Effect of Harvest Mortality on Muskellunge Size Structure in Wisconsin's Ceded Territory

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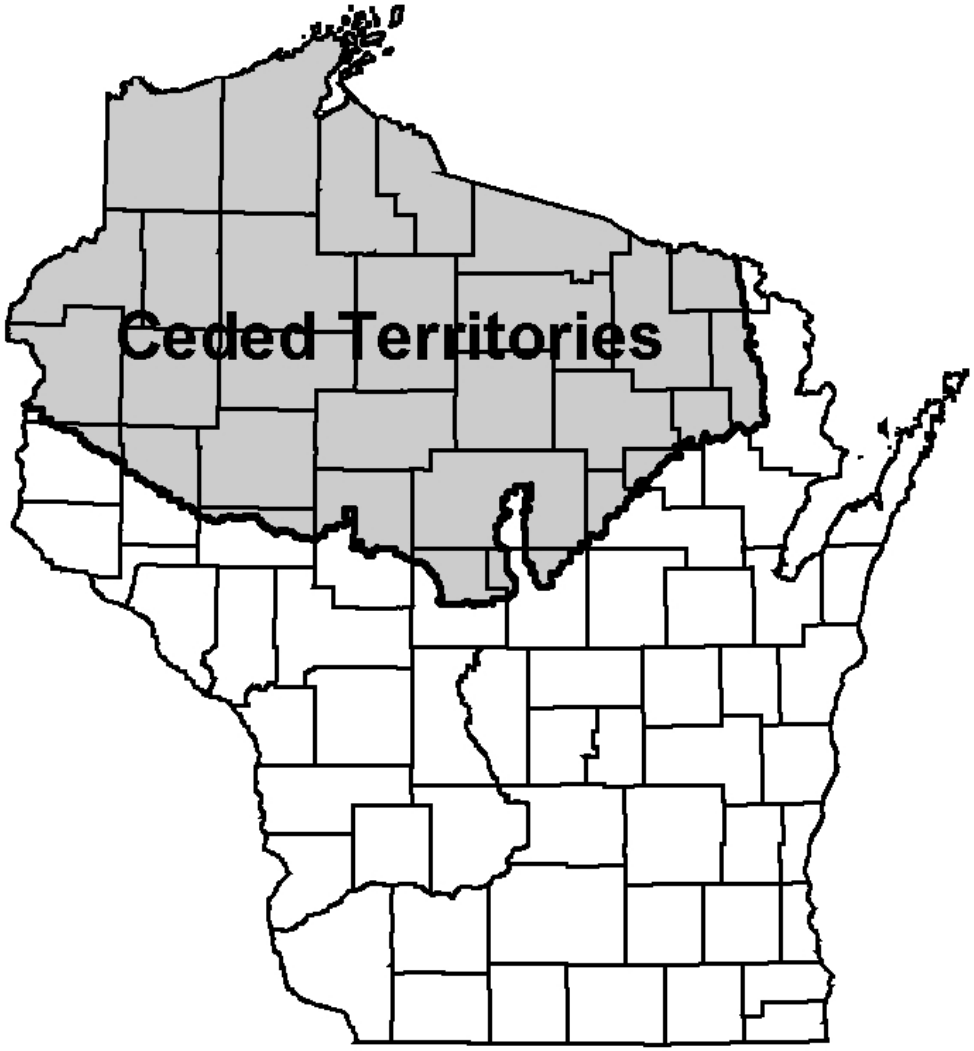
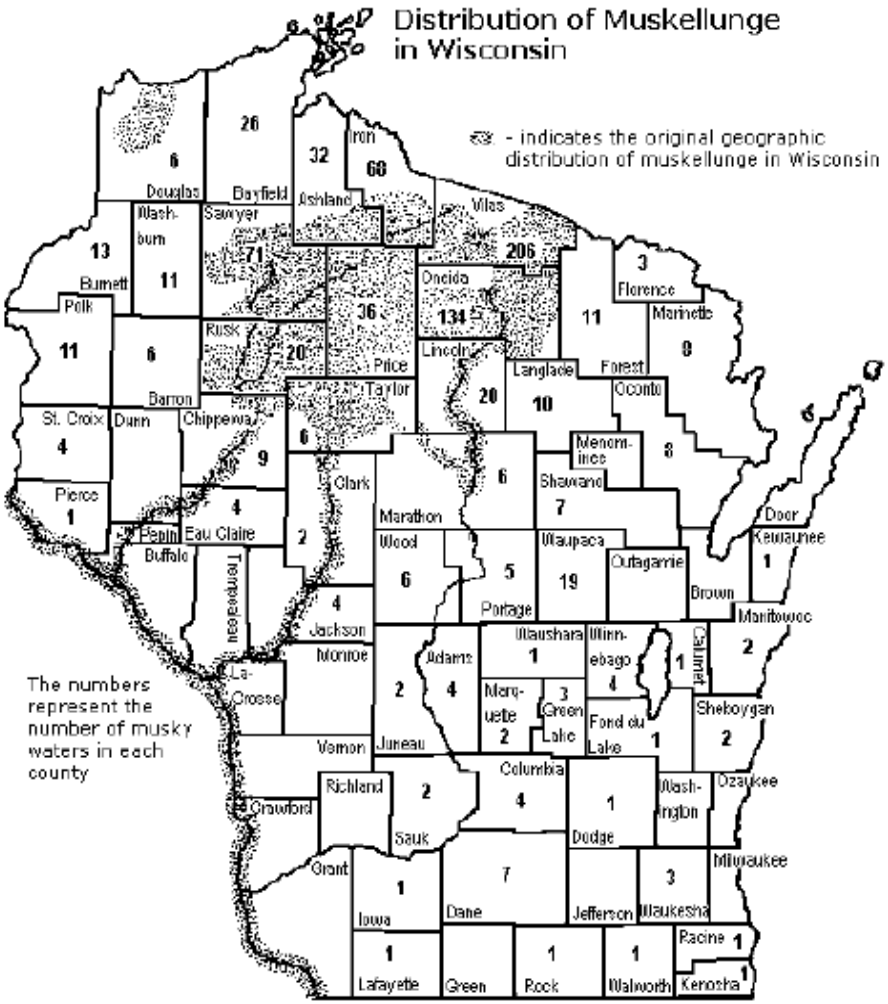
Introduction
Muskellunge in WI

http://www.ohiodnr.com/muskielog/images/MuskieMGMT.png

Introduction
Ceded Territory



GLIFWC 2004



WDNR 2008

Introduction
Question

- Can trophy angling fisheries be sustained on lakes with high levels of exploitation?

Introduction
Objective

- Determine the extent that harvest mortality affects muskellunge population size structure in Wisconsin's ceded territory
  - Muskellunge growth potential
    - Use cleithra to back-calculate growth histories
  - Develop simulation model
    - Predict size structure response to a range of harvest mortality

Methods

http://www.dnr.state.oh.us/Portals/9/Images/fishing/fish/muskie19.jpg

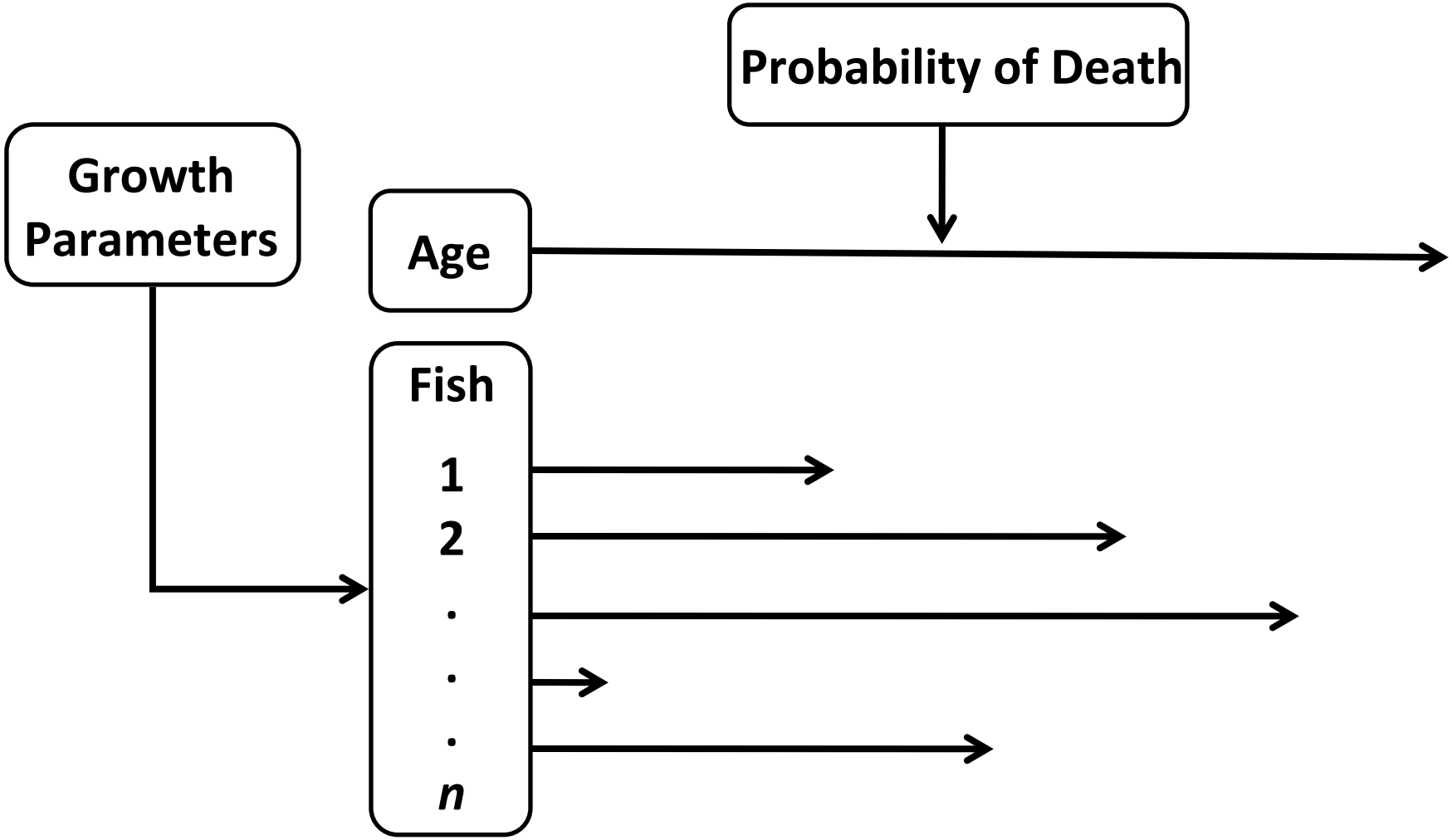
Methods
Growth Potential

- Cleithrum
  - 277 from across northern WI
- Back-calculate individual growth histories
  - Biological-intercept model (Campana 1990)
    - Fish and cleithrum length at hatching
- Fit von Bertalanffy growth curves to individual fish
  - Classify populations into either small-, medium-, or large-bodied

Methods
Simulation Model

- Individual-based simulation model
  - Growth potential vs. risk of mortality
- Populate model with muskellunge of varying growth potential (i.e. body type)
  - Based on age and growth results
- Subject simulated muskellunge to varying mortality rates
  - Angling and spearing fisheries

Methods
Simulation Model



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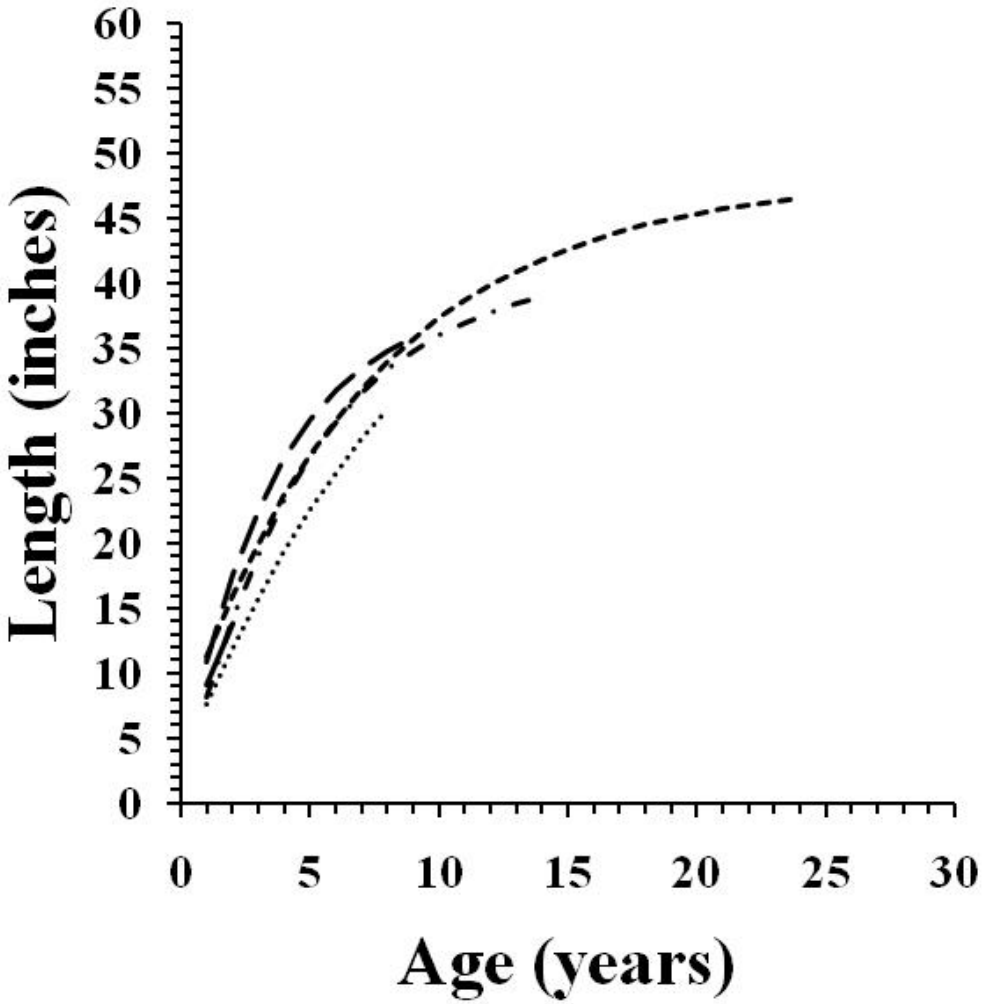
Simulation Model



Results

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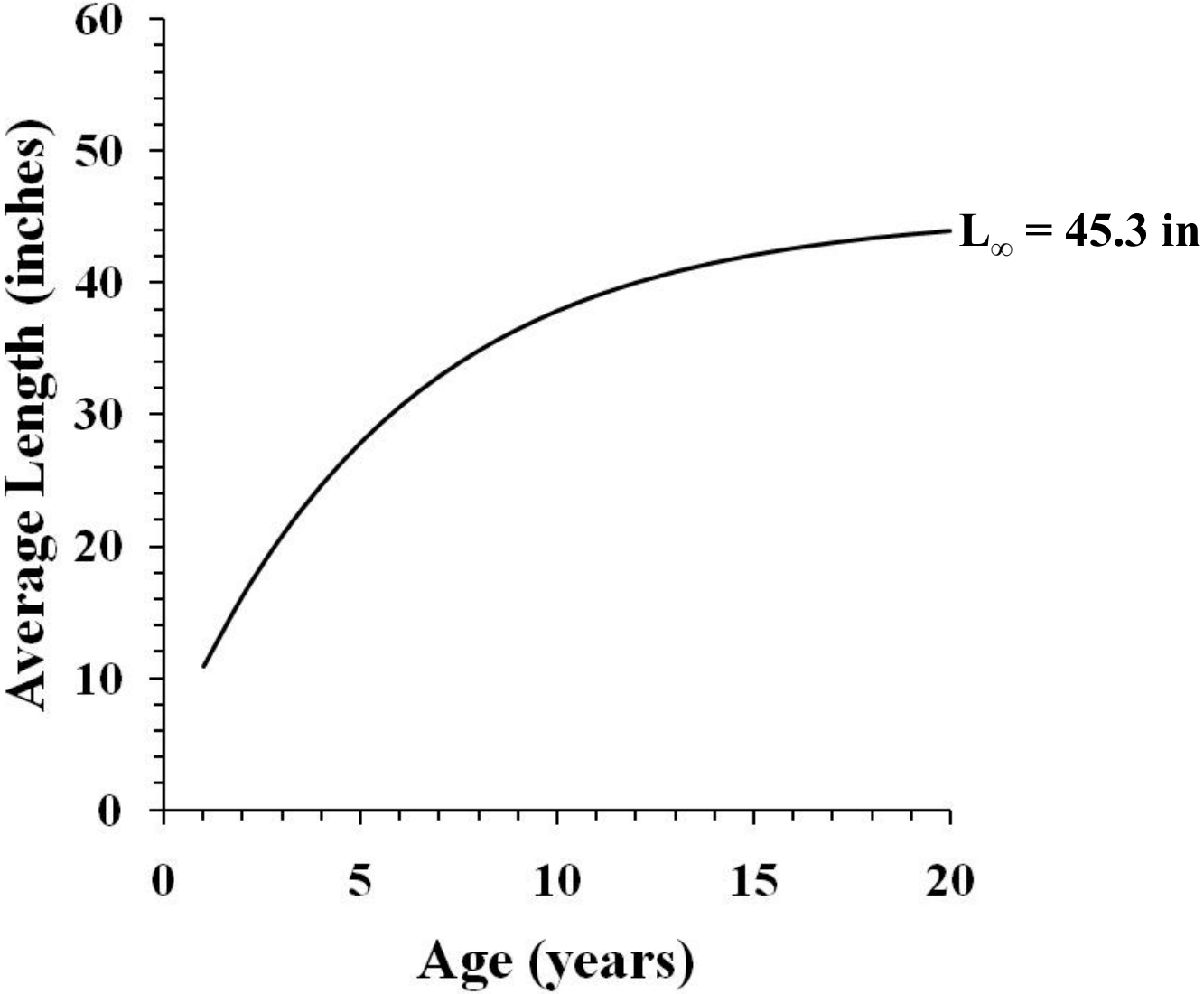
Body Type



