

Linking pollinator behavior to selfing rate for three distinct pollinators of alfalfa

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Insect pollinators are important to seed production but little is known about their impact on pollen dispersal and the amount of selfed seeds produced on a plant. Selfing can decrease the level of heterozygosity within populations and increase genetic differences among populations. High selfing can reduce fitness and yield, especially when inbreeding depression is high. Pollinator movements on a plant can affect selfing. We examined how the differences among pollinators in foraging behavior and pollen deposition patterns can affect a plant's selfing rate. Selfing rate was measured on an alfalfa field pollinated with distinct pollinators. Field-wide selfing rate was estimated at 27%. To compare the impact of these pollinators on selfing rate in alfalfa, we conducted individual greenhouse experiments with honey bees, common eastern bumble bees, and alfalfa leafcutting bees. We measured the number of open flowers per raceme, and number of racemes per plant to assess the effect of different floral displays on bee behavior and the impact on selfing rate. The results showed that large amount of flowers available on a plant can increase attractiveness and visitation rates of pollinators. Visiting more flowers in succession on a plant increases the selfing rate. An increase in the total number of open flowers per raceme and in the number of racemes per plant increase selfing rates with the three bee species studied. This study will shed light on how distinct pollinators affect plant mating systems and the genetic structure of plant populations.