



Growth, Consumption, and Energy Allocation Strategies of Age 0+ and 1+ Rockfish (*Sebastes spp.*) Reared at Three Different Temperatures

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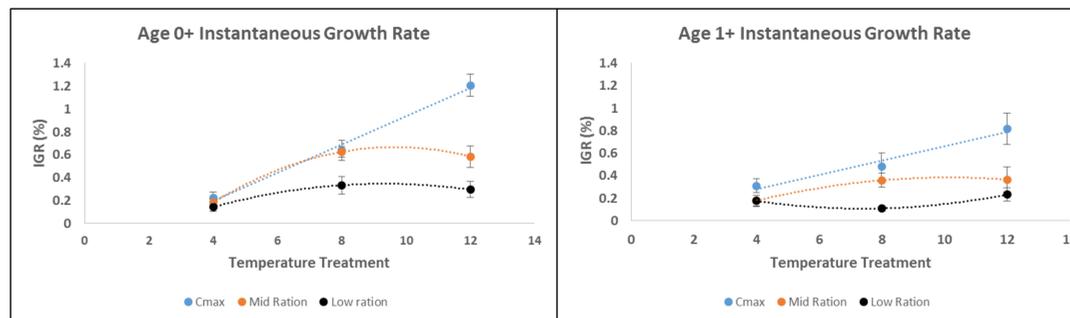
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Introduction

- The Gulf of Alaska Integrated Ecosystem Research Project is an ecosystem study examining physical and biological mechanisms determining survival of 5 focal juvenile groundfish in the Gulf of Alaska (GOA)
- This study focuses on juvenile rockfish, which comprise ecologically and commercially important groundfish species in the GOA
- Relative lack of information on juvenile growth, consumption, and energy allocation parameters
- These data are required inputs in ecosystem modelling

Comparison of instantaneous growth rates and energy allocation strategies between age 0+ and 1+ rockfish



- Growth rates at high, medium, and low rations range from ~0.15%-1.5% body-weight/day (age 0+), and ~0.1%-0.8% body-weight/day (age 1+)
- At unlimited rations, growth rates increase linearly with temperature

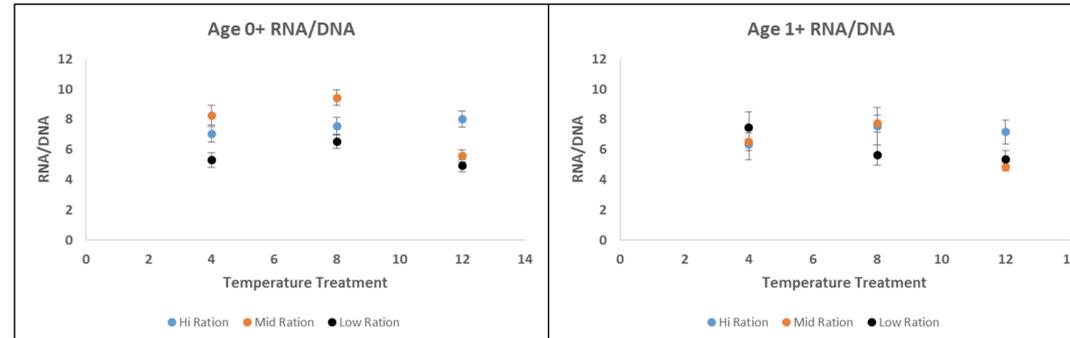
Different energy allocation strategies reflect adaptations to differing habitats occupied by each age-class

Conclusions

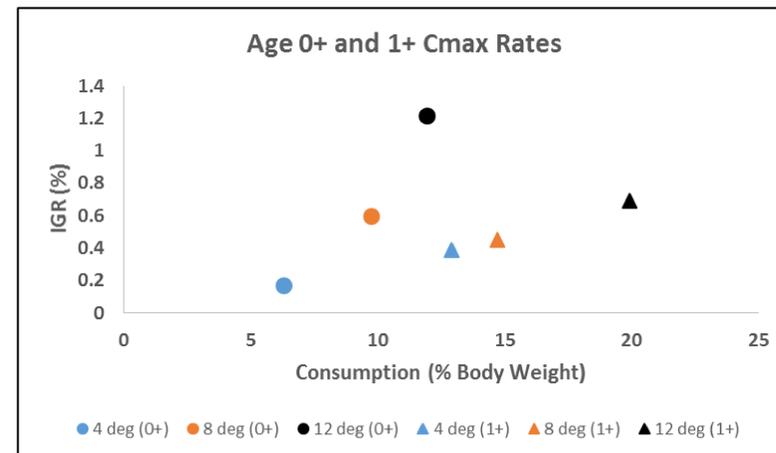
- Linear growth response to temperature; slowing of growth rates as fish age
- Temperature influences growth; energy allocation strategy is age-dependent
- C_{max} is temperature dependent
- Higher growth potential for age 0+ fish at warmer temperatures; higher growth potential for age 1+ fish at colder temperatures
- Higher lipid content (higher condition) suggests warmer temps better for age 0+; colder temperatures optimum for older fish



