ST. LUKE'S COLLEGE
True Love and True Companionship

# Trees in Haras Santa María Urbanization, Loma verde, Escobar, Buenos Aires, Argentina.

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**St. Luke' s College sede Haras Santa María. Escobar. Argentina.**
**Senior 5**

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## Summary

Preliminary taxonomic and biometric studies about trees located in "Haras Santa María ", Loma Verde, Escobar, Buenos Aires, Argentina. Main objective: increase knowledge about the trees in our neighborhood.Specific objectives: 1) Identification and mapping of species in order to make a future catalog and 2) Collection of primary data (biometric measurements) to be able to create a database useful for future phenological studies. Research questions are about the composition of species, the frequency of height, the circumference of the sampling specimens, and the location of older specimens. GLOBE Observer and Tree biometry protocols were used for measurements and uploaded into GLOBE Observer App. For Taxonomy identifications botanical keys were used and Botanists were consulted. Satellite images from Google Earth Pro were used. Random sampling was held by 21 students. We sampled 234 specimens and determined 25 species belonging to 19 families. The most frequent species is Fraxinus americana L. Taxonomic and biometric data (height and circumference) are shown in tables and graphs. Most specimens are exotic (89.9%) and deciduous (76.6%). Most of them are sapling specimens as it is a recent urbanization. Forestation progression has also been compared through historical satellite images in order to locate the older trees.

**Keywords:** Trees. Taxonomy. GLOBE Observer App. Biometry. Mapping.

## Research questions

1. **How could taxonomic and biometric studies improve knowledge in local biodiversity?**
2. **Which species grow in our neighborhood?**
3. **How is the frequency of species?**
4. **How is the frequency of height and circumference of these trees?**
5. **Where are the older trees located?**

## Introduction

Our neighborhood is called "Haras Santa María". It is located in Loma Verde, Escobar, Provincia de Buenos Aires, Argentina. It is a private urbanization, initiated in 2005, and has an extension of 360 has.

In April 2023 we started training ourselves in the use of tree protocols in the GLOBE Observer App in order to participate in the LAC Trees campaign.

We decided to study the trees of our neighborhood when we realized that we were not able to identify them. As there are no publications about this topic, we start collecting primary data (including biometry) in our own database in order to create a catalog for the local community in our next stage( Fig. 1). We have started researching the progression of this forestation during the last 20 years. Local studies are necessary to provide knowledge and environmental education.

Trees not only provide ecosystemic services but also beauty and wellness. They are part of our beloved memories, so we decided to write "Storytellings" about our favorite ones and develop an interactive map.

**Fig.1: Trees of our neighborhood measured using the GLOBE Observer App**

## Methodology

### 1) Study site:

"Haras Santa María" private urbanization in Loma Verde. Escobar. Provincia de Buenos Aires. Argentina ( Fig.2).

Latitude: 34°20'32,6" S Longitude:58°51'04,7 W Altitude:13 m.s.m

The climate is temperate and humid (annual averages of 17,2 °C and 1104 mm).

Originally area was a grassland but in the last 20 years it has developed into private urbanization and actually land cover could be considered MUC 821 (Parks and athletic field) but day after day more houses and buildings appear so in a few years could be transformed into urban land cover (MUC 91) if "green areas" are not protected.


**Fig. 2: Study site maps**

### 2) Sampling:

We have started this research in May 2023. As we were 21 students, we decided to form 5 different groups and choose some leaders in order to coordinate our work.

Each group took photos and measurements in different areas ( Fig.3).Each student took at least 10 measurements of trees near their homes and then created charts

where they wrote all the collected data. We have to give the exact location and map the measurements in order not to repeat the same.

**Fig.3: Students working in the field.**

We walked in pairs during the fieldwork as a safety precaution.

