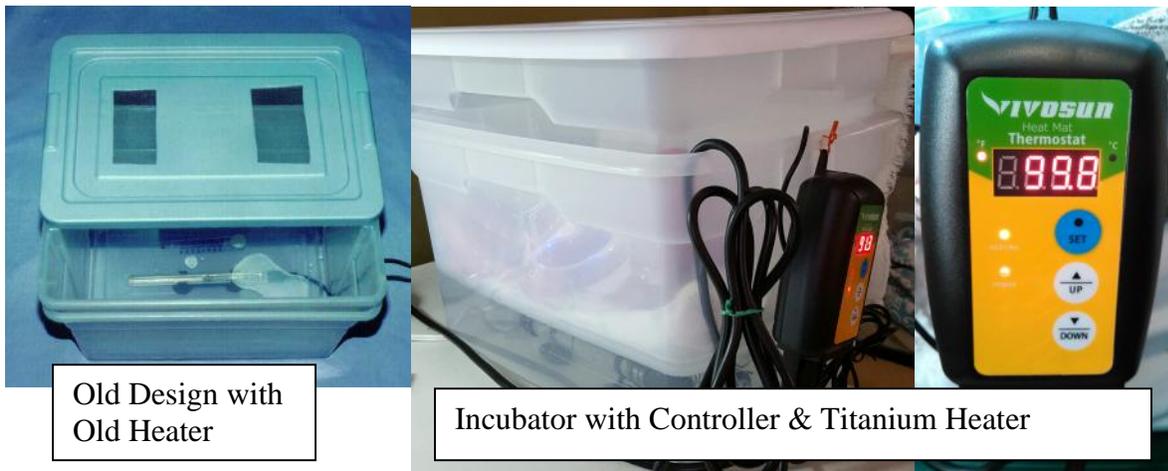

Professional Care for Injured and Orphaned Wildlife

Water-Based Incubator – Update 2016

By Robyn Graboski

Incubators are a critical piece of equipment for a wildlife rehabilitator but they can be very expensive. Commercial incubators can cost \$500 or more. The water-based incubator is a cost effective alternative. The water-based incubator bottom acts like a warm body next to the animal. It provides gentle consistent warmth which is much safer than a heating pad and more reliable. These incubators are cleanable, portable, easy to make at home and affordable.

This update and new design is a modification of a water-based incubator that was designed many years ago using a non-preset Hagan brand aquarium heater as published in the *IWRC J. Wildlife Rehab* 18(2):16–17, Simple Things That Make a Difference: Making Water-Based Incubators.



Old Design with
Old Heater

Incubator with Controller & Titanium Heater

The old design (to the left) is still used with a new heater and a controller on the right.

In recent years, almost all aquarium heaters have become pre-set so that the maximum temperature is 93°F to protect the fish in the aquarium from getting too warm. That won't work with our water-based incubators that need to go up to 102°F. However, we recently found an aquarium heater that has no thermostat and that works with a controller. But again, the fish tank controllers max out also at 93°F. With a little digging, a controller was located on Amazon that is designed for heat mats for seedlings and that has a wide temperature range. We were not sure if a heat mat controller would work with our incubator, but were pleasantly surprised that it kept the water within 1–2°F. This is much safer than a heating pad! With the old method, the aquarium heater had to be removed from the water and calibrated for days to get the right temperature. This new design uses a titanium heater working with a controller where the temperature can be changed on a digital readout.

A low-wattage heater (50 watt) was selected to provide slow gentle heat and prevent hot spots. In addition, the heaters are made of sturdy, unbreakable titanium construction. Using this new method, one can construct an incubator for about \$60–\$70.

For most small mammals and baby birds, set the water temperature at 100°F or 102°F respectively. For reptiles set the temp at the high end of their comfort range; it is different for each species. For adult birds 90–95°F. The ambient temperature will vary with the substrate in the incubator and the ventilation holes in the lid. The water temperature should never be higher than the animal's body temperature.

These incubators are portable. If a delicate animal or baby needs to go to the vet, they can be transported while inside the incubator. We also provide incubators to volunteers who routinely pick up and transport delicate babies. The incubator can be plugged in using a car inverter to maintain the temperature. There are many kinds available, but we like this one:

<http://smile.amazon.com/BESTEK-Power-Inverter-Charging-Ports>.

Text from the original article published in *IWRC J. Wildlife Rehab* 18(2):16–17. This information still applies.

