doi:10.20396/revpibic.v0i0.id

XXVI Congresso de Iniciação Científica Unicamp
17 a 19 de outubro Campinas | Brasil

Developmental rate of Chrysomya megacephala (Fabricius) (Insecta, Diptera, Calliphoridae), a species of forensic importance, under alternating temperature

Gabriela S. Zampim*, Ângela L. Daltin, Lucas T. Oliveira, Gustavo A. Faria, Patricia J. Thyssen

Abstract
Chrysomya megacephala (Fabricius) (Insecta, Diptera, Calliphoridae), originating in Asia and currently found in the African and American continents, may be associated with decomposing bodies due to its necrophagous habit. For this reason, it gains importance in the forensic field. Temperature is one of the most important extrinsic factors in the life of insects because it directly affects their metabolism. In the literature only data on the development of forensically important insects under controlled temperature are available. Thus, this study aimed to evaluate the rate of development of C. megacephala under two sets of alternating temperatures (22.5-32.5°C and 20-35°C). The results obtained here may be useful for obtaining more accurate development models to estimate the time of death in criminal events.

Key words:
forensic entomology, post mortem interval, developmental model.

Introduction

The estimation of the postmortem interval (PMI) through insects is done from the knowledge of their biological data and as external factors, under natural and laboratory conditions, affect their development[1]. The temperature is the most relevant and has therefore been the most studied parameter within the forensic field, since it allows the construction of prediction models of development time, which can be used to estimate the age of the insect and consequently the PMI[1]. In the literature only data of species of forensic importance under controlled temperatures are available.

Due to its necrophagous habit, *Chrysomya megacephala* (Fabricius) has already been recorded associated with corpses[2], for this reason it gains importance for the resolution of crimes.

Thus, this study aimed to evaluate the development rate of *C. megacephala* under alternating temperatures in laboratory conditions.

Results and Discussion

Colonies of *C. megacephala* were established from active collection in Campinas, SP, Brazil. After identification[3], adults were individualized in transparent plastic cages (30×30×50cm), fed with sugar and water *ad libitum* and maintained under controlled conditions (26±1°C, 70±10%, and 12:12h). It was offered bovine raw ground meat as substrate for oviposition.

Eggs placed on bovine raw ground meat were removed with the aid of a brush and deposited (N= 100) in plastic bottles (6×8cm) containing meat (1 g/egg). The vials were maintained in a growth chamber (Fanem™ model 387) with the same relative humidity and photoperiod as for the adults: during the day (7 a.m. to 7 p.m.) were maintained at the highest temperature while at night (7:00 p.m. to 7:00 a.m.) at the lowest temperature. To measure the evolution of growth, ten randomly chosen specimens were measured every 12h, from initial feeding larva until pupariation, and then discarded.

ANOVA 1-way was used to compare the effect of temperature alternation on the larval development, using length as response variable.

The developmental rate for *C. megacephala* was influenced by alternating temperatures, observed from the length gain (F= 771.7; p< 0.0001) (Fig. 1). Sukontason et al.[4] reported that *C. megacephala* larval development was 168h and 84h at approximately 20 and 32°C, respectively. Thus, the developmental rate of *C. megacephala* under alternating temperatures tends to be slower than when exposed to controlled fixed temperatures.

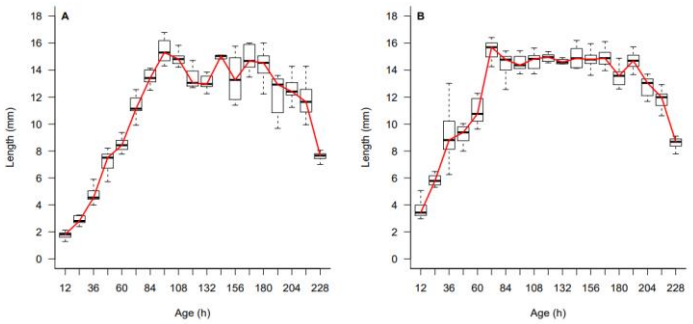

Figure 1. Median and standard deviation of the larval length of *C. megacephala* every 12 h reared under alternating temperatures. In: (A) 22.5 and 32.5ºC; (B) 20 and 35ºC.

Conclusions

The results obtained here show the importance to review all the development models to estimate the time of death in criminal events proposed so far for species of forensic importance.

Acknowledgement

This study is the result of a project developed during an undergraduate course (BZ 586) at the Institute of Biology of UNICAMP.

---

[1] Thyssen, P. J. *Entomologia Forense*. **2011**, 229-238.
[2] Carvalho, LM.L.; Thyssen, P.J.; Linhares, A.X.; Palhares, F.A.B. *Mem. Inst. Oswaldo Cruz*. **2000**, *95*, 135-138.
[3] Carvalho, C. J. B. and Mello-Patiu, C. A. *Rev. Bras. Entomol*. **2008**, *52*,390-406.
[4]Sukontason, K.; Piangjai, S.; Siriwattanarungsee S.; Sukontason, K., Parasitol Res. **2008** 102,1207-1216.