Mem. Inst. Oswaldo Cruz, Rio de Janeiro, Vol. 82, Suppl. IV: 307-309, 1987
Intern. Symp. on Schistosomiasis

BIOMPHALARIA TENAGOPHILA FEEDING BEHAVIOR

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The majority of freshwater pulmonates, show a positive association with macrophytes and their periphyton. (Thomas, J. D., 1982, *Malacologia, 22:* 81-91; Calow, P., 1970, *Proc. Malac. Soc. Lond., 39:* 203-215).

The objective of this work was to measure this association in the aspect of arrest and attraction of *Biomphalaria tenagophila* to macrophytes and periphyton and the daily consumption of periphyton at field condition.

The measure of arrest was made computing the time spent by 50 snails in 50 hours of observation over leaves of macrophytes with and without periphyton spread inside the aquarium.

During the 50 hours of observation the snails remainded more than 60% of this time in substract of periphyton. In Table I, the snail arrest time in leaves of macrophytes with and without periphyton and other activity out of this substracts are detailed.

Baits of extracts of macrophytes with gelatin, and gelatin with periphyton were investigated to verify snails atraction and preferences.

B. tenagophila was attracted by all macrophytes showing more preference to *Nasturtium pumilum* following this sequence *Polygonum acre, Commelia* sp. and *Echinochloa crusgalli.*

The snails were atracted by extracts of macrophyte's periphyton but they didn't show preference among them (Table II).

The daily consumption of periphyton was measured in the field in transparent and dark plastic cages.

The cages were kept in the water reservatory for colonization for a month. Ten snail (10 mm) were kept in the cages for 24 hours. The consumption was estimated comparing the dry periphyton weight of the cages control with the periphyton that remained in the cages which the snails grazed.

The transparents cages periphyton showed about 80 to 90% proportion of vegetal organisms. There were more animal organisms in the dark cages than in the transparents cages (about 90%).

The covariance analysis and "test t" prove that the snail consumption was equal in both

TABLE I

Time spend by ten especimens of *Biomphalaria tenagophila* during ten hours of observation in five repetitions

Repetitions	Substract with periphyton		Substract without periphyton		Other activitis other than the two former ones	
	(min)	(%)	(min)	(%)	(min)	(%)
1	3710	62	315	5	1975	33
2	3860	64	760	13	1380	23
3	3805	63	495	8	1700	28
4	4190	70	340	6	1470	25
5	4200	70	520	8	1261	21
Total	19765	66	2412	8	7291	24

sorts of cages. The snail consumption in transparent cages was $\bar{x} = 9.7$ mg and in dark cages was $\bar{x} = 8.5$ mg the "test t" resulted in $p = 0.16$.

Moreover the snail consumption was proporcional to the periphyton availability. When the cages were more colonized the snails consumed more and when the cages were less colonized the snails consumed less (Fig.).

TABLE II

Atraction of *Biomphalaria tenagophila* by baits of macrophyte's extracts in gelatin bloks and baits with periphyton

Baits	Snail attracted by each bait		Preference order of snail atraction by baits in each experiment*
	no.	%	
A – *Echinochloa crusgalli*	351	35	
B – *Heteranthera reniformes*	200	20	C = A > B > G
C – *Commelina* sp.	359	36	
G – Control	81	8	
D – *Nasturtium pumilum*	191	38	
E – *Hydrocotyle ranunculoides*	96	19	D > F > E > G
F – *Polygonum acre*	148	30	
G – Control	61	12	
D – *Nasturtium pumilum*	123	40	
A – *Echinochloa crusgalli*	46	15	D > F > A = C
C – *Commelina* sp.	46	15	
F – *Polygonum acre*	88	29	
Dp – Periphyton of *N. pumilum*	111	24	
Ap – Periphyton of *E. crusgalli*	117	25	Dp = Ap = Cp = Fp
Cp – Periphyton of *C.* sp.	111	25	
Fp – Periphyton of *P. acre*	127	27	

* The preference sequence was stablished by χ^2 test at the level of $p = 0.05$.

