The Bees of A.L. Mangham Jr. Regional Airport, Nacogdoches, Texas

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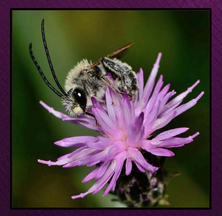
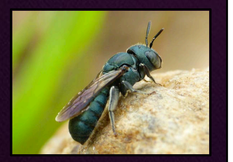
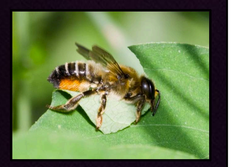


Eucera sp.
Credit: Gideon Pisanty, CC

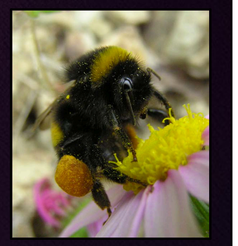


Ceratina sp.
Credit: L. Shayamal, CC



Megachile sp.
Credit: Bernhard Plank, CC

Lasioglossum sp.
Credit: Beatriz Moisset, CC



Bombus sp.
Credit: Tony Wills, CC

Introduction

The United States is home to about 4,000 species of native bees, and many are critically important due to the pollination services they provide (Buchman & Nabhan 1996). Most of these are inconspicuous, solitary bees that nest in the ground. In recent years, a number of bee species have been shown to be in decline (Burkle 2013). Due to these declines, it is important to study and provide habitat for local bee populations.

As a result of periodic mowing, the surroundings of the A.L. Mangham Jr. Regional Airport in Nacogdoches County, Texas provide a grassy, prairie-like habitat that results in a high diversity of wildflowers. This site may contain high bee diversity as well. In order to explore this possibility, a survey of bees at this location was conducted in the late summer and fall of 2016.

Methods

All fieldwork took place about five miles to the east of Nacogdoches near the regional airport during September and October 2016. Over the course of the two-month span, 10 sampling events were carried out which involved both sweeping and trapping methods. Traps consisted of blue and yellow bowls filled partially with soapy water, which is a technique that has been shown to be effective for trapping bees (Droege et al. 2010). Traps were placed along three 150 meter transects. One transect occurred in an open, mowed field, one occurred along a trail through an adjacent forest, and another occurred along the edge of the forest and field. Along each transect 10 yellow and 10 blue bowls were placed about 5-–10 meters apart and were left in place for 24 hours before being retrieved. Sweep samples were also taken with a standard insect net by lightly sweeping through vegetation. Samples were processed and archived at SFASU Biology Department.

Literature Cited

Buchman, S.L., & G.P. Nabhan. 1996. The forgotten pollinators. Island Press, Washington.

Burkle, L.A., J.C. Marlin, and T.M. Knight. 2013. Plant–pollinator interactions over 120 years: loss of species, co-occurrence, and function. Science 339:1611–1615.

Droege, S., V.J. Tepedino, G. Lebuhn, W. Link, R.L. Minckley, Q. Chen, and C. Conrad. 2010. Spatial patterns of bee captures in North American bowl trapping surveys. Insect Conservation and Diversity 3(1): 15-23.

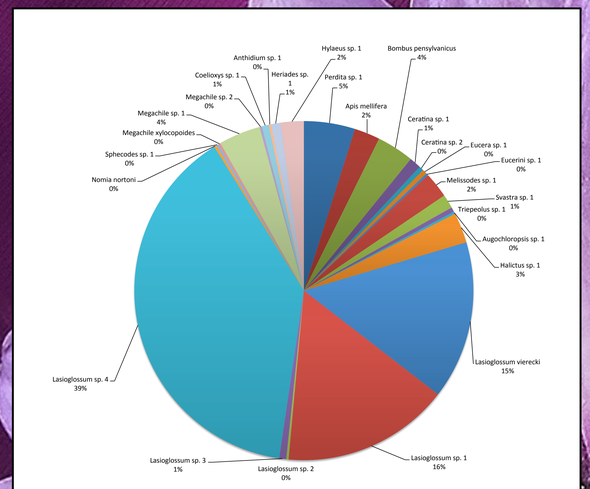


Fig. 1. Diversity of bee species collected.

