Developing rodent-proof covers for blunder traps

MuseumPests & Pest Odyssey Public Presentation Session

'Pesty business'

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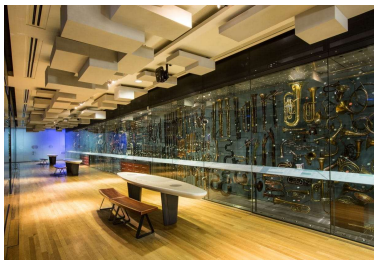
Anais Ellis
Horniman Museum and Gardens
Charlotte Ridley
Horniman Museum and Gardens
Andrew Hughes
Pitt Rivers Museum, Oxford

- Brief intro to me and colleagues

Context

- Variety of material and collection types at the Horniman that are vulnerable to insect pests
- IPM at the Horniman is quarterly, 120 traps spread across the museum and our storage site
- Increasing rodent problem, unfortunately getting stuck in both blunder and pheromone trap

Museum is set amongst gardens



Music Gallery

Natural History Gallery, currently under refurbishment

World Gallery

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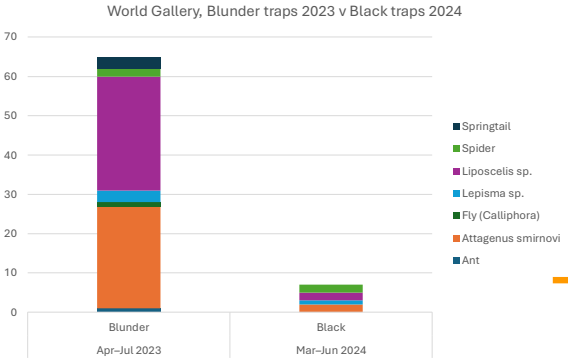
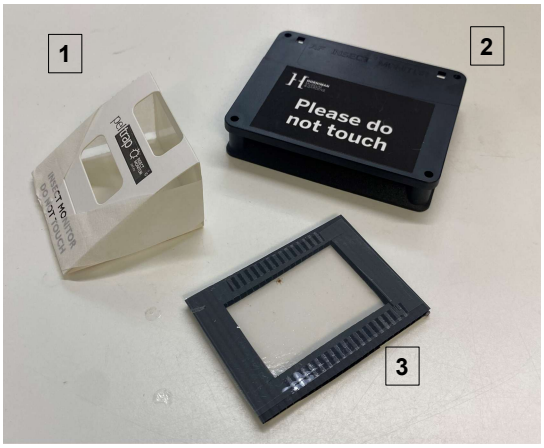
- Horniman is in South London, set amongst 16 acres of Gardens
- Has a wide variety of material and collection types amongst the galleries, and lots of those that are vulnerable to pest infestation
- IPM is undertaken quarterly across our museum and storage site

- Around two years ago, we began noticing an increase in mice being caught in blunder and pheromone traps. This raised ethical and legal concerns and prompted a review of our approach to pest control to ensure it is humane, effective, and compliant with legislation.

Initial experiments

1. Blunder traps with sides covered with masking tape
2. Black hinged traps
3. JTW Correx traps





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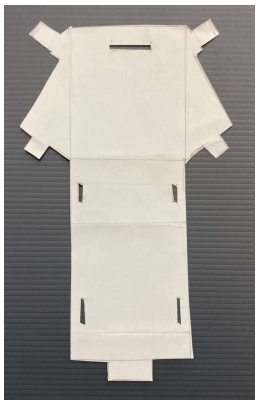
- Initially to try to address this issue we tried several experiments with different trap types. Wrapped PEL blunder traps with masking tape as a temporary measure while considering a more permanent solution.
- Black hinged traps; These have a ramp leading to a blunder trap inside, placed across problem areas. We put them across problem areas in the museum.
- Observed lower insect pest catch rates, especially for smaller insects, possibly because they couldn't climb the ramp.
- Graph data shows reduced catch rates compared to the blunder traps used at a similar time period the year before.
- So we reached out on PestList and asked if anyone else had a similar issue. JTW reached out and offered us an alternative, which we tried. Worked but was too resource-intensive.

