

## EFFECT OF TEMPERATURE AND DIFFERENT SPAWNING AGENTS ON REPRODUCTION SUCCESS OF BURBOT IN CAPTIVITY

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### Introduction

Since a few years burbot (*Lota lota*) has been introduced as a new aquaculture species in Belgium. However there is still some concerns regarding stable fingerling production. Latter can be improved by increasing control over the reproduction. Zarski et al. (2010) suggested that temperature is the major factor during final maturation and his study showed some variations in reproduction success under different thermal conditions. In this study three different temperature profiles were tested. This set-up could then be used to specify the better thermal regime that guarantees successful reproduction under controlled conditions. Kucharczyk et al. (2018) showed that the application of salmon gonadotropin releasing hormone analogue (sGnRH<sub>a</sub>) in burbot reproduction shortened latency time, synchronized final oocyte maturation and resulted in high embryo survival. Human chorionic gonadotropin (hCG) is another spawning agent that has been used successfully in the artificial reproduction of pikeperch (*Sander lucioperca*) (Zarski et al 2015). For this the effect of these two hormones were investigated in this experiment at two different application methods (one or two injections).

### Materials and methods

In 2016 burbot larvae were transported from Germany to Aqua-ERF and the largest fingerlings were reared in RAS for almost three years. Just before their third winter 126 of these burbot (61 males, ABW: 594±168.3gram; 65 females ABW: 660.7±191.9 gram ) were individually tagged and distributed over nine tanks (1m<sup>2</sup>; 0.4m<sup>3</sup>) connected to their own biofilte . Total biomass per tank was 8.78±0.63 kg m<sup>-1</sup>. Three cooling chambers, holding three fish tanks each, were used to assure three different temperature profiles. Temperature was lowered gently from  $\pm 10^{\circ}\text{C}$  till  $\pm 5^{\circ}\text{C}$ , then dropped fast till 1.5°C and holding this temperature for a one or two weeks before increasing it till 2°C, 3°C or 4°C, depending on the treatment. Light conditions were modulated based on natural light regime in Germany and were the same for all cooling chambers.

Part of the fish population were given 1 or 2 injection (14 days interval) with either 10 µg kg<sup>-1</sup> of sGnRH<sub>a</sub> or 500 IU kg<sup>-1</sup> of hCG. The spawning agents were always diluted in saline solution so that each fish received 1ml of solution per kg. All fishes that did not receive the 1<sup>st</sup> or/and 2<sup>nd</sup> injection with spawning agent received an injection with a saline solution at 1ml kg<sup>-1</sup>.

Cathetering of the females was repeated every week, starting at the moment of first injection, till oocyte showed to be ready for spawning. Females were then manually stripped to obtain the eggs. Obtained eggs were weighted and a working fecundity was calculated based on following formula: (Weight of eggs/Weight of fish) x100. Males were checked every week manually if they were given sperm.

### Results and Discussion

The first female started to spawn ten days after the first injection with sGnRH<sub>a</sub>, while the latest spawned on day 40. Highest frequency of spawning females occurred from day 22 till day 40. In total 46 out of 65 females have spawned (71%) during the trail and although higher spawning percentage were obtained for fish treated with sGnRH<sub>a</sub>, no significant effect was observed between the five different spawning agent treatments. This was also the case for the three different temperature regimes and the interaction between temperature and spawning agents. Temperature, spawning agents and the interaction between those two did not influence significantly the working fecundity. In the males we observed that not all males spermiated and that even the same male did not spermiated during the whole 40 days period.

This study showed that burbot reproduction in RAS with 3-year old burbot, reared from larval size in RAS, is possible. The results indicates the possibility to obtain earlier eggs from burbot females with the use of sGnRH<sub>a</sub> and even a better synchronization than with hCG. Although working fecundity was not influenced by the treatments, egg quality and further larval quality could be influenced for which further study is needed

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