

Reproduction of striped bass, *Morone saxatilis* (Walbaum), broodstock: monitoring maturation and hormonal induction of spawning

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Abstract. Levels of gonadal steroid hormones were quantified in an adult striped bass, *Morone saxatilis* (Walbaum), broodstock during their gametogenic cycle. Blood plasma concentrations of Estradiol (E_2) and testosterone in females, or 11-ketotestosterone (11-KT) and testosterone (T) in males, were used as indicators of maturation. In both sexes, hormone levels were low in summer but increased significantly by late October to intermediate levels which were then maintained until late January. They then increased again rapidly to maximum pre-spawning values attained in late February or March, and subsequently decreased during the spawning period (April and May) with an increased incidence of spent fish with low hormone levels. The changes in blood hormone concentrations coincided with annual changes in photoperiod and water temperature that may be useful landmarks for maturation in captive broodstock. Mature females were implanted with pellets containing a dose of approximately $20 \mu\text{g}/\text{kg}$ body weight of [D-Ala⁶-Pro⁹-NEt]-LHRH (GnRH_a) in a matrix of cholesterol (CH) and cellulose. In April, they had not yet begun final oocyte maturation (FOM) and were too immature for conventional induction of spawning by injection with human chorionic gonadotropin (hCG). In early April, females given two 95% CH (slow hormone-release) GnRH_a pellets (95/95) or females given one 80% CH (fast hormone-release) GnRH_a pellet and one 95% CH GnRH_a pellet (80/95) spawned within 13 days treatment ($n = 4$) with good egg fertility ($76 \pm 7\%$ of total) and hatch rates ($62 \pm 15\%$ of fertile). Females given dual fast-release GnRH_a pellets (80/80) or control (Sham) pellets did not spawn or show evidence of increased oocyte diameter or development. In late April, four of six females given the 80/95 GnRH_a pellet combination spawned within 9 days. Three fish produced fertile eggs ($54 \pm 18\%$), one spawned overripe eggs, and the remaining two increased oocyte diameter and maturation. Three corresponding controls did not spawn, and two of these showed clear signs of atresia within 11 days. In early May, some females were undergoing early FOM and were mature enough to be spawned by hCG injection. Three were given a single 80% CH GnRH_a pellet and spawned within 6 days of treatment to produce fertile eggs ($44 \pm 6\%$). Of two other females given dual 80% CH GnRH_a pellets, one spawned infertile eggs and the other failed to spawn within 9 days. GnRH_a implants show promise as a technique for inducing spawning of captive striped bass broodstock although the optimum hormone delivery systems, dosages and release rates should be verified for fish at specific maturational stages.