

SOME ASPECTS OF BIOLOGY OF *Poecilia reticulata* AND ITS ROLE AS A
MOSQUITO LARVIVORE IN MAN MADE ECOSYSTEMS WITH SPECIAL
REFERENCE TO GEM PITS IN ELAHERA

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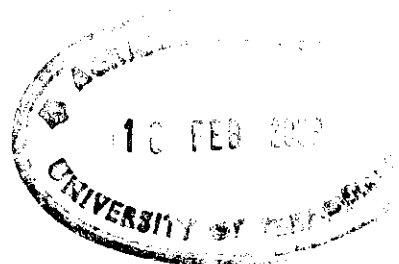
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ABSTRACT

Biological control of mosquitoes with predatory organisms in most instances is acceptable from an environmental standpoint and has been applied in many situations with reasonable success. Among them, larvivorous fish that are particularly suitable for control of aquatic stages of mosquitoes have shown some success. This study was carried out in two stages which included a laboratory part and a field study. The laboratory study included the detailed investigation of the biology of Wild guppy *Poecilia reticulata* and its predatory capacity. The field study included its potential as a mosquito larvivore in gem pits in Elahera gem field. Further, the present study was extended to determine physico-chemical parameters and observe the biological aspects such as association of mosquito larvae and other larvivorous predator communities in abandoned gem pits in Elahera gem field.

Morphological characters were compared in Wild guppy and in Sari guppy with respect to their adaptation as mosquito larvivores. Comparison of morphological characters of Wild guppy and Sari guppy indicated that Wild guppy is morphologically more adapted as a mosquito larvivore.

Studies on reproductive biology indicated that Wild guppy males become sexually mature at the age between 34 to 45 days. Female guppies started spawning at the age of three months. The male to female sex ratio of Wild guppy was 1: 2.4.



There was a significant ($p < 0.05$) correlation between spawning time of Wild guppy and the litter size ($Y = -2.13 X^2 + 19.31 X - 2.59$; $Y =$ litter size, $X =$ spawning time). A significant positive relationship was observed between standard length of the female fish and the litter size ($p < 0.05$).

Mosquito larval consumption capacity of Wild guppy depended on the body size of the fish. The presence of alternative feeds in a given location significantly ($p < 0.05$) reduced the mosquito larval consumption capacity of Wild guppy. The Wild guppy of length group $> 20\text{mm}$ showed significant predatory effect on all the length groups of goldfish larvae below 14mm indicating the possibility of predating eggs and relatively smaller larval stages of native fish species in the wild.

Field experiments were conducted in Elahera gem mining area from January 2001 to May 2001 in four stations along *Kalu Ganga* to evaluate the physico-chemical aspects, biological aspects such as associated mosquito larvae and larvivorous predator communities in abandoned gem pits. The correlation between rainfall and malaria incidences in the area with three month lag period and four month lag period indicated a significant negative relationship between rainfall and the following third month ($r_s = -0.335$; $p = 0.04$) or fourth month ($r_s = -0.439$; $p = 0.009$) malaria incidences. These indicated an increased malaria incidences in the area three to four months after a deficient rainy period.

Puntius filamentosus, *P. bimaculatus*, *Rasbora cavarii*, *Esomus thermoicos* were the dominant fish species observed in the gem pits. When fish were present, only 13.3% of the pits had mosquito larvae. When the fish were absent, 73.7% of the pits had mosquito larvae. When the proportion of pits having mosquito larvae with fish were compared with those without fish, a significant reduction of 94.5% was observed.

Better survival of Wild guppy were observed in all the gem pits until pits dried up. A significant reduction of mosquito larvae could be achieved in pits stocked with Wild guppy and in the pits having other fish species introduced through natural recruitment processes. This indicated the possibility of using native species of fish in mosquito control programmes in place of Wild guppy.

