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Behavior of *Fannia sabroskyi* (Seago, 1954) (Insecta, Diptera, Fanniidae), species of forensic importance, on different substrates for oviposition under laboratory conditions

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Abstract

Fanniidae is a family of Diptera (Arthropoda, Insecta) with worldwide distribution. They have very diversified eating habits. Some species are synanthropic and for carrying pathogens gain importance in the medical field. In addition, fanniids are also found in corpses in a more advanced stage of decomposition, so they can contribute to estimate the time of death in cases of violent death. In this study aimed to evaluate the selection behavior of females of *Fannia sabroskyi* (Seago, 1954) by the oviposition substrate and, from the obtained results, to classify their importance within the forensic context as potential or accidental. Three feeding substrates were offered to females during their reproductive period. The females had a greater preference for the liver for oviposition. Such results are important to better understand the biology of species of forensic importance.

Key words:

necrophagous, bionomy, postmortem interval.

Introduction

The sensory system of the insects can determine some forms of behavior such as the selection of mates, choice of substrate for feeding or for oviposition^{1,2}, among others. This same system facilitates the discrimination between different substrates, as well as their quality^{1,2}. Knowledge about substrate choice by females may be useful to determine the degree of association with the environment, with human and their domestic animals³, especially for the application of population control measures of species of medical and veterinary importance.

In forensics, biological and behavioral insect data can be used to estimate the postmortem interval (PMI), to infer if there was displacement of the body from the criminal scene or to investigate the cause of death⁴. Fanniidae is a family of flies with worldwide distribution and very diversified eating habits. Some species are necrophagous, so they are more commonly associated with corpses at an advanced stage of decomposition⁵.

Thus, in this study aimed to evaluate the selection behavior of females of *Fannia sabroskyi* (Seago, 1954), a species of forensic importance, by the oviposition substrate and, from the obtained results, to classify their importance within the forensic context as potential or accidental.

Results and Discussion

Fannia sabroskyi adults were collected in the field, taken to the laboratory and identified⁶. Afterwards, the females were individualized and kept in plastic cages under controlled conditions (27±1°C, 70±10RH, 12:12h). To evaluate the behavior of choice for oviposition by females were offered: (i) 50g of raw bovine liver putrefied for 24h; (ii) 50g of diet 1 composed of fresh raw bovine liver, milk powder, rodent feed and beer yeast (2:1:0.05:0.05), without antifungal component; (iii) 50g of diet 2 composed of fresh raw bovine liver, milk powder, rodent feed, beer yeast (2:1:0.05:0.05) and antifungal component.

The females had a greater preference for the liver for oviposition. Although the number of eggs was lower, diet 1 was also chosen by females, but not diet 2 with low

fermentation due to the use of the antifungal component (Table 1).

Necrophagous species may be classified as obligatory (feeding and breeding exclusively on organic matter of animal origin) or facultative (only feeding on organic matter)³. The fact that females of *F. sabroskyi* oviposited a greater number of eggs in the liver (approximately six times more than in the diet) evidences a clear choice for the resource with greater composition of putrefied animal tissue, typical behavior of obligatory necrophagous species, which tend to choose ephemeral resources for the development of their offspring.

Table 1. Weekly observations of the number of eggs per substrate.

Substrate	Week			TOTAL
	I	II	III	
Diet 1	1 ± 3.5	6 ± 3.5	0	7
Diet 2	0	0	0	0
bovine liver	20 ± 2.0	24 ± 2.0	0	44

Conclusions

Fannia sabroskyi is of potential forensic importance since this species is an obligatory necrophagous.

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¹ De Bruyne M., Baker T. Odor detection in insects: volatile codes. *J. Chem Ecol.* **2008**. 34:882–897

² Shah, R. M., et al. Effects of different animal manures on attraction and reproductive behaviors of common house fly, *Musca domestica* L. *Parasitology research*, **2016**. 115(9), 3585-3598.

³ Ferrar, P. In: A Guide to the Breeding Habits and Immature Stages of Diptera Cyclorrapha. 1987, p. 2, p. 43-44, p. 177-182.

⁴ Thyssen, P.J. In: *Entomologia Médica e Veterinária*. **2011**, p. 129-137.

⁵ Velazquez Y. et al. Diptera of forensic importance in the Iberian Peninsula: larval identification key. *Med Vet Entomol.* **2010**. 24:293–308

⁶ Albuquerque, D.O.; Pamplona, D. & Carvalho, C.J.B. Arq. Mus. Nac. RJ. 1830, 56: 9-31.