SALINITY TOLERANCE OF WILD *POECILIA RETICULATA* (GUPPY) UNDER LABORATORY CONDITIONS

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ABSTRACT

Fresh water fish Poecilia reticulata (guppy), widely used as a bio-control agent to control mosquito larvae occurring in freshwater habitats also demonstrated to survive in seawater which differs among strains. This makes it a potential candidate to control mosquito species such as Aedes aegypti and Ae. albopictus which have been recently shown to oviposit and undergo natural pre-imaginal development in brackishwater (0.5-30 ppt) collections. The present study was carried out to investigate the salinity tolerance of P. reticulata occurring in Sri Jayewardenepura canal system, in order to assess its suitability to control brackishwater breeding Aedes species.

Guppy was exposed to different salinity levels directly and gradually under laboratory conditions in glass tanks (size 60 cm x 30 cm x 30 cm). To test the direct effect of salinity, 9 different salinities (ranging from 0 as a control -35ppt) prepared in three replicates, each stocked with 10 fish were kept for a period of 3 months. To test the effect of gradual increase of salinity, three tanks containing freshwater were stocked with 10 fish in each and a gradual increase of salinity (by 5ppt once in 2 weeks upto 38ppt) was done. All fish samples used were random wild samples consisting of 5 males and 5 females. Mortality rates, growth (total length) and the breeding of fish were recorded in both experiments at regular time intervals.

When the fish were exposed to different salinities directly, fish started dying at 10 ppt (10% mortality) after the fourth day of exposure and this mortality rate was observed from 10-20ppt salinity range within the three months (exactly 0% mortality was recorded in control tank). 50% survival was shown at 28ppt salinity level at the end of the third month. Beyond 28ppt, there was 100% mortality. Fish showed an average of about 5-7 mm growth in salinities upto 28ppt but they were not significantly different (p=0.886). Breeding was seen in salinities upto 20ppt producing 7-15 fry/female and the fry also could tolerate the salinities they were bred into with a mortality level of 3% within the study period. Contrast to the above results, the fish when exposed to gradual increasing of salinities could survive upto 38ppt with only a 20% mortality rate. They showed a length increase between 1-5mm, in all salinities but they were not significantly different (p=0.330). In gradually increasing salinities, fish were seen breeding even at 35 ppt levels (7-10 fry/female) with a 3% mortality rate.

The present study demonstrates high salinity tolerance of *P. reticulata* and their successful growth and propagation in saline conditions. It is revealed that guppy can tolerate and survive in salinities upto 28ppt, when they are directly introduced from the wild and they can tolerate upto a level of 38ppt salinity if the salinities increase gradually. They can grow under saline conditions and breed successfully and the fry can survive well in the saline environment. This makes *P. reticulata* a potential candidate that can be used as a bio-control agent in the control of *Aedes* mosquito larvae that breed in brackish water environments.

Keywords: Guppy, Salinity, Aedes, Bio-control