



## Introduction and Background



A tiny dark bee visiting a *Dalea purpurea* flower at the CBG site

Today's lawns are energy intensive and do not provide the ecosystem services that would be possible with alternative plantings. Native prairie and meadow species could be desirable alternatives to standard turf grass for a variety of reasons, including providing opportunity for pollination among native bee species.

Tiny dark bees make up a wide range of native bee species, most prominently the subgenus *Dialictus*, and are often overlooked because of the difficulty in observation and identification of them. However, their pollination services cannot be disregarded. Tiny dark bees made up 28% of all pollination activity observed during this study, surpassed only by *Apis mellifera*, the honeybee, which is not native to Illinois.

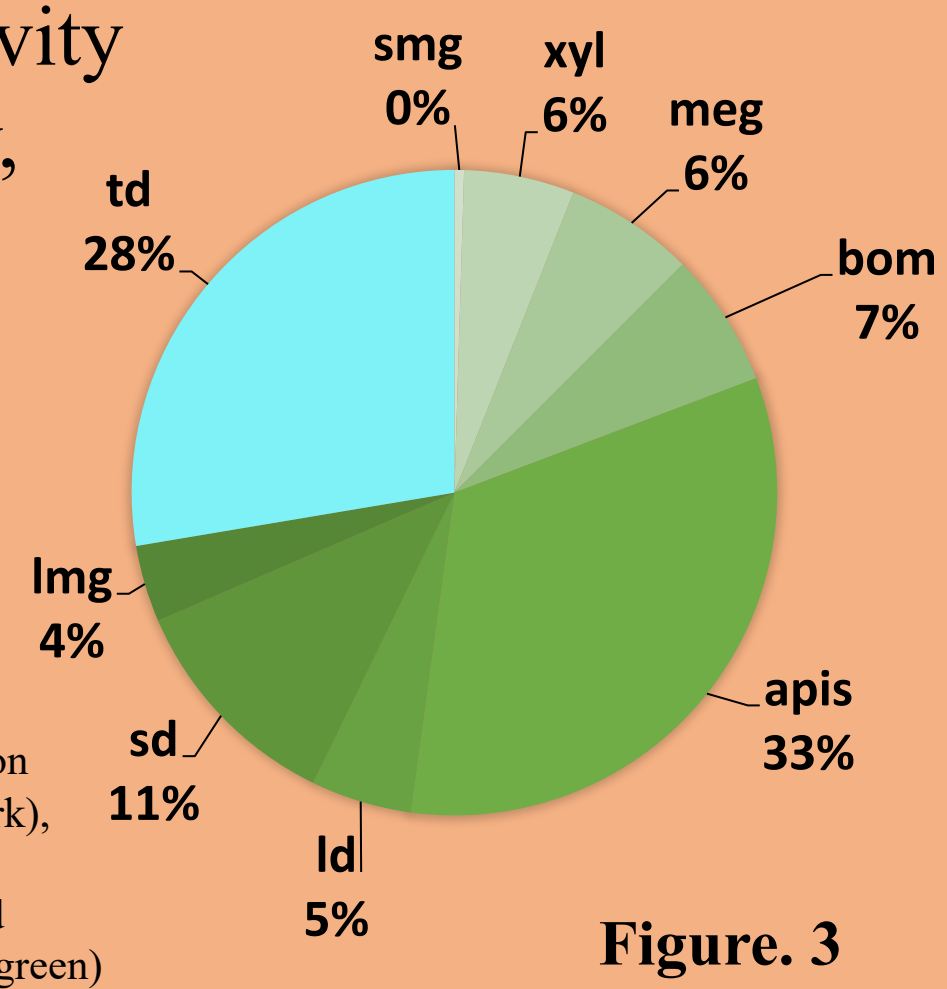


Fig.3. Pie chart showing the distribution of pollination across the different bee groups, including td (tiny dark), smg (small metallic green), xyl (*Xylocopa*), meg (*Megachile*), bom (*Bombus*), apis (*Apis mellifera*), ld (large dark), sd (small dark) and lmg (large metallic green)

## Questions

What flowering plant species are most attractive to tiny dark bees?

Does the bees' pollination behavior show a preference between the planted species or the nonnative species that grew unplanted in the plots?

