

**Nothing is Perfect: Biodegradable Packing Material as Food and Transportation for a Museum Pest, *Lasioderma serricorne* (F.) (Coleoptera: Anobiidae)**

Author(s): Annette Aiello, Edwin Domínguez Núñez and Henry P. Stockwell

Source: The Coleopterists Bulletin, 64(3):256-257. 2010.

Published By: The Coleopterists Society

DOI: <http://dx.doi.org/10.1649/0010-065X-64.3.256.12>

URL: <http://www.bioone.org/doi/full/10.1649/0010-065X-64.3.256.12>

---

BioOne ([www.bioone.org](http://www.bioone.org)) is a nonprofit, online aggregation of core research in the biological, ecological, and environmental sciences. BioOne provides a sustainable online platform for over 170 journals and books published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Web site, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at [www.bioone.org/page/terms\\_of\\_use](http://www.bioone.org/page/terms_of_use).

Usage of BioOne content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

## SCIENTIFIC NOTE

### NOTHING IS PERFECT: BIODEGRADABLE PACKING MATERIAL AS FOOD AND TRANSPORTATION FOR A MUSEUM PEST, *LASIODERMA SERRICORNE* (F.) (COLEOPTERA: ANOBIIDAE)

Among an insect collection manager's most dogged tasks is to keep museum pests at bay. The three main components of this responsibility are: 1) constant vigilance; 2) detection and elimination or mitigation of potential pest sources; and 3) fumigation if an infestation occurs. The second of these three is the trickiest, largely because pest sources are quite diverse and, if they are external of the collection, can fall outside the manager's jurisdiction. As examples, pests are more likely to invade a collection located near a building entrance, or, as in the case of a well known museum in the northeastern United States, if the mammal department's bone-cleaning room is located on the floor above. Here we report a recently recognized source of museum pests that has potential to affect collections worldwide: starch-based packing peanuts.

We were alarmed in January 2010 when small (2.4 mm), brown beetles, later identified as *Lasioderma serricorne* (F., 1792) (Anobiidae) (Fig. 1), began to appear on the floor of the insect collection room at the Smithsonian Tropical Research Institute (STRI) in Balboa, Ancon, Panama City, Panama. There were too many beetles for them to have entered the room one by one from outdoors, yet none of the specimen drawers had infestations. So from where were the beetles coming? The search led to a large bag of packing peanuts accumulated from parcels received from other museums, and now stored, ready for re-use when we send specimens out. The bag contained mostly polystyrene peanuts, but mixed in were a few starch-based biodegradable peanuts; the beetles were associated with the starch-based peanuts (Figs. 2a, b).

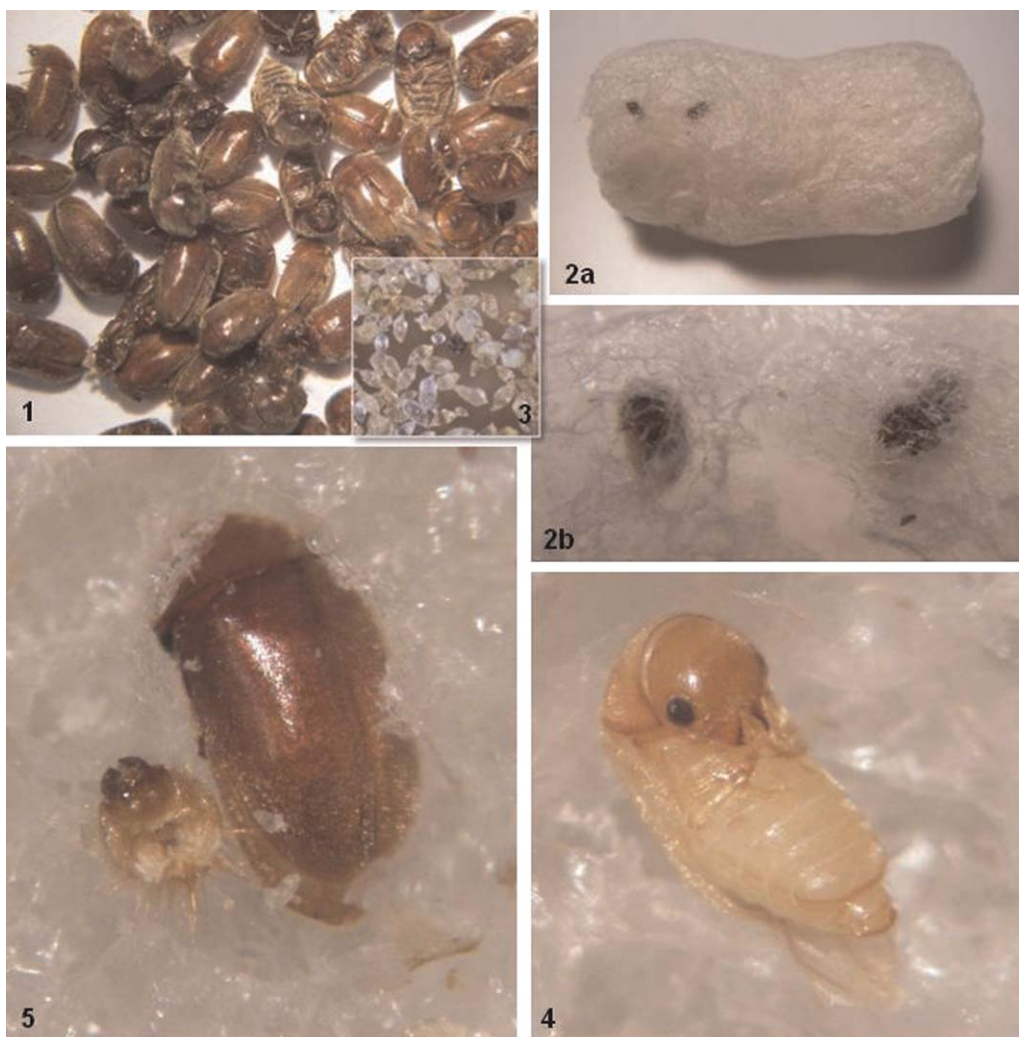
Utilization by *L. serricorne* as a food source is an unexpected downside of a starch-based packing material designed to biodegrade easily so as not to persist for decades in garbage dumps and landfills. These new materials are so biodegradable that they "vanish" within minutes of being soaked in water. Their fatal flaw is that despite optimistic claims by their manufacturers that the nutritional value has been removed from the corn starch or sorghum used to make them, they are fodder for insect pests. As Ward Watt quipped (personal communication), "If they removed all food value, there wouldn't be anything left to manufacture the packing peanuts from". See the Wikipedia website (Wikipedia 2010) for a general history of packing peanuts and the materials used to make them.

