

# The effects of iodophor disinfection and transportation on the survival to hatch of fertilized white sturgeon (*Acipenser transmontanus*) eggs.



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# Outline

- Background - Kootenay River white sturgeon
- Study - animals, location, gamete extraction
- Methods
- Results
- Summary

# Background



## Background (continued)

- The Kootenay River white sturgeon suffer from a lack of juvenile recruitment.
- An international, multi-agency recovery team is implementing a recovery plan to rebuild this population.
- Supplementation of the wild population with hatchery reared juveniles is one objective of the recovery plan.

## Background - Supplementation of wild population

- Kootenai Tribe of Idaho and Idaho Fish and Game capture and spawn wild adults.
- KTOI rears the resulting juveniles at Bonner's Ferry hatchery.
- BC Fisheries built a conservation sturgeon hatchery, near Cranbrook B.C., to rear a back-up (replicate) group of progeny.



## Background - Back-up supplementation facility in B.C.



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## Background – why an experiment?

- Canadian Fed/Prov fish transplant committee allowed only disinfected KRWS eggs transported into B.C.
- No information on the effects of disinfection and transportation on fertilized white sturgeon eggs in literature.
- Transportation of sturgeon eggs in Russia. Disinfection of sturgeon eggs in California commercial industry. Not documented.
- Kootenay River white sturgeon are endangered. Could not afford any unnecessary losses from transport or disinfection.



## Study - Animals and Location

- Set up experiment utilizing UC Davis captive white sturgeon.
- UC Davis fish are not endangered.
- UC Davis fish spawn ~ 2 months before Kootenay River white sturgeon.

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Male sturgeon in stretcher for sperm extraction:



Sperm extraction with syringe:





## Sperm storage:



## Netting the female sturgeon:





Carrying female sturgeon to anesthetic bath:



Female sturgeon in anesthetic bath:





Removing sturgeon eggs:



Removing sturgeon eggs:

