The importance of understanding how crayweed reproduction works when aiming to ac...

Science, Biology

Crayweed

Crayweed, or known by its scientific name Phyllospora comosa, is a species of brown algae that is primarily endemic to Australia’s east coast, spanning from Tasmania all the way up to Port Macquarie usually along shallow reefs. In addition, Crayweed was also abundant along the coastlines of Sydney. However, in 2008 it was discovered that populations of Phyllospora comosa had drastically changed in density, especially along Sydney’s coastline, spanning from Cronulla to Palm Beach. It is reasonable to assume that this is because of human activities, as the Sydney-metropolitan area has increased significantly and Crayweed populations have since declined. Marine biologists have concluded that the industrial development of Sydney during the 1980’s and 90’s is to blame, with high volumes of badly processed sewerage that was pumped straight into Sydney’s bays and beach areas, which would have indefinitely reduced the quality of water within Crayweed areas to extremely poor, which would’ve not only devastated the Crayweed, but also the other hundreds of marine species that were dependent upon them when their population numbers began to collapse.

Conveniently, Crayweed gets its name because it also serves as a prime habitat for Crayfish/lobsters. In addition to its ecologic al niche, Crayweed also captures carbon from the atmosphere and converts it through photosynthesis into oxygen for humans and other mammals to inhale, also acting as plants, when they’re not, but undergo similar processes such as photosynthesis.

Phyllospora comosa is a species of algae, meaning that it is a multicellular (eukaryotic) colony with different roles which is made up of unicellular (prokaryotic) organisms that use chlorophyll much like plants to convert sunlight and carbon into glucose which then provides it with the necessary energy to survive, and producing oxygen as well. Additionally, that would mean that Crayweed would belong to the Protist animal kingdom, which is one of six.

This research report's primary focus is upon the reproduction of a specific species of macroalgae, known as Phyllospora comosa, or Crayweed. In addition to this, upon researching how certain biotic and abiotic factors affect seaweed reproduction, this report will also delve deeply into what particular species of brown algae mostly prefer as a suitable habitat that will aid in maximising reproduction in order to achieve effective restoration of Crayweed along the eastern coast of Australia. Literature ReviewAs part of the research report, two different scientific journals related to macroalgae reproduction have been chosen to investigate into the implications of different abiotic and biotic factors affecting macroalgae (seaweed such as Crayweed) in adversely different ways.

The first journal was created on the 4th of November 2011 and investigates into how ocean acidification can affect types of macroalgae on a microscopic level when it comes to their reproductive cycles. The abstract of this journal continues, explaining how most of the research upon oceanic acidification has mainly overlooked the microscopic stages of macroalgae's life cycles and how human-caused pollution such as OA and UV-B radiation affects

seaweed reproduction. The research into this brought back conclusive results that when environmental cues and stressors occur, it affects the sex ratio between populations, which can have dramatic implications upon the mating system and success in recruitment among adult macroalgae. The results shown suggest that higher levels of acidity and the absence of dissolved inorganic carbon (DIC) leads to a significant reduction of germination rates, meaning that type of marine environment isn't generally preferred by species of seaweed – instead, they would prefer an environment with a lower level of acidity and higher concentration of DIC. Distribution of male and female gametophytes remained relatively the same, however being developed up to 32% larger than in higher PH can potentially suggest that over time macroalgae will adapt to their environment's current levels of acidity and in the future won't have a problem with OA. The only problem with this journal is that these tests were conducted on Giant Kelp, a different species compared to Crayweed. However, Giant Kelp is also a variation of brown algae, which suggests that Crayweed would naturally share similar traits and/or altogether display the same results.

The journal goes into extensive detail and references countless other sources of credible information and transfers it into a very thorough review that spans over ten pages. There aren't any problems with this journal besides from directly mentioning Crayweed as a species and what the species would typically prefer when it comes to it's overall habitat and biotic and abiotic factors that would lead to it's inclination or decline. The answers on each

category of macroalgae are thoroughly investigated, so it would be safe to assume Crayweed is covered in the journal.

Methodology

The abstract from the first journal briefly goes over the procedures that were undergone to obtain the information and results they did; “ Here, we report the effects of pH (7. 59–8. 50) on meiospore germination and sex determination for the giant kelp, Macrocystis pyrifera (Laminariales), in the presence and absence of additional dissolved inorganic carbon (DIC). ” – to simplify, this means that the researchers used controlled environments and variables to see if any of the reproductive processes would change in any way in Giant Kelp. The second journal consists of primarily secondary knowledge, with a vast amount of referencing towards other journals and various other sites. If the author had done any fieldwork of his own, it was conducted prior to the creation of the journal, as details or reference to past research isn’t mentioned in the text, only statements alone of the text.

Results

Through this research report, upon the close analysis of both of these journals, it is clearly evident that human pollution has drastically altered seaweed populations on a global scale, causing PH levels to decrease, which has the potential to affect the size and distribution ratio of male and female gametophytes, which affects how macroalgae such as Crayweed can efficiently reproduce and continue to thrive under certain circumstances (a/biotic factors). The research being conducted suggests that the change of size in high oceanic acidity is an adaptation to ensure that there are no

acidic-related obstructions to the most vulnerable life-history phase of algae development. In addition, the background information provided by the second journal in relation to the environmental conditions most suitable to that species would be especially helpful in achieving the effective restoration of Crayweed.

Discussion

Why might this have occurred not your research. I believe the journals I extensively studied helped significantly regarding my inquiry question and how they thoroughly went over different aspects of seaweed reproduction. One criticism I would have of this depth study would be the difficulty of finding the appropriate journal that fits with the focus question, meaning there should be more articles relating to these inquiries.

Conclusion

To conclude, the inquiry question chosen was “ Why is it essential to understand how Crayweed reproduction works when aiming to achieve effective levels of restoration?” and most of this report would suggest that this question was broken down into different partitions, with each being carefully answered through the use of the information provided through both of the scientific journals that were used and as to how this information can be utilised in order to understand the overall preferred environment and season in order to maximise the rates at which reproduction occurs – one of the primary indicators that a restoration program has successfully accomplished its mission.