Quarterly Report

Red Ribbon Seaweed as a New Species for Mariculture in Alaska
April 1- June 30, 2026

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Overview

This project is investigating methods to achieve open water aquaculture of the red alga, *Devaleraea mollis* (dulse). The overall methodology is to collect fertile tetrasporic plants in the spring from the low intertidal and to bring the plants to the lab where spore release is attempted. Released spores are germinated and grown in the lab either in free (bubble) culture or on seed strings. Seeded strings are outplanted at various times of the year and at various depths at a farm site on the west side of Coghlan Island near Auke Bay, Alaska.

The Native Village of Eyak is a partner in this project. They are to collect fertile dulse plants and send them to our lab in Juneau. We release spores to settle on string, then ship the seeded string back to NVE to outplant on their farm near Cordova. They will monitor growth of the dulse on their longlines.

Summary of Progress

Spore release

Devaleraea mollis was collected in April and May 2026 in both Cordova and Juneau. Similar frames to that from 2025 of 2.5 inches by 2.5 inches were wrapped with Cremona string. Additionally, larger frames were constructed with 80 feet of Cremona string wrapped around the frame to try for a larger settlement.

The seaweed was collected early before it was visibly fertile to attempt to postpone fertility until a more optimal spore release window. The environmental conditions were mimicked as closely as possible. The water where the seaweed was collected was still below 4 ˚C. The seaweed was placed in 4 ˚C sterile seawater and 12L:12D photoperiod with 100 and 40 μmol/m^2/s of light intensity. Each collection, however, became fertile within 2 to 3 days.

As soon as the spores began to release, they were carefully scraped from the bottom, counted and made into a spore solution.

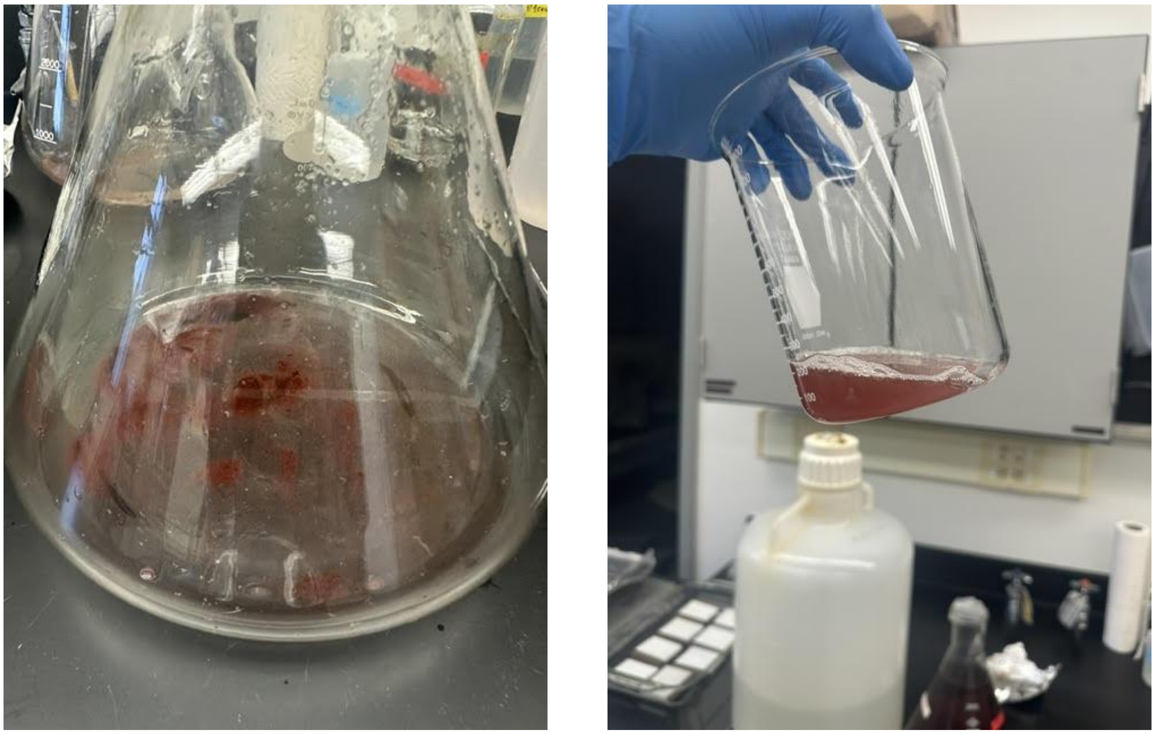

Figure 1. The image on the left shows the spores settled at the bottom of the culture. The image on the right shows a spore solution in sterile seawater.

