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Research Application Summary

Some aspects of reproductive biology of *Oreochromis andersonii, Oreochromis machrochir* and *Oreochromis niloticus* in ponds

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Abstract

The study on the reproductive biology of *Oreochromis macrochir*, *O. niloticus* and *O. andersonii* was carried out for sixty nine days in hapas. There were no significant ($P > 0.05$) differences in the number and weight of spawn incubated in the mouths of the three fish species although *O. macrochir* incubated the largest number of eggs with the lowest weight. However, it had longer ($P < 0.05$) eggs compared to other fish species. The brooding index for *O. niloticus* (5.04 ± 1.87%) was the lowest followed by *O. macrochir* (11.99 ± 3.59%) and *O. andersonii* (14.72 ± 5.13%).

Key words: Brooding index, cultured fish, Zambia

Résumé

L'étude sur la biologie de la reproduction des *Oreochromis macrochir*, *O. niloticus* et *O. andersonii* a été réalisée pour 69 jours dans les hapas. Il n'y avait pas eu de différences significatives (P> 0,05)dans le nombre et le poids des oeufs incubés dans la bouche des trois espèces de poissons bien que *O. macrochir* ait incubé le plus grand nombre d'œufs avec le poids le plus faible. Toutefois, il avait plus d'oeufs (P <0,05) par rapport à d'autres espèces de poissons. L'indice de couvaison pour *O. niloticus* (5,04 ± 1,87%) était le plus faible suivie par celui d'*O. macrochir* (11,99 ± 3,59%) et d'*O. andersonii* (14.72 ± 5,13%).

Mots clés: Indice de couvaison, poissons élevés, Zambie

Background

In Zambia, tilapias are the major cultured fish species because they are readily acceptable by consumers (Mudenda, 2004). However, the low fecundity of these species means that large numbers of brood fish must be kept (Ambali and Little, 1996) at a huge cost. Therefore, there is need to explore the specific reproductive biology of different fish species as a way of generating baseline data that can be used to manipulate their reproductive potential.

Literature Summary

In Zambia, the indigenous *O. andersonii*, *O. macrochir* and *Tilapia rendalli* are the leading grown fish species (Mudenda, 2004). However, the exotic *O. niloticus* that was introduced in 1982 (Schwanck, 2004) is steadily gaining popularity among the farmers as it is believed to do better than the indigenous Tilapia species. Worldwide, the poor productivity of *Oreochromis* species is attributed to synchronously breeding and failure to harvest fish seed efficiently (Ambali and Little, 1996).

Study Description

This study was conducted at National Aquaculture Research and Development Centre (NARDC), Kitwe, Zambia for 69 days. Four hapas (8 x 3 x 0.9m^3) were set in each of the three ponds with planks of wood placed on the sides to prevent fish escaping below the netting materials of the hapas. Three days later the hapas were stocked with three sexually mature *Oreochromis* species at 3 fish/m^2 in 3:1 (females: males) sex ratio with females averaging (99.54 ± 5.89, mean; SE). Fish were fed at 5% body weight using a 32% protein pellet manufactured by NARDC twice a day. Collection of the spawn was done at intervals of 21 days from the fish mouth. The eggs were then counted, weighed and length measured.

Findings

The fish length (SL) was found to significantly affect fish mouth (R^2 = 0.731, F = 119.73, $P < 0.05$). The mean number of spawn/ eggs incubated per fish (mean ± SE) was highest (789 ± 209) for *O. macrochir*, followed by 639 ± 130 for *O. andersonii* and lastly 605 ± 138 for *O. niloticus*. However, this difference was not significant across species (P > 0.05). The weight of the spawn did not differ significantly (P > 0.05) across the fish species under study. However, the spawn of *O. andersonii* were the heaviest (22.62 ± 7.11 mg), followed by *O. niloticus* (14.13 ± 5.99 mg). *Oreochromis macrochir* had the lightest spawn (11.62 ± 2.98 mg). The egg length of the species under study showed that *O. macrochir* (1.83 ± 0.04 mm) had the longest eggs followed by *O. niloticus* (1.78 ± 0.05 mm) and *O. andersonii* (1.601 ± 0.04 mm) but differences were not significant. The weight of eggs was significantly affected by egg number of the fish (R^2 = 0.0145, F = 0.572, P > 0.05). The brooding index for *O. niloticus* (5.04 ± 1.87%) was the lowest followed by *O. macrochir* (11.99 ± 3.59%) and *O. andersonii* (14.72 ± 5.13%).

Research Application

Oreochromis niloticus spends the least energy in reproduction among the fish species under study. Thus they gain weight

during spawning. Since *O. niloticus* is restricted to research stations and to farms permitted by authorities, the mesh sizes of the screens put on culture facilities should be relatively smaller than 1.0mm in order to avoid spawn escapes into natural water bodies.

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