Geographical distribution

Species	Pest status	USA & Canada	Central & South America	Europe & N.Asia	Mediterranean basin	Africa	S. & SE. Asia	Australia & Oceania
Attagenus brunneus	●●	X		X	X		X	
Attagenus cyphonoides	●●	X	X	X	X	X	X	
Attagenus fasciatus	●●		X	X	X	X	X	X
Attagenus megatoma	●●	X	X	X	X		X	X
Attagenus pellio	●●	X	X	X	X	X	X	X
Attagenus smirnovi	●●			X		X		
Attagenus unicolor	●●	X		X			X	

Pest status: ● minor to ●●●● major pest
X: recorded

Attagenus spp. occur worldwide in both tropical and temperate regions. In warmer climates, *A. fasciatus* is most often encountered. *A. unicolor* is especially well known as a domestic pest in North America. It is largely replaced in Europe by *A. pellio*. In Russia and parts of Europe and Africa *A. smirnovi* is becoming more frequently encountered as a domestic pest. *A. brunneus* is widely distributed in the northern hemisphere. In Australia, the most frequently encountered species is *A. megatoma*.

Hide beetles, Larder beetles (Genus: *Dermestes*)

Dermestes ater	Black larder beetle
Dermestes carnivorus	
Dermestes frishii	Hide beetle
Dermestes haemorrhoidalis	
Dermestes lardarius	Larder beetle
Dermestes maculatus	Hide beetle
Dermestes peruvianus	Peruvian larder beetle

Summary

Feeding strategies	primary pest, secondary pest, scavenger
Commodities attacked	dried material of animal origin, copra
Distribution	worldwide
Economic importance	medium–high
Eggs	laid amongst commodity
Larvae	eruciform, mobile, live amongst commodity
Adults	long lived, feed on commodity, can fly

Introduction

Members of the genus *Dermestes* are mainly carrion feeders but may also be found associated with bird and animal nests. More than 70 species are described worldwide of which about seven are frequently encountered attacking stored hides, skins and dried fish.

Identification

To identify *Dermestes* from other genera of Dermestidae beetles, see keys above or those of Kingsolver (1987), Haines (1991) or Peacock (1993). For further information see Haines and Rees (1989), Hinton (1945), Mound (1989) and Peacock (1993).

Adult *Dermestes* are elongate oval beetles, slightly flattened, 5.5 to 10 mm long (Figures 80–92). In most species the upper surface is black. The underside of the thorax and elytra are densely covered with either white hairs with black spots at the sides (Figure 86) or brown/golden hair (Figure 87). *Dermestes* spp. could be confused with *Alphitobius* species (Tenebrionidae) and *Tenebroides mauritanicus* (Trogossitidae). Members of these genera are glossy black but do not have undersides covered in hair.

Larvae are eruciform – elongate and covered with spines, when full grown they may be up to 20 mm long (Figure 84). They can be distinguished from other dermestid larvae by having two horn-like structures (urogomphi) on the last abdominal segment (Figure 85). Other dermestid larvae commonly associated with stored products lack these 'horns'.

Figure 80 *Dermestes ater*, adult

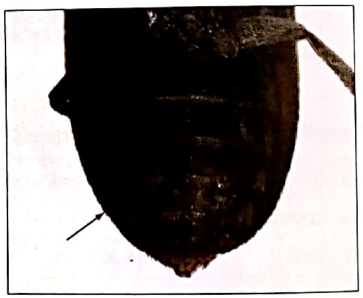


Figure 81 *Dermestes ater*, adult, underside covered with brown hairs with patches of darker hairs

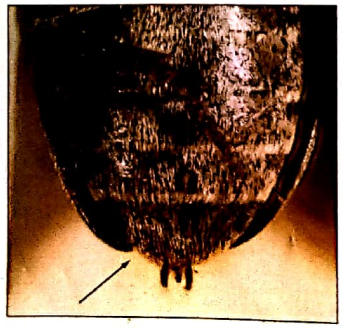


Figure 82 *Dermestes carnivorus*, adult, tip of underside, covered with white hairs, with black patches at margin of each segment, no black patch at tip of final segment

