

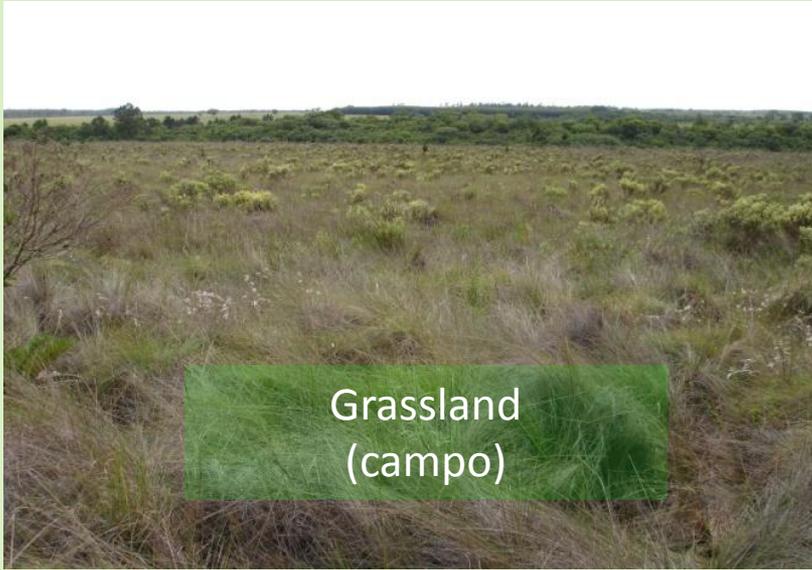
# Topsoil and hay transfer: assessment of the potential to restore the campo cerrado (savanna grassland) vegetation

Natashi A.L. PILON, Dr. Giselda DURIGAN





## Cerrado physiognomies



The studied vegetation:  
Campo cerrado (savanna grassland)



# Objective

- To verify the potential to restore at least part of the native vegetation of the Cerrado grassland by top soil and hay transfer.

# Methods:

- Sites:
- Santa Bárbara Ecological Station (collection of hay and top soil in natural areas, apparently without invasive grasses)
- Assis State Forest (restoration experiment in the field)
- The lab at the university (Assis): greenhouse experiment



# Collecting topsoil and hay



- Material was collected at the end of the dry season (the peak of seed dispersal in the Cerrado)

## Top soil collection

*50 Liters of the topsoil.  
Samples with 20 meters  
distance.*



# Hay collection



- Hay was cutted with mowing STIHL F5 160 and collected fresh with a vacuum/blower TEKNA.
- Hay was collected in a straight line across the area (a total of 300 Liters) .

# Hay collection



A photograph of a Cerrado grassland. In the foreground, there are several bright pink flowers with green leaves. The middle ground is filled with tall, dry grasses and some green shrubs. In the background, there are several trees with green foliage under a blue sky with light clouds.

**A floristic survey of the native vegetation of the Cerrado grassland was available from another project and was used for comparison**

## Preparing the experimental area



- An area around the plots (5 m radius) was totally cleared from grasses and the top soil removed, for the field experiment. A hydraulic lamina attached to a tractor was used to eliminate the seed bank of local species (invasive grasses and ruderal species).
- A wooden frame (0.50 m x 1.00 m) was used for every plot to prevent the material to be washed by the rain or blowed by the wind.

# Experimental design



- Treatment 1. **Top soil:** a layer of top soil 10 mm thick, was disposed on the soil surface (5 L per plot).
- Treatment 2. **Hay:** A layer of hay 5 cm thick was disposed directly on the soil surface (25 L per plot).
- Treatment 3. **Topsoil + hay:** both previous treatments combined.
- Treatment 4. **Control:** bare ground.

# Field experiment

- Randomized blocks
- Five replicates
- (wooden frames)



