Study of Physical Factors Affecting the Growth of *Caulerpa lentillifera* J. Agardh

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Abstract

This study of physical factors affecting the Growth of *Caulerpa lentillifera* J. Agardh growth in the Ban Yong Star mangrove forest. Results showed that areas with algae had higher average water temperature (30°C), dissolved oxygen (6.75 mg/L), transparency (66 cm), and salinity (2.8 ppt) compared to areas without them. Soil temperature was also higher (30°C) in present areas. However, pH levelsforbothwaterandsoilremainedconsistentat5.5inalllocations. Thesefindingssuggestthattemperature,DO,transparency,and salinity arekeydriversforthegrowthofthisseaweed.

Research Question

1.physical factors affect the growth of *Caulerpa lentillifera* J. Agardh ?

Introduction

Sea grape (*Caulerpa lentillifera* J. Agardh) is a seaweed of high economic and nutritional value, widely consumed for its richness in vitamins, minerals, and dietary fiber. It typically thrives in shallow coastal waters and mangrove forests where environmental conditions are suitable. Its growth is primarily influenced by physical factors such as water temperature, pH, dissolved oxygen (DO), transparency, and salinity. According to the Department of Fisheries, optimal growth occurs at temperatures of 25–30°C and salinity levels of 25–30 ppt. Therefore, this study aims to investigate these physical factors in the local mangrove forest to provide essential data for economic cultivation and to support supplementary income for the community.

Research Methods

- **Site:** Ban Yong Star mangrove forest, Trang (Lat: 7.1730812, Long: 99.6766430).
- **Sampling:** Two points compared: areas where algae were found vs. absent.
- **Protocol:** Used **GLOBE Protocols** for Hydrosphere and Pedosphere.
- **Measurement:** Recorded water/soil temperature, pH, DO (test kit), transparency (tube), and salinity.

Results

Analysis of the physical factors of water and soil in areas where *Caulerpa lentillifera* J. Agardh are not found.

print	1st time	2nd time	Third time	Average ($\bar{x}$) ± standard deviation
temperature (°C)	25	27	26	26 ± 1
pH value	5.5	5.5	5.5	5.5
Transparency value (mg/L)	52.5	52.5	52.5	52.5
Oxygen dissolved in a liquid. (mg/L)	5.75	5.75	5.75	5.75
Saltiness (ppt)	2.3	2.3	2.3	2.3
Soil temperatur (°C)	27	28	27	27.33 ± 0.58
pH value (pH)	5.5	5.5	5.5	5.5

Analysis of the physical factors of water and soil in areas where *Caulerpa lentillifera J.* Agardh are found.

print	1st time	2nd time	Third time	Average ($\bar{x}$) ± standard deviation
temperature (°C)	31	29	30	30 ± 1
pH value	5.5	5.5	5.5	5.5
Transparency value (mg/L)	66	66	66	66
Oxygen dissolved in a liquid. (mg/L)	6.75	6.75	6.75	6.75
Saltiness (ppt)	2.8	2.8	2.8	2.8
Soil temperature (°C)	30	31	30	30.33 ± 0.47
pH value (pH)	5.5	5.5	5.5	5.5

Discussion

The area with Caulerpa lentillifera showed a higher water temperature of 30°C, suggesting that warmth stimulates metabolic processes and growth. Higher dissolved oxygen (6.75 mg/L) in these areas further supports efficient respiration and photosynthesis, leading to the algae's vibrant green color. Increased water transparency (66 cm) also allows better light penetration for photosynthesis. While salinity was slightly higher (2.8 ppt) in present areas, it helps maintain cellular balance for semi-marine species. Interestingly, both areas shared a consistent acidic pH of 5.5, indicating that the local organisms have successfully adapted to these specific environmental conditions.

Conclusions

Water temperature, dissolved oxygen, transparency, and salinity are the primary physical factors affecting the growth of *Caulerpa lentillifera* J. Agardh. Areas with thriving algae exhibit higher values in these parameters compared to absent areas. These factors collectively support biological survival in the mangrove ecosystem. Soil and water acidity (pH 5.5) was not a determining factor for the presence of the algae in this study.

Bibliography

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