

Possible Effects of Dryer Sheets on Pollinator Activity on Butterfly Bush

Introduction

The insect repellent qualities of dryer sheets have long been described in wives' tales; many say that rubbing a dryer sheet on you before going outside will keep you bug-free for the entire day. However, recent research shows that there may be truth in these tales. Scientists found that when gnats were isolated in two connected containers, one containing dryer sheets and one without dryer sheets, the gnats preferred the dryer sheet free container. Further research identified two possible repellent chemicals in dryer sheets: linalool, a compound found in lavender that is toxic to some insects, and beta-citronella, a compound which helps citronella candles to repel insects (Zielinski, 2010).

In a second study, the repellency effects of various essential oils on spot clothing wax cicadas were examined and, of the ten oils studied, only lavender oil effectively repelled the cicadas. Mass spectroscopy revealed that linalool made up 42.2% of the lavender oil and, when further investigated, was found to be the only repellent agent in the lavender oil (Yoon, et al., 2011).

The effect of flower scent on pollinators has been long assumed, but only recently studied. A significant early discovery in this budding field is that even slight differences in the composition of the volatile, aromatic compounds that make flowers smell can result in a significant change in the species of pollinator that is attracted to that flower. In short, certain compositions of volatile compounds are specific to certain pollinators and even a slight difference in the composition of these compounds can vastly alter pollinator attraction (Van der Niet, et al., 2010).

Furthermore, plants within the same species have been known to release vastly different volatile aromatic compounds to attract different pollinators. For example, *Echinopsis ancistrophora* can be pollinated by a variety of different insects and frequently emits different aromatic compounds to attract specific pollinators (Soler, et al., 2010).

Bees in particular are notorious for their role as pollinators influenced by scent. For example, several species of orchids actually release aromatic compounds that mimic a female bee's own pheromones. Male bees will try to mate with the flower, covering themselves in pollen which they then carry to the next flower they mistake for a female bee (Pichersky, et al., 2002).

In the current study, we hope to determine the effect of dryer sheets on pollinator activity on butterfly bush. We hypothesize that the volatile aromatic compounds found in the dryer sheets will either significantly alter the scent profile for the butterfly bush or act as repellents so that fewer pollinators visit the sections of butterfly bush tied with dryer sheets than the sections without dryer sheets.

Materials/Methods

Two standard commercial dryer sheets were cut into 15 approximately one inch by nine inch strips. On a sunny day with low humidity, seven strips were tied to one half of a butterfly bush and eight strips were tied to one half of a second butterfly bush. Data was collected at 2:00PM on a warm, sunny day in mid September. A stop watch was used to time a half hour period and during that time the number of pollinators on the dryer sheet strip covered portions of the butterfly bushes and the normal portions of the butterfly bushes were recorded. Next, the data was examined for a significant difference using a chi square test (Kirkman, 1996).

Results

All observed pollinators that visited the butterfly bushes were butterflies, flies, or bees. The bush with seven dryer sheet strips tied to one half of it was visited by 32 pollinators, 14 on the side with the strips on it and 18 on the side without the dryer sheet strips. The bush with eight dryer sheet strips tied to one half of it was visited by 35 pollinators, 16 on the side with strips on it and 19 on the side without the dryer sheet strips. In total, 67 pollinators visited the two plants, 30 on the portions of the plants with the dryer sheet strips and 37 on the portions without the strips.

When subjected to a chi square test, the chi square value was 0.731 and the probability value was 0.392. The probability value of 0.392 means that there is a 39.2% probability the difference in pollinator number on the two sides of each plant was due to chance.

Discussion

The results did not fulfill our original hypothesis. In fact, the dryer sheets seemed to have little or no effect on the pollinators, deterrence or attraction. Prior study of the literature ensured that butterflies, bees, and flies can all detect airborne aromatic compounds (Pichersky, 2002), so the most logical, but not necessarily sound, conclusion is that the aromatic compounds in the dryer sheets did not alter the smell of the butterfly bush or deter the pollinators in any way.

Alternatively, it is possible that experimental errors prevented us from obtaining reliable data. For example, perhaps the smell of the dryer sheets was so overpowering that insects were deterred from the entire bush, not just the side with the dryer sheet strips. In this case, we would be unable to determine if the dryer sheets actually altered pollinator behavior or not. Furthermore, although the day the experiment was conducted was dry and with generally favorable conditions for pollination, there had been an ample amount of recent rain. Perhaps the damp earth somehow interfered with the pollinator's ability to sense aromatic compounds. A family friend who gave us our beagle once told me that rain lifts all of the scents off the ground, preventing dogs from following a rabbit's trail. If this is true, perhaps the same sort of thing could have happened in this experiment to the pollinators, preventing them from recognizing the dryer sheet's scent.

To confidently conclude that dryer sheets do not deter or confuse pollinators, additional experimentation is necessary. Further research should determine if damp earth does in fact affect pollinators' ability to detect aromatic compounds and find a way to ensure that the aromatic compounds in dryer sheets are not overwhelming those given off by the side of the butterfly bush without dryer sheet strips. Perhaps a longitudinal study could be performed on a single bush. During the

first thirty days of the study the pollinator activity on the bush could be recorded and then during the last thirty days of the study dryer sheets could be added to the bush and pollinator activity could again be studied to determine if the sheets had any effect on pollinator activity. The only issue with this study is the inability to control outside factors such as temperature, season change, etc. that might alter the pollinators' activity on the butterfly bush over a long term period.

References

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