**Bombus Movement Project—Sampling Protocol—Jenna Melanson**

**NOTE: Minimum Weather Conditions for Sampling**

Temperature: temps should be > 12C for workers, >10C for queens

Wind: < 2.5 m / sec

Sky: overcast okay, no rain

**Bumble bee Survey**

**\*\*set up thermometer at start of sampling!**

1. Record weather:
   1. Temperature (Keep thermometer in shade always; take reading in shade at waist height). Use towel or umbrella as needed to shade thermometer.
   2. Wind speed (average over 1 min at shoulder height into the wind).
   3. Cloud cover (“clear”= no clouds; “scattered clouds” = clouds rarely/never cover sun, “partly cloudy” = clouds cover sun sometimes; “hazy” = even haze/clouds but sun and/or shadows are visible; “overcast” = clouds cover sun (but no rain—do not sample in rain)
2. Set the stopwatch to **5 min**.
3. Slowly walk down transect without exceeding bounds of area surveyed in vegetation surveys (50 meter transect for “linear” points, e.g., roadside, field edge, or 10m radius for “nonlinear” points, e.g., gardens).
4. Pause timer when bumble bee is first observed; catch bee and attempt ID. For species that are clearly identifiable as not belonging to *B. impatiens, B. mixtus, B. flavifrons, B. vosnesenskii,* *B. rufocinctus,* or *B.californicus*, record presence and release.
5. For focal species, transfer individual to a sterile vial and assign a sample ID and active flower species (if applicable). Write sample ID and date on outside of vial in sharpie. Place vial on ice packs.

**Vegetation Surveys**

**Each sampling point will receive an abundance estimate for each flowering species present.** All flowers along the surveyed transects will be included. Note: for linear elements, the surveyed transect will be a 50 meter transect extending in 25 meters in each direction from the GPS coordinate of the sampling point (if the GPS coordinate is at the corner of a field, this means an “L”-shaped transect). For nonlinear points (e.g., gardens), a 10m radius around GPS coordinate should be used instead.

Identify each flowering species\* and designate with 4 letter code (first two letters of genus, first two letters of species). Estimate the number of blooms on a log scale (0-10 blooms (score = 1), 11-100 (score = 2), 101-1000 (3), 1001-10,000 (4), 10,000+ (5)).

**\*Procedure for new or unknown plants (not on list)**: For any unknown specimens, collect sample to be identified later.  Assign a temporary ID name, and identify plant back at lab.  Responsibility for field nickname rests with field tech and they **must update with final plant ID** **on sheet, in database, and on working plant list ASAP**. Identify plant sample with same label as in database. Be sure to update the data sheet, database and working plant list as soon as plant is identified! (Seek from iNaturalist is a useful tool for getting IDs in the field, but is not always reliable for roses and several other families).