



INTERAKSI ANTAR ARTROPODA PADA PADI ORGANIK HEMAT AIR

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Intisari

Teknik budidaya yang diaplikasikan pada budidaya padi sawah diyakini sangat mempengaruhi bentuk interaksi antar artropoda secara *bottom-up* dan *top-down*, yang selanjutnya mempengaruhi keragaman dan kelimpahannya. Sehubungan dengan itu, telah dilakukan penelitian tentang interaksi antar artropoda pada padi organik hemat air dengan tujuan untuk mempelajari pengaruh sistem budidaya padi organik hemat air terhadap tanaman padi, dan dampaknya terhadap keragaman dan kelimpahan herbivora-karnivora serta hasil panen. Adapun tujuan penelitian secara khusus adalah untuk: (1) Mempelajari pengaruh sistem budidaya padi organik hemat air terhadap keragaman dan kelimpahan herbivora-karnivora pada dua musim tanam, (2) Mempelajari pengaruh budidaya padi organik hemat air secara *bottom up* terhadap tanah, tanaman padi, keragaman dan kelimpahan herbivora-karnivora dan hasil panen, (3) Mempelajari pengaruh kehadiran laba-laba secara *top down* terhadap kelimpahan herbivora-karnivora, tanaman padi dan hasil panen pada sistem budidaya padi organik hemat air, (4) Mempelajari pengaruh kompetisi terhadap daya predasi dua jenis predator (*P. pseudoannulata* dan *V. lineata*) pada kepadatan *N. lugens* yang berbeda.

Penelitian tersebut telah dilakukan dalam tiga tahapan studi. Studi I dilakukan pada periode musim hujan (Maret-Juni 2012) yang didisain secara faktorial dua faktor (2x3): pupuk (organik dan sintetis) dan pengairan (hemat air, semi hemat air dan konvensional), masing-masing kombinasi perlakuan memiliki tiga ulangan. Studi II dilakukan pada periode musim kemarau (April-Juli 2013), yang didisain secara faktorial tiga faktor (3x2x2): (1) pupuk (organik, sintetis dan tanpa pupuk), (2) pengairan (hemat air dan konvensional) dan (3) kehadiran laba-laba (dengan laba-laba dan tanpa laba-laba). Kedua penelitian lapangan tersebut dilaksanakan di Desa Ngestiharjo kecamatan Wates Kabupaten Kulonprogo Yogyakarta. Adapun Studi III dilakukan di laboratorium Entomologi Dasar Fakultas Pertanian UGM pada Bulan Januari-Mei 2014, menggunakan rancangan acak lengkap dengan 10 ulangan. Pengujian predasi tunggal dilakukan pada kepadatan mangsa 5, 10, 15, 20, sedangkan predasi gabungan pada kepadatan mangsa 10, 20, 30, 40 dan tanpa mangsa.

Perbedaan musim telah mempengaruhi keragaman dan kelimpahan herbivora-karnivora. **Pada musim hujan**, pemberian pupuk organik meningkatkan keragaman dan kelimpahan herbivora akan tetapi tidak mempengaruhi kelimpahan karnivora, sedangkan pengairan hemat air tidak mempengaruhi keragaman dan kelimpahan herbivora-karnivora; **Pada musim kemarau**, pemberian pupuk organik pada pengairan hemat air dapat menurunkan



