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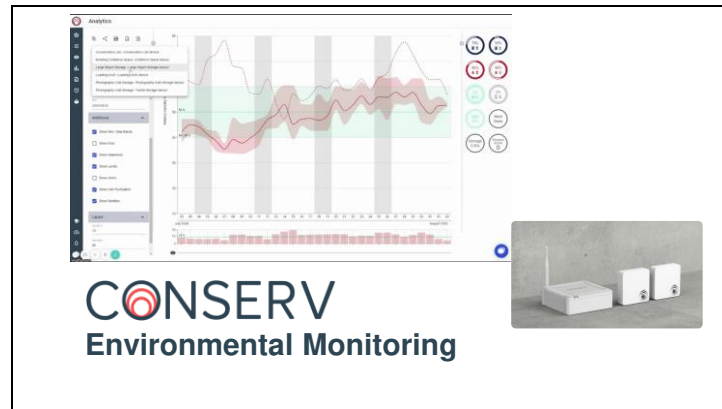


The Development of the Collection Pest Database and the Pest Occurrence Database

By Melissa King, Austin Senseman, and Nathan McMinn

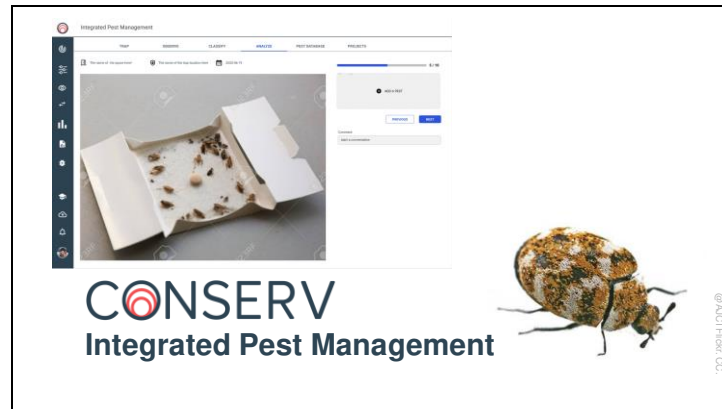
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I am so honored to have been invited to the MuseumPests Working Group this meeting. It is an incredible group of people, and I am in awe with the amount of important work produced in a mere week. I am excited to share two projects that are in the works as a collaboration between Conserv and MuseumPests.



- As a quick background on Conserv, we are a software company focusing on tools for preventive conservation.
- Our first hurdle we've been tackling is remote environmental monitoring with free analytic tools created specifically for collections professionals.
- 100's of conversations with these professionals, we have continued to hear a need for more integrated pest management tools - particularly if we can analyze T + RH data alongside pest data. (THE DREAM)

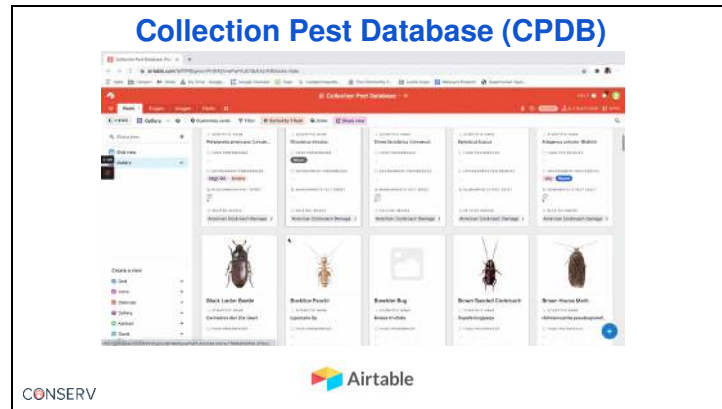
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- people continue to have challenges in this area - still using Excel - what can we do to take it further?
- Some really great analytic tools and visualizations in the works
- We are excited to share that we will be incorporating the Pest Occurrence Index discussed by Jane Henderson and Dr. Christian Baars in the two talks prior. This will allow us to normalize the data so we can more confidently compare it
- In our discussions with preservation professionals, we have learned that the #1 challenge = identifying pests



- We quickly determined that we needed a pest database, and decided on the application, Airtable
- We like Airtable because it has good API, which is the publicly available information about the code that allows for better integration into other types of software.
- We approached MuseumPests about this because the website already has a rich database of valuable information, but in its present state is difficult to utilize within software and for any form of data analytics
- Keeping things updated on a website is hard - requires developer-type effort
- An advantage of this database is that it can be updated all the time and we can control access while also allowing for crowdsourcing
- The search function is leaps and bounds better than the embedded PDF Fact Sheets



- The MuseumPests group has been filling this out all week and have successfully finished:
 - Fact sheets
 - Image gallery
- It is already embedded on the website
 - Can easily adjust for different languages - already working on Spanish

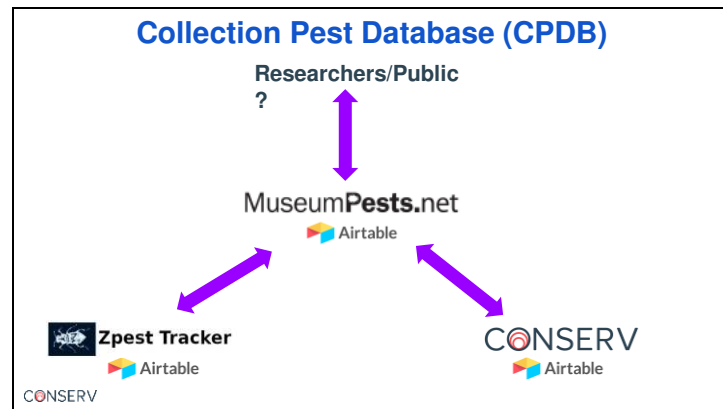
Collection Pest Database (CPDB)

