

Larvivorous Potential of Fish Species Found in River Bed Pools Below the Major Dams in Sri Lanka

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ABSTRACT Malaria in Sri Lanka is closely associated with the river systems in the country. Construction of major dams across rivers has resulted in year-round pooling and anopheline mosquito breeding in river beds below the dams. This study was carried out to determine the larvivorous activity of fish found in river bed pools below the dams to identify the potential fish species for anopheline larval control in these areas. Fish species in five river beds below the dams, namely, Laxapana, Kotmale, Nilambe, Victoria, and Rantembe, were identified in June 2000. The larvivorous potential of the 12 fish species collected was determined in the laboratory based on the number of larvae consumed per fish within 10 min and an hour. *Danio malabaricus* Jerdon, *Oreochromis mossambicus* Peters, *Oreochromis niloticus* L., and *Poecilia reticulata* Peters consumed nine or more larvae per fish within 10 min. *Aplocheilichthys dayi* Steindachner and *Rasbora daniconius* Hamilton consumed nine and eight larvae, respectively, within 1 h. *O. mossambicus*, *O. niloticus*, and *P. reticulata* consumed 10 larvae per fish within 10 min. Despite some species having a high larvivorous potential in the laboratory, field studies are required to determine the feasibility of using these fish for anopheline mosquito control in the river bed pools below the dams.

KEY WORDS larvivorous fish, larvivorous potential, anopheline mosquito control, river bed pools, Sri Lanka

MALARIA IN SRI LANKA is closely associated with the river systems (Dunn 1936, Gill 1936), because the major vector of malaria in Sri Lanka, *Anopheles culicifacies* Giles, primarily breeds in river beds (Dunn 1936, Abhayawardana 1995). Damming of major rivers to form upstream reservoirs for hydroelectric power generation and irrigation has resulted in year-round pooling in the river beds below the dams. These river bed pools have been identified as important breeding places of the major vector of malaria in Sri Lanka, *An. culicifacies*, and other anopheline species during previous malaria outbreaks/epidemics (Kusumawathie and Wijesundera 1992). As a vector control measure, temephos at 1 ppm is applied at 10-d intervals, during malaria outbreaks/impending malaria outbreaks in these areas. Application of temephos has the potential to cause environmental pollution and insecticide resistance and involves high cost of application. Furthermore, its application is inconvenient owing to security reasons and the impassable nature of the areas.

Studies have shown that fish could be used successfully in anopheline mosquito larval control in a variety of habitats, such as, rice fields, marshes, swamps, drains, tanks, ponds, wells, streams, gem pits, temporary water pools, and brackish waters (Hora and Mukerji 1953; Menon and Rajagopalan 1977; WHO 1979, 1982; Haas and Pal 1984; Costa 1985; Wickramasinghe and Costa 1986; Sharma et al. 1987; Yadav and Das 1989; Malhotra and Anil Prakash 1992; Prasad et al. 1993). This study was carried out to identify probable fish species for anopheline mosquito larval control.

Materials and Methods

Study Area. The study was carried out in the Mahaweli and Kelani river systems, which are the two main rivers in the country and are a major source of malaria vectors in the Kandy and Nuwara Eliya districts of Sri Lanka. These two rivers have been impounded at several locations to form upstream reservoirs for hydroelectric power generation and irrigation in the dry zone. Ten dams/barrages, namely, Moussakelle, Norton bridge, Castlereigh, Laxapana, Kotmale, Nilambe, Polgolla, Victoria, Randenigala, and Rantembe, are situated in the study area. River beds below the Laxapana, Kotmale, Nilamba, Victoria, and Rantembe dams were selected based on the occurrence of malaria outbreaks since 1985 (Wijesundera 1988, Kusumawathie and Wijesundera 1992).

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