## Results

Figure 1

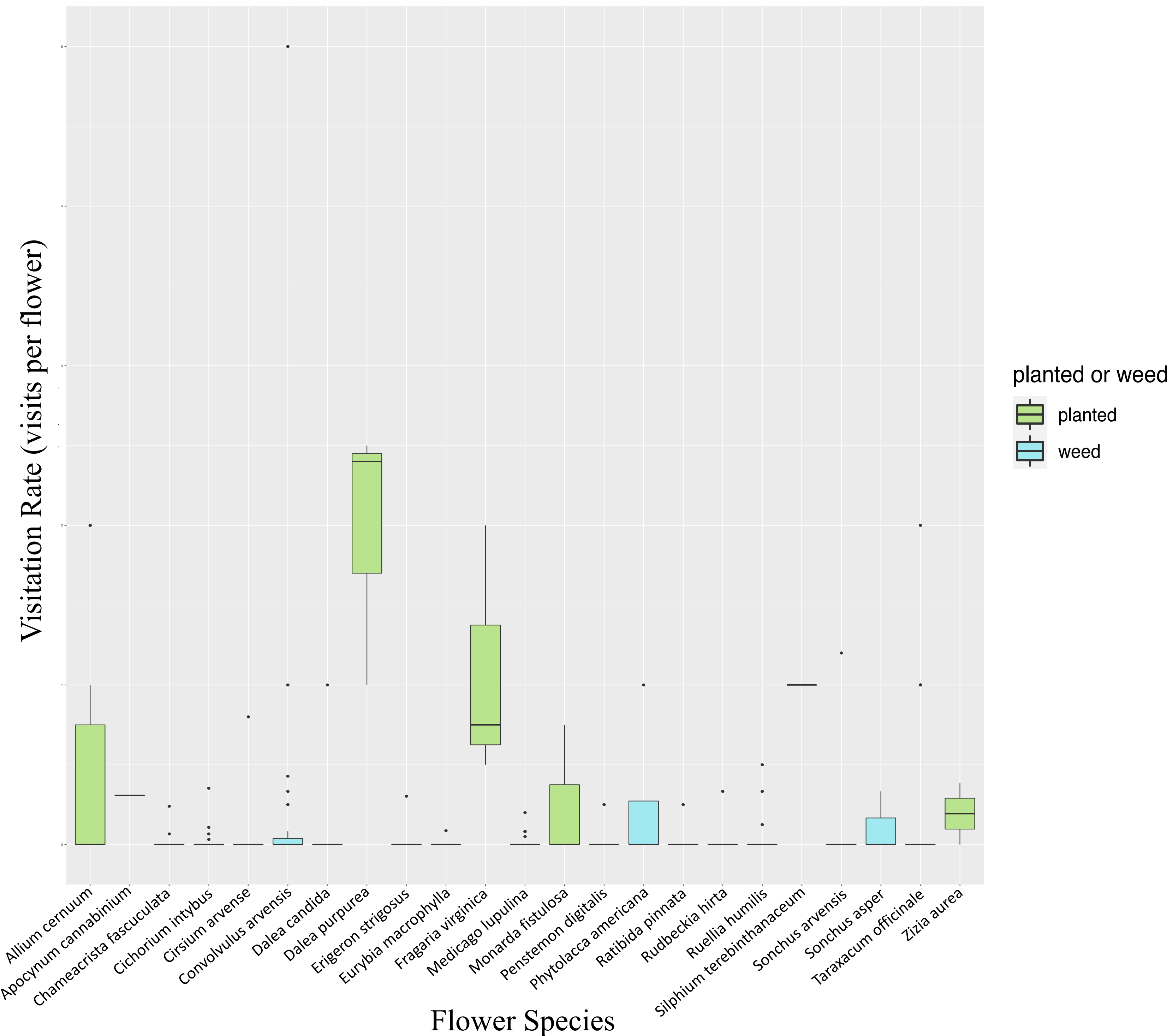


