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Gape size of the wild guppy, *Poecilia reticulata:* Does it matter in mosquito larval control?

N. M. N. G. Nayakarathna[1], S. N. Weerakoon[2*], G. A. S. M. Ganehiarachchi[1]

[1] Department of Zoology and Environmental Management,
Faculty of Science, University of Kelaniya, Sri Lanka
[2]Regional Directorate of Health Service, Badulla, Sri Lanka
snweerkn@gmail.com

Larvivorous fish is very important tool in controlling disease transmitting vector mosquitoes in many parts of the world. However, there is a lacuna of knowledge about the vector control potency in relation to the gape size of these fish. Since the wild guppy, *Poecilia reticulata;* is a topmost larvivorous fish, the current study was performed to study the effect of gape size of guppy in controlling mosquito larvae.

For the current study, wild guppies were collected from their own natural habitats located around the Kelaniya area. In the laboratory, measurements of total length (TL) and Gape Size (GS) of individual specimens were obtained. These fish were then grouped in to ten length classes of 0.2 cm intervals ranging from 0.8 to 2.8 cm. For each length class of fish, 5L capacity glass tank was assigned. Accordingly, there were 10 experimental tanks for 10 size classes of fish, and for each tank assigned for a particular size class, 10 fishes were introduced. After acclimatization, fish were kept without food for 24 hours. In the meantime, laboratory reared mosquito larvae were collected and separated according to their instar level. Four instar stages of larval and the pupal stage were used for investigating of prey selection by *P. reticulata*. The rationale used here was that all the immature stages of mosquitoes were separately exposed to each length class of fish to determine the mosquito larval/pupal mortalities. Ten mosquito larvae/pupa form a particular instar were introduced to a fish tank at a time. Subsequently, the mortality rates of mosquito larvae/pupa in each tank were determined after 24 hours. All the fish were kept under 24 hour fasting period prior to each experimental cycle. In the next experimental cycle, ten mosquito larvae/pupa form a particular instar were introduced to another fish tank. This procedure was continued until all the instar/pupal stages expose to all the fish tanks. Relationship between TL and GS was tested with a Pearson correlation and with linear regression analysis. One way – ANOVA was performed to analyse the significance of the mortality of different instars along in different length classes. The results revealed that the relationship between TL and GS is best fitted for liner regression model ($R^2 = 0.80$) with the equation; GS = 0.1 TL – 0.02. The 24 hour percentage mortality of different mosquito instars indicated that the 1st and 2nd mosquito larval instars were vulnerable to all the length classes tested for these instars (GS range = 0.06 – 0.26 cm). Fishes of 0.8 – 1.0 cm length class (GS range = 0.06 – 0.08 cm) were unable to consume 3rd instar mosquito larvae. Fishes of 0.8 – 1.2 cm length range (GS range = 0.06 – 0.1 cm) were unable to consume 4th instar larvae. Pupae were consumed by the fishes whose length range was 1.4 – 2.8 cm (GS range = 0.12 – 0.26 cm). Hence, the gape size of the guppy fish has a significant effect on the mosquito larval controlling and the fishes with GS > 0.12 cm (TL > 1.4 cm) are excellent in controlling the pupae and all the instars of mosquito larvae.

Keywords*:* Gape size, Larvivorus fish, Mosquito control, Wild guppy