According to David Stephan (*in litt.*), "In the US, *L. serricorne* can be as serious a pest in herbaria as *Anthrenus* dermestids are in insect collections." The problem affects herbaria around the globe, and the beetles attack the labels, species cards, and genus covers as well as all parts of the plant specimens (Croat 1978; Retief and Nicholas 1988; Kabir *et al.* 1996). Thus, in retrospect, it should not be surprising that *L. serricorne* includes starch-based packing peanuts in its diet. Unfortunately, these beetles do not confine their attacks to plant material; Keith Philips (*in litt.*) discovered them destroying a student insect collection. We selected a few live adult beetles for observation and set them up with starch-based peanuts in a transparent plastic cup with a tightly fitting lid for observation over a period of five days. The bag of mixed packing peanuts was put into a large freezer for one week to terminate the infestation, after which we separated the two types of peanuts and discarded the biodegradable ones.

The defrosted rubble in the bottom of the bag was a jumble of tiny scraps of polystyrene and starch-based peanuts, dead *L. serricorne* adults (Fig. 1) and larvae, beetle parts, larval exuviae pertaining to at least three stadia, and shiny, spindle-shaped eggs (Fig. 3). From this rubble we point-mounted vouchers, which are deposited in the collections of STRI and MIUP (Museo de Invertebrados G. B. Fairchild de la Universidad de Panamá): 14 adults, nine larval exuviae, five dehydrated larvae, and a few eggs. We also saved loose samples of eggs and rubble in mounted gel caps, and pinned a packing peanut that had eggs on it.

Captive females laid their eggs, singly or in small clusters, on the surface or in crevices of the biodegradable packing peanuts. Mature larvae sequestered themselves within the peanut to pupate (Fig. 4), and teneral adults (Fig. 5) remained there with their larval exuviae for some days before emerging.

Fraga *et al.* (2009) reared two species of Coleoptera and one species of Lepidoptera from the same type of packing material in Brazil. They also found adults of three additional species of Coleoptera, including *L. serricorne*, in those products, but did not report evidence that they had bred there. Our findings confirm that *L. serricorne* indeed can and does breed in starch-based packing materials. From the point of view of a beetle, what could be better than a system that provides abundant food (though perhaps not the most appetizing) and automatic dispersal to all points of the globe? Curators beware.



**Figs. 1–5.** *Lasioderma serricorne* in starch-based packing peanuts. **1)** Adults (2.4 mm long); **2)** Two teneral adults in a whole peanut (a) and just below the peanut surface (b); **3)** Eggs (0.17 mm long); **4)** Pupa dissected from a peanut; **5)** Teneral adult and its larval exuviae dissected from a peanut.

We thank Keith Philips (Western Kentucky University) for identification of the beetle, and both him and David Stephan (North Carolina State University) for commenting on its pest status.

#### REFERENCES CITED

- Croat, T. B. 1978.** Survey of herbarium problems. *Taxon* 27(2/3): 203–218.
- Fraga, F. B., I. D. C. C. Alencar, and M. T. Távares. 2009.** Disseminação de insetos-praga por meio de embalagens à base de amido extrusado. *Neotropical Entomology* 38(4): 548–549.
- Kabir, S. M. H., M. S. Khan, and S. Begum. 1996.** Pest insects from two herbaria in Dhaka City. *Bangladesh Journal of Zoology* 24(2): 121–124.
- Retief, E., and A. Nicholas. 1988.** The cigarette beetle *Lasioderma serricorne* (F.) (Coleoptera: Anobiidae): a serious herbarium pest. *Bothalia* 18(1): 97–99.
- Wikipedia. 2010.** Foam peanut. Wikipedia, The Free Encyclopedia. Available from: [en.wikipedia.org/w/index.php?title=Foam\\_peanut&oldid=365638705](http://en.wikipedia.org/w/index.php?title=Foam_peanut&oldid=365638705). (Accessed 9 June 2010).
- Annette Aiello, Edwin Domínguez Núñez, and Henry P. Stockwell, Smithsonian Tropical Research Institute, Apartado 0843-03092 Balboa, Ancon, PANAMA**

(Received 1 March 2010; accepted 18 June 2010. Publication date 20 September 2010.)