

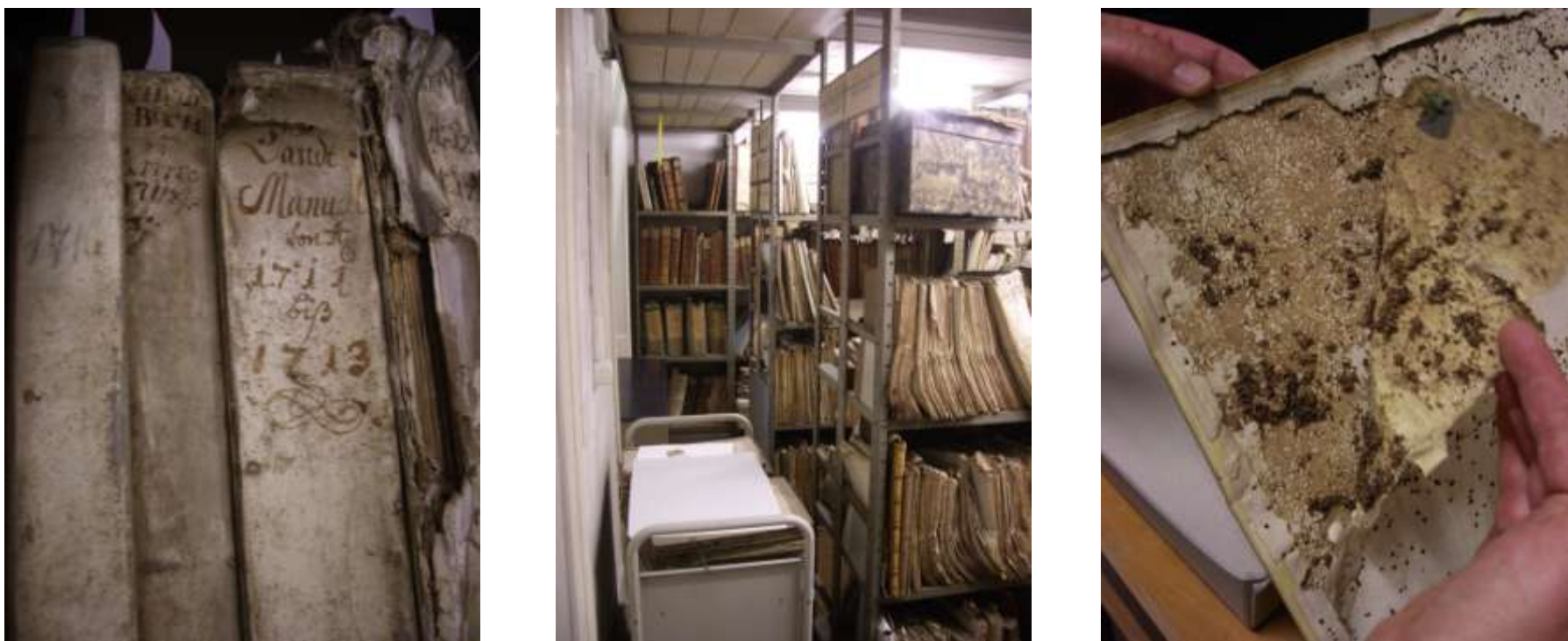


Staatliche Museen zu Berlin
Preußischer Kulturbesitz

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Introduction

Biscuit beetles (*Stegobium paniceum*) and webbing clothes moths (*Tineola bisselliella*) cause a large proportion of the damage of museum objects. Some organic objects and materials are often re-infested after treatment. In the last years parasitoid wasps were applied in biological pest control strategies in mills and storages in the food industry. Parasitoid wasps are usually host specific and lay their eggs on the larvae and eggs of their host species. We present results from 5 different museums in Germany and Austria where parasitoid wasps (*Lariophagus distinguendus* against *Stegobium paniceum* and *Trichogramma evanescens* against *Tineola bisselliella*) were used **(1) as a biological pest management strategy and (2) as a preventive management.**



Augsburger Stadtarchiv, Germany

In the large municipal library Augsburg Stadtarchiv an **active *Stegobium paniceum* infestation** was discovered in 2009. Besides cooling the rooms to slow down their development and treating the books with anoxia (nitrogen), 20 x 30 *Lariophagus distinguendus* wasps were released on two occasions in 2009 (August and September).



Technisches Museum Wien, Austria

One historic automobile in the museum exhibition space and one historic horse carriage in the storage depot were heavily **infested by *Tineola bisselliella*** for many years. Therefore in 2009 we performed a mass release of *Trichogramma evanescens*. Four cards with 2,000 wasps each were placed in the car and in the horse carriage every four weeks from May until August. During the whole time the monitoring with pheromone traps was continued to evaluate the effect of the parasitoids. **The release of the wasps did not have any short term effect on the moth catch during the whole active period of the moths.**



Picture Gallery in the Kunsthistorisches Museum Vienna

The picture collection of the Kunsthistorisches Museum was repeatedly **infested by *Stegobium paniceum***. They attack specifically the paintings lined with starch paste linings. As the whole collection will be moved 2011 to a new storage site, pictures were not immediately treated with nitrogen. To reduce the beetle population and the damage on the paintings, we released 12 x 30 *Lariophagus distinguendus* individuals on three occasions (April, Mai, June 2010). **In 2011 only very few live biscuit beetles were found in the storage room.**



Deutsches Museum Verkehrszentrum München, Germany

Felt mats in the historic cars in museum exhibition rooms were repeatedly **infested with *Tineola bisselliella***. *Trichogramma evanescens* were released on a weekly basis in 74 cars and vehicles with a total number of 45,000 individuals per year. With the help of pheromone traps, the moth populations were monitored during the parasitoid release (2007-2009). **After the third year of the release a significant decrease of moths was found from an average of 10-15 moths per car down to 2-3 moths per car. In some cars the moths were completely extinguished.** Besides the release of the wasps individual cars were treated with anoxia (nitrogen) against the infestations.



Ethnological Museum Berlin, Germany

In two collections (American and African Ethnology) an **active *Stegobium paniceum* infestation** was discovered in spring 2010. Different types of objects like basketry, voodoo dolls or pumpkin bowls were infested. As the monitoring with pheromone traps for biscuit beetles was not successful (the commercial traps did not capture any beetles, even though live and dead beetles were regularly found on the window sills), we release 100 x 30 *Lariophagus d.* wasps on three occasions in 2010 (July, August and September). The wasps were released in the two storage rooms and 36 individual closets with possibly infested objects.

Conclusion

Using parasitoid wasps against insect pests show a **large potential in IPM as the wasps are cheap, easy to release in confined areas and can be also applied as a preventive measure** if climate conditions are right (+15C). For an active biscuit beetle infestation *Lariophagus distinguendus* wasps are found very successful against the beetles. An active clothes moth infestations is harder to treat with the parasitoid *Trichogramma evanescens* but with a very regular exposure of wasps, the clothes moth populations can be reduced over the years. **Research is still needed to critically evaluate the distance the wasps can actively move to find their hosts, the number of individuals and times per year that the parasitoids should be released.**

Material List

Lariophagus distinguendus and *Trichogramma evanescens* were ordered from the German company **BiP, Biologische Beratung Ltd. in Berlin.**

Acknowledgements

We thank the mentioned museums for allowing us to work with parasitoid wasps in their collections.