1. Abstract

Seagrasses are found in coastal zones around the world, often in areas of large anthropogenic impact. It forms highly productive and diverse grass-like meadows on oceanic sediments in the euphotic zone, with the leaves providing settling ground for a wide variety of colonial organisms. These epibionts live in a mutualistic relationship with the host plant but can overgrow and impede seagrass growth under low grazing pressure and in eutrophied environments. Seagrass meadows off the coast of Hainan, in the South China Sea, consist of six different species at the investigated sites and exhibit a diverse community of epibionts. These seagrass communities are under threat, due to an increase in coastal populations, aquaculture and industry and the resulting increase in nutrient discharge. However, the direct effect of this increase in nutrients on seagrass or epibiont biomass, productivity, nutrient and community composition remains unclear. In this study, we are trying to shed light on this understudied region and quantify the effects of an increase in nutrients on the most abundant species of seagrass (Thalassia hemprichii) and its epibiontic community. We performed fertilization experiments at two separate sites over 4 weeks. The investigated parameters were environmental physio-chemical data, growth rates, community composition of epibionts, tissue nutrients and net primary productivity.

An additional control treatment of artificial seagrass was used to quantify shading and changes in epibiont functional groups. We hypothesized that, epibiont growth rates, diversity, net primary productivity rates and the amount of total nitrogen in the tissue will increase with nutrient addition. Due to strong weather events and resulting unstable experimental conditions the fertilization treatment did not show the expected effect. As a result, the hypotheses could not be clearly answered. However, we found that in the studied sites during the experiment, nutrients were not the decisive factor. Light and community composition of the epibiontic functional groups could explain the observed dynamics in biomass change rates, incorporated nitrogen and productivity. The artificial seagrass was found to be not suitable to represent the natural seagrass, but still useful for light reduction measurements.