

# Activity of Tabanids (Insecta: Diptera: Tabanidae) Attacking the Reptiles *Caiman crocodilus* (Linn.) (Alligatoridae) and *Eunectes murinus* (Linn.) (Boidae), in the Central Amazon, Brazil

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*Tabanid females are better known as hematophagous on man and other mammals, and linked to mechanical transmission of parasites. The association between tabanids and reptiles is poorly known, but has been gaining more corroboration through experiments and occasional observation in the tropics. The present study was conducted at a military base (CIGS/BI-2), situated 54 km from Manaus, Amazonas, in a small stream in a clearing (02°45'33"S; 59°51'03"W). Observations were made monthly, from April 1997 to March 1998, during two consecutive days. At the same time, other vertebrate animals were offered, including humans. However in this paper only data obtained on a common caiman, Caiman crocodilus (Linn.), and an anaconda, Eunectes murinus (Linn.), in diurnal observations from 05:30 a.m. to 18:30 p.m., will be discussed. A total of 254 tabanid specimens were collected, 40 from the anaconda and 214 from the caiman. Four tabanid species were recorded on these two reptiles: Stenotabanus cretatus Fairchild, S. bequaerti Rafael et al., Phaeotabanus nigriflavus (Kröber) and Tabanus occidentalis Linn. Diurnal activities showed species-specific patterns. The first three species occurred only in the dry season. T. occidentalis occurred during the whole observation period, and with increased frequency at the end of the dry season. We observed preferences for body area and related behavior of the host. Observations on the attack of tabanids on one dead caiman are also presented.*

Key words: Tabanidae - horse fly - hematophagy - common caiman - anaconda - tropical forest - Amazon Basin

Blood-feeding of tabanids (Diptera: Tabanidae) has been the subject of occasional observations and experiments in the tropics. This is because the females of tabanids are known as ectoparasites of humans and other mammals, and thus are likely to transmit pathogens mechanically during interrupted feeding on different hosts. The association of tabanids with reptiles was described briefly by Leclercq (1952) apud Oldroyd (1954). More recently, Medem (1981) reported ten tabanid species attacking caimans in Colombia, but only four fed exclusively or preferentially on caimans. Philip (1983) reported one species attacking turtles in the Galapagos islands and in 1986 reported four tabanid species attacking anacondas in the Tambopata River, Peru. Barros (1996) observed one species flying around alligators at Corumbá, Brazil. Oliveira (1998) collected three tabanid species flying around alligators near the site where the present study was conducted. Henriques et al. (2000) recorded four species attacking caimans in the Central Amazon.

The present study was undertaken to verify the diurnal activity and seasonality of tabanids captured using two reptile host-species: the common caiman, *Caiman crocodilus* (Alligatoridae) and the anaconda, *Eunectes murinus* (Boidae). We observed parasite/host-specificity, frequency of landing and blood feeding on different body parts, host defense behavior and we studied the relationship between tabanid species occurrence, temperature and relative humidity.

## MATERIALS AND METHODS

Fieldwork was carried out in cooperation with the Brazilian Army at the Center for Instruction of Forest War (Centro de Instrução de Guerra na Selva, Base for Instruction 2 (BI-2), about 54 km east of Manaus, Amazonas on AM-010 highway (Fig. 1). A small stream in a clearing around 500 m from the Base (02°45'33"S and 59°51'03"W) was selected for the experiment.

The local climate provides permanently hot and humid conditions, classified by Köppen (1948) as a typical climate of the Amazon basin. The vegetation surrounding the clearing is tropical humid "terra-firme" forest, with trees reaching up to 40 m height (Lechtchaler 1956, Aubréville 1961).

Temperature and relative humidity were measured at 30 min intervals in the experimental site.

The observations were conducted monthly from April 1997 to March 1998, from 05:30 to 18:30 p.m. during two consecutive days. The diurnal and annual activity was determined by the number of tabanid attacks on the hosts. Collections were made using entomological nets. During the observation period, the caiman was kept tied and the anaconda was kept in a cage, covered with 2 cm mesh. Both were partially submerged in a small stream.

The descriptions of attacking behavior of the horse flies, preference for landing places and host defense were made in field observations. Captured tabanids were identified in the field by the second author, mounted with entomological pins, labeled and deposited in the invertebrate collection of the Instituto Nacional de Pesquisas da Amazônia.

