

DO HONEYBEES ACT AS POLLEN THIEVES OR POLLINATORS OF *DATURA WRIGHTII*?

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Most plants flower during the day, but some flower at night. One such plant is *Datura wrightii*, sometimes known as moonflower or Sacred Datura. These plants typically produce many flowers, but each individual flower opens at dusk and typically withers away early the next day. Researchers have found that the main pollinator for *D. wrightii* are hawk moths (Family: Sphingidae), which is not surprising given that moths are night-active.

We observed that there were many honeybee (*Apis mellifera*) foragers on the flowers even before the flowers opened at dusk and in the morning after hawk moths visited but before the flower completely withered. This led us to wonder if honeybees were capable of pollinating the flowers during the day or if they were stealing pollen without doing any pollination.

To test this idea, we performed a series of experiments and observations to see if honeybees visited *Datura* flowers in large numbers, if they carried *Datura* pollen, if foragers removed pollen from anthers, and if flowers were able to set fruit if they were visited by a single honeybee. We also restricted flowers to night-active pollinators (mostly hawkmoths) or daytime pollinators (mostly bees) to look for differences in fruit production.

We were somewhat surprised to find that honeybees visited *D. wrightii* flowers in great numbers and contacted reproductive parts frequently. Not only that, but they removed significant amounts of pollen from the male organs of the plant and carried lots of *D. wrightii* on their bodies. Perhaps because they gathered lots of pollen, a single visit to a flower was often sufficient to set fruit. Flowers that were restricted to

daytime pollinators set a similar proportion of fruit as flowers restricted to night pollination, suggesting that honeybees are as effective as hawk moths for pollination.

In our system, it appears that pollinators can pollinate *D. wrightii* flowers, but there are many questions that remain. For example, although the proportion of flowers setting fruit was similar for bee and moth-pollinated flowers, we do not know if there were differences in the quality of offspring from the different pollinators. Honeybees are known for visiting many open flowers on the same plant, thus causing self-pollination, which might result in reduced offspring health. Hawk moths, on the other hand, often move a great deal among plants, perhaps resulting in healthier offspring.

We showed that honeybees are abundant and effective at pollinating a plant that was mostly thought to be pollinated by hawk moths. It is becoming increasingly clear that honeybees, because of their human-aided transport across the globe, are becoming more common visitors to plants who do not share a coevolutionary history with them. Whether this is a good thing for plant populations is just beginning to be addressed by scientists, but there are probably more surprising stories to tell.



Honeybee foragers visiting a newly-opened Datura wrightii flower. Photo by Deborah Wilson.

