

PRELIMINARY ANALYSIS BY SAMPLING METHODS OF THE PRESENCE OF SOME BEETLES HARMFUL FOR NATURAL HISTORY COLLECTIONS.

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PICTURE 1



ABSTRACT

Preliminary results of Museu de Ciències Naturals de Barcelona IPM preventive conservation programme, applied to detection of natural history collections pests, are reported. Attention has been focused on detection and identification of potentially harmful species of carpet beetles (Insecta: Coleoptera: Dermestidae). Specimens were sampled for two years using adhesive pheromones traps placed in different collection storage areas of the museum. Phenology, relative frequency and abundance, is analyzed for the taxons identified (adults). Some remarks about the effect of collection store temperature on the relative abundance of specimens are also given.

INTRODUCTION

The building called "Laboratori de Natura" of the Museu de Ciències Naturals de Barcelona (MCNB), shelters, among other facilities, the zoology collections of museum. The location of this historic building, its peculiarities, spaces occupied by collections and the organic nature of the stored pieces, make that the development of IPM sometimes become in a titanic fight.

In return, the museum has specialists in entomology that, since 2008, actively collaborate with the preventive conservation team in the identification of key insects groups harmful to the collections.

During 2010, we decided to go further and to analyze the obtained results not only to level of identification but to statistical level.

The objective was to compare the incidence of certain populations of damaging insects in different areas where the museum stores zoological collections, bearing in mind that these spaces are kept in different conditions of isolation, temperature and humidity.

The ultimate aim of the study is to determine how this variables affect to the conservation of collections stored in the analyzed areas, in reference to pest control.

In this way, we intend to sustain a science-based guidelines and recommendations on preventive conservation to be taken to alleviate the deficiencies of the museum's storage facilities. Moreover, the results of the study will enable more effective direct scheduling actions on pests.

METHODOLOGY

There were chosen four nearby storage areas of similar dimensions for the study. In all of them naturalized animals are stored.

- 3CN: On the third floor. Without doors. With not sealed windows. (Picture 1).

- 3RE: On the third floor. Without doors. With not sealed windows.

- 4T4: In one of the towers of the building. With not sealed doors and windows.

- 335: On the third floor. With doors and windows not sealed, but better insulated than in the previous cases. (Picture 2)

The only area that has environmental control is 335, where an air conditioning device is installed. It works set at 25 °C from mid-May to late September. The rest of the year the device is off.

The RH and temperature data from the storage areas were recorded during all the sampling period, using four dataloggers "Testo 175".

Sampling was taken from May to October 2009, and from June to October 2010. Traps were removed with a periodicity of one month, and specimens identified and quantified.

For this study we only consider the results concerning the specimens of the family of dermestid beetles, the most harmful to the collections.

RESULTS

A total number of 40 traps have been analysed along the sampling periods of 2009 and 2010. Around 50% of coleoptera specimens captured were carpet beetles of the dermestid family. Six species belonging to three different genera (Anthrenus, Attagenus, and Trogoderma) have been detected. All of them are synanthropic and common museum pests (Table 1).

The most abundant and frequent species were *Anthrenus coloratus*, *Anthrenus* sp. (probably a variety of the former), and *Attagenus lobatus*. *Anthrenus* sp. (probably a variety of the former), and *Attagenus lobatus*. Relative abundance of carpet beetles species for the whole periods of 2009 and 2010 is displayed in chart 1 (accumulated values for all traps). Composition of dermestid fauna found in the MCNB is compared with the results obtained from recent studies on urban environment coleoptera of central Spain (GAMARRA et al., 2009).

Chart 2 shows the adult fenology for the period June-October 2010, considering the total number of specimens captured. According with the methodology employed, the highest number of specimens is observed at July for all the species monitored but *Trogoderma versicolor*.

Combined effect of temperature and isolation degree of the collection storage areas have also been considered. Chart 3 compares the number of dermestid specimens obtained in July 2010 from the areas 3CN, 3RE and 4T4 to that of the area 335.

The first three areas remained at room temperature and shared similar low isolation conditions, whereas 335 were isolated and kept under controlled temperature conditions (table 2).