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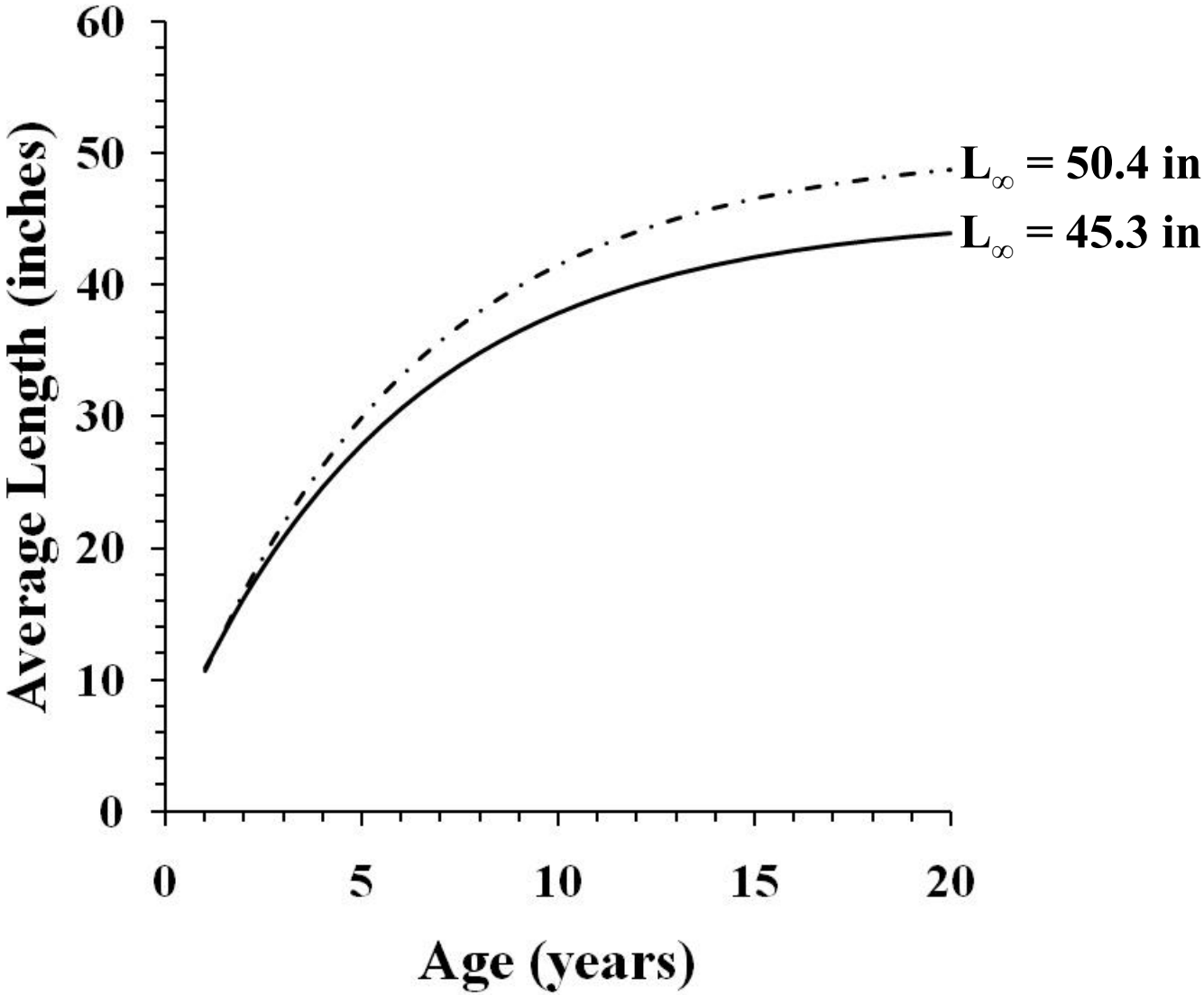

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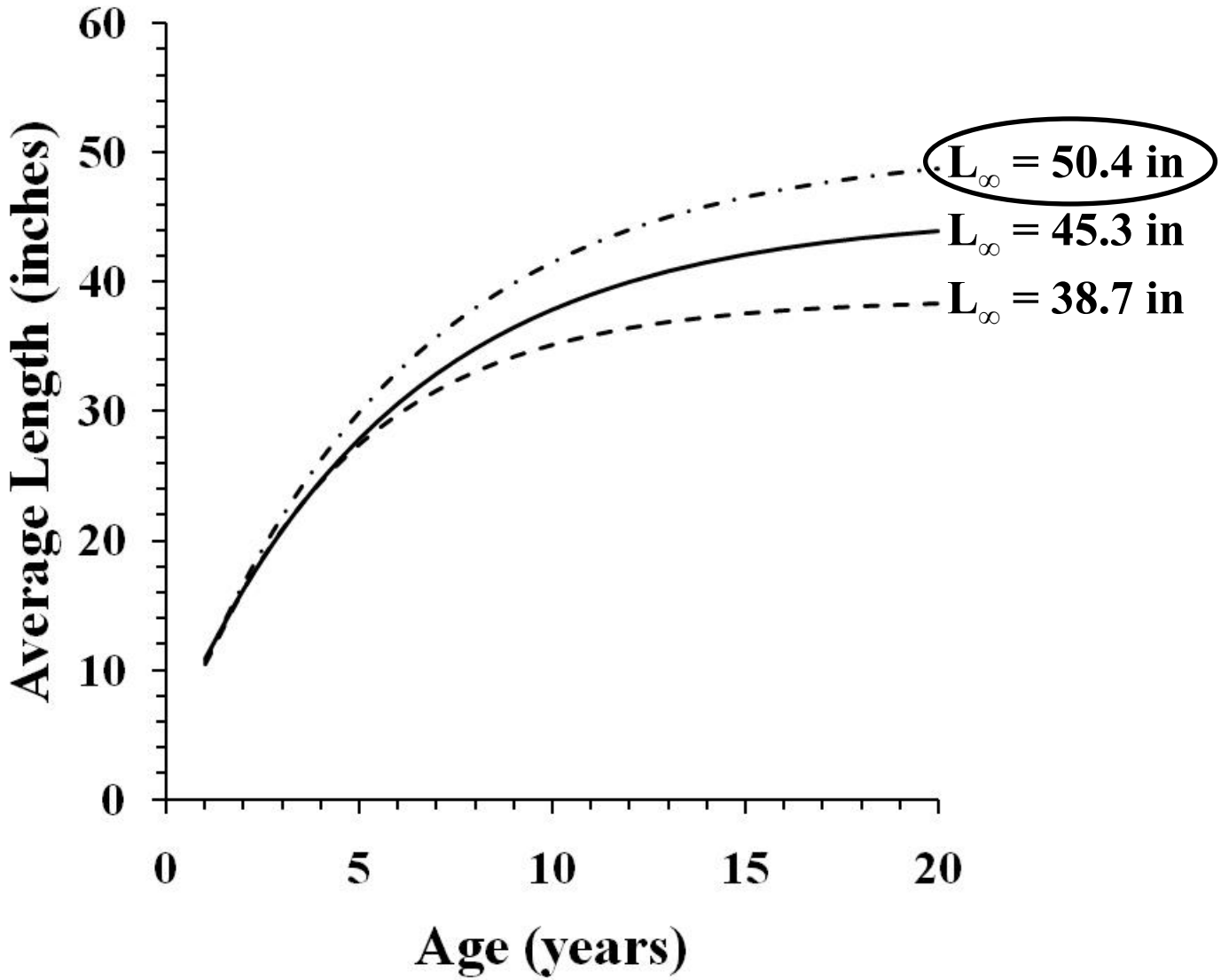

Results
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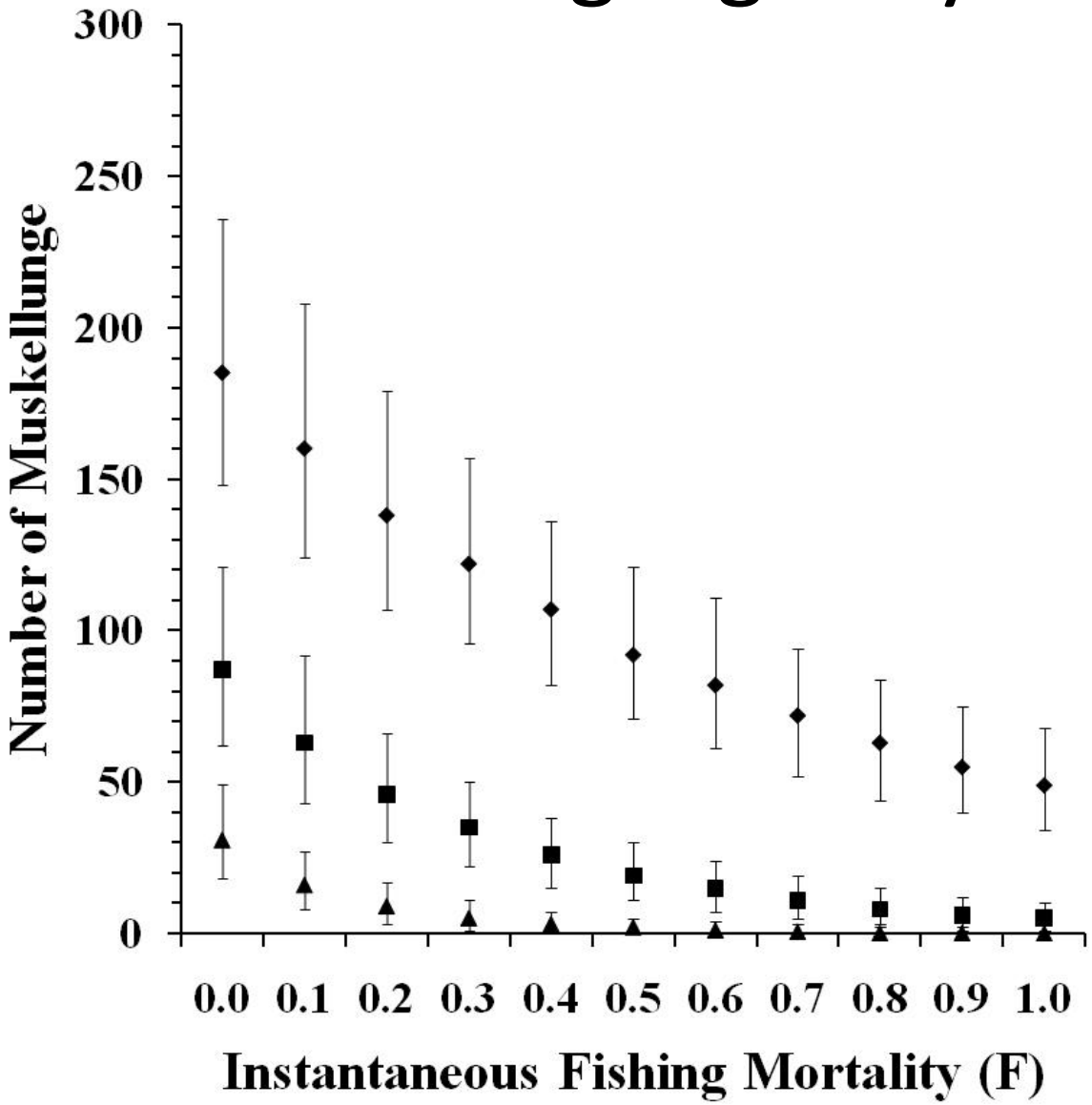

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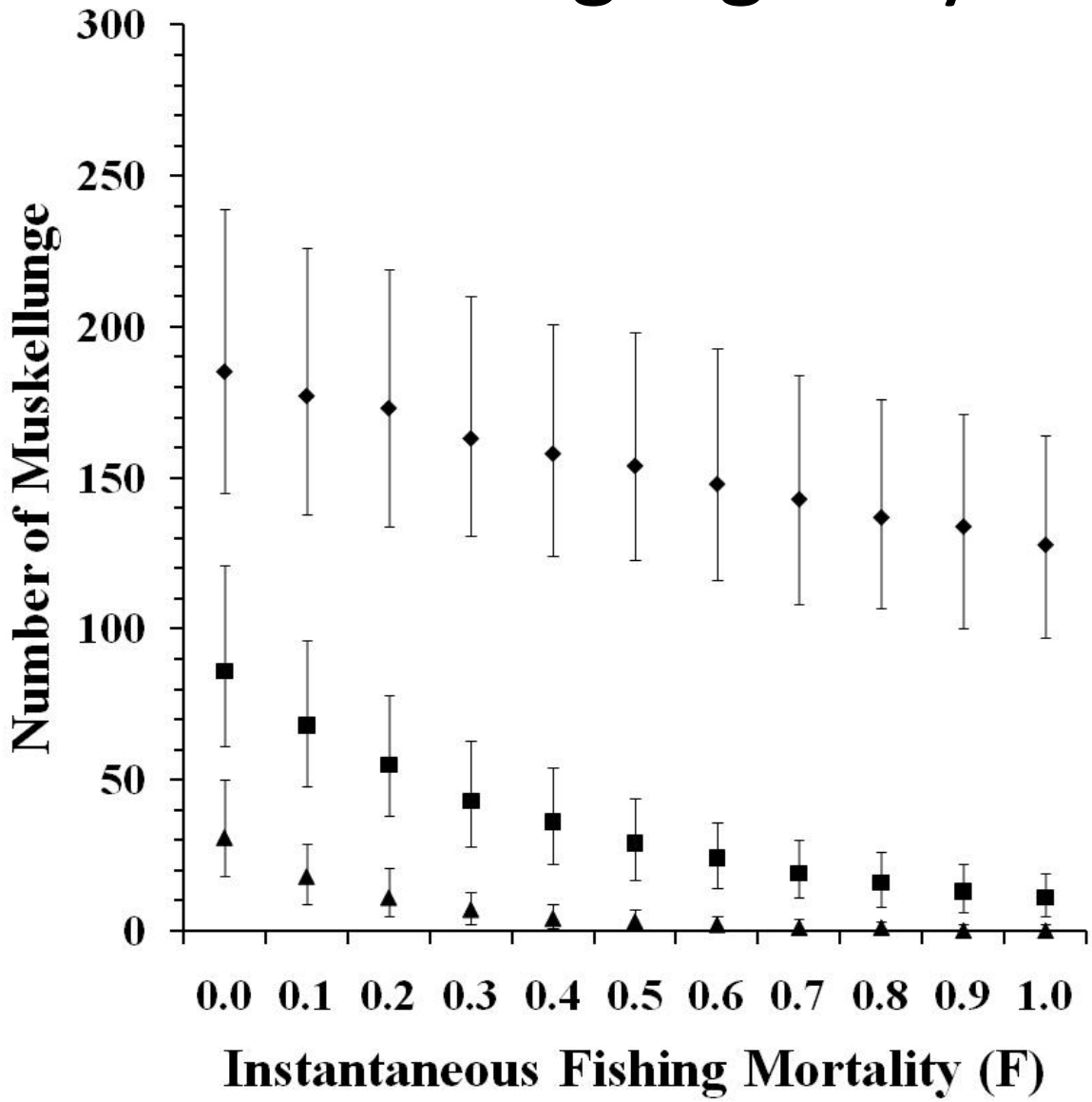

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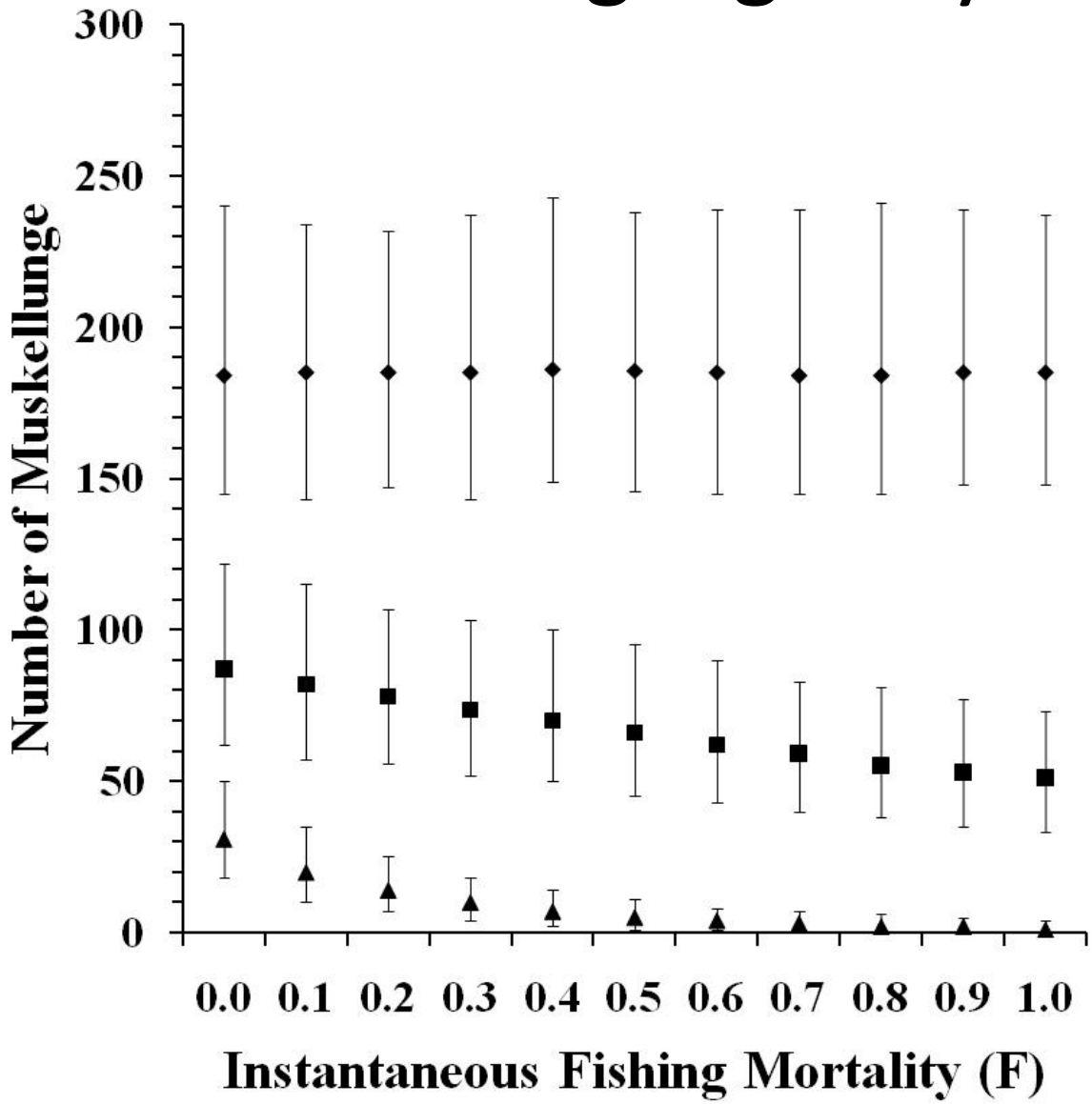