Fish were fin-clipped and held in temperature-controlled tanks



- RNA/DNA ratios mirror growth rate trends
- Heightened correlation of RNA/DNA with growth at warmer temperature in age 0+ fish



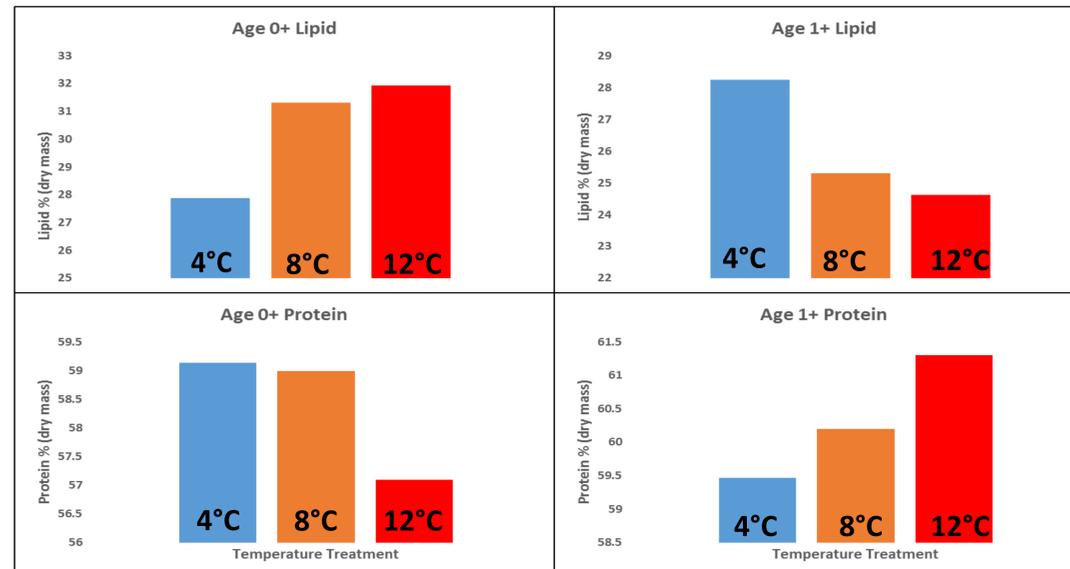
- C_{max} rates for age 0+ fish range from ~6%-12% body-weight/day, and for age 1+ fish range from ~13%-20% body-weight/day

- Age 0+ fish growth more sensitive to temperature than age 1+ fish at unlimited rations

The recommendations and general content presented in this poster do not necessarily represent the views or official position of the Department of Commerce, the National Oceanic and Atmospheric Administration, or the National Marine Fisheries Service

Objectives/Methods

- Estimate maximum consumption rates (C_{max}) of juvenile (ages 0+ and 1+) rockfish across temperature treatments (4°C, 8°C, 12°C) in separate studies in the laboratory
- Estimate and compare growth of both age-classes at unlimited (C_{max}), medium, and low rations
- Compare energy allocation strategies between age-classes as a function of temperature/ration using physiological growth indices (RNA/DNA ratios, total-body lipid and protein)
- Fish in both studies cultured on identical diet for periods ranging from 21-36 days in 50 L tanks



- Average lipid content in age 0+ fish at unlimited rations increases with temperature (4°C < 8°C < 12°C), while protein content decreases (4°C > 8°C > 12°C)
- Inverse patterns observed in age 1+ fish
- Body composition differences between age-classes suggests an age-dependent effect on energy allocation over the temperature treatments