SHORT COMMUNICATION

Occurrence of *Microcerella halli* (Engel) (Diptera, Sarcophagidae) in snake carrion in southeastern Brazil

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ABSTRACT. Occurrence of *Microcerella halli* (Engel) (Diptera, Sarcophagidae) in snake carrion in southeastern Brazil. The occurrence of 27 second-instar larvae of the flesh fly *Microcerella halli* (Engel, 1931) (Diptera, Sarcophagidae) in a carcass of a snake usually called as Urutu, *Bothrops alternatus* (Duméril, Bibron & Duméril, 1854) (Serpentes, Viperidae, Crotalinae) is reported. The snake was kept in captivity in a snake farm in Morungaba, São Paulo state, Brazil. Descriptions of reptile carcass colonization by insects and general biological data of this flesh fly are scarce and this necrophagic behavior is described for the first time in literature.

KEYWORDS. Flesh flies; fly colonization; forensic entomology; reptile carcass.

RESUMO. Ocorrência de *Microcerella halli* (Engel) (Diptera, Sarcophagidae) em uma Carcaça de Cobra no Sudeste Brasileiro. A ocorrência de 27 larvas de segundo estádio do sarcofagídeo *Microcerella halli* (Engel, 1931) (Diptera, Sarcophagidae) em uma carcaça de urutu *Bothrops alternatus* (Duméril, Bibron & Duméril, 1854) (Serpentes, Viperidae, Crotalinae) é relatada. A cobra era mantida em cativeiro em um serpentário no município de Morungaba, estado de São Paulo, Brasil. Descrições de colonização de carcaças de répteis por insetos e dados gerais da biologia deste sarcofagídeo são escassos, e este comportamento necrófago é descrito pela primeira vez na literatura.

PALAVRAS-CHAVE. carcaça de réptil; colonização por moscas; entomologia forense; sarcofagídeos.

Bothrops alternatus (Duméril, Bibron & Duméril, 1854) (Serpentes, Viperidae, Crotalinae) is known in Brazil as Urutu, Cruzeiro, Cruzeira, Jararaca de Agosto, Jararaca rabo-de-porco, Coatiara, Cotiara, Boicoatiara and Boicotiara (Campbell & Lamar 1989). This species has broad dispersion in South America (Barrio & Miranda 1966) occurring in Brazilian forests in Minas Gerais and possibly southern Goiás, countryside of São Paulo, Paraná, Santa Catarina, Rio Grande do Sul and Mato Grosso. It can be also found in Uruguay, south Paraguay and central and north regions of Argentina (Campbell & Lamar 1989). Regarding its habitat, *B. alternatus* is encountered in fens, swamps and other wet sites, being very common in sugarcane plantations.

The genus *Microcerella* Macquart (Diptera, Sarcophagidae) is restricted to the New World and contains 74 species, six of which have been recorded from the Nearctic region (Pape 1996, Mariluis 2006). Species of *Microcerella* in the Neotropical region usually inhabit high altitude sites, with the highest species richness occurring in the southern temperate zones. The genus has preference to feed on decomposing animal matter, especially dead invertebrates. The saprophytic habit is also suggested by the morphology of the first instar larva, which exhibits conspicuous mandibles and well formed clypeal arch (Lopes 1982).

Microcerella halli (Engel, 1931) is common in Bolivia, Argentina and Brazil (states of Minas Gerais, São Paulo, Rio de Janeiro and Ceará). In the states of São Paulo and Rio de Janeiro, *M. halli* is considered synanthropic.

A given area, localized either in tropical or temperate zones, contains a considerable amount of rodents of several sizes, snakes, frogs and birds, in addition to the young of large animals, their abortions and afterbirths (Blackith & Blackith 1990), all of them being considered small carcasses. The colonization of such resources by invertebrates is often neglected although it may provide information of forensic importance.

In fact, the fate of the vast number of small carcasses (including reptiles) in some habitats, as well as the parameters

that control this process, are not objective of important studies (Moretti *et al*. 2008).

