Responding to a Potential Disaster: Moths in the Ethnographic Collections at the American Museum of Natural History

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On the evening of December 23, 2015, while securing storage for the holidays, Collections Management staff noticed two webbing clothes moths, Tineola bisselliella, fluttering down the main aisle of one of the Division of Anthropology’s largest ethnographic storage rooms. Despite a preexisting integrated pest management strategy, it was obvious that the collections had been compromised. 2016 and beyond would have to be largely devoted to mounting an emergency response.

AMNH’s eighth building was constructed in 1908. Originally, the building’s first through fourth floors were conceived as exhibition spaces, the fifth floor became the Anthropology Division’s curatorial offices, and the sixth-floor/attic was used as ethnographic storage space. The fourth floor held the Philippines Hall from 1911 until the 1920’s, then Margaret Mead’s Hall of Peoples of the Pacific from 1921 until 1977. That exhibit was relocated to the third floor in 1964, and the fourth floor finally became a designated anthropology storage space. The addition of a mezzanine level that same year doubled the room in two, and the installation of an HVAC unit made the division’s first climate-controlled storage area. In 1985, compact storage was installed on the mezzanine, vastly increasing storage capacity. The 0.577-square-foot building’s 4, 4th floor mezzanine storeroom currently houses 6,000 ethnographic and 5,583 archeological objects from Africa, Asia, and North America.

On March 3, 2016, Collections Management was informed that a large wool rug in an office in the Northeast corner of Building 8’s 4th floor was severely infested with webbing clothes moths. Upon closer inspection, Collections Management discovered a small hole in the floor beneath the rug leading directly into fourth floor mezzanine storage. The hole had apparently been drilled many years prior for a phone line. It was immediately obvious that this was the moth’s point of entry into the collections.

Collections Management, Conservation, Curatorial, and Custodial staff carefully discarded the rug, thoroughly cleaned the office and furniture, and treated all suspect personal property by fumigating. The Museum Exterminator treated the room with Tempo and sealed the hole in the floor. On the other hand, the hole in the ceiling of the 4th floor mezzanine was hidden by a light fixture. Museum Electricians removed the light fixture and the Museum Exterminator sealed the hole again from below. Closures were found in the floor/ceiling debris that had collected on the top of the light fixture.

Efforts were made to seal off other obvious entrances/exit to the moth in the storeroom. Facilities staff installed covers and sargents on all doors. Given the building’s age and the room’s history however, innumerable small gaps remain in the ceiling, walls, and floor.

On Monday, January 4, 2016, the Division of Anthropology’s five person Collections Management team commenced a thorough inspection of all collections in this space and on the same day found a new infestation in the Northeast corner of the room. About a dozen objects were directly affected, found with webs, webbing, cocoons, and live and dead/infested clothes moth adults and larvae. Holes with fuzz/flying flat in ethylene lined shoe boxes were the most commonly affected objects. The moth had also built cocoons in the corners of the traps, inside ethylene boxes, and along the edges of the storage unit’s rubber gasketing. The obviously affected objects were immediately treated by freezing and the storage surfaces thoroughly cleaned, treated, or discarded.

In late winter, 2016, Collections Management began to hear from other scientific departments about new moth infestations cropping up in several collections and exhibition spaces throughout the museum. AMNH’s Natural Science Conservation staff took the lead in investigating these outbreaks and coordinating a response. They discovered a significant correlation between rotting and moth activity throughout the museum, executed large scale exhibition treatments, and brought on board a diverse collection of AMNH staff to address the problem.

On April 1, 2016, six trays were deployed in 6 rooms. We inspect the traps, record data, and mail an evaluation to relevant museum staff weekly. Since April, 2016, we have seen a significant overall drop in moth-capture. This is especially true of the 5th floor offices where the infestation originated. However, we continue to see consistent, if low level, moth activity in the collections storage space below.

Collections Management began experimenting with pheromone traps in March 2016, and initiated a consistent pheromone trap-monitoring regimen as of April 1, 2016. We currently have 14 traps deployed in 8 rooms. We inspect the traps, record data, and mail an update to relevant museum staff weekly. Since April, 2016, we have seen a significant overall drop in moth-capture. This is especially true of the 5th floor offices where the infestation originated. However, we continue to see consistent, if low level, moth activity in the collections storage space below.

In retrospect, we were lucky to have caught the collections stage of the infestation relatively early. Though we first noticed the moths in mid-February, we did begin to capture them in the room’s five strategically placed blender traps soon after. So our basic pest-monitoring FMU-monitoring program would have eventually sounded the alarm. Nevertheless, given webbing clothes moth’s potential to rapidly multiply, their devastating effects on museum collections, and the costs of mounting an adequate response, adding pheromone traps to a standard monitoring regimen before noticing a problem would provide a significant and overall cost-effective advantage. Likewise, expanding more effort in seeking a storage space to whatever extent possible before an infestation hits might prevent it from reaching collections altogether. It is also noteworthy that while the situation began with a relative office infestation which then spread to collections storage, the office was quickly eradicated of the pests whereas the nature of a legacy storeroom makes complete eradication then extremely difficult if not impossible. Thus non-collections staff FMU education should be considered a priority.