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Syafira Izzatul Jannah[1], Erny Poedjirahajoe[2]

INTISARI

Ekosistem sumber mata air (umbul) memiliki keterkaitan terhadap kondisi vegetasi penutup lahan sekitar dan *catchment area* yang menentukan karakteristik lingkungan perairan. Kondisi air tersebut dapat tercermin pada bioindikator komponennya seperti plankton, serta faktor abiotik yang menggambarkan kualitasnya. Penelitian ini bertujuan untuk menganalisis struktur dan komposisi vegetasi, serta hubungan karakteristik perairan dengan keanekaragaman plankton untuk memahami kondisi perairan Umbul Kemanten dan Umbul Cokro, Kabupaten Klaten.

Menggunakan metode penelitian *systematic random sampling* dengan penempatan *nested plot* untuk mengukur vegetasi berdasarkan tingkat pertumbuhan pada *catchment area* dan tingkat habitus pada area sekitar umbul. Sedangkan sampel air diambil 5 liter dan dikonsentrasikan ke botol tampung 250 ml menggunakan plankton net untuk identifikasi plankton juga faktor abiotiknya di kedua umbul. Kemudian hasilnya dianalisis menggunakan *Rstudio* untuk mengetahui nilai indeks keanekaragaman, keseragaman, dan dominansi plankton.

Hasil penelitian menunjukkan INP tertinggi diduduki *Persea americana* (alpukat) 87.30% diikuti 24 jenis vegetasi lainnya dari tingkatan pertumbuhan pohon di catchment area, *Ficus racemosa* (lo) 145.124% diikuti 26 jenis lainnya dari tingkat habitus di Umbul Kemanten dan *Samanea saman* 28.84% (trembesi) diikuti 28 jenis lainnya dari tingkat habitus di Umbul Cokro. Hubungan signifikan antara karakteristik perairan dengan keanekaragaman plankton di Umbul Kemanten ditunjukkan oleh korelasi positif keseragaman fitoplankton *(E_Phyto)*–kekeruhan (0.69*). Sementara Umbul Cokro memiliki korelasi negatif dominansi fitoplankton *(D_Phyto)*–kecepatan arus (-0.90*). Perbedaan karakteristik perairan antar dua umbul berdasarkan *Mann-Whitney U Test* ditunjukkan oleh parameter suhu air (p=0.005**), kecepatan arus (p=0.043*), *dissolved oxygen* (p=0.016*), H_zoo (p=0.012*) dan D_zoo (p=0.012*).

Kata Kunci: Akuifer, Umbul, Vegetasi, Plankton, Kualitas air

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THE RELATIONSHIP BETWEEN WATER CHARACTERISTICS AND PLANKTON DIVERSITY AT UMBUL KEMANTEN AND UMBUL COKRO, KLATEN REGENCY

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ABSTRACT

Spring ecosystems (umbul) are closely linked to the condition of the surrounding land cover vegetation and the catchment area, which determine the characteristics of the aquatic environment. These water conditions can be reflected in their bioindicator components, such as plankton, as well as abiotic factors that indicate water quality. This study aims to analyze the structure and composition of the vegetation, as well as the relationship between water characteristics and plankton diversity, to understand the water conditions of Umbul Kemanten and Umbul Cokro in Klaten Regency.

A systematic random sampling method with nested plots was used to assess vegetation based on growth stage within the catchment area and habitus stage in the areas surrounding the springs. Meanwhile, 5 liters of water samples were collected and concentrated into 250-ml collection bottles using a plankton net to identify plankton and their abiotic factors at both springs. The results were then analyzed using RStudio to determine the diversity, evenness, and dominance indices of the plankton.

The results of the study show that Persea americana (avocado) had the highest INP at 87.30%, followed by 24 other vegetation species from the tree growth stage in the catchment area, Ficus racemosa (lo) at 145.124%, followed by 26 other species at the habitus level in Umbul Kemanten, and Samanea saman at 28.84% (trembesi), followed by 28 other species at the habitus level in Umbul Cokro. A significant relationship between water characteristics and plankton diversity at Umbul Kemanten is indicated by a positive correlation between phytoplankton evenness (E_Phyto) and turbidity (0.69). Meanwhile, Umbul Cokro exhibits a negative correlation between phytoplankton dominance (D_Phyto) and current velocity (-0.90*). Differences in water characteristics between the two springs, as determined by the Mann-Whitney U Test, were evident in the parameters of water temperature (p=0.005**), current velocity (p=0.043*), dissolved oxygen (p=0.016*), H_zoo (p=0.012*) and D_zoo (p=0.012*).*

Keywords: *Aquifer, Spring, Vegetation, Plankton, Water Quality*

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