Harvesting sustainability of the marine alga *Ascophyllum nodosum* in Nova Scotia

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**Introduction**

- *Ascophyllum nodosum* is a marine fucoid alga that grows apically from a clustered holdfast.
- Individual frond branches form an annual air bladders and many reproductive bodies (receptacles), which contain the gametes. Receptacles are shed each spring.
- A. *nodosum* is currently harvested commercially in southwestern Nova Scotia by Acadian Seaplants Ltd. and as a byproduct of plant biostimulants and supplements for livestock fodder (Ugarte and Sharp 2001). Their methods involve boats and rake-like cutters that get dragged through the beds, leaving a minimum harvesting height of 12.7 cm (Ugarte et al. 2006). A combination of ground observation and aerial photographs is used to judge when a population is ready to undergo harvesting again (Ugarte and Sharp 2012). Generally this period is 3-4 years.
- A working paper from DFO (Vandermeulen 2013) is suggesting that these methods are not entirely reliable, and does not allow enough time for total frond recovery. An increase in the minimum harvesting height from 12.7 cm to 25.4 cm is being suggested in hopes to facilitate quicker recovery from harvesting.

**Objectives:**

- Compare two harvesting heights (12.7 cm and 25.4 cm) on various populations of *Ascophyllum nodosum* from around the province.
- Determine the frond distribution of biomass and receptacle initials to help predict recovery.
- Assess the impacts of the removal of the epiphyte, *Vertebrata lanosa* due to harvesting.
- The bulk of frond biomass occurs in the upper region of the frond between 2.6 cm and 5.2 cm. It appears neither 12.7 cm nor 25.4 cm is removed due to harvesting.

**Sites and Frond Selection**

- 8 sites in total were sampled and 20 fronds were collected from each site.
- Clumps of plants were chosen haphazardly; either the longest frond in the clump was selected or the longest frond with *Vertebrata lanosa* (lif present).
- Data presented on this poster represents only the Chebogue Point site.

**Laboratory Methods**

- Fronds were subjected to one of the harvesting heights, either 12.7 cm or 25.4 cm (N=10 for each).
- Before cutting, total frond length, number of air bladders, and the previous year’s growth were measured.
- After cutting, the remainder of the frond was divided into 10 cm increments and the following metrics were quantified for each: biomass (wet weight), number of receptacle initials and apical tips, frond circumference and dry weight of *V.lanosa*.

**Results – Chebogue Point, NS**

The general data for this specific population is displayed in Table 1. It is also important to note for this region that *V. lanosa* was very common and occurred on all collected fronds.

**Discussion**

Environmental consequences of *Ascophyllum nodosum* removal include the following:

- Frond growth behavior changes after cutting (Cousens 1985).
- Larger fronds provide a canopy and habitat for other economically important species such as juvenile lobster (Seeley and Schlesinger 2012).
- Removal of *Ascophyllum* results in the removal of a potential carbon source from the annual shedding of receptacles (Josselyn and Mathieson 1978).

The accidental removal of *Vertebrata lanosa* with the harvesting of *Ascophyllum* leads to a loss in habitat and potential food source for small crustaceans (Pavía et al. 1999).

**Conclusions**

- The bulk of frond biomass occurs in the upper region of the frond between 50-110 cm, as do the majority of the receptacle initials.
- Very little biomass and few receptacle initials occur near the base of the frond; this corresponds to the region left on shore to initiate re-growth.
- Where present, 100% of *V. lanosa* is removed due to harvesting.
- It appears neither harvesting height is quite appropriate for the current recovery regime and more focus should be on estimating an accurate time for frond length recovery and original plant architecture.

**Important Literature**


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