



## Quarterly Report

### Red Ribbon Seaweed as a New Species for Mariculture in Alaska

January 1- March 31, 2026

Michael Stekoll and Mari Fester

April 30, 2026

#### 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

**Objective 1. Spore release methods will be tested in two different ways.**

The first method is collecting fertile plants from the field and releasing the spores in the lab. This task was accomplished last spring and summer. Spore release occurred readily (Figure 1). We are collecting more plants this spring.

The second method is growing dulce fragments in bubble culture under conditions that would keep the plants non-reproductive. Then place them in conditions that would make them fertile. The idea here is to have some control over timing of spore release. To date we have not been successful in finding conditions to keep the fragments from getting fertile. All conditions tested resulted in spore release.

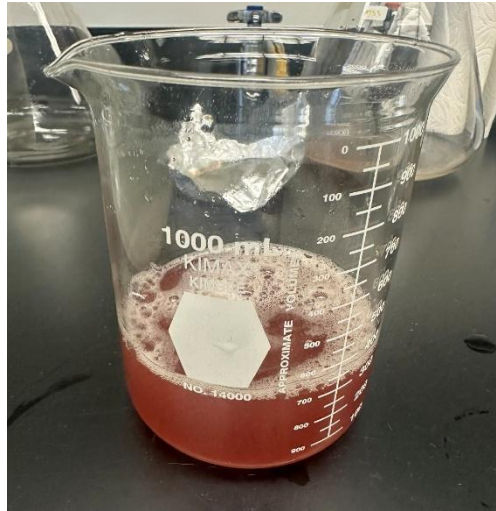


Figure 1. Newly released spore solution from *Devaleraea mollis* at the CFOS Lena Point Kelp Lab.

**Objective 2: Growth of *Devaleraea mollis* will be cultivated at different depths and seasons (fall/winter, spring/summer) by employing dropper lines.**

The seaweed outplanting deployed in June was removed in late summer due to poor or no apparent growth. Outplantings in August, October and January are still in the water. Seaweed deployed in Cordova in January is in the water. Measurements are occurring monthly (weather permitting). We are starting to see good growth for several of the outplantings. There is a strong depth trend where growth is good in the top few meters (about 0 to 3 meters) and then drops significantly as depth increases.

Juneau:

We have growth data from the August and October outplantings. Our January outplanting does not have enough data yet to report, but the seaweed is still growing in the water. Plants were longest when placed near or at the surface (Figure 2) for both the August and October outplantings.

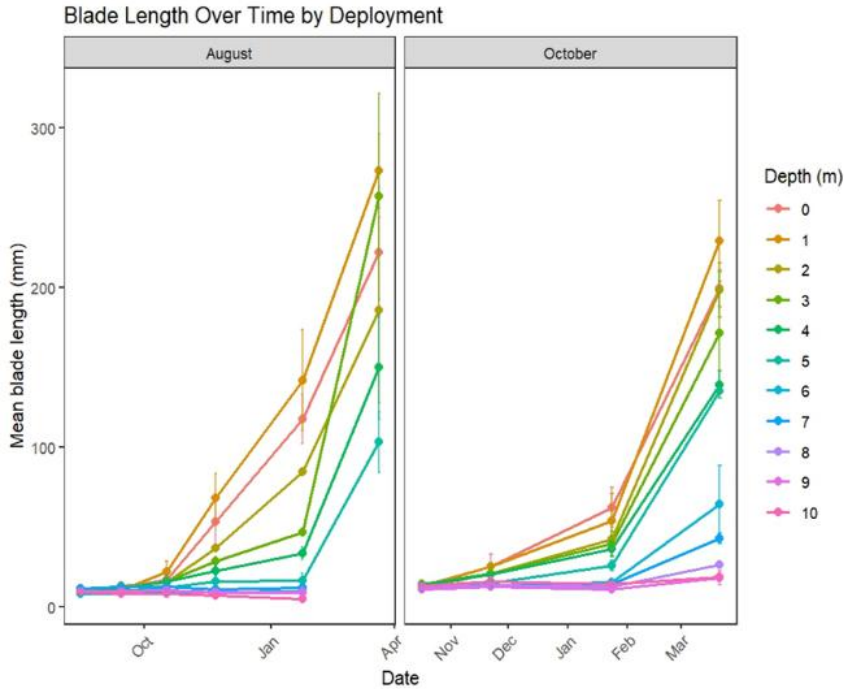


Figure 2: Left: mean blade length (mm) of *D. mollis* by depth (0m to 10 m) from outplantings in August and October. Each outplanting has 3 replicate dropper lines. Error bars display  $\pm 1$  SEM. Right: *D. Mollis* from Juneau outplanting.

