

Trogoderma granarium

(Khapra beetle)

Fam. Dermestidae

General information: Invasive primary pest of stored grains, grain products and oilseeds, also milk powder and fishmeal; in many countries with moderate climate regulated as quarantine pest; facultative diapause (until 8 years) under unfavourable conditions (<30°C), 1-10 generations per year, thermophilic

Infested products: Grains and grain products (e.g. wheat, barley, maize...), copra, dried fruits

Related species: *Trogoderma variabile*, *T. angustum*, species determination is difficult and may require preparation of genitals

Total development: 26 days under optimum conditions (35°C and 45-70 % RH), about 220 days at 21°C, 39-45 days at 30°C

Egg	Larva	Pupa	Adult (beetle)
			
3 to 14 days	19 to 190 days	3 to 8 days	12 to 25 days
<ul style="list-style-type: none"> - cylindrical, white yellowish, 0.8 mm long, 0.3 mm width - Females lay 50-125 eggs loosely into the substrate (e.g. surface of grains) 	<ul style="list-style-type: none"> - oval - yellowish-brown - 1.8 mm (neonate larva) – 5.0 mm long - reddish-brown transverse hair bands - tuft of long hairs on the (9th) last abdominal segment - 5-11 instars 	<ul style="list-style-type: none"> - 3.5 mm long (males) and 5.0 mm long (females) - Pupa remains within last larval exuvia (larval skin) 	<ul style="list-style-type: none"> - 1.6-3.5 mm long (females slightly larger) - oval form, reddish-brown to black (indistinct reddish brown markings on their wings) - dense yellow to black-brown hairs - 9-11-segmented yellow antennae, last 3-5 segments form club - mating 5 days after hatching

Damage: Feeding damage to stored products caused by larvae (usually, they first feed on the living germ part and then on the endosperm) and to packaging materials; dusty residues; reduced germination capacity; infested grains smell musty; contamination by frass and larval skins.

Prevention: Cleanliness; regular inspections; removal of infested seeds from the previous year; filling of cracks and crevices; cool and dry storage.

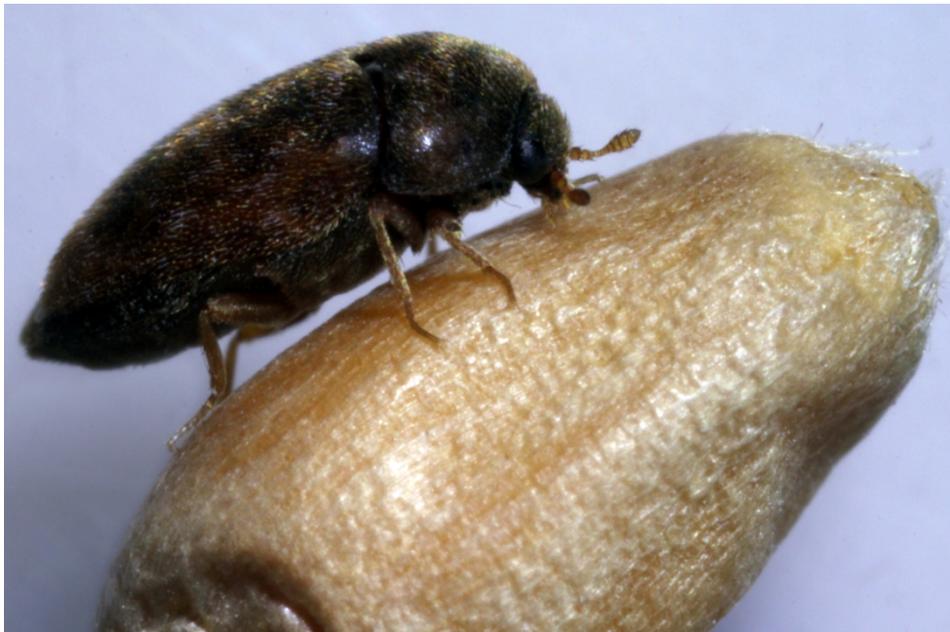
Early detection: Pheromone and food substrate traps for monitoring.

Control:

Thermal treatment; fumigation-; authorized plant protection products. Please refer to www.bvl.bund.de: Database and pesticides directory, part 5, stored product protection. As the Khapra beetle, particularly its larvae, could be more tolerant or resistant to PH_3 , fumigations, especially during phytosanitary treatments, should be undertaken at higher temperatures with longer exposure times as well as with higher application rates/CT-products (see EPPO PM 10/22 and applicable national authorizations of PPP).



Larva



Beetle