



Prey preference in the carnivorous pitcher plant, *Sarracenia alata*



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INTRODUCTION

Most plants acquire mineral nutrients from the soil. However, in nutrient-poor environments, some plants have evolved carnivorous traits that allow them to obtain nutrients by capturing and digesting insects.¹ For example, the carnivorous pitcher plant *Sarracenia alata* uses passive pitfall traps to capture their insect prey. Although studies have examined prey composition for *S. alata*, few have included a comparison to the insects available in the environment. Thus, it is unknown whether they attract and capture particular insects or whether they capture insects indiscriminately.

OBJECTIVE

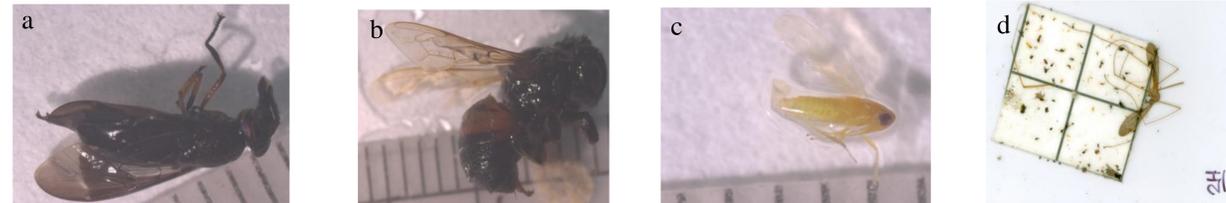
To determine whether *Sarracenia alata* selectively captures particular insects from among those available.

METHODS

- Study was conducted on a population of *S. alata* in Leon County, TX.
- Insects available in the environment were assayed by using sticky traps with an area of 16 cm² at the same height as the opening of the pitcher, placed in the vicinity of each pitcher. Sticky traps were coated with an odorless adhesive to trap insects.
- A sample size of n = 7 pitchers and n = 7 corresponding traps was used.
- Pitchers and traps were allowed to capture insects for one week.
- Traps were collected. Pitchers were cut at their bases and preserved in 70% ethanol to prevent further decomposition of prey.
- Captured insects were identified to the taxonomic level of order.²
- Traits such as the size, number of body parts, and coloration of the insects were used to group the insects into “morphospecies.”

RESULTS

Figure 1. a-c: examples of prey captured by pitchers. d: sticky trap with captured insects.



- Pitchers and sticky traps captured different groups of insects (Table 1). Pitchers captured a larger proportion of dipterans. No thysanopterans were captured by the pitchers even though they were captured in large numbers by the sticky traps.
- Jaccard’s index showed low overlap of morphospecies (0.02) and orders (0.34) between pitchers and traps .
- Simpson’s index, which decreases with an increase in evenness, shows higher evenness in morphospecies in pitchers (0.07) than on sticky traps (0.46; Wilcoxon’s signed rank test, P = 0.043).

Table 1. Insect capture of *S. alata* pitchers vs. sticky traps by order (mean ± SE).

| | Pitchers | Sticky traps |
|--|-------------|--------------|
| Number of individuals of each order captured | | |
| Coleoptera | 0.4 ± 0.2 | 0 |
| Diptera | 6.4 ± 2.7 | 23.4 ± 3.6 |
| Hemiptera | 0.3 ± 0.2 | 0.3 ± 0.2 |
| Homoptera | 0.1 ± 0.1 | 0 |
| Hymenoptera | 0.3 ± 0.3 | 0.4 ± 0.3 |
| Psocoptera | 0 | 0.3 ± 0.3 |
| Thysanoptera | 0 | 38.6 ± 11.2 |
| No ID | 1.0 ± 0.5 | 14.6 ± 1.9 |
| Proportion of prey made up of each order | | |
| Coleoptera | 0.05 ± 0.03 | 0 |
| Diptera | 0.67 ± 0.12 | 0.32 ± 0.04 |
| Hemiptera | 0.02 ± 0.02 | <0.01 ± 0.01 |
| Homoptera | 0.14 ± 0.14 | 0 |
| Hymenoptera | 0.01 ± 0.01 | <0.01 ± 0.01 |
| Psocoptera | 0 | <0.01 ± 0.01 |
| Thysanoptera | 0 | 0.46 ± 0.06 |
| No ID | 0.10 ± 0.05 | 0.21 ± 0.04 |

CONCLUSIONS

The results suggest that *S. alata* selectively captures only a subset of the insects available in the environment. There is low overlap between the morphospecies and orders that are captured by pitchers versus those captured by sticky traps. In general, pitchers capture different morphospecies than sticky traps but they capture these morphospecies in more equal proportions.

There are a number of possible explanations for the differences in insect capture between pitchers and sticky traps. *Sarracenia alata* produces extrafloral nectar, colored nectar guides, and volatiles that could serve as attractants for certain taxa of insects.³ However, it is also possible that some of the differences in insect capture are due to a bias in the method of sampling the insects in the environment. Further studies with other methods of sampling are needed to avoid bias.

REFERENCES

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