

Does the use of Electronarcosis on adult coho salmon prior to spawning affect mortality and fry growth?

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Introduction

Electronarcosis

- use of electricity to elicit a state of narcosis, or deep sleep, using low voltage, non-pulsed DC power



Electrotetany

- immobilization by electricity, commonly involves the use of AC or pulsed DC power
- *(both found to have more negative impacts on adult salmon than non-pulsed DC)*



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History

- Used to tag Atlantic salmon in the mid-60's (*Hartley 1967*)
- First used in U.S. on rainbow trout in the mid-70's (*Kynard and Lonsdale 1975, Curry and Kynard 1978*) and Pacific salmon in the mid- 80's (*Gunstrom and Bethers 1985*)
- It has since been used on channel catfish, striped bass, sturgeon, and many South American fish species for handling and researching effects on behavior



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Applications

- Biological Sampling
 - Length, Scales, Genetic samples
- Tagging
 - Floy, PIT, Elastomer
- Surgery
 - Radiotags, PIT



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Theory

- Requires a voltage gradient of aprox. 0.25 to 0.5V/cm and a power density around $30\mu\text{V}/\text{cm}^3$
- Physiologically, during electronarcosis, no cerebral messages reach the motor paths
- The result is that the fish is limp and motionless as long as it remains in the water



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Objectives

- Determine if there is a difference in egg mortality from spawning pairs of coho salmon subjected to electronarcosis vs. MS-222, and electronarcosis vs. no treatment prior to spawning.
- Determine if there is a difference in fry growth from spawning pairs of coho salmon subjected to electronarcosis vs. MS-222, and electronarcosis vs. no treatment prior to spawning.

If there is no difference between MS-222 and electronarcosis, and no difference between electronarcosis and the control, then it would indicate electronarcosis has no negative impacts on survival and reproductive potential.



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Construction



- 162 qt marine cooler
- Electrodes constructed from aluminum and mounted on plywood



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Power Connection

Power Supply

Electrode
(cathode)

Electrode
(anode)



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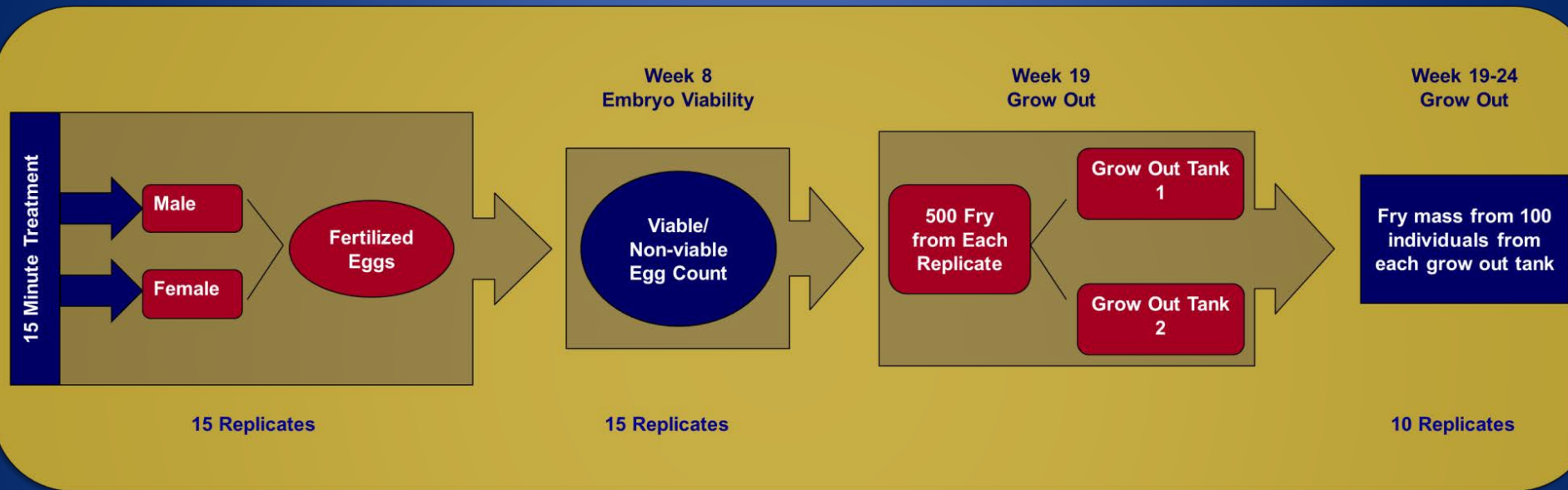
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Methods



