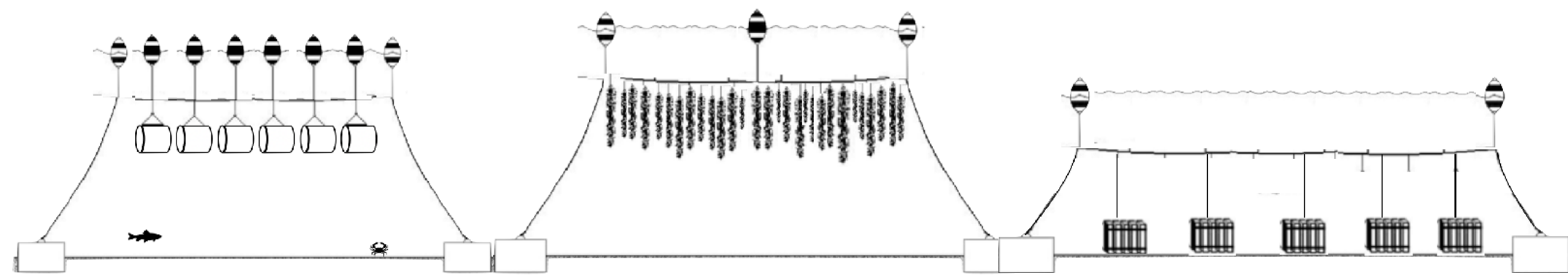
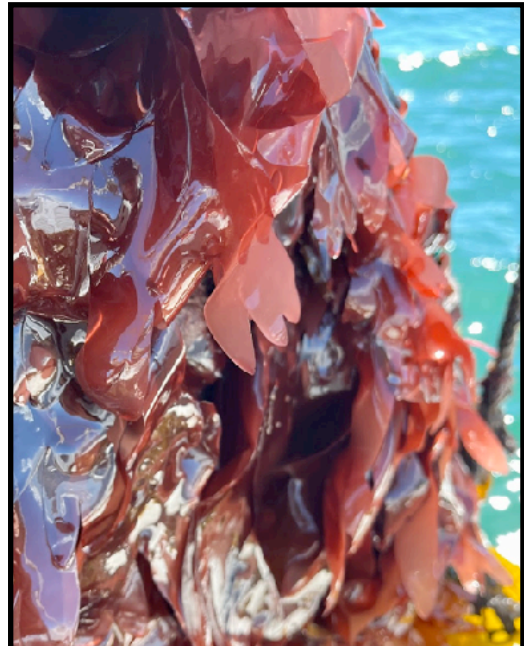


DEVELOPING AN INTEGRATED SEAWEED AND GREEN SEA URCHIN AQUACULTURE MODEL IN MAINE

Sarah Redmond¹, Andrea Angera^{2, 1} Springtide Seaweed, LLC, ² Maine Seaweed Exchange

FARM SYSTEMS



A typical sea farm system consists of a submerged horizontal longline held by two end moorings and suspended by buoys on the surface. This system is simple, adaptable to different cultivation systems, and can withstand extreme tidal and storm conditions. Longline systems can be arranged in either parallel rows or in a grid pattern, and can be utilized for suspending cages in the water column, for cultivating seaweeds directly on longlines, or on droppers, and for securing and retrieving bottom cages.

Suspended cages should be made of a lightweight but rigid material to reduce stress on the longline, with each cage having its own buoy. Cages are typically suspended at depths of 10-15 feet. Urchins should not be floated on the surface to avoid stressful wave action, high temperatures, or changes in salinity. Bottom cages should be placed on hard bottom to avoid smothering urchins with mud.

Urchins can be integrated into existing seaweed and shellfish farms to diversify income, utilize excess seaweed, and control fouling. They are especially well suited for scallops, clearing surfaces of barnacles, blue mussels, and other fouling organisms.



UNI

Rich and creamy, sweet and briny, uni has been described as the essence of the sea. Sea urchins are prized for their uni, which is present inside the shell of the urchin as five gonadal lobes. The gonads are a unique organ, functioning to both produce gametes for reproduction and to store nutrients. When the gonads are filled with large nutritive phagocytes, before gametogenesis has fully developed, the uni is at peak quality.

After cultivating urchins on the Springtide Seaweed farm site in Frenchman Bay, ME, for several years, we conducted sampling on uni quality and yields in 2024 and 2025. Gonad index (GI) is a measure of the proportion of gonad weight to total body weight, where a GI index of 10-15% or higher is generally considered commercially acceptable. Average gonad index increased in our farmed urchins through the fall and winter, from September until January, then decreased after February to lows in June and July, with increases occurring again the following fall and winter (Fig. 1). Gonad proportions in farmed samples were high, with maximum values reaching over 35% in Jan. 2025. These are higher than reported values of wild or enhanced green urchins, which typically reach 20-25% at their peak. All samples in fall and winter were of a yellow, yellow-orange, or orange color, with pleasant flavors that were described as buttery, sweet, vegetal, briny, and creamy, with aftertastes of kelp, lobster, and clams, with occasional instances of astringency, iodine, or bitterness. Despite overall patterns in gonad index over time, there is usually some variability between individual urchins in uni flavor and texture, though nearly all uni had pleasant flavors and would be marketable.