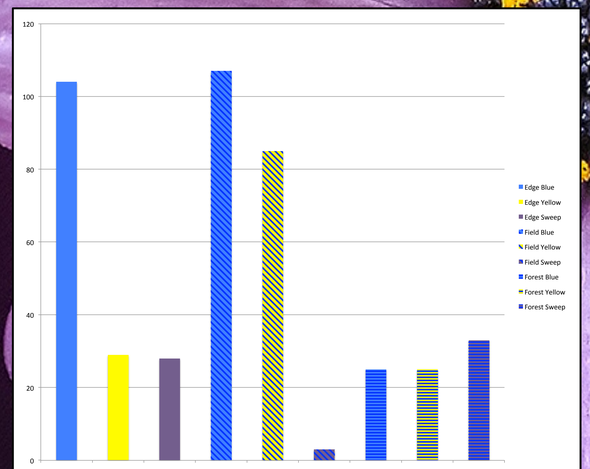


Fig. 2. Number of bee specimens captured at three sites utilizing two types of colored bowls and sweep sampling.

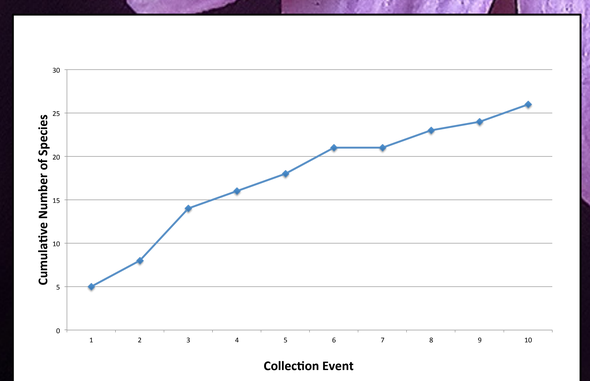


Fig. 3. Cumulative accumulation of bee species collected vs. collecting events (sampling days).

Results

Both colors of bowls trapped a wide variety of insects. A total of 451 individuals representing 26 species of bees were collected by the traps and sweep samples combined (Table 1). Blue bowls were more effective at catching bees than yellow bowls (236 vs. 139 individuals) and the open field produced more individuals (195) than either the forest (83) or the forest/ field edge (161) (Fig. 2). Sweeping resulted in far fewer bees than traps (64 vs. 387) but resulted in the capture of five species that were not caught by the other methods. One species of *Lasioglossum* accounted for over one third of all individuals collected (Fig. 1). Sixteen species were represented by five or fewer specimens (Table 1). Each site contained almost the exact amount of bee diversity, with the forest site containing one more species than the other two sites. Bee taxa accumulated steadily over the course of the study (Fig. 3).

Family	Genus species	Number
Andrenidae	*Perdita sp. 1*	22
Apidae	*Apis mellifera*	11
Apidae	*Bombus pennsylvanicus*	16
Apidae	*Ceratina sp. 1*	5
Apidae	*Ceratina sp. 2*	2
Apidae	*Eucera sp. 1*	2
Apidae	*Eucerini sp. 1*	1
Apidae	*Melissodes sp. 1*	11
Apidae	*Svastra sp. 1*	6
Apidae	*Triepeolus sp. 1*	2
Colletidae	*Hylaeus sp. 1*	10
Halictidae	*Augochloropsis sp. 1*	1
Halictidae	*Halictus sp. 1*	13
Halictidae	*Lasioglossum vierecki*	68
Halictidae	*Lasioglossum sp. 1*	72
Halictidae	*Lasioglossum sp. 2*	1
Halictidae	*Lasioglossum sp. 3*	3
Halictidae	*Lasioglossum sp. 4*	175
Halictidae	*Nomia nortoni*	1
Halictidae	*Sphecodes sp. 1*	1
Megachilidae	*Megachile xylocopoides*	1
Megachilidae	*Megachile sp. 1*	18
Megachilidae	*Megachile sp. 2*	1
Megachilidae	*Coelioxys sp. 1*	3
Megachilidae	*Anthidium sp. 1*	1
Megachilidae	*Heriades sp. 1*	4
	Total	451

Table 1. Checklist of bees collected.

Conclusions

These data show that trapping methods utilizing blue bowls, and to a lesser extent yellow bowls, in field and field-forest ecotones yield substantial catches of bees in areas surrounding Nacogdoches, Texas.

In this study, most of the bees were captured at the field site. This is due to the high capture rate of *Lasioglossum spp*. with bowl traps in this habitat. At this site, over 80% of all bee specimens collected were of this genus. However, sweep netting did not reflect this result, which yielded very few specimens at this site. Curiously, sweeping produced much greater captures in the other sites (Fig2).

The species accumulation curve (Fig. 3) suggests that additional sampling would catch more species at this location. Additional sampling at other times of the year and with a greater variety of trap types should be conducted to complement these results and provide a more complete picture of the bee fauna of this ecologically interesting site.