The curves in Figure 2 indicate that growth is exponential and therefore, we can calculate the specific growth rate (% day<sup>-1</sup>) as

$$SGR = \frac{\ln(L_t) - \ln(L_0)}{t} \times 100$$

where  $L_t$  is the length at time =  $t$  and  $L_0$  is the length at time = 0.

The best growth rates were 1.5 to 1.8% day<sup>-1</sup> (Figure 3) for both the August and October outplantings, again, with the best SGR near the surface.

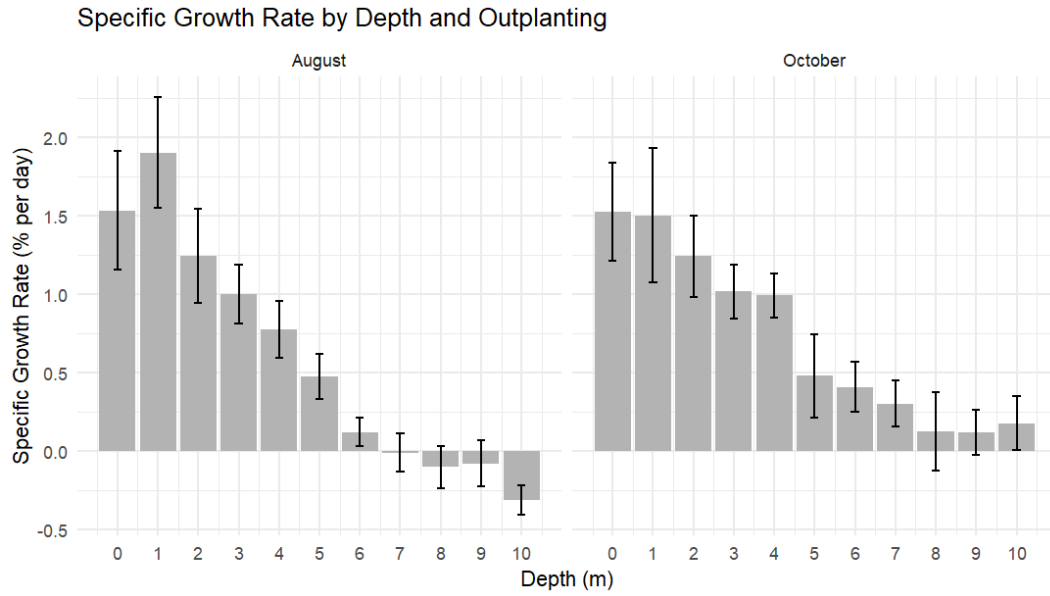


Figure 3: Mean specific growth rate (SGR, % day<sup>-1</sup>) at each depth for the August and October deployments in Juneau, Alaska. Error bars represent ± 1 SEM calculated from replicate buoy observations.

A growth model again showed that growth was highest at shallow depths and decreased with increasing depth, with October generally exhibiting higher growth than August across depths (Figure 4).

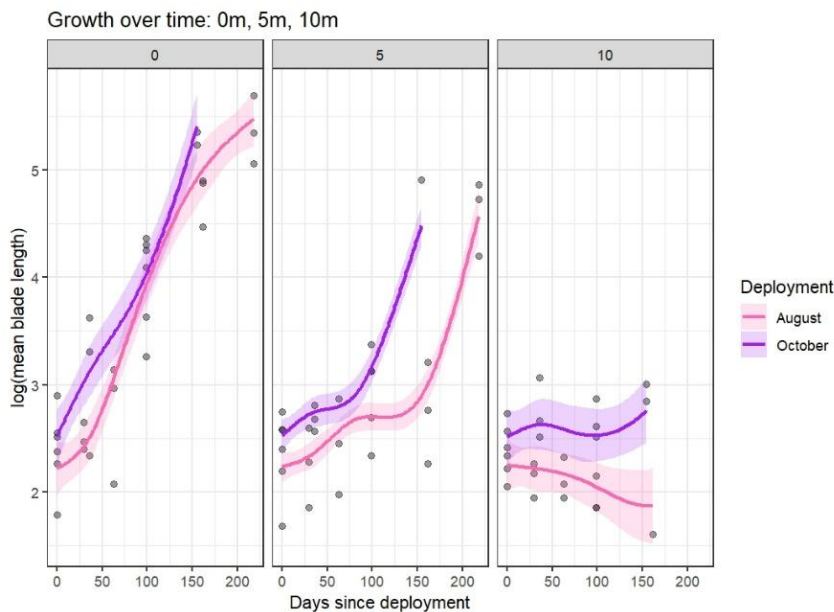


Figure 4: Model predicted growth trajectories of *D. mollis* over time at selected depths (0, 5 and 10m) for August and October deployments. Lines represent fitted values from the tensor generalized additive model (GAM) on the log-scale, with shaded areas indicating 95% confidence intervals and points showing observed data