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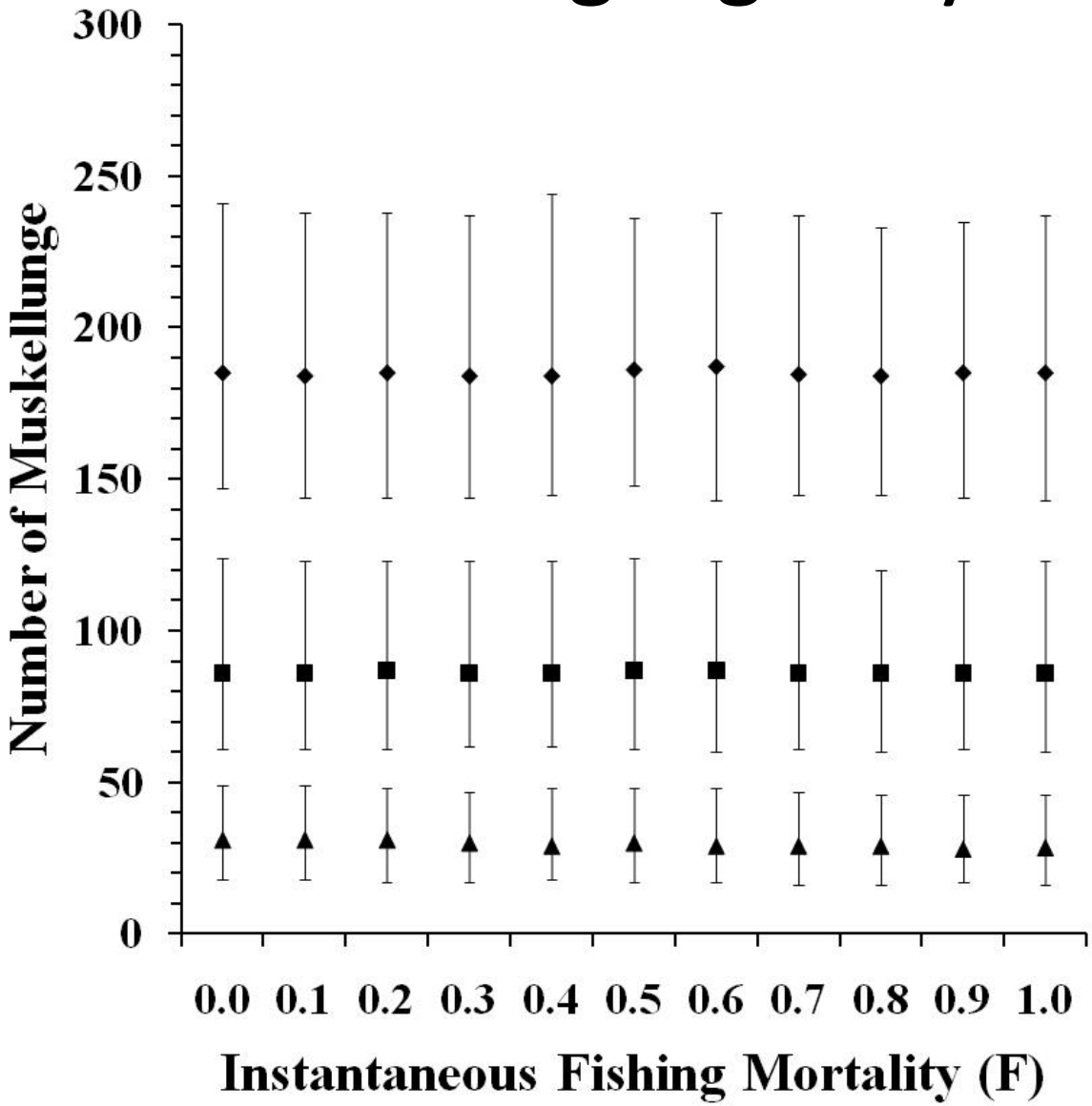
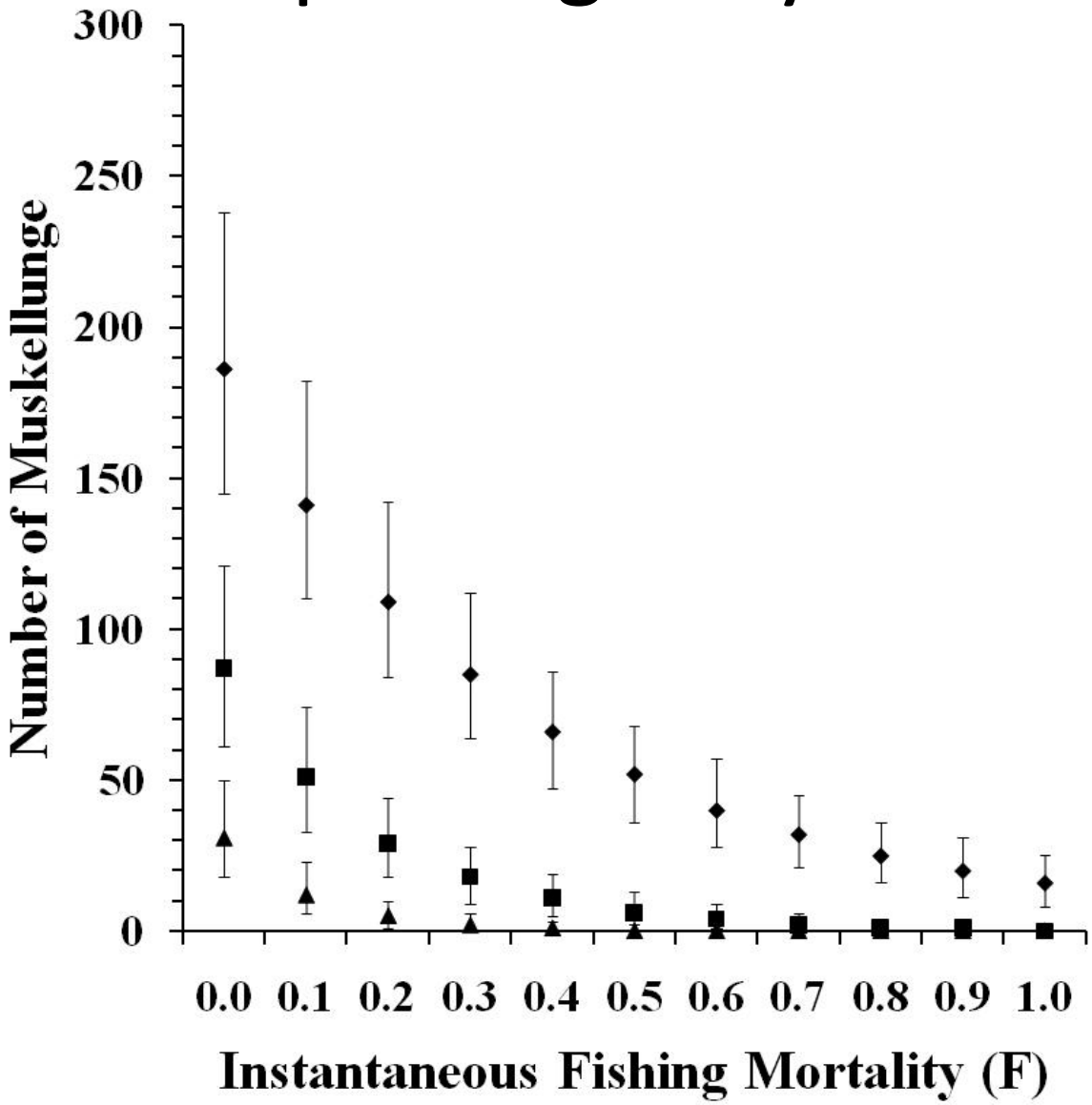


Results
Spearing Only



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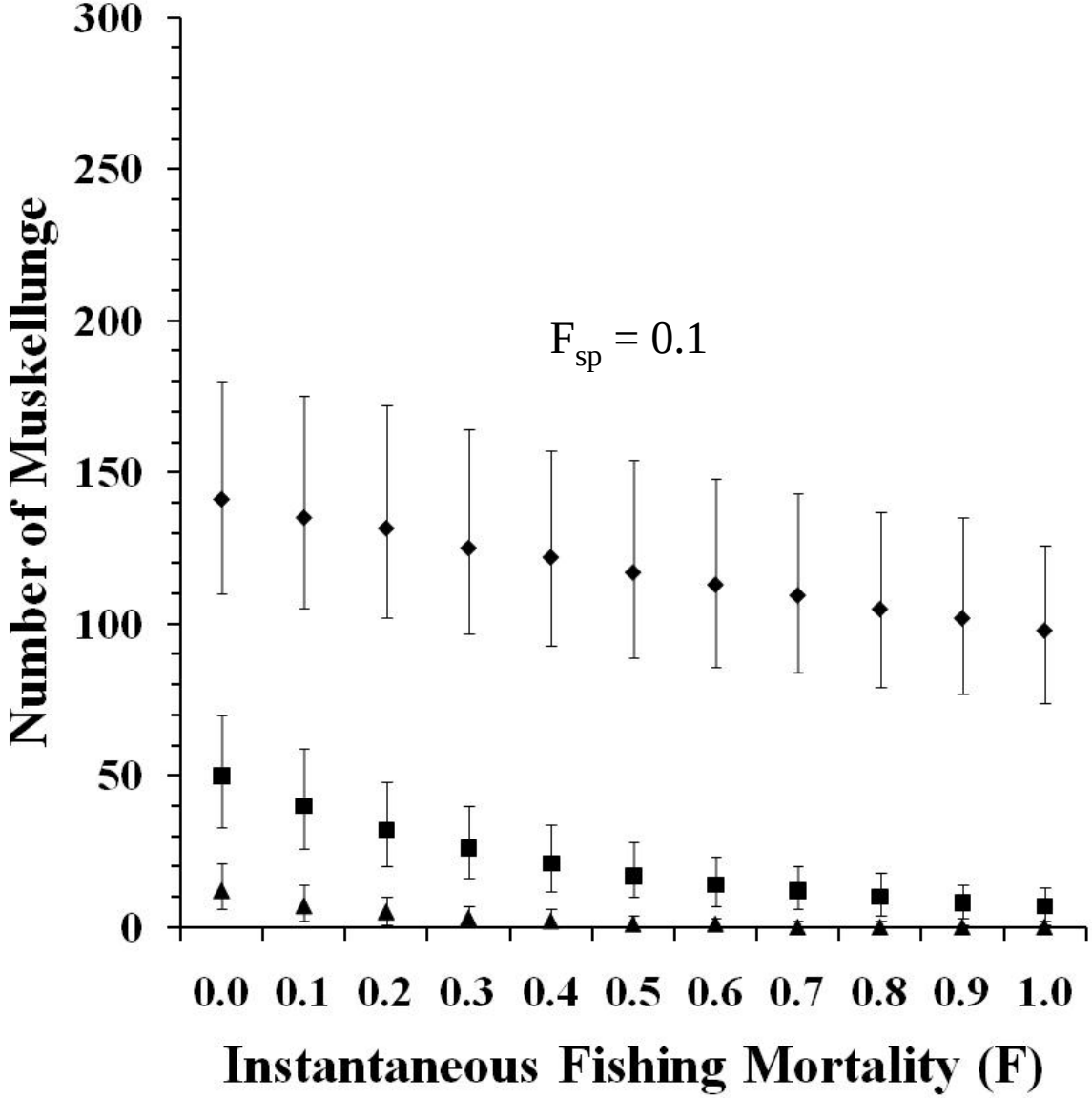

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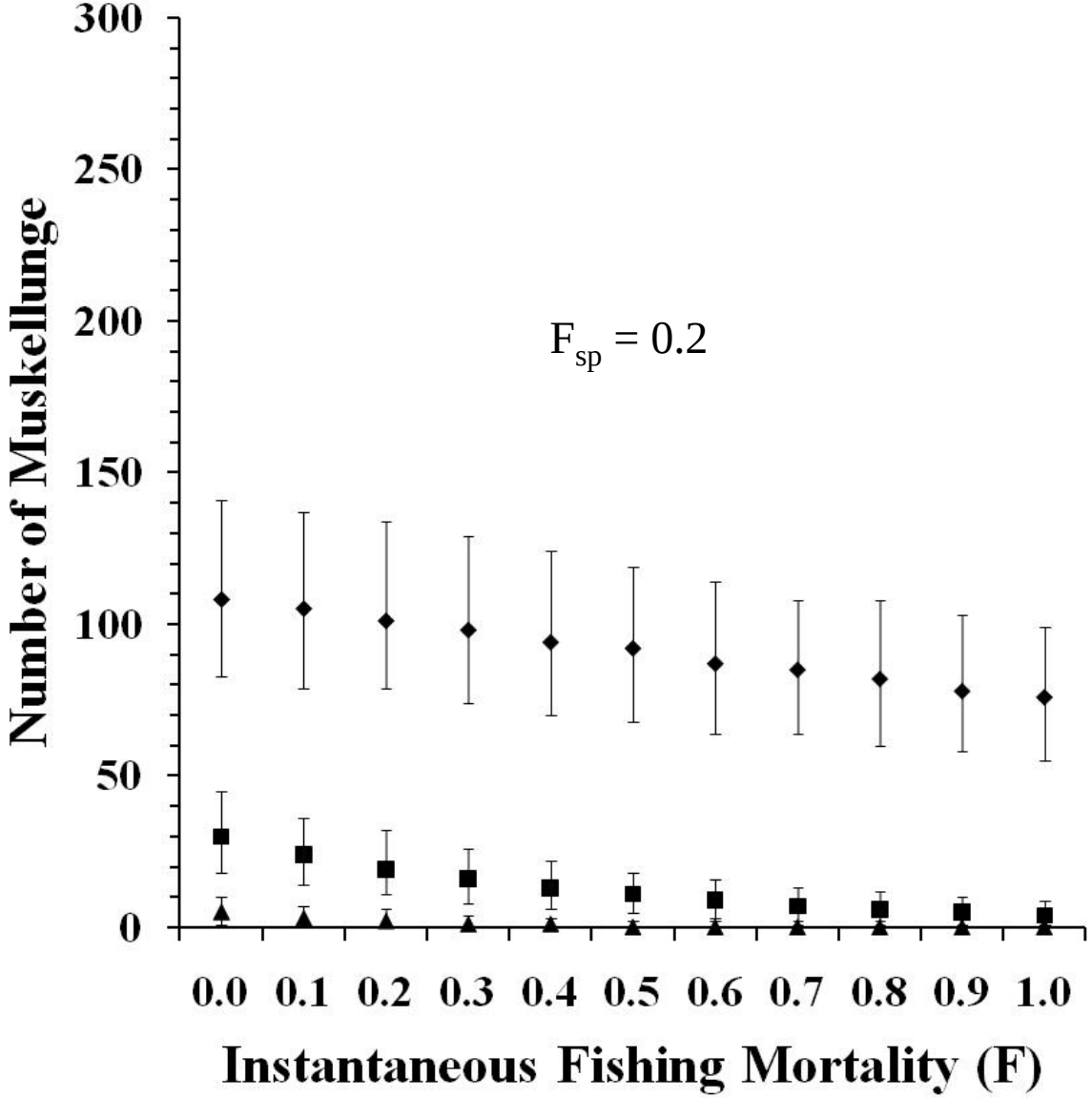

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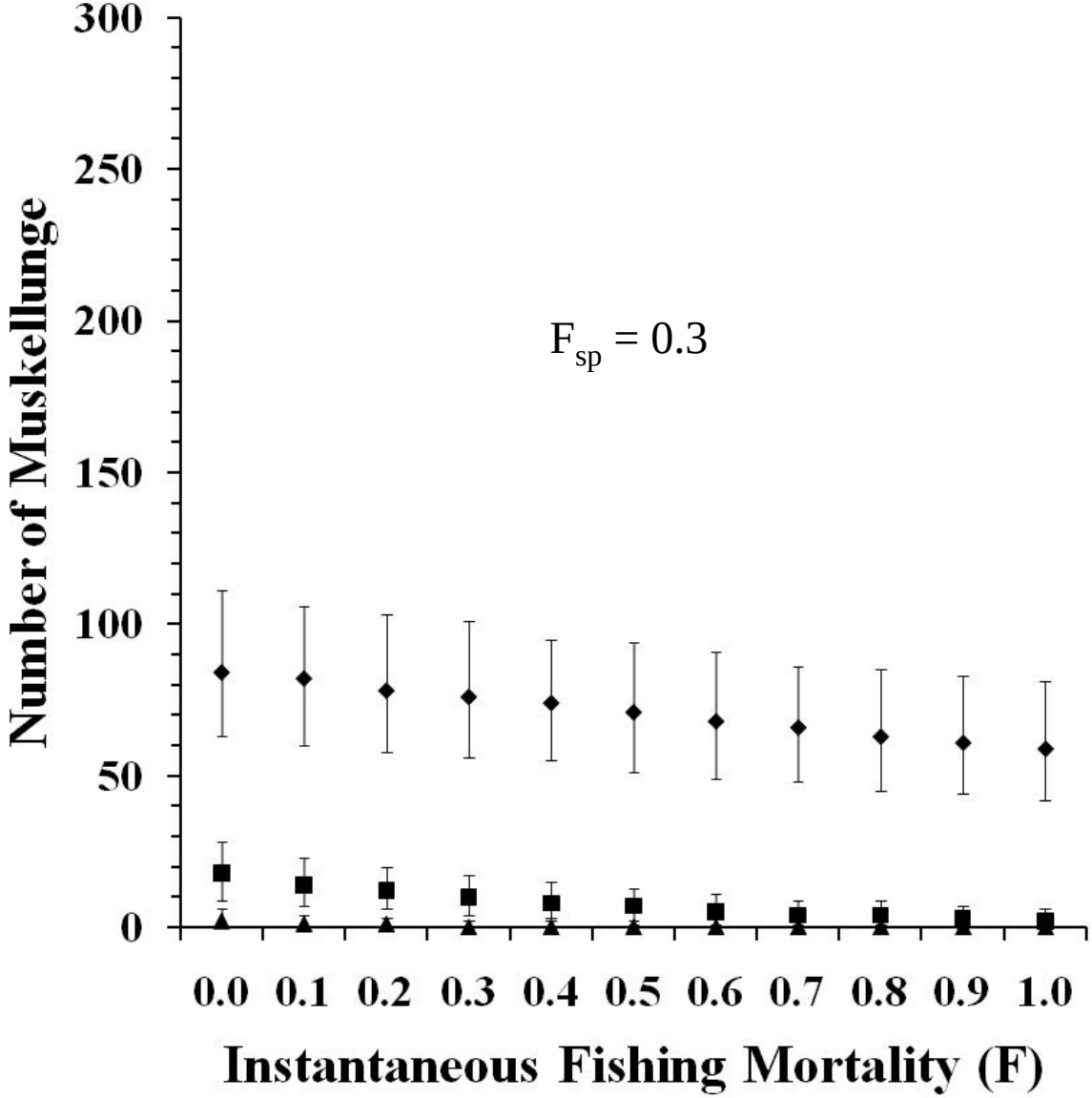

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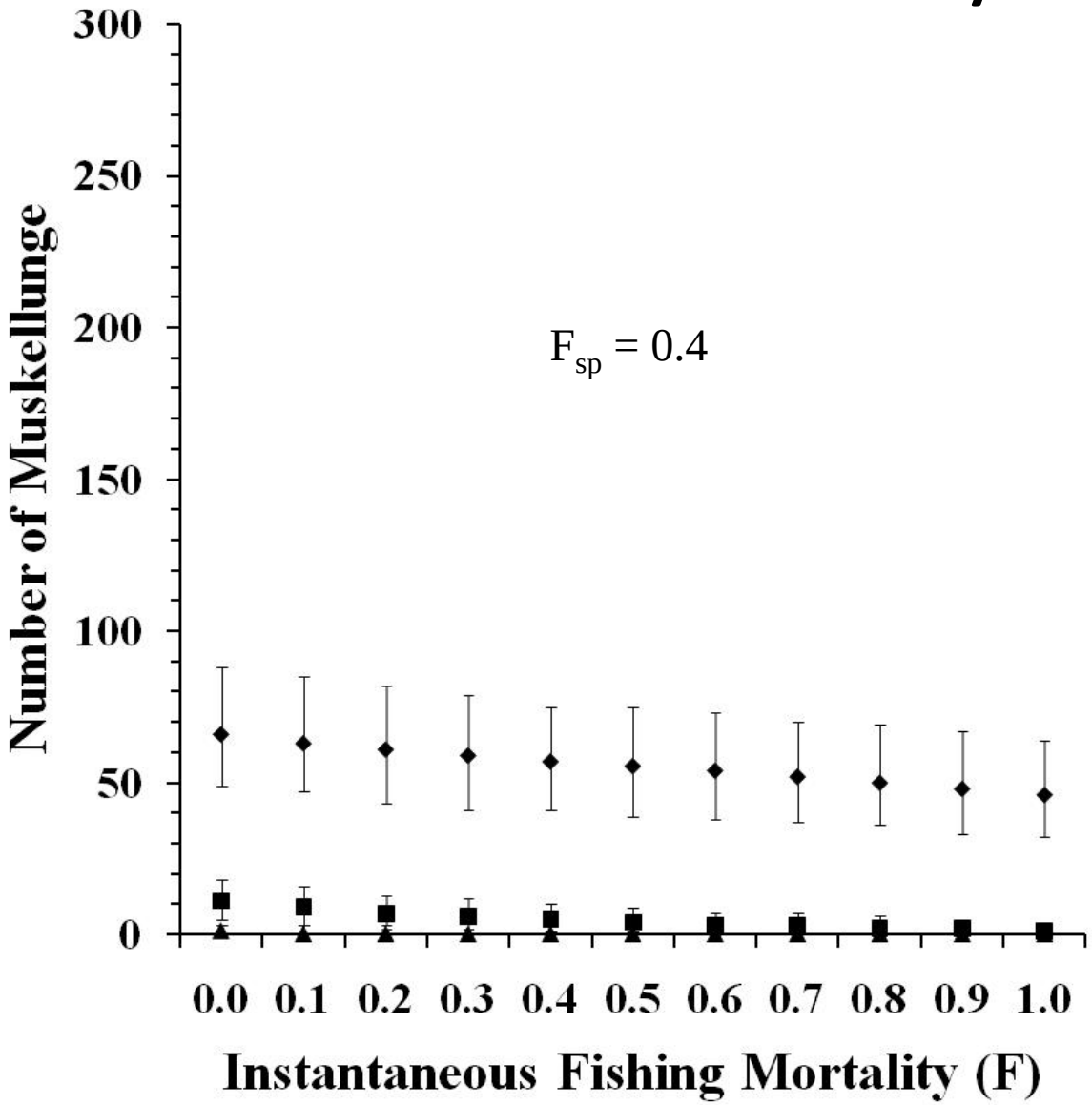