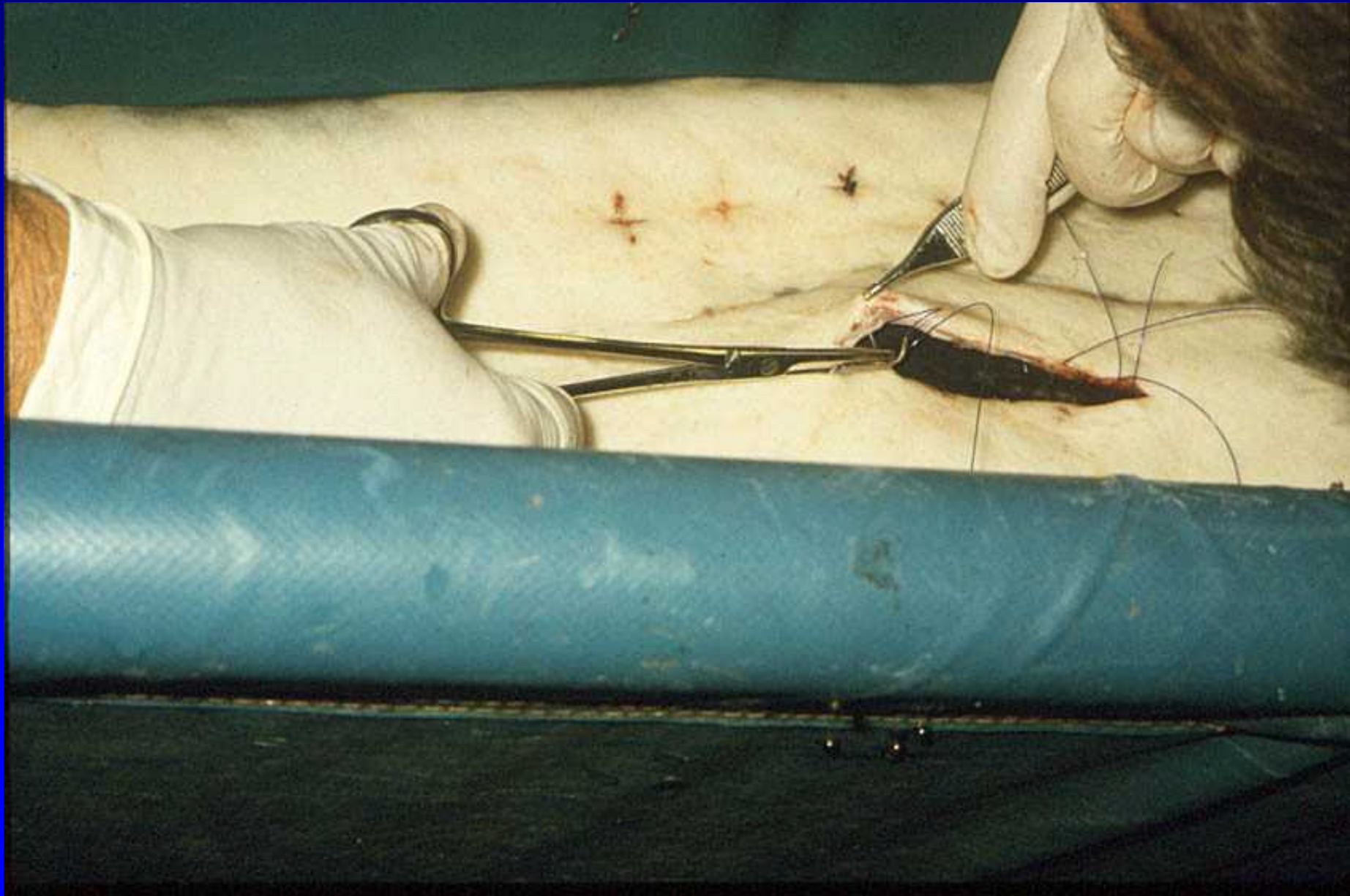




Removing sturgeon eggs:



Closing incision:





# Methods

- Objective: test the effects of iodophor disinfection and transportation on white sturgeon eggs.
- Iodophor disinfection: hand- stirred bath of 100 mg/L iodophor for 15 minutes.
- Transportation: eggs placed in transport bags containing 20 % water and 80 % oxygen. Bags placed in temperature regulated coolers.

# Methods

- Six treatment groups
  - 1) No disinfection, incubated in dishes after de-adhesion
  - 2) No disinfection, held in bags (3 h), and incubated in dishes
  - 3) No disinfection, transported in bags (3 h), incubated in dishes
  - 4) Disinfected, incubated in dishes after disinfection
  - 5) Disinfected, held in bags (3 h), and incubated in dishes
  - 6) Disinfected, transported in bags (3 h), incubated in dishes

