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Production of channel catfish (*Ictalurus punctatus*), female X blue catfish (*Ictalurus furcatus*) and male hybrid progeny using xenogenesis

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Xenogenesis was studied as a method to produce hybrid catfish fry via mating xenogeneic males with normal channel catfish *I. punctatus* females. This technology could reduce or eliminate the intensive labor and sacrifice of blue catfish males currently required to produce hybrids by hand-stripping and artificial fertilization. The primary goal was to produce naturally spawned hybrids using xenogeneic catfish. Stem cells isolated from blue catfish were transplanted into confirmed triploid channel catfish. The transfer of stem cells was done at three life stages: blastula injection, sac-fry injection, and catheterized sub-adult injection. The xenogeneic catfish were allowed to grow in ponds for 3 years until they reached sexual maturity. Putative xenogeneic channel catfish males harboring sperm of blue catfish were paired and mated to normal channel female in aquaria following LHRHa injection of both fish at a dosage rate of 100 mg/kg of fish. One xenogeneic male from the sub-adult treatment successfully spawned twice, but produced only 3 and 21 progeny, respectively. The putative xenogeneic fish from the blastula treatment have yet to produce a viable spawn. Three xenogeneic males from the fry treatment produced hybrid spawns with high fertility. One paired twice to two different channel females resulted in 20% fertility of the egg mass and the other two males spawned and the resulting egg masses were 100% fertile. PCR results for the progeny produced from the semi-natural spawning of putative xenogeneic channel males paired to normal channel females confirmed genotype to be that of channel catfish x blue catfish hybrids. This is the first report of large-scale, 100% hybrid production using xenogenesis. The production of xenogeneic brood stock must be improved for commercial scale production of brood stock.

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Disturbance of essential fish habitat by commercial passive fishing gear in the Delaware, Maryland and Virginia region of the Mid-Atlantic Bight

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Trap fishing is one of the oldest methods utilized to capture fish and fish traps are currently one of the most dominant fishing gears utilized by commercial fishermen in the Delaware, Maryland and Virginia region. Impacts of traps on live-bottom habitat have become an increasing concern since the 1990's, yet, there is little published data regarding trap-habitat interactions. Any substrate necessary for fish spawning, breeding, feeding or growth to maturity is deemed Essential Fish Habitat (EFH). To increase capture success, traps are often deployed near or on EFH. We assessed the degree of trap impacts via video observations from commercial traps at four fishing sites in the Delaware, Maryland and Virginia region, 27-36 km off the coast, at depths of 20-30 m. Two traps within a 20 trap rig were customized by attaching GoPro® cameras. Analyses of 123 trap deployments show traps often drag across the ocean floor and habitats during the retrieval process. Duration of the dragging phase is strongly correlated with trap position on the line ($r2=0.6$; $p<0.001$); traps farther down drag significantly longer than traps closer and first retrieved (1st vs. last trap: $p<0.01$). Dragging significantly increases trap-habitat interactions. Traps with minimal drag have <1% chance of contacting EFH but dragging increases the proportion of traps interacting with EFH to 46%. Observed trap-habitat interactions include: Breaking coral and trampling sea stars, anemones, and bryozoans. EFH located off the Delaware, Maryland and Virginia coast are highly fragmented and sparse and therefore adverse impacts of fishing traps probably affect a large portion of available habitat.

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