below MLLW and attained a size comparable to that of plants in the population from which they were originally obtained. A number of the experimental plants reached reproductive maturity. Laboratory cultures were initiated with carpospores or tetraspores obtained by natural release or surgery. Germination and early development of sporelings was most rapid at light intensities of 600–700 ft-c (cool-white fluorescent) at 10C or 15C (16L;8D). When germlings began producing small blades, they were most readily maintained in culture if the light intensity was reduced to approximately 150 ft-c and the temperature maintained at 10C with frequent change of culture medium.

2:15 **Thorhaug, A.** and **K. F. Kellar.** University of Miami, FL.—Laboratory and Field Growth Studies of Four Green Calcareous Algae. I. Preliminary Results.—Scant attention has been paid to the physiology of tropical estuarine macroalgae. Among those neglected are the calcareous green algae *Halimeda, Penicillus, Udotea* and *Rhipocephalus.* Together with *Thalassia* and *Laurencia,* these algae have been found to be major constituents of some shallow tropical marine environments. In addition, geologists have found these organisms of great interest due to the large amount of calcium carbonate they contribute to the sediment. We have also found them to be of value as shelter for many important small food chain members. To examine the growth rate, turn-over time and amount of production, field studies were combined with laboratory experiments. Two years of counts of juveniles, mature and scenescent plants at 24 stations in thermally stressed and non-stressed areas allowed a baseline for growth and turn-over rate; however, detailed laboratory observations became necessary. Juvenile plants of *Penicillus capitatus, Udotea flabellum, Halimeda incrassata* and *Rhipocephalus phoenix* were collected in Biscayne Bay, Florida, and simultaneously planted in a square in the field, in out-of-door running seawater tanks with subsand filter systems and in 2½-gallon plastic aquaria fitted with a subsand filter system in the laboratory. Results of all showed rapid growth in early juvenile stages. Further results will be discussed.

2:30 **Thorhaug, A.** and **Julio Garcia-Gomez.** University of Miami, FL.—Preliminary Laboratory and Field Growth Studies of the *Laurencia* Complex.—During three years of field studies in the shallow South Florida estuaries, we have found the *Laurencia* complex to be an important member of the benthic plant community. Monthly otter trawling at 40 stations from 1968 has shown a close correlation between number of animals caught and weight of *Laurencia* obtained in the trawls (Roessler, 1971). From this information, coupled with bi-monthly diving observations at 24 stations, it is apparent that *Laurencia* provides shelter for many of the important food chain animals. In addition, it is highly probable that *Laurencia* enters the food chain as detritus. There appears to be a marked seasonality to its occurrence, with a great increase in winter and a decrease in summer. However, virtually nothing is known about the dynamics of *Laurencia* in tropical or subtropical estuaries. To overcome these problems we have studied the growth of *Laurencia* in the laboratory and in the field. The laboratory method included collection of specimens via scuba gear, meticulous cleaning of plants in the field, transport to laboratory in plastic 10-gallon containers with bubbling. One group of plants was tied on monofilament and another placed in nylon mesh bags. Half of each group was placed in an out-of-door, running seawater tank; the other in an indoor running seawater, light with grolux lights. Weekly measurements of marked branchlets were made on plants tied to the filament. The bagged plants were subjected to a volume measurement weekly. Field experiments included nylon cages of ¼ inch mesh in which were suspended 12 strings each anchoring 5 *Laurencia* plants. Measurements were made of number of branchlets and length. Results will be discussed.

2:45 **Littler, Mark M.** University of California, Irvine.—Biological Aspects of the Porolithon Ridge in Tropical Pacific Reefs.—*Porolithon gardineri* (13% cover) is the major species in the crest portion of Hawaiian algal ridges. *Porolithon onkodes* appears very abruptly (41% cover) on the heavily grazed seaward slope of the algal ridge. This species reaches maximum development (several centimeters thick) where the ridge extends above mean low water. *Porolithon onkodes,* because of its role in maintaining and providing the surf-resistant reef edge, is indicated to be the most important reef-building organism. Experimental evidence shows that *Porolithon onkodes* is adapted to and requires intense illumination and is thereby unique in respect to other crustose coralinaceae. The estimates of the maximum total productivity were the same for both *P. onkodes* and *P. gardineri,* about 0.5 g C/m² of reef/day. The net productivity of the two crustose corallines (2.2 g C/m² of thallus/day for *P. onkodes* and 2.4 for *P. gardineri*) lies within the range reported for other reef primary producers. Manipulative experiments indicate that the dominance role of *Porolithon* in formation of the algal ridges is due to a combination of at least two phenomena: its physiological tolerance and its physical nature. First, the peculiar physiology of *P. onkodes* would seem to give it competitive advantage over corals and other corallines in direct sunlight. Secondly, it would seem to be relatively insensitive to the wave forces and grazing that remove the frondose algae that overgrow it under other circumstances.

3:00 **Recess.**

3:15 **Vadas, Robert L.** University of Maine, Orono.—Infrared Aerial Photographic Studies on Benthic Marine Algae.—Comparative studies using regular high-speed Ektachrome, Aerial Ektachrome Infrared (Type 8443), Ektachrome Infrared (Type 2443) and Ektachrome Infrared films have been made on intertidal benthic marine algae in Maine. Infrared photographs readily separate living algae and marsh grasses from dying, dead, or non-living materials. The technique allows for rapid determinations of percent cover in intertidal areas. Gradients in algal vegetation patterns are detectable with infrared films and will be discussed. Species recognition from aerial photographs is presently not possible, although higher levels of classification can be made.

3:30 **Provasoli, Luigi** and **Irma J. Pintner.** Haskins Laboratories, Yale University, New Haven, CT.—Effects of Bacteria on Seaweed Morphology.—Over 200 strains of marine bacteria isolated from seaweeds in nature or from laboratory cultures were screened against seaweeds which, when grown in aseptic culture, lose their normal morphology. To save time, the screening was done by inoculating simultaneously single bacterial strains with the assay alga in mineral media devoid of normal carbon sources. Over 40 bacterial isolates, not necessarily 40 species, induced, in *Ulva lactuca,* growth of tubular filaments similar to an *Enteromorpha*; none induced the typical flat blade of *U. lactuca.* Some bacteria grew heavily on the excretory products of *Ulva* and most of them accelerated *Ulva* growth. The supernatants of these bacterial isolates grown separately on various carbon sources were inactive on *Ulva*—contiguous symbiotic growth seems necessary. Twenty seven bacterial isolates restored normal morphology to *Polysiphonia urceolata,* but only in parabiotic cultures. Over 60 bacterial strains isolated from a laboratory impure culture of a normal *Dasya pedicillata* failed alone or in groups of ten or more to restore normal morphology in *Dasya.* Specific bacteria seem needed for each species of seaweed. Whenever a bacterial isolate was polyvalent, it was found, upon repeated isolation, to be a mixture of species.

3:45 **Kalinsky, Robert G.** The Ohio State University, Columbus.—Evidence for Selective Epiphytism by Diatoms on Aquatic Phanerogams.—Aquatic phanerogams were collected

Littler, Mark M. 1972.
Biological aspects of the Porolithon ridge in tropical Pacific reefs. [Abstract]
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