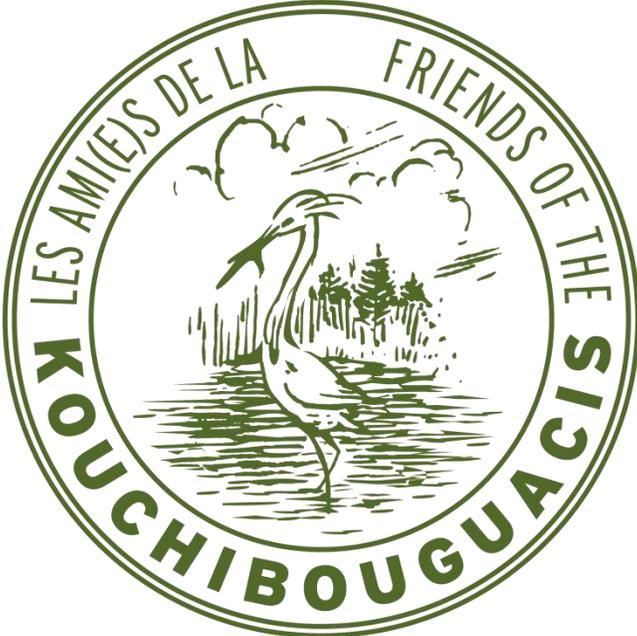


Summary: Experience gained using Jordan-Scotty Salmonid Egg Incubators, A learning tool June 2016 by The Friends of the Kouchibouguacis



Site Location:

try to avoid spring ice flows

avoid areas susceptible to erosion or areas that cause sedimentation

aim for readily accessible

aim for sites that offer a little seclusion from public

use sites with gravelly bottoms suitable for salmon spawning with cobble type substrate downstream

take site photos, GPS coordinates and use flagging tape

Timing:

Fall months...

You will be using green eggs

- egg are more vulnerable
- must accomplish incubation well within a 48 hour window
- eggs are more vulnerable towards end of 48th hour
- ✓ As backup plan, can store eggs until eyed and incubate during Spring months if needed.

Spring months...

You will be using eyed eggs

- ice and snow may add more challenges
- only backup option may be covering hatchery cost plus fry marking (if necessary)
- hatchery may not have available space to keep unfed fry until large enough for marking
- ✓ eggs are tougher

Preparing:

Obtain valid transfer permit and fishing permit

Contact hatchery if needed

Inspect your used incubator

Order incubators if needed

Inspect sites ahead of time in case site is unusable

Install rebar during low water levels

Inspect already set rebar and site marking/reset rebar and add new flagging tape

Order Ovadine solution if needed

Gather volunteer names and contact info. /team members

Contact property owner to ask if OK to pass on their property

**1 female =5000 to 8000 eggs...good to have at least 2 females for genetic diversity.

**1 incubator = 1000 eggs

Figure out back-up plan for excess eggs...verify with DFO if permitted to release unmarked unfed fry in your location

Disinfecting the incubators and loading trays:

- Manufacturer's recommendation to disinfect fish egg is a 4 part diluted solution (100ppm =10 ml Ovadine™ to 1 litre with clean water) to one part egg ratio or Mix approximately 10 litres of disinfectant solution for each litre of eggs.
- One 4 Liter jug is quite sufficed for the quantity of eggs and amount of equipment used during a seven incubation unit project (may even be suffice for two years if properly stored).
- Ovadine can be used as a general disinfectant used on different equipment and can also be used as a fish egg disinfectant. It was recommended that we disinfect the incubators prior to using them.
- A 250 part per million Ovadine solution for the disinfection of the incubators and loading trays
- soaked in the solution for 10 minutes
- Rinse and place as a full condo in large disinfected garbage bags (garbage bag also need to be soaked in the Ovadine solution). Tie off at the top and place in back packs for transportation.

Disinfecting solution used on the eggs:

- A 100part per million Ovadine solution for the disinfection of the salmon eggs.
- Identify with its contents (using a permanent marker) and seal its cover using adhesive tape and keep out of sunlight and refrigerated until it was ready to be used. We store the container in the refrigerator because we wanted the solution to stay cool so that the solution's temperature would not differ too much from the water in which the eggs were transported.

