



IDENTIFYING AND MITIGATING INSECT INFESTATIONS

Museum and household textiles are susceptible to damage from several kinds of insect pests. This handout will address how to identify and mitigate damage from three of the most common insect pests impacting textiles in the United States: silverfish, carpet beetles, and clothes moths.

- Most insect infestations occur in dark and moist areas where plentiful food is available and there is little disturbance. Ideal places include closets, trunks, boxes, plastic bags, suitcases, cupboards, and beneath carpets. You may know you have an infestation because you see the insects or their larvae, but just as often you see only piles of fiber, droppings (frass), webbing, and holes in your textiles.
- Insect activity is often seasonal. As spring approaches, dormant eggs hatch, larvae grow and then pupate, and mature adults emerge days or weeks later capable of mating and creating more eggs. Open doors and windows also allow new insects to inhabit the home.
- Insects choose which textiles to infest based on what the material is. Most textiles fall into one of three categories. Protein fibers are made from animal products and include wool, silk, feather, fur, and leather. Cellulosic fibers come from plants and include cotton, linen, hemp, jute, and paper. Synthetic fibers are mostly man-made polymers, including rayon, a man-made cellulosic fiber.
- If you believe you have an insect infestation, contact a conservator or Historic New England immediately. Do not use pesticides, such as bug spray, moth balls, or boric acid because they are potentially harmful to pets, people, and your textiles. You may carefully vacuum the effected textiles and surrounding areas to remove insects, their larvae, and eggs only if you are certain you can do so without damaging fragile fabrics. Quarantine effected items in zip-top or garbage bags and contact a conservator or Historic New England.
- A conservator will assess the infestation to determine how to isolate and treat affected items. Sometimes dry or wet cleaning will eliminate an infestation, but not all textiles can be safely cleaned. Conservators may choose to use inert gas chambers, high- or low-temperature treatments, or non-toxic chemicals to safely kill insects. The best treatment choice is the one that causes the least damage to the textile and to people.
- Treatment of an insect infestation often involves treating the area in which textiles are stored. A conservator may make a site visit to determine the extent of the problem and mitigate conditions that led to the infestation. Storage materials are usually upgraded, monitoring traps are set and checked, and conditions such as high relative humidity, soiling, and egress from outside are corrected.
- After de-infestation of your items and storage areas, most insects can be controlled with careful monitoring, proper storage, and diligent housekeeping. Clothing and craft materials, such as yarn and fleeces, are especially vulnerable and should be stored in clear polypropylene bins or bags.
- The most common insect pest that causes damage to cellulosic textile fibers is the silverfish. Resembling a ½-inch-long shark, silverfish are attracted to starch found in food, building materials, paper, and textiles, as well as mold or fungi. They are often found in damp places, such as bathroom linen closets and are mostly nocturnal.



- Damage from silverfish takes the form of a network of rounded holes, often on the perimeter of books, towels, lace, underclothing, and other cotton or linen textiles. The presence of silverfish indicates there is a moisture problem. Try to identify and dry out damp areas and call a conservator if you encounter infested textiles.
- Most structures are home to the carpet beetle, which subsists on protein (keratin). Varied carpet beetles, measuring as little as $\frac{1}{8}$ -inch long, are the species most common to the US north east. They are oval with a brown and tan striped pattern on their scales. Carpet beetle larvae and their casings, when left behind by the hatching beetle, are fluffy and brown.
- Carpet beetles thrive around dead insects, human and pet food, natural history and taxidermy specimens, carpets, furnishings, and wool or silk clothing. They can be found near warm windows and light fixtures, especially in spring. To help control carpet beetles, keep light fixtures and window sills free of dead insects, clean curtains, and keep clothing properly stored and monitored.
- The two most common moths that infest household and museum collections are the webbing clothes moth and case making clothes moth. Both are frequent pests on wool and silk clothing, carpets, tapestries, upholstery, and craft supplies. Webbing clothes moths grow up to $\frac{3}{8}$ -inch long and are pale tan in color. They tend to avoid light, however they can be seen flying around, especially in spring and summer.
- Damage from webbing clothes moths takes the form of holes or “grazing” where pile and felting is removed. They often leave behind piles of fiber, silky webbing, frass the color of what they have been eating, and slim white cocoons resembling grains of rice.
- Case making clothes moths are smaller, measuring only $\frac{1}{4}$ -inch long, and may be brown and faintly speckled. The larvae create a silky case and carry it around with them, depositing fiber and frass on it as they graze. The larvae cannot live outside their case. Case making clothes moth larvae are just as voracious as webbing clothes moths and will leave holes and large areas of denuded threads.
- Despite their similarities, webbing clothes moths and case making clothes moths have key differences. The larvae of the webbing clothes moth will eat for 68–87 days, however the case making clothes moth larvae can survive as long as 2.5 years before pupating. The case making clothes moth survives a mere 4–6 days, however the webbing clothes moth has up to one month to mate and lay eggs before dying.
- A more in-depth treatment of this subject is available online in the National Park Service August, 2008, Conserve O Gram entitled Identifying Museum Insect Pest Damage. For additional resources on prevention, identification, monitoring, and treatment of museum pests, visit: museumpests.net.
- Museum Textile Services does not provide insect mitigation. Historic New England provides insect infestation mitigation, and is one of the only professionals to provide that service in the New England area. Historic New England’s uses “nitrogen gas is used to displace the oxygen in the bubble to a percentage below 1% low enough to kill all stages of the insect life-cycle: adults, larvae, pupae, and eggs.” (<https://www.historicnewengland.org/nitrogen-treatment-for-collections/>).