

COMUNICACIÓN CORTA – SHORT REPORT

**Biological Control of Larvory Stages of Malaria Vector of
Trujillo, Venezuela (*Anopheles nuneztovaris*) with Fish
Poecilia (levistes) reticulata ***

Drs. Jesús A. Benítez ^{1,2}, Alfonso J. Rodríguez Morales ^{2,3}, Hugo Lobo ¹,
Carlos Villegas ¹, Leonardo Oviedo ¹.

¹Service of Rural Endemic Diseases, Malariology and Environmental
Health Office, Trujillo, Trujillo; ²General Direction of Environmental Health and Sanitary
Control, Ministry of Health and Social Development, Maracay, Aragua; and

³Los Andes University, Trujillo; Venezuela.

E-mail: ajrodriguezmd_md@hotmail.com

Acta Científica Estudiantil 2007; 5(2):74-75.

Resumen

En este trabajo se resumen los efectos del uso de peces en el control biológico de la malaria, usando *Poecilia reticulata* contra *Anopheles nuneztovaris*.

Palabras Clave: malaria, anopheles.

(fuente: DeCS Bireme)

Abstract

In this report we summarized the effects of the use of larvivorous fishes in the biological control of malaria, using *Poecilia reticulata* against *Anopheles nuneztovaris*.

Key Words: malaria, anopheles.

(source: DeCS Bireme)

*This work was previously presented at the 11th International Congress on Infectious Diseases, Cancún, México, March 2004 (poster 63.007).

Effort against malaria control tends to reduce chemical products (especially for its toxic side effects for people and environment) and increase biological and other environmental measures to control different stages of anopheline vectors, not only for a better entomological control but also for a best environmental balance ^{1,2}. For this reason in a preliminary form we studied viability and impact of larvory control with an autochthonous larvivorous fish in malaria vector control in a low-endemic zone for malaria in Venezuela.

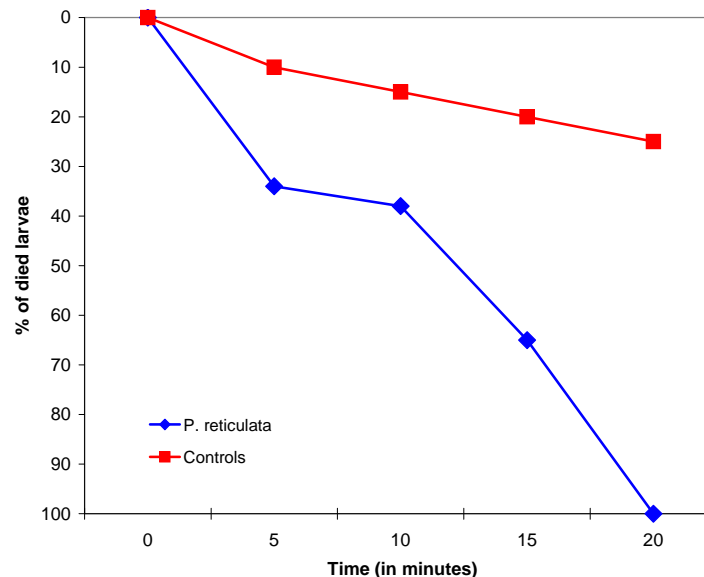
A controlled larvicide ex vivo assay was made to evaluate impact of *Poecilia (Levistes) reticulata* in vector control of malaria for Trujillo anophelines (*Anopheles nuneztovaris*). We compared against controls, *Poecilia caucana* and *Caracidos sp* (other fishes in the area). We compared against controls. Three different appropriate recipients were used for ex vivo assays. Larvae (all stages) deaths mean in time evolution with presence of fishes was end-goal of this assay. Data were compared statistically by χ^2 and Fisher exact tests with a 95% confidence, P significant <0.05. Epi Info v.6.0 was used as statistical software.

In total, 244 larvae (all stages) were used (106 in *P. reticulata* vs control assay and 138 in species for comparative assay). In first assay (Figure 1) at 5' 34%

of larvae dies, at 10' 38%, at 15' 65% and at 20' 100%, whilst this figure for control was 10, 15, 20 and 25%, respectively ($P < 0.05$). In comparative assay at 30' all larvae population die (in three species), but there were significant differences for time to reach 100% of larvae ingestion (means): $11.3' \pm 4.2$ for *P. reticulata*, $20.3' \pm 5.3$ for *P. caucana* and $13.0' \pm 6.5$ for *Caracidos sp.* ($P < 0.05$).

Any vector control intervention for malaria control should set precise objectives in relation to its expected contribution to the overall goal of malaria control. These objectives should be based on the particular epidemiological problem as well as the specific impact that the measure or measures selected may have on the chain of transmission^{1,2}. Larvivorous fish recently have gained world interest in control of vector-borne diseases, especially in malaria³⁻⁸. Given these results, we consider that *P. reticulata* could be a natural, viable and efficient tool for biological control of malaria vectors in Trujillo, Venezuela. Further studies are needed to extend and validate these findings for its practical application.

Figure 1. Larviciding activity of *P. reticulata* and control at 5' – 20'.



References

1. OPS. Atención primaria ambiental. Pan American Health Organization, Washington, 1998.
2. Najera JA & Zaim M. Malaria vector control. World Health Organization, Geneva, 2002.
3. Sabatinelli G, Blanchy S, Majori G, Papakay M. Impact of the use of larvivorous fish *Poecilia reticulata* on the transmission of malaria in FIR of Comoros. *Ann Parasitol Hum Comp.* 1991;66(2):84-8.
4. Rajnikant, Bhatt RM, Gupta DK, Sharma RC, Srivastava HC, Gautam AS. Observations on mosquito breeding in wells and its control. *Indian J Malariol.* 1993 Dec;30(4):215-20.
5. Volff JN, Korting C, Altschmied J, Duschl J, Sweeney K, Wichert K, Froschauer A, Scharl M. Jule from the fish *Xiphophorus* is the first complete vertebrate Ty3/Gypsy retrotransposon from the Mag family. *Mol Biol Evol.* 2001 Feb;18(2):101-11.
6. Ghrab J, Bouattour A. Experimental study of larval efficiency of *Gambusia affinis holbrooki* (GIRARD, 1859) (fish-Poeciliidae). *Arch Inst Pasteur Tunis.* 1999 Jan-Apr;76(1-4):33-8.
7. Ghosh SK, Tiwari SN, Sathyanarayan TS, Sampath TR, Sharma VP, Nanda N, Joshi H, Adak T, Subbarao SK. Larvivorous fish in wells target the malaria vector sibling species of the *Anopheles culicifacies* complex in villages in Karnataka, India. *Trans R Soc Trop Med Hyg.* 2005 Feb;99(2):101-5.
8. Kusumawathie PH, Wickremasinghe AR, Karunaweera ND, Wijeyaratne MJ. Larvivorous potential of fish species found in river bed pools below the major dams in Sri Lanka. *J Med Entomol.* 2006 Jan;43(1):79-82.