HYBRID STRIPED BASS

Project Component Termination Report for the Period
May 1, 1989 to August 31, 1993

NCRAC FUNDING LEVEL: $232,960 (May 1, 1989 to August 31, 1993)

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Extension Liaison:
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REASON FOR TERMINATION
The objectives for this work on Hybrid Striped Bass were completed.

PROJECT OBJECTIVES
(1) Obtain and maintain (in captivity) populations of spawning size white bass.

(2) Define reproductive development in wild and captive white bass by characterizing seasonal changes in hormone titers and gonadal histology.

(3) Evaluate the effects of selected photoperiod/temperature and hormonal manipulations on gonadal development and spawning in white bass brood stock.

PRINCIPAL ACCOMPLISHMENTS
Southern Illinois University-Carbondale (SIUC) researchers have successfully captured adult white bass, acclimated them to tank culture conditions, and trained them to accept formulated feed. Some fish have been held in captivity for over three years. This level of domestication is not known to have been achieved with white bass in any other laboratory or commercial enterprise.

Considerable numbers of white bass spawns have been accomplished using various hormonal/temperature/photoperiod manipulations over the course of this project. Fish have been accelerated to spawn as early as January, and have had their spawning delayed to as late as October. Accordingly, techniques have been developed that allow successful spawning of white bass any season of the year. Moreover, female white bass that successfully spawned in October 1992 were successfully induced to spawn again in April 1993. Thus, it was demonstrated that white bass can be successfully spawned twice in a 7-month period. It was also shown that male white bass held at or above spawning temperatures (15°C; 59°F) produced viable sperm for at least two months. Average hatching rates have also been improved from 25% to 50%. These findings represent major steps toward the development of domesticated white bass brood stocks to be used for hatchery production of hybrid striped bass.

Injection levels of a synthetic luteinizing hormone-releasing hormone analogue (LhRha) and human chorionic gonadotropin (hCG) have been identified that greatly improve upon previous results at SIUC, and elsewhere, with respect to controlled spawning of white bass. Data indicate that hCG dosages considerably less than that traditionally used to induce final egg maturation are more useful in white bass. In addition to providing guidance for improved spawning performance, these data have positive implications toward eventual regulatory approval of hCG by FDA for spawning Morone species.
Annual rhythms of serum levels of estradiol-17β and testosterone, as well as gonadal growth and histology of the wild and the three captive populations of white bass were documented and correlated with actual spawning events.

**IMPACTS**

**DOMESTICATION**
The development of a protocol to habituate adult white bass to captivity, including training to dry formulated feeds, allows for developing domesticated brood stock. Domesticated brood stock is clearly advantageous by:

- obviating need to collect brood stock from wild,
- resolving numerous regulatory issues regarding collection and hauling of wild brood stock,
- allowing for brood stock selection programs, and
- ensuring availability of brood stock when needed.

**OUT-OF-SEASON SPAWNING**
The development of efficacious procedures to manipulate sexual maturation and induce out-of-season spawning is important for optimal management of brood stock. It leads to:

- greater predictability of gamete production,
- reduced incidence of failed spawnings,
- reduced incidences of brood stock losses due to toxemia, and
- production of fertilized eggs and fry at predetermined times throughout the year.

**HATCHING RATES**
Improvements in hatching rates allows for increased hatchery production or reduction in brood stock needs.

**hCG DOSAGES**
Determination of the most efficacious hCG dosages not only improves spawning performance, but these data have positive implications toward eventual regulatory approval of hCG by the FDA for spawning *Morone* species. As a direct consequence of this work:

- standard dosages of hCG are being tested for efficacy in a multi-state Investigational New Animal Drug (INAD) application being administered by Auburn University through sponsorship of Intervet Inc.,
- hCG will be tested for animal safety by SIUC under sponsorship of Intervet Inc., and
- these projects will collectively provide FDA with necessary information to make a determination for approval of hCG for brood fish.

**RECOMMENDED FOLLOW-UP ACTIVITIES**
NCRAC funded a follow-up study that is focused on developing procedures to intensively rear white bass larvae to a stage when they will consume formulated feed (see next Project Component Termination Report). A proposed study for the next NCRAC funding cycle will, among other topics, compare three strains of white bass in yield trials. Collectively, the results from these studies should pave the way to undertake a white bass brood stock selection program.

**PUBLICATIONS, MANUSCRIPTS, OR PAPERS PRESENTED**
See the Appendix for a cumulative output for all NCRAC-funded Hybrid Striped Bass activities.
## Support

<table>
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<th>Year</th>
<th>NCRAC-USDA Funding</th>
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## Appendix

### Hybrid Striped Bass

**Publications in Print**


**Manuscripts**


Papers Presented


Kohler, C.C., R.J. Sheehan, and T.B. Kayes. 1989. Advancing hybrid striped bass culture in the
Midwestern United States. 51st Midwest Fish and Wildlife Conference, Springfield, Illinois,
December 5-6, 1989.

Collection, acclimation to captivity, and out-of-season spawning of white bass. American
Fisheries Society Annual Meeting, Rapid City, South Dakota, September 14-17, 1992.

Kohler, C.C., R.J. Sheehan, V. Sanchez, and A. Suresh. 1994. Evaluation of various dosages of
hCG to induce final oocyte maturation and ovulation in white bass. 25th Annual Meeting of

Kohler, C.C., R.J. Sheehan, A. Suresh, L. Allyn, and J. Rudacille. 1996. Effect of hCG dosage on
hatching success in white bass. International Congress on the Biology of Fishes, July 15-18,
1996, San Francisco, California.


of extended and cryopreserved *Morone* sperm: when is cryopreservation the best option?
Annual Meeting, Illinois/Wisconsin Chapters of the American Fisheries Society, Waukegan,


Rudacille, J.B., and C.C. Kohler. 1996. Relative performance of white bass, sunshine bass, and
palmetto bass fed a commercial diet. Aquaculture America '96, U.S. Chapter of the World
Aquaculture Society, February 14-17, 1996, Arlington, Texas. (Awarded Best Student
Presentation)

Sheehan, R.J. 1995. Use of sperm extenders. North Central Regional Aquaculture Center Hybrid

Workshop, November 2-4, 1995, Champaign, Illinois.