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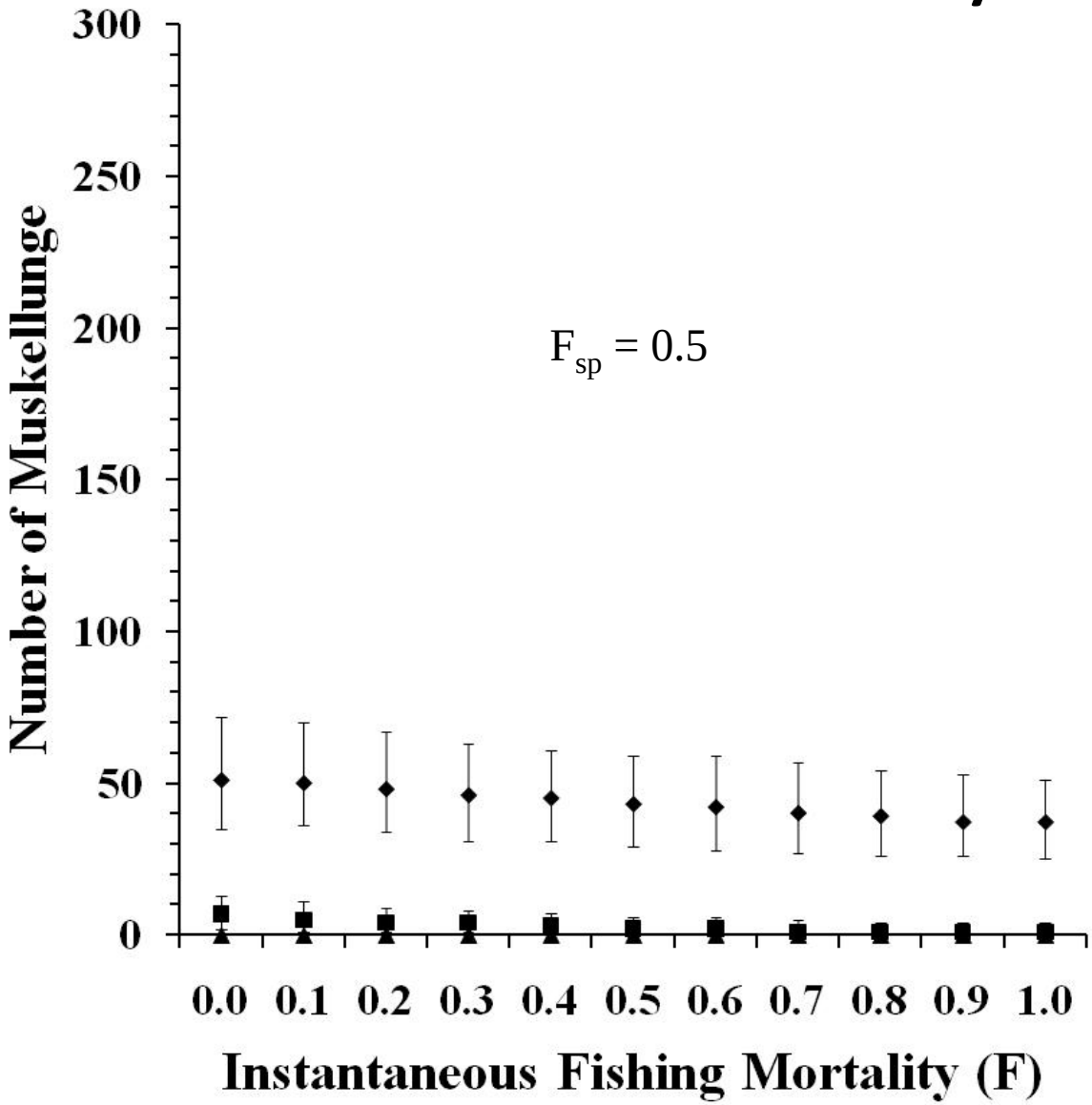

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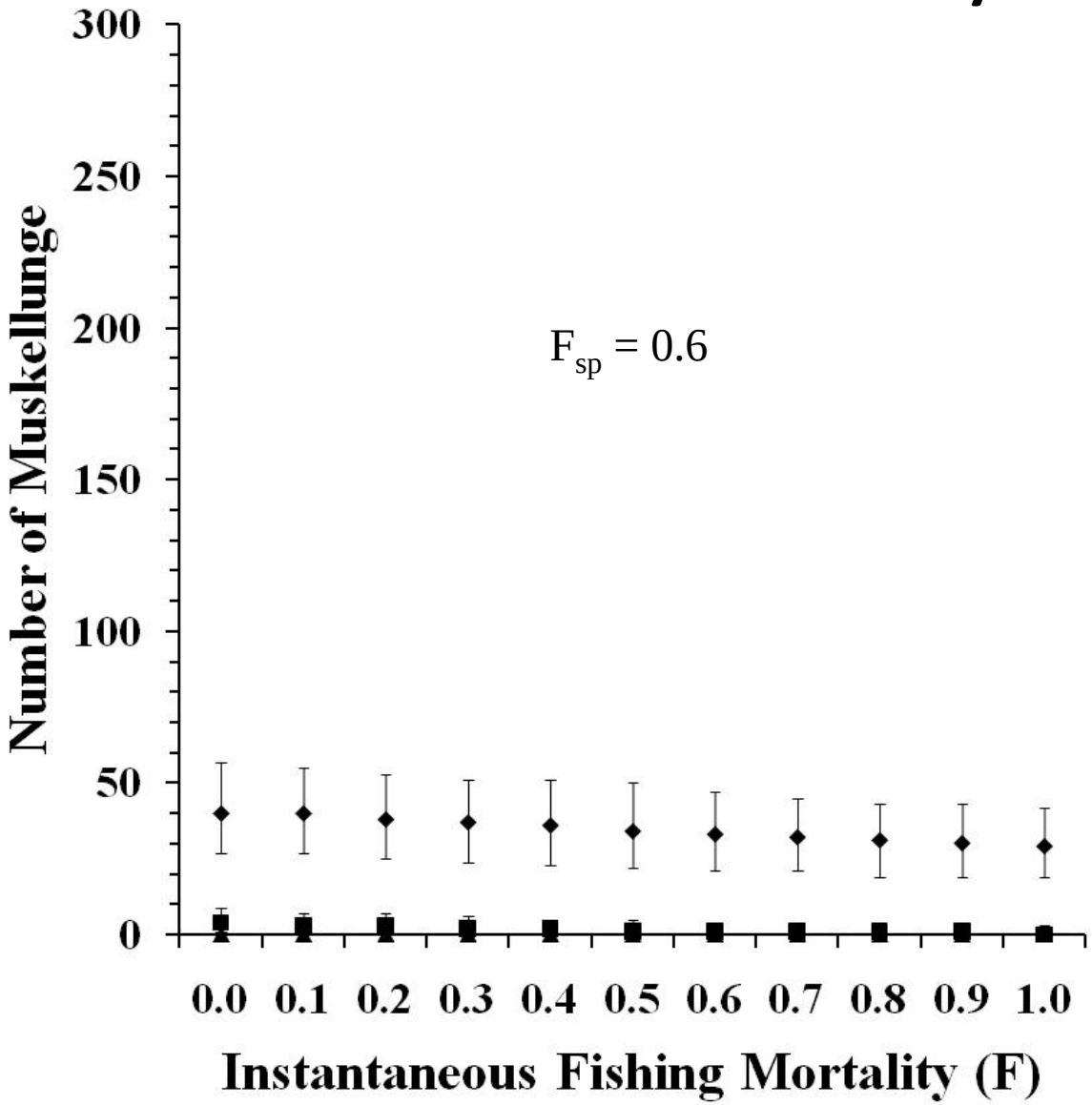

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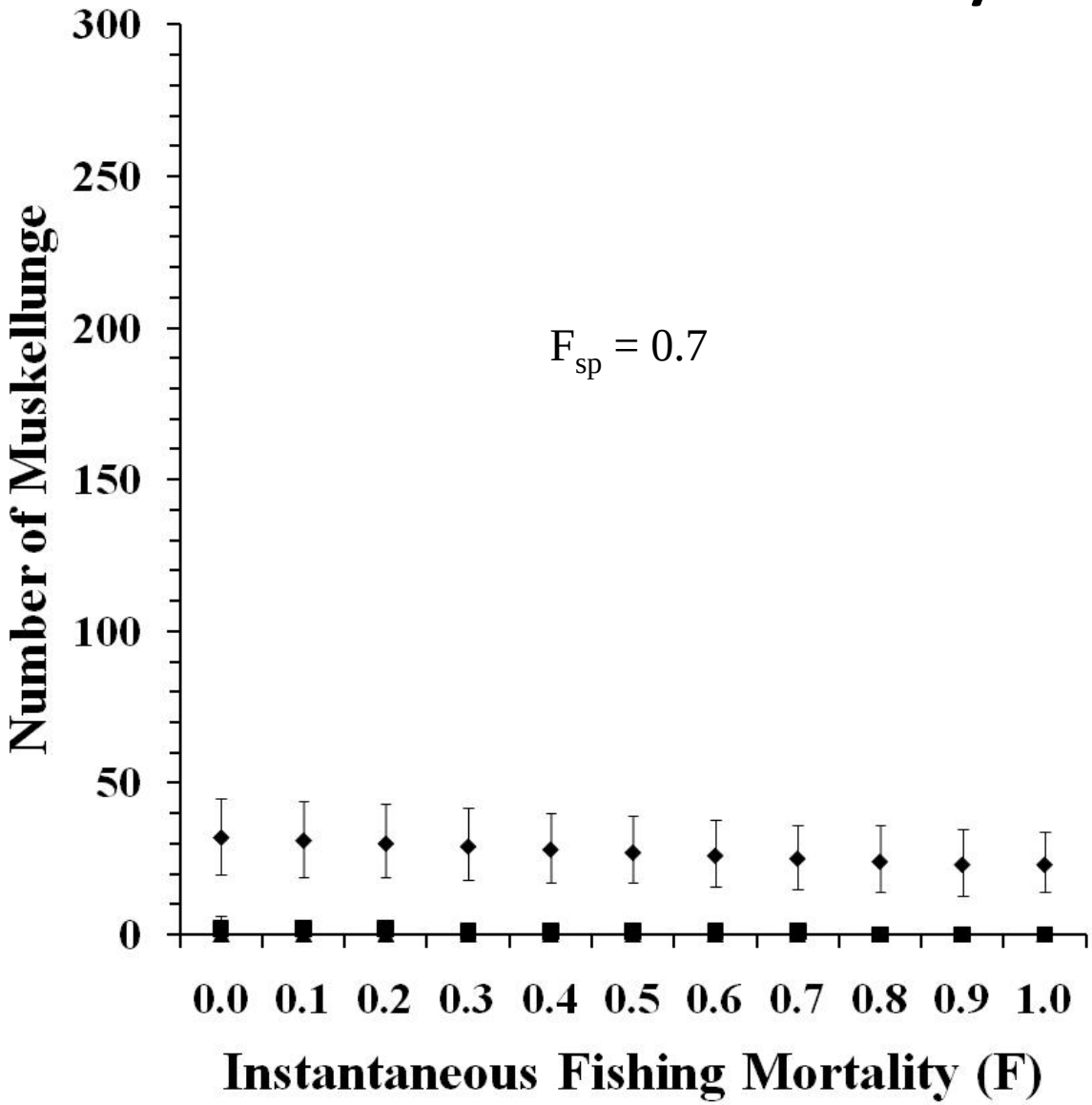

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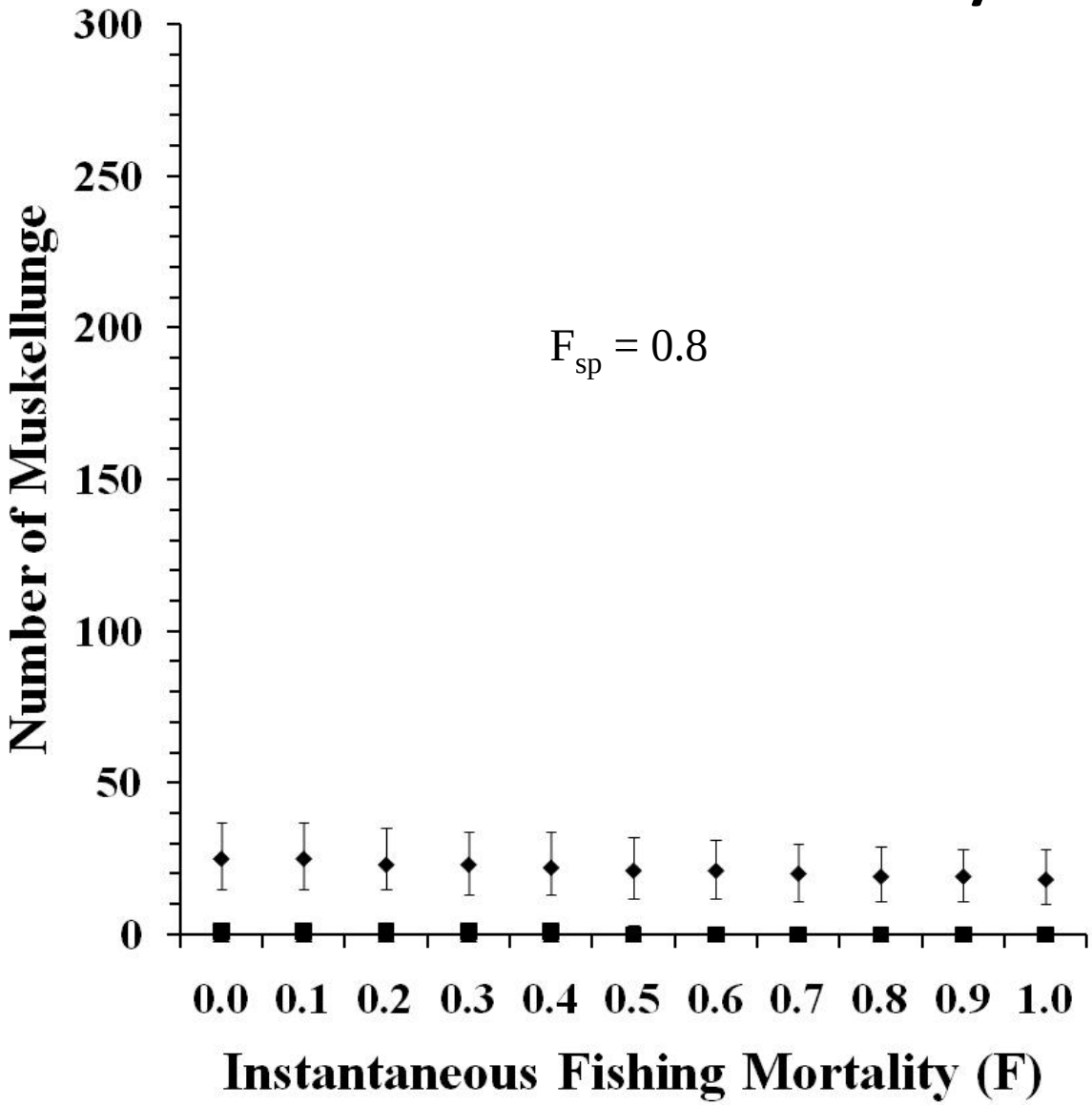

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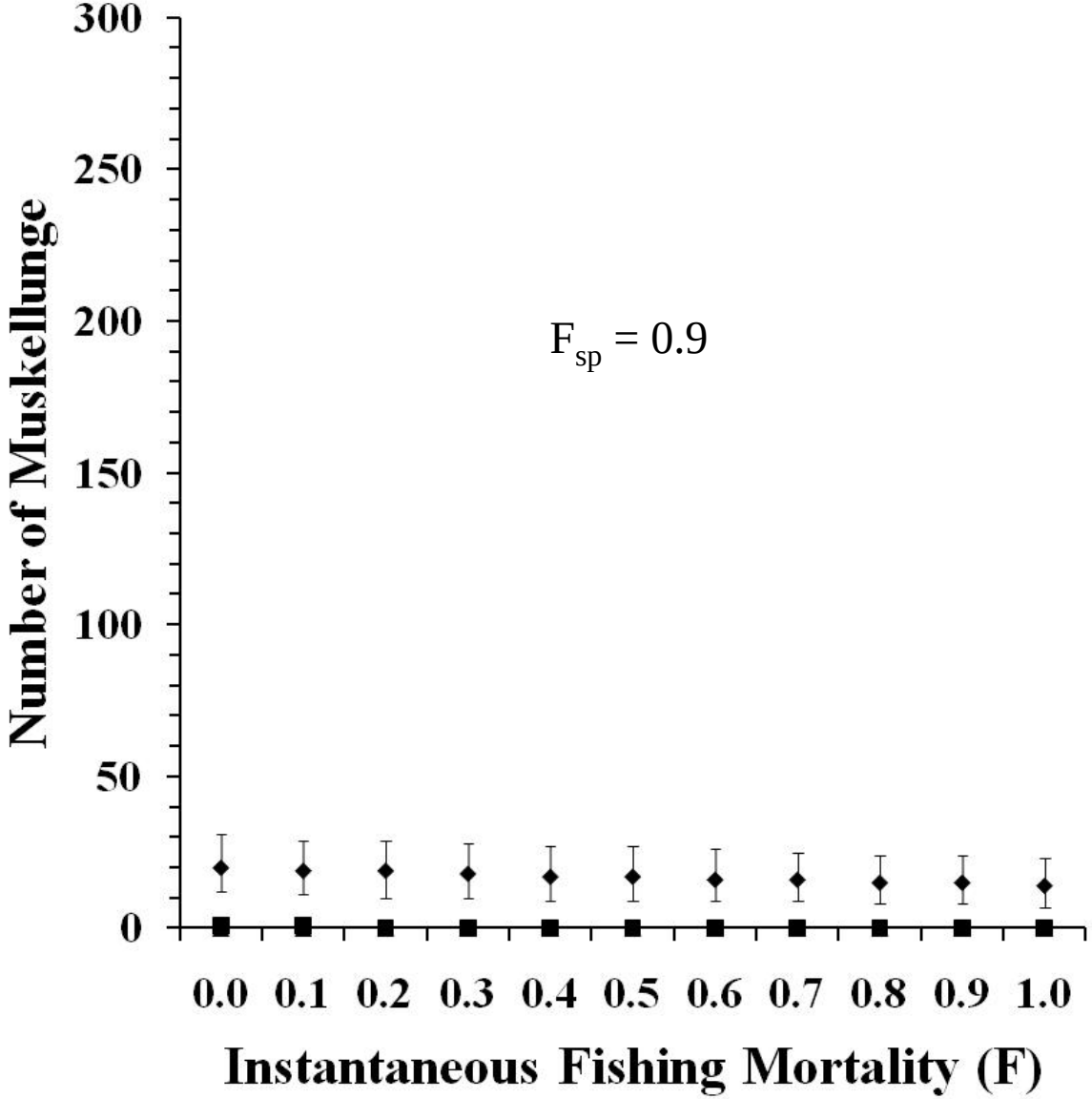

