

Fitness consequences of delayed mating on reproductive performance of *Chilo partellus* (Swinhoe)

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Abstract

We investigated the effects of mating among different-aged males and females on reproductive physiology, progeny production, and longevity of *Chilo partellus* (Swinhoe) adults under laboratory conditions. Present studies involved virgin males (M) and females (F) of three different ages namely, on the day of emergence (1D), next day (2D), and further next day (3D), thus comprising of a total of nine mating treatments (1DM × 1DF, 1DM × 2DF, 1DM × 3DF, 2DM × 1DF, 2DM × 2DF, 2DM × 3DF, 3DM × 1DF, 3DM × 2DF, and 3DM × 3DF). The observations were recorded on fecundity, fertility, hatchability, and longevity of male and female adults. We found that mating among old aged males and females significantly reduce fecundity, fertility, and egg hatchability. Further, the fecundity, fertility, and egg hatching were significantly higher when newly emerged females mated with either of the ages of males as compared with other mating treatments. Conversely, the 3-day-old females, when mated with either of the ages of males, laid more numbers of unfertilized eggs, thus reduction in egg hatchability. Mating among newly emerged adults significantly reduced the longevity of male and female adults. Kaplan-Meier estimation showed that none of the adults across mating treatments survived more than 6 days. The recovery of spermatophores from the reproductive tract of females from 3DM × 1DF were significantly higher than other mating treatments. However, no association was found between spermatophore recovery and longevity of male and female adults. Findings of present studies will help to devise appropriate techniques to disrupt mating and suppress *C. partellus* population under field conditions.

KEYWORDS

eggs fertility, longevity, mating delay, physiology, reproduction, spotted stem borer

1 | INTRODUCTION

Reproduction is an important physiological mechanism which controls population growth of an organism. In adult insects, mating and oviposition are the two most important behaviors which determine population growth in the next generation. These two adult behaviors occur for a limited period due to temporal changes in the physiology of both the sexes in insects (Jiménez-Pérez & Wang, 2003). Therefore, it is important for an insect to mate at the correct time and age to gain maximum reproductive performance and

population growth. Delayed mating in insects is very common in nature, and temperature, photoperiod, rain, and wind are some of the responsible factors for this delay. Moreover, anthropogenic activities to control insect pests such as mating disruption and mass trapping are also responsible for delayed mating (Carde & Minks, 1995).

A little delay in mating greatly affects reproductive physiology leading to the reduction in progeny production and fitness of the insect (Kruger, 2005). Experimental evidence in many lepidopteran species has also demonstrated that the aging of virgin females is disadvantageous for reproduction, either by decreasing readiness of