

Pollen use and foraging distances of the Neotropical bee *Megalopta*

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Megalopta on *Pseudobombax septenatum*

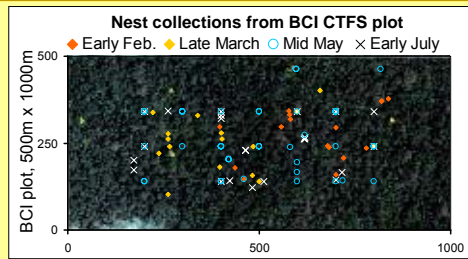
INTRODUCTION: The facultatively social halictid bee *Megalopta genalis* and the Center for Tropical Forest Science (CTFS) 50ha forest dynamics study plot on Barro Colorado Island (BCI), Panama, present an excellent opportunity to study the interactions between resource distribution, bee behavior, and pollen movement in a tropical moist forest. Here we present preliminary results of work in progress based on identifying pollen from collected nests.

THE BEE: *Megalopta* forage just before sunrise and after sunset, and nest in dead sticks caught in vegetation. Egg-adult development time is 5 weeks, so each nest offers a 5-week history of pollen foraging. We collected feces or uneaten pollen from brood cells, and processed specimens through acetolysis before identification.

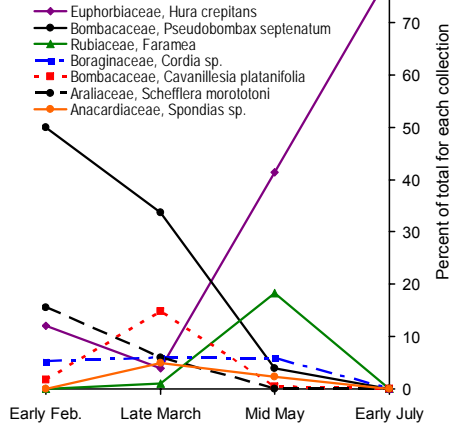
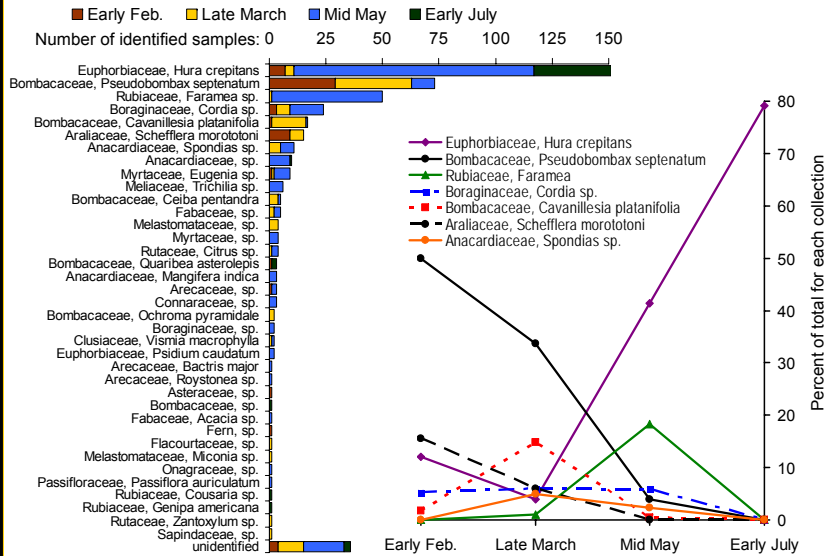


Megalopta pupa and egg cells and adult female with *Pseudobombax* pollen

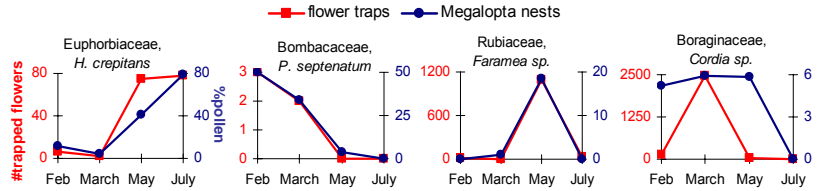
THE CTFS PLOT: All trees are identified and mapped, and a marked grid in the forest permits mapping of nests. We use flower trap data collected by S.J. Wright and O. Calderon as a general measure of floral availability. We performed two dry season collections (Early Feb. and Late March) and two in the wet season (Mid May, Early July).



RESULTS, 1) POLLEN IDENTIFICATION: We identified 461 pollen samples from 108 nests (below, left, in decreasing rank abundance). The lower right graph shows relative seasonal abundance of the seven most common pollen types.

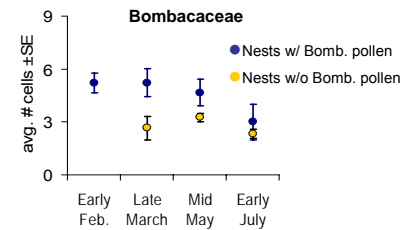
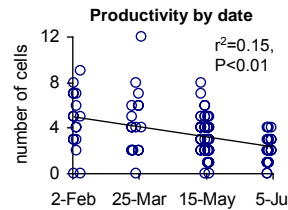
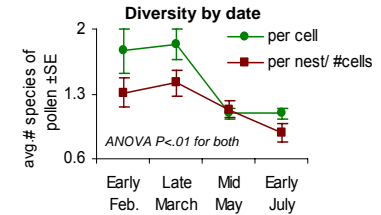


2) FLOWER PHENOLOGY: Seasonal variation in *Megalopta* pollen use generally corresponds to relative pollen availability as measured by the flower traps, although many common species were not used.

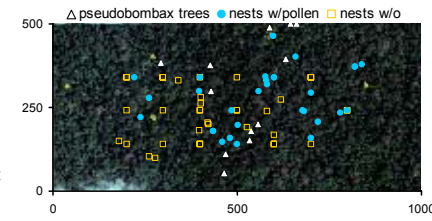


3) SEASONAL TRENDS: Bee productivity (brood cells per nest) and pollen diversity (both per cell, and per nest divided by number of cells) both declined in the wet season (May and July collections).

The productivity decline may be due to the decline of Bombacaceae flowering, as season *does not* significantly affect productivity when Bombacaceae presence/absence is included in the model: GLM $F_{\text{bomb}}=6.9, P=.01, F_{\text{date}}=2.0, P=.12$



4) FORAGING DISTANCES: Minimum nest-tree distances could be quite large: *Schefflera* = 353±55m, *Cavanillesia* = 328±31m. However, for the species we have analyzed so far, there was little influence of distance on pollen presence/absence, except for *Pseudobombax*, in which nests with pollen were significantly closer to *Pseudobombax* trees (188±9m) than nests without (231±9m; see right, graph excludes July nests).



CONCLUSIONS:

- Megalopta* use many pollen species, but just a few dominate their diet on BCI.
- Megalopta* adjust diet opportunistically with pollen availability, yet ignore many common species.
- Bombacaceae seem to be the "best" food on BCI.
- Pollen use is not uniform between nests, but not strongly structured by distance to pollen source either. Long-distance foraging suggests access to most tree species--what determines choice between nests?

FUTURE ANALYSES:

- similarity indices to compare pollen use by neighboring and distant nests.
- effect of pollen species on body size of bees reared from collected cells.
- And, for future research: **Are *Megalopta* pollinators?**
- Smithsonian canopy cranes permit bee/bat enclosure studies on *Hura* and *Pseudobombax*.

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Hura crepitans