The diameter of the spores were measured to be between 35 to 50μ. Spore solutions of 2500 to 5000 spores per milliliter were poured over the wrapped Cremona string. There were no spore releases that were clear of contamination. Conditions mimicked those of last year's spore release as well as some at 4 ˚C. This year, green contamination was prevalent even more so than last year. All the strings on the larger frames were contaminated with green algae, and the dulse was very slow to grow. Ultimately, the seaweed on the larger frames was placed in warmer conditions to attempt to force the dulse to outgrow the green algae. This was only partially successful. Some string was salvaged with *D. mollis* blades growing on it. The seaweed on the smaller frames grew nicely, although also contaminated with green algae. It is thought that the green contamination may be appearing from an endophyte within the *D. mollis*. The Cordova seaweed faired worse than the Juneau and was much more contaminated. Only a small few samples from that spore release are still growing.

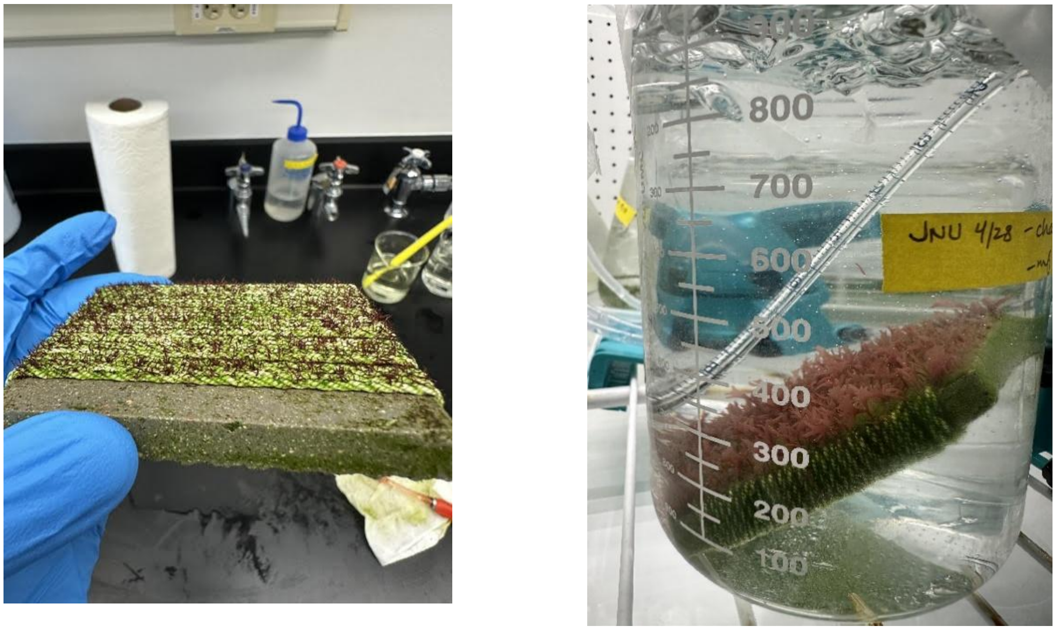

Figure 2. The left image shows seaweed after 4 weeks of growth. The right image shows seaweed after 3 months of growth. This is the same sample from a 4/28 Juneau spore release.

Outplanting

Seaweed in Juneau was outplanted in June 2026. All the seaweed from Juneau 2025 outplantings were pulled from the water and their final measurements were taken.

Figure 3. Photo shows outplanting in June 2026 from spores settled in April 2026.

Figure 4. Photos of seaweed from 2025 outplantings before removal and final measurement.

<u>Data from 2025 outplanting and final measurements:</u>

Juneau Data: The graph below shows growth of *D. mollis* from the August, October and January outplantings through to June 2026. Temperature and salinity graphs are also shown for each monthly measurement.