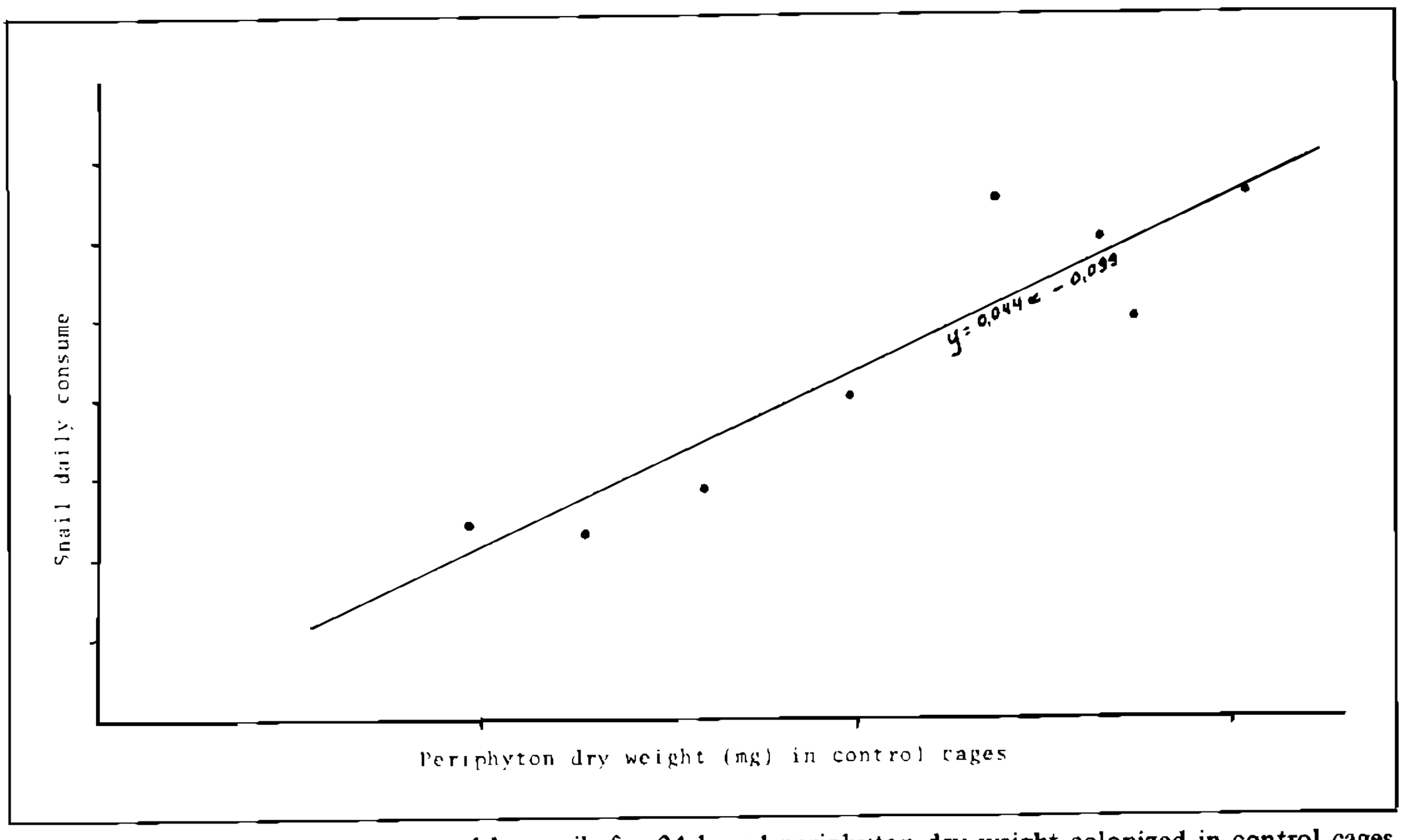

Fig. 1: Periphyton average consumed by snails for 24 h and periphyton dry weight colonized in control cages (without snail).

Covariance analysis between the total number of each organism of periphyton in control cages (without snails) and the organisms in the cages with snails (grazed) showed a correlation of about 89% in both kinds of cages. The snails didn't select the periphyton organisms.

Snails reared in these cages for twenty days grew from 5.0 mm to 8.6 mm shell diameter, each laid 0.5 batch of eggs per day and the overall survival during the period was 75% (Santos, M. B. L. & Freitas, J. R., 1987, *Rev. Inst. Med. trop. São Paulo, 22:* 76-79).

Discussion: aspects of *B. tenagophila* feeding adaptation became evident in this study. The fact that the snails were arrested 2/3 of the time in substract with periphyton can be explained by the kind of food used by these animals. The herbivorous with low assimilation efficiency in general spend more time eating.

Moreover, the ability to locate the food is an important factor of the species success (Koln, A. J., 1961, *Am. Zool., 1:* 291-309).

The *B. tenagophila* showed a chemical perception to select and locate edible organisms. To explain the attraction by macrophytes there has been the hypothesis like: a – Feeding (Sepers, A. B. J., 1977, *Hydrobiologia, 52:* 39-54); b – Simbiosis relation (Thomas, J. D., 1982, *Malacologia, 22:* 81-91; Thomas, J. D. & Tait, A. J., 1984, *Phil. Trans. R. Soc. Lond., 305:* 201-253); c – To avoid competition (Pip, E. & Stewart, J. M., 1976, *Can. J. Zool., 54:* 1192-1205).

When the periphyton suffers diversity changes or productivity changes the *B. tenagophila* responds with behavior strategies molding to each situation.

All this adaptability explains in terms the success of this specie in water environment, mainly in small reservatories and irrigation canals.

In fact, this considerations become important to decide about this habitat management aiming the vector control, and also to rear these snails in laboratory.