Effect of lunar pattern on the fishery, gillnet selectivity, growth and mortality of flying fish off the north western coast of Sri Lanka.

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Abstract

Small pelagic fishery resources contribute about 40% of the total fish production in Sri Lanka. These fishery resources are exploited using gillnets and beach seines. On the northwestern coast of Sri Lanka, off Kandakuliya there is a seasonal fishery for flying fish resources from October to April every year. Gillnets of stretched mesh sizes 3.4 cm and 4.5 cm are used in this fishery exclusively. In the present study, effect of lunar pattern on the fishery, gillnet selectivity, growth and mortality of flying fish species off Kandakuliya were investigated from October 2002 to April 2003.

Daily catch per unit effort (CPUE) data obtaining from the log-books of fish vendors were grouped into new moon phase, quarter moon phase and full moon phase and were compared using ln (CPUE + 1) data transformation. CPUE of flying fish catches during full moon phase was significantly lower than those of other lunar phases indicating that catch efficiencies of flying fish in gillnets were lower when the light intensity is relatively high.

Gillnet selectivity of three abundant flying fish species *Cheilopogon nigricans*, *Cypselurus poecilopterus* and *Cheilopogon suttoni* was determined using Baranov-Holt method. As the length frequency data for two adjacent mesh sizes were not available for *Cypselurus naresii* to perform Beranov-Holt method, gillnet selection pattern was deduce from the gillnet selection curve of *Cypselurus poecilopterus* , based on body depth.

When the mesh-wise length frequency data were superimposed on the gillnet selection curves for all four species studied, only a limited range of length class have been caught in gillnets of each mesh size. In 3.4 cm mesh gillnets, size classes smaller than the optimal length (22.4 cm for C. *nigricans*, 20.6 cm for *C. poecilopterus* and 23.7 cm for *C. suttoni*) and in gillnet catches of 4.5 cm mesh size, size classes bigger than the optimal length (29.6 cm for C. *nigricans*, 27.3 cm for *C. poecilopterus* and 31.4 cm for *C. suttoni*) were virtually absent indicating that only intermediate size ranges were available in the fishing grounds of all three species.

The length frequency data of flying fish species caught in the gillnets of two mesh sizes can be corrected only for the size ranges that are available in the fishing ground. Accordingly, the size ranges of the three flying fish species, which were caught in both mesh sizes, between the optimal lengths of two mesh sizes could be corrected for gear selection. These corrected length frequency data were useful for precise estimation of Von Bertalanffy growth parameters. However, being migratory species it is uncertain whether the population structure larger size classes of flying fish are represented by length frequency data or are not available in the fishing grounds. As such, reliability of the estimates of total needs to be cross-checked based on an analysis using length frequency data obtained from the ranges of distribution of flying fish species.