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# BIOECOLOGICAL FEATURES OF DOMINANT INSECT PEST SPECIES IN THE HISTORICAL MUSEUM OF UZBEKISTAN

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## ABSTRACT

Museum insect pests are mainly categorised as dry wood feeders and belong to populations producing high biomass in terms of number of individuals, which is rare among species in terms of diversity.

Under the conditions of Uzbekistan, the black domestic beetle *Hylotrupes bajulus* and the Turkestan termite *Anacanthotermes turkestanicus* and the large Transcaspien termite *Anacanthotermes ahngerianus* are very common in our historical museums.

**KEYWORDS:** insect, *Hylotrupes*, *Anacanthotermes*, individual, beetle, termite, pest, anthropogenic.

## 1. INTRODUCTION

In today's world, rising temperatures to global levels, increasing drylands create favourable opportunities for the development of insect pests. This means that the invasion of insect pests in all tropical and warm countries is considered a real scourge of buildings, wooden products, archival libraries, textile clothing and field agro-cenosis and wild plant life, bringing them into disrepair, especially in anthropogenically transformed places.

Insect pests are mainly categorised as dry wood feeders and belong to populations producing high biomass in terms of number of individuals, which is rare among species in terms of diversity. That is, by the middle of 2002 pests (termites) occupied 870 square kilometres of the territory of the republic, every 2 years they expanded their area by another 30 square kilometres, and today there are more than 3354 residential houses, 6 socio-economic objects and 14 historical shrines. In addition, it is noted that 37 objects of historical and cultural heritage in Ichan fortress of Khiva city and 16 objects of historical and cultural heritage in Ichan fortress are seriously damaged by pests [1; 2; 3]. In addition, many species of insect pests (Carpenter bee - *Xylocopa valga*, black moustached house beetle - *Hylotrupes bajulus*, house stomper - *Anobium pertinax*, brilliant coloured beetle - *Acmaeoderella sp.*) are widespread in our republic.

In the conditions of Uzbekistan among these species the black beetle *Hylotrupes bajulus*, belonging to the genus *Hylotrupes* (Audinet-Serville, 1834), the Turkestan termite *Anacanthotermes turkestanicus* and the large Trans-Caspian termite *Anacanthotermes ahngerianus*, belonging to the genus *Anacanthotermes* (Audinet-Serville, 1834) are distinguished. Jacobson, 1904) are very common [4].

From this point of view, anthropogenically transformed places take into account the harmful characterisation of museum pests, monitoring of their distribution, adaptation of the pest to the region from a seasonal point of view, the diversity of the food unit, the degree of infestation of residential buildings, social facilities, mineral heritage and strategic sites, as well as pest resistant ones. Ensuring the construction of buildings and implementing improved preventive measures against them is an important issue.

## 2. MATERIALS AND METHODS

Materials required for the research work of the State Inspectorate for Preservation and Use of Cultural Heritage Sites of the Republic of Uzbekistan, Karakalpakstan in 2019-2023, Beruni district - Akshakhan, Tishirman fortress; Ellikkala - Tuprok, Kyrgyz, Ayaz-1-2 castles; Tortkol - Jambas, Kumbaskan fortress; Karauziak - Jampik, Sultan Uvois mountain, Gaur fortress; Khojaly - Mizdahkan complex; Collection of research materials and experiments were conducted in anthropogenically transformed places: Kegeyli Shibili paternal sanctuary, Ichan-Kala neighbourhood and Khiva city of Khorezm province, Jame mosque and historical museums of Poglavon Mahmud. In the course of the research, a geographical map of the experimental sites was made and material was collected by wrapping the columns with adhesive film (Figures 1). In addition, the bioecological



characteristics of the collected insect pests were studied [5;6]



**Figure 1: Method of collecting Hylotrupes bajulus, a black house beetle of the genus Hylotrupes, from museum columns.**

