



IOWA DEPARTMENT OF NATURAL RESOURCES

Sport Fish Restoration Research Findings

Short-term stocking survival of yearling
Muskellunge raised in a recirculating
aquaculture system



Project Duration: 2020-2021

Location: Spirit Lake (Dickinson County)



Natural Lakes

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Short-term stocking survival of yearling Muskellunge raised in a recirculating aquaculture system

Culture of sportfish for wild stock enhancement via a recirculating aquaculture system (RAS) has large advantages over traditional flow-through culture systems and has increased in popularity amongst agencies that rear and stock sportfish. However, the methodology to maximize fish growth, condition, and health within a RAS system has not been explored for many sportfish nor have their overall contribution to the fishery been evaluated. This research evaluated the short-term stocking survival of yearling Muskellunge raised in a RAS by implanting telemetry tags into fish and tracking their movements, depth, and habitat usage in Spirit Lake, Iowa.

Goals

- Evaluate the short-term (~100 days) stocking survival of yearling Muskellunge raised in a RAS and stocked into Spirit Lake, Iowa.
- Evaluate if providing minnow forage to yearling RAS Muskellunge prior to stocking (1-2 weeks prior to stocking) improved survival in the wild.
- Evaluate the movement, depth, and habitat usage of RAS yearling Muskellunge during the 100 day stocking evaluation.

Results

- During the final RAS grow-out phase, yearling Muskellunge had clinical symptoms of *Aeromonas* and were impacted by moderate to severe fin erosion, thus contributing to poor health and quality of fish prior to stocking.
- Despite these observations, 36 RAS Muskellunge were fitted with radio tags and stocked in Spirit Lake in late April.
- Fourteen (39%) of RAS Muskellunge were consumed by avian predators within the first three weeks post-stocking and 22 (61%) were consumed by these predators within 110 days.
- Fish and terrestrial predators consumed 5 RAS Muskellunge and two others died from presumed bacterial infections.
- Another five fish died of unknown reasons and only 2 (5.6%) survived up to 153 days after being stocked. No difference was detected between RAS fish finished with minnows and those that were not.
- RAS Muskellunge preferred shallow depths and

were almost exclusively found in the cattail and bulrush area near the stocking location.

- Timing (late April) and location (< 3 ft water depth) of fish stocked, fish condition, water transparency (> 15 ft), and preference of shallow water habitats likely contributed to the high rate of mortality of yearling RAS Muskellunge observed in this study.



Conclusions

The bacterial infection may have contributed substantially to the poor initial survival and high predation rates of stocked yearling RAS Muskellunge. For a meaningful evaluation of stocked yearling RAS Muskellunge survival in the wild, techniques and procedures used to maximize fish fin condition and improve health of fish raised in a RAS system need to be explored. Furthermore, the final grow-out period used here was ineffective at improving survival and a longer duration may be needed to allow fish proper foraging conditions. The use of RAS Muskellunge culture is promising, but needs further evaluation.