# House Hunting: Harvester ant (*Pogonomyrmex sp.*) colonies in an urban gradient

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## Methods

**Intramural Colonies**

- A week in January 2020 was dedicated to surveying the UTRGV Edinburg campus for harvester ant colonies. Their coordinates were documented and saved to excel. Colonies located within and around the intramural fields, which will further be referred to as intramural colonies, were isolated for the study on colony dispersement in the intramural fields.

**Soil Moisture**

- In the Fall of 2021, soil moisture samples (n=22) were taken at the intramural fields, spaced 50m apart from one another. Three measurements were taken and averaged per sample. These measurements were taken and used to predict the soil moisture values of the surrounding area using kriging.

- The kriging map was exported as a raster and using the extract by circle tool at a radius of 5m and 70m and averaged at both radii.

**Road Proximity**

- To determine each colonies proximity to the nearest road, a line shapefile was created to represent the roads surrounding the intramural fields. This shapefile was inputted into the Near tool. The near tool calculates the distance and additional proximity information between the input features and the closest feature in another feature class. In this case the point to line was used (Fig 1.).
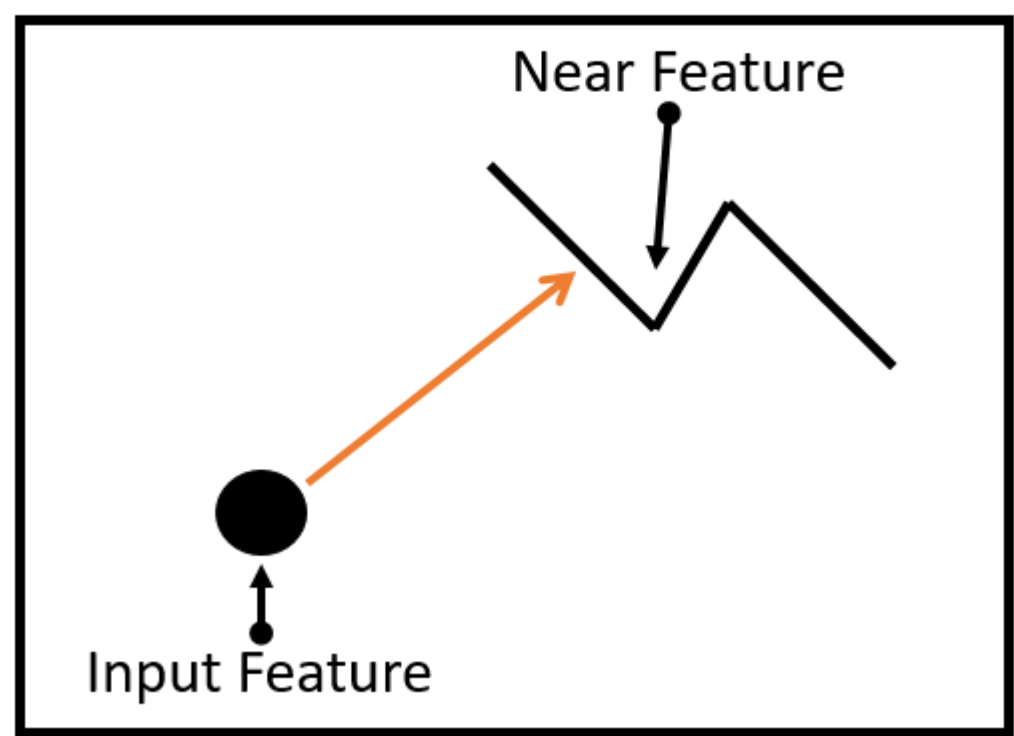

Harvester ant

### Point to Line



Fig 1. Example of options the "near" tool can offer for use on ArcMap.


Location of Soil Moisture samples taken at the UTRGV Intramural Fields

**Legend**
× Soil Moisture Samples

Map 1. Location of soil moisture samples (n = 22).


