Utilizing IPM: Examples for Applying Pest Management Data

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Abstract

Museum staff can quickly and easily analyze the IPM data they collect to inform collections care.

Integrated pest management (IPM) is vital to maintaining the health of museum collections. While many institutions routinely lay down pest traps and record the number of pests found on each, fewer actively use the records to analyze and utilize the data from their IPM program. Utilizing simple software, museum professionals can easily create visual representations of pest data which reveal trends and activity zones that go unnoticed on standard IPM records.

Formatting and Managing Data

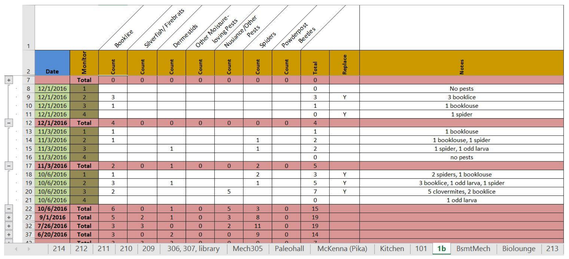
Your IPM program is only as good as your record keeping. The data you collect should be kept in a way that not only retains all of the pest data, but also formats the information in a way that is useful to your institution. These records should create useful categories, keep numbers easily accessible for later analyses, and consistently keep the data from past years as well as ongoing entries. This may mean using one form for data collection, and another for data archiving and analysis.

Fig. 1: Recording Data During Collection

1B		Pests on Trap	Replaced?
	1	0	
	2	3 booklice	Y
	3	1 booklouse	
	4	1 spider	Y
Bsmnt Mech			
	1	4 spiders, 1 silverfish, 1 odd larva	Y
	2	3 spiders, 1 booklouse	Y
	3	1 spider, 2 silverfish, 1 booklouse, 1 drain fly	Y
	4	3 odd larvae	Y
Biolounge			

... | 11.17-12.17.15 | 12.17.15-1.19.16 | 1.19-2.23.16 | 2.23-3.08.16 | 3.08-4.05.16 | 4.05

Fig. 2: Recording Data For Analysis and Retention



Date	Microclimate	Booklice Count	Silverfish/Firebrats Count	Dermestids Count	Other Musical-Instrument Pests Count	Nuisance/Other Pests Count	Spiders Count	Freeloaders/ Beetles Count	Total	Replaced	Notes
Total		0	0	0	0	0	0	0	0		
12/1/2016	1								0		No pests
12/1/2016	2	3							3	Y	3 booklice
12/1/2016	3	1							1		1 booklouse
12/1/2016	4								0	Y	1 spider
12/1/2016	Total	4	0	0	0	0	0	0	4		
11/3/2016	1	1							1		1 booklouse
11/3/2016	2	1				1			2		1 booklouse, 1 spider
11/3/2016	3		1			1			2		1 spider, 1 odd larva
11/3/2016	4								0		no pests
11/3/2016	Total	2	0	1	0	0	2	0	5		
10/6/2016	1	1					2		3	Y	2 spiders, 1 booklouse
10/6/2016	2	3		1			1		5	Y	3 booklice, 1 odd larva, 1 spider
10/6/2016	3	2				5			7	Y	5 clovermites, 2 booklice
10/6/2016	4								0		1 odd larva
10/6/2016	Total	6	0	1	0	5	3	0	15		
9/1/2016	Total	5	2	1	0	3	8	0	19		
7/26/2016	Total	3	3	0	0	2	11	0	19		
6/20/2016	Total	3	0	2	0	0	9	0	14		

214 | 212 | 211 | 210 | 209 | 306, 307, library | Mech305 | Paleohall | McKenna (Pika) | Kitchen | 101 | 1b | BsmtMech | Biolounge | 213

Figures 1 & 2: While **Figure 1** is an easy recording method during collection, **Figure 2** retains the data is a more useful format.

Examples of Visual Tracking and Data Usage

Fig. 3: What Is Normal, What is Abnormal

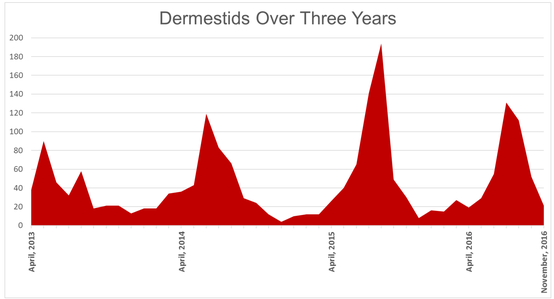


Figure 3: **Data can show trends in a single problematic pest.**

This simple graph can help staff understand what may be considered "normal" for your institution, and what represents a problem that needs to be addressed. This type of visualization is particularly useful in seeing anomalies in persistent trends. The figure above indicates routine seasonal spikes, one unusual spike in the fall of 2013, and an oversized, problematic spike.