Initial questions we are trying to answer with this database:

- **How can I identify this?**
 - Pictures
 - Lifecycles
- **Why does it matter?**
 - Risk
 - Diet/damage
 - Indicator
- **What can I do about it?**
 - Environment

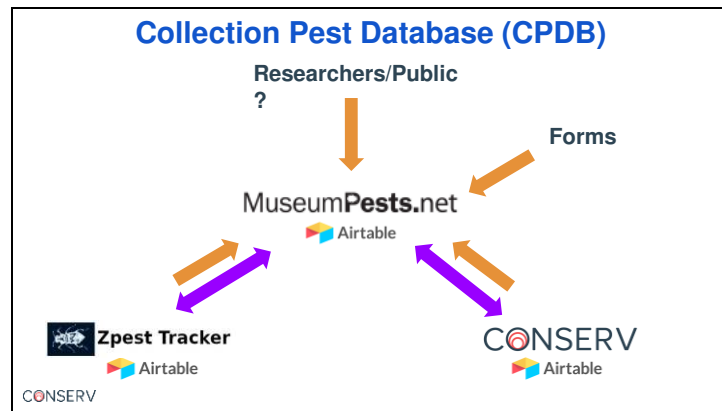
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Some of the important questions we are initially trying to answer with the data we collect for our IPM database to integrate into our tool.

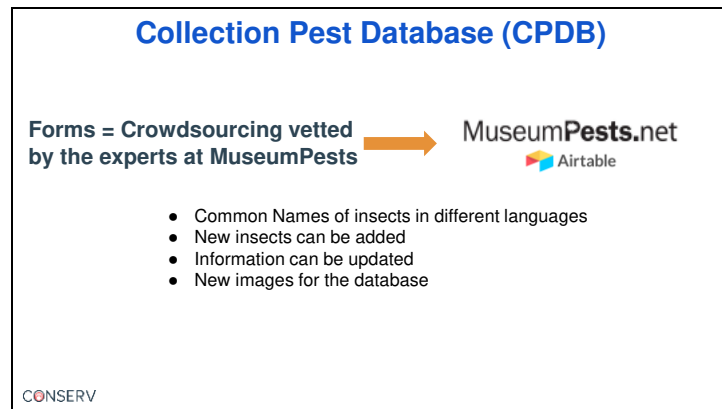


We want the database to come from an authoritative source that has the ability to curate additions (MuseumPests). We also wanted a database that will be available to researchers.

- One thing really exciting about Airtable is that we at Conserv can maintain our own version that is fed from the MuseumPests' version.
- If at any time we decide it would be useful to collect other variables from a data analysis perspective - especially as we start to integrate T/RH data, we can do that without interfering with the version that MuseumPests is maintaining.
- MuseumPests then has the capability of forking those variables or datapoints into their canonical version that they can then maintain.



Airtable allows the creation of forms that can be shared with the same fields from the database for easy integration of new information. These forms can live on Conserv and Zpest, be shared in emails, and on the MuseumPests website



These forms allow for crowdsourcing that is then vetted by the experts at MuseumPests and ultimately integrated into the database. Some of the questions we can ask in these forms are:

- Common names of insects in different languages
- Entirely new insects that can be added
- Existing information can be updated
- New images can be added to the database - this will allow us to build a large image gallery with expert-led identification to train algorithms for artificial intelligence



- There's another database that we will be working on and will continue to expand over time.
- The idea is similar to what is being accomplished with the Pest Recording Database - "What's Eating Your Collection?" initiative, which compiles IPM datasets from collections into a singular database. We hope to combine these!
- However, instead of intentionally uploading dataset to a database - we will make this process part of our regular monitoring workflow with the use of our IPM software, where users can easily select if they wish to contribute their dataset
- It's worthy to note that this software is not a revenue model for us - in fact there will always remain a free version of it!
- We want people to use the software to drive value to the field by taking individual spreadsheets and converting them into a big-data structure to promote further data science research into the topic
 - Benchmarks trends (particularly on a local level)
 - Attracting other scientists - entomologists and data scientists
 - More data = greater capacity to inform machine learning techniques
 - Predictive models
 - Image gallery - AI (artificial intelligence) identification
 - it would be EXCELLENT if we could empower people with the tools to identify insects beyond the main culprits - this can then build an even richer database of insect activity!


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This is a preview of the MuseumPests database in action within our IPM software that is in the works. You can sign up for our free environmental software on our website, and if you are interested in hearing more about the release of our free IPM software, you can sign up on the email at the bottom.

Thank you!

- Austin Senseman
- Nathan McMinn
- MuseumPests Working Group
 - Rachael Arenstein
 - Leon Zak
 - Matt Micketz
 - Pat Kelley
- Jane Henderson
- Dr. Christian Baars



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I would like to thank the co-founders of Conserv, Austin and Nathan for their commitment to creating a better IPM analytics experience for us all. I would also like to thank the MuseumPests working group for their hard work on the Collection Pest Database this week, with a special thanks to Rachael, Leon, Matt, and Pat for their leadership. Finally, I would like to thank Jane and Christian for their incredible research into IPM data visualizations and normalization, and their willingness to collaborate with us. Thank you all for your time!