Sonderdruck aus:
Reprint from:

STUDIA DIPTEROLOGICA

Gegründet 1994
in
Halle an der Saale

Studia dipterologica und *Studia dipterologica. Supplement*
erscheinen im Ampyx-Verlag Dr. A. Stark Halle (Saale).

Studia dipterologica
erscheint in zwei
Heften jährlich.

Herausgeber:
Andreas Stark
und Frank Menzel

Autorenhinweise, Bezugsmöglichkeiten und die Inhalte aller Hefte sind abrufbar unter (Instructions for authors, information on subscriptions to the journal, and the contents of back issues are available at):

http://www.studia-dipt.de

Oviposition of Simuliidae (Diptera) on pupae of *Simulium* (*Hemicnetha*) *rubrithorax* Lutz

[Eiablage von Vertretern der Simuliidae (Diptera) auf Puparien von *Simulium* (*Hemicnetha*) *rubrithorax* Lutz]

by

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Abstract The occurrence of Simuliidae oviposition on pupal cases of the same family is reportet. Two pupae of *Simulium* (*Hemicnetha*) *rubrithorax* Lutz were found with cocoon and filament gills covered with Simuliidae eggs. The material was collected on rocky substrate at Itaguaí, Rio de Janeiro, Brazil.

Key words Diptera, Simuliidae, blackflies, immature, egg posture

Zusammenfassung Es wird über die Eiablage von Kriebelmücken auf Puppenhüllen von Vertretern der gleichen Familie berichtet. Es wurden zwei Puppen von *Simulium* (*Hemicnetha*) *rubrithorax* Lutz gefunden, deren Cocon und Filamente von Eiern anderer Simuliiden bedeckt waren. Das Material stammt von felsigem Substrat in Itaguaí, Rio de Janeiro, Brasilien.

Stichwörter Diptera, Simuliidae, Kriebelmücken, Präimaginalstadien, Eiablage

Introduction

Haematophogous diptera are non-social insects without parental protection as a means for survival of their progeny. One of the ways of attaining this goal is by a careful selection of their oviposition site. Female blackfly (Diptera: Simuliidae) choose an adequate posture location by hovering over the breeding site (Crosskey 1973). Simuliidae deposit their eggs on submerged objects and large egg formations are made by certain species (McCall & Camargon 1995; Crosskey 1990). Both visual and olfactory stimuli are involved in the selection of the Simuliidae´s egg posture site location (McCall 2002). Oviposition usually occurs at night fall and therefore seems to be stimulated by sunlight reduction (Crosskey 1990).

Simuliidae eggs are longer then wide and have an irregular oval shape with a smooth shell. A positive identification is difficult at this stage, because no physical characteristics are visible (Colbo 1986). Shortly after egg posture the egg becomes ivory white or slightly translucent, and darkens during embryogenesis (Crosskey 1990).

Each posture consists in a mass of 150 to 600 eggs. It is possible that egg masses from different species overlap at the same breeding site, or even the same substrate. McCall (1995, 2002) suggests that volatile pheromones from the eggs already present at the site are responsible for the mass aggregation of eggs from different species.

Massive egg aggregation is a means of guaranteeing that eggs will hatch even if the water level becomes critical. The massive egg aggregation not only retain water but occasionally due to its weight. The huge amount of eggs also ensures survival from predators (Rodriguez-Perez et al. 2003; McCall 1995).

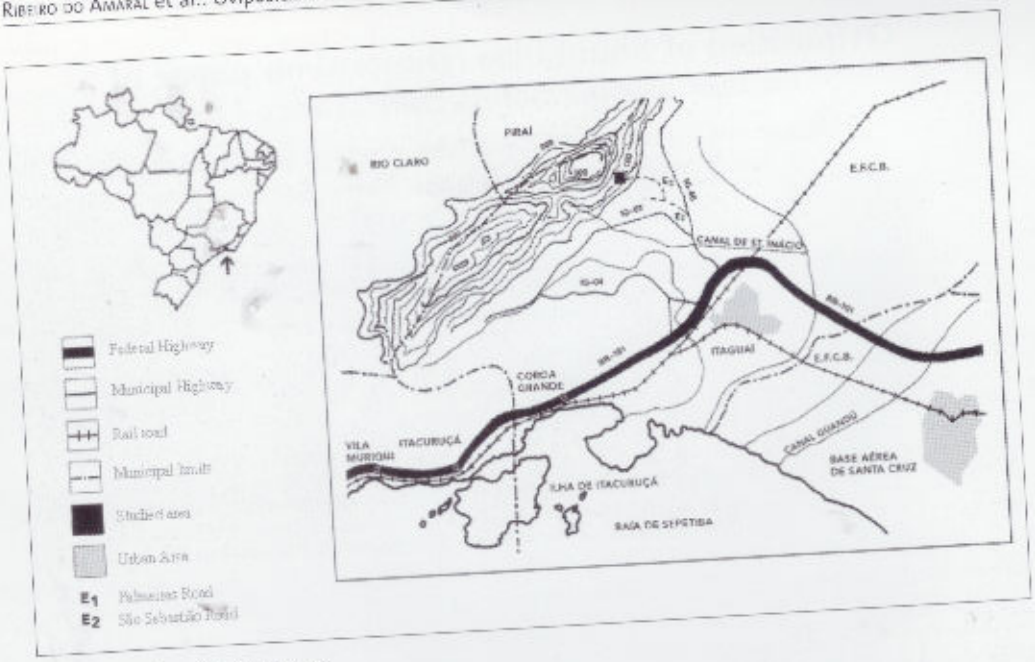


Fig. 1: Location of the study area.