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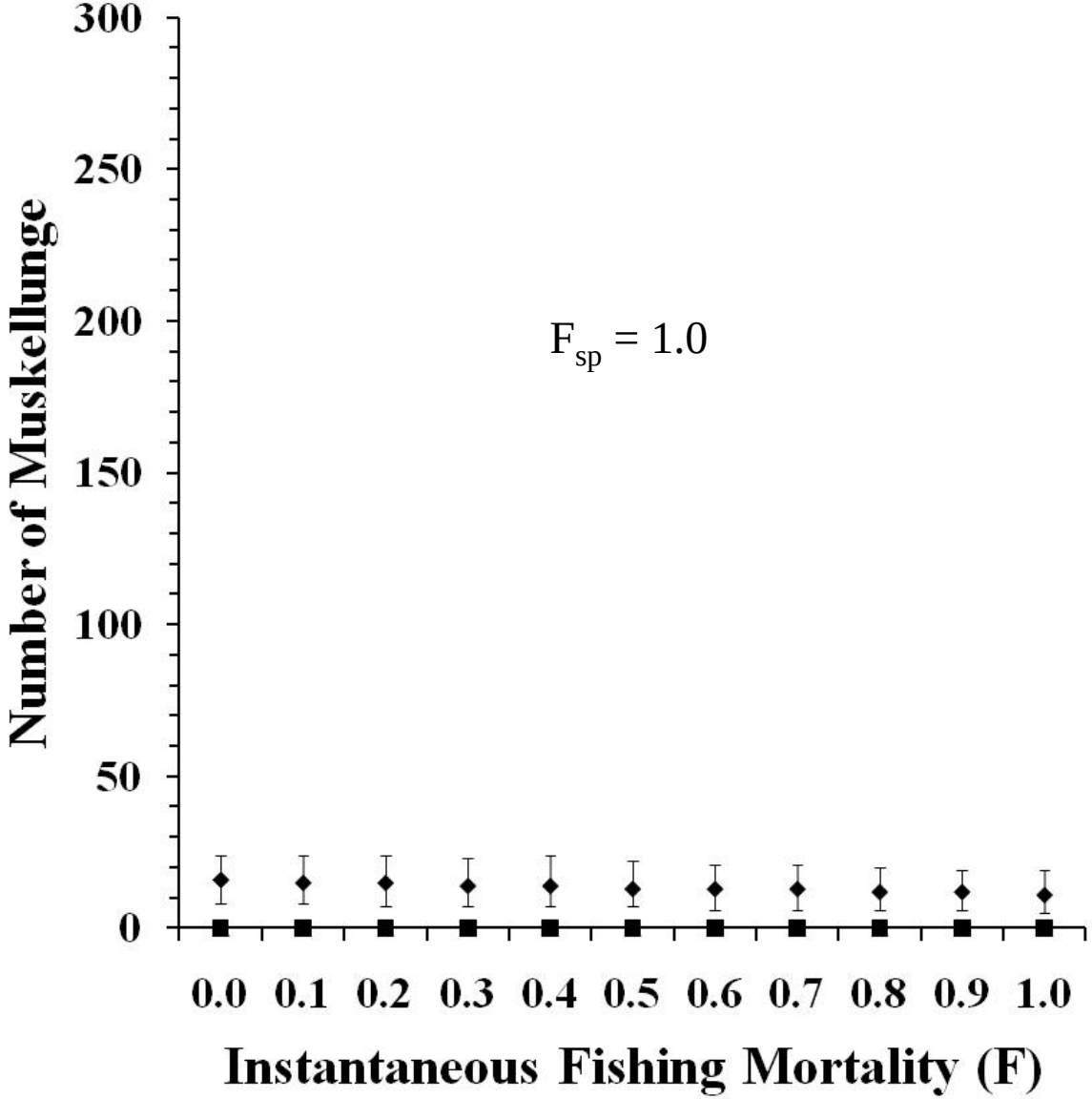

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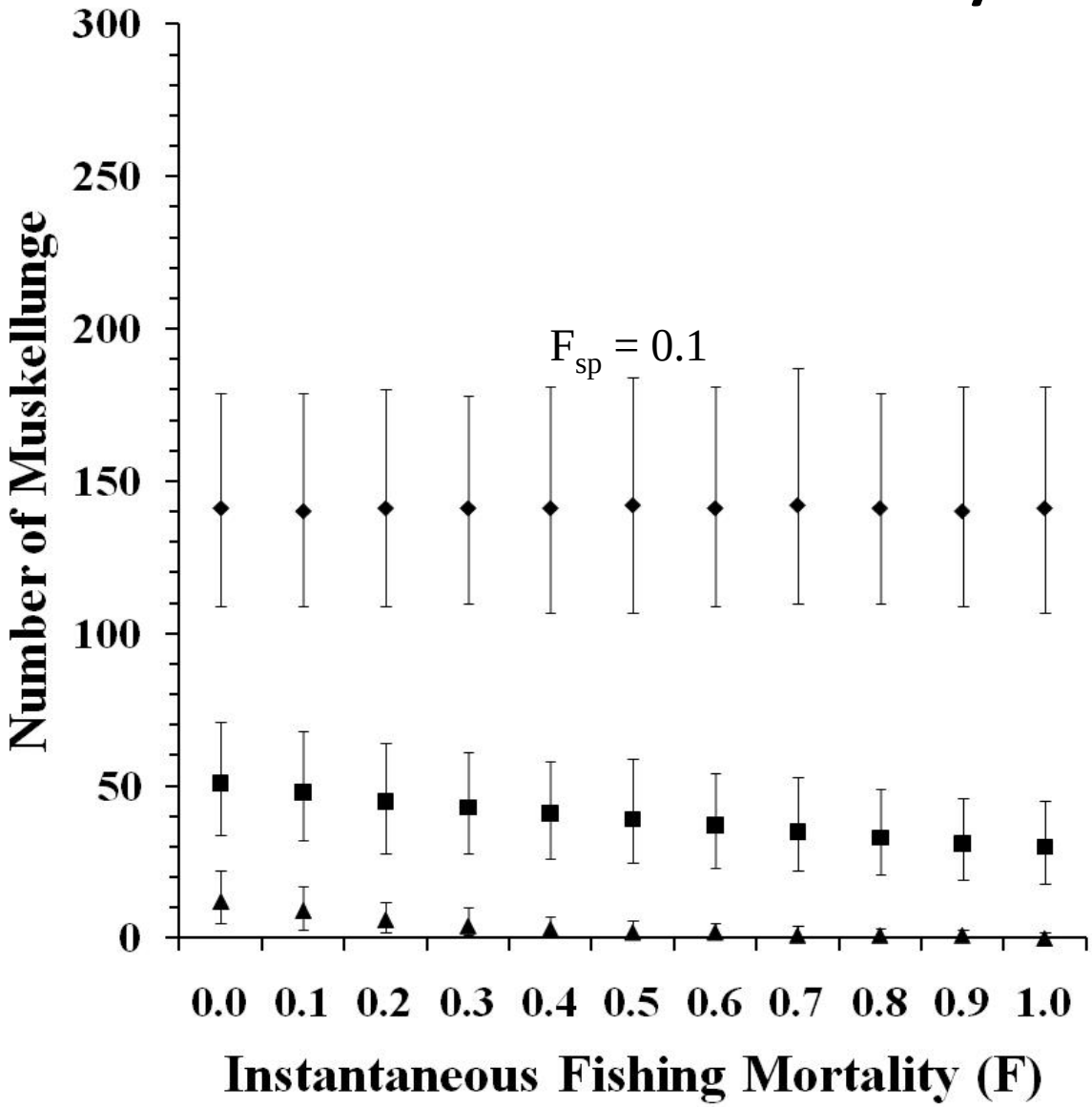

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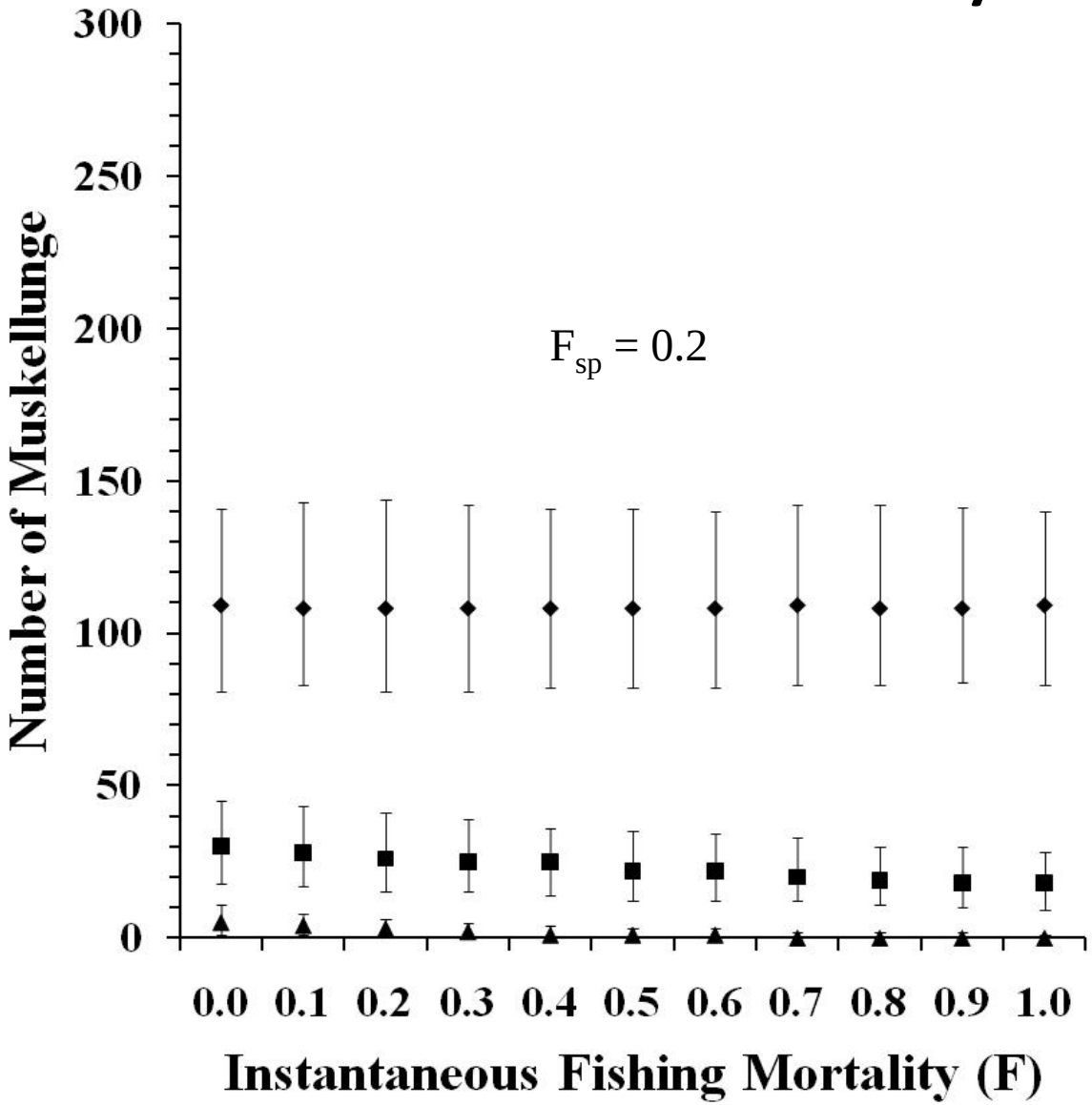

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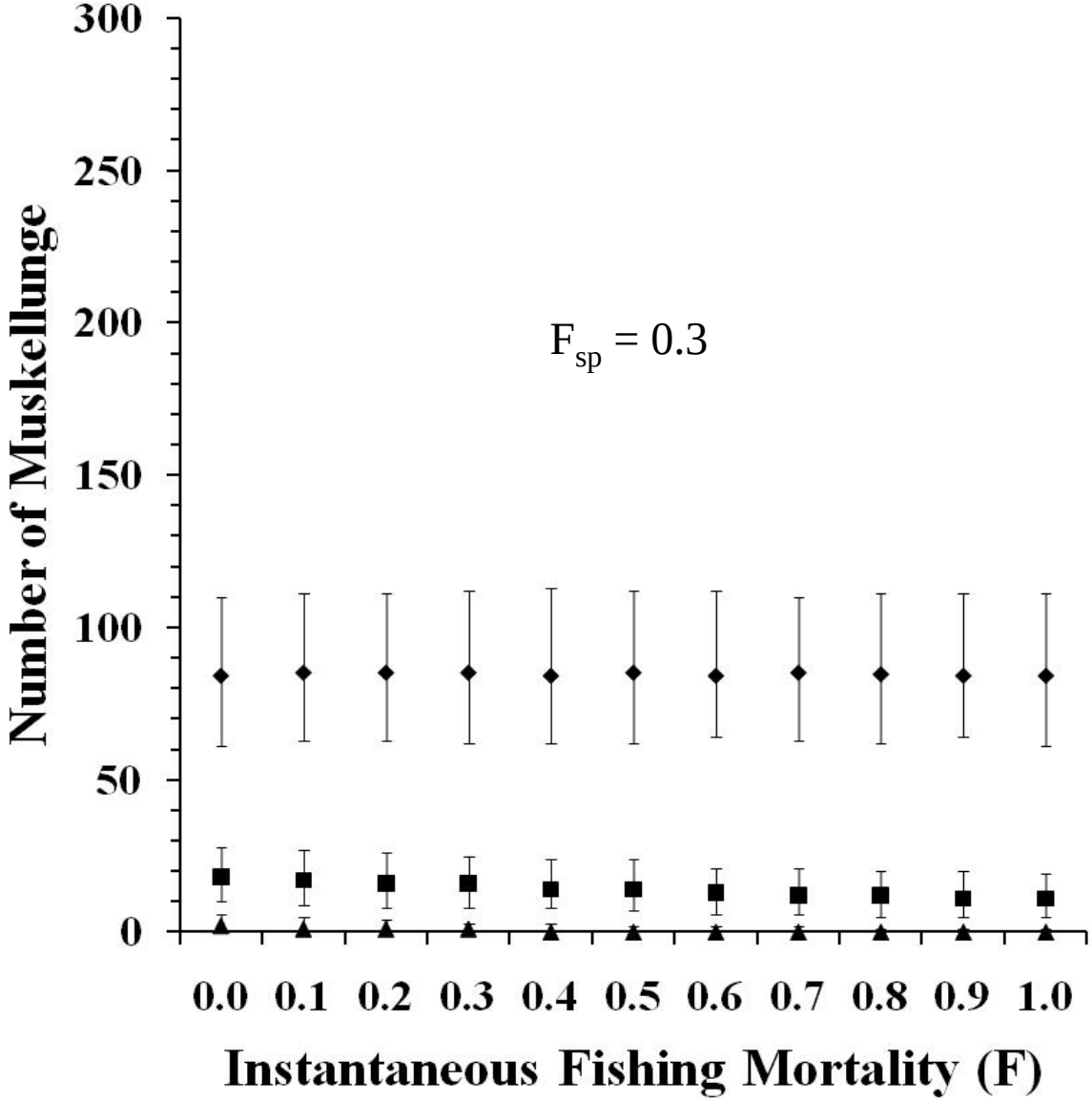

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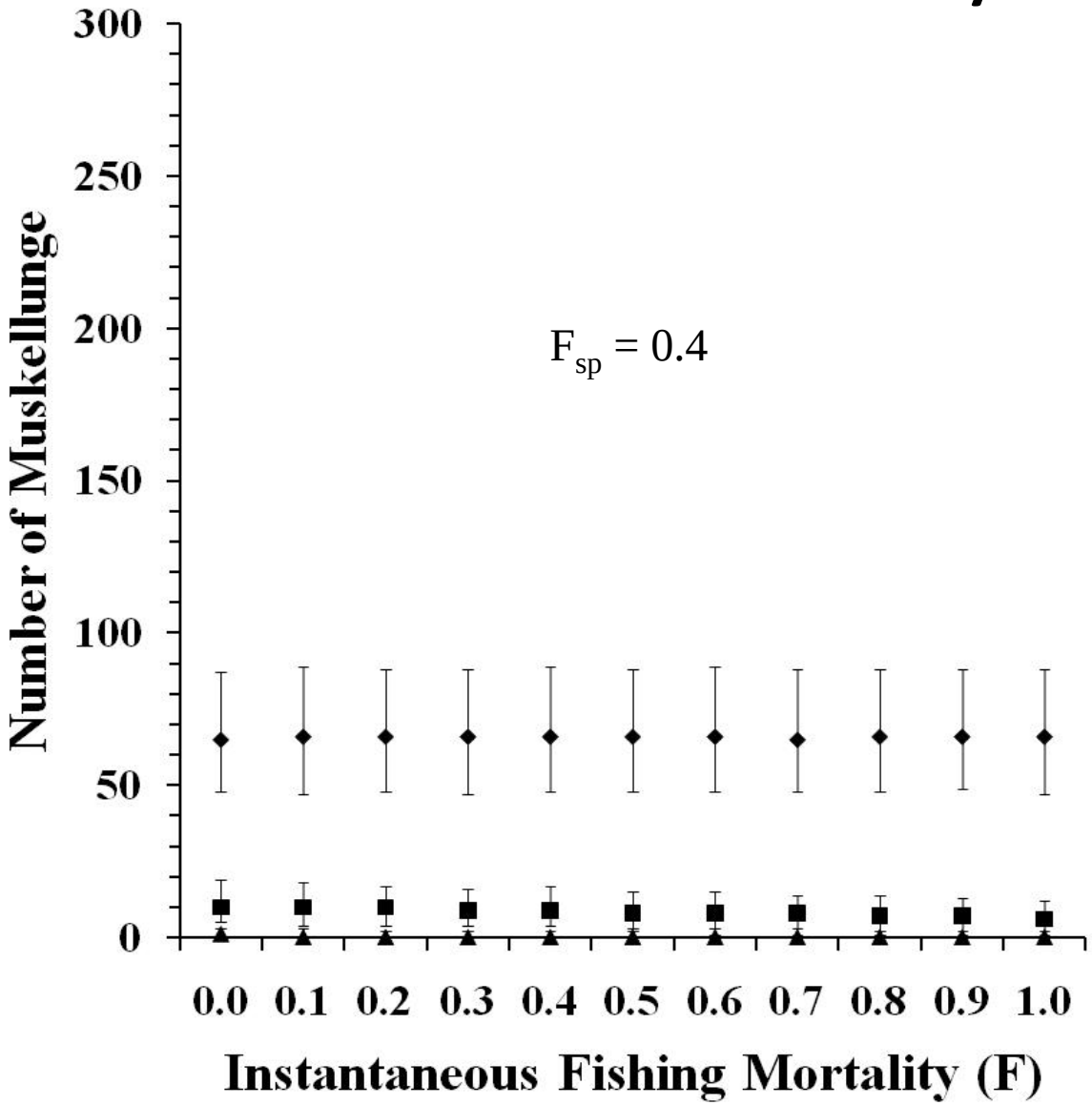

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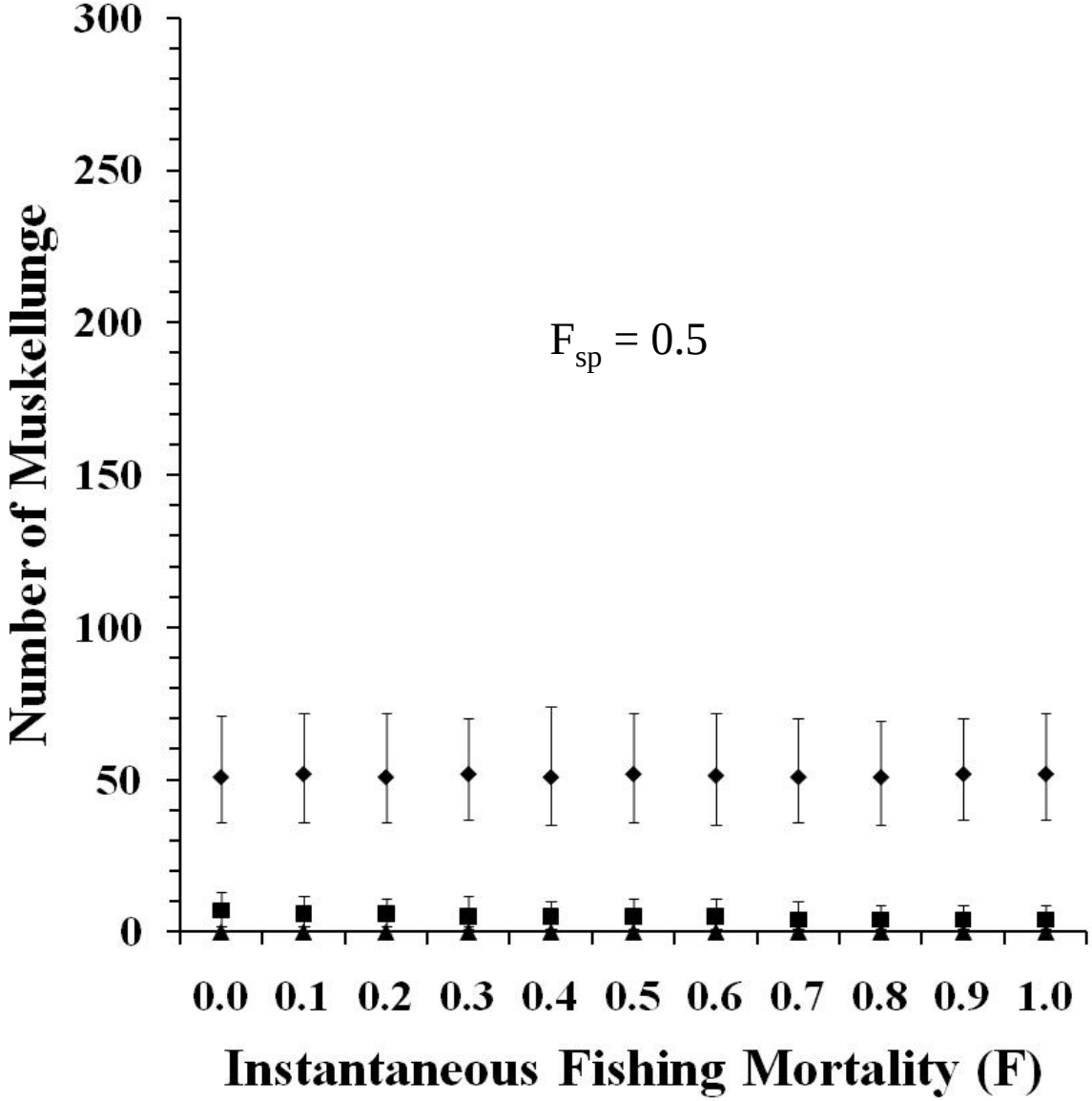