### Cordova:

In Cordova we have one outplanting from January and have measurements from each month since. The seaweed has grown dramatically from early March to mid-April (Figure 5).

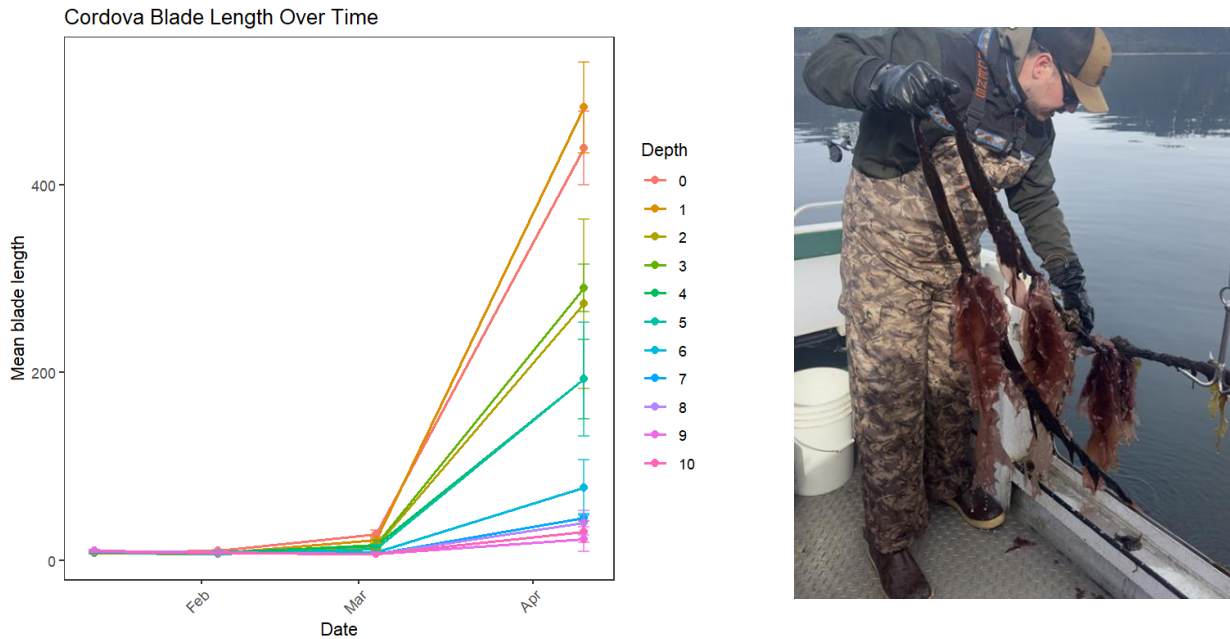


Figure 5. Left: mean blade length (mm) of *D. mollis* by depth (0m to 10 m) from outplanting in Cordova in January. Each outplanting has 3 replicate dropper lines. Error bars display  $\pm 1$  SEM. Right: *D. mollis* outplanting by the Native Village of Eyak near Cordova .

### **Objective 3: Oceanographic parameters**

At every visit to the outplanting sites we have taken data on water temperature and salinity and have collected water samples for later analysis of nitrogen and phosphorus. One interesting observation is that the plants grew best near the surface where salinities were as low as 20 ppt.

### **Objective 4: Assessment of the best season and depth for outplanting to achieve the maximum yield of material and to determine if these optima are site specific.**

At this time, it appears that an early summer outplanting is not successful, but later outplantings can be. The reasons for this are not known at this time. However, our June outplanting may have recovered if left in the water for a longer period. This objective will be addressed at the end of the project when we have collected all of the data.

### Currently:

We will be collecting seaweed again for continued experimentation with seeded lines and growth of *D. mollis*. At this time the seaweed should be releasing spores which we can settle on seedstring. We are exploring ways to count spores and to create a spore solution of known concentration to achieve better estimates of settlement rates.