After that, all the charts were gathered in a single database.(Fig. 4)

https://docs.google.com/spreadsheets/d/1T6iTqHouG75Gw5pzH4OG8azjwH5BHEELH7g8DlTekNs/edit#gid=0

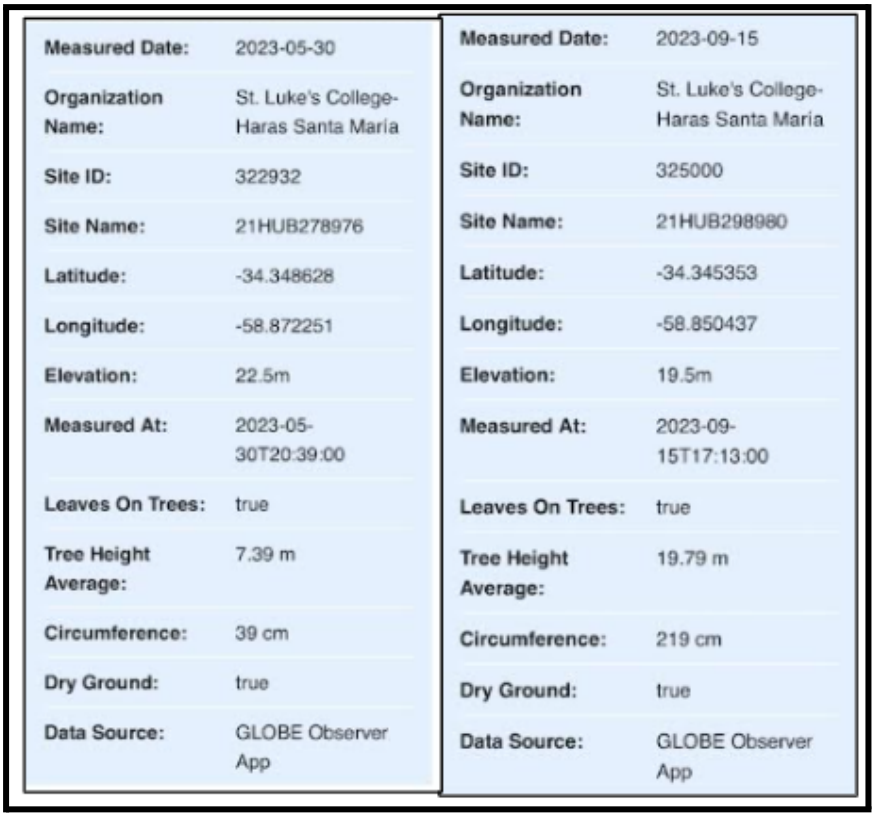
If you open the link, you should see our own database:

| Tree Number | Date | Student name | Tree height (m) | Circumference (cm | ploaded to the ap | Latitude | Longitude | Vulgar name (in spanish) | Scientific name | Status | Foliage | Photo |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2023-11-09 | Sofia | 7,44 | 53 | YES | -34.347.726 | -58.872.231 | Liquidambar | Liquidambar styraciflua L. | Exotic | Deciduous | |
| 2 | 2022-10-17 | Sofia | 5,38 | 13 | YES | -34.347.726 | -58.872.231 | Liquidambar | Liquidambar styraciflua L. | Exotic | Deciduous | |
| 3 | 2022-10-18 | Sofia | 7,51 | 22 | YES | -34.347.726 | -58.872.231 | Liquidambar | Liquidambar styraciflua L. | Exotic | Deciduous | |
| 5 | 2022-10-20 | Sofia | 5,67 | 34 | YES | -34.347.726 | -58.872.231 | Sauce eléctrico | Salix-erythoflexuosa Ragonese & Rial Alberti | Exotic | Evergreen | |

**Fig.4: Fraction of the table in order to show it as an example of the process.**

### 3) Protocols:

GLOBE Observer and Tree biometry protocols (Height and Circumference) were used for measurements and uploaded into the GLOBE Observer app (Fig .5).



