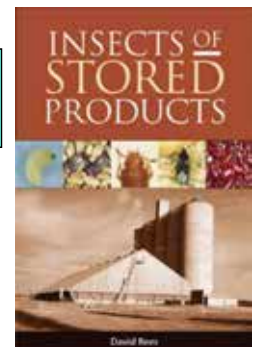
Good coverage of pest species
Great value: \$
User friendly
For pest control professional



Very detailed coverage of beetles and other pests
Costly: \$\$\$
For pest control professional



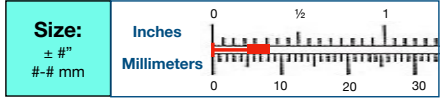
Very detailed coverage of stored product pests
Good value: \$\$
For pest control professional



General Info on Pest

Name of Beetle

Family Name, Scientific Name



Key ID feature(s):

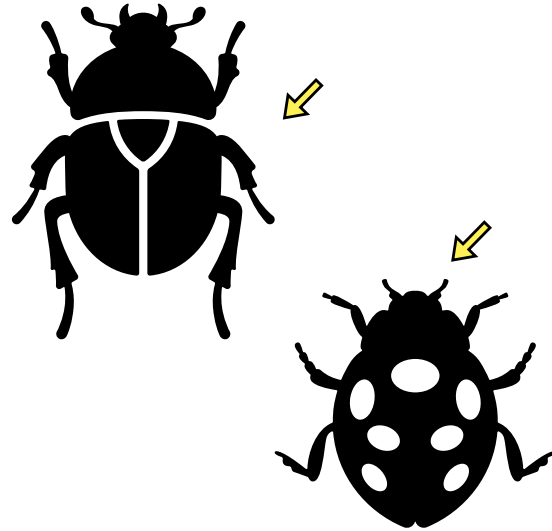
- Important features to help you identify this beetle

Notes:

- Described important aspects of biology
- Implications for scouting & management also mentioned when appropriate

Potential Look-alikes:

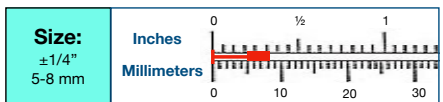
- Any common look-alikes?



Nuisance invader (Autumn)

Multicolored Asian Lady Beetle

Family Coccinellidae: *Harmonia axyridis*



Key ID feature(s): Distinctive!

- Convex shape
- Usually orange with black spots or simply orange
- Black **W** shape on white pronotum
- Larvae: spiky, black & orange

Notes:

- Non-native species from east Asia
- Overwinter in cracks on cliffs in native range or in other protected locations
- Larvae are beneficial predators

Potential Look-alikes:

- Other lady beetles, *but this is our only species that will invade in significant numbers*

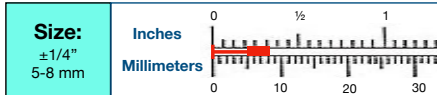


Pest and Diseases Image Library, Bugwood.org

PJ Liesch, UW Insect Diagnostic Lab

Elm Leaf Beetle

Family Chrysomelidae: *Xanthogaleruca luteola*



Key ID feature(s):

- Oblong shape
- Yellowish body with black stripes
- Black spots on pronotum

Notes: Pest of elm trees

- Pest of elm trees; larvae skeletonize foliage
- Adults seek overwintering sites in fall

Potential Look-alikes:

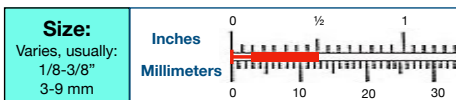
- Other leaf beetles, *but this is the only species that will invade structures in notable numbers*
 - Ex. striped cucumber beetles (crop/garden pest)
 - Ex. Western corn rootworm (crop/garden pest)



General ID

Weevils & Broad-Nosed Weevils: General ID

Family Curculionidae & Subfamily Entiminae



Key ID feature(s):

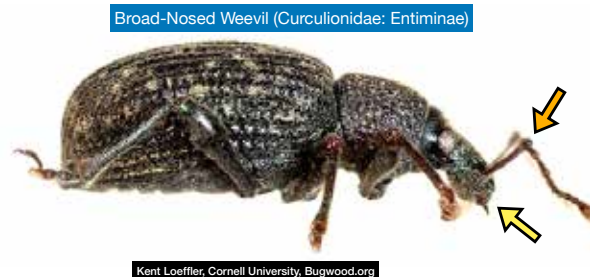
- Oblong or pear-shaped bodies
- Color variable: black, brown, reddish, grey, pale
- Long snout (weevils); shorter snout (broad-nosed)
- Elbowed antennae (similar to ants)

Notes:

- Life histories vary significantly by species
- Some notable stored product pests & nuisance invaders

Potential Look-alikes:

- Some stored product pests due to similar size/color



Nuisance invader (Warm-season)

Black Vine Weevil & Strawberry Root Weevil

Otiorhynchus sulcatus & *O. ovatus*

Key ID feature(s):

