

Major pest species are cosmopolitan. *C. cautella* and *P. interpunctella* are most often found in warm-temperate to tropical regions. *C. cephalonica* is restricted to tropical and sub-tropical regions. *E. kuehniella* and *E. elutella* are most prevalent in temperate regions. *E. calidella* and *E. figulilella* are largely restricted to areas with warm-temperate and Mediterranean climates. *P. farinalis* is widespread in temperate regions.

References

Aitken (1984), Cox and Bell (1991), Haines (1974, 1981, 1991), Ferguson (1987), Mound (1989), Solis (1999) and Weismann (1987).

Tineid moths

(Family: Tineidae)

<i>Nemapogon granella</i>	European grain moth → minor pest of grains
✓ <i>Tinea</i> spp.	Case-bearing clothes moths → wool
✓ <i>Tineola bisselliella</i>	Clothes moth → wool

Summary

Feeding strategies	secondary pest, scavenger
Commodities attacked	damp grain and grain products, clothes, carpets, upholstery made from animal fibres, occasionally dried meat
Distribution	mainly temperate regions
Economic importance	low on stored food, high on textiles and woollen goods
Eggs	laid on cracks and crevices
Larvae	active, external feeders
Adults	short lived, do not feed on commodity, can fly

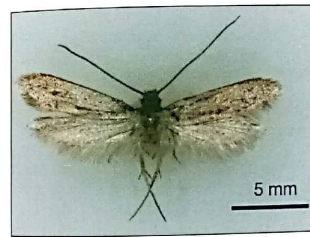
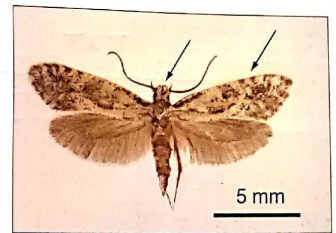
Introduction

Larvae of moths of the family Tineidae feed wholly or mostly on dried material of animal origin. As a result, many are associated with the nests of rodents and birds where they feed on dried remains, hair and feathers. *Tinea* spp. and *Tineola bisselliella* are pests of products containing natural fibres such as wool. Another species, *Nemapogon granella*, is found in association with dried material of vegetable origin and is a minor pest of stored grain.

Identification

The heads of tineid moths are covered in rough erect scales which give a hairy appearance (Figure 207). Labial palps are short and not curved upwards. When fresh, fore wings of *N. granella* are about 7 mm long and are distinctively marked with dark brown/black blotches on a lighter background (Figure 208). In nature, adults of *Tinea* spp. and *T. bisselliella* are rarely seen and are undistinguished light to dark brown coloured moths (Figure 209). Fore wings of *Tinea* spp. are 4.5–8 mm long and are darker and/or patterned. Feeding damage caused by *Tinea* spp. or *T. bisselliella* can be used to identify infestations to genus, (see 'Type of damage and symptoms', below).

The classification of *Tinea* spp. has been subject to change. The species referred to as *Tinea pellionella* in literature prior to the late 1970s is now known to be a complex of 11 species, of which at least five are pests or potential pests of stored products (Robinson 1979, Robinson and Nielsen 1993).



Top left: Figure 207 *Nemapogon granella*, adult, detail of head covered in rough hairs
 Top right: Figure 208 *Nemapogon granella*, adult, pattern of fore wing, head covered in rough hairs
 Left: Figure 209 *Tinea pellionella*, adult

Life cycle

Adults lay eggs in crevices. Larvae move over and through food material, feeding as they go. Pupation may occur in or near affected food material. Larvae of *N. granella* and *T. bisselliella* produce lots of webbing. *Tinea* spp. produce a silken tube-like case in which they live and pupate.

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
<i>Tineola bisselliella</i>	10–33°C	39 days at 25°C (on fishmeal)	

Generation time is highly variable and depends on both environmental conditions and the nutritional quality of the infested material. Development data quoted above is rapid due to the high nutritional quality of the food media. Populations breeding on carpets etc. are likely to complete one to four generations a year. In cold winters they may overwinter in the larval stage.

Economic importance

N. granella can be a pest of stored grain usually associated with damp residues. It has also been reported attacking the corks of wine bottles, especially those that have mould growing upon them. *T. pellionella* and *T. bisselliella* are pests of articles containing wool and other material of

animal origin such as feathers and horsehair. They are capable of causing significant damage to clothes, carpets, tapestries and upholstery. Occasionally they may attack stored products such as dried meat. As domestic pests these insects are most likely to be found in damp areas.

Type of damage and symptoms

Larvae of *N. granella* produce silk webbing and frass as they feed and pupate. Irregular holes may be bitten into attacked material. Larvae of *Tinea* spp. construct a portable cylindrical case of silk and cut fibres which they carry around and do not leave (Figures 210 and 211). By contrast, larvae of *T. bisselliella* produce mats and tubes of silk which become contaminated with frass and cast skins; they are often seen naked as they do not construct a portable case (Figure 212).



Figure 210 *Tinea dubiella*, silken tube containing cast skin of pupae

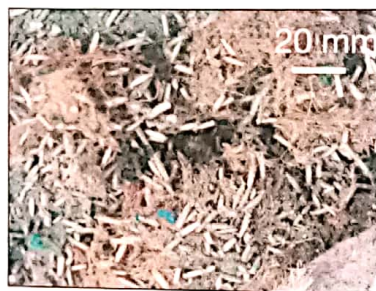


Figure 211 *Tinea dubiella*, infestation of underside of carpet

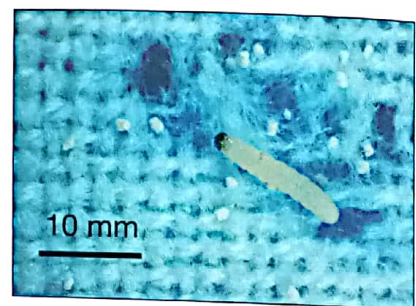


Figure 212 *Tineola bisselliella*, larvae and damage

Ecology

In nature tineid moths are frequent inhabitants of bird and animal nests and will also infest dried corpses of animals. The importance of these moths as domestic pests has declined due to increased use of artificial fibres and a general improvement in standards of building maintenance. Ecological requirements of the pest *Tinea* spp. vary. In Europe, for example, the installation of air conditioning and central heating is leading to the decline of *T. pellionella* and an increase of outbreaks of *T. dubiella*.

Geographical distribution

Species	Pest status	USA & Canada	Central & South America	Europe & N.Asia	Mediterranean basin	Africa	S. & SE. Asia	Australia & Oceania
<i>Nemapogon granella</i>	•	X						
<i>Tinea</i> spp.	••	X	X	X	X			X
<i>Tineola bisselliella</i>	•••	X	X	X	X	X	X	X

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

N. granella is of temperate origin and is most often encountered in Europe and North America. *Tinea* spp. and *T. bisselliella* occur in mainly temperate and Mediterranean regions and in cool tropical areas. Infestations in other areas are mainly a result of importations.

References

Aitken (1984), Cox and Bell (1991), Mound (1989), Robinson (1979), Robinson and Nielsen (1993), Solis (1999) and Weismann (1987).