

## Dried fruit beetle, Corn sap beetles, Sap beetles, *Carpophilus* species

(Family: Nitidulidae) (selected species listed)

<i>Carpophilus dimidiatus</i>	Corn sap beetle
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<i>Carpophilus hemipterus</i>	Dried fruit beetle
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<i>Carpophilus ligneus</i>	
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<i>Carpophilus maculatus</i>	
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<i>Carpophilus marginellus</i>	
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<i>Carpophilus mutilatus</i>	
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<i>Carpophilus obsoletus</i>	
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<i>Carpophilus pilosellus</i>	
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## Summary

Feeding strategies	secondary pest, mould feeder
Commodities attacked	dried fruit, damp and newly harvested grain, grain residues
Distribution	worldwide
Economic importance	variable – minor pest of grain, more important on dried fruit
Eggs	laid in crevices and folds of commodity
Larvae	campodeiform, active, external feeders
Adults	long lived, feed on commodity, fly readily

## Introduction

The family Nitidulidae consists of more than 2000 described species. Many live on the sap of trees and juice of fruits, especially if partly fermented. Others feed on flowers, fungi and carrion. A few species are predatory and a few others are leaf miners.

A number of genera of nitidulids have been recorded as infesting stored products, including *Brachypeplus*, *Carpophilus*, *Glischrochilus*, *Haptoncus*, *Nitidula*, *Stelidota* and *Urophorus*. *Nitidula* are carrion feeders, and other genera listed are associated with fruit or other damp material of plant origin. By far the most important and frequently encountered genus on stored produce is *Carpophilus*.

## Identification

Adult *Carpophilus* are oval, flattened beetles 2 to 4 mm long (Figures 124–127). Colour varies from light brown to black. Elytra are short and leave two or three abdominal segments exposed. Elytra are often marked with one or two yellow, reddish or brown spots. Antennae are terminated by a three-segmented flattened, round club. Most *Carpophilus* species are very similar in appearance and are difficult to identify to species. Many can only be reliably identified by microscopic examination of their genitalia and/or the texture of the cuticle of the underside of the insect (see References). However, one common species *C. hemipterus* (Figures 125–126) is easily distinguished on account of a characteristic large, roughly triangular, yellow spot on each elytra.

The general appearance and distinctive elytra of nitidulids distinguish *Carpophilus* spp. from other beetles commonly found in stored products. Members of the family Histeridae that occur in stores can sometimes be confused for dark specimens of *Carpophilus*. Histerids, which are predatory, also have clubbed antennae and short elytra which leave abdominal segments exposed. They are glossy black or metallic in colour and are not marked with yellow, reddish or brown spots.

## Life cycle

Female beetles can lay 1000 eggs over a life span of 3–4 months. Eggs are laid on or in food material. The active translucent campodeiform larvae move amongst the commodity and may burrow into the soft and mouldy fruit or residue. Pupation occurs within the food material. The adults fly readily and often congregate at suitable feeding and oviposition sites.



Figure 124 *Carpophilus dimidiatus*, adult, showing short elytra which leave tip of abdomen exposed



Figure 125 *Carpophilus hemipterus*, adult, live



Figure 126 *Carpophilus hemipterus*, adult, showing short patterned elytra which leave tip of abdomen exposed



Figure 127 *Carpophilus marginellus*, adult

### Physical limits to development

Species	Conditions within which breeding takes place	Shortest development period, with optimum conditions	Maximum monthly rate of increase
<i>Carpophilus hemipterus</i>	18.5–42°C, r.h. > 50%	12 days at 32°C, high humidity	50
<i>Carpophilus dimidiatus</i>	17.5–32.5°C, r.h. > 50%	15 days at 32°C, high humidity	

Warm damp conditions favour the rapid development of *Carpophilus* spp. Under optimal conditions and given a good food supply, development to adulthood can be extremely rapid.

### Economic importance

Worldwide some several dozen species have been found associated with stored products. Among the most important are *C. hemipterus*, and *C. dimidiatus*. *Carpophilus* species will feed on a wide

range of vegetable matter, especially if it is damp and decomposing. Usually only a minor pest of stored grain, *Carpophilus* spp. are common inhabitants of ripening cereal crops (they are often very common in ripening maize), and damp mouldy grain residues. *C. hemipterus* can be an important pest of dried fruit. A number of *Carpophilus* spp. are important pests of ripening soft and stone fruit.

### **Type of damage and symptoms**

Larvae and adults are general feeders, and damage is not readily identifiable as being specifically caused by this insect. Larvae burrow into the soft and mouldy parts of grain, fruit or residues.

### **Ecology**

*Carpophilus* spp. are attracted by moulds and yeasts on potential food and their presence in the diet appears very beneficial. Many species of *Carpophilus* including those associated with stored products are more important as pests of ripening fruit. They are highly mobile insects capable of rapid population development, well able to exploit transient habitats such as ripening grain or fruit. They are common inhabitants of compost heaps and other accumulations of rotting plant material.

### **Monitoring**

In the orchard industry, flight traps of various designs have been used to trap *Carpophilus* species. These are baited with a synthetic aggregation pheromone and / or a food bait such as whole wheat bread dough or fermenting fruit juice.