- Pear-shaped bodies; elbowed antennae
- **BVW**: Black w/pale spots on elytra
- **SRW**: Reddish brown; “wrinkled” pronotum
- BVW notably larger than SRW

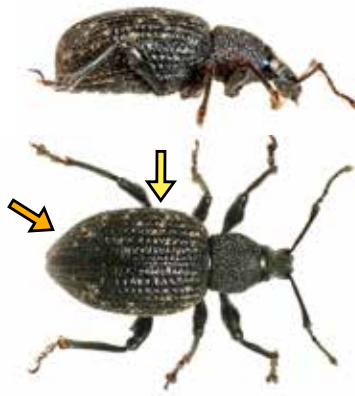
Notes:

- Both species native to Europe
- Associated with plants (larvae feed on roots)
- BVW strongly associated with **yews**

Potential Look-alikes:

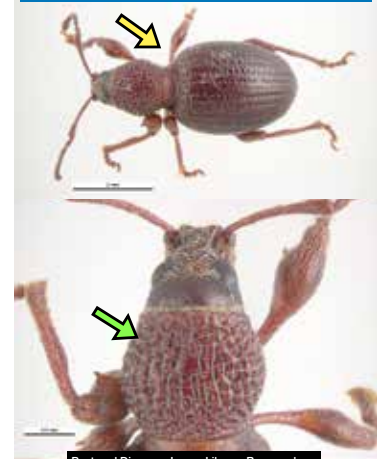
- Unlikely to misidentify
- A few other broad-nosed weevils can invade structures; will have similar body shape and general appearance but are often pale/grey

Black Vine Weevil (*Otiorhynchus sulcatus*)

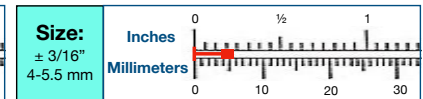
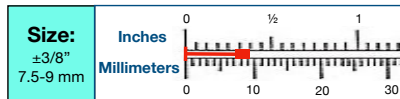


Kent Loeffler, Cornell University, Bugwood.org

Strawberry Root Weevil (*Otiorhynchus ovatus*)



Pest and Diseases Image Library, Bugwood.org

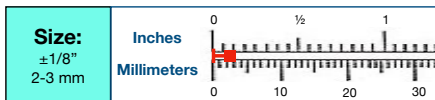


Nuisance invader (Moisture/Fungus)

Stored Product Pest (Fungal Feeder)

Foreign Grain Beetle

Family Silvanidae: *Ahasverus advena*



Key ID feature(s):

- Small size
- Reddish brown or dark beige color
- Clubbed antennae
- “Shoulder pads” on pronotum

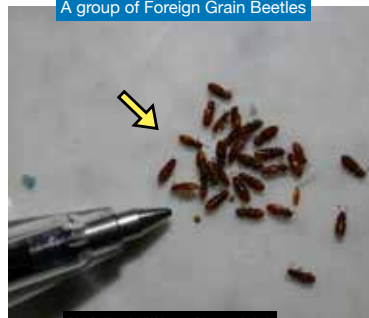
Notes:

- Unusual association w/new construction
- Can indicate plumbing/moisture issues
- Can be associated with musty grains

Potential Look-alikes:

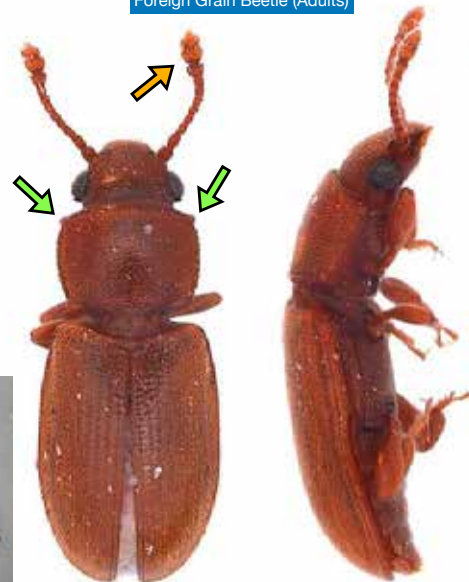
- Other stored product pests due to similar size/color

A group of Foreign Grain Beetles



Phil Pellitteri, UW Insect Diagnostic Lab

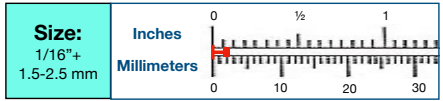
Foreign Grain Beetle (Adults)



Emilie Bess, USDA APHIS PPO, Bugwood.org

Plaster Beetles & Relatives

Family Lathridiidae; several species



Key ID feature(s):

