

Induction of Ovulation in Common Snook, *Centropomus undecimalis* [Bloch], using Human Chorionic Gonadotropin (HCG) and Gonadotropin-Releasing Hormones (GnRH)

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ABSTRACT

Common snook, *Centropomus undecimalis*, is one of Florida's most popular inshore sport fish and the subject of an ongoing stock enhancement program. In the development of hatchery techniques for spawning this species, both human chorionic gonadotropin (HCG) and gonadotropin-releasing hormones (GnRH) were investigated. Doses of HCG were compared to determine the smallest dose that would induce ovulation and produce optimum egg and larval survival. Doses of 50, 100, 250, 500, 1,000, and 2,000 IU/kg body weight (BW) were used. A dose of 500 IU/kg BW of HCG produced consistent ovulation, good egg quality and larval survival. Secondly, four analogs of GnRH were each administered in time-release pellets at a dose of 10 $\mu\text{gm/kg/day}$ over five days. These were salmon (sGnRH), chicken (cGnRH-II), seabream (sbGnRH), and mammalian (mGnRH) gonadotropin-releasing hormones. With the exception of sbGnRH which was ineffective, the time to ovulation was similar with all hormones, and viable larvae were obtained. Control fish did not ovulate.

KEY WORDS: Common Snook, induced ovulation, spawning

INTRODUCTION

Common snook is a popular inshore sport fish in southern Florida. This species is an important candidate for both aquaculture and stock enhancement (Chapman 1982). The procedure to induce final oocyte maturation and ovulation in common snook has been to use HCG at a dose of 1,000 IU/kg BW. In an effort to improve spawning methods, six doses of HCG were compared to determine the lowest dose that would induce ovulation and provide the best egg quality and larval survival. In addition, four forms of gonadotropin-releasing hormone were evaluated for their ability to induce ovulation in common snook. Two of these were known forms (cGnRH-II and sGnRH) that occur in common

snook (Sherwood et al., 1993). A third form of GnRH was also isolated from common snook in insufficient quantity for sequence determination. However, sbGnRH has since been sequenced (Powell et al. 1994) and may be the same as the unknown form in common snook. The three GnRH forms that have been isolated from fish and the mammalian analog were compared for their ability to induce gonadotropin-releasing activity in the pituitary of seabream, *Sparus aurata* (Zohar et al. 1995). We compared their ability to induce ovulation in common snook.

MATERIALS AND METHODS

Common snook were collected during their spawning season using either a seine or trammel net (Taylor et al. 1998). To compare doses of HCG, females were divided into six groups of five fish each and injected with: 50, 100, 250, 500, 1,000, and 2,000 IU/kg BW of HCG. Controls were injected with the carrier, 0.9% sodium chloride. Each form of GnRH was administered to groups of four female common snook as intraperitoneal, time-release GnRH pellets (10 μ gm/kg/day). Controls were untreated or implanted with a placebo.

Individual fish were kept in soft-mesh net pens in recirculating tank systems where they were biopsied to follow final oocyte maturation. Percent of fertilized eggs, percent hatch, and percent survival to first feeding (72 hour post-hatch) were evaluated to determine spawn quality (Neidig et al. 2000).

RESULTS

The dose of HCG and number of fish injected versus the number that ovulated were as follows: controls 5:0; 50 IU 5:0; 100 IU 5:1; 250 IU 5:2; 500 IU 5:5; 1,000 IU 5:5; and 2,000 IU 5:5. Control fish did not ovulate. The percent fertilization and percent survival of larvae to first-feeding from fish injected with 250, 500, 1,000, and 2,000 IU/kg BW HCG were within acceptable ranges (Neidig et al. 2000).

In the GnRH study, the control, placebo, and sbGnRH-treated fish did not ovulate. Most (75%) of these fish had no advance in oocyte maturation. Three of four mGnRH-treated fish ovulated, and the ovaries of the fourth reached a preovulatory stage. All of the fish implanted with sGnRH and cGnRH-II ovulated and produced viable eggs.

DISCUSSION

The dose of HCG that produced consistent ovulation and good egg quality was 500 IU/kg BW. Implants of sGnRH, cGnRH-II, and mGnRH induced ovulation and produced viable eggs. The GnRH study was performed in August at the end of the reproductive season, and this may account for one of the fish (mGnRHa) failing to ovulate.

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