Figure 2

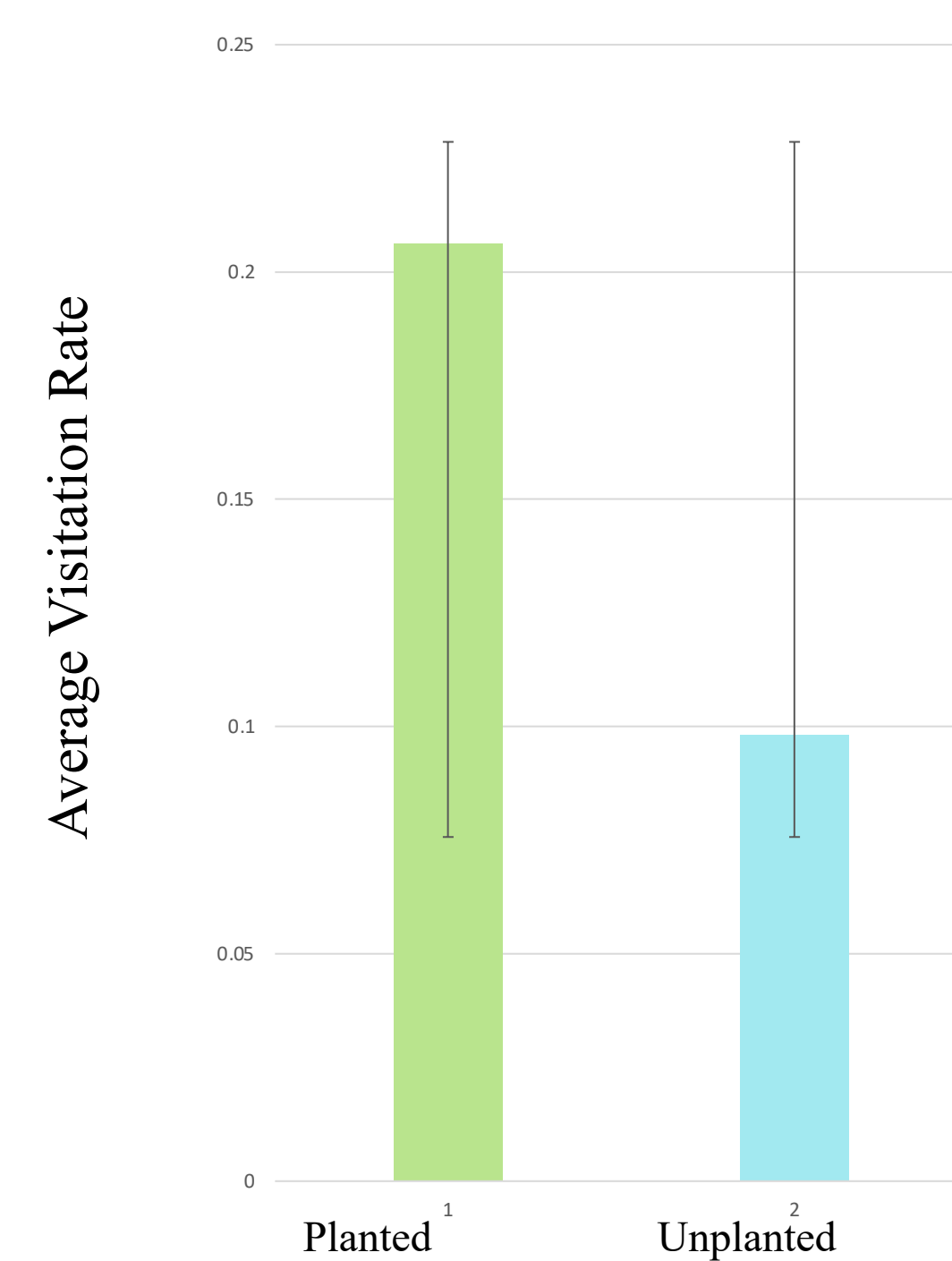
