Possible Use of Blue Light in Aquaculture and Kelp Forest Ecology

1-4. Possible Use of Blue Light in Aquaculture and Kelp Forest Ecology

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Latest studies have shown that blue light promotes the growth of both gametophytes and sporophytes of laminarian kelps. On the contrary, insects and some other animals are negatively affected by the blue light emission. Therefore, we aimed to promote the growth of cultured *Undaria pinnatifida* and also to deter the herbivorous grazing isopod *Cymodoce japonica* by the emission of blue light. *Cymodoce japonica* grazes on the young sporophytes of cultured *U. pinnatifida* and often causes great loss of its production. A water-proof blue LED light capable of emitting in every night time for more than two months was developed and employed underwater for the growth experiment of *U. pinnatifida* in the field from January to April in 2018. In the laboratory, alternative selection experiments from four conditions: red, green and blue LED lights and dark were conducted in a container for 30 individuals of *C. japonica*. The nocturnal blue light emission in the field promoted the growth of *U. pinnatifida*. In the laboratory choice experiments, *Cymodoce japonica* apparently avoided blue light. Therefore, the blue light emission to young sporophytes will largely contribute to the rise of *U. pinnatifida* production through the promotion of growth and the exclusion of grazers.

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Associate Professor. Major interest is in the ecology and life history strategies of the temperate reef marine benthos. Main study materials: peracarid crustaceans (such as caprellids, gammarids and isopods), herbivorous gastropods, *Undaria pinnatifida*, *Ecklonia cava*, *Eisenia bicyclis*, *Sargassum* spp.