ABSTRACT

Devi Nur Aziza, 24020122140145. **Insect Exploration Using Morphological and Molecular Approaches in Rice Field Ecosystems of Jeruk Gulung Village, Dempet District, Demak Regency.** *Under the guidance of Rully Rahadian and Aprilia Nurul Aini*

Rice field ecosystems serve as habitats for various insect species that play diverse ecological roles, ranging from pests to natural enemies that contribute to maintaining agroecosystem balance. Therefore, accurate insect identification is essential to support sustainable agricultural management. This study aimed to analyze insect diversity in rice fields located in Jeruk Gulung Village, Dempet District, Demak Regency based on morphological characteristics, to explore and inventory insect species according to their ecological roles, and to evaluate the level of agreement between morphological and molecular identification results. Sampling was conducted during the pre-harvest stage using a zig-zag sampling method combined with sweep nets, hand-picking, and light traps. Morphological identification was performed using a stereo microscope and taxonomic references, while molecular identification was carried out using DNA barcoding and DNA metabarcoding based on the cytochrome oxidase I (COI) gene. Morphological data were analyzed using the Shannon–Wiener diversity index, evenness, relative abundance, and dominance indices. The results showed that the insect community in the rice field ecosystem exhibited a moderate level of diversity, with a Shannon–Wiener diversity index of 1.2121. The most abundant species was Micronecta siva, accounting for 67.6040% of the total relative abundance, with a low evenness value of 0.3765 and a sub-dominant dominance index of 0.5702. Morphological identification revealed 25 morphospecies belonging to 7 orders and 21 families, including pest species, predators, parasitoids, algae-feeding insects (non-pest herbivores), ecological role undetermined. DNA barcoding successfully confirmed two species, namely Nilaparvata lugens and Maiestas dorsalis, while DNA metabarcoding detected 447 insect taxa. Comparison between morphological and molecular identification showed agreement at the species level for seven taxa and at the genus level for four taxa, whereas fourteen taxa could not be confirmed through molecular analysis. These findings indicate that molecular approaches can both validate and complement morphological identification, thereby improving species identification accuracy.

Keywords: DNA barcoding, DNA metabarcoding, Micronecta siva, Rice field insects