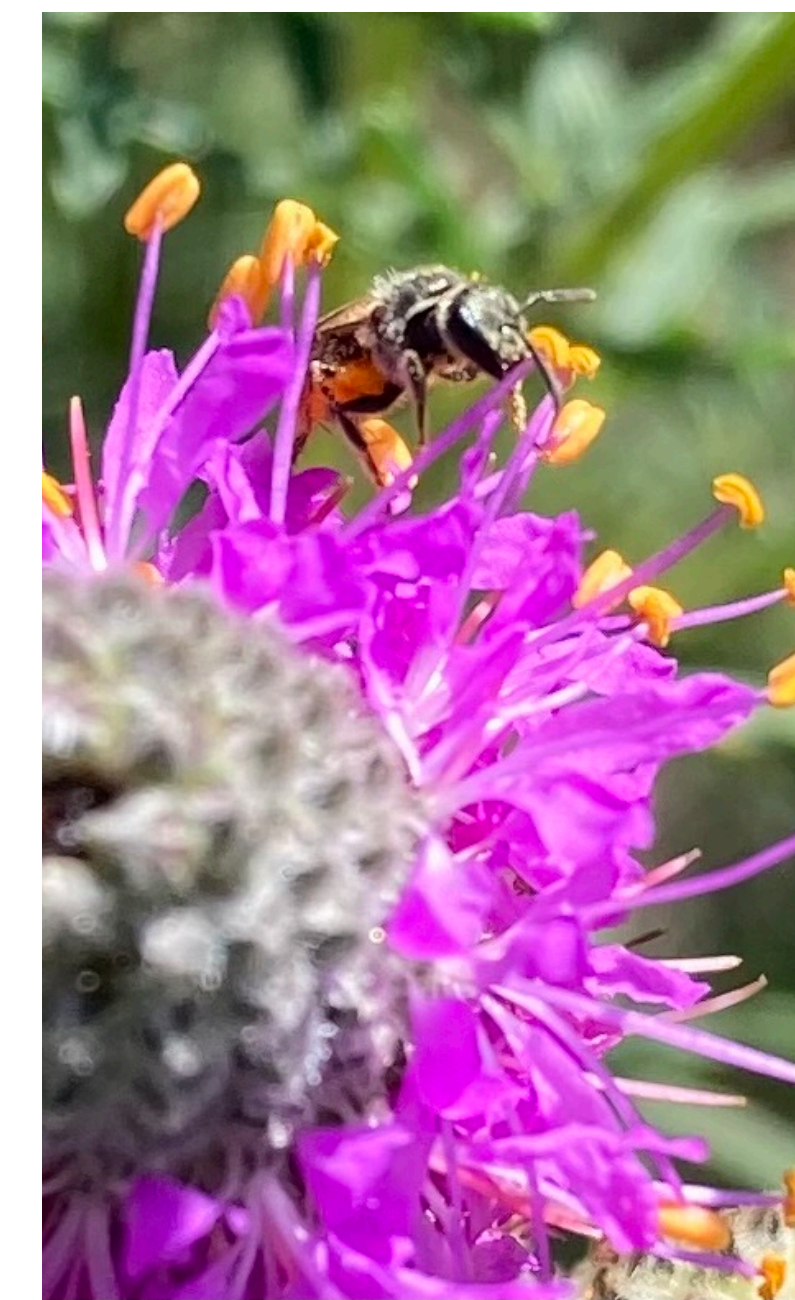


