

The effects of resources limitation on the population variability of the diamondback moth, *Plutella xylostella* (L.) (Lep.: Plutellidae)

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To explore the hypothesis that differences in resources (food and space) affect the population variability of *Plutella xylostella*, a long-term resource-limited population dynamic experiment was established using the three different factors including food renewal amount (one or two plants), food renewal time (two or four days) and cage size (small: 40×20×40 cm or big: 40×40×40 cm). The treatments were replicated four times in a factorial design, and maintained under constant environmental conditions (25±2°C; 70±10% RH; 16L:8D h). To start the experiment, one 5-week-old *Brassica pekinensis* (Chinese cabbage) cv. Hero, four pairs (male and female) of newly emerged *P. xylostella* adults, and aqueous honey solution (20%) were placed in each cage. Plant renewal regime (of 5-week-old *B. pekinensis* cv. Hero) was performed based on the above-mentioned treatments. The adult food supply (honey solution) was replaced every 48 h. The experiment was run for 30 weeks. The resource influences on *P. xylostella* populations were monitored by weekly census counts of live adults. To examine the variability in the population dynamics, comparisons within and between treatments were made using coefficients of variation (CV), as the variances were not constant and increased with the mean. The results showed that the cage size greatly affected the population variability of *P. xylostella*; such that the CV of adult moth population in small cages (0.42) was about twice of that in big cages (0.21). On the contrary, the population variability of *P. xylostella* was not effectively influenced by food renewal amount (CVs: one plant: 0.40, two plants: 0.48) or food renewal time (CVs: two days: 0.46, four days: 0.39). These findings indicate that space limitation plays a paramount role in the population variability of *P. xylostella*.

Keywords: *Plutella xylostella*, resource limitation, population, food, space