## RESULTS AND DISCUSSION

During one year of observation, 254 tabanids were collected, 40 on the anaconda and 214 on the caiman. Only four species were recorded during the experiment:

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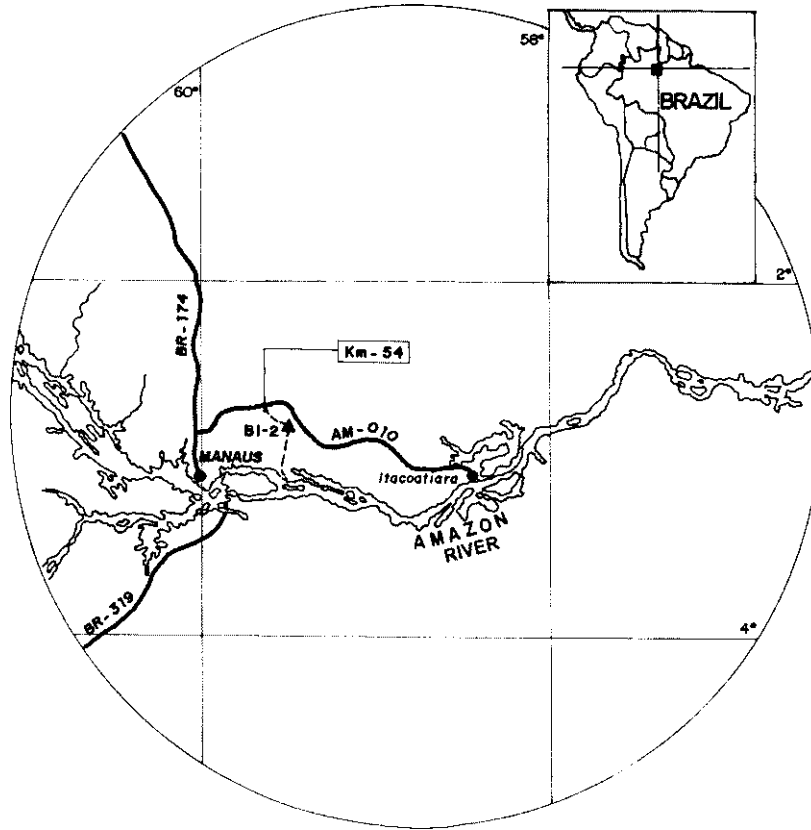


Fig. 1: map showing the collection locality, Base for Instruction of Forest War at the Manaus-Itacoatiara highway.

*Stenotabanus cretatus* Fairchild, *S. bequaerti* Rafael, Fairchild & Gorayeb, *Phaeotabanus nigriflavus* (Kröber) and *Tabanus occidentalis* Linnaeus, all attacking both hosts. *S. cretatus* and *T. occidentalis* were the most abundant species with 123 and 61 specimens respectively. The remaining species totalled with 35 specimens each.

The majority of diurnal activity occurred in the hours with lower humidity and higher temperature. *S. cretatus*

was an exception, because it was present throughout the day and increased in abundance in the early evening (Fig. 2)

During the year the occurrence of all species was almost completely restricted to the dry season. The only exception was *T. occidentalis*, which occurred during the whole sampling period and was more frequently observed at the end of the dry season (Figs 3, 4).

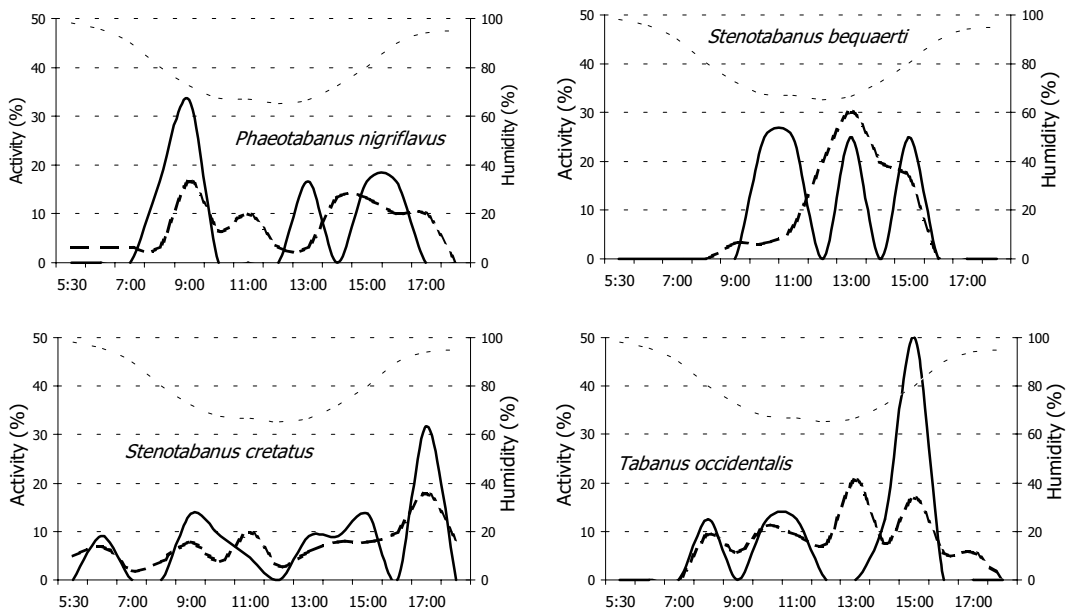


Fig. 2: frequency of four horse fly species in attacking alligator (—) and anaconda (- -) related to the humidity during observations at Base for Instruction 2, Manaus, Amazonas.