Fig.1. Boxplot showing the distribution of visitation rates. Visitation rates are defined as the total number of visits by tiny darks within one observation period per individual flower observed within said observation period. Each box shows the distribution of visitation rates across all observation periods for each individual flowering species.

Fig.2. Bar graph showing the mean visitation rate of tiny darks across the summer for planted and unplanted species respectively. Error bars show standard deviation. However, this difference was not to a significant degree ( $p < .3$ )



A tiny dark bee pollinating a *D. purpurea* flower at the CBG site

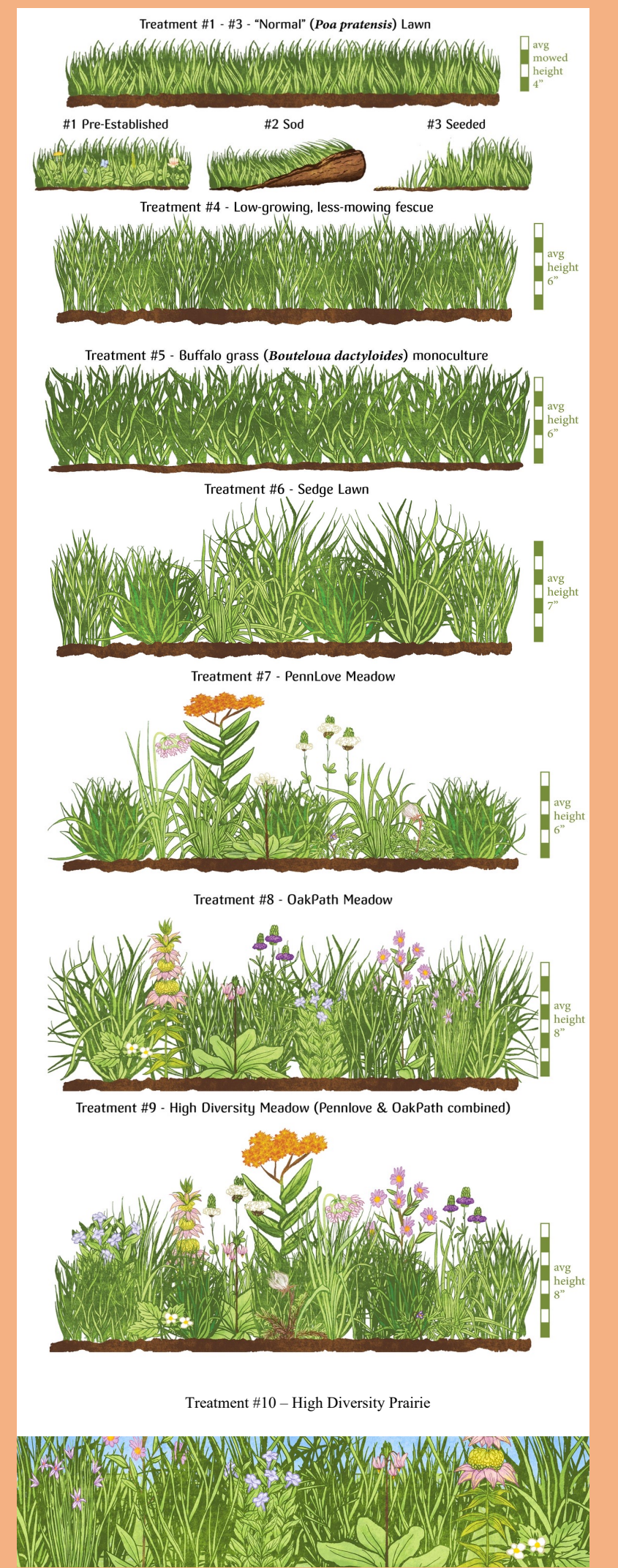
Flowering species that were never visited by tiny darks include: *Ambrosia artemisiifolia*, *Arctium minus*, *Crepis tectorum*, *Daucus carota*, *Echinacea purpurea*, *Erigeron annuus*, *Eryngium yuccifolium*, *Geranium carolinense*, *Hypericum perforatum*, *Lepidium virginicum*, *Melilotus officinalis*, *Oxalis stricta*, *Persicaria*, *Phytolacca decandra*, *Plantago lanceolata*, *Rorippa islandica*, *Solanum carolinense*, *Sonchus oleraceus*, *Stellaria media*, *Trifolium pratense*, *Trifolium repens*, *Verbascum Thapsus*

In total 115 individual tiny dark bees were observed this summer

## Methods

There are 10 lawn 'treatments' currently being tested, including standard turf grass and variations on native prairies and meadows. These treatments can be found at 3 sites: Marian R. Byrnes Park, Marquette Park, and at the Chicago Botanic Garden. Plots at MRB and Marquette were installed last year, while the CBG site was installed this year. Each site was visited approximately once a month for pollinator observations.

Pollinator observations were done in 10 minute increments in which a section of each flowering species within a plot was observed and bees that visited said species were documented. Bees were identified within 9 groups: apis (*Apis mellifera*), bom (*Bombus*), meg (*Megachile*), xyl (*Xylocopa*), smg (small metallic green bees), lmg (large metallic green bees), td (tiny dark bees), sd (small dark bees), and ld (large dark bees)



## Discussion

Though more extensive research is necessary as this data does not present a significant variance between planted and unplanted species, tiny dark bees showed preliminary evidence of a slight preference for the planted native species over the unplanted nonnative species. Specifically, tiny dark bees seemed to prefer *Dalea purpurea* and *Fragaria virginica*, both planted species part of the "OakPath" treatment (*D. purpurea* was also planted in the prairie, and both are in the high diversity meadow) as well as *Cirsium arvense*, a non-native weed.

It would be interesting to compare these results to *Apis mellifera* preferences to determine if there is a connection between nonnative bees and flowers.

## Acknowledgements

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