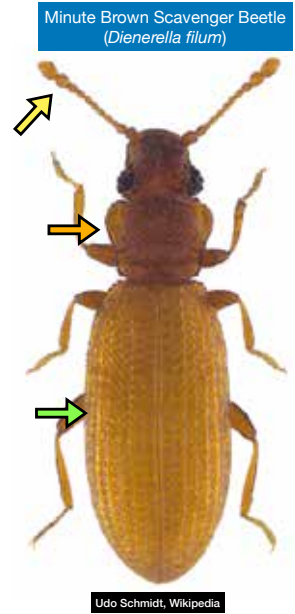
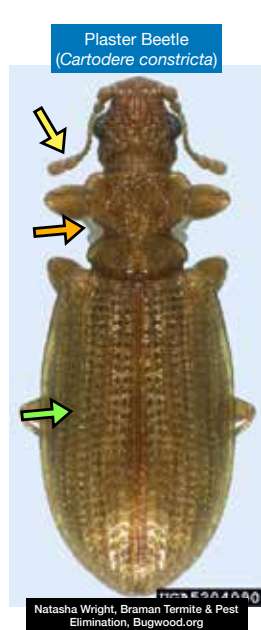
- Some of the smallest beetles you'll likely encounter
- Brown or reddish brown color
- Clubbed antennae
- Unique shape of pronota
- Golf-ball-like divots (punctures) on elytra

Notes:

- Unusual association w/new construction
- Can indicate plumbing/moisture issues
- Can be associated with musty grains

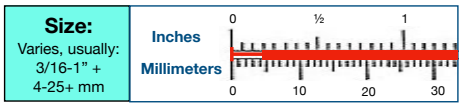
Potential Look-alikes:

- Other stored product pests due to similar size/color



Ground Beetles

Family Carabidae; many species



Key ID feature(s):

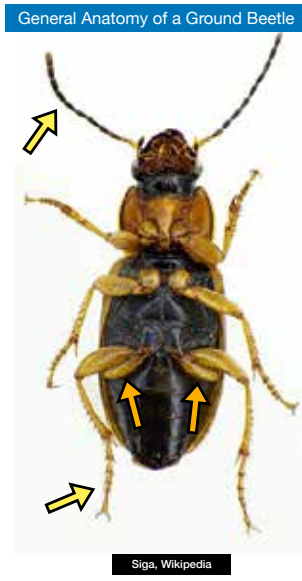
- Long, slender legs and antennae (no club)
- Oval/slender bodies
- Enlarged trochanters at base of hind legs
- Size, color, appearance varies by species

Notes:

- Common, widespread family
- Most species are beneficial predators
- Some can be strongly attracted to lights
- Can't survive indoors long

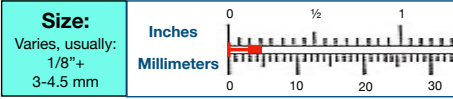
Potential Look-alikes:

- Sometimes mistaken for roaches
- *Scarites* spp. can be mistaken for stag beetles



Granary Weevil & Relatives

Family Curculionidae: *Sitophilus granarius*



Key ID feature(s):

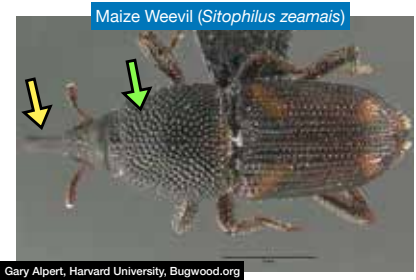
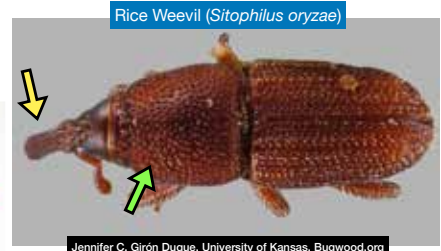
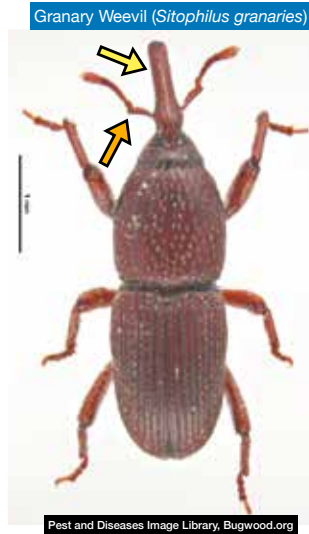
- Oblong bodies
- Reddish brown or brown color
- Prominent "snout"
- Elbowed antennae
- Golf-ball-like punctures on body

Notes:

- Associated with whole stored grains
- Occasionally associated with processed foods (pasta)

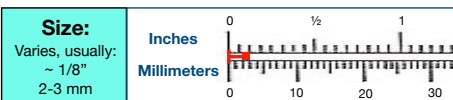
Potential Look-alikes:

- Other stored product pests due to similar size/color



Lesser Grain Borer

Family Bostrichidae: *Rhyzopertha dominica*



Key ID feature(s):

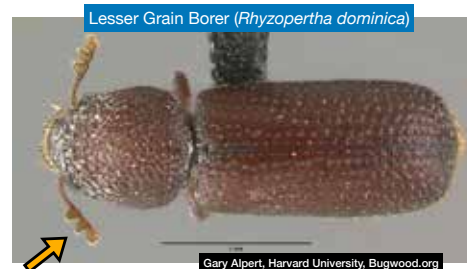
- Cylindrical bodies
- Reddish brown color
- "Hood" over head
- Clubbed antennae w/ 3 distinct segments in club
- Golf-ball-like punctures on body

Notes:

- Associated with whole stored grains, esp. rice, wheat, barley, etc.

