**STUDY OVERVIEW**

Data Dictionary

Database: 2016 Bees

Date: Date the samples were collected (m/d/yyyy)

Site: Site name samples were collected from (lat/long can be found elsewhere)

Trap: Trap type samples were collected in

Bees: Number of bees collected in each trap type

Diptera, Coleoptera… : Number of organisms collected within each order in each trap type

Database: 2016 Quadrats

Date: Date the samples were collected (m/d/yyyy)

Site: Site name samples were collected from (lat/long can be found elsewhere)

Quadrat: Quadrat number (1-10)

Species: Species of blooming forb observed (“No blooms” denoted if none observed)

% Cover: Percentage of 1m x 1m quadrat area covered by each blooming forb species

% Bare Ground: Percentage of 1m x 1m quadrat area covered by bare ground

Species in Strip, Not in Quadrat: Blooming forb species found in strip, but not sampled by quadrat

Outside Species: Blooming forb species observed outside of sample strip

Observers: Individuals observing quadrats

Study Design

In order to assess native bee species richness and abundance, traps will be utilized at eight sites in central and eastern Iowa. Multiple trap types will be employed in an effort to capture the widest range of species possible, as each technique has been shown to target different species (Roulston et al., 2007). The distance between each site will be greater than the flight range of bees to ensure independent populations are being sampled. Blue vane and pan traps will be used to collect bees. Because bees are readily influenced by weather conditions, these traps will be placed by 7:00am on days with weather conducive to bee activity: cloudless, sunny, calm (< 24 kph wind speeds), and warm (> 18ºC). Weather information will be retrieved from weather stations near each site. Within each strip, a sixty meter long transect will be measured and two blue vane traps filled with approximately an inch of soap and water solution will be placed at either end. Twelve pan traps, which are 96 mL plastic Solo® bowls, four of each white, fluorescent blue, and fluorescent yellow color, will be placed in random color order every five meters along the transect and then partially filled with a weak soap and water solution. Bamboo stakes of varying height will be used to adjust the height of the pans to that of the vegetation as the growing season progresses. Both the blue vane traps and the pan traps will remain deployed for six hours. Targeted and nontargeted sweep netting will be employed along the transect. Targeted sweeping is conducted to capture individual bees visiting flowers, whereas nontargeted sweeping through vegetation for a uniform amount of time and distance provides a consistent survey tool from site to site. Both sweeping methods will be conducted by two individuals along half of the transect (30m) for six minutes each for a total of 48 minutes of sweeping. Upon capture, individual bees will be placed in separate vials, the flower on which they were caught will be recorded, and pollen samples will be collected. Trapping and sweeping will begin in early May (two samples will be taken in May, one in early May and one in late May) and will be repeated once per month through August for a total of five samples.

Floral resources will be assessed by placing a 1m x 1m quadrat randomly to either side of the transect every six meters for a total of ten quadrats. Percent cover of each blooming forb species within the quadrat will be estimated. Additional species in bloom found near, but not within, the strip will be recorded.

After collection, all bee specimens will be moved to the lab where they will be removed from ethanol, washed, dried, pinned with mouthparts pulled, and labeled. Identification will follow by utilizing online (Discover Life) and dichotomous (Mitchell [1960 and 1962] and Arduser [2016]) keys.