kelimpahan karnivora, namun tidak meningkatkan pH tanah, N total tanaman, tinggi dan jumlah anakan. Pemberian pupuk organik pada pengairan hemat air tidak mempengaruhi keragaman-kelimpahan herbivora, dan tidak mempengaruhi keragaman karnivora, serta tidak mempengaruhi bulir bernas, dan komponen hasil lainnya. Kehadiran laba-laba pada musim kemarau tidak mengubah dominansi dan struktur komunitas herbivora dan karnivora, namun berperan dalam meningkatnya tinggi tanaman dan hasil panen. Lebih lanjut, kehadiran laba-laba meningkatkan keragaman karnivora lain, akan tetapi kehadiran laba-laba pada pengairan hemat air telah menurunkan kelimpahan karnivora lain. Kehadiran *Verania lineata* (Coccinellidae) dapat memberikan tekanan terhadap eksistensi *P. pseudoannulata* dan menurunkan kemampuan memangsanya, yang selanjutnya menurunkan pula tekanannya terhadap Delphacidae dan mempengaruhi berat tubuh kedua predator. Semakin tinggi kelimpahan populasi Delphacidae, semakin sering terjadi pertemuan antara kedua predator maka semakin kuat pula tekanan *V. lineata* terhadap *P. pseudoannulata*.



INTERACTION BETWEEN ARTHROPODS ON ORGANIC RICE WITH LESS WATER

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Abstract

Cultivation techniques that be applied to rice cultivation is believed to greatly affect interaction between arthropods in form of bottom-up and top-down ways, which in turn, affects their diversity and abundance. Related to that, it was done a research that generally aimed to determine the effect of organic rice with less water (ORLW) cultivation to rice plant, diversity and abundance of herbivore-carnivore, and also the yield. The objectives of the research in particular: (1) Studying the effect of ORLW cultivation to diversity and abundance of herbivores-carnivores in two seasons, (2) Studying the effect of ORLW cultivation in bottom up ways to the soil, the rice plant, the diversity and abundance of herbivores-carnivores and the yield, (3) Studying the effect of the spiders presence in top down ways to the diversity and abundance of herbivores-carnivores, the rice plant and the yield in ORLW cultivation, (4) Studying the effect of interspecific competition on the predation of two predators (*P. pseudoannulata* and *V. lineata*) on different densities of *N. lugens*.

Three research were undertaken to achieve the objectives of the research. The 1st study was conducted during the period of the rainy season (March-June 2012) which was designed as a factorial of two factors (2x3): fertilizers (organic and synthetic) and water levels (less water, semi less water and conventional), each combined treatment had three replications. The 2nd study was conducted in the dry season (April-July 2013), which was designed as factorial of three factors (3x2x2): (1) fertilizers (organic, synthetic and without fertilizers), (2) water levels (less water and conventional) and (3) the spiders presence (with spiders and without spiders). The two research were conducted in Desa Ngestiharjo Kecamatan Wates Kabupaten Kulon Progo, Yogyakarta. Then, the 3rd study was conducted in Basic Entomology Laboratory, Faculty of Agriculture (January-May 2014), University of Gadjah Mada, by using a completely randomized design with 10 replications. The single predation was on 5, 10, 15, 20 prey densities, while the joint predation was on 10, 20, 30, 40 prey densities and without prey.

The differences season affected the diversity and abundance of herbivores-carnivores. In the **rainy season**, organic fertilizers increased the diversity and abundance of herbivores but did not affect the abundance of carnivores, whereas less water irrigation did not affect the diversity and abundance of herbivores-carnivores. In the **dry season**, applying organic fertilizers on less water irrigation decreased the abundance of carnivores, but did not increase the soil pH, total N of plant, height and number of tillers. Applying organic fertilizer on less water irrigation did not affect the diversity-abundance of herbivores and carnivores, and also did not affect the filled grain and the other components. The spiders presence in the dry season did not change the dominance and community structure of herbivores and carnivores, but contributing to increase plant



Interaksi antar artropoda pada padi organik hemat air

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height and yield. Furthermore, the spiders presence increased the diversity of other carnivores, but the presence of spiders on less water irrigation decreased the abundance of other carnivores. The presence of *Verania lineata* (Coccinellidae) gave pressure to the existence of *P. pseudoannulata* and decreased the ability to prey on them, then decreased its pressure on prey population and also body weight of both predators. The higher the population of Delphacidae, the stronger the pressure of *V. lineata* to *P. pseudoannulata*.

Keywords: diversity, herbivore, carnivore, rice, nutrient, water level, competition