Potential Look-alikes:

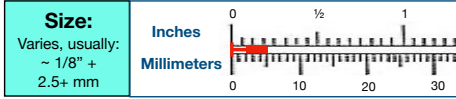
- Other stored product pests due to similar size/color
- Bark beetles due to size/shape/color; *but these wouldn't be in grains*



General ID

Pea & Bean Weevils (Seed Beetles)

Family Chrysomelidae: subfamily Bruchinae



Key ID feature(s):

- Rounded, convex bodies
- "Swollen" femurs
- Color pattern from tiny setae ("hairs")
- Short elytra; exposed pygidium
- Emarginate (notched) eyes

Notes:

- Associated with legumes (peas, beans, etc.)

Potential Look-alikes:

- Distinctive in appearance and habits

General Body Shape



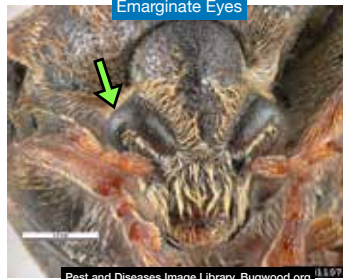
Pest and Diseases Image Library, Bugwood.org



Seed Beetle Infestation

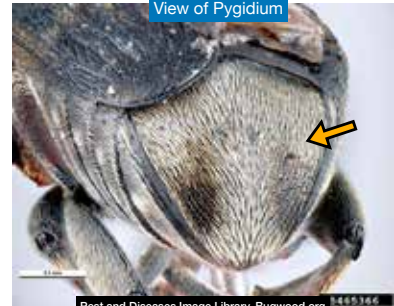
Carl Davies, CSIRO via Wikipedia

Emarginate Eyes



Pest and Diseases Image Library, Bugwood.org

View of Pygidium



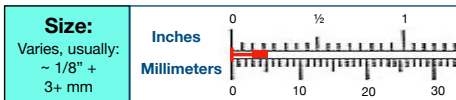
Pest and Diseases Image Library, Bugwood.org

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Stored Product Pest (Primary/Internal Feeder)

Pea & Bean Weevils (Seed Beetles)

Family Chrysomelidae: subfamily Bruchinae



Mexican Bean Weevil (*Zabrotes subfasciatus*)



Pest and Diseases Image Library, Bugwood.org

Notes: Associated with beans

Pea Weevil (*Bruchus pisorum*)



Natasha Wright, Braman Termite & Pest Elimination, Bugwood.org

Notes: Associated with peas and lentils

Cowpea Weevil (*Callosobruchus phaseoli*)



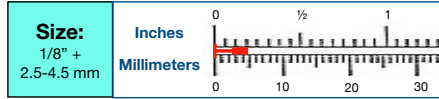
www.padi.gov.au

Notes: Associated with peas, lentils, cowpeas, mung beans

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Flour Beetles

Family Tenebrionidae, *Tribolium* spp.



Key ID feature(s):

- Small size, fairly flat
- Reddish brown color
- Ridge in front of eye
- RFB: Distinct, 3-segmented antennal club
- CFB: Gradual antennal club

Notes:

- Scavengers of grains; common in processed foods
- Red flour beetle can fly, CFB can't fly

Potential Look-alikes:

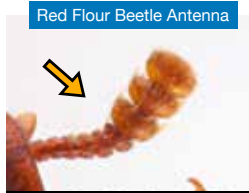
- Other stored product pests due to similar size/color
- Related flour beetle species—examine under microscope!



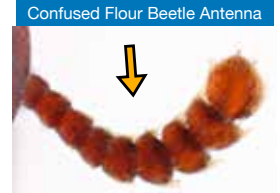
Natasha Wright, Branman Termite & Pest Elimination, Bugwood.org



Pest and Diseases Image Library, Bugwood.org



Pest and Diseases Image Library, Bugwood.org



Pest and Diseases Image Library, Bugwood.org

Sawtoothed & Merchant Grain Beetles

Family Silvanidae: *Oryzaephilus surinamensis* & *O. mercator*



Key ID feature(s):

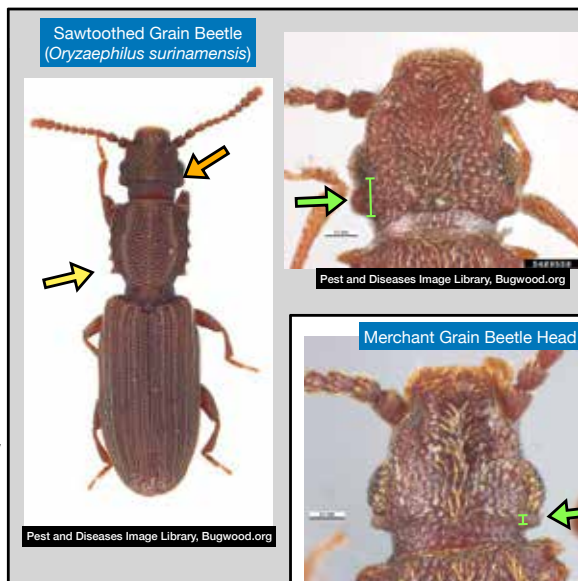
- Slender bodies, fairly flat
- Reddish brown or brown color
- Serrated pronotum ("saw teeth")
- Trapezoid-shaped heads
- Sawtoothed grain beetle: long "temple"
- Merchant grain beetle: short "temple"