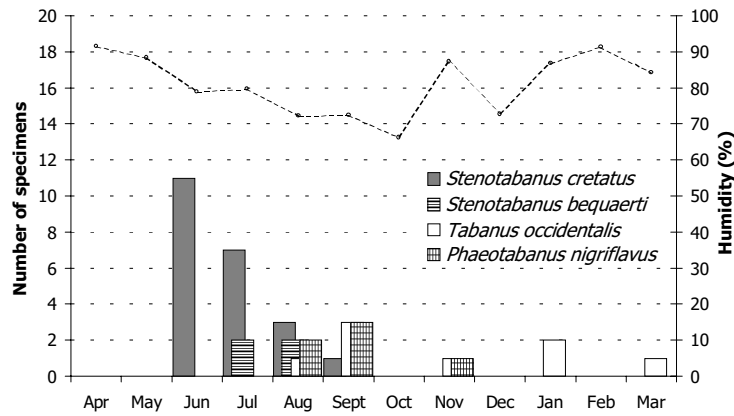


Fig. 3: activity of four horse fly species (Diptera), collected on anaconda from April 1997 to March 1998 at Base for Instruction 2, km 54, AM-010 Manaus, Amazonas with relative humidity.

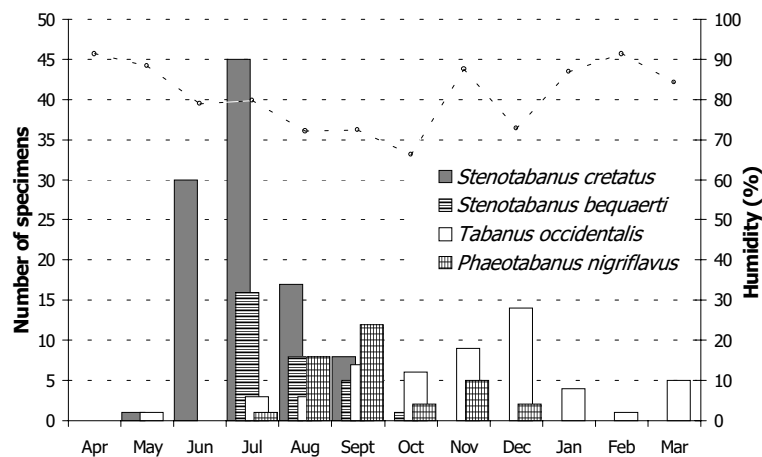


Fig. 4: activity of four horse fly species (Diptera), collected on alligator from April 1997 to March 1998 at Base for Instruction 2, km 54, AM-010 Manaus, Amazonas with relative humidity.

The preferred landing and feeding area on each host was observed for the four tabanid species (Figs 5, 6). We observed that *S. cretatus* was visually attracted to the reptiles, when seeking a blood meal. After landing, it walked along the body of the animal, without defining a feeding place. Frequently it was captured in the sucking position, always on the head of the hosts, but it was never collected in a blood-filled state.

For all of the tabanid species, we observed circular and fast flight before settling on the head or other place chosen for landing and blood feeding. At the moment the tabanid selected the desired place and started feeding, we noticed a tenseness of the host. Caiman near the water dived or showed visible irritation, beating with the tail in an attempt to dislodge the pest flies. This behavior was aggravated when four or five tabanids attacked at the same time on the head and snout, as in the case of *S. cretatus*. Anaconda appeared to be bothered and, if the snake began moving or dived to dislodge, the tabanid resumed its attack immediately after the host reemerged.

The adult flight activity of the majority of the species has been recorded from June to December, the dry season in the Central Amazon Basin. In this season the water level of rivers and lakes is lower and the reptiles are more easily seen. The feeding place on the hosts, head and back, sug-

gests that the tabanids can feed when the reptiles are in the water because the head stays above the water surface.

Additional observations on the attack of tabanids on dead caimans were conducted in Cruzeiro do Sul, Acre 7°37'02"S, 72°46'15"W, in November 1996. A common caiman was captured to be used as bait for tabanids, but was dead on the morning of the following day. At 09:30 we recorded the attack of *T. occidentalis*, at 09:40, *Diachlorus curvipes*, at 12:30, two individuals of *T. occidentalis* and one of *P. nigriflavus*, and finally, at 15:30 two individuals of *T. occidentalis* and one of *P. nigriflavus*.

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