Effects of Pristane on Growth of Pink Salmon (*Oncorhynchus gorbuscha*)

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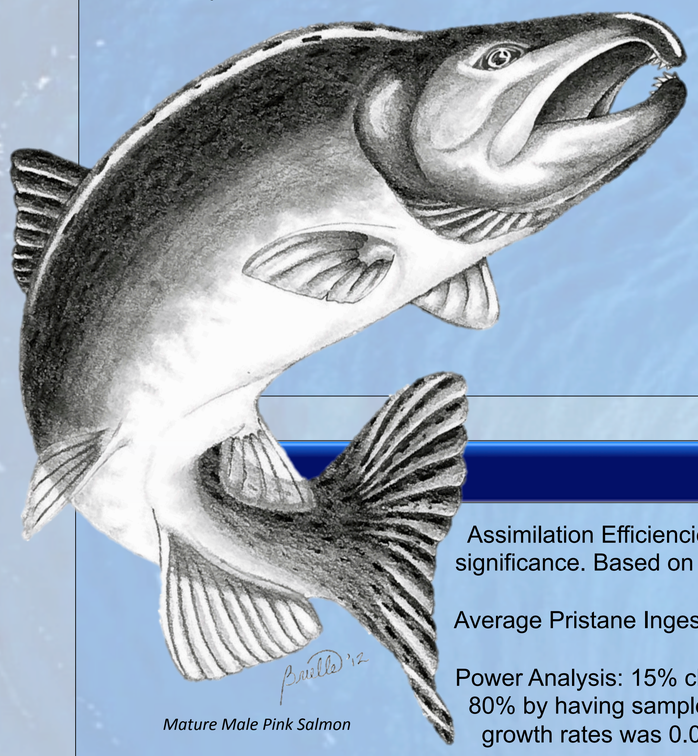
Introduction

Understanding dietary factors that affect the growth and survivability of marine organisms is an essential step in monitoring and sustaining marine fisheries.

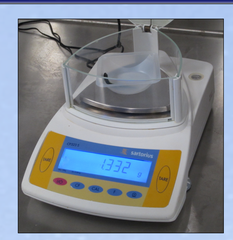
- Pristane is a naturally occurring hydrocarbon generated by copepods in marine ecosystems. Copepod predators do not readily metabolize pristane, causing it to accumulate in marine food webs.
- Pristane may be an appetite suppressant and growth inhibitor in fish. However, those studies utilized unnaturally high pristane quantities.
- Factoring in effects of pristane will increase our understanding of marine ecosystem dynamics. If pristane inhibits growth of organisms ingesting it, pristane may govern energy flow in food webs.
- The objective of this study was to emulate the previous studies using natural levels (0.001%) of pristane fed to Pink salmon diets.

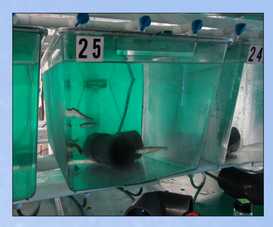


Mature Male Pink Salmon

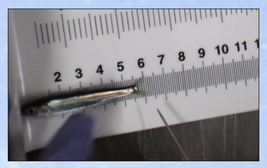
Approach

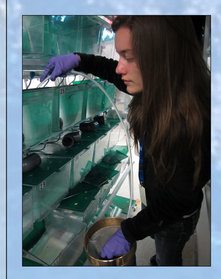
Initial length and mass measured for each individual fish (identified by fin clips)



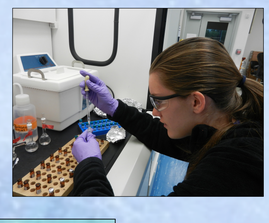


Fish fed pristane or control. Unconsumed food removed and weighed daily

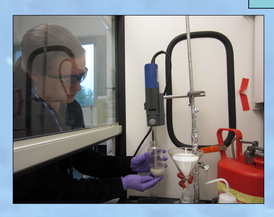


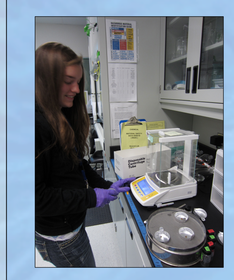


After 3 weeks of feeding, final mass and length were recorded for each fish

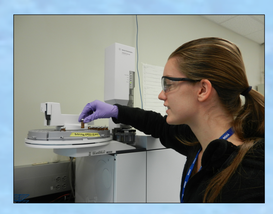


Fish tissues were homogenized, pristane extracted from tissue using solvents





Concentration of pristane in tissue used to calculate food intake for each fish



Growth, assimilation efficiency, and pristane ingestion assessed with T-Test and ANOVA

Results

Assimilation Efficiencies: Based on Unconsumed Food=Pristane 16.2%, Control 20.5%. No statistical significance. Based on Pristane Concentration in Tissue=Pristane 39.3%

Average Pristane Ingestion in Tissue: Pristane=**5,453.76 ng/g**, Control=**0 ng/g**

Power Analysis: 15% chance of detecting significant differences. Power could have been increased to 80% by having sample sizes of >64 fish or by extending study until difference in instantaneous growth rates was 0.003.

