

Turtle Egg Incubation



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Presentation Outline

- ▶ Importance of Turtle Egg Incubation
- ▶ Wisconsin Turtle Conservation Program
- ▶ Methods & Results of Incubation Program
- ▶ 2018 Incubation Method - Detailed Protocol
- ▶ Egg Collection
- ▶ Troubleshooting Incubation Problems
- ▶ Hatching & Release
- ▶ Questions

Why Incubate Turtle Eggs?

- ▶ Declining turtle population in Wisconsin
 - ▶ Multiple threats
- ▶ Positive experience
 - ▶ Rehabilitators, volunteers, & public
- ▶ Inexpensive & low maintenance program
- ▶ Turtles are cool!



Wisconsin Turtle Conservation Program

Road Mortality & Turtle Sighting

- ▶ Citizen-science mapping project
- ▶ Improves data on high risk areas for conservation policy and infrastructure
- ▶ Add to population data of species in Wisconsin
- ▶ Members of the public & rehabilitators can participate
- ▶ Accessible for online entries or mailed reports

- ▶ <http://wiatri.net/inventory/witurtles/>



2014 ReptiBator, Homemade Styrofoam Incubator

- ▶ Reptibator incubator by ZooMed & Styrofoam incubator
 - ▶ Limited space
 - ▶ Temperature variations
- ▶ 120 eggs incubating
 - ▶ 8 hatched & released
 - ▶ 2 snapping, 1 painted, 5 spiny softshell
 - ▶ 6.67% success rate



2015

- ▶ Incubation method:
 - ▶ Plastic storage bin with heated water; Tupperware containers with vermiculate floating in water
 - ▶ Eggs buried $\frac{3}{4}$ with top $\frac{1}{4}$ exposed
- ▶ Limitations:
 - ▶ Excessive moisture & humidity, mold
- ▶ 252 eggs incubating
 - ▶ 16 hatched & released
 - ▶ 9 snapping, 7 painted
 - ▶ 6.35% success rate



2016

- ▶ Two incubation methods
 - ▶ Eggs split randomly
- ▶ 303 eggs incubating
 - ▶ 21 hatched & released
 - ▶ 19 snapping, 2 painted
 - ▶ 6.9% success rate



2016 Two Incubation Methods

Method 1 2016

- ▶ Glass aquarium with heated water; tupperware container with sand substrate on shelf above water
 - ▶ Eggs buried $\frac{3}{4}$ with top $\frac{1}{4}$ exposed
- ▶ Limitations:
 - ▶ Inefficient use of space
 - ▶ Excessive moisture

Method 2 2016

- ▶ Glass aquarium filled with sand
 - ▶ Eggs buried 6-10 inches deep
- ▶ Limitations:
 - ▶ Inefficient use of space
 - ▶ Desiccation of eggs, more moisture required

16-1079 Common Snapping Turtle



- ▶ HBC adult, 35 eggs incubating after being laid in care
- ▶ 11 hatched & released
 - ▶ 5 hatched from Method 1 (glass aquarium incubator, tupperware with sand substrate)
 - ▶ Average incubation length 66.4 days
 - ▶ 6 hatched from Method 2 (buried in sand)
 - ▶ Average incubation length 97.8 days
- ▶ 16-1079 released after rehabilitation



2017

- ▶ Two incubation methods
 - ▶ Eggs split randomly
- ▶ 430 eggs incubating
 - ▶ 85 hatched & released
 - ▶ 13 spiny softshells, 68 snapping, 7 painted turtles
 - ▶ 19.77% success rate



- ▶ Method 1 2017: plastic storage bin with heated water; tupperware container with vermiculite substrate on shelf above water
 - ▶ 84 eggs hatched & released
 - ▶ Limitations:
 - ▶ Excessive moisture, mold
- ▶ Method 2 2017 “Turtle Garden”:
plot of sandy soil outside of wildlife center
 - ▶ 1 egg hatched & released
 - ▶ Limitations:
 - ▶ Multiple eggs stopped mid development
 - ▶ Difficult to imitate natural nesting

2017 Method 2 “Turtle Garden”



2018

- ▶ One incubation method - best practice based on previous years
 - ▶ Similar to 2017 Method 1
 - ▶ plastic storage bin with heated water; tupperware container with vermiculite substrate on shelf above water
- ▶ 477 eggs incubating
 - ▶ 223 hatched & released
 - ▶ 46.96% success rate



2018 Incubation Method - Supplies

- ▶ Plastic storage bin with lid - under bed design
 - ▶ Sold at Menards, Walmart, etc.
 - ▶ Approx. \$8-15
 - ▶ One storage bin creates one incubator
- ▶ Egg crate light panel - Plaskolite
 - ▶ Sold at Menards (SKU: 5177116)
 - ▶ Approx. \$15 for 24 x 48 inch panel
 - ▶ Shelving inside incubator
- ▶ Tupperware containers - multiple sizes acceptable
 - ▶ Easy to find at most stores
 - ▶ ~6-12 eggs fit per container