CONCLUSIONS

1. Six forms of dermestid carpet beetles have been detected in different collection storage areas of the Museu de Ciències Naturals de Barcelona.

2. All the species considered are synanthropic and common museum pests.

3. *Anthrenus coloratus*, *Anthrenus* sp. (probably a variety of the former), and *Attagenus lobatus* are the most abundant and frequent species.

4. The higher number of specimens (nearly 85%) were observed in July (chart 4).

5. The number of specimens collected seems to be influenced (among other factors) by the combined effect of isolation and environmental conditions of the collection storage areas.

In summary, preliminary results seem to confirm that the environmental control and isolation of storage areas helps control pest. Furthermore, direct action on the pests in non-conditioned storage areas, should be undertaken prior to the time peak, that is, before July.

REFERENCES

GAMARRA, P. et al., 2009, "Coleópteros en las viviendas de la zona centro de España (Insecta, Coleoptera)". Bol. R. Soc. Esp. Hist. Nat. Sec. Biol., 103, p. 1-4.

Review of the english translation:

CHART 1

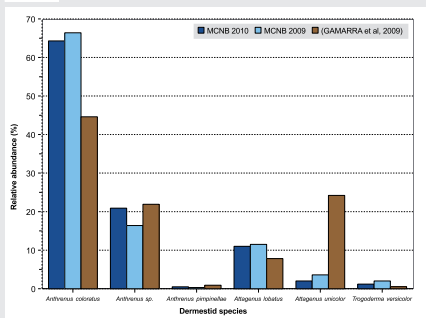


CHART 2

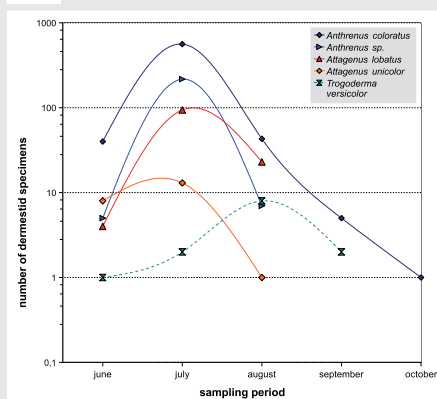
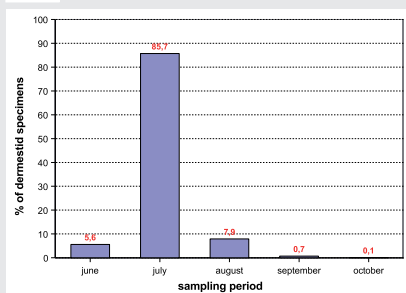


CHART 3



PICTURE 2



CHART 3

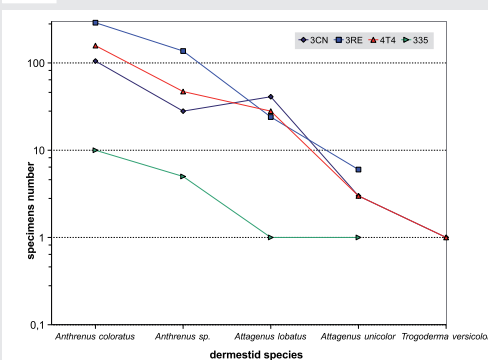


TABLE 1

Dermestid species	Frequency in the MCNB (%)	Synanthropic	Harmful for natural history collections
<i>Anthrenus coloratus</i>	62,5	+	+
<i>Anthrenus</i> sp.	40	?	?
<i>Anthrenus pimpinellae</i>	15	+	+
<i>Attagenus lobatus</i>	42,5	+	+
<i>Attagenus unicolor</i>	25	+	+
<i>Trogoderma versicolor</i>	27,5	+	+

TABLE 2

Collection storage area	Temperature °C (July)	Relative humidity (July)	Isolation degree
3RE	30,0 (32,3-27,3)	64,7 (64,7-41,4)	-
3CN	31,3 (34,2-28,5)	61,5 (58,0-41,5)	-
4T4	30,2 (32,1-27,6)	62,9 (57,8-44,1)	-
335	25,0 (26,8-24,1)	61,3 (60,2-34,7)	+