Fig. 2: Breeding site where Simuliidae immatures were collected.

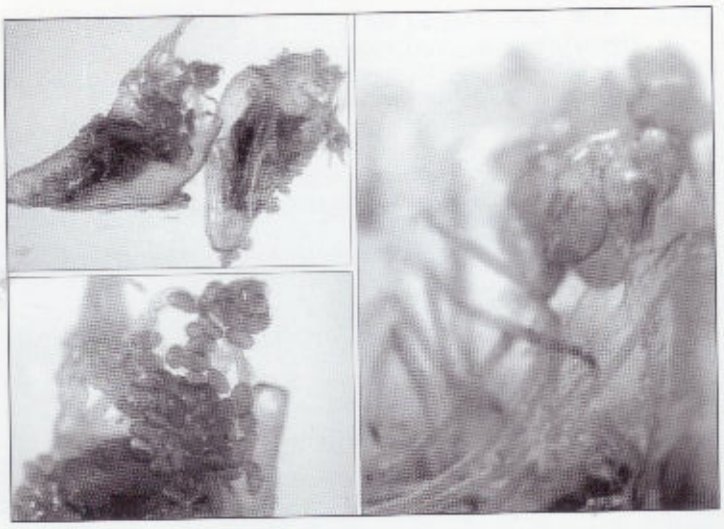
Shelley et al. 1995, describe details of oviposition of two zoophilic species in Brazil: *Simulium (Hemicnetha) brachycladum* Lutz & Pinto, 1932 and *Simulium (Chirostilbia) subpallidum* Lutz, 1910.

It is known that female blackflies can indeed oviposite over anything, including immature forms of its own family, as long as these are submerged (Crosskey 1990). We could, however, not find any report of this kind from Brazil in the literature.

Material and methods

The egg masses reported in this paper originated from a collection of simuliids made on March 12th, 1997, at Sítio Porangaba, located in Raiz da Serra, First District of Itaguaí, Rio de Janeiro State, Brazil (22°48'43,7" S/ 43°49'38,2" W, altitude 1000 m a. s. l.) (Fig. 1).

The immature (larvae and pupae) simuliids were found fixed on rocks (Fig. 2) and manually collected and kept in 80 % alcohol. An egg mass was found among the material collected. The material was taken to the Laboratório de Referência Nacional em Simulídeos e Oncocercose (LRNSO), Entomology Department of Oswaldo Cruz Institute for identification.



a **c**
b

Fig. 3a–c: Masses of Simuliid eggs on *Simulium rubrithorax* LUTZ, 1909. – **a**: On pupae; – **b**: Detail of the mass of eggs; – **c**: Detail of the Simuliidae eggs found on the respiratory gills.

Results and discussion

Two pupae of *Simulium* (*Hemicnetha*) *rubrithorax* LUTZ, 1909 were found covered with egg masses over the respiratory gills and cocoons. In one of the pupae approximately 90 eggs were counted and on the other, around 110 eggs (Fig. 3).

The pupae were found separated; therefore the oviposition may have occurred at two different substrate locations. As the eggs presented a dark coloration due to the advanced embryogenesis, their presence was probably not interfering negatively with the development of the pupae. These were found in good condition. These findings correspond with the concept that some species use this kind of oviposition as a means for ensuring progeny survival. In case of a water level decrease, the egg mass retains water and the larvae may therefore develop and find more suitable breeding sites. CROSSKEY (1990) affirms that Simuliidae can oviposite on immature forms of its own family only by chance. We could only find records illustrating Simuliidae oviposition over Simuliidae eggs and immatures of other families. This finding is important because it corroborates and illustrates CROSSKEY´s affirmation, that simuliidae oviposition can indeed occur on pupae of the same family.

Material examined: *Simulium* (*Hemicnetha*) *rubrithorax* - two pupae in 80 % alcohol (with Simuliidae oviposition over the respiratory gills and cocoon) LSO 0010 - IOC/FIOCRUZ, Brasil, Rio de Janeiro, Itaguaí, Sítio Porangaba (S22°46': W43°41'), Un-named stream (Point A), 12.iii.1997, Collectors: AMARAL, A. M. R. & COSTA RIBEIRO, M. C. V. Specimens collected on rocks, clear water, pH 4,5; water temperature 26,5 °C, stream depth: 13 cm, relative air humidity 56,5 %.

Acknowledgements

Our thanks go to MSc Antônio PAULINO A LUNA-DIAS, MSc Verônica MARCHON-SILVA and to Dr Guilherme HERZOG NETO for revising the manuscript, Dr Jurgen DOBERAINER for authorizing the field work in his property and MSc. Magda Clara VIEIRA DA COSTA RIBEIRO, for helping with the field work.

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The paper was accepted on 10 August 2006.
Editum: 22 December 2006.