Mem. Inst. Oswaldo Cruz, Rio de Janeiro
Vol. *84* (4): 577-578, out./dez. 1989

Research Note

BELOSTOMA MICANTULUM STAL, 1858 (HEMIPTERA: BELOSTOMATIDAE) AS A PREDATOR OF LARVAE AND PUPAE OF *AEDES FLUVIATILIS* (DIPTERA: CULICIDAE) IN LABORATORY CONDITIONS

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Belostoma micantulum is an aquatic hemiptera, prevalent in South America from Guiana to Argentina, whose biology in laboratory conditions was studied by G. R. Spinelli et al. (1983, *Neotropica, 29:* 27-34) and M. H. Pereira et al. (1989, *Resumos do XII Congresso Brasileiro de Entomologia,* vol. 1, p. 53).

With the aim of assessing the predation of this species on immature mosquitoes, 1st to 5th instar ninfae and adults were tested against 4th instar larvae and pupae of *Aedes fluviatilis* in presence and absence of small (3-5 mm) specimen of *Biomphalaria glabrata* (Molusca: Planorbidae).

In each experiment, repeated in 3 replicates, 3 glass dishes (9 cm diameter) containing each 150 ml of dechlorinated tap water and: A) 30 larvae or pupae and one hemiptera; B) 30 larvae or pupae, one hemiptera and one snail; C) 30 larvae or pupae (control) were observed for 24 hours. The numbers of surviving larvae, pupae and snails were recorded. Room temperature stayed between 23 and 29 °C. Table I shows the means of surviving larvae and pupae, after being offered to each instar of *Belostoma micantulum*. In each experiment, means were compared to respective controls using Duncan's test (a = 0.05). 1st instar ninfae did not kill a significant number of larvae or pupae whether these were presented alone or associated with *Biomphalaria glabrata*; 2nd instar ninfae were effective only against larvae when offered alone and pupae when in presence of *Biomphalaria glabrata;* 3rd instar *Belostoma micantulum* proved efficient against both larvae and pupae in presence or absence of snails; the same was truth for the 4th instar in respect to larvae, but pupae were predated significatively by these

TABLE I

Mean and standard deviation ($\bar{X} \pm SD$) of surviving larvae and pupae of *Aedes fluviatilis* when offered: A) as only food source to *Belostoma micantulum*; B) together with *Biomphalaria glabrata*, and C) control

Instar of *B. micantulum*	Surviving ($\bar{X} \pm SD$)					
	Larvae			Pupae		
	A	B	C	A	B	C
1	25.7 ± 3.2	26.0 ± 3.5	30.0 ± 0.0	24.3 ± 4.7	23.7 ± 3.2	29.3 ± 1.2
2	15.7 ± 10.4	22.3 ± 2.1	29.3 ± 0.6	20.0 ± 2.0	12.3 ± 6.7	27.0 ± 0.0
3	9.0 ± 1.6	8.3 ± 4.2	28.3 ± 1.0	14.0 ± 6.1	5.0 ± 6.2	27.7 ± 1.2
4	7.0 ± 2.0	4.0 ± 2.6	29.0 ± 1.0	8.7 ± 0.0	15.7 ± 8.1	29.7 ± 0.6
5	–	–	29.7 ± 0.6	–	3.3 ± 4.9	28.7 ± 2.3
Adult	10.7 ± 1.2	3.3 ± 3.1	28.7 ± 0.6	6.7 ± 6.5	9.0 ± 3.8	29.7 ± 0.6

Supported in part by CNPq – Brazil.

Received June 23, 1989.
Accepted July 27, 1989.

only when presented alone; the 5th instar, as well as adults were efficacious against larvae and pupae in any case. No snails were predated by *Belostoma micantulum* except in two instances by 5th instar ninfae (one when presented together with larvae and the other together with pupae) and in one case by adult when associated with pupae. Table II shows also the comparative effectiveness (Duncan, a = 0.05) of ninfal and adult hemiptera against immature *Aedes fluviatilis*.

TABLE II

Comparative effectiveness (a = 0.05) of immature and adult *Belostoma micantulum* (BM) as predators of larvae and pupae of *Aedes fluviatilis* in presence and absence of *Biomphalaria glabrata* (BG)

Instar of BM/more effective	Instars of *B. micantulum*			
	Larvae		Pupae	
	Alone	With BG	Alone	With BG
1	–	–	–	–
2	1	–	–	1
3	1	1, 2	1	1, 4
4	1, 2	1, 2	1,2	–
5	1, 2, 3, 4, AD	1, 2, 3	1, 2, 3	1, 2, 3, 4, AD
Adults (AD)	1	1, 2, 3	1, 2, 3	1

Of all instars, the 5th showed to be the most predacious, both against larvae and pupae, followed by adults when in absence of *Biomphalaria glabrata*. Early instars of *Belostoma micantulum* were less predacious against the immature mosquitoes employed – perhaps younger larvae will be predated easier.

Predation of mosquito larvae by *Belostoma apache, Belostoma boscii* and other aquatic hemiptera was described by A. Santa-Maria Mijares & R. G. Broche (1985, *Rev. Cub. Hig. y Epid., 23:* 140-146; *Rev. Cub. Med. Trop., 37:* 203-209), who suggested the employment of these as mosquito control agents in semi-permanent and temporary breeding-places.

Though being predacious on immature mosquitoes in the conditions described, the correct evaluation of *Belostoma micantulum* as as usefull mosquito control agent will depend on additional work on its biology and predacious behaviour in field conditions.