Notes:

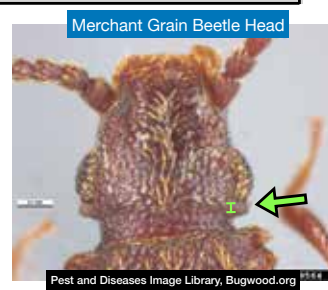
- Scavengers of grains; common in processed foods
- Merchant grain beetle can fly, SGB can't fly

Potential Look-alikes:

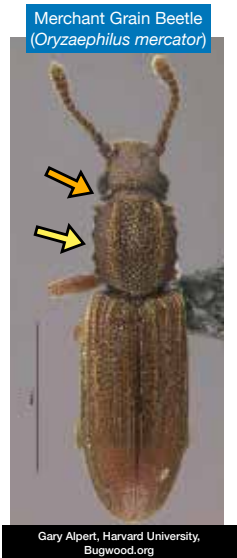
- Other stored product pests due to similar size/color



Pest and Diseases Image Library, Bugwood.org



Pest and Diseases Image Library, Bugwood.org



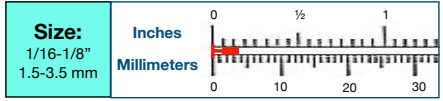
Gary Alpert, Harvard University, Bugwood.org

Stored Product Pest (Secondary/External Feeder)

Scavenger

Drugstore & Cigarette Beetles

Family Ptinidae: *Stegobium paniceum* & *Lasioderma serricorne*



Key ID feature(s):

- Rounded, convex bodies
- “Hooded” head
- Body covered with fine setae (“hairs”)
- **Drugstore beetle:** lines on elytra; oddly clubbed antennae
- **Cigarette beetle:** no lines on elytra; serrate antennae

Notes:

- Very wide feeding habits—just about any type of dried plant material: foods, herbs/spices, dried flowers, tobacco, etc.

Potential Look-alikes:

- Warehouse beetles due to size/shape

Cigarette Beetle (*Lasioderma serricorne*)



Pest and Diseases Image Library, Bugwood.org

Cigarette Beetle Antenna



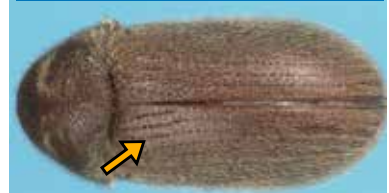
Death-Watch and Spider Beetles of Wisconsin R.A. Arango & D.K. Young, USDA Technical Report FPL-GTR-209

Infestation in Rodent Bait Station



Mohammed El Damir, Bugwood.org

Drugstore Beetle (*Stegobium paniceum*)



Natasha Wright, Brame Termite & Pest Elimination, Bugwood.org

Drugstore Beetle Antenna



Death-Watch and Spider Beetles of Wisconsin R.A. Arango & D.K. Young, USDA Technical Report FPL-GTR-209

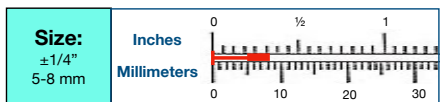
Stored Product Pest (Secondary/External Feeder)

Scavenger

Fabric/Museum Pest

Larder Beetle

Family Dermestidae: *Dermestes lardarius*



Key ID feature(s):

- Oval body
- Black with beige band across elytra
- Covered with fine “hairs” (*setae*)
- Clubbed antennae
- “Hairy” larvae have rear-curving horns (*urogomphi*) at end of body

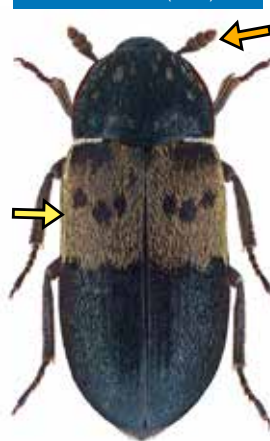
Notes:

- One of commonest Dermestids in homes
- Likes protein: fur, feathers, sinews, dead insects, wool, silk, etc.
- Common foods: dried goods, meats/cheeses

Potential Look-alikes:

- Adults not easily confused with other beetles
- Larvae could be confused with other Dermestids

Larder Beetle (Adult)



Udo Schmidt via Wikipedia

Dermestes Larva



Mohammed El Damir, Bugwood.org

Larval Urogomphi



Hide Beetle (*Dermestes maculatus*)

Larder Beetle (*Dermestes lardarius*)

Black Larder Beetle (*Dermestes ater*)

