My title*

STA304 Paper 1 Submission

Veyasan Ragulan Another author

September 23, 2024

First sentence. Second sentence. Third sentence. Fourth sentence.

1 Introduction

Urban spaces are often void of nature, whether it be grass fields, blooming flowers, or teaming and diverse natural wildlife. One simple way to tackle this is to incorporate nature within the urban landscape, such as with trees. Trees are a vital plant in the world, they take in carbon dioxide and provide oxygen, a key component in the air we breath. Urban areas are known for the excess in carbon dioxide, which only makes it seem natural that trees can live and perhaps thrive in such environments. Trees can also alter the way wind affects pedestrians below (Krayenhoff et al. (2020)). It should be no suprise then, that many cities around the world, including Toronto, have incorporated trees into their landscape, in busy downtown centres, to sleepy suburbs, and everywhere in between.

One way cities have incorportated trees into the city are roadside trees. Trees line many of the cities highways, arterials, collectors, and small roads. Large quantaties of trees lined against highways can act as a natural sound barrier, INSERT STATISTIC WITH SORUCE HERE. Even in cases where trees are more sporadic, they act as

2 Data

The data comes from OpenData Toronto, an open source portal containng datasets carried out at the municipal level ((**opendata?**)). This particular dataset is called Street Tree Data, and focuses on city-owned trees located on roads. This information would be most likely used by city planners and road maintenance, ensuring snow plows and street dusters don't impede on any trees that line the roads. It is important to note that there may be some privately

*Code and data are available at: https://github.com/Veyasan1/STA3014-Paper1

owned trees listed among the municipal trees, as they may be of interest with regards to road maintenance or other city services.

Street Tree Data contains around 32000 observations, each observation being an individual tree. Each observation has a general id for data analysis, as well as an structure id, telling us if the tree is part of an existing structure or building. Next is the location of the tree, using the nearest parcel delivery address, nearest cross-junction, and which ward it is located in. Street Tree contains both the botanical name and the common english name, however we have decided to use only the botanical name to avoid confusion between similar sounding trees. Common english names will be provided for species of key interest. Finally, there is a measurement called dbh_trunk. This is a standard method for measuring the diameter of a tree. The method asks record takeres to read the circumference of the tree from 1.3m off the ground it is rooted in. This measurement has been known to be vaguage, especially when it comes to wawrped or tipping trees, making the exact measurements made on each tree inaccurate at best.

And also planes (**?@fig-planes**). (You can change the height and width, but don't worry about doing that until you have finished every other aspect of the paper - Quarto will try to make it look nice and the defaults usually work well once you have enough text.)

