

## Freezing of a mammal collection to mitigate persistent drugstore beetles

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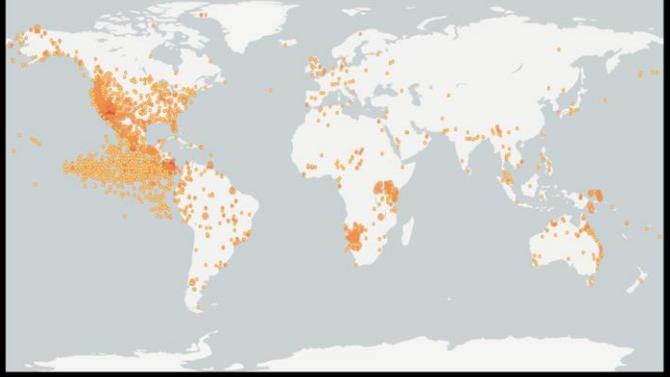
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### What & From Where

~99,000 specimens: 5k marine, 94k terrestrial

~1,700 species from 115 countries

~ 6,500 specimens from Los Angeles County



Natural History Museums of Los Angeles County



We hold the 14<sup>th</sup> largest collection in North America with nearly 100,000 specimens. Globally broad representation and locally deep.

## Drug store beetle history and damage



Over ten years of persistent drugstore beetle infestation. Attempts to mitigate included pheromone traps, silica dust in the bottom of cabinets, and spot cryofumigation. Beetles would be reduced but not resolved. The damage to the study skins is visible. End of 2019, in coordination with the LACM conservator, Mammalogy began a plan to pack and freeze the entire collection.

## Packing the collection



- Jan 2020 began packing with 10-15 volunteers
- 70,000 skull and/or skeleton specimens
- 55,000 skins
- 258 storage cabinet

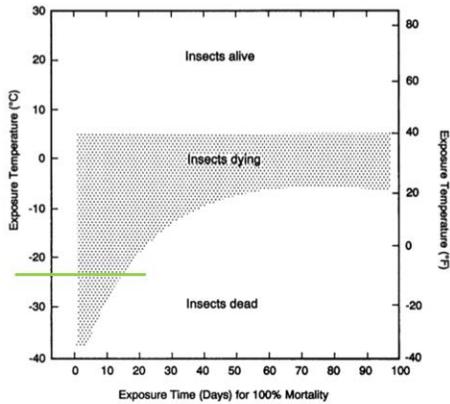


Because the cabinets are old and 3 high, it wasn't possible to remove the cabinets and freeze them with contents inside. We coordinated with the Volunteer department and by Jan 2020 we had recruited about 15 students and volunteers to help pack specimens from 258 cabinets into individual boxes.



## Freezing the collection

- 800 boxes total
- Packed and wrapped onto 48 pallets to minimize handling
- Frozen in 40' freezer container at -25°C for 4 weeks
- Four cycles to freeze all pallets



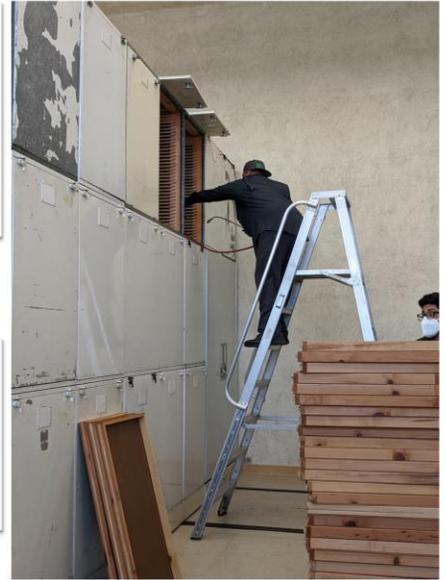
From Strang, Thomas J. K. 1997, rev.2008. Controlling Insect Pests with Low Temperature. CCI Notes 3/3



We packed nearly 800 boxes total, stacked on pallets we shrink wrapped them and moved by pallet jack into a 40' freezer container delivered to the Museum loading dock. Using a CCI Notes reference by Strang we estimated at -25\* freezing temperature a minimum of 3 weeks duration. We froze the collection at -25°C for four weeks (literally overkill).

## Cleaning and chemical treatment of cabinets and drawers

- Vacuumed and chemically treatment of all cabinets and ~ 2000 drawers



Once the last box was packed and sealed, we started cleaning and vacuuming cabinets and drawers. Full-time gallery staff were able to help following masking and distancing guidelines. In Sept 2020, Western Exterminator spent 2 weeks in the evenings spraying all cabinets and drawers with a mixture of Excite R and Phantom insecticide.

## COVID challenges and opportunities

- ❌ Museum closed to public and volunteers 13 Mar 2020 and not reopened as of today (11 Mar 2021)
- ❌ Staff shutdowns: Mar-May 2020 & Dec 2020-Mar 2021
- ❌ Returned freezer after 2<sup>nd</sup> freeze cycle

- ✅ Closure opened gallery spaces for staging
- ✅ Collection unavailable to researchers during freeze, also during COVID
- ✅ Chemical spraying allowed in evenings

Mammal Freeze Project 2020 Timeline



COVID challenges: we lost our volunteers and helpers 13 Mar 2020 when the museum shut down (and we have yet to reopen). Subsequently there were 2 periods of staff shutdowns which delayed first packing and later delayed reinstallation. COVID opportunities: the collection in boxes was unavailable to researchers. After COVID this was no longer an issue. With exhibition galleries closed we had more room for staging boxes, pallets, and storing pallets after freezing. Chemical treatment isn't permitted when museum is open, and with closure allowed to do treatment 5-9pm.

## Reinstallation underway



**SO MANY opportunities starting from a blank slate!**

- Cabinet and drawer renumbering and labeling
- Reinstallation reorganization by updated taxonomy
- Complete presence/absence audit of specimens
- Noting missing, uncataloged, or misplaced specimens
- Rehousing in new trays, new drawer liners, new vial boxes



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