| | |
|---|---|
| Measured Date: | 2023-05-30 |
| Organization Name: | St. Luke's College-Haras Santa Maria |
| Site ID: | 322932 |
| Site Name: | 21HUB278976 |
| Latitude: | -34.348628 |
| Longitude: | -58.872251 |
| Elevation: | 22.5m |
| Measured At: | 2023-05-30T20:39:00 |
| Leaves On Trees: | true |
| Tree Height Average: | 7.39 m |
| Circumference: | 39 cm |
| Dry Ground: | true |
| Data Source: | GLOBE Observer App |

| | |
|---|---|
| Measured Date: | 2023-09-15 |
| Organization Name: | St. Luke's College-Haras Santa Maria |
| Site ID: | 325000 |
| Site Name: | 21HUB298980 |
| Latitude: | -34.345353 |
| Longitude: | -58.850437 |
| Elevation: | 19.5m |
| Measured At: | 2023-09-15T17:13:00 |
| Leaves On Trees: | true |
| Tree Height Average: | 19.79 m |
| Circumference: | 219 cm |
| Dry Ground: | true |
| Data Source: | GLOBE Observer App |

**May 30th** **September 15 th**

**Fig.5: Screenshots from Globe Observer measurements**.

### 4) Materials and tools:

- Metric flexible tape for measurements of circumference.
- Mobile phones with GLOBE Observer App.
- Excel data sheet specially designed for the project in order to create our own database.
- Guides and apps in order to identify species.
- Airbus satellite images from Google Earth.
- Historical satellite images (from 2003 to 2023) from Google Earth Pro to research about changes in Land Cover during the last 20 years.

## Results

**Data analysis:** The following results are preliminary. We have measured 234 specimens and identified 122 of them due to the extremely meticulous work that takes the identification of species. In some cases, photos do not appear in "my observations" so we have to go back to the field. This project is still going on because it is a large area (360has) to register. We have studied nearly 36 has.

### 1) Taxonomy. Floristic composition:

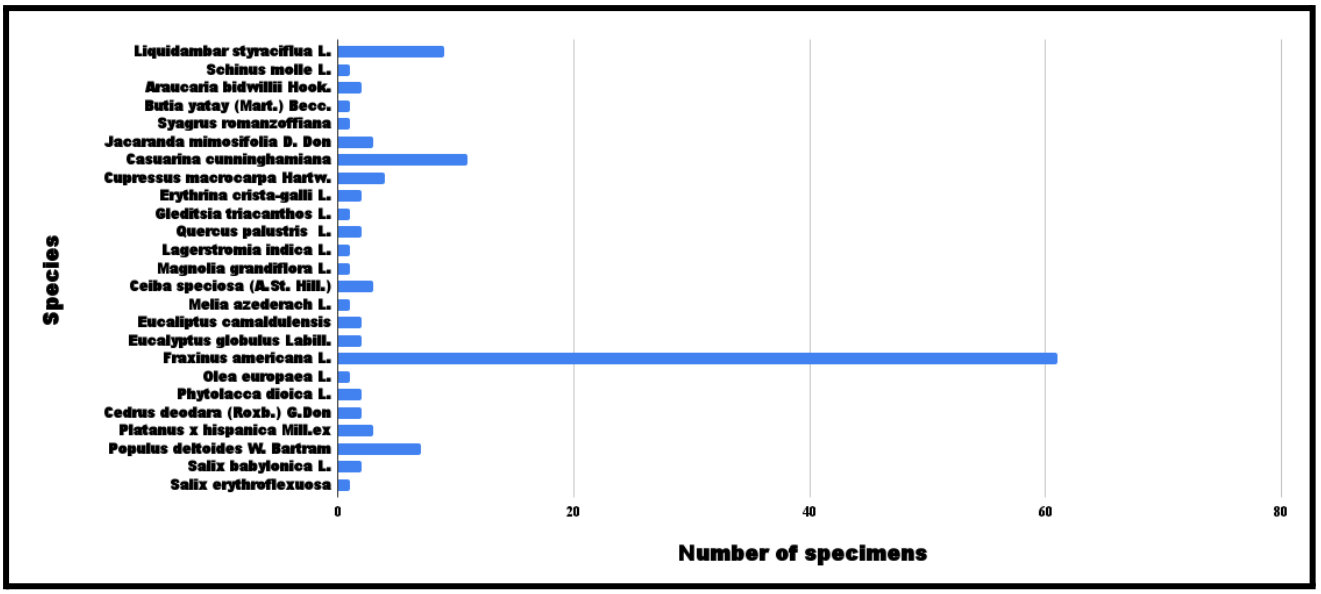
**1a) Richness of species:** 25 species belonging to 19 families were identified.