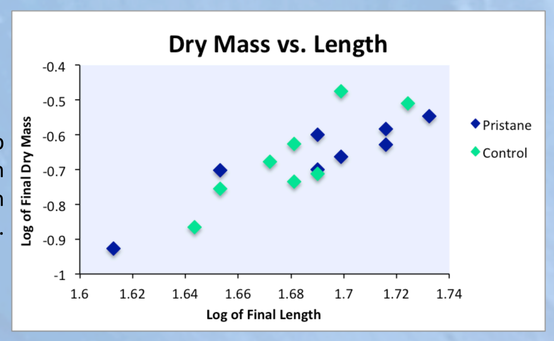


Figure 1. Relationship between mass and length gain in juvenile Pink Salmon (N=16).

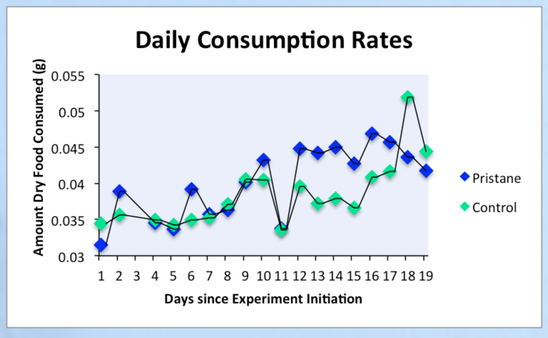


Figure 2. Food consumed per day by each treatment group. After 16 days, consumption rates diverge (not statistically significant).

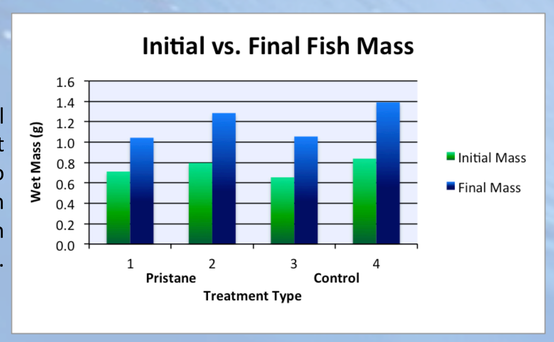


Figure 3. Mean initial final masses for each treatment tank. All fish grew in size, no significant difference in average growth between pristane and control groups.

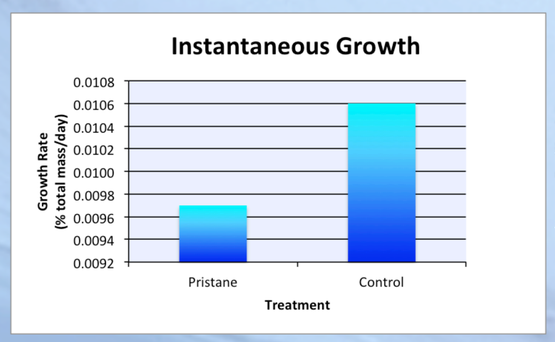


Figure 4. Mean instantaneous growth rates in pristane and control fish. The difference between growth rates in the two groups is $9x10^{-4}$ and is not significant ($t(1)=0.46$, $p=0.65$).

Discussion

- Assimilation efficiency was consistently lower in fish eating pristane-spiked food, causing higher consumption rates (*Fig.* 2).
- Feeding trends mimicked those observed in a previous study.[1] The pristane group showed decreased consumption, suggesting that pristane may suppress appetite.
- If pristane-fed fish began eating less, their low assimilation efficiency could cause a decrease in instantaneous growth.
- Although all results from this study followed the trends of Luquet et al. (1984), differences were insignificant. The length of the study or dosage of pristane may determine statistical significance of results.

Juvenile Pink Salmon

Male (top) and Female (bottom) Adult Pink Salmon

Acknowledgments

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Background Photo: http://fc3arch.files.wordpress.com/2011/08/big_wave.jpg
Juvenile Pink Salmon Photo: http://mwigle.zenfolio.com/img/s3/v7/p490507639-3.jpg
Adult Pink Salmon Photo: Dr. Ron Heintz

[1]Luquet et al. 1984

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