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Kajian Ekologis Gastropoda Intertidal Taman Nasional Alas Purwo Jawa Timur
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KAJIAN EKOLOGIS GASTROPODA INTERTIDAL TAMAN NASIONAL ALAS PURWO JAWA TIMUR

Susintowati

INTISARI

Kawasan pesisir Taman Nasional Alas Purwo (TNAP) dapat dijadikan model ekotipe pesisir lautan tropis. Penelitian ini bertujuan melakukan analisis ekologis Gastropoda intertidal di TNAP khususnya diversitas jenis, distribusi, adaptasi ekomorfologis, plastisitas fenotip serta variasi genotip. Pengambilan data dilaksanakan di sembilan pantai dan dua mangrove. Lokasi penelitian dipilih (*purposive*) atas dasar tipe pantai, yaitu: berbatu, berpasir, berlumpur dan mangrove. Data populasi diambil secara acak (*random*) dengan transek kuadrat. Parameter lingkungan diukur secara *in situ* kecuali butir sedimen. Preparasi histologis dengan metode parafin dan pewarnaan Hematoxilin-Eosine Erlich's dan Alcian Blue-PAS. Analisis data ekologis: indeks diversitas Shannon-Weinner, Indeks Morisita, *Correspondence Analysis*, *Redundancy Analysis* dan *Principal Component Analysis*. Data ekomorfologi dianalisis secara deskriptif terhadap otot dan epitelium kaki perut. Data plastisitas fenotip dianalisis menggunakan *Multivariate Non-matrix Dimensional Scalling.* Penelusuran diversitas genotip dilakukan pada spesies terpilih hasil analisis plastisitas fenotip, yaitu berdasar analisis *PCR* dan *DNA sequencing*. Hasil penelitian menunjukkan, ditemukan 22.484 individu, 148 spesies, 60 genus, 36 familia dan 10 ordo. Diversitas tertinggi ada di Pancur yaitu 3.271 dengan indeks Shannon-Weinner dan tercatat: 9055 individu, 67 spesies, 30 genus, 22 familia, 9 ordo. Spesies infauna: 23 spesies, 9 genus, 7 familia dan 4 ordo. Distribusi spesies mengelompok hingga *random* dengan indeks Morisita: 0.165 - 0.016. Anggota Neogastropoda mendominasi semua sub zona. Distribusi spesifik tampak pada anggota Fissulleridae, Olividae, Coraliophilidae dan Phasianellidae. Hasil analisis ekomorfologi terutama pada proporsi tipe otot polos dan rongga hemoselik, kelenjar sub mukosa, ukuran mukosit dan silia. Berkas otot lebih padat pada *Nassarius pullus* (semi infauna), berkas ini tidak begitu jelas pada genus *Nerita* (epifauna), dan proporsi otot *perpendicular* tampak dominan pada *Siphonaria javanica*. Operkulum merupakan struktur yang stabil dibandingkan bagian-bagian cangkang. Plastisitas fenotip yang tinggi pada *Siphonaria javanica, Nerita exuvia, Nerita albicilla, Nerita sphengleriana* dan *Nerita litterata*. Diversitas genotip cukup tinggi pada populasi (*rounded* dan *elongate*) *N. albicilla* dan *N. exuvia*. Diversitas genotip yang tinggi tersebut diduga karena tingginya aliran genetik dalam populasi. Hasil penelitian ini memberikan kontribusi pada asesmen lingkungan di masa yang akan datang. Penggunaan spesies sebagai bioindikator terbaik adalah yang mempunyai plastisitas rendah dalam arti fenotip yang stabil.

Kata kunci: Adaptasi, Gastropoda, ekomorfologi, plastisitas fenotip, diversitas genetik

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ECOLOGICAL STUDY OF INTERTIDAL GASTROPODA IN ALAS PURWO NATIONAL PARK EAST JAVA

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ABSTRACT

The coastal area of the Alas Purwo National Park (TNAP) can be used as a model of tropic coastal ecotype of Indo-Pasific region. The study aims to conduct Gastropoda ecological analysis in intertidal zone of TNAP: species diversity, distribution, abundancy, ecomorphological, phenotype plasticity to genotype diversity. Data was collected at nine beaches and two mangroves. The selection of research locations based on the purposive sampling method mainly on the type of beach: rocky, sandy, muddy and mangrove. Retrieval of population data using random sampling with quadratic transects. Environmental parameters measured in situ except for sediment grains. Histological preparation used paraffin methods and Hematoxilin-Eosine Erlich's staining and Alcian Blue-PAS. Ecological data analysis: Shannon-Weinner diversity index, Morisita Index, Correspondence Analysis, Redundancy Analysis and Principal Component Analysis. Ecomorphological data analyzed descriptively on the foot muscles and the epithelium. Phenotype plasticity data analyzed by Multivariate Non-matrix Dimensional Scalling. The genotype diversity carried out on selected species from phenotypic plasticity analysis. It based on PCR and DNA sequencing analysis. The results showed that 22,484 individuals, 148 species, 60 genera, 36 families and 10 orders were found. The highest diversity index was in Pancur: 3,271 recorded of 9055 individuals, 67 species, 30 genera, 22 families, 9 orders. Infauna species: 23 species, 9 genera, 7 families and 4 orders. Distribution of species showed weakly clumped to random by Morisita index: 0.165 - 0.016. Neogastropoda dominate of all sub zones. Specific distribution was seen in Fissulleridae, Olividae, Coraliophilidae and Phasianellidae. The results of ecomorphological analysis mainly on the proportion of smooth muscle type and hemoselic cavity, sub mucosal glands, mucocyte size and cilia. Muscle bundles are denser in Nassarius pullus (semi infauna), these bundles are not very clear in the genus Nerita (epifauna), and the proportion of perpendicular muscles appears dominant in Siphonaria javanica. The operculum is a stable structure compared to the shell. High phenotypic plasticity was found in Siphonaria javanica, Nerita exuvia, Nerita albicilla, Nerita sphengleriana and Nerita litterata. Genotype diversity is quite high in the population (rounded and elongate) of N. albicilla and N. exuvia. The diversity of genotypes is thought to be due to the high genetic flow in the population. The results of this study contribute to the environmental assessment in the future. In case of using Gastropod as bioindicator, the best one is the species with low plasticity in the sense of a stable phenotype.

Keywords: Adaptation, Gastropods, ecomorphology, phenotypic plasticity, genotype diversity