



University  
of Victoria

Graduate Studies

Notice of the Final Oral Examination  
for the Degree of Master of Science

of

**AHARON FLEURY**

BSc (University of Hawai'i, 2013)

**“Reproductive Biology and Ecology of Pacific Hagfish (*Eptatretus stoutii*) and Black Hagfish (*Eptatretus deanii*) off the Coast of Vancouver Island, BC”**

Department of Biology

Monday, August 29, 2016

3:00 P.M.

Hickman Building

Room 120

Supervisory Committee:

Dr. Francis Juanes, Department of Biology, University of Victoria (Supervisor)

Dr. Kim Juniper, Department of Biology, UVic (Member)

Dr. Fabio De Leo Cabrera, Department of Oceans Networks Canada Society, UVic (Outside Member)

External Examiner:

Dr. Chris Darimont, Department of Geography, UVic

Chair of Oral Examination:

Dr. Sylvia Pantaleo, Department of Curriculum and Instruction, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

## **Abstract**

Hagfish are one of the more lucrative commercial opportunities in the world with fisheries harvesting them specifically for food and for their skin for leather-based products. In 2013 a three year experimental fishery opened off the west coast of Vancouver Island, British Columbia in order to determine the sustainability of a Pacific hagfish (*Eptatretus stoutii*) and Black hagfish (*Eptatretus deani*) fishery. In this study, I examined the reproductive biology of both species including: length-weight relationships, sex ratios, fecundity, and size-at-gonadal development. This study corroborates previous suggestions that Pacific hagfish are juvenile protogynous hermaphrodites while black hagfish are likely to be dioecious with an unknown juvenile stage. Sexual dimorphism appears in both species of hagfish, which is likely the result of inter- and intraspecific morphological differences. For both species fecundity decreases throughout developmental stages, and the average fecundity is very low (27-32 eggs per female). Additionally, in both species females commence gonadal development prior to males. Furthermore, both species exhibited extreme female: male sex ratios across length-classes, however, in opposite directions. The reproductive biology of Pacific and Black hagfish models that of a *k*-selected species, which is a species that tends to live long and has a slow growth rate, low fecundity, and late maturity. As a result there are a variety of concerns that should be addressed when developing a sustainable hagfish fishery to prevent collapses observed in previous hagfisheries.