Designing the blunder trap cover

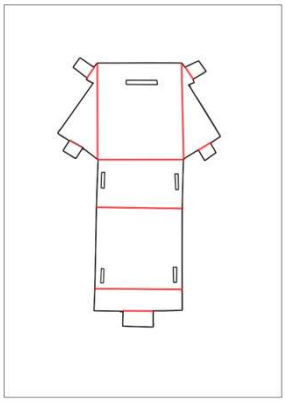
Criteria for blunder trap cover:

1. Strong enough to protect the trap and stop mice from entering
2. Thin enough to keep the blunder trap close to the ground
3. Flexible enough to be scored, folded into shape
4. Durable against repeated opening
5. Not too resource intensive; time and material used

Design process:



1. Paper prototype



2. Adobe Illustrator Template

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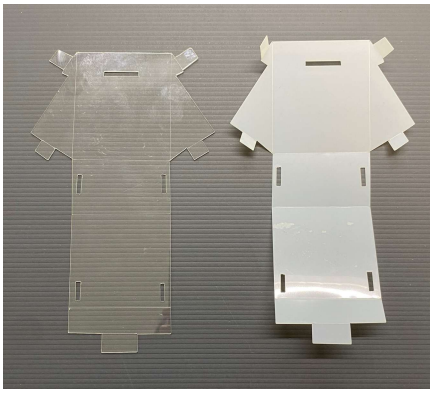
- Charlotte proposed creating a **cover for the blunder trap**, as these traps are the most effective for us.
- Key criteria for the cover were established upfront to ensure it met our practical, ethical and legal need
- Laser cutting, previously Horniman had worked on a project before and we wanted to reproduce it for a lot of traps, approx., 30 so that would ensure quality control and repeatability. We also decided we needed a material that could be laser cut and was also already was a known quantity within the museum context.
- Initially Charlotte designed a paper prototype which is an exoskeleton essentially of a PEL blunder trap, I then took that and then translate the template to Adobe Illustrator

Designing the blunder trap cover

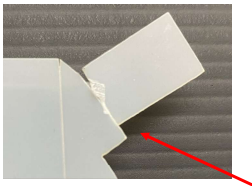


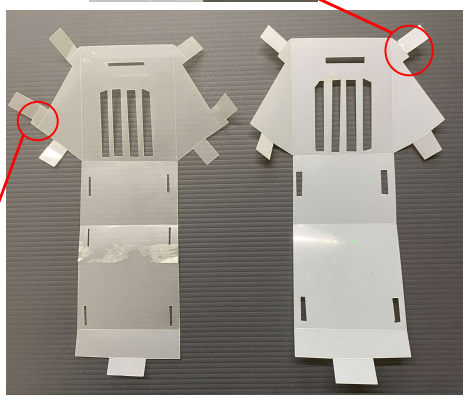
Acrylic Melinex

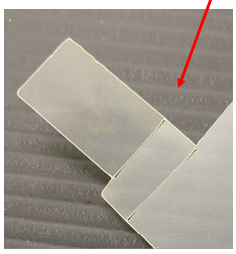
Prototype v.1

Issues encountered:

1. Skill level
2. Working with commercial laser cutters
3. The design
4. Quality control







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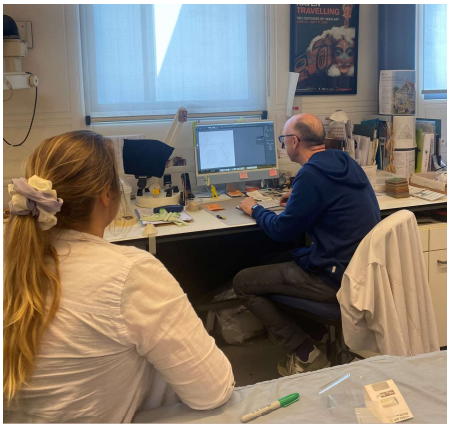
- After the prototype was made we
- Issues encountered
- I was novice in creating a template
- Initially trying to get commercial laser cutters to understand out project was difficult
- Quotes were very expensive or there was a minimum order, where we initially just wanted a one-off prototype
- We found a small company that were willing to give one-off prototypes
- Initial design there were some issues, it was a bit too small and the tab placement felt like mice would be able to enter, changed the design accordingly
- There were also issues with quality control from the laser cutters, tabs snapping off easily, perhaps they were giving us whatever was in the laser cutter at the time of us asking