To obtain Ovadine®:

Distributors in Canada:

West Coast / Canadian Head Office:

Syndel Laboratories Ltd
2595 McCullough Rd.
Nanaimo, B.C.
Canada V9S 4M9
Tel: (250) 585-2006 or (800) 663-2282
Fax: (250) 585-5300
E-mail: info@syndel.com
www.syndel.com

East Coast Distributor:

GMG Fish Services
14 Magaguadavic Drive
St. George, NB
Canada E5C 3H8
Tel: (506) 755-1387 or (888) 724-4040
Fax: (506) 755-1421
E-mail: gmgretail@cookeaqua.com

Disinfecting of the equipment:

Distilled water (if using municipality or city water)
Empty 1 Gallon water jugs
Watch or timer
Large garbage bags (1 per incubator)
Serving tray

Ovadine prescription
4 Liter beaker
Measuring cup
Stir rod
Syringe measure
Permanent marker
Goggles
Masking tape
Industrial sink

Getting the eggs from hatchery

Fill transportation jars hallway with fresh water prior to adding the eggs.
Once eggs are fertilized, place in wide mouth glass jars for transportation.
Top off jars with fresh water and place lids on tightly for the voyage.

**We were advised not to place green eggs in the incubators for transportation; it would be best that the eggs move around in the jars as a whole mass rather than being in solitude and hitting against the walls of their individual chamber.

**We were advised to leave the eggs the water for at least 2 hours before handling them. This allotted time would allow the eggs “water harden”.

Once at the incubation site:

To avoid temperature shock,:

-Submerge the Ovadine solution and the transportation jar containing the salmon eggs in the brook...Ovadine = egg water = brook water.

**It is important to make sure that the jugs are submerged as much as possible so that their contents will acclimate to the water temperature and not the air temperature.

-Immediately set out to finding the incubation area using the previous reference site photos and GPS coordinates. The team members will also look for the flagging tape that was attached on nearby tree branches and on the rebar.

-Retrieve Ovadine solution and egg jars are then from the brook and verify temperature and record.

**The temperatures are compared with the water temperature in the brook and when they are all conform to one another (and the eggs are left undisturbed in water long enough for hardening), the incubation preparations may begin.

**Water temperature used during the disinfection process should not change more than 3°Celsius and direct sunlight should be avoided and the suggested temperature for incubating Atlantic salmon ranges from 7 to 10°Celsius.

**Oxygen levels and pH levels in the brook are measured, recorded and compared with the recommendations set for freshwater aquatic life by the Canadian Environmental Quality Guidelines. Ambient oxygen levels should remain within 5.5 mg/L to 9.5 mg/L and pH levels should remain within 6.5 to 9.0.

Team of at least three members:

One for disinfecting the eggs and filling the loading tray,

Two members for preparing, filling and installing the incubator.

One for fetching fresh water whenever needed, taking photos.

**The team members should keep the same assignments throughout the entire day for the sake of instilling routine and eventually cutting back on time.

**Environmental parameter segment would only need to be done whenever a new site would be set-up or whenever significant change would be visible when arriving at the site.

**Information taken and recorded at each site is name of team members, date, site code, start and finish time, name of basin, name of water body, site photos, air temperature, longitude and latitude coordinates using a GPS unit, and water parameters using the YSI Professional Plus (Pro Plus) meter.

**The water parameters recorded at the sites were water temperature, dissolve oxygen, total dissolve solids, pH, and conductivity.

Desinfecting the eggs:

- The Ovadine solution (disinfection solution) is poured in the disinfecting container.
- The lot of the eggs and water are then carefully poured out from the jar into the 600 µm sieve that is sitting in a container of fresh brook water (the brook water acts as a cushion so the eggs would not hit against the disinfecting container).
- The sieve containing the eggs is then transferred to the disinfecting container and left in the disinfection solution for 10 minutes.
- The 600 µm sieve of eggs is then transferred to a rinsing container. The sieve is then moved around to assure that the eggs are well rinsed and then transferred again to a container of fresh brook water.

Loading trays and incubators:

- Pour eggs from the sieve onto the loading tray. The loading tray is set on top of the container of fresh water. One person pours the eggs from the sieve onto the loading tray and begins pushing the eggs around in order to fill up the compartments of the tray.
- All the extra eggs sitting on the tray are wiped off into the fresh water and transferred back to the sieve.
- Any dead eggs are removed from the loading tray with the use of a plastic (disposable) inoculating wand.
- Pass loaded tray to team members responsible in filling unit plate. A unit plate is added on top of the loading tray. While holding the plate and tray tightly together the designated member flips the pair upside down in order to have the loading tray on top of the plate.
- As the incubator is being filled, another loading tray is being filled.