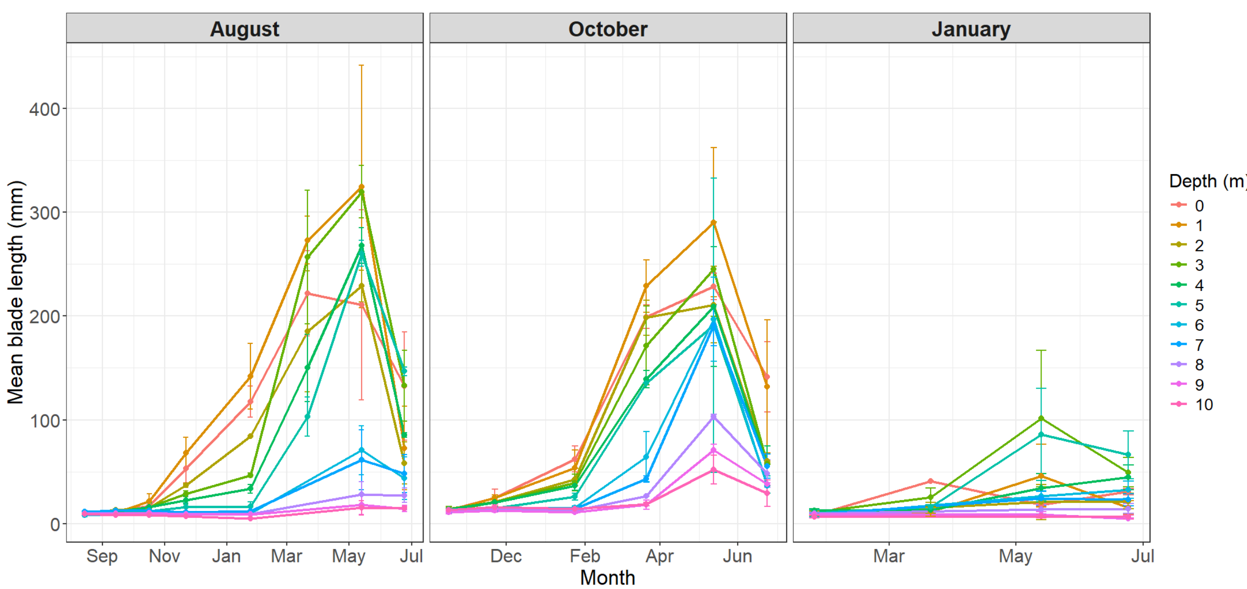

Figure 5: Mean blade length (mm) of *D. mollis* by depth (0m to 10 m) from outplantings in August, October and January. Each outplanting has 3 replicate dropper lines. Error bars display ± 1 SEM.

The outplanting in August had the best growth followed by the October outplanting. For all of the outplants the blades grew better near the surface. The March outplanting showed the least growth. Growth rates declined and the blades became bleached in May when the nutrients in the water typically decline.

