The effects of food and space limitations on the equilibrium population level 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 equilibrium of *P. 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, and the data used as a measure of abundance for the population equilibrium. The data were analyzed using a 3-way factorial analysis of deviance. The results showed that there was no significant interaction between the factors. In addition, the cage size significantly affected the population equilibrium of *P. xylostella*; such that weekly mean number of live adult moth per cage in big cages (19.3) was significantly greater than small cages (9.7). On the contrary, there was no significant difference between weekly mean number of live adult moth per cage for different levels of food renewal amount (one plant: 15.2; two plants: 13.7) or food renewal time (two days: 15.6; four days: 13.4). These findings indicate that space limitation plays a paramount role in determining the population equilibrium of *P. xylostella*.

Keywords: *Plutella xylostella*, space limitation, population, time series analysis