

## Gillnetting for small indigenous cyprinids in a Sri Lankan reservoir where culture-based fisheries are practiced

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**Abstract** In Sri Lankan reservoirs, small, indigenous fish species (SIS) are abundant and can be differentially exploited using small mesh (15-38 mm stretched mesh sizes) gillnets without any detrimental effects on the cichlid fisheries. However, in the recent past a paradigm shift in the reservoir fisheries of Sri Lanka is observed from total dependence on exotic cichlids to exploitation of exotic carps, stocked in reservoirs for the development of culture-based fisheries (CBF). As fingerlings of Chinese and Indian major carps and common carp are regularly stocked in reservoirs for the development of CBF, it is essential to investigate the potential impact of the use of small mesh gillnets to catch SIS on stocked fish fingerlings on CBF. In the present study, small mesh gillnets were used to exploit SIS during September 2011 to March 2013 when carp fingerlings were stocked in Chandrika wewa, Sri Lanka. The results revealed that no carp fingerlings (except 2 specimens of Indian carp species) were caught in any of the fishing trials with small mesh gillnets. As juvenile fish and stocked fish fingerlings occur in shallow littoral areas of reservoir, and as small mesh gillnets are laid at the depths  $\geq 1.5$  m, there is a habitat segregation of these two categories of fish. It is therefore possible to introduce a subsidiary fishery with small mesh gillnets to exploit SIS, which can co-exist with CBF in reservoirs of Sri Lanka.

**Keywords:** reservoir fisheries; small indigenous species; Cyprinidae; Cichlidae; culture-based fisheries

### INTRODUCTION

Inland fish and fisheries are crucial for many socially, economically and nutritionally vulnerable groups of people around the world because of their vital role in providing an important source of animal protein and essential micronutrients for local communities, especially in the developing world and ensuring global food security (Yong et al. 2014; Funge-Smith and Bennett 2019). In the tropical belt, reservoirs make a significant contribution to inland fish production (Fernando and Holčik 1991; Welcomme 2001). However, reservoir fish production in many counties of Asia is dependent on a few species so that utilization of spectrum of biological production in reservoir ecosystems is often not fully realized (Pet et al. 1996; Amarasinghe and De Silva 2015). Occurrence of small indigenous fish species (SIS) in inland waters of many tropical countries are reported

(De Silva and Sirisena 1987, 1989; Ahmed et al. 2001; Amarasinghe et al. 2016; Kolding et al. 2019). Nevertheless, many of these fishery resources remain unexploited or underexploited and this may be due to, among other reasons, the fisheries management strategies currently in place targeting the exotic fish species which contribute most to commercial fisheries production by regulating mesh sizes of gillnets (Amarasinghe and De Silva 2015).

Previous studies in Sri Lankan reservoirs have shown that SIS could be differentially exploited using gillnets of stretched mesh sizes, 15 mm to 38 mm without adverse effects on the fishery based on larger fish species such as exotic cichlid species (i.e., *Oreochromis mossambicus* and *O. niloticus*), which account for over 70% of the landings (Amarasinghe 1985, 1990; De Silva and Sirisena 1989; Pet and Piet 1993). Such differential exploitation of SIS and commercially