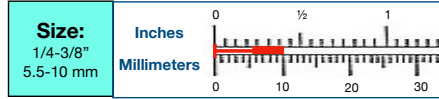
Minor tunneling caused by larvae seeking pupation spots



Mohammed El Damir, Bugwood.org

Larder Beetle Relative: Hide Beetle

Family Dermestidae: *Dermestes maculatus*



Key ID feature(s):

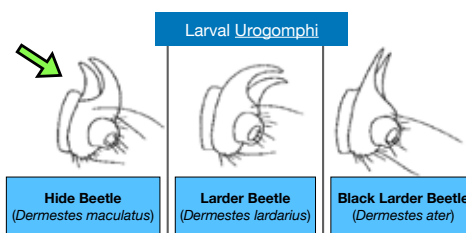
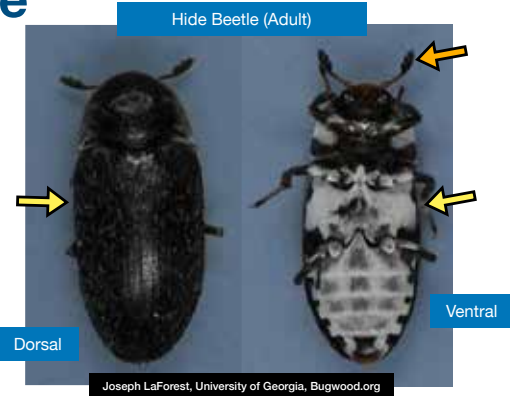
- Oval body
- Black (dorsal), white underside
- Covered with fine "hairs" (*setae*)
- Clubbed antennae
- "Hairy" larvae have forward-curving horns (*urogomphi*) at end of body

Notes:

- Likes protein: fur, feathers, sinews, dead insects, wool, silk, etc.
- Common foods: dried goods, meats/cheeses
- Used in museums to clean skeletal remains

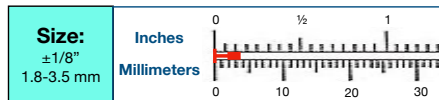
Potential Look-alikes:

- Larder beetle (adults colored differently; larval urogomphi curve in different directions)



Warehouse Beetles

Family Dermestidae: *Trogoderma variabile*



Key ID feature(s):

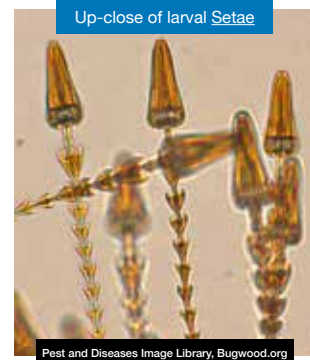
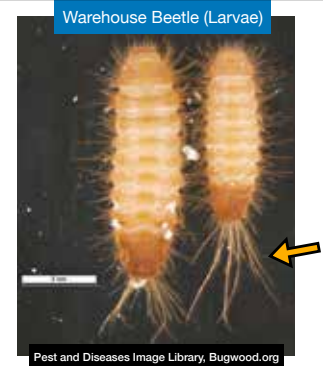
- Small size, convex body
- Brownish color with "wavy pattern" on elytra
- Covered with fine "hairs" (*setae*)
- Clubbed antennae
- "Hairy" larvae, with long setae at back end of body

Notes:

- One of commonest Dermestids in homes
- Likes protein: fur, feathers, sinews, dead insects, wool, silk, etc.
- Common foods: grain-based items, dried goods, etc.

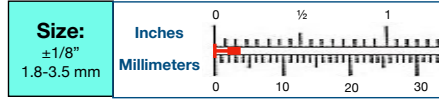
Potential Look-alikes:

- Adults: other *Trogoderma* sp.
- Adults: Drugstore/cigarette beetles due to size/shape
- Larvae: other Dermestid larvae



Warehouse Beetle Relatives

Family Dermestidae: *Trogoderma* spp.



Key ID feature(s):

- Same general appearance as Warehouse beetles
- Differ in color pattern and subtle features of the antennae, antennal cavity, etc.

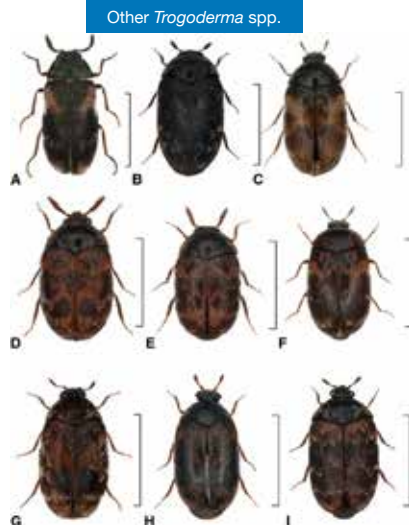
Notes:

- Most have similar habits to warehouse beetles
- Khapra beetle (*T. granarium*) is one of most significant stored product pests worldwide

Potential Look-alikes:

- Adults: Warehouse beetles
- Adults: drugstore/cigarette beetles due to size/shape
- Larvae: other Dermestids