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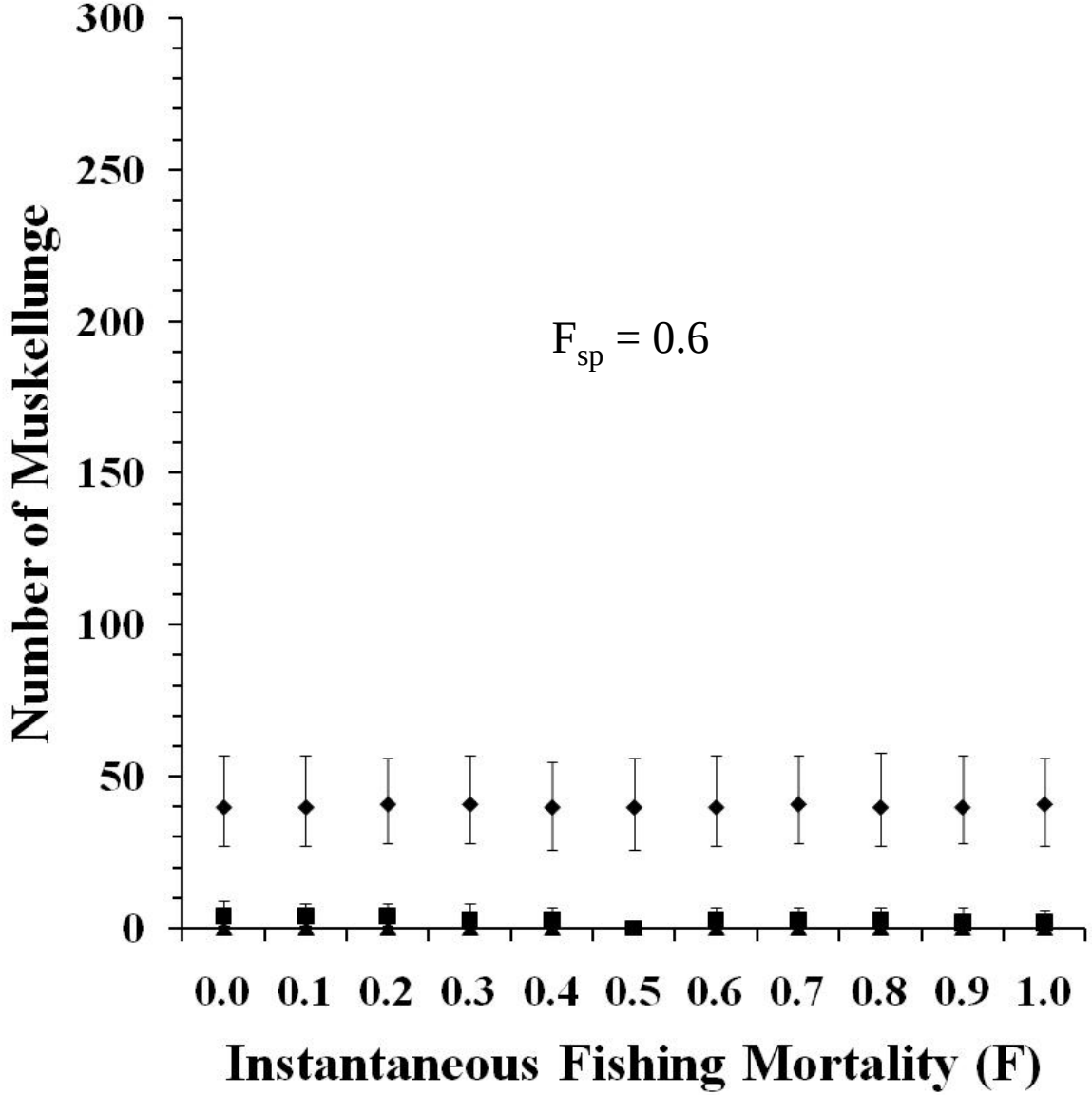

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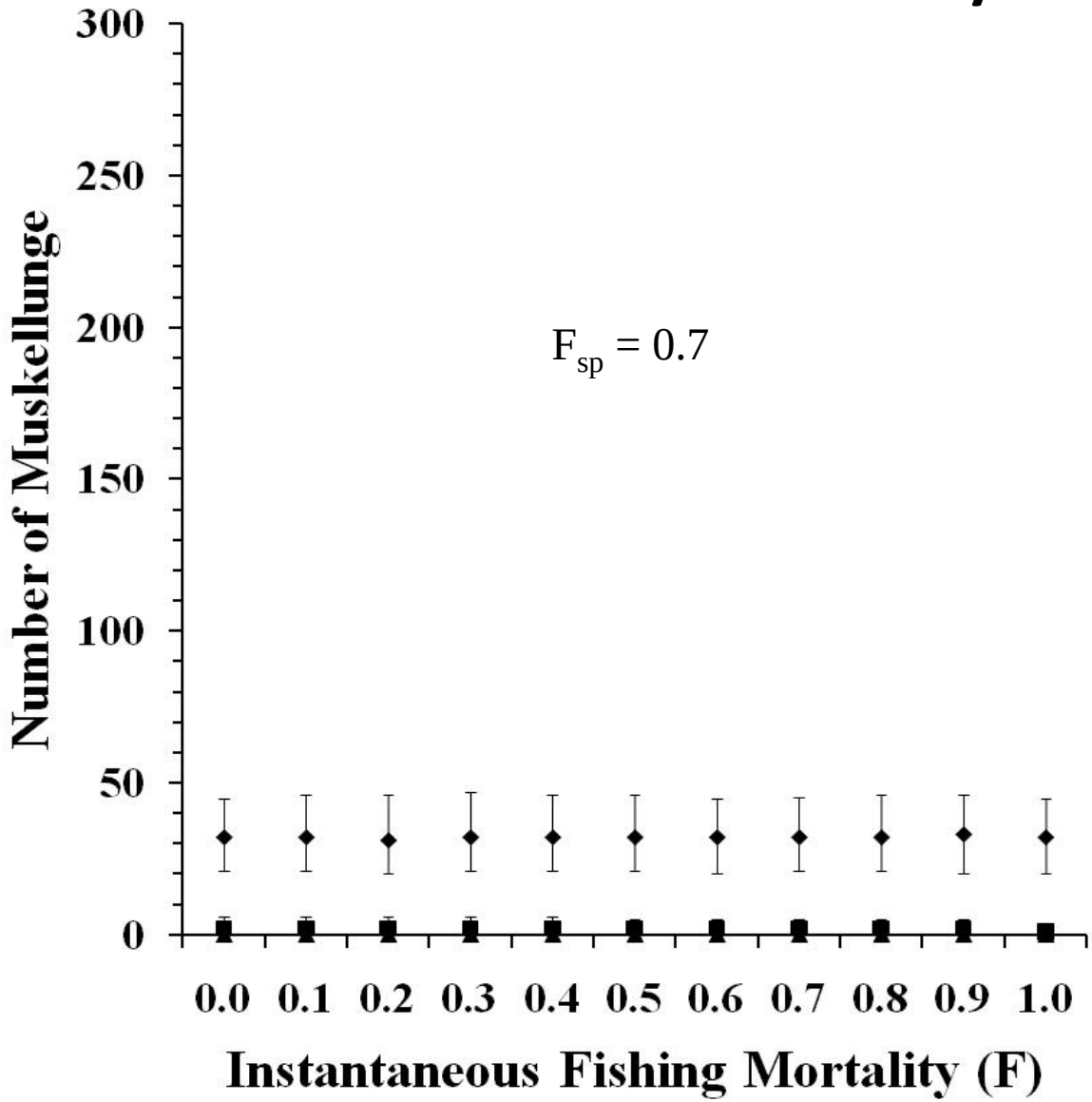

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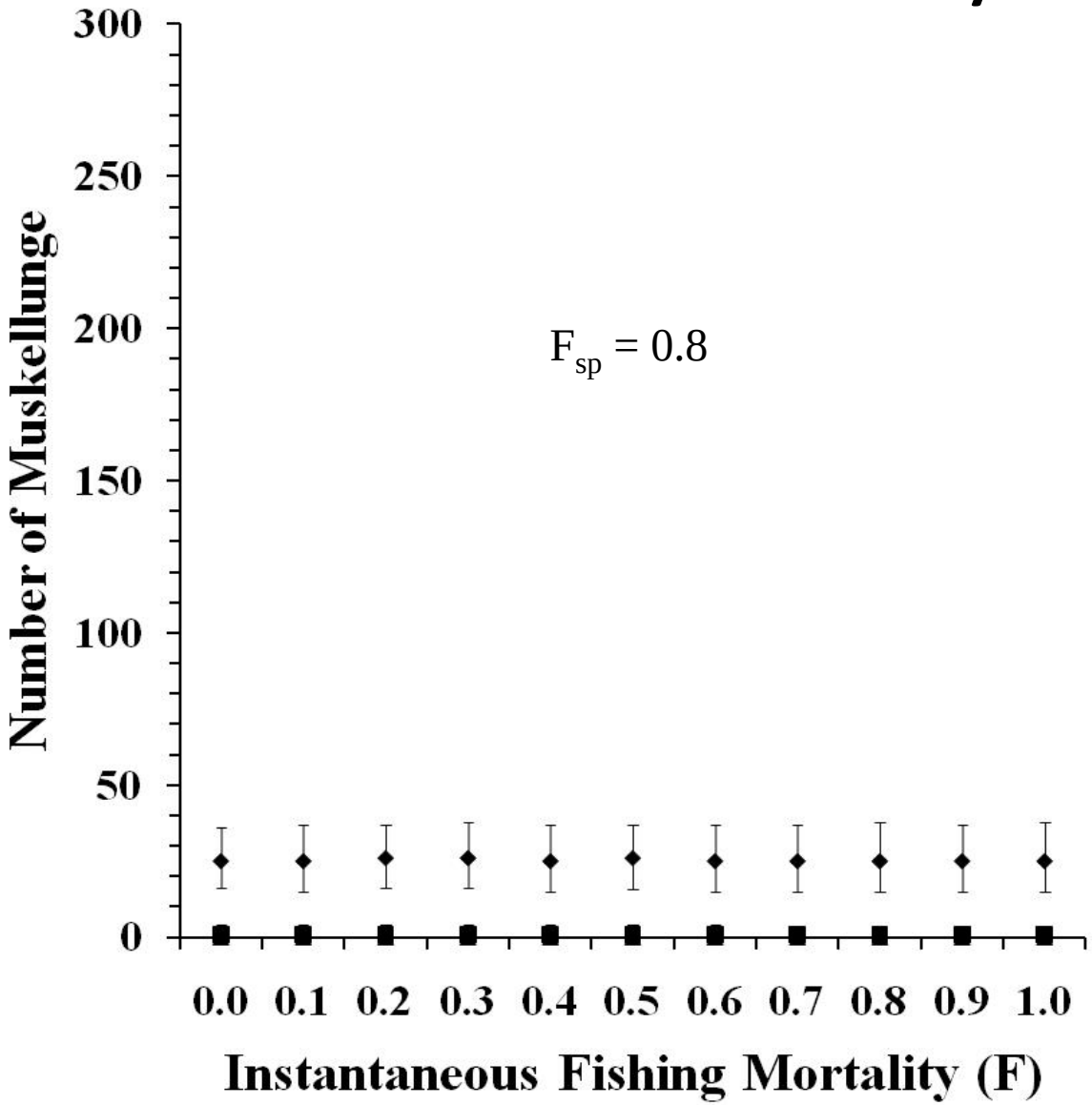

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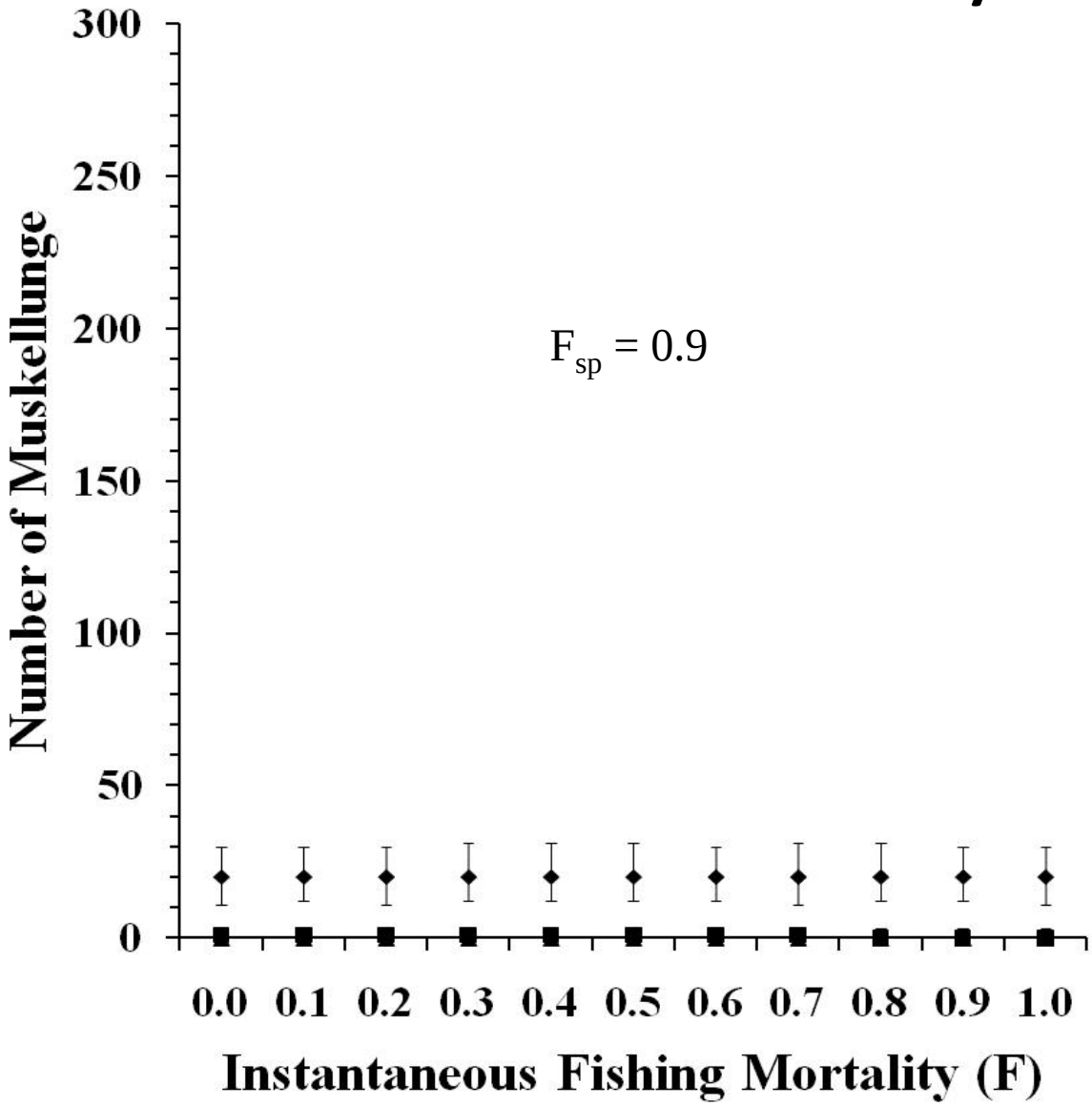

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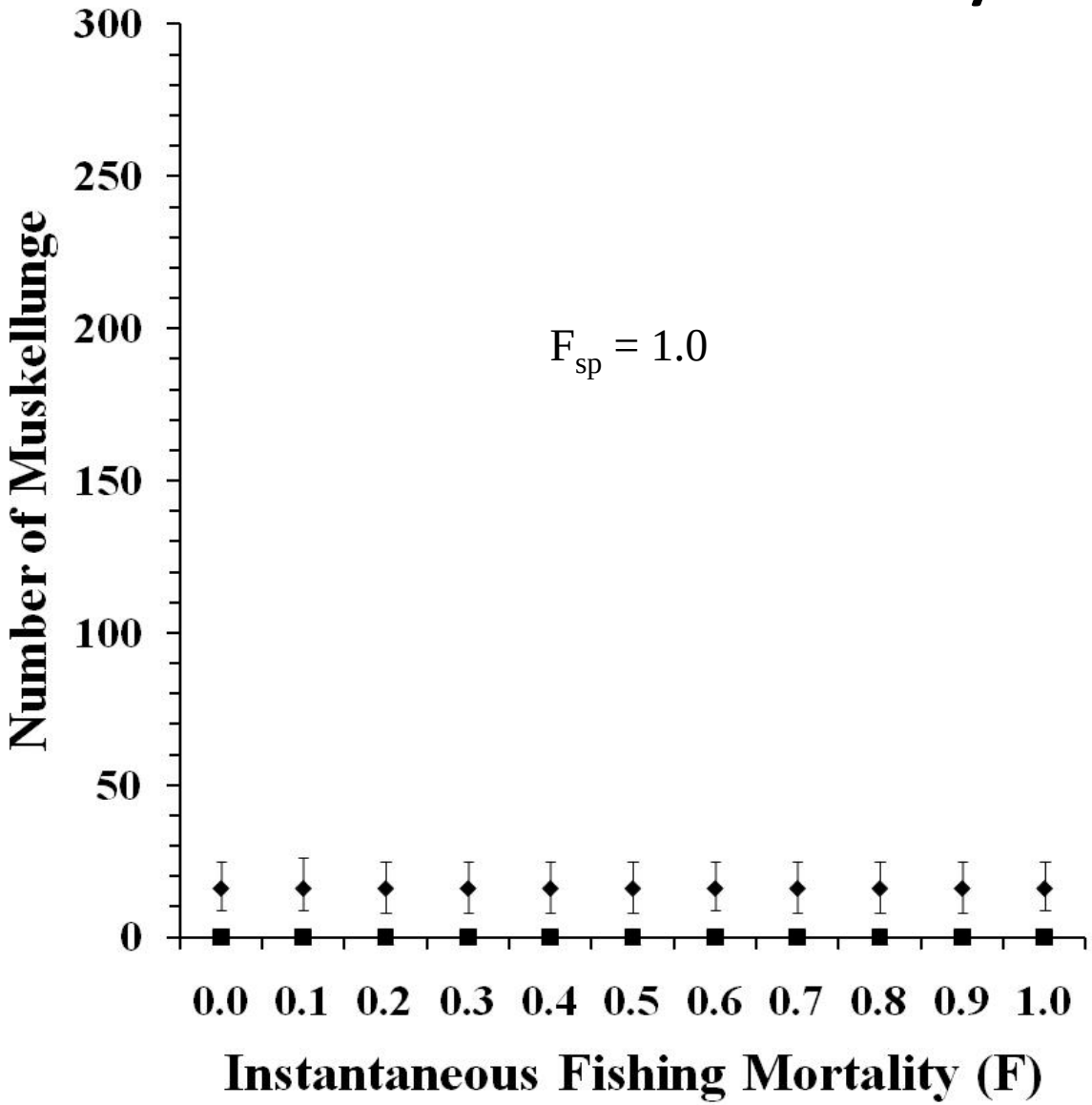