The author has used this type of incubator successfully with birds, mammals (including fawns, in a larger version) and reptiles. For most mammals, the water is heated to 100°F. When the water is 100°F, the air temperature is warmed to between 85–95°F depending on the substrate and the number of ventilation holes in the top of the incubator. For reptiles on antibiotics, the water is heated to 90°F and for opossums, who have a body temperature of 95°F normally, the water is heated to 95°F. The aquarium heater will maintain the temperature of the warmed water but would take a little while to heat cold water. The author leaves them plugged in when use is anticipated. The water should not be heated above 100°F because the bottom of the incubator will be the same temperature as the water which could potentially be in contact with the animal. Most animals will stay closer to the bottom if they require more heat. Baby squirrels absolutely love it. Some of them will actually dive down underneath the bedding to get closer to the bottom if they want to get warmer. Likewise, the author offers a place for animals to go higher to get away from the heat if they so desire by providing a crumpled towel or perch. This type of unit has been used to successfully raise hairless opossums.

How to set up the incubator

Put water in between two plastic containers that will be nestled together. The water should be touching the bottom of the top container. Place the heating element and probe in the water; see picture below for setup. Stick heater to bottom of container with the water. Use warm water to get the incubator ready for babies sooner. Otherwise, it can take hours for the temperature to equilibrate. Plug the heating element into the controller and set the temperature on the controller. It is best to leave the incubator plugged in (and warm) if you anticipate arrivals especially during busy season.

When setting up, place the probe next to the heater, but not touching. The configuration in this picture works well. Attach the probe so the plastic bracket is in between the heating element and the probe. If the probe is too far away, the heated water will take too much time to get to the temperature probe and it will get too hot. If the probe is touching the heating element, it does not work very well. It is important to have the probe close, but not touching the heating element.

Caution: Always UNPLUG heating element before removing it from the WATER



With this configuration, the water temperature stays within 1–2°F.

Use white vinegar to clean, disinfect and remove mineral deposits on the heating element from using hard tap water. You can prevent mineral deposits by using distilled water. Usually once the water incubator is set up, you should not have to change the water or add water for weeks or months. Usually only the inside chamber, where the animals are housed, needs to be cleaned and disinfected on a regular basis.



Nylon Screening is glued onto the lid using a glue gun...baby gray squirrels in an incubator

These incubators are especially useful for small mammals such as tiny squirrels, opossums, etc. We use them for all small mammals. Once their eyes open and they are moving around, the babies are moved to an aquarium or larger enclosure with a heating pad under part of the enclosure. For baby opossums, it recommended to put a warm, damp cloth on top of them and then dry cloth on top of that to keep the humidity close to the babies. These incubators are also useful for nestling birds. Tiny delicate hatchlings do better in a commercial incubator such as a Havobator with high temperature and high humidity. Also this incubator is not the best choice for incubating eggs. It is harder to regulate the humidity inside the inner chamber of the water-based incubator. Having said that, it can get humid depending on how many animals are inside the incubator. The incubators should be cleaned and disinfected regularly.



Several incubators in a row with insulating covers and a baby bird (grackle) in an incubator

The water-based incubator is easy to clean and is very cost effective, so it is easy to have more than one to keep different batches of babies isolated.

Insulating covers were made by a volunteer with repurposed sheets on the outside, lining on the inside and insulating material sandwiched in between the two fabrics with a draw string to keep the cover in place. An insulating cover is not necessary, but it does help insulate the incubator and helps keep the sides and wires clean. The covers pictured are machine washable.

Supplies

50-watt aquarium heater from Won Brothers

<http://wonbrothers.us/economic-titanium-heating-tubes-50-watt-150-watt-250-watt-400-watt.html> \$29.95 plus S&H

Vivosun Controller from Amazon.com

<http://smile.amazon.com/VIVOSUN-Digital-Seedling-Thermostat-Controller>

\$20.99 plus S&H (free shipping with Prime membership) This controller is made for heating mats, but it works well for this purpose.

Two plastic containers that can be purchased from local stores or online; the key is to have about 2 inches space to fill with water in between the two containers.

Nylon screening (hardware supply)

Glue gun (hardware or craft supply)

Sheets – Donated

Insulated material – Fabric store

Questions – Contact Robyn Graboski at centrewildlifecare@gmail.com or 814-692-0004