Most of the studies dealing with colonization of carcasses utilize mammal carrion (pigs, dogs, rabbits and rodents), basically because the data obtained can be extrapolate to human forensic investigations (Schoenly *et al*. 2006). Moreover, these types of carcasses are more currently available at universities, bioteries and research centers. According to Frye (1991), myiasis is common in reptiles, such as in the American chameleon, *Anolis carolinensis* (Blake 1955); in the Grand Canyon rattlesnake, *Crotalus viridis abyssus* (Garrigues 1964); in the teiid lizard, *Ameiva chrysolaema* (Smith *et al*. 1994); in the South American rattlesnake, *Crotalus durissus terrificus* (Silva *et al*. 1999) and in the green anole lizard, *Anolis carolinensis* (Irschick *et al.* 2006).

However, there are few studies on the colonization of reptile carcasses by insects, such as in Cornaby (1974) and Kneidel (1984), who utilized, respectively, carrion of lizards (*Iguana iguana* and *Ctenosaura similis*) and carrion of snakes (*Carphophis amoenus*, *Diadophus punctatus*, *Opheodrys aestivus* and *Nerodis sipedon*). Blackith & Blackith (1988), dealing specifically with colonization of a snake carrion, described two new species of sarcophagid (*Sarcophaga claviger* and *Sarcophaga disneyi*). None of these studies mentioned the occurrence of *M. halli* in the reptile carcasses.

The present study focuses on the occurrence of *M. halli* in a *B. alternatus* carcass, which was previously kept in captivity, aiming both to contribute to the understanding of insect colonization in reptile carrion and to gather information on the biology of this flesh fly. The specimen of *B. alternatus* object of the present study was approximately 20 months of age, weighed 385 grams and was 110 cm in total length. It was kept individually in a plastic container (40 x 30 x 22 cm) at 30ºC in a snake farm in the municipality of Morungaba (22º52'48''S, 46º47'30''W), São Paulo state, Brazil. After its death, we examined the reptile to check it for the presence of internal parasites.

Upon *post-mortem* internal examination, we came across 27 second-instar larvae of a sarcophagid fly firmly attached to the external tegument, digestive and respiratory systems (lungs outer surface) of the reptile. The snake had died approximately four days prior to this examination, according to the biologist responsible for the snake farm. The larvae were collected and deposited in a plastic vial containing raw ground beef and vermiculite (for pupation), covered with organza and transferred to a climatic chamber kept at 25±1°C, 75% of relative humidity with a 12-hour photoperiod until the emergence of the adults. After 21 days, the adult males (n = 10) were identified as *Microcerella halli* (male specimens are more currently used for identification purposes in the family Sarcophagidae). Only one flesh fly female specimen has emerged and remained unidentified. The other 16 larvae died prior to pupation.

The adult male observed characters were: ninth sternite reduced, palpi genitalium very peculiar in shape, showing a ventral apophysis, theca small, paraphallus well sclerotized, a very large membranous region occupying the ventral part of penis, apical plate bifid, well sclerotized, lateral plates very large with an acute and recurrent terminal apophysis, ventralia situated internally, partially covered by lateral plates, styli elongated, apically dentate, the bases united, median process also apically dendate, long and curved, conspicuous sclerotized plates connecting the glans with apical plate and ventralia (Lopes 1973).

Microcerella halli prefers to feed on decomposed animal organic matter, as pointed out by Lopes (1982). Hence, it is possible to infer that the colonization occurred after the death of the snake, which was already exhaling a typical decomposing odor when it was found. Consequently, a case of myiasis must be excluded.

This flesh fly species has been cited in some forensic studies, such as in Moura (2004) and Moura *et al.* (2005), in which the larviposition occurred in rats and mice - mammal carcasses. In the present study the larviposition took place in reptile carrion. Therefore, it is possible to deduct that *M. halli* does not show any specificity in relation to the taxon of the colonized carcass, which is in accordance to Kneidel (1984), who asserted that various species of flies reared from non-mammal small carcasses are opportunistic scavengers of a great variety of organic sources.

Although the knowledge of the relative abundance of different carcass taxons in natural environments is still scarce, it is a fact that small animal carcasses are more unpredictable sources compared to large animal carcasses, since the former ones are more susceptible to variations in the physical environment and to the consumption by vertebrates or large invertebrates (*e.g.* Coleoptera). Further investigations on the fate of non-mammal carcasses in natural environments, as well on the biology of *M. halli* are strongly suggested, especially in the current context of the growing importance of forensic entomology in the Neotropical region (Mavárez-Cardozo *et al.* 2005).

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