University of Victoria | Graduate Studies

Notice of the Final Oral Examination for the Degree of Doctor of Philosophy

of

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"Impacts and Interactions of Two Non-Indigenous Seaweeds *Mazzaella japonica* (Mikami) Hommersand and *Sargassum muticum* (Yendo) Fensholt in Baynes Sound, British Columbia"

Department of Geography

Friday, April 1, 2016
1:00PM
David Turpin Building
Room B215

Supervisory Committee:
Dr. Stephen Cross, Department of Geography, University of Victoria (Co-Supervisor)
Dr. Mark Flaherty, Department of Geography, UVic (Co-Supervisor)
Dr. John Dower, Department of Biology, UVic (Outside Member)
Dr. Louise Page, Department of Biology (Additional Member)

External Examiner:
Dr. Robert DeWeede, Department of Botany, University of British Columbia

Chair of Oral Examination:
Dr. Christopher Lalonde, Department of Psychology, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

This thesis examines the interactions of two non-indigenous algae, *Mazzaella japonica and Sargassum muticum,* where they co-exist and their impacts on native species in their recipient habitats. Field and lab experiments were conducted to determine if they impact native seaweed communities, marine invertebrates, and supralittoral regions.

In situ studies conducted in areas where *Mazzaella japonica* exists without *Sargassum muticum* found that removal of *M. japonica* allowed for an increase of native seaweed abundance and richness growing in fully subtidal regions, but had no impact on native seaweeds growing in intertidal regions. Additionally, at the intertidal site, removal of *M. japonica* allowed for the recruitment of *S. muticum*. In regions where the two seaweeds co-exist, removal of both invasive seaweeds negatively impacted native seaweeds. The magnitude of this increase was greater in subtidal compared to intertidal regions. *M. japonica* removal had a greater impact on native seaweed recovery than did *S. muticum* removal in areas of co-existence.

Removal of *Mazzaella japonica* also allowed for a significant increase in percent cover of *Sargassum muticum* at both sites where these two seaweeds co-exist. An increase in percent cover of *M. japonica* was found at the subtidal site when *S. muticum* was removed. Though both species increased when reprieved from competition with the other non-indigenous species, removal of *M. japonica* had a far greater influence on the increase in cover of *S. muticum.* This suggests that *M. japonica* is the dominant competitor in the ecosystem outcompeting *S. muticum.*

Field surveys found *Mazzaella japonica* was the dominant wrack species washing up on beaches in Baynes Sound. Though *Sargassum muticum* is also a component of the wrack, it has a disproportionately large influence as a spatial subsidy on beach habitats. *S. muticum* decayed and decomposed at a faster rate than *M. japonica* and all native seaweeds tested except for *Chondracanthus exasperatus*. Additionally, *S. muticum* was colonized by significantly more invertebrates than either *M. japonica* or *Fucus* spp. Results from these studies are intended to provide information relevant to resource managers making policy decisions regarding the fate of these two non-indigenous species.