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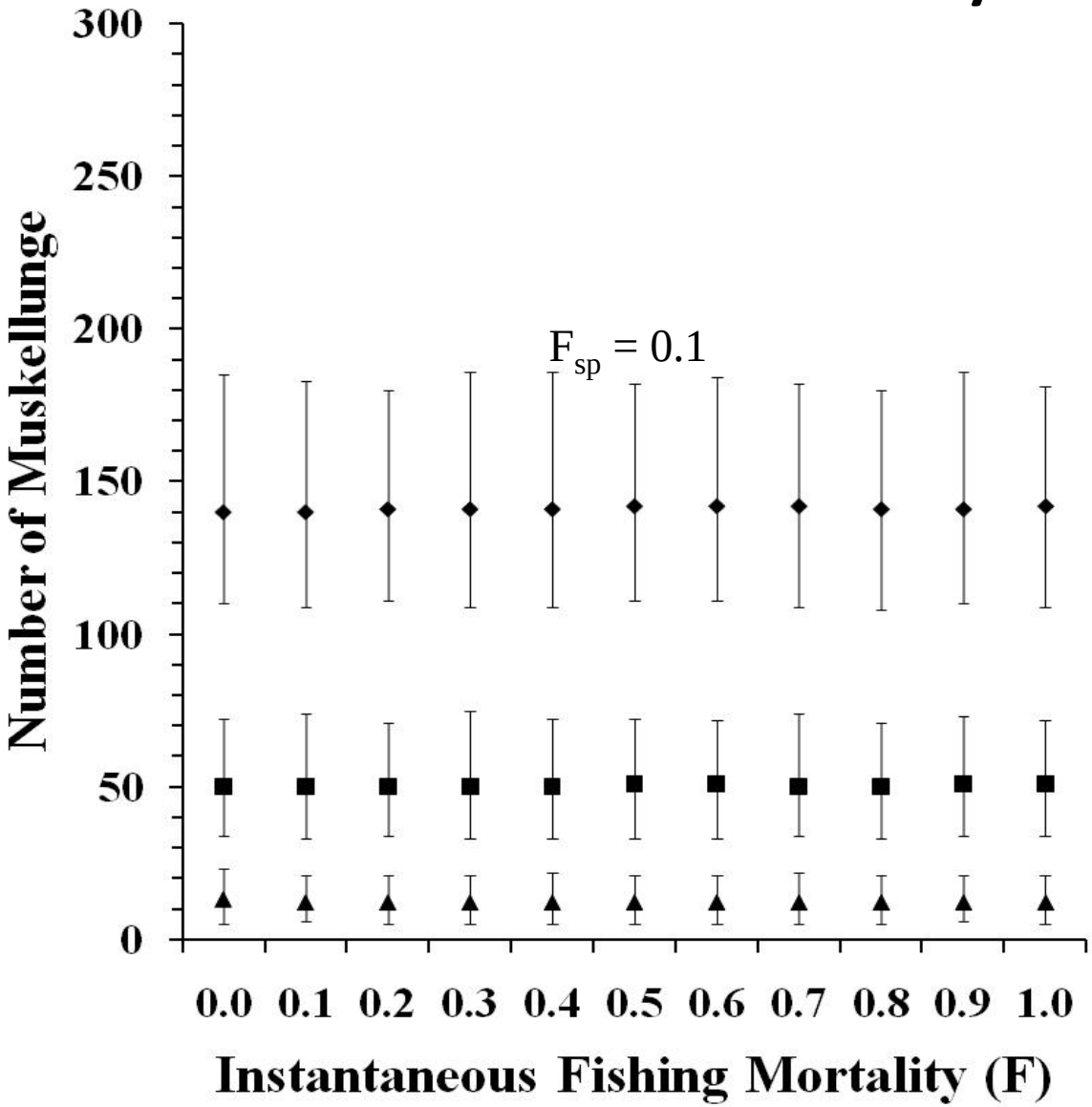

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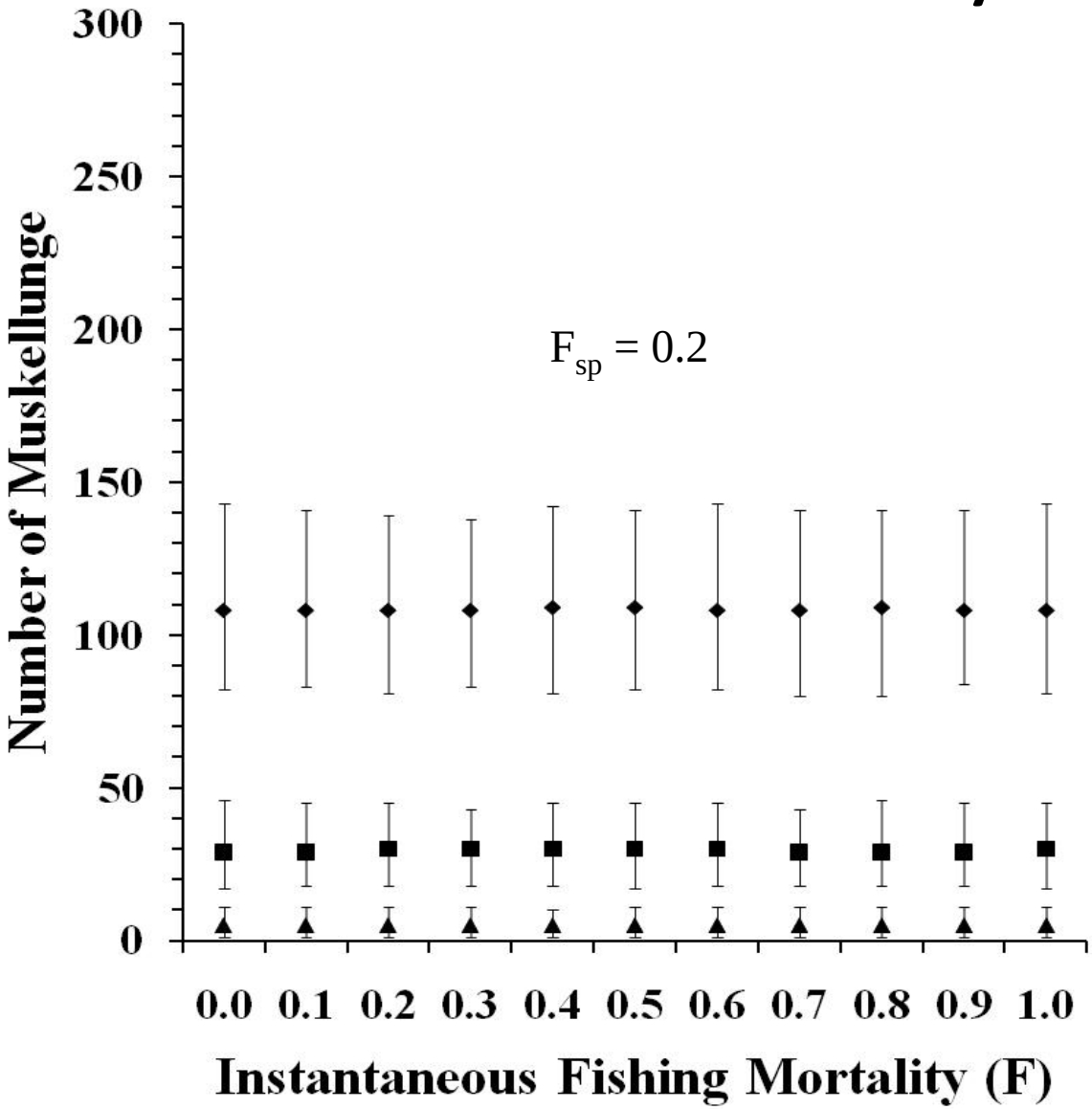

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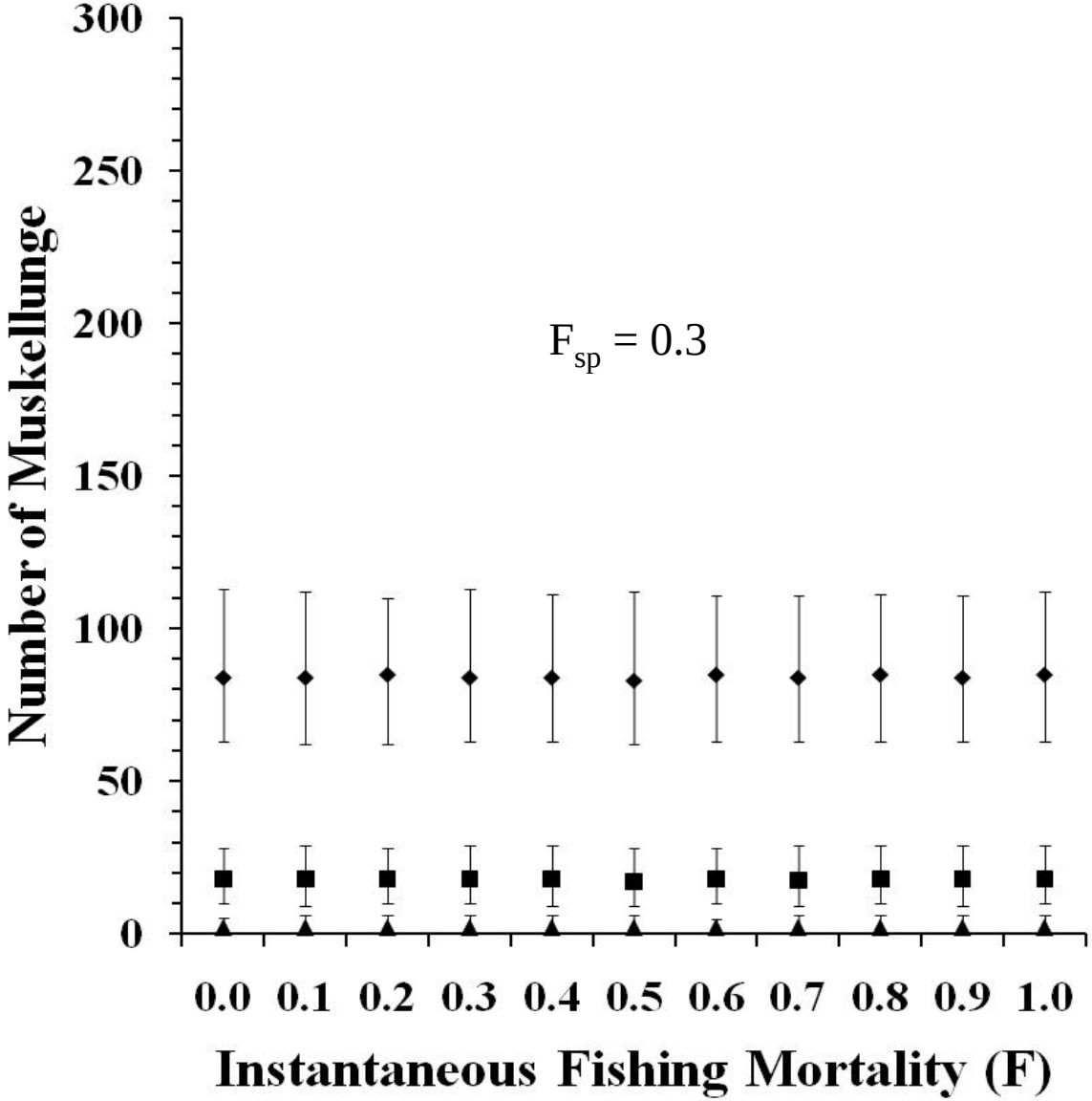

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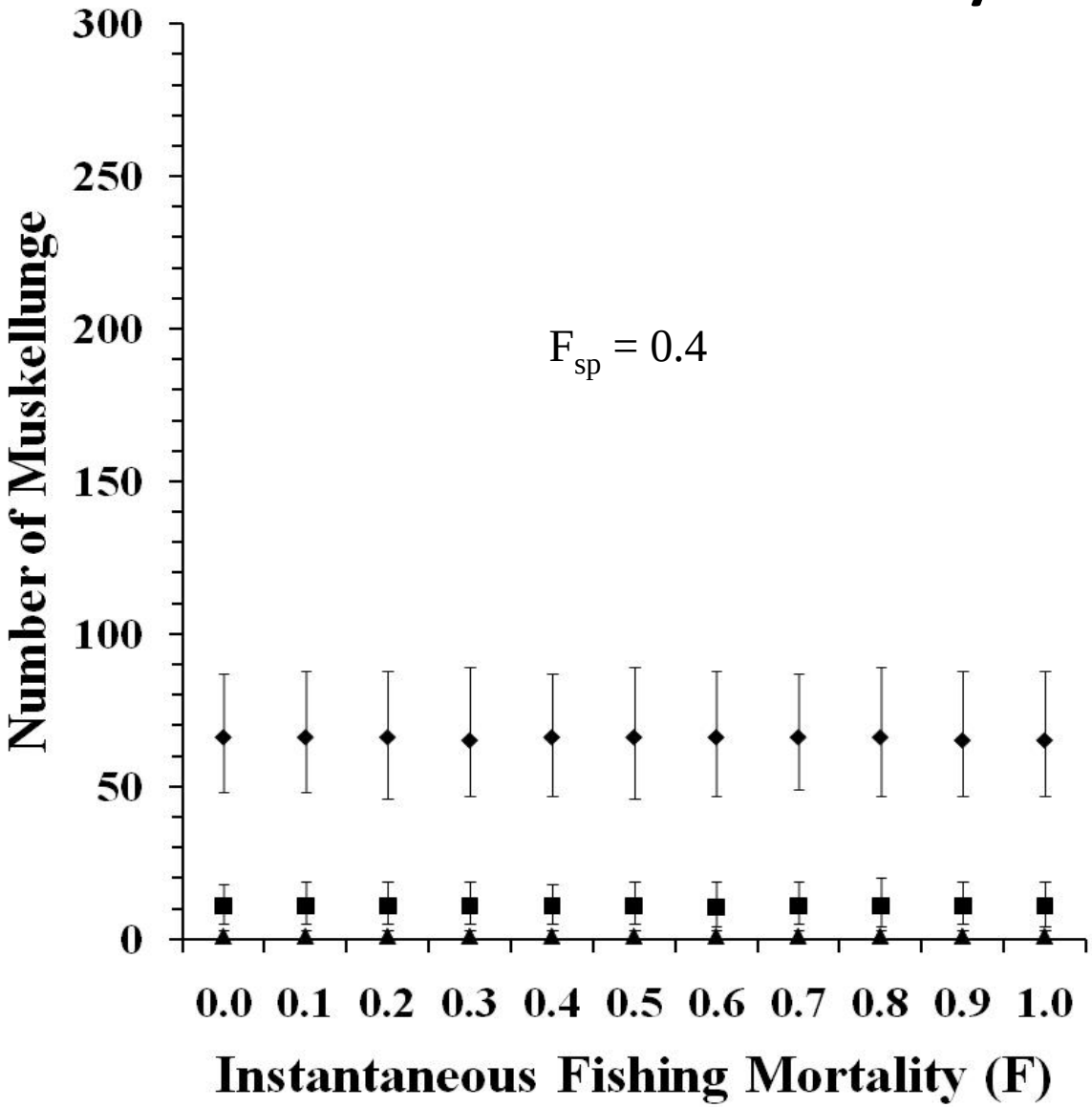

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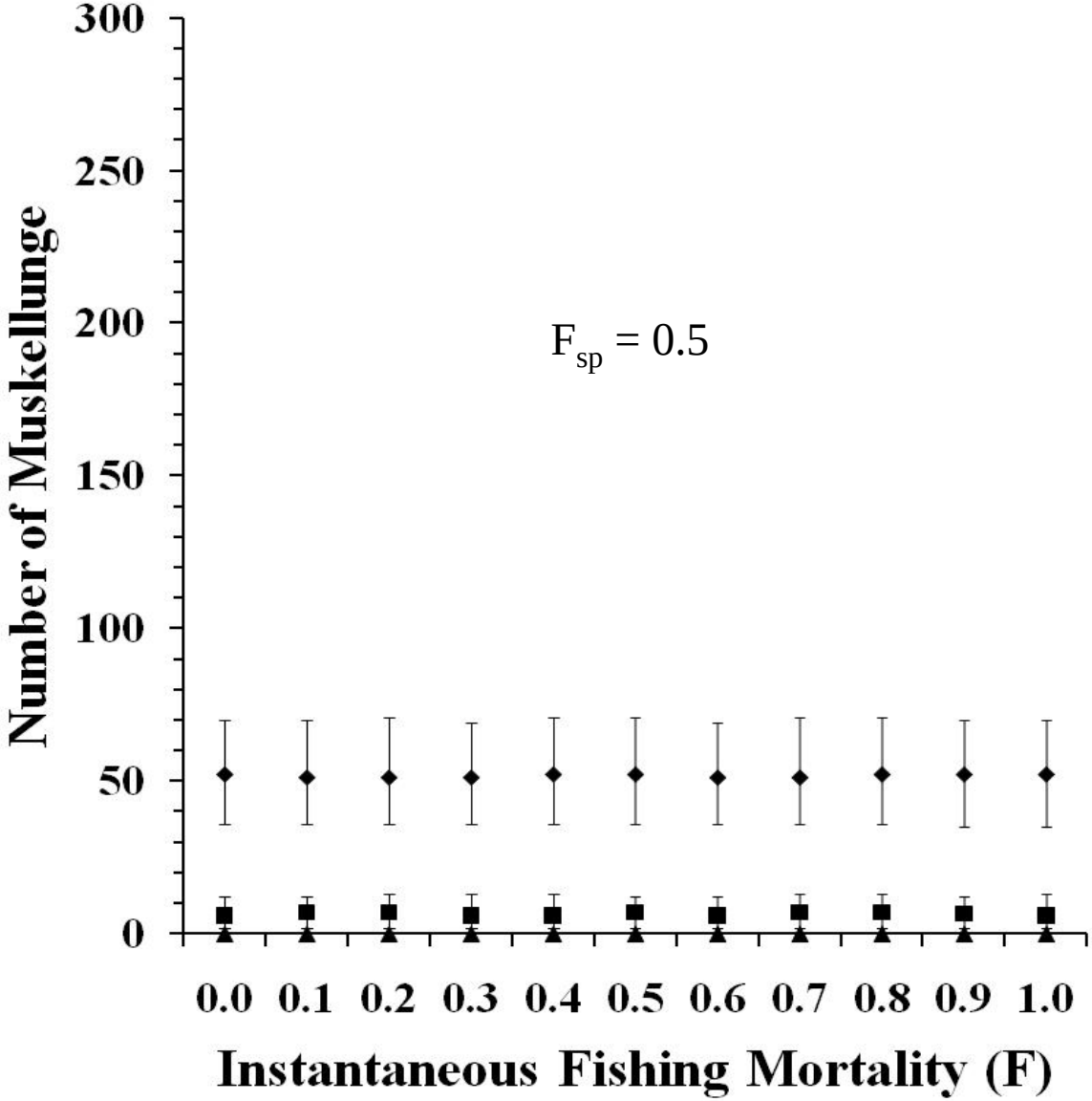