2018 Incubation Method - Supplies

- ▶ Submersible water heater - easy to read temperature settings ideal
 - ▶ Sold at pet stores, online (Amazon, etc.)
 - ▶ Approx. \$12-40
 - ▶ One per incubator depending on wattage
- ▶ Thermometer with temperature probe - Zoomed, Pangea brands
 - ▶ Sold at pet stores, online (Amazon, etc.)
 - ▶ Approx. \$6-10
 - ▶ One per incubator



2018 Incubation Method - Supplies

- ▶ Vermiculite Fine Grade Potting Substrate
 - ▶ Sold at Menards, garden centers
 - ▶ Approx. \$15 for 8 qt. bag
 - ▶ One bag enough for 1-2 incubators
- ▶ Miscellaneous items to hold egg crate shelf in place
 - ▶ Utilize available resources
- ▶ Water



2018 Incubation Method - Set-Up

- ▶ Choose a location where incubator can stay undisturbed for 2-3 months
- ▶ Fill plastic storage bin with 2 inches water
- ▶ Add submersible water heater, temp set to 80 degrees F
- ▶ Add egg crate shelf with feet to hold it just above water level
- ▶ Individual tupperware containers with vermiculite substrate rest on shelf
- ▶ Add thermometer temp probe to one tupperware container
- ▶ Secure lid



2018 Incubation Method - Set-Up

Tupperware containers

- ▶ Punch small holes along side walls of container along the top 1/3rd
- ▶ Mix vermiculite substrate 1:1 by weight with water; substrate should be damp
- ▶ Fill tupperware 1-1.5 inches with substrate



Recommendation

- ▶ Set-up incubator and several tupperware containers with substrate early
 - ▶ Allows for temperature fluctuations to be resolved
 - ▶ Increases efficiency
- ▶ Create a record log to keep accurate account of turtle eggs

Temperature-Dependent Sex Determination

- ▶ Sex of hatchlings of many species determined by the incubation temperature
 - ▶ Softshell turtles are the exception
- ▶ Painted Turtles
 - ▶ 70.7-80.6 degrees F = males only
 - ▶ 68 and 82.4 degrees F = 50% males
 - ▶ 84.2-89.6 degrees F = 100% female
- ▶ Snapping Turtles
 - ▶ 68 degrees F = 100% females
 - ▶ 69.8-71.6 degrees F = produce both
 - ▶ 73.4-75.2 degrees F = 100% males
 - ▶ 77-82.4 degrees F = produce both
 - ▶ 84.2-87.8 degrees F = 100% females

Egg Collection

Viable Eggs for Incubation

- ▶ Laid in care by turtle in rehabilitation
 - ▶ Laid in water or dry dock
- ▶ DOA turtle admissions
- ▶ Euthanized on arrival or in care

Eggs Laid in the Wild

- ▶ Best chance of success in the wild
- ▶ WI DNR resource guide to protecting turtle nests
 - ▶ <https://dnr.wi.gov/files/PDF/pubs/nh/nh0939.pdf>

Gravid, Female?

Identifying Females

- ▶ Painted turtles - forelimb claw length
- ▶ Painted & Snapping turtles - cloacal location on tail relative to carapace
- ▶ Other species specific characteristics



Identifying Gravid Females

- ▶ Palpation
- ▶ Radiographs
- ▶ Actively check all females after death during egg laying season
 - ▶ May - June

Harvest Eggs

- ▶ Confirm death for DOA and euthanized turtles
 - ▶ Doppler, pith
- ▶ Prepare tupperware containers with substrate
- ▶ Create incision into coelom through the inguinal region
 - ▶ Gently pull eggs out of body cavity
 - ▶ Egg shells soft at this stage
- ▶ Discard broken eggs & any tissue appropriately for chemically euthanized turtles



Setting Eggs Up for Success

- ▶ Label eggs with individual ID # with pencil
- ▶ Use this ID to maintain egg orientation throughout incubation
 - ▶ Unlike other species, turtle egg development can be disturbed if the egg is rotated
- ▶ Gently bury eggs in substrate - $\frac{3}{4}$ of egg is buried with top exposed
- ▶ Use equal spacing
 - ▶ Egg size varies by species and individual parent
 - ▶ 6-12 eggs may fit per tupperware container
- ▶ Label individual tupperware containers with egg and adult information



Troubleshooting Incubation Problems

- ▶ Mold
- ▶ Excessively wet substrate
- ▶ Desiccating eggs
- ▶ Discolored eggs



Hatching - Release

- ▶ 60-90 day incubation periods
 - ▶ Temperature, species dependent
- ▶ Complete physical exam after hatching
 - ▶ Yolk sac prominent for several days post-hatching
- ▶ Release Considerations:
 - ▶ Release site should be chosen from parent's rescue location (same watershed)
 - ▶ Appropriate habitat
 - ▶ Weather
 - ▶ Release site accessibility
 - ▶ Permission to release



Questions?



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