Zoo-technical characterization of four strains of *Oreochromis niloticus*

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Introduction

Oreochromis niloticus is the species the most widely used in aquaculture in continental waters in Africa, because of its rapid growth, its easy and continuous reproduction, and its robustness. Many studies in the disciplines of reproductive physiology, genetics, and culture systems have been carried out in order to characterize the different sub-species or strains to distribute. This study, presents the results of the zoo-technical characterization of four strains of *Oreochromis niloticus.*

Materials and methods

In this trial, four strains of *Oreochromis niloticus* were compared ; a domestic strain, the Bouaké strain (BKE), and three natural

strains : Ghana (GHA), Niger (NIG), and Senegal (SEN). These last three strains arrived at the Idessa (Institut des savannes) pisciculture station (Bouaké) in June 1994, May 1993, and December 1993 respectively. The samples were initially collected from Lake Volta (GHA), and the Senegal (SEN) and Niger (NIG) rivers. The domestic strain is a result of the crossing on the Idessa station of a strain from theVolta basin (Burkina Faso, arrived in 1957) and a strain from the Nile basin (Uganda, arrived in 1968). The whole of the biological material was made up of juveniles which were grown-out then placed in reproduction in cement tanks for growth comparisons.

Eleven ponds of 50 m^2 each were used, three ponds for each strain with the exception of the GHA strain, where individuals were placed into two ponds due to a lack of available juveniles. The stocking density used was 2.2 fish per m^2 (110 fish per pond). The tests were carried out over a period of five months (150 days). Months 1, 2, 3, 4, and 5 had 28, 30, 29, 30, and 32 days respectively. The fish were fed with Faci (Fabrique d'aliment de Côte d'Ivoire) granulated feed « Tilapia 2 GE »(containing 30% protein of which 10% is of animal origin). The feed ration was identical for all ponds. The ration was based on the group having the highest mean weight. The fish were sampled each month in order to adjust the ration. All fish were individually weighed at stocking and draining.

To characterize the zoo-technical performances of each strain, the evolution of mean weights, daily individual growth rate and the feed conversion ratios were first examined with an Anova and then the Newman-Keuls or Student's t test with a 5% tolereance.

Results

Figure 1 shows the evolution of mean weights of the strains at the different samplings. The general trend shows an increase in mean

weights of all strains during the entire grow-out period. The Anova of mean weights of the strains shows significant differences at every sampling. At stocking, the BKE (71.3 g +1.3), GHA (69.8g+0.2) and SEN (70.6g+1.3) strains had statistically identical mean weights, greater than that of the NIG strain (58.9g+0.1).

At the first sampling, the three srains BKE (143.5g+6.1), GHA (132.8g+3.0) and SEN (147.5g+6.2) had statistically similar mean weights but the GHA strain was slightly lower than the other two. The NIG strain (125.3g+4.7) had a mean weight clearly lower than the other two.

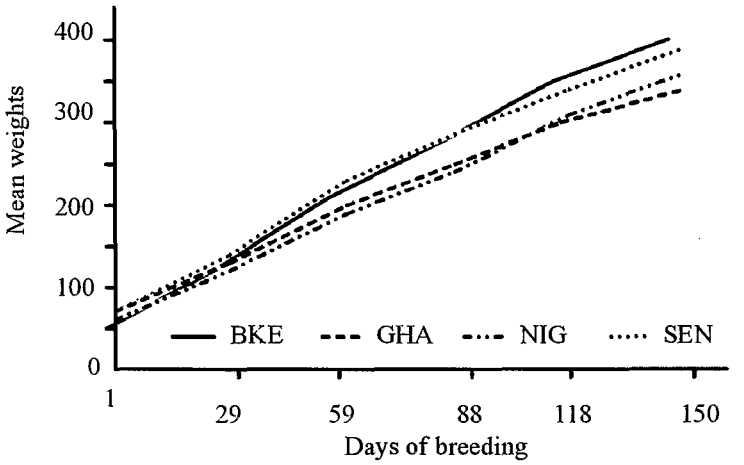

Figure 1
Evolution of mean weights at the different samplings.

We therefore have two groups, one made up of the BKE, GHA and SEN strains, and the other of the NIG strain.

At the second, third and fourth samplings we see that among the three strains that had identical initial mean weights, the GHA strain

now has mean weights inferior to those of the BKE and SEN strains.

Also, the NIG strain which had the lowest mean weight, now has the same mean weight statistically as that of the GHA strain.

It thus appeared two groups, the BKE and SEN strains in one hand the GHA and NIG strains in the other. The first two strains cited have higher mean weights.

At draining, we found three groups. The first is made up of the BKE (426.8g+22.8) and SEN (413.0g+19.3) strains. The second has the NIG (364.0g+9.4) strain. The last is the GHA (338.8g+3.6) strain. The strains in the first group have mean weights greater that that of the strain in the second group. The second group has mean weights greater than that of the third group.

Throughout the the grow-out period the BKE (2.4g/d+0.2) and SEN (2.3g/d+0.1) strains had better daily individual growth rates than the GHA strain (1.8g/d+0.0).

Concerning the NIG strain (2.0g/d+0.1), it holds an intermediate position between the two groups, not significantly different from the BKE and SEN strains on the one hand or the GHA strain on the other.

During the 150 days of grow-out, the feed conversion ratio of the GHA strain (2.4+0.1) is greater than that of the BKE (1.8+0.1) and SEN (1.9+0.2) strains. The ratio for the NIG strain (2.0+0.0) is not different from that of the GHA strain or the BKE and SEN strains.

Conclusion

From a zoo-technical point of view, based on the evolution of mean weights, daily individual growth rates and feed conversion ratios, the strains showing the best growth performances are the BKE and SEN strains. In Côte d'Ivoire, given the fact that the SEN strain which is imported, has no real advantages over the BKE strain, this

last remains the best for *Oreochromis niloticus* culture. In Senegal, the strain originating in this country should be distributed because it shows good performances. The GHA strain is the least performant of the four tested. It should be noted that the BKE strain can already be found in Côte d'Ivoire in the Bia and the Tanoé, two water systems shared by these countries. As for the NIG strain, it should be distributed in its country of origin, because it shows good growth potential.

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