

## KOMUNITAS PLANKTON SEBAGAI BIOINDIKATOR PERAIRAN DI TELAGA MERDADA, DATARAN TINGGI DIENG, JAWA TENGAH

Wahyu Febriani

(18/429400/BI/10166)

### INTISARI

Perubahan karakteristik Telaga Merdada tidak terlepas dari aktivitas manusia. Pemanfaatan sebagai pariwisata, pemompaan air skala besar, aplikasi pupuk dan pestisida berkesinambungan, dan perubahan tata guna lahan menjadi kawasan pertanian meningkatkan laju erosi tanah, material sedimentasi, masukan nutrien, pendangkalan, dan penurunan kualitas perairan sehingga berpengaruh terhadap komunitas plankton. Potensi komunitas plankton sebagai bioindikator dievaluasi komprehensif melalui struktur komposisi, kelimpahan, dinamika harian, indeks ekologi, saprobitas dan faktor pembatasnya untuk mendemonstrasikan tingkat kesuburan perairan. *Random sampling* dilakukan Mei 2021 di 5 titik dengan 3 ulangan setiap pukul 19.00, 05.00, dan 09.00 WIB. Hasil menunjukkan Alga Koloni, Alga Unisel, *Diatom Centric*, *Diatom Pennate*, Protozoa Berklorofil, dan Dinoflagellata sebagai *functional group* penyusun fitoplankton. Zooplankton disusun oleh *functional group* Cladocera, Copepoda, Larva Mikro Krustase, Protozoa, dan Rotifera. Kelimpahan fitoplankton sebesar 2000,07-3227,53 ind/L dengan kelimpahan tertinggi pada *functional group* alga unisel dan spesies *Chlorococcum humicola*. Kelimpahan zooplankton sebesar 5,51–22,47 ind/L yang tertinggi pada *functional group* Rotifera dan spesies *Phyllodia* sp. Dinamika harian fitoplankton tertinggi pada siang Pukul 09.00 WIB sedangkan dinamika zooplankton tertinggi pukul 19.00 WIB. Indeks keanekaragaman Shannon-Wiener rendah pada fitoplankton 1,43-1,81 dan zooplankton 1,76-1,90. Sebaran antar spesies fitoplankton tidak merata dengan indeks keseragaman Evenness 0,26-0,34 sedangkan zooplankton 0,72 -0,80 cukup merata. Indeks Dominansi Simpson fitoplankton cukup tinggi 0,64-0,79 dan zooplankton 0,79-0,82. Indeks Saprobitas 1,44 – 1,60. Komunitas plankton sebagai bioindikator kualitas perairan dengan faktor pembatas berupa intensitas cahaya, nitrat, oksigen terlarut, alkalinitas, dan migrasi vertikal. Ketidakseimbangan ekologis dan ekosistem perairan Telaga Merdada tidak sehat dengan tingkat kesuburan Mesotrofik-Eutrofik. Penelitian Komunitas Plankton diharapkan menjadi acuan pengelolaan berkelanjutan.

**Kata kunci:** Bioindikator, Fitoplankton, Kualitas Perairan, Telaga Merdada, Zooplankton

## PLANKTON COMMUNITIES AS A WATER BIOINDICATOR AT MERDADA LAKE, DIENG PLATEAU, CENTRAL JAVA

Wahyu Febriani

(18/429400/BI/10166)

### *ABSTRACT*

Changes in the characteristics of Lake Merdada cannot be separated from human activities. Utilization as tourism, large-scale water pumping, continuous application of fertilizers and pesticides, and changes in land use into agricultural areas increase the rate of soil erosion, sedimentation material, nutrient input, siltation, and a decrease in water quality so that it affects the plankton community. The potential of the plankton community as a bioindicator was evaluated comprehensively through the composition structure, abundance, daily dynamics, ecological index, saprobity and limiting factors to demonstrate the level of water fertility. Purposive random sampling was conducted in May 2021 at 5 points with 3 replications every 19.00, 05.00, and 09.00 WIB. The results showed that Colonial Algae, Unisel Algae, Centric Diatoms, Pennate Diatoms, Chlorophyll Prtotozoa, and Dinoflagellates were the functional groups that make up phytoplankton while the zooplankton were composed of Cladocera, Copepoda, Micro Crustacean Larvae, Protozoa, and Rotifers. The abundance of phytoplankton was 2000.07-3227.53 ind/L with the highest abundance in the functional group of unicellular algae and species of *Chlorococcum humicola*. The abundance of zooplankton was 5.51–22.47 ind/L which was the highest in the functional group Rotifera and *Phillodia* sp. The highest daily dynamics of phytoplankton is at noon at 09.00 WIB while the highest dynamics of zooplankton is at 19.00 WIB. The Shannon-Wiener diversity index was low at 1.43-1.81 for phytoplankton and 1.76-1.90 for zooplankton. The distribution between phytoplankton species was uneven with an Evenness index of 0.26-0.34 while zooplankton 0.72 -0.80 was quite even. Simpson's Dominance Index is quite high in phytoplankton 0.64-0.79 and zooplankton 0.79-0.82. Saprobity Index 1.44 – 1.60. Plankton community as a bioindicator of water quality with limiting factors such as light intensity, nitrate, dissolved oxygen, alkalinity, vertical migration, and grazing food. Ecological imbalance and unhealthy water ecosystem of Telaga Merdada with Mesotrophic-Eutrophic fertility level. The Plankton Community Research is expected to be a reference for sustainable management.

**Keywords:** Bioindicator, Merdada Lake, Phytoplankton, Waters Quality, Zooplanktoon