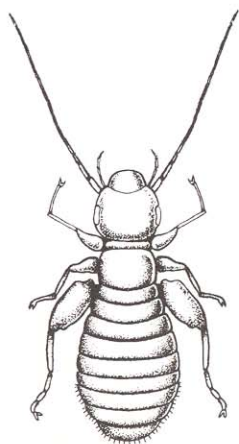




CCI Notes

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Psocids or “Book Lice”: A Warning of Dampness



Book lice, called psocids, are members of the insect order Psocoptera, which has about 340 identified species in North America (Mockford, 1992). These can be roughly divided into two types: winged and wingless. Winged psocids usually live outdoors, primarily on bark and leaves, although they will occasionally come indoors; wingless types are more commonly found indoors. The most common and most studied psocids are *Liposcelis* species. These insects are 1 mm long, pale to translucent in colour, and have a dry weight of 27 µg. To put them in perspective, a dry, single sheet of 21.6- by 28-cm (8.5- by 11-in.) paper weighs about 4 g, which is equivalent to 150 000 psocids.

Psocids are typically seen in moist conditions, although they can be found in dry areas. The bodies of *Liposcelis* species contain about 66% water at 73% relative humidity (RH), but only 22% water at 33% RH. It is this ability to utilize their own water reserves that allows them to survive in dry atmosphere for up to three weeks, after which they will rehydrate quickly if returned to a damp area but will die if the exposure to dry conditions is continued. A dry

atmosphere for psocids can be defined as RH under 58% for indoor types and under 70% for outdoor types. Above this critical RH, psocids utilize food energy to transport water vapour into their bodies, enabling them to replace transpired water vapour and maintain body mass even in the absence of food that contains water (Knülle and Spadafora, 1969). In high humidity, their life spans range from six months to a year (Broadhead and Hobby, 1944).

Psocids are omnivorous. Various authors cite moulds, yeasts, whole grain, starches, and, to a lesser extent, pollen, algae, lichen, feathers, hair, and insects as food sources. Psocids thrive in humidities that are conducive to extensive mould growth, and moulds are often cited as their major food. Yeasts have been found to improve egg-laying capacity more so than other foods (Broadhead and Hobby, 1944). Feeding activity of these insects is restricted to surface grazing; they do not eat holes in objects. In turn, psocids are prey for insectivorous insects and small parasitic wasps (New, 1971).

Many psocid species are parthenogenetic, that is, they have the ability to

reproduce without mating. Maximum oviposition observed in *Liposcelis* is two eggs per day. However, egg laying can be stopped by decreasing the surrounding humidity (Knülle and Spadafora, 1969). Indoor-dwelling psocids do not lay their eggs in clusters; they will, however, breed continuously under suitable conditions and live up to a year, which explains the large numbers that can develop in humid conditions.

Indoor psocids, the most common type seen in collections, are rarely implicated in damage unless found in large numbers. Seeing a few psocids on an object is not likely to constitute a risk to the object unless the object is small, such as a tiny insect specimen. Large numbers, however, have been reported. In one instance, thousands streamed out of a damp straw mattress and covered household surfaces. The mattress probably contained millions of psocids. In this type of case, eliminating the prime breeding area would be the key to treatment. Lesser numbers can be readily controlled by airing and drying the objects on which the insects are found (Back, 1920).

The greatest problem caused by psocids has not been physical damage, but stalled house sales, lawsuits, and occupant unease (New, 1971). For cultural collections, the presence of psocids sounds an alarm indicating unacceptably damp conditions — conditions that promote mould growth on objects and in buildings, which in turn damages collections and human health. The most reliable way to eliminate psocids and moulds is to dehumidify the building and affected objects.

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