Silvanid beetles

(Family: Silvanidae)

Ahasverus advena	Foreign grain beetle
Cathartus quadricollis	Square-necked flour beetle
Monanus concinnulus	
Oryzaephilus acuminatus	
Oryzaephilus gibbosus	
Oryzaephilus mercator	Merchant grain beetle
Oryzaephilus surinamensis	Saw-toothed grain beetle

Summary

Feeding strategies	secondary pest, mould feeder
Commodities attacked	grain and grain products, oilseeds, nuts, herbs and spices, dried fruit
Distribution	worldwide
Economic importance	low to high
Eggs	laid in amongst commodity
Larvae	campodeiform, mobile, external feeders
Adults	long lived, feed on commodity, fly readily

Introduction

The Silvanidae are small flattened beetles, the majority of which live under bark of trees where they are mould and detritus feeders and sometime predators. *Ahasverus*, *Cathartus*, *Monanus* and *Oryzaephilus* species attack a wide range of stored products. *Oryzaephilus* species rank among the most important pests of stored products.

Identification

Silvanid beetles are small, highly flattened, parallel-sided beetles, 2.5 to 3.5 mm, long with tooth-like projections along the side and/or corners of the pronotum (Figures 128–135).

Figure 128 *Ahasverus advena*, adult, live

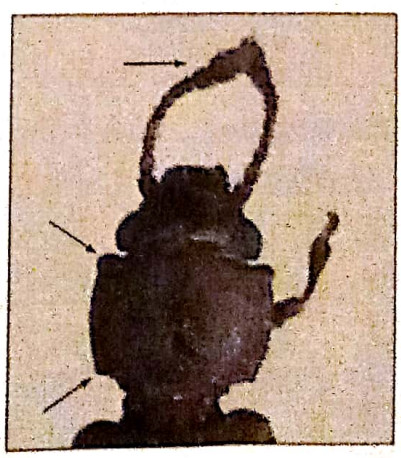

Figure 129 *Ahasverus advena*, adult, head, showing antennae and teeth-like structures at corners of thorax, margin of thorax curved

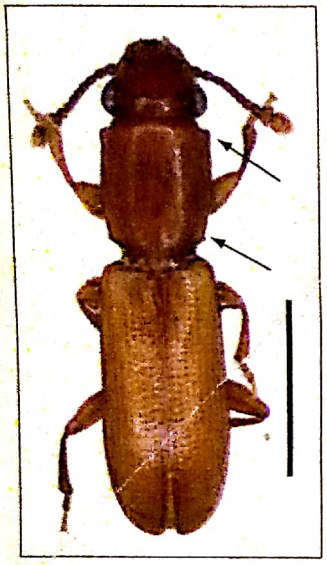

Figure 130 *Cathartus quadricollis*, adult, showing square corners of thorax

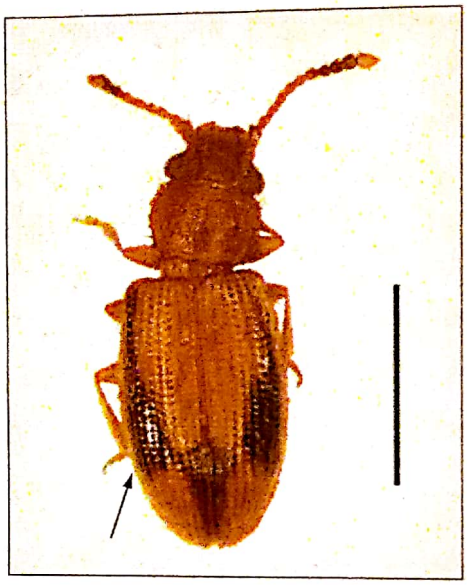

Figure 131 *Monanus* spp., adult, showing patterned elytra (non-storage species shown)

Figure 132 *Oryzaephilus mercator*, adult, head and thorax, showing teeth-like structures and three longitudinal ridges on thorax, length of area behind eye relatively short