Infestations of *Trogoderma* spp. in stored products should be closely examined



Comparison of females of some *Trogoderma* non-*granarium* species: (A) *T. angustum*; (B) *T. glabrum*; (C) *T. grassmani*; (D) *T. inclusum*; (E) *T. ornatum*; (F) *T. simplex*; (G) *T. sternale*; (H) *T. variabile*; (I) *T. versicolor*. Scale bar = 2 mm. Tomasz Klejdysz, Instytut Ochrony Roślin – Państwowy Instytut Badawczy, Poznań, Poland

Khapra Beetle
(*Trogoderma granarium*)



Natasha Wright, Braman Termite & Pest Elimination, Bugwood.org

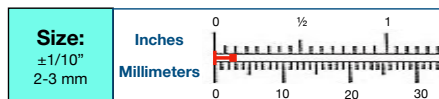
Khapra Beetle Infestation



Ministry of Agriculture and Regional Development, Bugwood.org

Varied Carpet Beetle

Family Dermestidae: *Anthrenus verbasci*



Key ID feature(s):

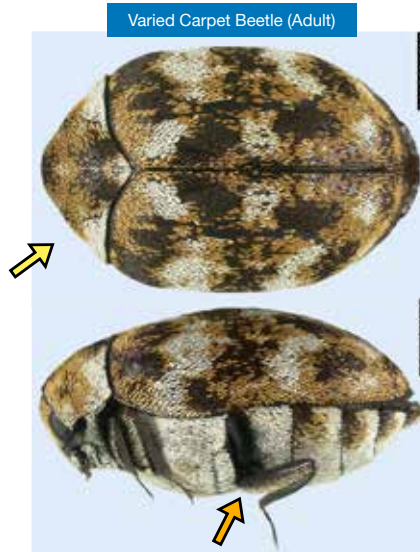
- Oval, egg-like body
- Limbs can be tucked in when disturbed
- Pale, mottled pattern on body created by small, flat “scales”
- “Hairy” larvae, with two “tufts” at end of body

Notes:

- One of commonest Dermestids in homes
- Likes protein: fur, feathers, sinews, dead insects, wool, silk, flower pollen, etc.
- Common foods: grain-based items, dried goods, etc.

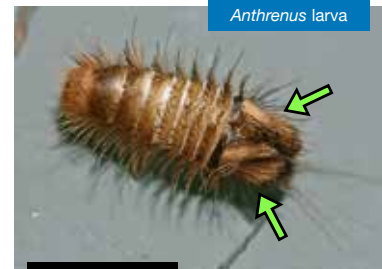
Potential Look-alikes:

- Other Dermestids



Natasha Wright, Braman Termite & Pest Elimination, Bugwood.org

Anthrenus larva



Entomart via Wikipedia

Larval damage in museum setting



Ryan Jones, Colonial Williamsburg Foundation, Bugwood.org

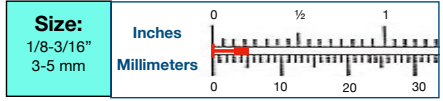
Stored Product Pest (Secondary/External Feeder)

Scavenger

Fabric/Museum Pest

Black Carpet Beetle

Family Dermestidae: *Attagenus unicolor*



- Key ID feature(s):**
- Oval, seed-like body
 - Entirely brownish or blackish
 - Antennal club long and slender
 - “Carrot-like” larvae slender and “hairy”; long filaments at end of body

- Notes:**
- Less common than other Dermestids
 - Likes protein: fur, feathers, sinews, dead insects, wool, silk, etc.
 - Can infest food items: grain-based items, dried goods

- Potential Look-alikes:**
- Adults: Warehouse beetles, cigarette/drugstore
 - Larvae: other Dermestids



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Wood-Borer

Firewood Pest

Powderpost Beetles

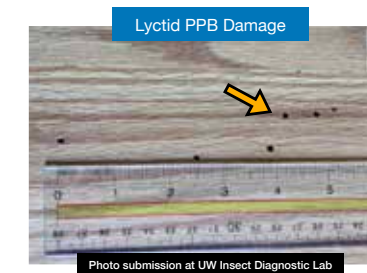
Families Lyctidae & Anobiidae (now Ptinidae)



- Key ID feature(s):**
- Slender bodies
 - “Hooded” heads (Anobiid PPB)
 - Small holes in wood (~1/16 - 1/8")
 - Frass: fine powder (Lyctids); small, loosely-packed clumps (Anobiids)
 - Larvae: small, pale, grub-like

- Notes:**
- Common wood-boring pests
 - Can reinfest under the right conditions
 - Differ in types of wood they infest

- Potential Look-alikes:**
- Stored product pests (flour beetles, etc.)
 - Drugstore/cigarette beetles
 - Bark beetles



Beetle Type	Wood Attacked
Lyctid PPB	• New Hardwoods
Anobiid PPB	• New softwoods • Old hardwoods • Old softwoods