Working with the Pitt Rivers Museum team



Working on the design of the cover on Adobe Illustrator

Using the laser cutter

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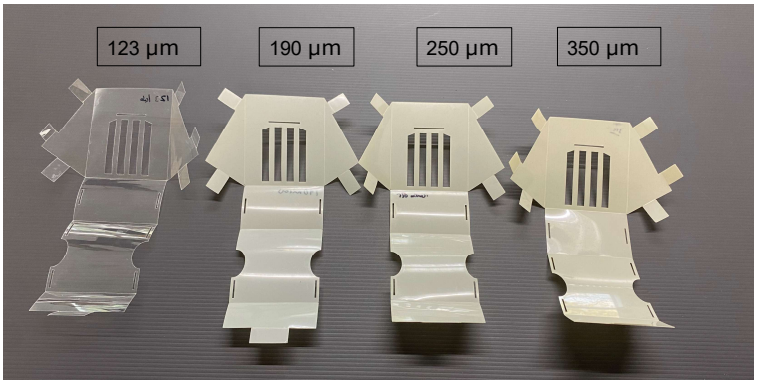
- Then we reached out to the team at PRM, who agreed to help and they have an in-house laser cutter

We had purchased 4 different Melinex thicknesses to test;
123 microns (from cons lab)
190 microns (purchased from Ideal Stencils)
250 microns (purchased from Ideal Stencils)
350 microns (purchased from Ideal Stencils)

Working with the PRM team



Different type of Melinex thicknesses (microns) tested

Bowing at the bottom edge of the trap

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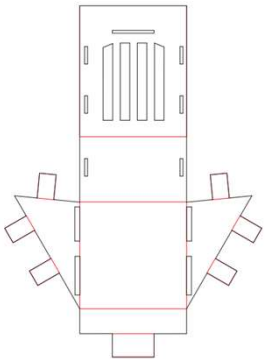
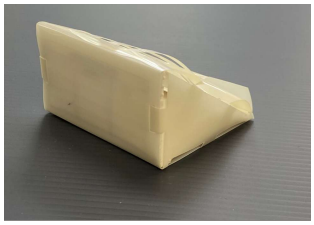
After laser cutting the initial trap design a small modification was made to the bottom edge of the trap and a semi-circle was cut into that edge. This was to stop the bowing of the bottom and to ensure that the insects did not crawl under the trap. This eventually did not seem to help much with those two issues.
The laser cutting worked for all 4 thickness and there was a better sense of quality control (i.e. the tabs and fold line points were sturdier). I think we felt that the medium thicknesses were the best. 350 microns was sturdy, but it was also quite rigid to fold and difficult to get it into the trap, this will likely pose problems when trying to do the IPM programme as it would take a lot of time which would not be ideal.
Laser cutter settings were changed accordingly due to melinex thickness. Andrew noted that parameters for the laser are dependent on the laser itself/age of the laser and the materials being tested.
We also experimented with changing the structure of the trap, we cut off one of the tabs on the side to see if it was needed but then it was felt like that the tab was needed to make the trap secure from mice.
There were still issues with the size of the traps and bowing at the base – basically it caused the blunder trap inside to sit proud and not flush with the floor. This would mean that there would not be enough 'blunder-ability' which

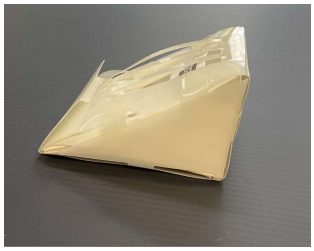
means that insects may not be able to get into the traps.
This is potentially due to:
The melinex being rolled and the curvature from that.
The lack of structurally support – tabs at the side and not the middle
The size of the melinex cover – potentially to big?
Andrew has kindly investigated tweaking the design. We left some melinex with him and he sent us the new trap design via post

Preliminary results and next steps

Final design:







Results

Blunder trap experiment cover	Melinex thickness	Location	Date set	Date collected	Pest count
E1	250	Under pacific case	21/07/2025	27/08/2025	1 booklouse
E2	190	Under Chinese culture case	21/07/2025	27/08/2025	0
E3	190	RHS of Studio door (back of studio)	21/07/2025	27/08/2025	1 spider 2 winged booklice
E4	250	RHS of Studio door (back of studio)	21/07/2025	27/08/2025	1 fly 1 woodlouse

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- New trap design with tabs switched from the top edge of the trap to the bottom
- Andrew sent us this design in 190 microns and 250 microns, 2 of each
- Tested the traps for 4 weeks in problem areas
- Initial results are encouraging, catching smaller insect pests
- Now to roll it out, we'd like to created more covers and test these across all areas but we will flatten the Melinex properly before it is cut to ensure there is no bowing

Thanks for listening!

A big thank you to:

- MuseumPests & Pest Odyssey
- Our colleagues at the Horniman Museum and Gardens
- Pitts Rivers Museum team

Contact:

aellis@horniman.ac.uk

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