Quantification of the costs of insect collection curation

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Introduction

The operating costs of maintaining an insect collection must be justified to university administrators and external granting agencies. Quantification of the costs and benefits of curatorial work is important to compete for funds for hiring personnel and for purchasing equipment and supplies.

The Triplehorn Insect Collection still has a substantial portion of its material stored in hard bottom unit trays (*right*).

We are now re-curating the Coleoptera. The process involves updating the taxonomic names, transferring specimens to new unit trays, databasing the specimen labels, and storing specimens in new, tightly closed, naphthalene-free drawers.

The objective of this work was to quantify the costs of the units of curatorial tasks. While every collection is different, our results may provide a starting point for the purposes of comparison.

Goals

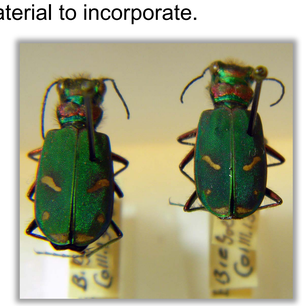
1) Curate specimens to the level where they can easily be made available to experts for study or further identification.
2) Make the specimen level data available online.
3) Remove the substandard drawers and eliminate the use of naphthalene.

Major Challenges

1) Cost.
2) Taxonomic names: how does one find the current names?
3) Personnel training & oversight: demands substantial planning, preparation, and active one-on-one time and effort from permanent staff.

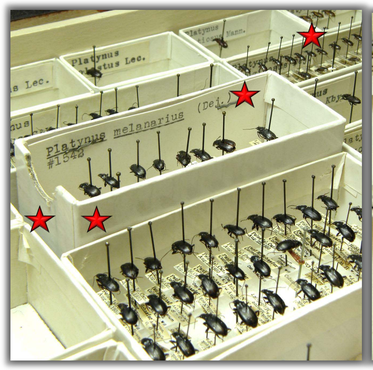
Why start with Coleoptera?

1) Coleoptera is one of the most active parts of the collection in terms of loans and general use, *i.e.*, benefits of curation will be felt immediately.
2) Level of curation - majority of the material determined to genus or species by specialists.
3) Large volume of *pro tem* material to incorporate.
4) New material being added steadily.
5) Beetles are "hardier" and more forgiving of the handling by relatively inexperienced workers.



Current status

The collection was traditionally organized to the family level "phylogenetically." This is now outdated. Further, the focus was on Nearctic material, and "exotics" were segregated from their closest relatives. Many taxonomic names have not been updated in decades. In addition, specimens are tightly packed due to earlier space restrictions.



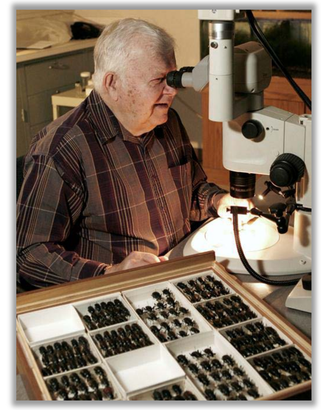
Changes in costs and materials available over the years resulted in the use of a wide variety of now substandard pins, paper, unit trays, and drawers.

Hard bottom unit trays are a particular concern because they make it very difficult to handle specimens.

End product

The end result of the curatorial process is specimens safely stored in high quality, durable and properly labeled unit trays and drawers.

Specimens can be easily handled for the purpose of loans or for study on site.



Steps in our curatorial process

a. Preparation

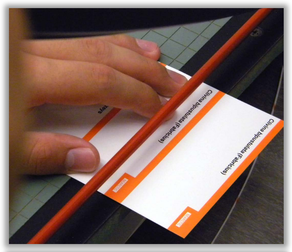
Move unit trays to temporary drawers

➔ Cost per drawer = **$0.83**

Taxonomic name check

➔ Cost per drawer = **$4**

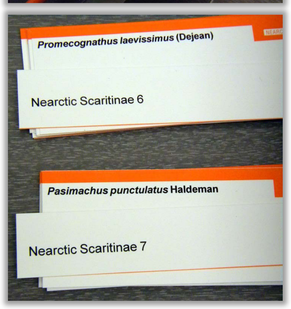
Research current names using a variety of sources (catalogs, online databases, published literature).



Header labels for unit trays

➔ Cost per drawer = **$14**

1) Update OSUC catalog.
2) Determine the number of header labels and biogeographic regions needed for each taxon.
3) Print, cut, organize the header labels.



b. Transfer

Label unit trays and handle the specimens.

➔ Cost per drawer (based on an average of 386 specimens per drawer) = **$31**

1) Place header labels in new unit trays.
2) Transfer specimens from the old, hard bottom unit trays to the newly prepared, foam bottom ones.

c. Re-house

Final steps for incorporation of specimens

➔ Cost per drawer (includes only step 1) = **$3+**

1) Organize the finished unit trays within and between drawers.
2) Label drawers.
3) Repair/remount specimens as needed*.

*The cost of specimen repair is highly variable. Depends on the type of damage, the type of repair required.

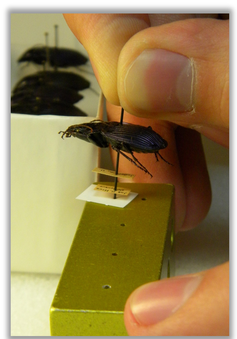
Rate of damage: **0.72%**

d. Database

➔ Cost per drawer = **$89**

1) Add barcode: each specimen receives a unique identifier.
2) Transcribe specimen data: copy determination information, plus specimen label data verbatim into a data entry template.
3) Semi-automated data entry: includes the georeferencing of localities and the actual recording of specimen data to the database.

Specimen data are accessible through local web portals (*hol.osu.edu*) as well as the Global Biodiversity Information Facility (*www.gbif.org*).



e. Summary

Trained undergraduate employees and permanent curatorial staff were timed and output measured for each of the major steps involved in the curation process. Cost of labor is included in the calculations.

Curation in numbers

- **19,696** = specimens transferred
- **268 =** hours worked on prep & transfer
- **111** = specimens transferred per hour
- **51 =** drawers before curation
- **71** = drawers after curation (↑ **39%**)

Summary of costs per drawer

1) Materials = **$55 - $63**
   - ✓ Cost of one USNM-style drawer = $42
   - ✓ Cost of one custom made unit tray = $0.68 - $0.83
2) Preparation = **$19**
3) Transfer = **$31**
4) Re-house = **$3+**
5) Database = **$89**

Because databasing is not a required step for the curation of a collection and its cost vary based on the methods used, we are not including it in our total cost per drawer (*below*). Drawers and unit trays are 54% of the total cost.

Total cost of curation per drawer (databasing not included) = **$108 - $116**

Acknowledgments

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