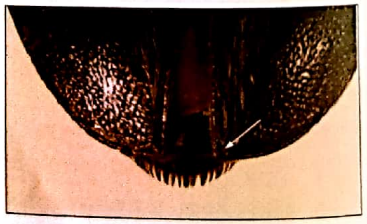


Figure 83 *Dermestes frishii*, adult, tip of elytra with no spine

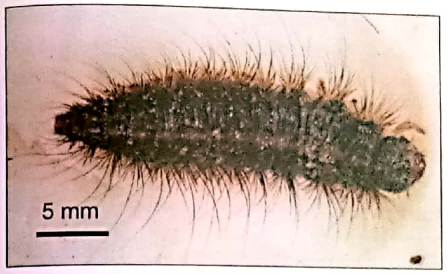


Figure 84 *Dermestes frishii*, larva

Figure 85 *Dermestes frishii*, larva, tip of abdomen, ninth segment with horn-like structures (urogomphi)

Figure 86 *Dermestes frishii*, adult, underside, covered with white setae, with black patches at margin of each segment, black patch at tip of final segment

Figure 87 *Dermestes haemorrhoidalis*, adult, underside covered in light brown hairs

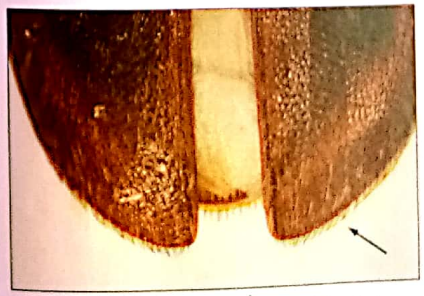


Figure 88 *Dermestes haemorrhoidalis*, adult, elytra, with fringe of hair which projects beyond margin

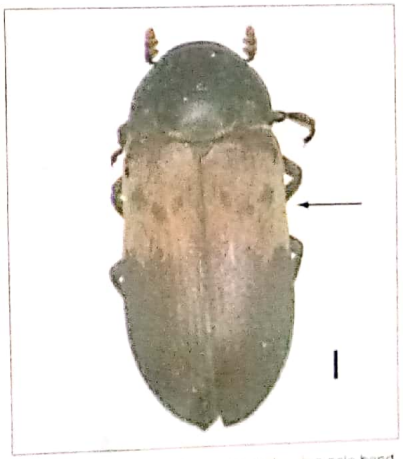
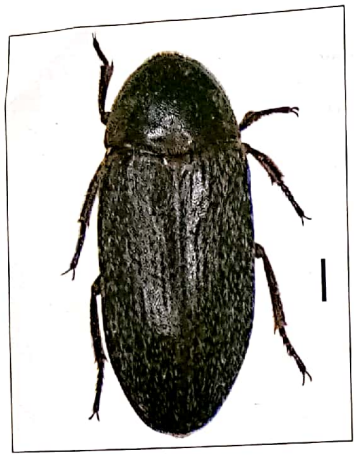
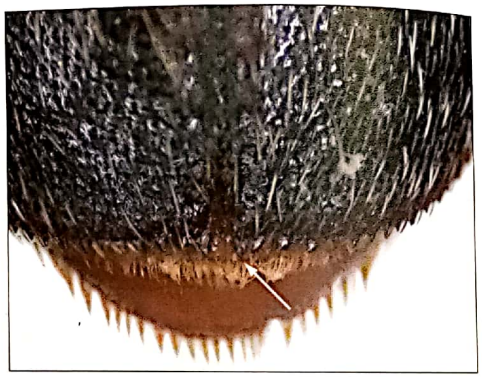


Figure 89 *Dermestes lardarius*, adult showing pale band across elytra





Top left: Figure 90 *Dermestes maculatus*, adult

Top right: Figure 91 *Dermestes maculatus*, adult, underside covered with white setae, with black patches at margin of each segment, black patch at tip of final segment

Right: Figure 92 *Dermestes maculatus*, adult, tip of elytra with spine

Key to adult *Dermestes* species associated with stored products

1 Basal half of elytra with band of pale brown hairs, in the middle of which are small patches of black hairs. Other half of elytra black (Figure 89) ..... *D. lardarius*
Elytra black, without pale markings (Figures 80, 90) 2

2 Underside of abdomen covered with white hairs and dark spots (Figures 86, 91) 3
Underside of abdomen covered with brown or golden hairs (Figure 81, 87) 5

3 Tip of elytra with spine (Figure 92) ..... *D. maculatus*
Tip of elytra without spine (Figure 83) 4

4 Tip of underside of abdomen marked with black patch (Figure 86) ..... *D. frischii*
Tip of underside of abdomen not marked with black patch (Figure 82) .. *D. carnivorus*

5 Underside of abdomen golden with dark patches (Figure 81) ..... *D. ater*
Underside of abdomen uniformly coloured (Figure 87) 6

6 At apex elytra with thick fringe of hair which project beyond its edge (Figure 88) .... *D. haemorrhoidalis*
At apex elytra without thick fringe of hair which project beyond its edge ..... *D. peruvianus*

Life cycle

Eggs are laid at random on the foodstuff. Larvae burrow into the food, moulting five to seven times as they develop. Cast skins are left behind in the infested food. These maintain their shape and are often confused with live larvae. Prior to pupation, larvae wander and burrow into wood, plaster and even through soft metal such as lead, to make a chamber in which to pupate. Adults feed on the infested commodity, are long-lived and fly readily.