- Electronarcosis: non-pulsed DC (40 volts at 0.01-0.03 amps)
- MS-222: 60mg/L
- Control: no sedation (physically euthanized)



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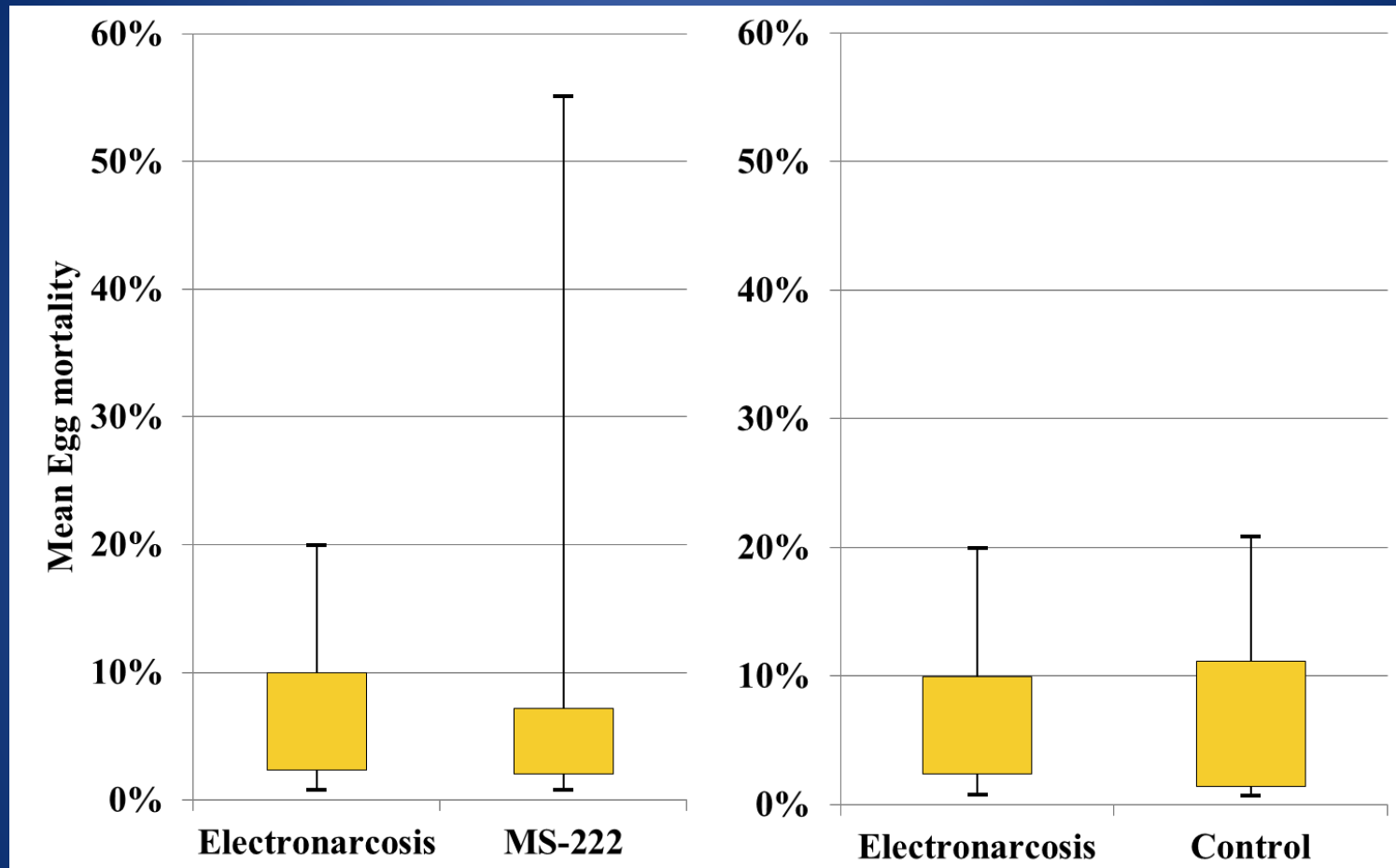
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Embryo Viability