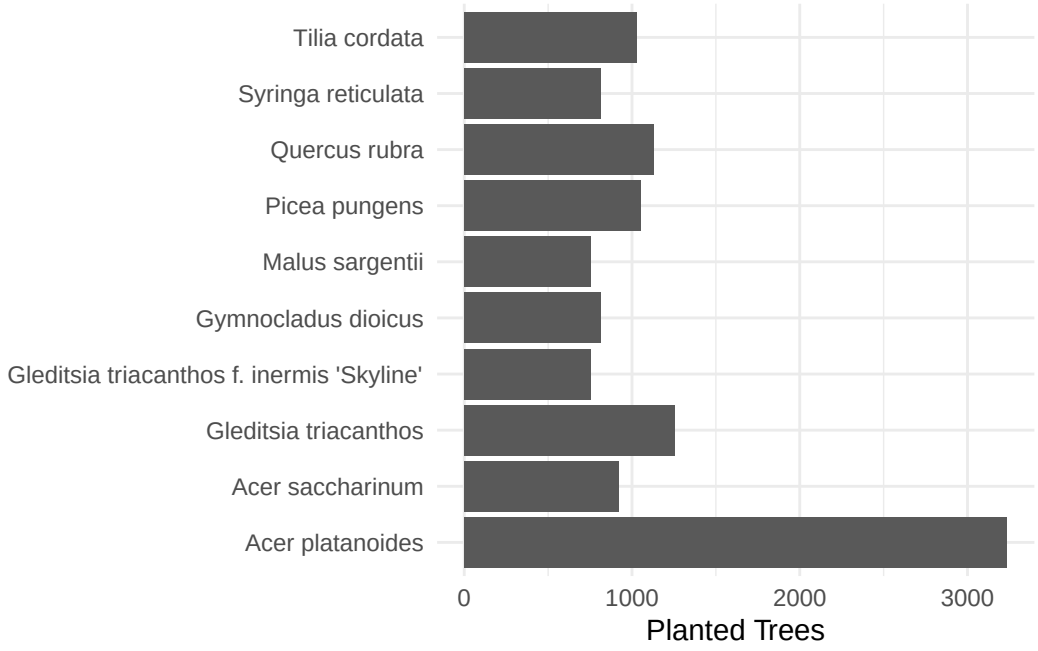

Figure 1: Relationship between wing length and width

Talk way more about it.

```
# A tibble: 1 x 7
```

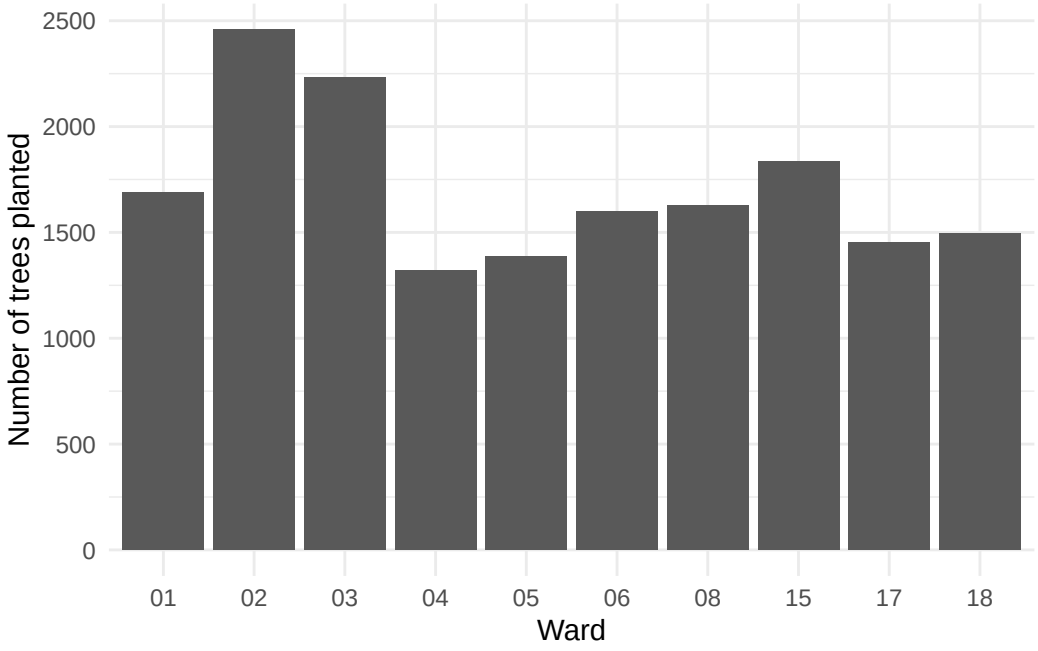

Figure 2: Relationship between wing length and width

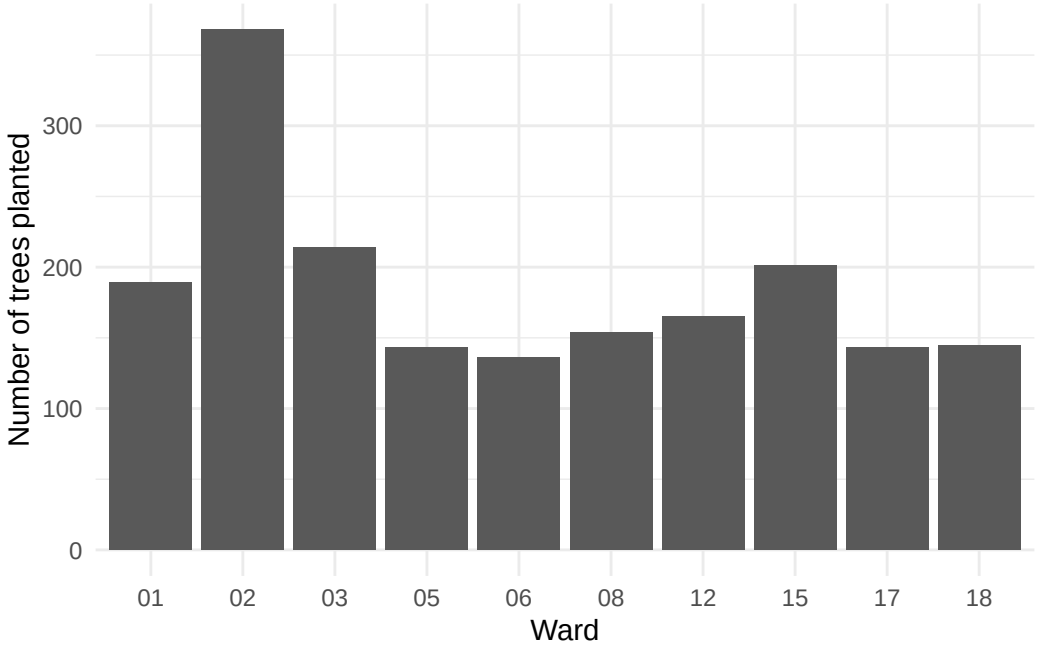

Figure 3: Relationship between wing length and width

```
  objectid structid address streetname     ward  botanical_name        dbh_trunk
     <dbl> <chr>      <dbl> <chr>          <chr> <chr>                     <dbl>
1     4549 262610      2122 ST CLAIR AVE W 05    Tilia cordata 'Glenl~       815
```

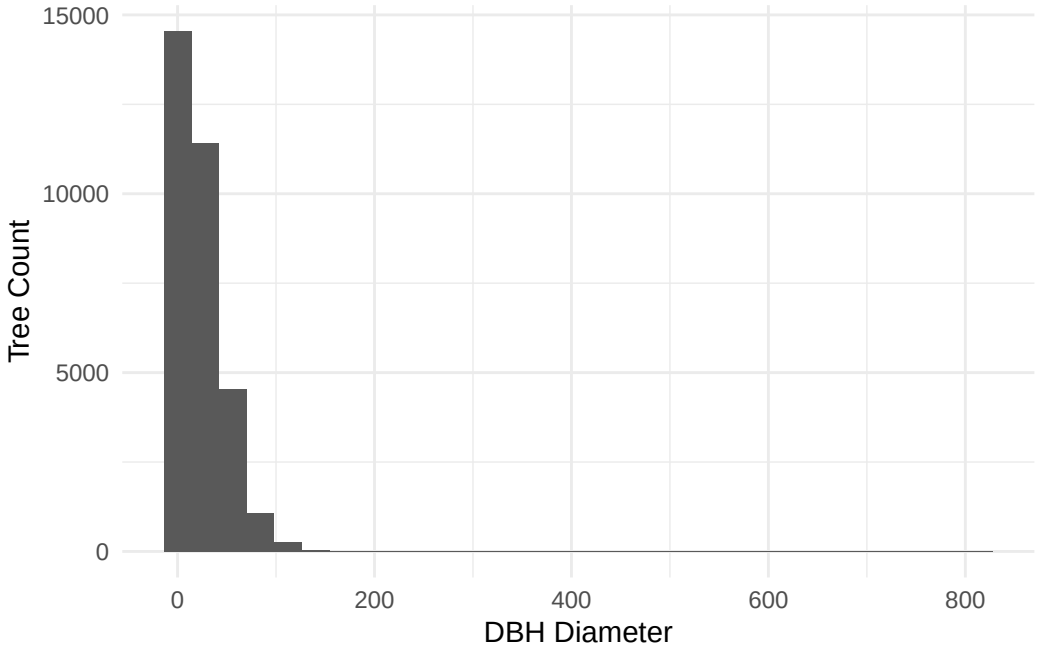

Figure 4: Relationship between wing length and width

3 Discussion

3.1 First discussion point

If my paper were 10 pages, then should be be at least 2.5 pages. The discussion is a chance to show off what you know and what you learnt from all this.

3.2 Second discussion point

3.3 Third discussion point

3.4 Weaknesses and next steps

Weaknesses and next steps should also be included.

Appendix

A Additional data details

References

Krayenhoff, E. Scott, Timothy Jiang, Andreas Christen, Alberto Martilli, Timothy R. Oke, Brian N. Bailey, Negin Nazarian, et al. 2020. "A Multi-Layer Urban Canopy Meteorological Model with Trees (BEP-Tree): Street Tree Impacts on Pedestrian-Level Climate." *Urban Climate* 32: 100590. https://doi.org/10.1016/j.uclim.2020.100590.