Aquaponics

HORT 4601

University of Minnesota
Driven to Discover℠

Elusive Catch: Using Aquaponics to Grow Sturgeon and Wild Rice

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Introduction

The number of watersheds that contain wild rice has declined since 1900, and pallid sturgeon have become endangered. Our project aims to produce these species in an aquaponics system in order to aid conservation efforts. We will produce wild rice to reseed lakes and we propose partnering with the U.S. Fish and Wildlife Service to raise sturgeon to maturity and then release them back into their natural habitat.

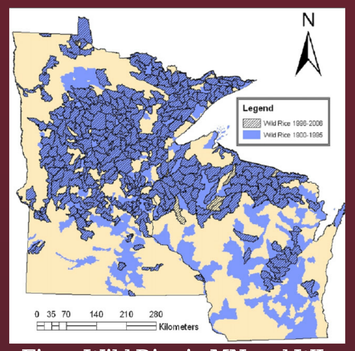


Fig. 1: Wild Rice in MN and WI; Drewes, A. & Sibernagel J., 2012

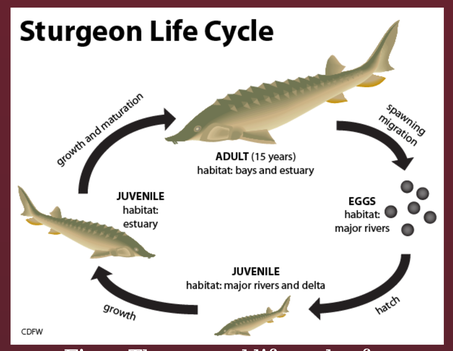
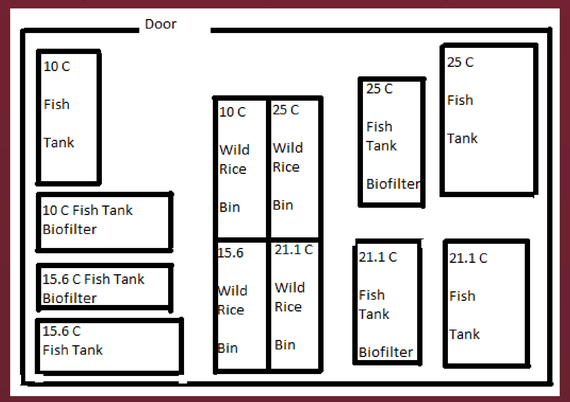


Fig. 2: The general life cycle of a pallid sturgeon; Gingras, M., 2013

Objectives

- Test 4 systems at different water temperatures to investigate ideal conditions for the aquaponic production of wild rice and sturgeon.
- Explore the social, economic and environmental implications of raising sturgeon and wild rice.
- Engage with resources, corporations and stakeholders to understand what knowledge currently exists and what knowledge is needed.

Fig. 3: The proposed greenhouse arrangement



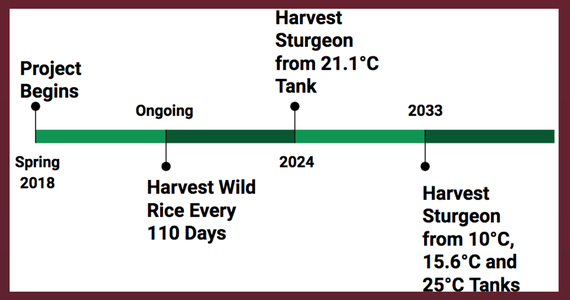


Fig. 4: The proposed project timeline

Methods

VARIABLE
- WATER TEMP: 4 tanks, one each at 10° C, 15.6° C, 21.1° C and 25° C.

STURGEON
- SOURCE: Gavins Point Hatchery (yearlings).
- STOCKING DENSITY: 10/tank (5 male, 5 female).
- FEED: 5-6 times/day with 34.75 g pellet feed.
- DATA: Avg. length, weight, days to maturity.

WILD RICE
- ARRANGEMENT: 48 plants per tub.
- SOURCING: Wild rice seed from UMN.
- DATA: Avg. weight, days to maturity.

Anticipated Results

- Ideal Pallid Sturgeon Temperature: 22° C
- Ideal Wild Rice Temperature: 17.7° to 21.1° C
- Therefore, we anticipate the best results in the 21.1° C tank, measured by weight of fish and weight of seeds.

Potential Problems & Solutions

Stocking Density →
- Start with 10 fish/tank.
- Increase/decrease as needed.

Unsafe pH & Ammonia Levels →
- Test water everyday.
- Have buffers to control spikes in pH or Ammonia.
- Use starter fish before introducing sturgeon into the system.

Proofing Sturgeon for Release into the Wild →
- Wean sturgeon off pellet feed as they mature.
- Expose sturgeon to live prey.
- Mimic the water flow of their natural environment .

Acknowledgements & References

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- References: z.umn.edu/ElusiveReferences