UNIVERSITI TEKNOLOGI MARA

POPULATION BIOLOGY OF BROWN PLANTHOPPER, *Nilaparvata lugens*

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ABSTRACT

Brown planthopper (BPH), *Nilaparvata lugens* is one of the major pests of rice and damage by this pest could cause hopper burns due to intensive sucking of the plant. This suggested an urgent need for alternative control measures besides using chemical insecticides. The population biology of BPH needs to be better understood, in order to be able to rationalize decisions about the short-term and long-term control. This study was conducted with the objectives to determine the survivorship and rate of increase of BPH at laboratory conditions, establish the biological life tables of BPH, investigate the nature of feeding and movement behaviours of BPH, compare the population fluctuation of BPH between two seasons and between direct seeded and transplanted paddy fields by using yellow sticky trap and yellow pan trap, determine the relationship of BPH population with the temperature and rainfall, and to compare the effect of different rice cultivars against BPH. The studies were conducted in rainshelter at UiTM Puncak Alam and paddy field at Tanjong Karang. A life table was constructed using single sex methods. Survivorship curve patterns of BPH population fall into type III curve as mortality rate was higher in early stages and lower in later stages. Population growth of BPH was rapid and built up in a short time period as the intrinsic rate of natural increase (r_m) was 0.08, net reproduction rate (R_o) of 14.48 and doubling time of 8.19 days. Therefore, the results suggested that the control program should be done at the early stage of BPH nymph, which is during first and second instar is the ideal stage to be treated with a control method in order to suppress the BPH population effectively. Higher numbers of feeding lesions were observed on 30 day old plants than 45 day and 60 days old plants. More BPH feeding on leaf sheath than on leaf blade was observed. In the movement behaviour study, BPH adults were found more active than the nymphal instars. In older rice plants, the highest movement (4.7 cm per two hours) was observed on 60- day-old plants and lowest (2.7 cm per two hours) on 30-day-old plants. Increased movements of BPH were observed at 13:00hrs. The highest number of BPH was found at 80–86 DAT which is during the maturity stage. Crops can be direct seeded or transplanted technique. The most suitable planting technique depends on locality, soil type, and crop ecosystem. However, farmers should be aware that closed canopy of the rice plants and densely seeded crops favours insect development. BPH populations prefer the densely seeded, close canopy. Besides, both yellow sticky and pan traps are an alternative IPM tool for the monitoring of the BPH. It can be concluded that the abiotic factors have contributed to the changes in population of BPH. This study highlights the important of climate change to be considered when planning the strategies for managing BPH outbreaks besides the plant stage and fertilizer effect. The rice varieties MR220 CL1 and MR219 would be the ideal source of resistance for breeding rice crop for resistance against BPH. The number of 15 to 25 of BPH nymphs per hill attacked at the tillering stage can cause yellowing in lower leaves then wilting and death in the varieties MR 219 and MR 220. However, the variety MR 220 CL1 is not affected because of its high level of resistance to BPH.

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