Physical limits and optimum rate of multiplication

Species	Conditions within which breeding takes place	Shortest development period, with optimum conditions	Maximum monthly rate of increase
Dermestes ater	r.h. > 40%	42 days at 27–30°C, 75% r.h.	
Dermestes carnivorous	20–35°C, 30–90% r.h.	35°C, 90% r.h.	
Dermestes frishii	20–35°C, r.h. > 30%	26 days at 35°C, 90% r.h.	30
Dermestes haemorrhoidalis	15–32.5°C, r.h. > 40%	27–30°C, 75% r.h.	
Dermestes lardarius	15–30°C, r.h. > 40%	18–20°C, 80% r.h.	
Dermestes maculatus	20–40°C, r.h. > 30%	21 days at 30°C, 75% r.h.	30
Dermestes peruvianus	15–30°C, r.h. > 40%	25°C, 80% r.h.	

D. lardarius, D. haemorrhoidalis and *D. peruvianus* are frequently encountered in temperate countries and can breed at slightly lower temperatures than other species. *D. maculatus* and *D. frishii* have similar requirements, except that *D. frishii* is more cold-hardy than *D. maculatus*. *D. ater and D. carnivorus* require a slightly higher minimum relative humidity and are most often found in humid tropical regions.

Development can be rapid (less than four weeks) under ideal conditions. However, under adverse conditions, development can take up to several years. The number of eggs laid is greatly increased if liquid water is available to female beetles.

Economic importance

Dermestes species will feed on almost any material of animal origin or on commodities of plant origin which have a high protein content. They are important pests of uncured skins and hides and dried fish and fish meal. *D. maculatus* and *D. frishii* are the species most usually encountered on dried fish. *D. ater* is frequently found infesting copra but will also attack dried fish. *D. carnivorus* is known as a pest of dried fish in hot humid areas of south and south east Asia. *D. lardarius* is a minor pest of domestic premises. *D. haemorrhoidalis* and *D. peruvianus* are inhabitants of food processing plants in North America and Europe. *Dermestes* spp. can cause a lot of damage to structures holding or containing the infested commodity.

In grain stores *Dermestes* spp. are scavengers, feeding on dead insects, rodents and birds.

Type of damage and symptoms

Both larvae and adults of *Dermestes* damage skins, hides and dried fish by burrowing into them. Dried fish can be fragmented by heavy feeding activity. Infested commodities become contaminated with insect bodies and cast skins. When mature, larvae will bore into wood or soft plaster to make a chamber in which they pupate. Over time, storage structures, drying racks and even buildings can become severely weakened by this activity.

Ecology

In nature, *Dermestes* spp. assist in the destruction of animal remains. They can be found in bird nests and are attracted to corpses of dead animals.

Monitoring

Infestations are usually easy to see, given the size of the insect and the accumulations of cast larval skins. Adult beetles may be attracted to food baits and light.

Geographical distribution

Species	Pest status	USA & Canada	Central & South America	Europe & N.Asia	Mediterranean basin	Africa	S. & SE. Asia	Australia & Oceania
Dermestes ater	●●●	X	X	X	X	X	X	X
Dermestes carnivorus	●●	X	X	X	X	X	X	
Dermestes frishii	●●●	X	X	X	X	X	X	X
Dermestes haemorrhoidalis	●●	X	X	X	X	X		X
Dermestes lardarius	●●	X	X	X	X	X	X	X
Dermestes maculatus	●●●	X	X	X	X	X	X	X
Dermestes peruvianus	●●	X	X	X	X			

Pest status: ● minor to ●●●● major pest
X: recorded

Dermestes species associated with stored products have a cosmopolitan or wide distribution. *D. ater* and *D. carnivorus* are mainly tropical, and records in temperate regions are mostly as a result of interceptions in imports. The other species occur in both temperate and tropical regions.