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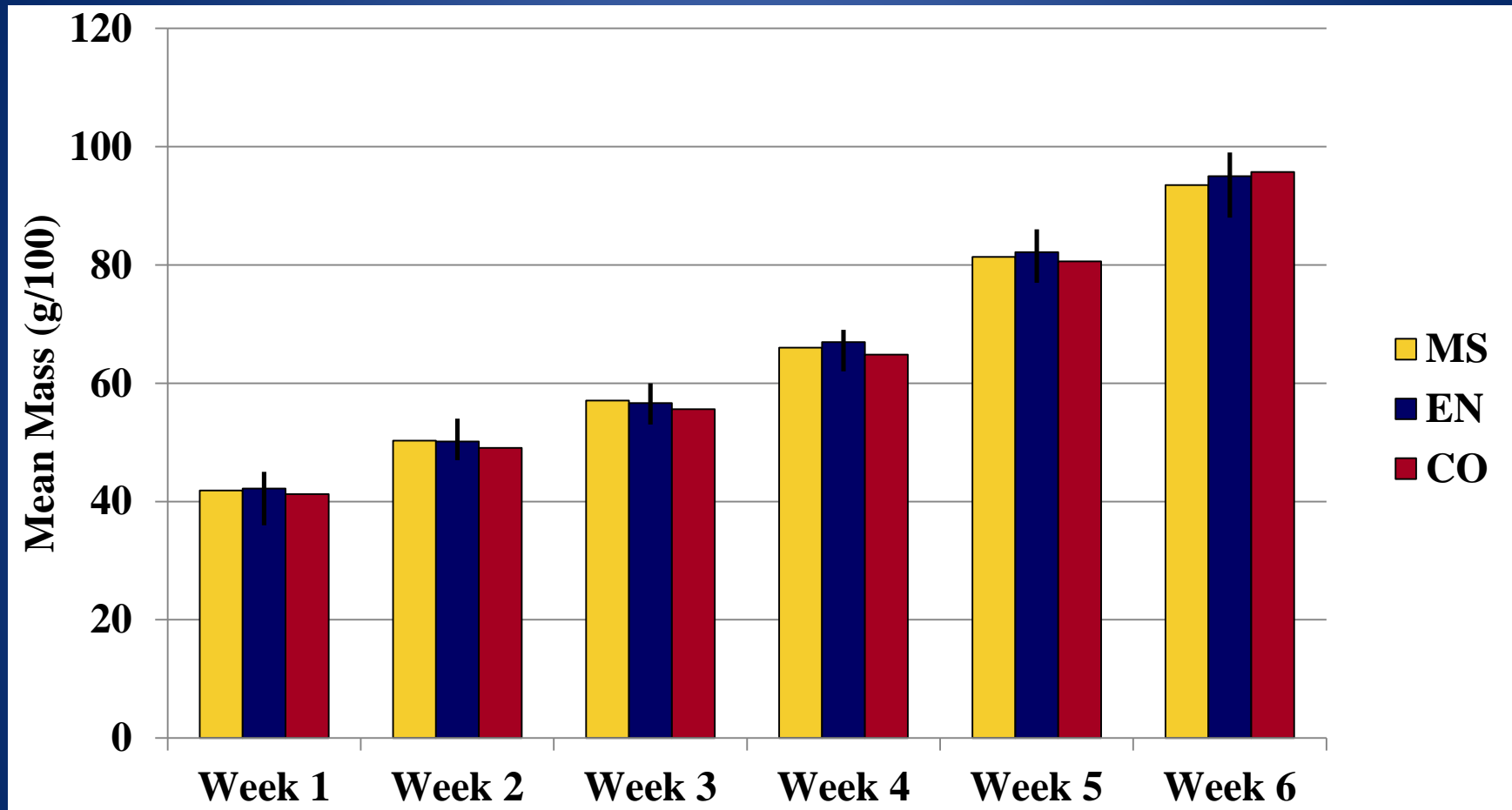
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Average weekly mass of coho Fry



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Conclusions

- Electronarcosis does not negatively impact coho embryo viability or fry growth rates
- Electronarcosis may be used as an alternative to MS-222 for both hatchery and wild salmonid populations
- Physical and physiological response of adult fish and their progeny to electronarcosis needs to be further researched



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Electronarcosis

Zzzap!



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