

Volitional Tank Spawning of Female Striped Bass with Male White Bass Produces Hybrid Offspring

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Abstract.—We report the first volitional tank spawning of female striped bass *Morone saxatilis* with male white bass *M. chrysops*. The female striped bass were reared for 6 or 8 years from larvae to mature adults in captivity. The wild-caught male white bass were acclimated to captivity 1 year before spawning trials. The fish were induced to mature with implanted pellets containing synthetic analogue of mammalian gonadotropin-releasing hormone, [D-Ala⁶-Pro⁹-NET]-LHRH, at 10 µg/kg body weight in a cholesterol and cellulose matrix. Males later received an additional injection of human chorionic gonadotropin at 500 IU/kg body weight to maintain spermiation. At hormone implantation, females were in an advanced state of maturity with oocyte diameters ranging from 650 to 1,000 µm and males were producing milt. Eight females were placed in tanks with three or six males for spawning. Three females did not release eggs within 14 d. The remaining five females spawned, but only two produced fertilized eggs and hybrid offspring. All spawnings had large numbers of over-ripe eggs, which suggests that striped bass females had a behavioral aversion to spawning with white bass males.

Tank spawning is the preferred method for production of striped bass *Morone saxatilis* in aquaculture (Bishop 1975). Mature adults are collected from the wild, injected with human chorionic gonadotropin (HCG), placed in spawning tanks, and allowed to mature and spawn volitionally (Smith and Whitehurst 1990). The technique is ideal for hatcheries with a limited number of personnel and avoids repetitive gonadal biopsy to monitor ovarian maturation for manual spawning and in vitro fertilization (Rees and Harrell 1990).

Hybrid striped bass are generally used in commercial aquaculture because they are less regulated than striped bass and are perceived to be a superior cultivar. In previous trials, neither original-cross hybrid striped bass (female striped bass × male white bass *M. chrysops*) nor reciprocal-cross hy-

brids (female white bass × male striped bass) were successfully produced through tank spawning (Bishop 1975; Jenkins and Smith 1987).

We undertook experiments to evaluate production of original-cross hybrid striped bass by inducing captive broodstock to spawn in tanks. The fish were matured with a synthetic analogue of mammalian gonadotropin-releasing hormone. We also sought to provide insight into the mechanisms of hybridization in nature, an important phenomenon from the perspective of fishery resource management.

Methods

Experimental fish.—Female striped bass were reared in tanks at the Crane Aquaculture Facility (Agricultural Experiment Station, University of Maryland) until sexually mature. They were of mixed Chesapeake Bay stock origin, from the Chesapeake and Delaware Canal and the Choptank or Nanticoke rivers. All were received 1 d after hatching. Larvae were fed nauplii of brine shrimp *Artemia* sp. and commercial salmon and trout diets thereafter. Water quality characteristics during fish rearing were similar to ambient Chesapeake Bay ranges of 1–7‰ salinity, 0–33°C, and 4–15 mg/L dissolved oxygen. The laboratory photoperiod was from natural daylight. Details on the broodstock rearing methods were reported by Woods et al. (1990, 1992). Females used for spawning trials were age 6 or 8. They had not previously spawned or been treated with hormones, although other fish from the same cohorts had been successfully induced to spawn (Woods et al. 1990, 1992; Woods and Sullivan 1993).

Male white bass about age 2 were captured by hook and line from the Illinois River near Starved