**3.RESULTS AND DISCUSSION**

During the monitoring the State Inspectorate for Protection and Use of Cultural Heritage of the Republic of Uzbekistan, Karakalpakstan, Beruni district - Akshakhan, Tishirman fortress; Ellikkala - Tuprok, Kyrgyz, Ayaz-1-2 castles; Tortkol - Jambas, Kumbaskan fortress; Karauzyak - Jampik, Sultan Uvois mountain, Gaur fortress; Khojaly - Mizdahkan complex; In Kegeyli - sanctuary of Shibiliya's father, Ichan Castle and Khiva city of Khorezm province, Jome Mosque and historical museums Poglavon Mahmud, a black house beetle of the genus Hylotrupes (Audinet-Serville, 1834) is a Turkestan termite belonging to the genera Hylotrupes bajulus and Anacanthotermes. (Jacobson, 1904) It was confirmed that Anacanthotermes turkestanicus and the large Caspian termite Anacanthotermes ahngerianus are very common as dominant species (Table 1).

**Table 1**

**Frequency of occurrence of dominant species Hylotrupes bajulus, Anacanthotermes turkestanicus and Anacanthotermes ahngerianus in historical museums of Uzbekistan**

№	List of museums (fort)	Types of insects		
		Hylotrupes Bajulus	Anacanthotermes Turkestanicus	Anacanthotermes Ahngerianus
1	Akshakhan city.	-	+	++
2	Tashkirman city.	-	-	++
3	Tuprok city.	-	-	+++
4	Kyrkyz city.	-	+	++
5	Ayaz-1 city.	-	-	+++
6	Ayaz-2 city.	-	-	++
7	Zhambas city.	-	-	++
8	Kumbaskan city.	-	-	++
9	Zhampik city.	-	-	++
10	Sultan Uvois	++	+	+++
11	Gaur	-	-	++
12	Mizdahkhan complex	+	-	+++
13	Shibilii father's shrine	-	+	+++
14	Ichan city	+++	+	++
15	Jomo mosque	+++	+++	++
16	Pahlavon Mahmud	+++	++	+

Note: + - rarely occurring species, ++ - moderately occurring species, +++ - densely occurring species, - not occurring species.



During the research, the black house beetle *Hylotrupes bajulus*, belonging to the genus *Hylotrupes* (Audinet-Serville, 1834), was observed mainly in historical museums where wood treatment was carried out, while their damaging activity was also shown in the inner parts of wood. As a result of the observation, it was confirmed that the beetle *Hylotrupes bajulus* severely damaged wooden columns of Mount Sultan Uvois, Mizdahkan complex, Ichan Castle and Jame Mosque, historical museums of Khiva city, Khorezm province, Republic of Karakalpakstan. The beetle *Hylotrupes bajulus* was found to form corridors with loopholes inside wooden museum exhibits at the larval stage of feeding, turning pieces of wood into shavings. *Anacanthotermes* (Jacobson, 1904) The Turkestan termite *Anacanthotermes turkestanicus* feeds in Akshakhan, Kyrgyzstan, Ichan Castle, Mount Sultan Uvais, Shibili-Ata Temple, Jame Mosque, on the roofs of the Poglavon Mahmud Museums, and the large Zakaspien termite *Anacanthotermes ahngerianus* is found nesting inside and behind the walls of almost all museums.

It was noticed that termites in the process of feeding cover the external parts of museum exhibits with dirt and plaster, creating negative situations.

In conclusion, it should be noted that in the conditions of Uzbekistan, the black house beetle of the genus *Hylotrupes* (Audinet-Serville, 1834) - *Hylotrupes bajulus* and the Turkestan termite *Anacanthotermes turkestanicus* and the large Transcaspien termite *Anacanthotermes ahngerianus* belonging to the genus *Anacanthotermes* (Jacobson, 1904) are considered serious pests of wooden parts of museums and museum exhibits. It has been known to cause severe damage by causing scabs. Given these circumstances, the implementation of improved preventive measures against museum pests is one of the important issues for the development of the tourism industry of Uzbekistan and the preservation of the history of our country.

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