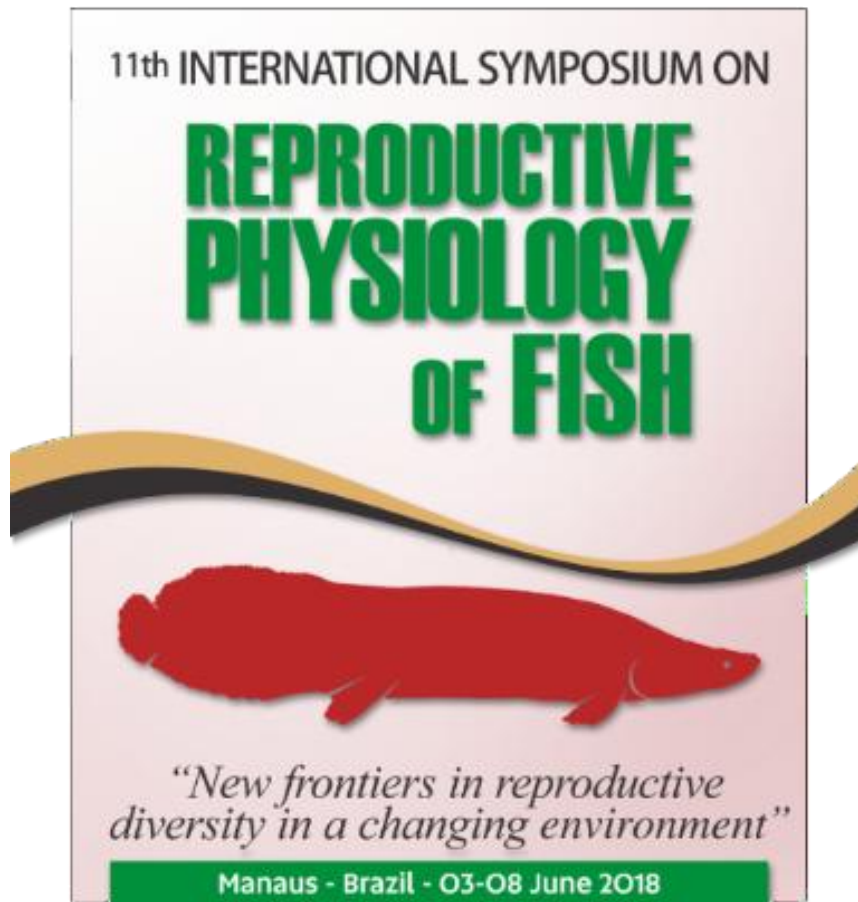


PROGRAM AND ABSTRACTS



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THE INFLUENCE OF WATER PH ON THE SEX DETERMINATION OF TAMBAQUI (*Colossoma macropomum*)

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Introduction

The Amazonian tambaqui (*Colossoma macropomum*) are the most important native fish in Brazilian aquaculture. The species is responsible for more than 38% of the national production of fish. At harvest, females are almost 20% heavier than males, therefore are the most profitable sex to be cultivated in tambaqui farming. In order to provide knowledge supporting the development of new technologies for the tambaqui industry, we aimed to evaluate the influence of pH on the sex determination of tambaqui.

Methods

The experiment was carried out under controlled laboratory conditions. Two independent tests were developed using larvae from different parental background (even different origin). We tested three pH treatments, 6.5 (acid), 7.5 (control) and pH 8.5 (alkaline) in two replicates (n = 350/ polyethylene tank). Tambaqui larvae (12 days after hatching) were maintained in the pH treatments until they were 4 cm standard length (SL), since at this size the gonads are already differentiated (unpublished data). Next, they were transferred to net tanks for growth, until 20 cm SL for sex identification through histology.

Results and Discussion

There was no significant difference between the treatment of pH 8.5 and control (7.5) in both tests ($\chi^2 = 0$, $p = 1$ and $\chi^2 = 5.496$, $p = 0.01$ for tests 1 and 2, respectively). On the other hand, more acidic water (pH 6.5) affected the sex ratio, resulting in a larger number of males in both tests ($\chi^2 = 12.54$, $p = 0.0003$ and $\chi^2 = 6.87$, $p = 0.00$ for tests 1 and 2, respectively). However, the pH 6.5 significantly increased the fish mortality. The low survival rate strongly suggests that this condition causes stress in tambaqui larvae. Since cortisol is a stress mediator steroid, in addition to being normally involved in the ionic regulation of fish, we assume that the ionic stress may increase the levels of cortisol. The function of cortisol in male formation is well characterized in other species in which environmental features interfere with sex (by inhibition of aromatase, induction of 11-ketotestosterone synthesis and/or causing germ cell apoptosis). Thus, we suspect that the pH effect on tambaqui masculinization is mediated by this steroid.

Conclusion

The pH imbalances the sex ratio in tambaqui. More acidic water leads to more males in the population, whereas neutral and alkaline pH have no influence on the sexual determination of the species. It remains to be elucidated if i) this effect is mediated by cortisol as in other species and ii) if this pH value is relevant in the natural environment, as differentiating larvae survival was very low in this condition. Our data stands out as the first indicating an environmental influence on the sex of tambaqui.