**Table N° 1: Richness of species**

| Family | Species | Vulgar name | Status | Foliage |
|---|---|---|---|---|
| Altingiaceae | ***Liquidambar styraciflua L.*** | Liquidambar | Exotic | Deciduous |
| Anacardiaceae | ***Schinus molle L.*** | Aguaribay | Native | Evergreen |
| Araucariacae | ***Araucaria bidwillii Hook.*** | Araucaria | Exotic | Evergreen |
| Arecaceae | ***Butia yatay (Mart.) Becc.*** | Yatay | Native | Evergreen |
| Arecaceae | ***Syagrus romanzoffiana (Cham.) Glasman*** | Pindó | Native | Evergreen |
| Bignoniaceae | ***Jacaranda mimosifolia D. Don*** | Jacarandá | Native | Deciduous |
| Casuarinacea | ***Casuarina cunninghamiana Miq.*** | Casuarina | Exotic | Evergreen |
| Cupressaceae | ***Cupressus macrocarpa Hartw.ex Gord.*** | Ciprés | Exotic | Evergreen |
| Fabaceae | ***Erythrina crista-galli L.*** | Ceibo | Native | Deciduous |
| Fabaceae | ***Gleditsia triacanthos L.*** | Acacia negra | Exotic | Deciduous |
| Fagaceae | ***Quercus palustris L.*** | Roble palustre | Exotic | Deciduous |
| Lythraceae | ***Lagerstroemia indica L.*** | Crespón | Exotic | Deciduous |
| Magnoliaceae | ***Magnolia grandiflora L.*** | Magnolia | Exotic | Evergreen |
| Malvaceae | ***Ceiba speciosa (A.St. Hill.)Ravenna*** | Palo borracho | Native | Deciduos |
| Meliaceae | ***Melia azederach L.*** | Paraíso | Exotic | Deciduous |
| Mirtaceae | ***Eucalyptus camaldulensis Dehnh.*** | Eucalipto | Exotic | Evergreen |
| Mirtaceae | ***Eucalyptus globulus Labill.*** | Eucalipto azul | Exotic | Evergreen |
| Oleaceae | ***Fraxinus americana L.*** | Fresno | Exotic | Deciduous |
| Oleaceae | ***Olea europaea L.*** | Olivo | Exotic | Evergreen |
| Phytolaccaceae | ***Phytolacca dioica L.*** | Ombú | Native | Evergreen |
| Pinaceae | ***Cedrus deodara (Roxb.) G.Don*** | Cedro deodara | Exotic | Evergreen |
| Platanaceae | ***Platanus x hispanica Mill.ex Münch*** | Plátano | Exotic | Deciduous |
| Salicaceae | ***Populus deltoides W. Bartram ex Marshall*** | Alamo | Exotic | Deciduous |
| Salicaceae | ***Salix babylonica L.*** | Sauce llorón | Exotic | Deciduous |
| Salicaceae | ***Salix erythroflexuosa Ragonese & Rial Alberti*** | Sauce mimbre | Exotic | Evergreen |