**Throughout the entire loading process, one person is designated to fetch rinsing water from the brook for the members loading the incubators. The rinsing water is squirted on the bottom of the loading tray in order to dislodge any egg stuck to the tray.

- The tray is lifted from the incubation plate and verified for any remaining egg. If eggs are still present in the tray, the tray is placed back on the plate and squirted with fresh water; this is repeated until the loading tray is completely empty.
- Place another plate on top of the now loaded plate.
- Pass a rope through the center hole of the incubator unit. The unit is then placed in a container of fresh water and hold down with a heavy object (we used a large rock).
- Continue for the remaining four units (5 pair of plates creating a full condo equal 1000 incubated eggs per site), compiling them one on top of another assuring all apartment are covered with fresh water and passing the bolts through them.
- Once all the units are filled with eggs, nuts are added to the end of the bolts, assuring that the apartments are tightly clamped together. Ropes are then passed through the holes located on the top side

of the plates and fashioned so that the incubator could be attached from the front (upstream side) and from the sides.

-A pair of 1 inch square steel tubing is then secured at the bottom of the incubation condos with string and rubber tubing (to prevent the string from chafing against the steel tubing).

-The condos are then attached to the rebar rods previously set out in the brook in a manner to best resist the environmental pressures that the winter months might present.

When incubating green eggs, all incubators must be set out well within the 48 hour window allowed for handling green egg without causing harm to the embryos.

-Secured Water temperature data loggers on two of the incubation set-ups.

-The sites used for the installation of data loggers are noted in the field booklet. The temperature data loggers are secured on one of the anchors low enough to assure that they will be submerged by water at all times.

-A water temperature data logger form provided by the NB Aquatic Data Warehouse is filled for all sites equipped with data loggers.

-Fish stocking forms are also filled out for each site.

**Field sheets should be used for the purpose accurately record and store the field data. A quick look at a properly organised field sheet will assure that all the needed information has been collected before leaving the site.

The eggs will hatch the following Spring. Once the fry will have used up all of the contents of its yolk sack, the unfed fry will leave the incubator and merge into the water current and flow a few meters downstream to finally hide within the substrate. The unfed fry will use the substrate as shelter and will start to feed themselves. The incubators will be recovered from the brook at the end of the following June. The inventory of eggs left in the incubators will be done giving us an approximate count of eggs survival for each site. Doing this at the end of June will permit enough time for all eggs to be hatched and assure we don't disturb the development of embryos from any possible late hatchers that may still present in the incubators.

Dead egg counts:

Counting the dead eggs left inside the units will give us an approximate value on the survival ratio for this type of stocking. It should be noted that all dead eggs are removed as the plates are being filled. The crew assigned for filling up the plates may simply use an inoculating wand to remove any visible dead egg prior to assembling and installing the units.

Field Equipment needed for incubation day:

A list of the needed field equipment should be made available for the designated team members. The designated members are responsible of gathering the equipment and packing the equipment by following the said list (see following page for list).

Field Equipment needed for incubation day:

- Rebar
- Field measuring tape
- Meter stick
- Salmon eggs transfer permit
- Empty Incubators (pre-disinfected with Ovadine) stored in garbage bags
- Nuts & bolts + extras
- Rope (3 sections/ units) + extras
- 2 loading trays
- 2 White plastic tubs
- 2 Grey “Rubbermaid” tubs
- Ovadine solution 100ppm
- Field book + Field sheets
- Pencils
- Sledgehammer
- Camera
- GPS
- MSD sheets
- Watch
- Pencil sharpener
- Goggles
- Extra batteries for YSI
- Extra batteries for digital camera
- Extra batteries for GPS
- Calculator
- 600 µm sieve
- Squirt bottles (Gatorade bottles)
- Site reference photos
- Ovadine prescription
- YSI
- Thermometer
- Stopwatch
- Data logger
- Water temp. data logger form
- Fish stocking form
- Clipboard
- Flagging Tape
- 3 Backpacks
- Salmon eggs in large water filled jar
- Vinyl gloves
- Rubber gloves (elbow length)
- Chest waders
- Knife
- Lighter
- Inoculating wands
- Cell phone
- First Aid Kit