

METAMORPHOSIS OF *Zophobas morio* BEETLE IN DIFFERENT CONDITIONS

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1. Introduction

Zophobas morio (superworm) is a species of darkling beetle (*Tenebrionidae* family). They live in the tropical zones of Central and South America. They feed on rotting wood, leaves, cereals, and fresh or rotting fruit and vegetables. Their metamorphosis consists of three life stages – larva, pupa and adult beetle (imago). Regarding the environmental factors, the metamorphosis is influenced by temperature, humidity, daylight duration and available food and water. The isolation of individual specimens of *Z. morio* also influences their metamorphosis. Therefore, the aim of this research is to examine the influence of isolation and some environmental factors on the metamorphosis of this species.

2. Methods

For the purpose of this research 80 larvae were used and divided in 4 groups of 20 individual specimens, with each group in its own terrarium. The substrate in the terrariums was a mixture of sawdust and oats in 3:1 ratio. The temperature was maintained with an electric terrarium heating mat. The air humidity was maintained using water dispersion. Two groups of larvae were exposed to favorable conditions regarding temperature, humidity and available food required for the metamorphosis (30°C, additional cat-food and carrots; water dispersion 3 times a week; groups A1 and A2). The other two groups were exposed to unfavorable conditions for the metamorphosis (20°C, diet limited exclusively to oat; water dispersion once a week only; Groups B1 and B2).

The larvae from one of the two groups in favorable and unfavorable conditions respectively were isolated inside the terrariums (Groups A2 and B2). During the 60-day experiment, the stage of each individual larva was recorded on a daily basis.

3. Results

The total number of metamorphosed specimens (adult beetles) during the experiment was 16 (Figure 1). The results demonstrate that isolation influences the metamorphosis favorably and regardless of the external factors. The larvae in isolation had 7 and 5 more adult specimens respectively, in comparison with the larvae not isolated from one another. Figure 2 shows the temporal aspect of the larvae metamorphosis in isolated groups. During the isolation, the favorable temperature, humidity and food conditions significantly hasten the metamorphosis process. We can see that the first adult beetle in favorable conditions developed on the 20th day of the experiment, while in unfavorable conditions it developed on the 51st day.



Figure 1 – Total number of metamorphosed larvae per group

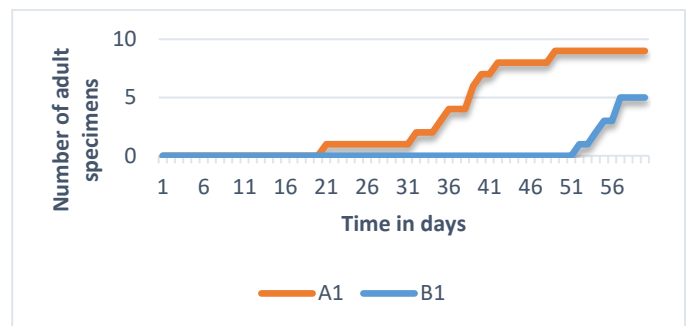


Figure 2 – Number of adult specimens per day

The statistical significance was verified by the Gehan-Breslow-Wilcoxon test, which certified that the presented data is statistically significant ($p < 0.05$).

4. Conclusion

While researching the metamorphosis of *Z. morio* beetle, the following conclusions were made: the isolation of an individual specimen is the key factor that encourages the metamorphosis of larvae for this species, regardless of favorable or unfavorable conditions. The isolated larvae metamorphose faster when exposed to favorable conditions of temperature (about 30°C), humidity and available food. The grouping of individual specimens in the same terrarium prevents the metamorphosis but encourages molting and larvae growth. Favorable temperature, humidity and diet conditions accelerate the growth of non-isolated larval specimens. The obtained conclusions could be useful in the cultivation of *Z. morio* as food for insectivorous pets.

5. Reference

Bruins E., 2001., The Complete Encyclopedia of Terrarium, Grange Books Ltd., UK.