## Methods

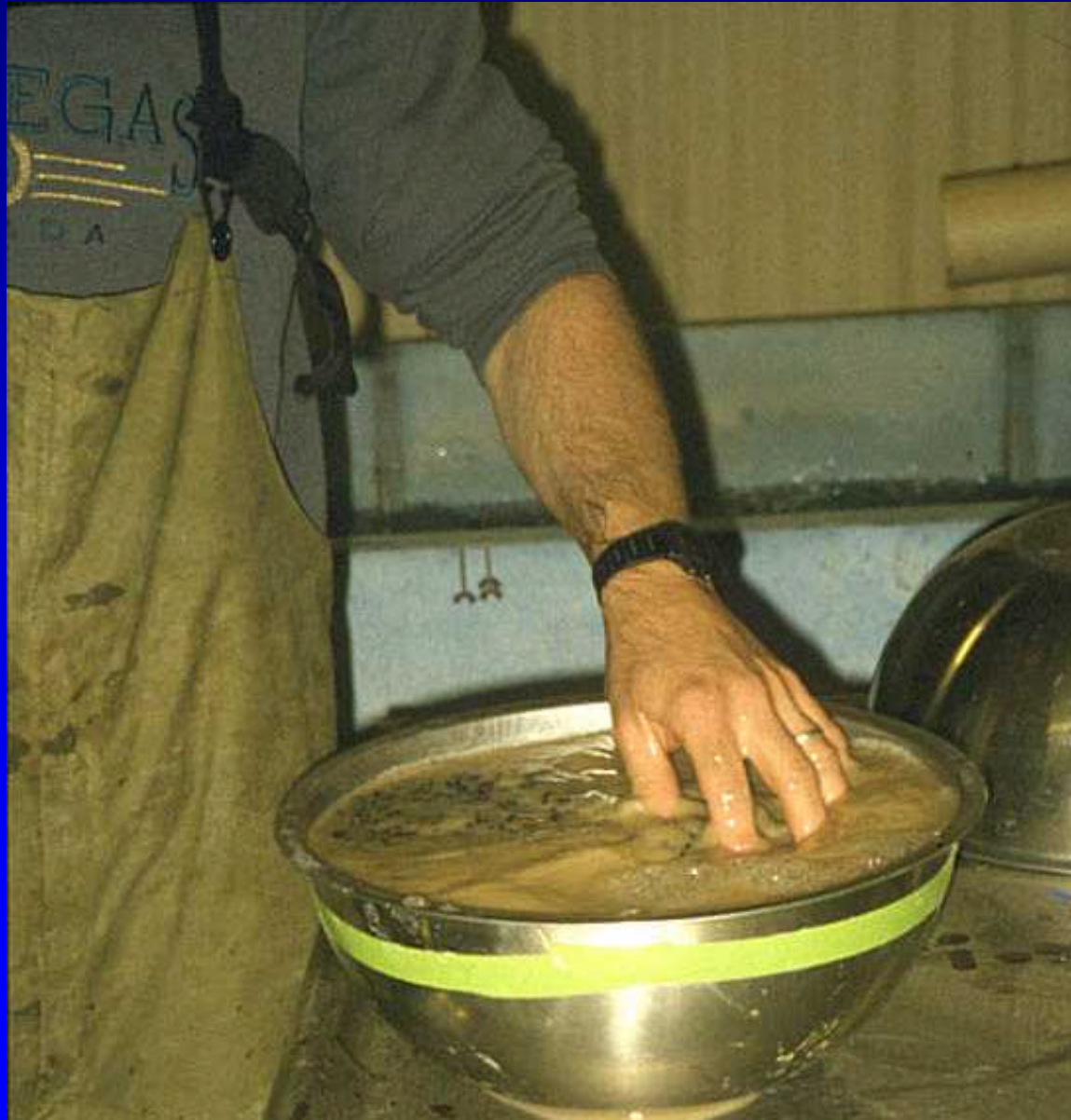
- Each treatment group was replicated three times.
- ~1,000 eggs per replicate.
- Hatchery control: eggs not utilized in experiment, incubated in McDonald jar after de-adhesion.

Eggs fertilized, then de-adhesed.





Eggs hand-stirred during de-adhesion.



Eggs disinfected with iodophor for 15 min.



