

09-‘Cosmodrome’: an experimental design to study movements and behavior of the banana weevil, *Cosmopolites sordidus*, using RFID

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The banana weevil *Cosmopolites sordidus* (Germar) is an important pest of banana crops. Radio-tracking and capture-recapture studies at the scale of the field have revealed a limited capacity of dispersion of the banana weevil. However, for a better understanding of the epidemiological process more information on the movement at a finer scale is needed. To analyze the behavioral response of individuals, we use the Cosmodrome, an experimental design composed of two patches whose quality may vary (bare soil, banana rhizome). The patches are connected by a tunnel of one meter of length at the ends of which RFID tag readers are placed. We analyzed the behavioral response of individuals to variation in patch density. The statistical analysis of results using generalized linear model revealed that the individuals shows a non-linear response of movement to the density in patches. The banana weevil tends to move at a higher rate at intermediate density than at low and high density. The movement response to patch density differs also according to the sex, with a higher activity of females than males at low and intermediate patch density. These preliminary results on the effect of density may reflect the individual strategies of colonization of banana fields by *Cosmopolites sordidus* that maximize the individual fitness (mating, oviposition). The information on movement and behavior of the banana weevil at the plant level is of great importance for the understanding of the dynamic of the epidemiological front during the colonization process.

10-Genetic inferences about the population dynamics of codling moth females at a local scale

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Estimation of demographic parameters is important for understanding the functioning of natural populations and the underlying ecological and evolutionary processes that may impact their dynamics. Here, we used sibship assignment methods to estimate the local dynamics of codling moth females in eight orchards in a 90-ha domain near Valence, France. Based on full-sib inference among 1,063 genotyped moths, we estimated i) the effective number of females that had offspring, ii) their fertility and iii) the distribution of their oviposition sites within and among orchards. The average number of females in all the orchards increased between the first (~130) and the second (~235) annual generations. The average fertilities of the females were similar at each generation according to the host plant considered (apple, pear, or walnut), but differed between commercial (~10) and non-treated (~25) apple orchards. Females mainly clustered their eggs on contiguous trees along orchard borders, but they also occasionally dispersed their eggs among different orchards independently of the cultivated host plants or the inter-orchard distances (up to 698 m) during the second annual generation. The mean distance between two oviposition sites was 30 m. Sibship estimates of both the effective number of females and the inter-orchard migration rates (~5%) were in agreement with the observed genetic differentiation among the eight orchards ($0.006 < F_{st} < 0.013$). These results confirm and extend previous field and laboratory observations in *Cydia pomonella*, and they demonstrate that sibship assignments based on genetic data are an interesting alternative to mark–release–recapture methods for inferring insect population dynamics.