MULTISPECIES MANAGEMENT OF FRESHWATER FISHERIES USING MESH SIZE REGULATIONS

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Introduction

Many studies have been done at Kenyir Lake for the purposes of obtaining the information for fisheries management (Yusoff et al. 1995; Mohammad Zaidi et al. 1997; Zakaria et al. 1998; Ambak and Jalal 1998). The mesh size regulation is an approach that have been used in fisheries management in regulating the commercial fisheries of inland waters. The probability of catching a fish in a gill net may be separated into two components: (1) the probability of the fish encountering the net; and (2) the probability of the fish being caught and retained in the net. Since the gillnets are the only gears that have been licensed for commercial fisheries it is important to regulate these gear. Gillnets are physically size- or species-selective, therefore the information could provide the basic understanding of fish populations studies. A total of ten important species have been studied, i.e., *Puntius schwenenfeldii, Hampala macrolepidota, Labiobarbus lineatus, Cyclocheilichthys apagon, Osteochilus vittatus, Osteochilus hasselti, Mystus nemurus, Notopterus notopterus, Chela anomalura and pristolepis fasciatus.*

Materials and Methods

Gillnetting experiments were conducted at Kenyir Lake from January to December 1997 in order to obtain the species composition in related to their length. Seven different mesh size of gillnets were used to obtain the fish population samples, which consisted of 1.5 in, 2.0 in, 2.5 in, 3.0 in, 3.5 in, 4.0 in and 5.0 in. The mesh size defines a selection range, a length range of the fish vulnerable for being caught in the gillnets. Normally the smallest fish just fits in a mesh size or is slightly less. The medium-size fish is caught with the mesh perimeter just around its post-operculum. Very large fish is less likely to be caught. If they are not entangled in the net, they can escape after having touched it.

The cm-category in which most fish is caught is called optimum length (l_o) and is proportional to the mesh size: $l_o = k*m$, where k is a constant specific for the fish species (slender fish have a higher k-value) and m refer to the mesh size. The length-at-first maturity was derived from the length-weight relationship.

Results and Discussion

There are ten to fifteen species that are commonly caught by the gillnets. The species that we have analysed do not include the Tor tambroides, Channa macropeltis because they are either scarce or hardly caught using gillnets. *Mystus nemurus* and *Hampala macrolepidota* can grow more than 48 cm but the lake were dominated by *Puntius schwenenfeldii.* In general, it was found that all of the fish species in Kenyir Lake were present in the loltic habitat, while only nine species were found in the lentic habitat. From the lentic habitat only two species were found in the littoral and open water while seven species were found in littoral zone only. The commercial target species were mainly *P. schwenenfeldii,* and *H. macrolepidota* which are at present the most abundanct species found in Lake Kenyir. Other species include *Tor tambroides* which can be found at certain tributaries of Lake Kenyir and *Channa macropelti,,* which are normally caught by hooks. It was found that the habitat partitioning of Puntius schwenenfeldii could be grouped according to their size. The fish smaller than 9.4 cm were normally found at the lotic habitat and the fish bigger than 9.4 cm were found at the lentic habitat. Since the length-at-first maturity for *P. schwenenfeldii* was 8.6 cm, all the populations that were in the lentic habitat were fully matured. At the lentic habitat the population samples have possibly 4 cohorts with mean lengths at each cohort were $l_1 = 9.4$ cm, $l_2 = 15.9$ cm, $l_3 = 17.4$ cm and $l_4 = 21.4$ cm. However, the spawning population during migration shows that there were 5 different cohort with the means length of each cohort was $l_1 = 13.2$ cm, $l_2 = 16.5$ cm, $l_3 = 20.6$ cm, $l_4 = 24.5$ cm and $l_5 = 28.2$ cm.

Length-at-first maturity for *Hampala macrolepidota* was 16 cm followed sequentially by 22cm, 32 cm, 44 cm and 48 cm. However, most of the fish were caught between 11 cm to 27 cm in standard length while the number bigger fish caught was small. This might be due to the fact that the mortality rate was higher during this stage.

Conclusions

The commercial fisheries at Kenyir Lake mainly targetted at two main species, that is, *Hampala macrolepidota* and *Puntius schwenenfeldii.* The body shape of these two species is totally different wth *P. schwenenfeldii* having a compressiformes while *H. macrolepidota* having a torpedo shape. Based on their length-at-first maturity it is suggested that the mesh size regulation can be applied for both species which should gives the species a chance to spawn at least once in its life time. The mesh size of gillnets should not be less than 3 inches.

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