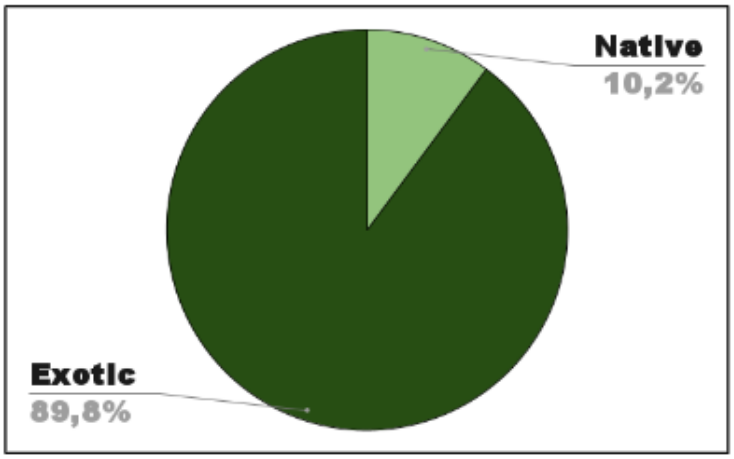
**1b) Species frequency**: The most frequent species is ***Fraxinus americana L.***

**Graph N°1: Species frequency**



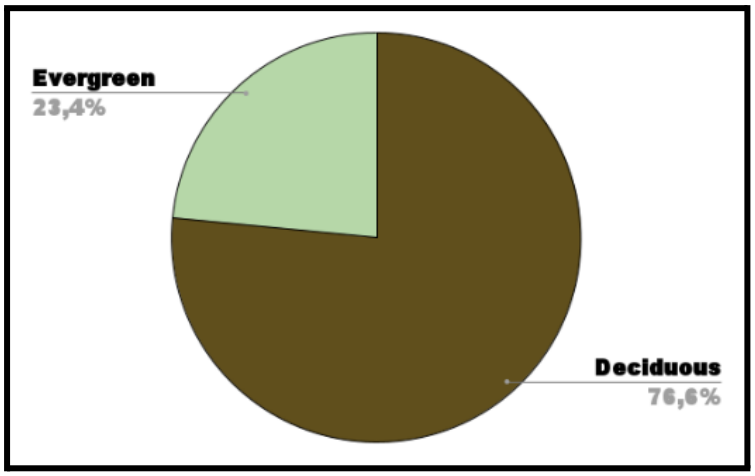

**1c) Status:** Most specimens (89.9%) are exotic.

**Graph N°2: Status**



**1d) Foliage**: Most specimens are deciduous (76.6%)

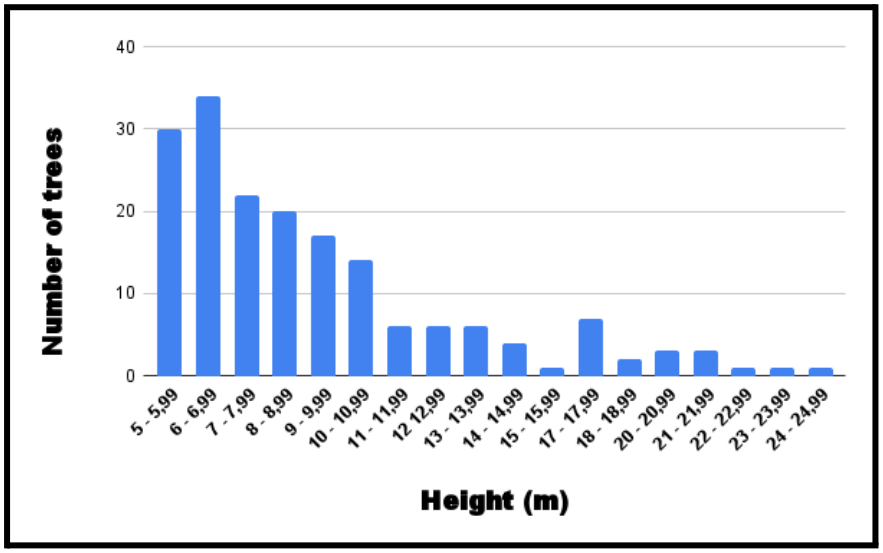
**Graph N°3: Foliage**




**2)Biometry:**

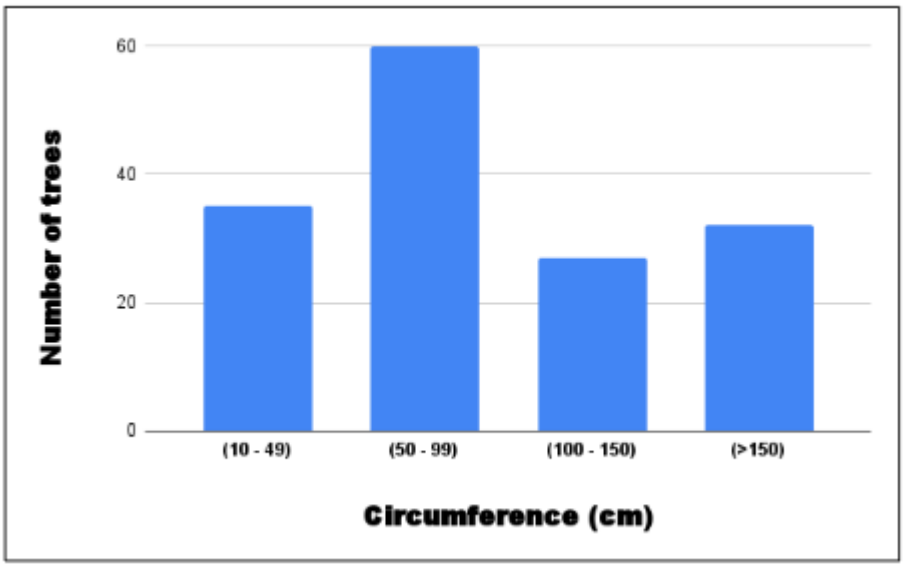
**2a) Height frequency**

**Graph N°4: Height frequency**



## 2b) Circumference frequency

### Graph N° 5: Circumference frequency




## 3) Location in a Map:

All the trees measured were located by us in the following link.

https://earth.google.com/earth/d/1cZWQm63ooC8QPeOd34sP3Mb0Tu4KYJ0W?usp=sharing

## 4) Forestation progression:

The following link leads to a series of images showing the changes in land cover and forestation progression in Haras Santa María since 2003:

https://docs.google.com/presentation/d/1Du0bx-y-s40IQC3HwfeydMJxUBvY2Eu89RrG2tFRoFE/edit


