

Laboratory development of immature forms of *Fannia trimaculata* (Stein, 1898) (Diptera, Fanniidae): a species of forensic importance

Aline M. Prado*, Maicon D. Grella, Cauê T. Mira, Patricia J. Thyssen

Abstract

Fanniidae (Insecta, Diptera) is a small family of flies little studied in laboratory, mostly due to their immature stages. Species of this family are commonly found in association with the late stages of decomposition of corpses, featuring their importance in forensic sciences. This study aimed to evaluate the development of immature stages of *Fannia trimaculata* (Stein, 1898) in laboratory, species that is collected in and attracted to decomposing substrates and animals. Two substrates were tested in the analysis: raw bovine muscle (MB) and a combination containing raw bovine muscle + rodent food (MBRR). The range of the cycle from egg to adult, both to MBRR and MB groups, was of approximately 15 days. Differences were noticed on the viability the species, being MB most viable than MBRR for their development. Although having high protein content, MBRR composition was less efficient than MB, since the liquefied condition of the MB group may be essential for the development of Fanniidae. Thus, the present study data become valid for greater knowledge about the development of *F. trimaculata* in laboratory.

Key words: Forensic entomology, viability, biological cycle

Introduction

Insects of the order Diptera gain importance in the medical and veterinary fields as agents of myiasis and/or transmitters of a wide range of pathogens¹. Also, being among the first organisms to colonize a corpse, they can be relevant in the forensic sciences². In this last field, some of the contributions that the knowledge of insects can bring are associated with the estimation of postmortem interval (PMI), the assessment if there was displacement of a body site where death occurred or infer the way or cause of death. In any of these cases, identification of the insects involved is essential, as well as the knowledge of their biology³. In the present study, we aimed to evaluate the development of the immature stages of *Fannia trimaculata* (Stein, 1898), to obtain biological data that can be useful to estimate the PMI in cases of violent and unclear death.

Results and Discussion

Adult individuals were collected in field and taken to the laboratory where they were identified⁶ and females were individualized in plastic cages under controlled conditions (27 ± 1 °C; 70 ± 10 RH, 12:12 h). Eggs were counted and transferred to raw bovine muscle (MB) and a fermented mixture containing raw bovine muscle and rodent food (MBRR). In general, it was observed that for both substrates, egg to adult cycle is similar (Table 1). However, viability for MB in comparison to MBRR proved to be higher (Table 1). This result can be attributed both to the liquid retention capacity as well as the energy balance and protein amount present in each of the studied substrates. Although MBRR have a higher protein content than MB, the mixture has a higher quantity of starch, cellulose and fibrous matter. The fact that the rodent food doesn't retain water for a long period of time can contribute to *F. trimaculata* immature to feed the least on this substrate. However, studies involving other species *Fannia* demonstrate that a proper development can occur in yeast, wheat bran, sardines and liver. In comparison, studies with *Fannia pusio* (Wiedemann, 1830), show that the species has a proper rate of hatching and adult emergence in rodent food.

Tabela 1. Number of eggs, larvae and adults of *Fannia trimaculata* in bovine muscle, collected in Pedra grande – Atibaia, SP.

Geração	Data de postura	Nº de ovos	Nº de larvas	Nº de adultos	Substrato
F1	28/04/2016	10	3	2	MB
F2	02/05/2016	31	9	4	MB
F3	24/05/2016	30	8	3	MB
F4	03/06/2016	30	14	2	MB
F5	09/06/2016	27	5	5	MB
F8	22/06/2016	5	3	1	MB
F9	22/06/2016	35	15	5	MB

Tabela 2. Number of eggs, larvae and adults of *Fannia trimaculata* in bovine muscle and rodent food, collected in Pedra grande – Atibaia, SP.

Geração	Data de postura	Nº de ovos	Nº de larvas	Nº de adultos	Substrato
F6	16/06/2016	70	15	2	MBRR
F7	17/06/2016	30	6	1	MBRR
F8	22/06/2016	5	4	0	MBRR
F9	22/06/2016	35	4	2	MBRR

Conclusions

Thus, for *Fannia trimaculata*, food with higher protein content and lower fiber content, cellulose and starch, such as bovine muscle, has the greatest influence on its development.

Acknowledgement

À FAEPEX-FUNCAMP (convênio nº 519.292) pelo auxílio financeiro.

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⁴ Ferrar,P.; *A Guide to the Breeding Habits and Immature Stages of Diptera Cyclorhapha*, **1987**,2, 43-44,177-182.
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⁶Marchiori, C.H. *Tese de mestrado*, **1993**, 2-94.