Fig. 4: Pest Correlations

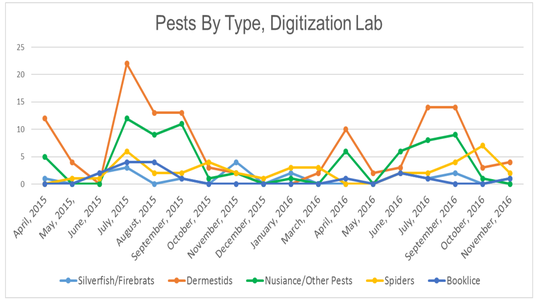


Figure 4: **Graphing data reveals correlations in pest activity.**

Seeing these relationships can give insight into what may be influencing the number of pests observed. In the example above, dermestids, a common museum pest that can wreak havoc on collections if not properly managed, peak and drop correlatively with "nuisance pests," such as box elders and cluster flies, whose carcasses offer a food source to dermestids.

Fig. 5: Finding the Hot Spots

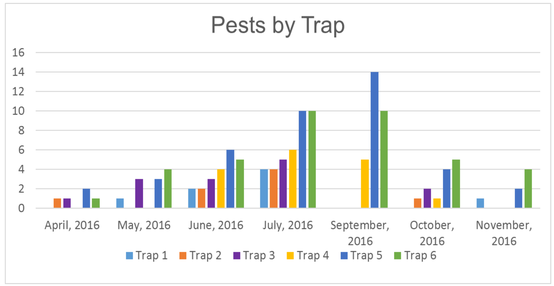


Figure 5: **Graphs identify problem areas and entry points.**

Sometimes tracking pest totals does not address your concerns. Creating a data visualization of pests by trap within a given space can help you hone in on the problem areas in your collection, and can lead you to the source of an infestation. In this figure Trap 5 and 6 are the most impacted in every season. This area of the space should be inspected for entry points or infested materials.

Fig. 6: External Factors

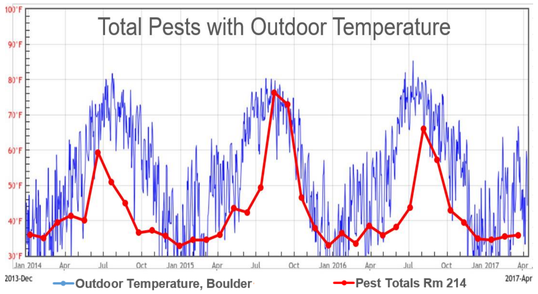


Figure 6: **Data analysis reveals factors driving a pest influx.**

Finding the cause of an increase in pests helps design control methods. This graph demonstrates a close correlation in trends in the climate outside the museum and fluctuations in the pests inside. By understanding how these external factors influence your own institution's pests, you can better hypothesize causes of new infestations, or anticipate and prepare for "problem seasons" before they begin.

Using Your Data

Simple analysis of pest data can directly inform collections management decisions. The information this analysis provides can be employed by collections staff to implement an action plan for a particular pest problem, to support requests for assistance and funding, or to track the impact of new practices on pest populations.

Examples of useful applications for analysis of collected IPM data:

- ✓ Visualizing where extra traps are needed in an IPM grid system
- ✓ Knowing when pest-specific traps need to be added to an IPM program to target problem areas
- ✓ Indicating when windows or building seams need to be resealed
- ✓ Monitoring long-term pest trends for changes
- ✓ Tracking infestations to the source or point of entry
- ✓ To support grant applications
- ✓ Determine the impact of building maintenance
- ✓ Create supporting evidence for presentations or requisitions based on collection needs

Fig. 7: Beetle and moth traps added after data analysis indicated increased activity

Key Points

- ✓ Data analysis is the useful part of IPM
- ✓ Museums do not need expensive software to analyze IPM data
- ✓ Keep your data in a format useful to your particular institution
- ✓ Don't retire data; use previous data to show long-term trends
- ✓ Be consistent in record-keeping methodology
- ✓ Collect data routinely
- ✓ Analyze regularly to spot trends and anomalies
- ✓ Use IPM data to guide changes to collections care