

COMPLUTENSE

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Aestivation patterns in the Carpetania elisae cryptic complex in Madrid (Spain)

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Introduction

Several studies have shown that *Carpetania elisae* Álvarez (1977), previously known as *Hormogaster elisae*, is, actually, part of a complex of at least six cryptic species that inhabit the Iberian Peninsula. It is known that the most studied species of the complex, now called *Carpetania matritensis*, can aestivate under unfavorable environmental conditions.



To investigate the possible aestivation patterns that *C. elisae* may present, we have studied, in laboratory experiments, its relationship with extreme environmental conditions of humidity and temperature, which could be predominant in the Iberian Peninsula in the near future, due to climate change.









The microcosms were maintained in culture chambers for two weeks.

- After, before and during each experiment the weight of the earthworms and the soil humidity were controlled.
- ✓ When the experiment finished the number of aestivation chambers and aestivating earthworms
- ✓ Six replicates of each type of microcosm: N= 36
 ✓ 400g of dry and sieved soil (2mm) of El Tomillar
 ✓ 23°C or 13°C temperature
 ✓ 10%, 15% or 20% humidity
- ✓ Two earthworms in each replicate

Type of	1	2	A	Л	Б	6
microcosms	-	2	5	4		0
Temperature (^o C)	23	23	23	13	13	13
Humidity (%)	10	15	20	10	15	20
Nº of replicates	6	6	6	6	6	6

2,0

Aestivation percentage

Autumn

Number of aestivation chambers

Autumn

- Materials a
- were registered.
- Finally, the earthworms were taken to new microcosms in optimal conditions until they reached their initial weight.
- The experiment was carried out each season of the year.
- C. elisae can aestivate under adverse climatic conditions, creating aestivation chambers.
- ✓ Most of the individuals aestivate at 10% soil humidity, while this phenomenon is rarely observed at 20%.
- ✓ Higher aestivation rates were observed at 23°C tan at 13°C.
- The season of the year doesn't seem to influence the process.



Conclusions

 C. elisae can aestivate under adverse climatic conditions, creating aestivation chambers similar to those found for C. matritensis (Díaz Cosín et al., 2006).

- In this process, soil humidity seemed to be the main factor that influenced this behavior, as it was observed with C. matritensis.
 Temperature seems to influence the process of aestivation of C. elisae secondarily.
- Season didn't seem to influence the aestivation of *C. elisae*, confirming that the type of aestivation process is, indeed, facultative diapause, also known as paradiapause, which is only caused by the shift in the environmental conditions. This wasn't observed for *C. matritensis*, which appeared to aestivate more frequently in spring and summer (Díaz Cosín et al., 2006).

References: Díaz Cosín, D., Pilar Ruiz, M., Ramajo, M. & Gutiérrez López, M. 2006. Is the aestivation of the earthworm *Hormogaster elisae* a paradiapause? *Inv. Biol.* 125,3, 250-255.