Experimental eggs: 50% disinfected, 50 % not disinfected



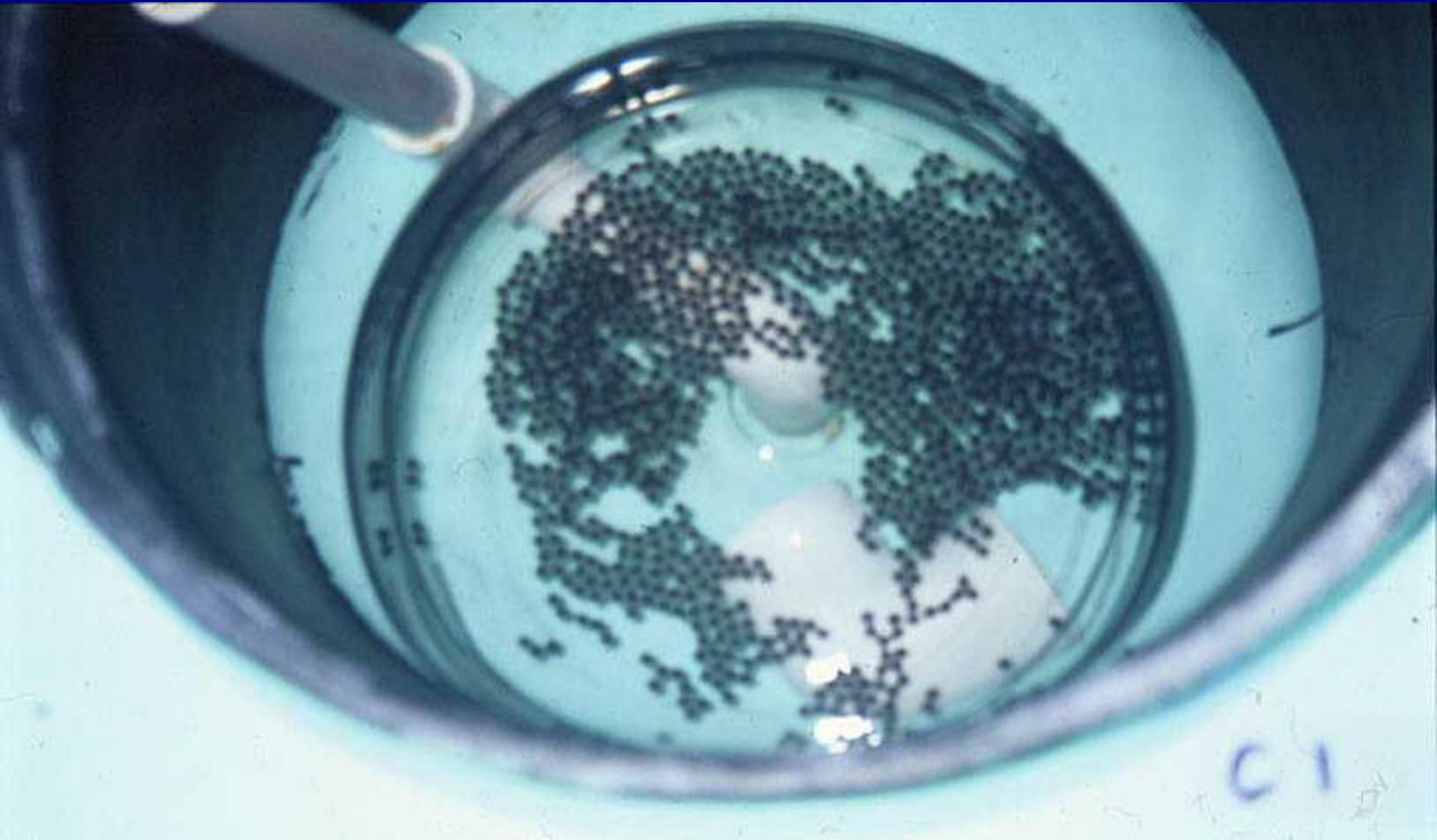


Treatment groups 1 (non-disinfected) and 4 (disinfected) placed directly into incubation.





Treatment groups 1 (non-disinfected) and 4 (disinfected) placed directly into incubation.



Treatment groups 2 (non-disinfected) and 5 (disinfected) placed into transport bags and coolers but not transported.





Treatment groups 3 (non-disinfected) and 6 (disinfected) placed into transport bags and coolers and then transported (3 h).





Water temperature was monitored closely during transportation.