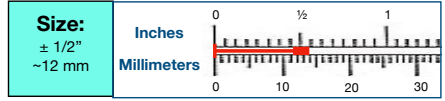


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Wood-Borer

Wharf Borer

Family Oedemeridae: *Nacerderes melanura*



Key ID feature(s):

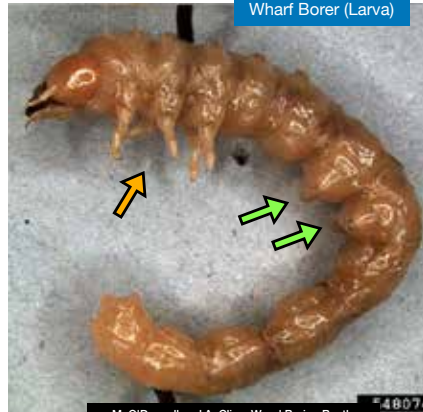
- Slender bodies
- Beige color with black at tips of elytra
- Larva slender, pale with 3 pairs true legs, 2 pairs of prolegs; up to 1.5" long

Notes:

- Uncommon wood-boring pests
- Associated with very damp wood: wharfs, docks, water leaks indoors, etc.

Potential Look-alikes:

- Longhorned beetles



Wharf Borer (Larva)

M. O'Donnell and A. Cline, Wood Boring Beetle Families, USDA APHIS PPO, Bugwood.org



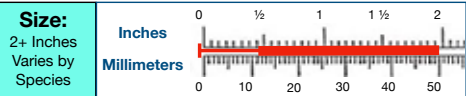
Wharf Borer (Adult)

Udo Schmidt via Wikipedia

General ID

Longhorned Beetles (Roundheaded Borers)

Family Cerambycidae



Key ID feature(s):

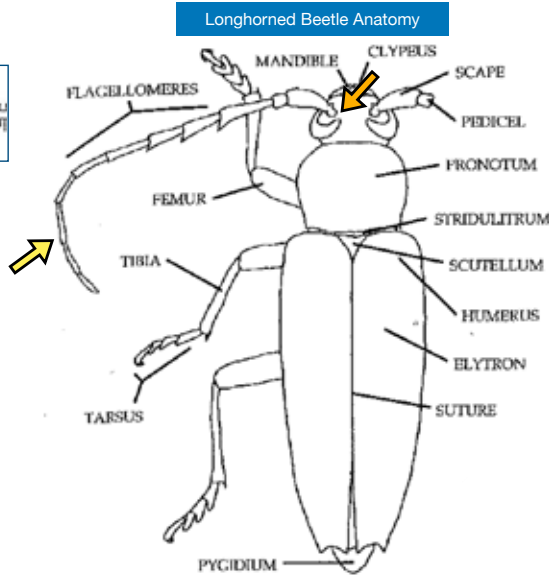
- Slender bodies, often large (3/4"+)
- Lobed tarsi
- Long antennae (usually >1/2 body length)
- Emarginate ("notched") eyes
- Larvae pale, usually legless, round
 - Create round or oval holes ~1/4-1/2"

Notes:

- Common wood-boring pests
- Usually associated with dead/dying trees
- Common sources: firewood, "rustic" furniture, or new log cabins
- A few can be associated with structural wood

Potential Look-alikes:

- Wharf borer (which has distinctive color)



Longhorned Beetle Anatomy

From: A Field Guide to Northeastern Longhorned Beetles, Douglas Yanega

Longhorned beetle Larva (aka "roundheaded borer")



Gerald J. Lenhard, Louisiana State University, Bugwood.org

Wood-Borer

Firewood Pest

Longhorned Beetles

Family Cerambycidae; Many(!) species

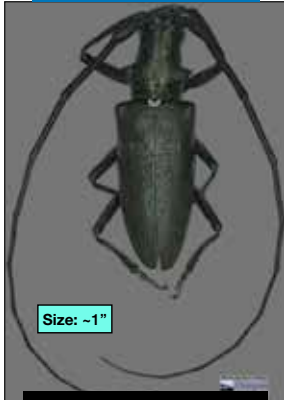


Old House Borer
(*Hylotrupes bajulus*)

Natasha Wright,
Braman Termite &
Pest Elimination,
Bugwood.org

Size: Up to 3/4"

Pine Sawyer
(*Monochamus scutellatus*)



Size: ~1"

USDA Screening Aid for the Cerambycidae of
Western North America

Cedar Tree Borer
(*Semanotus ligneus*)



Size: ~3/4"

Natasha Wright, Braman Termite &
Pest Elimination, Bugwood.org

Redheaded Ash Borer
(*Neoclytus acuminatus*)



Size: ~1/2"

Steven Valley, Oregon
Department of Agriculture,
Bugwood.org

Locust Borer
(*Megacyllene robinia*)



Size: 3/4-1"

USDA Screening Aid for the Cerambycidae of
Western North America

Brown Prionid
(*Orthosoma brunneum*)



Size: Up to 2"

Nathan Lord, Longicorn ID, USDA
APHIS PPO, Bugwood.org

Questions & Discussion

What do you want to know about beetles?