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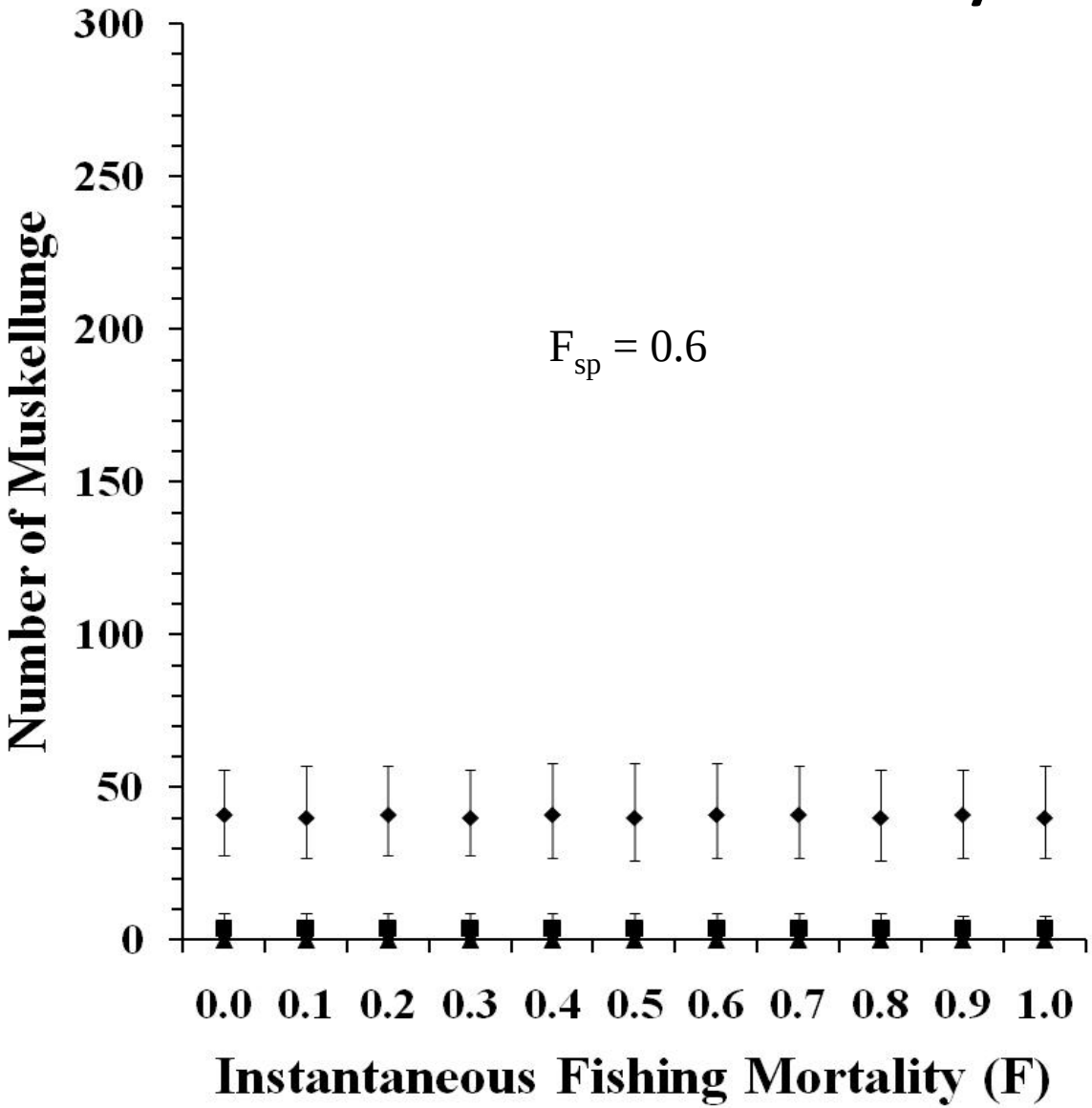

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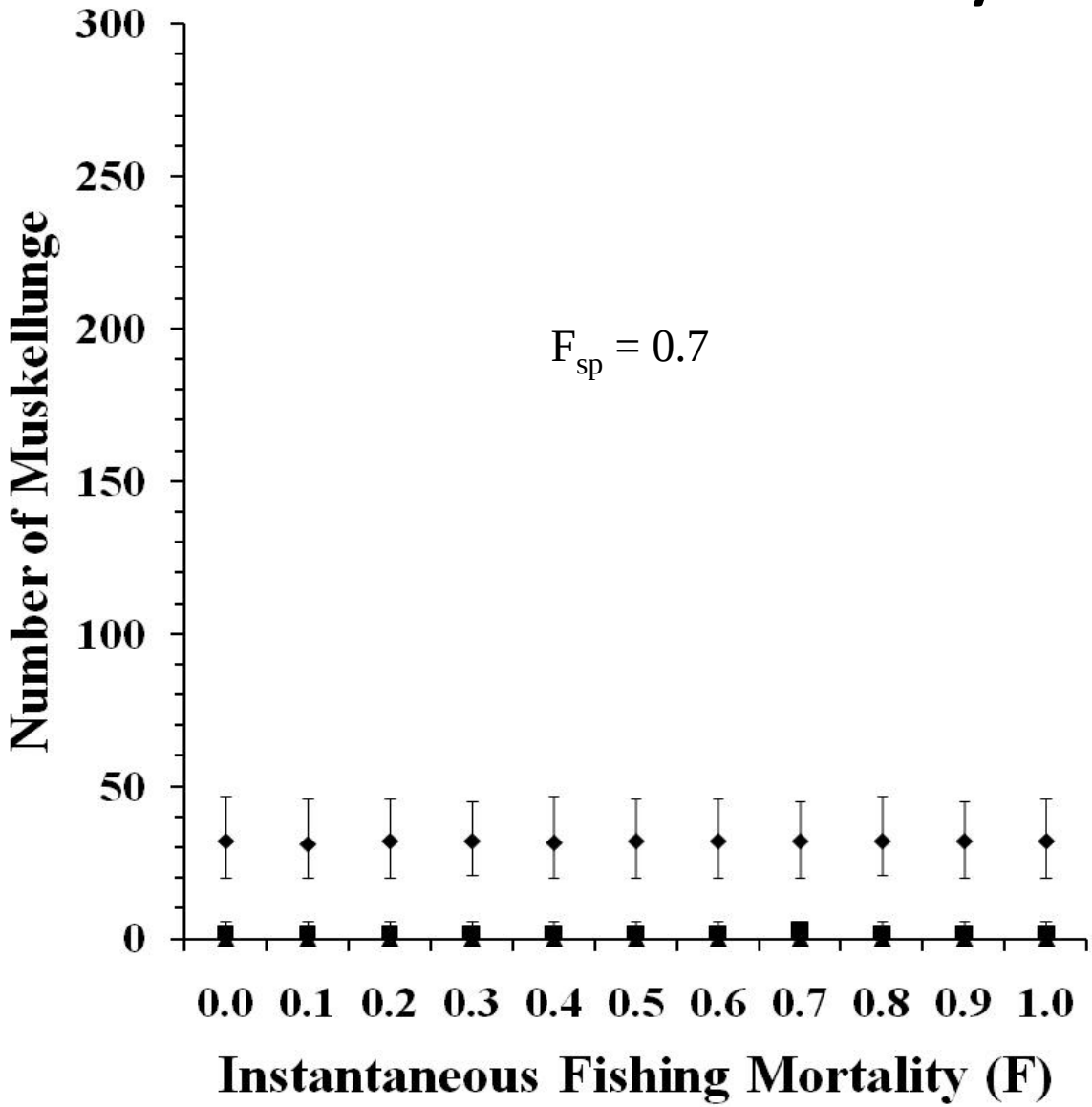

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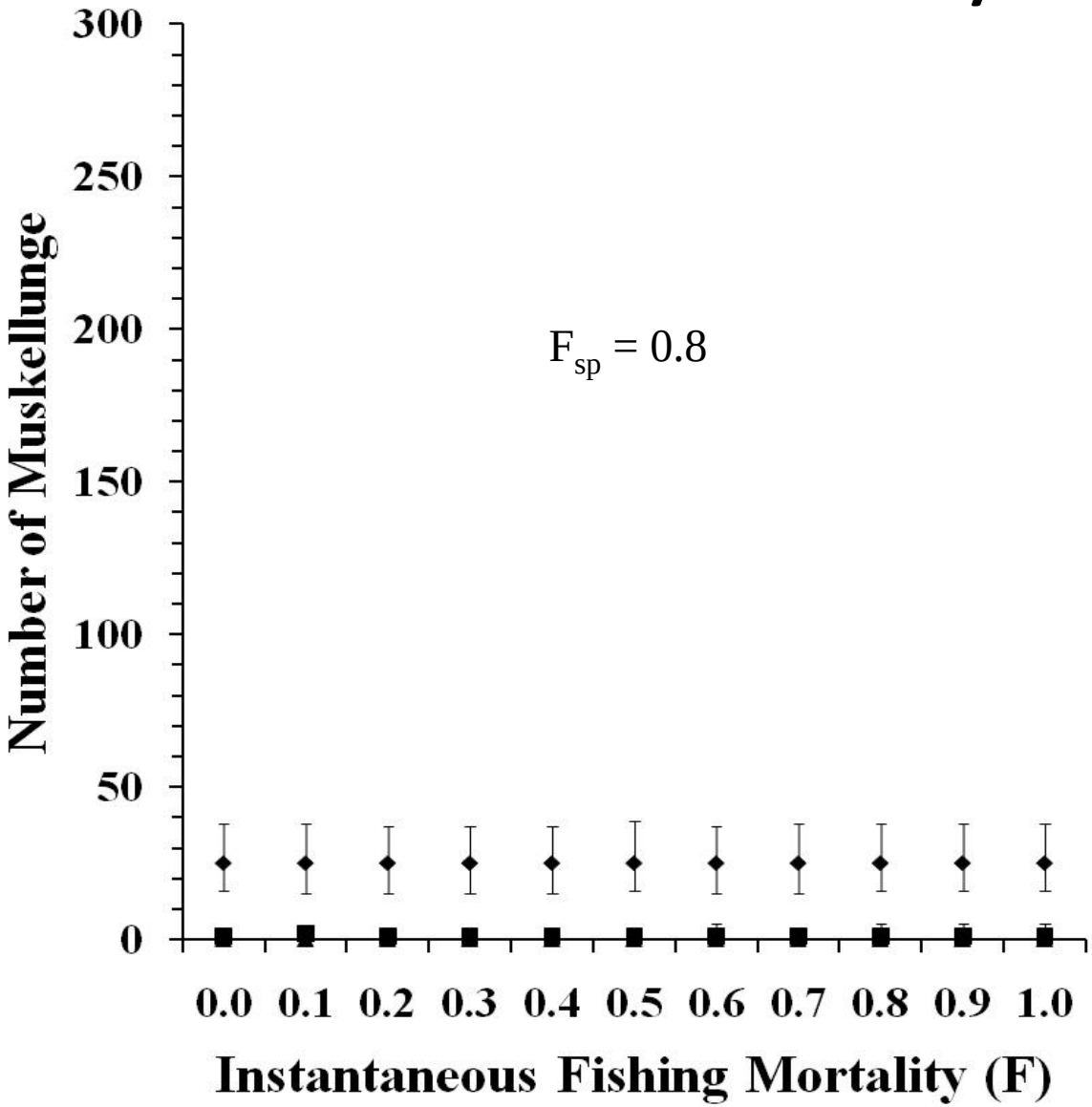

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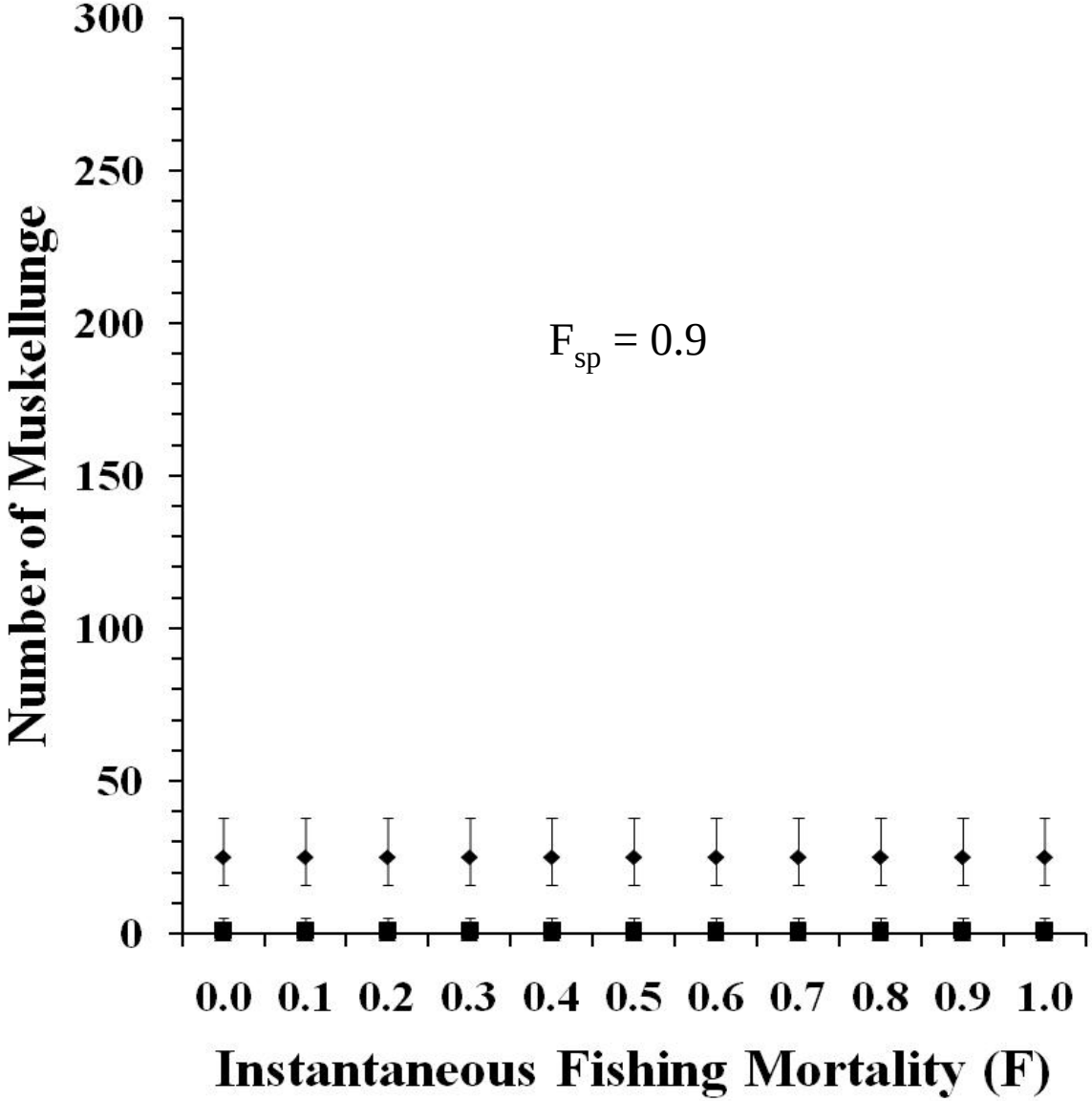

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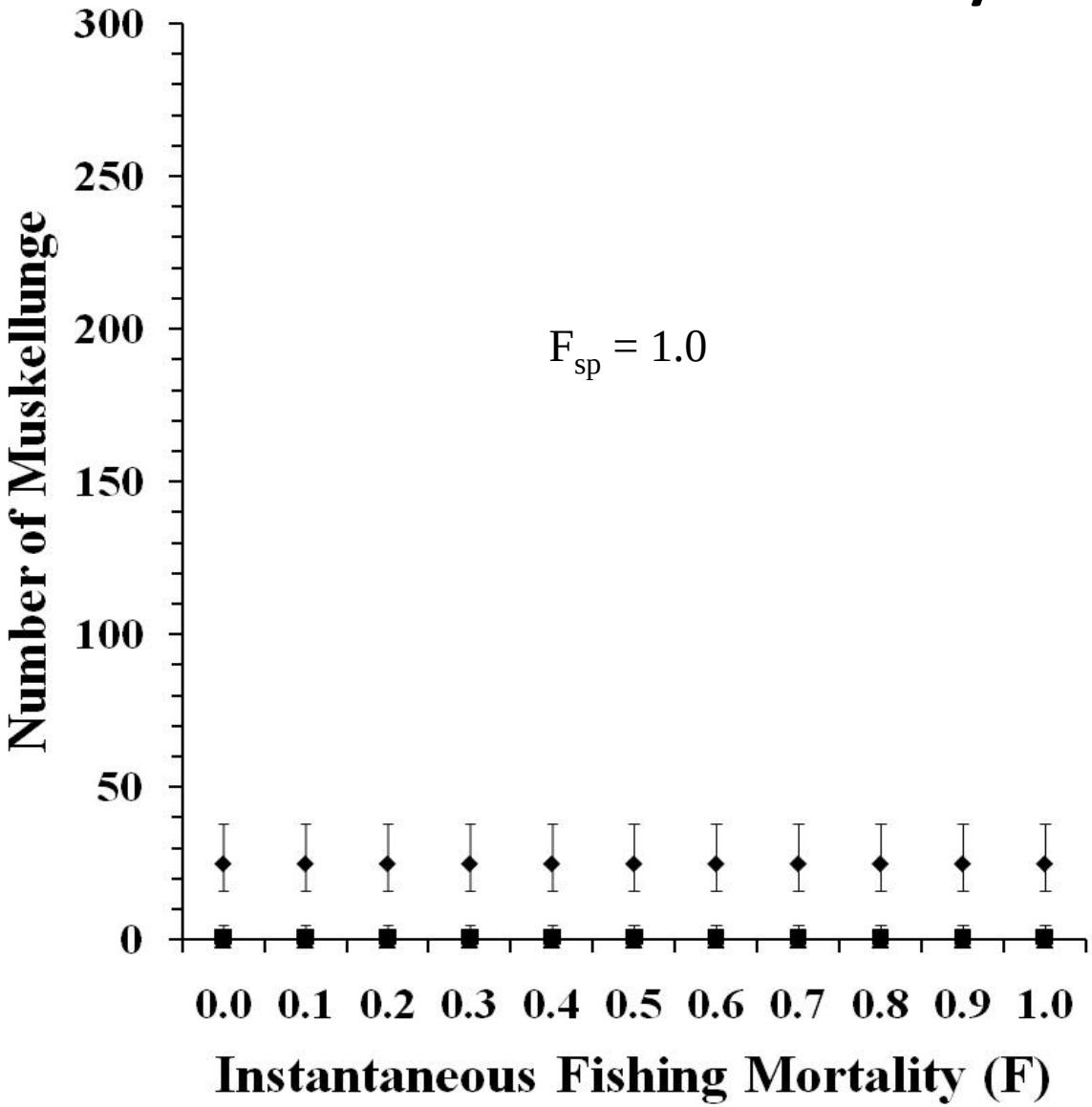

Discussion

Discussion

- Increasing harvest mortality caused decrease in number of muskellunge reaching trophy sizes
  - Spearing only fishery
  - Mixed fishery
  - Angling only fishery

Management Implications

- Insight into WI muskellunge population response to increasing exploitation
- Pinpoint combinations of angling and spearing harvest mortality that reduce trophy potential
  - Identify fisheries suspected of being at or near such combinations

Acknowledgments

- University of Wisconsin – Stevens Point
  - Dan Isermann
  - Michael Dombeck
  - Kevin Russell
  - Ryan Stephens
- Wisconsin Department of Natural Resources
  - Kent Bass
  - Ron Bruch
  - Tom Cichosz
  - Steve Gilbert
  - Joe Hennessy
  - John Kubisiak
  - Terry Margenau
  - Frank Pratt
- Great Lakes Indian Fish and Wildlife Commission
  - Mark Luehring

Questions?

Muskietoons
by Chuck Weiss
Plop! Plop! Plop!
"Remember, Practise catch and release, Son, try to grab the lure and then spit it out."
C. Weiss