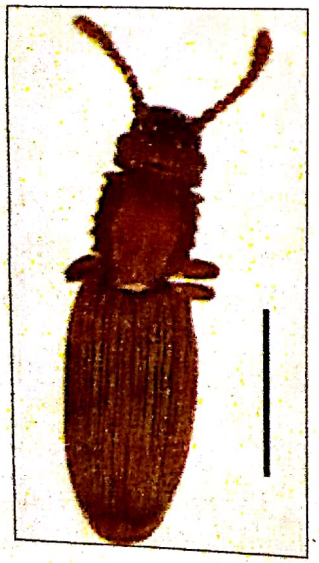

Figure 133 *Oryzaephilus surinamensis*, adult

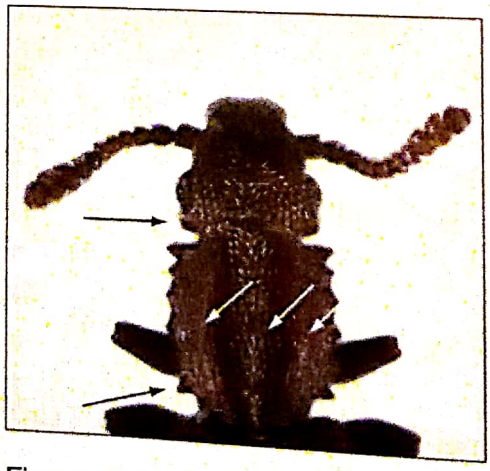

Figure 134 *Oryzaephilus surinamensis*, adult, head, showing teeth-like structures and three longitudinal ridges on thorax, length of area behind eye relatively long

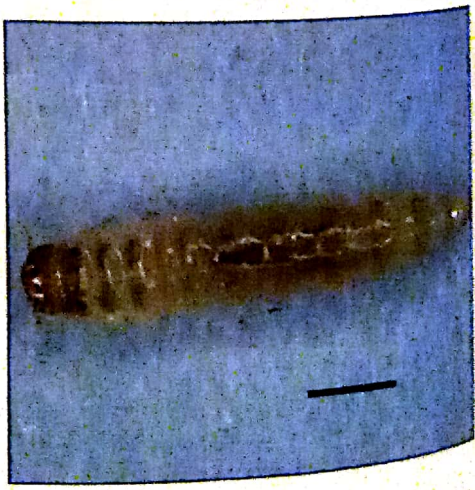

Figure 135 *Oryzaephilus surinamensis*, larva

Life cycle

The eggs are laid loose amongst the substrate or in cracks and crevices in grains. Several hundred are laid over the life span of the female. The flattened white to pale yellow campodeiform larvae (Figure 135) move freely amongst the foodstuff and eventually pupate within a cocoon-like structure made from small grains or food particles. Adult silvanids are long-lived and continue to feed during their lives. For example at 30°C, adult *O. surinamensis* live on average 6–8 months, but under cool temperate conditions this may extend to several years.

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
Ahasverus advena	> 17.5°C, > 65% r.h.	22.5 days at 27°C, 75% r.h.	
Cathartus quadricollis	20–30°C, r.h. > 65%	20 days at 27–28.5°C, 80–85% r.h.	
Oryzaephilus surinamensis	20–38°C, r.h. > 10%	20 days at 30–32.5°C, 70–90% r.h.	50
Oryzaephilus mercator	18–38°C, r.h. > 10%	25 days at 30–32.5°C, 70% r.h.	20
Oryzaephilus acuminatus	20–37.5°C, r.h. > 30%	18 days at 32.5°C, 80–90% r.h.	

Populations of *O. surinamensis* from temperate areas are often highly cold tolerant and are able to survive extended periods at or below 0°C. Both *O. surinamensis* and *O. mercator* are capable of breeding under dry conditions. In contrast, *A. advena* and *C. quadricollis* are sensitive to low humidities.

Economic importance

A. advena is a minor secondary pest of a wide range of produce including cereal grains and products, oilseeds, copra, groundnuts, dried fruit, dried herbs and cocoa beans. It is often present at harvest but usually does not persist in dry clean grain. Large, persistent populations usually indicate unsatisfactory storage conditions with the presence of mouldy grain. In the USA, *A. advena* is also a nuisance pest associated with damp and newly constructed houses.

C. quadricollis is best known as a pest of maize. Infestation often begins in the field in ripening cobs and continues in storage. Infestations can be severe, especially in maize stored on the cob under conditions of tropical subsistence agriculture. *M. concinnulus* is a minor pest on a wide range of stored products.

O. surinamensis is an important pest of stored cereals, particularly milled and processed products. It also occurs on a very wide range of other commodities including dried fruit, nuts and oilseeds. In temperate regions, *O. surinamensis* is often regarded as the most important insect pest of stored cereals. Its close relative *O. mercator* is more often found on commodities such as dried fruit and oilseeds rather than cereals. It is also an important pest, but generally less so than *O. surinamensis*. The small size and flattened form allow *Oryzaephilus* spp. to easily enter packaged goods. *O. gibbosus* has been found infesting coconut shell, oil palm fruits and groundnuts. *O. acuminatus* has been found infesting coconut shell and dried neem seed.