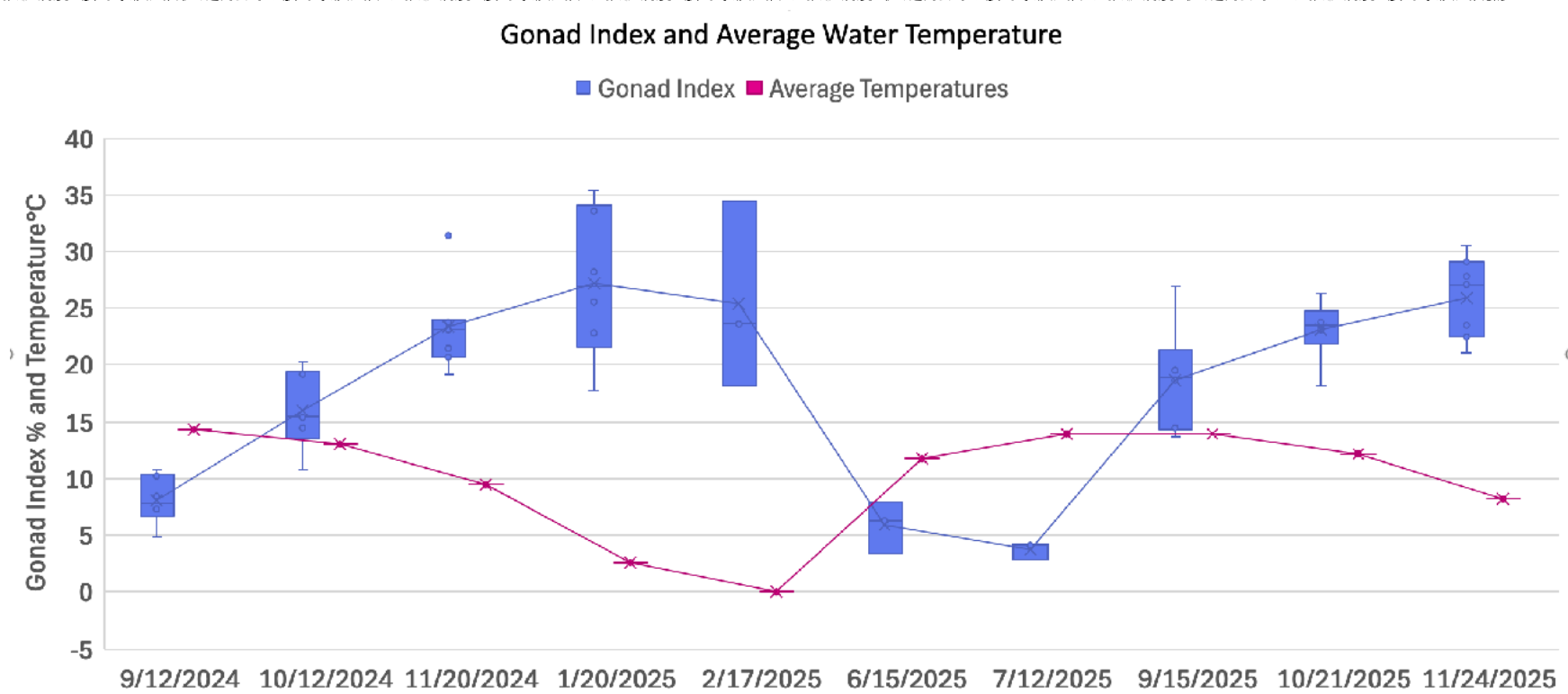


Figure 1. Gonad Index of Farmed Urchin Samples, determined by: ((gonad wt / total wt)*100), 2024-2025. Box and whisker plots with mean line (blue). Average seawater temperatures at farm site (red).



Farmed Urchin Gonad Index (%)			
Date	Average	Max	SD
9/12/2024	8.1	10.7	2.16
10/12/2024	16	20.3	3.41
11/20/2024	22.7	31.4	3.71
1/20/2025	27.2	35.3	6.61
2/17/2025	25.5	34.5	8.31
6/15/2025	5.9	7.9	2.3
7/12/2025	3.7	4.2	0.71
9/15/2025	18.7	26.9	4.71
10/21/2025	23.1	26.3	2.72
11/24/2025	25.9	30.5	3.59

Table 1. Sampling Means and Max GI values for farmed green sea urchin.

Springtide Seaweed's Representative Farmed Uni Samples 2024-2025

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