**Fig. 6: Airbus images showing the area where the older trees were located in the study site.**

Comparing images (Fig. 6) allowed us to confirm which are the older trees (in the "marked "area) because they were present before the urbanization took place. These specimens are the highest specimens and have the largest circumferences (Fig. 7)

| Tree height (m) | Circumference (cm) | Uploaded to the app | Latitude | Longitude | Vulgar name (in spanish) | Scientific name |
|---|---|---|---|---|---|---|
| 18,02 | 220 | Yes | -34.345.369 | -5.884.935 | Ciprés | Cupressus macrocarpa Hartw.ex Gord. |
| 17,63 | 177 | Yes | -34.345.369 | -5.884.935 | Ciprés | Cupressus macrocarpa Hartw.ex Gord. |
| 17,79 | 235 | Yes | -34.345.369 | -5.884.935 | Cedro | Cedrus deodara (Roxb.) G.Don |
| 21,82 | 280 | Yes | -34.345.369 | -5.884.935 | Araucaria | Araucaria bidwillii Hook. |
| 20,16 | 417 | Yes | -34.345.369 | -5.884.935 | Araucaria | Araucaria bidwillii Hook. |

**Fig. 7: Examples of "Older" trees biometry**

## 5) Interactive map "Our favorite tree: Storytelling"

We decided to choose our favorite tree in the neighborhood, take a photo and explain in a short storytelling why we chose it. We mapped them and created this interactive map.