Pervious surface surrounding Pogonomyrmex Colonies
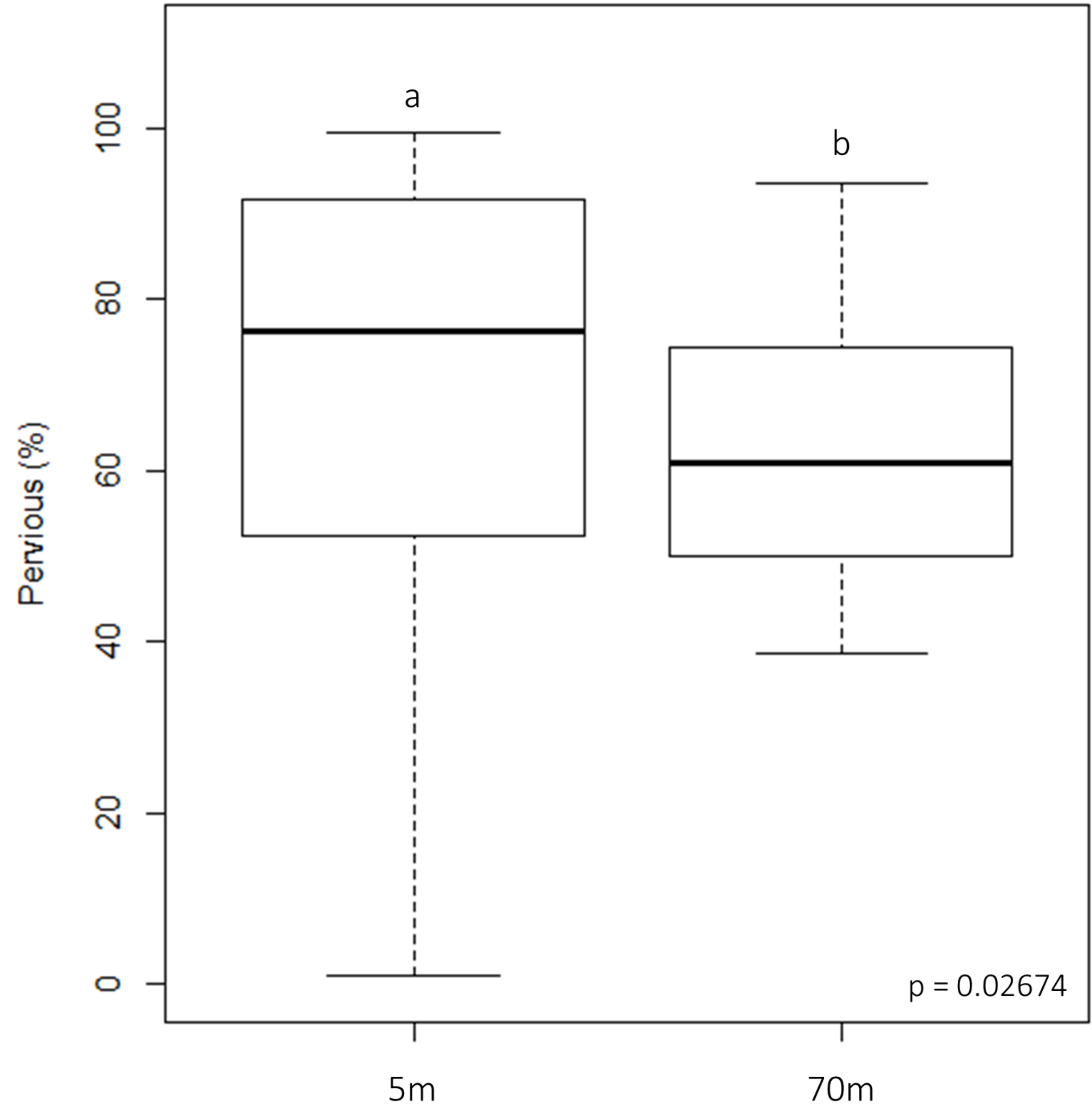
Fig 3. Box plot comparing the percentage of pervious surface surrounding the colony at the 5m radius (n = 50) and 70m radius (n = 50). The amount of pervious surface surrounding the colony is greater at 5m than 70m, Wilcoxon ranksum test was used to compare their means (p = 0.02).


Soil Moisture (VMC%) by the UTRGV Intramural Soccer Fields

**Legend**
⊙ Harvester Ant Colonies

**Soil Moisture (VMC%)**
- 17 - 19
- 20 - 21
- 21 - 22
- 23 - 24
- 25 - 26
- 27 - 28
- 28 - 29
- 30 - 31
- 32 - 33
- 34 - 35

This study was conducted at the UTRGV Edinburg Campus (26°18'35.8"N 98°10'47.2"W). Soil moisture samples (n = 22) were taken using the FieldScout TDR 350 Soil Moisture Meter at the UTRGV intramural fields evenly spaced from one another. The data was used to interpolate the values for the surrounding area in the field.