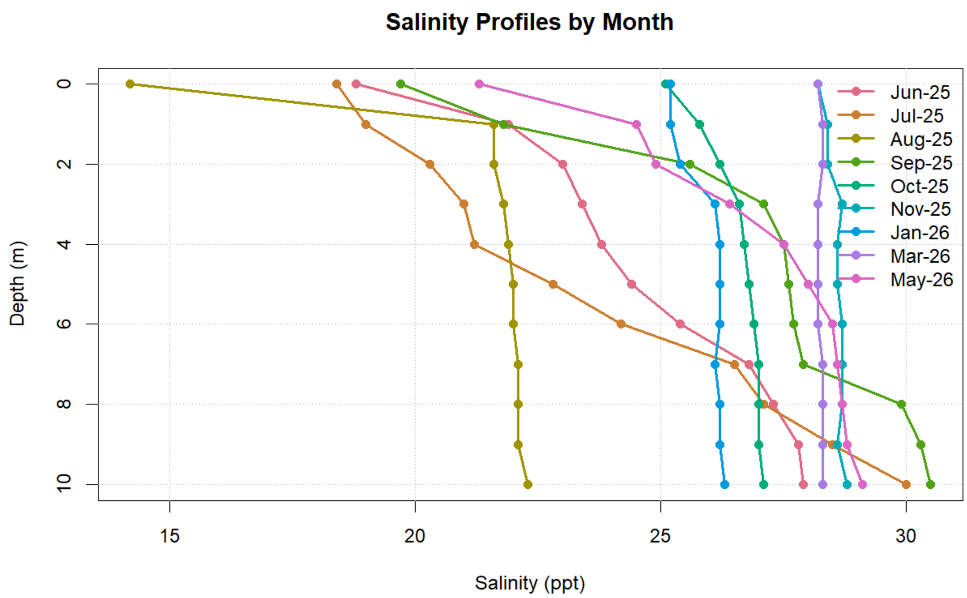

Figure 6: Salinity at each depth (0 to 10 meters) for each monthly measurement

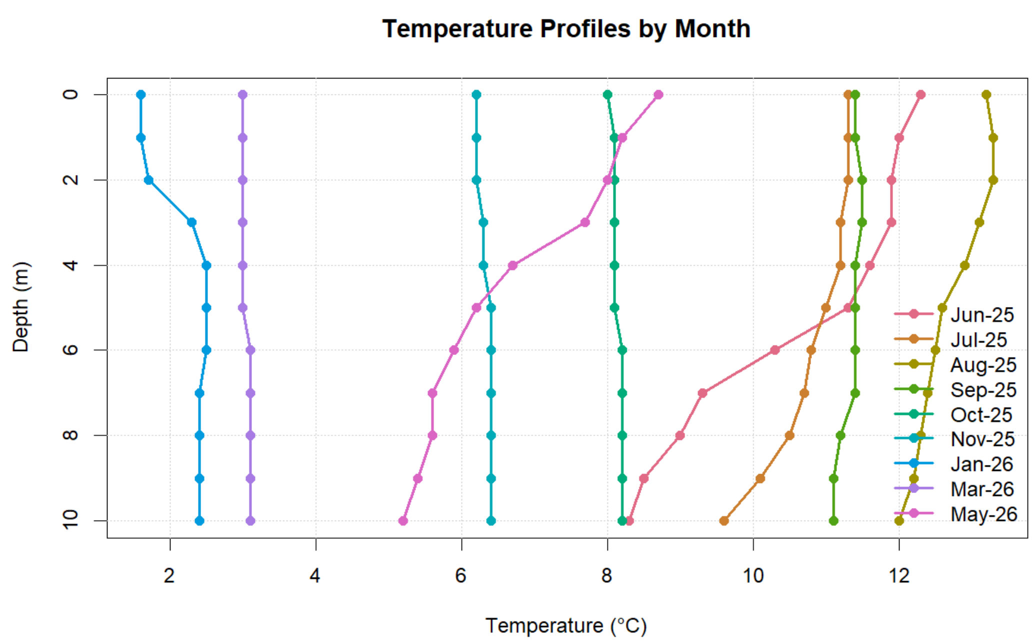

Figure 7: Temperature (˚C) at each depth (0 to 10 meters) for each monthly measurement.

Even though salinities were lower near the surface during the summer and fall, this apparently did not affect the growth *of D. mollis.* Thermoclines appeared in the late spring and summer, but temperatures in the fall and winter were uniform to 10m.

Figure 8. Juneau Photos – May, 2026

Cordova Data:

The graph below shows the growth of the January outplanting in Cordova from January through June. Growth of *D. mollis* at the Cordova site was better than at Juneau. But the blades have bleached and stopped growing by June. We have not yet received the environmental data from Cordova.

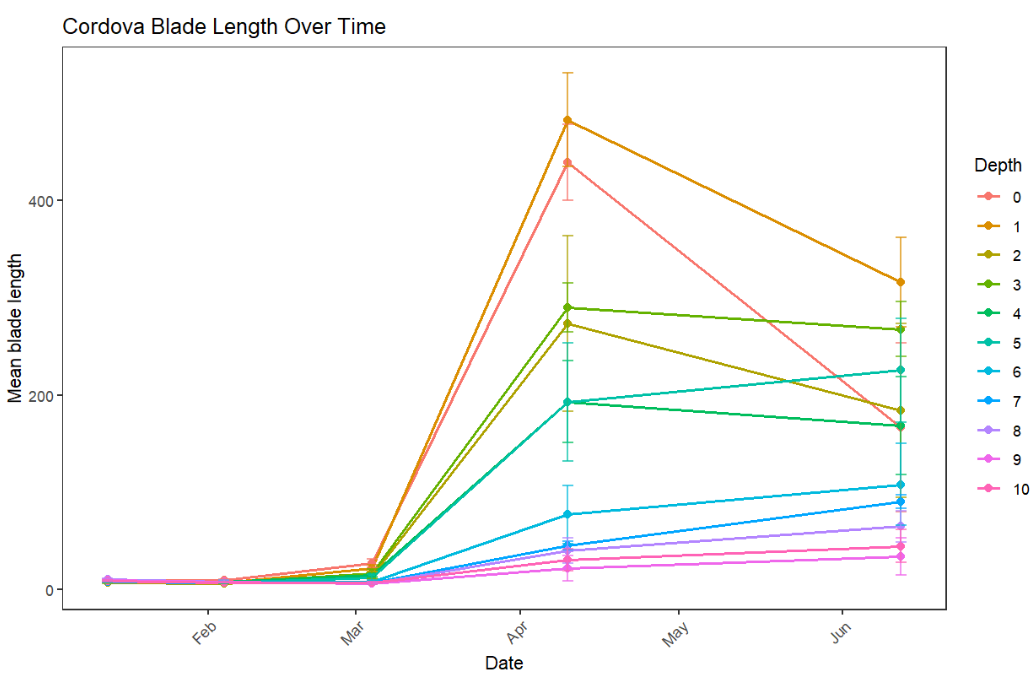

Figure 9: Mean blade length (mm) of *D. mollis* by depth (0m to 10 m) in Cordova from the January outplanting. The outplanting has 3 replicate dropper lines. Error bars display ± 1 SEM.

Figure 10. Cordova photos – April, 2026

Figure 11, Cordova photos – June, 2026