Our stories and photos can be seen in this link:

https://earth.google.com/earth/d/1klLIbCHx-a9v74-hoOe1IQ31NfF2tvNE?usp=sharing

**The following screenshots show how the interactive map works. (Fig. 8)**

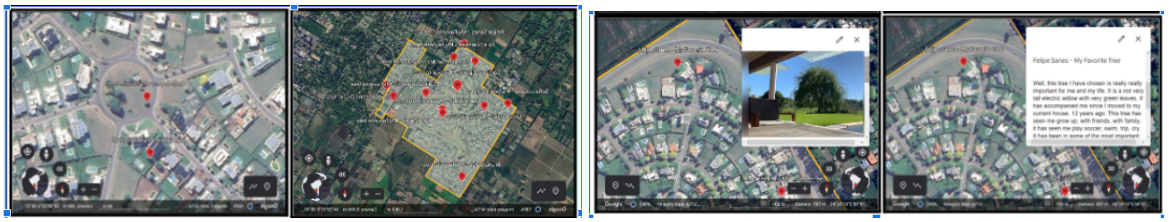


**Fig. 8: How the interactive map works.**

## Discussion

Before "Haras Santa María" was created, it was a rural area (grassland) with few cultivated trees around. Land cover is in constant transformation. Satellite images allow us to confirm there is a group of older trees. This urbanization impacts the environment. However, the neighborhood did a good job in compensating, by planting a huge amount of trees. Our data reveals recent forestry (Trees height average: 7.19 m and Trees circumference average: 74,17 cm).

One of our methodological mistakes was not to take phenological data while we were collecting biometric data. Another mistake was to take photos including people, so all those pictures were not uploaded to the GLOBE Observer App.

We hope this research will help people understand their importance and think twice before getting rid of them and stimulate sustainable management of this forestry. Trees not only provide better air quality and beautify landscapes, but they also decrease air and surface temperature. Finally, they offset human carbon footprint.

In future studies we would like to calculate carbon capture. It is very important to finish our basic survey about species and number of individuals.

Making surveys is important but as Cobas (2021) said "No solo se trata de "juntar números y saber cuántos árboles tiene un municipio, sino que también que esto sirva para planificar las acciones a realizar en el corto, mediano y largo plazo".

We would like to contribute with future plan replacements .

## Conclusions

Our taxonomic and biometric studies would improve knowledge in local biodiversity data.

It is impossible to calculate " Carbon Capture" if we don't even know which species are living in a certain area.

Species richness (25 species were identified) and measurements of height and circumference would help in the creation of a catalog of trees for this neighborhood.

As Roic & Valverde (1998) we considered that "Green spaces, both public and private, have an important influence on life quality of people living in urban areas" so it is important to improve knowledge and awareness on local communities.

*Fraxinus americana L.* was registered in this study as the most frequent species and it has also been qualified as adequate in Buenos Aires (Gobierno de la Ciudad Autónoma de Buenos Aires, 2018).

We thank Lic. Andrea Ventoso (GLOBE) for her permanent assistance as a Tutor.

We also thank Prof. María Ema Múlgura de Romero , Botanist ( IBODA), for her support.

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## BADGE SPECIFICATION


### I AM A PROBLEM SOLVER

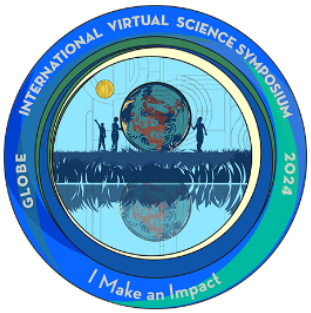
**Why do we deserve it?:**

Climate change is actually perhaps the main “Global problem” that we are facing as human beings.
We believe that this investigation contributes to one of the main problems : the lack of basic data about Biodiversity. Richness of species is unknown even in urban places. People don't even recognize the trees of their neighborhood.
This research is an effort to increase knowledge about trees in our urbanization and report it to the local community in order to increase awareness of their importance .


### I AM A STEM STORYTELLER

**Why do we deserve it?:**

As a very important part of our project we worked on “Our favorite tree” because we believe that loving memories are very important to understand that individual actions could contribute to global solutions . Each of us wrote a personal story and included an image about it. We developed an interactive map locating the trees and including there all the storytellings we have written.




### I MAKE AN IMPACT

**Why do we deserve it?:**

The presence of students measuring and studying trees in our neighborhood impacted our community in a positive way.People started asking what we were doing and that gave us the opportunity to invite them to our presentations at school and get them involved in the creation of the future catalog.

Thanks for your attention!