Map 2. Interpolated soil moisture values taken from the field (n = 22) within and surround the intramural fields.

## Results

- The intramural fields had a predicted soil moisture range of 17 to 34%. Around 47% of the intramural colonies were found to be established in a range between 28-28.5%. (Fig. 2b)
- Of the intramural colonies, 48% were situated within 10m of a road, the farthest available point within the intramural fields was ~140m. The farthest colony to the road was ~70m away. (Fig. 2a)
- 47% of the intramural colonies have an area of pervious material above 80%, while less than 23% have an area of pervious material above 70%
- 90% of the colonies were located at an elevation range of 28.5-30 m.

## Discussion

- Colonies in the area of interest situated themselves near roads, and mostly situated themselves at an elevations between 28.5-30m and soil moisture levels of 28-28.5% VMC.
- Further soil moisture data needs to be collected given the fields are regularly watered in different sections at different times of the week. An option for more accurate elevation measurements is to use a handheld GPS device to calculate colony elevation as well as grid measurements surrounding them to predict the surrounding elevation more accurately than the USGS 1mx1m resolution file.


Pogonomyrmex colony proximity to roads


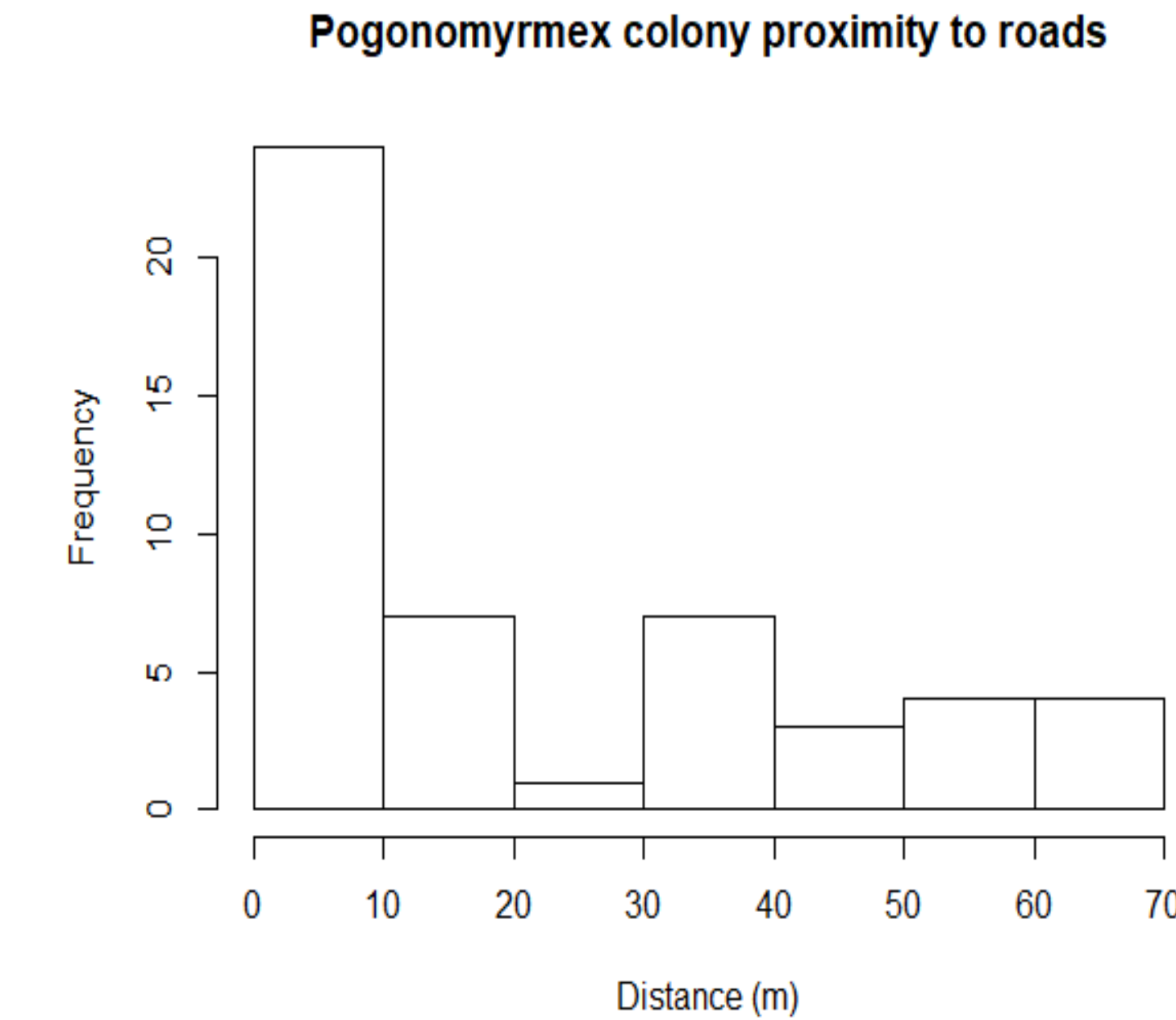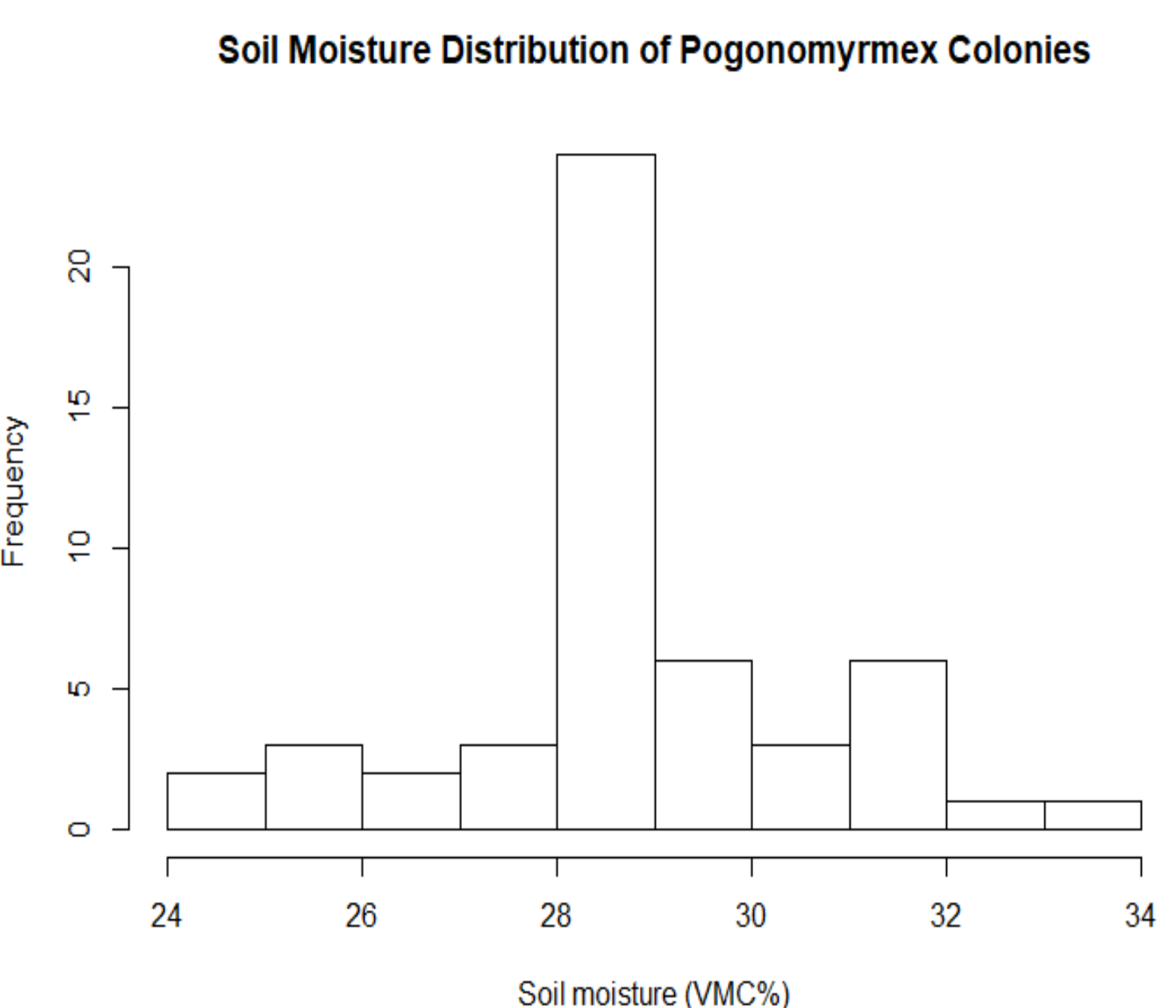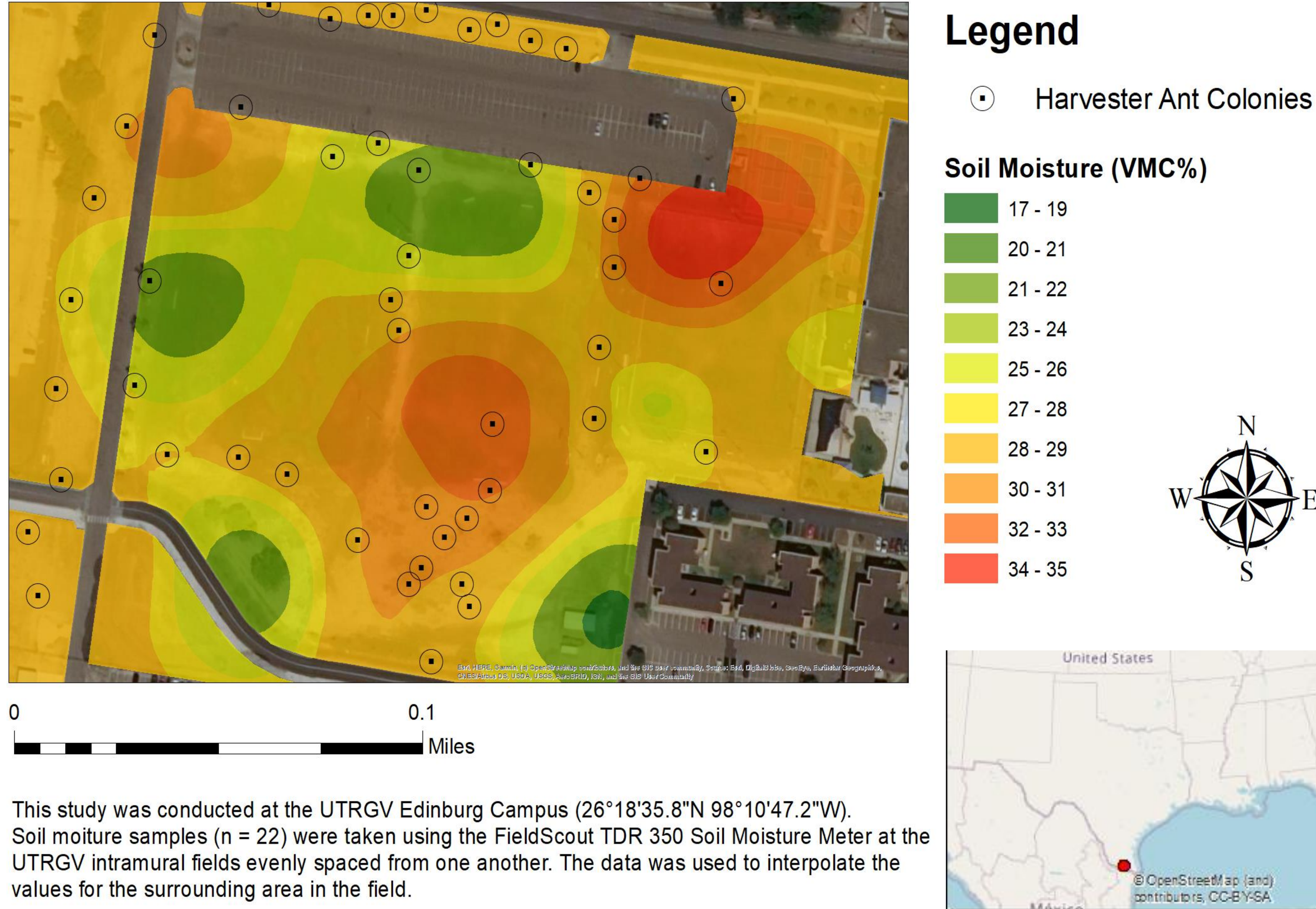Soil Moisture Distribution of Pogonomyrmex Colonies

Fig 2. a) Distribution of distances of *Pogonomyrmex* colonies to nearest impervious surfaces (i.e., roads) (n=50), b) the distribution of interpolated soil moisture levels around colonies (n=50).

Citations: MacMahon, J. A., Mull, J. F., & Crist, T. O. (2000). Harvester ants (Pogonomyrmex spp.): their community and ecosystem influences. Annual Review of Ecology and Systematics, 31(1), 265-291.
Taber, S. W. (1999). The world of the harvester ants. Texas A & M University Press.