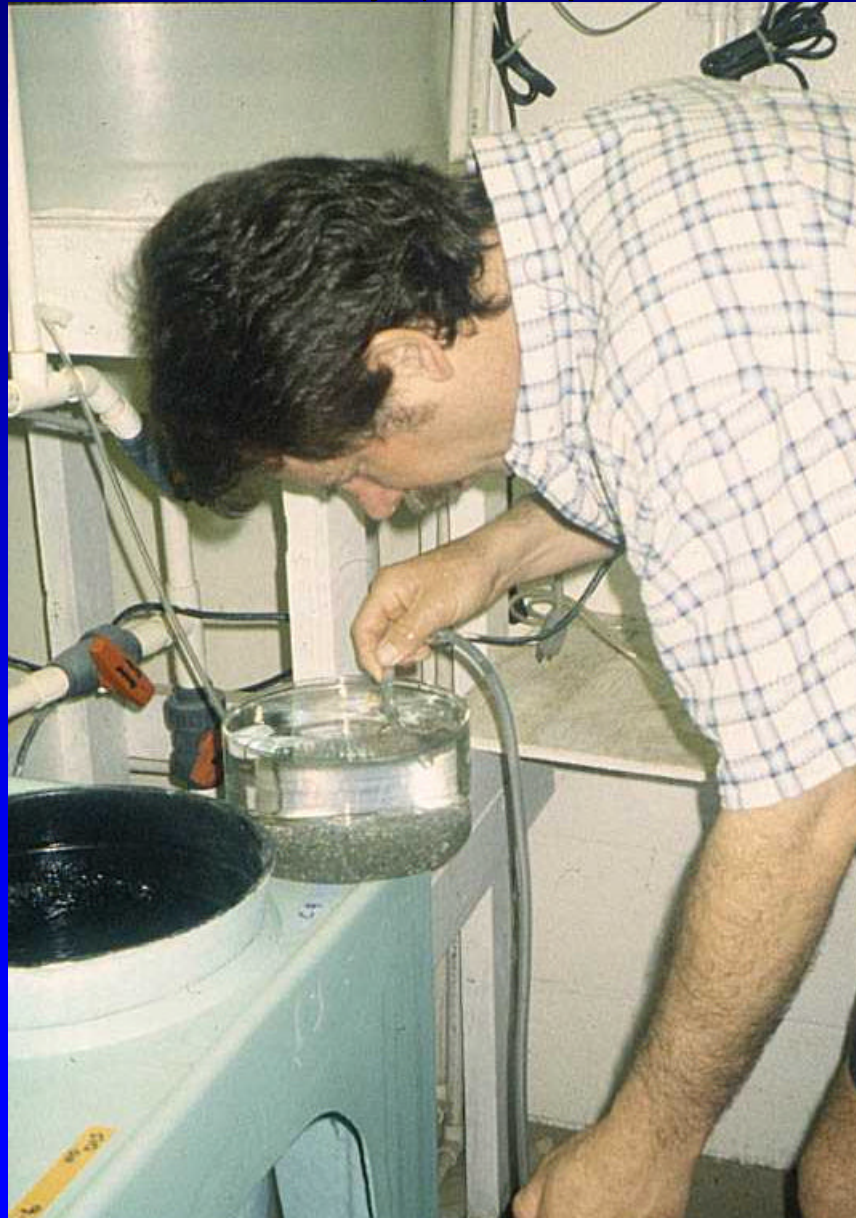


After transportation, treatment groups 3 and 6 were placed into incubation.





Mortalities were removed daily (48 hr post fert to 240 hr post fert.).





Canadian Data Processing.



Results: no sig. difference among treatment means (P=0.944).

Group	Treat- ment	Number of eggs	% Hatch rate	% Hatch Mean $\pm$ SD
A		~62,000	92.4	
B	1	1101	90.4	90.9 $\pm$ 0.6
B	1	1048	90.6	
B	1	1039	91.6	
B	2	1052	90.4	91.4 $\pm$ 1.1
B	2	1055	92.5	
B	2	1063	91.2	
B	3	1053	91.2	89.9 $\pm$ 1.1
B	3	1071	89.1	
B	3	1067	89.4	
C	1	1088	95.1	91.2 $\pm$ 3.5
C	1	1017	90.0	
C	1	1014	88.5	
C	2	1044	92.0	91.9 $\pm$ 0.3
C	2	1054	91.5	
C	2	1064	92.1	
C	3	1091	89.0	91.0 $\pm$ 1.7
C	3	1028	91.8	
C	3	1062	92.2	

# Summary

- Survival to hatch was high for all treatment groups (89-95%).
- Survival to hatch for treatment groups was similar to hatchery control group (92.4%).
- No significant difference between treatment groups.
- The survival to hatch of fertilized white sturgeon eggs was not affected by the iodophor disinfection or transportation methods of this study.



# Summary

- The iodophor disinfection protocol used controls pathogen transmission in salmonid eggs. Its efficacy was not tested on sturgeon eggs.
- The use of the UC Davis white sturgeon allowed for:
  - a large number of high quality eggs to be used in the experiment;
  - the results to be generated prior to the transportation of the Kootenay River white sturgeon into B.C.

.....Kootenay River White Sturgeon raised in B.C.