Net of cotton string to protect the hay from the wind



# Experiment in the greenhouse

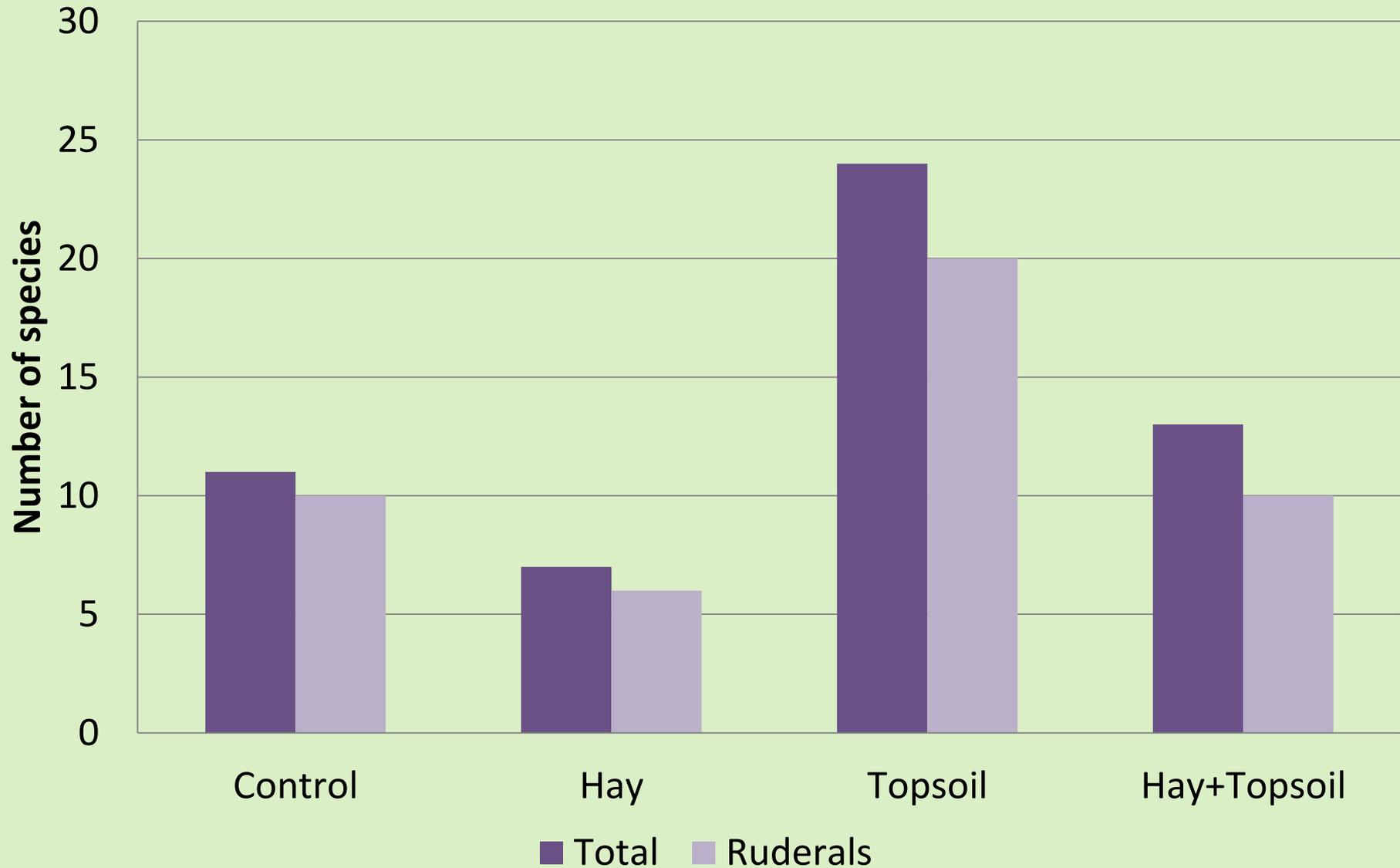
## **Objective:**

- To determine the species pool brought about with the hay and top soil.

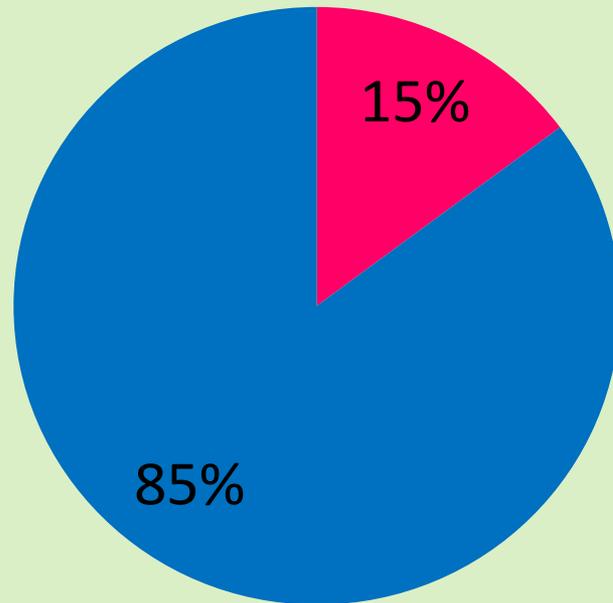
## **Design:**

Five boxes with hay (30 x 40 cm), five box with top soil and three control plots (only sand)

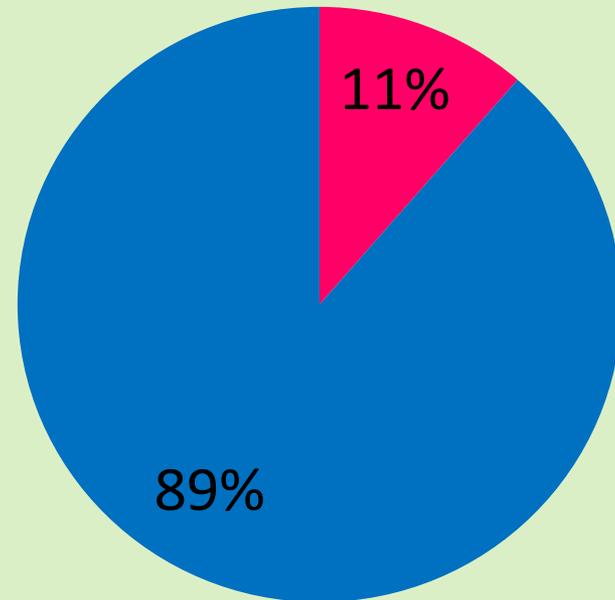
# Results – field experiment



## Richness



## Density (ind m<sup>-2</sup>)



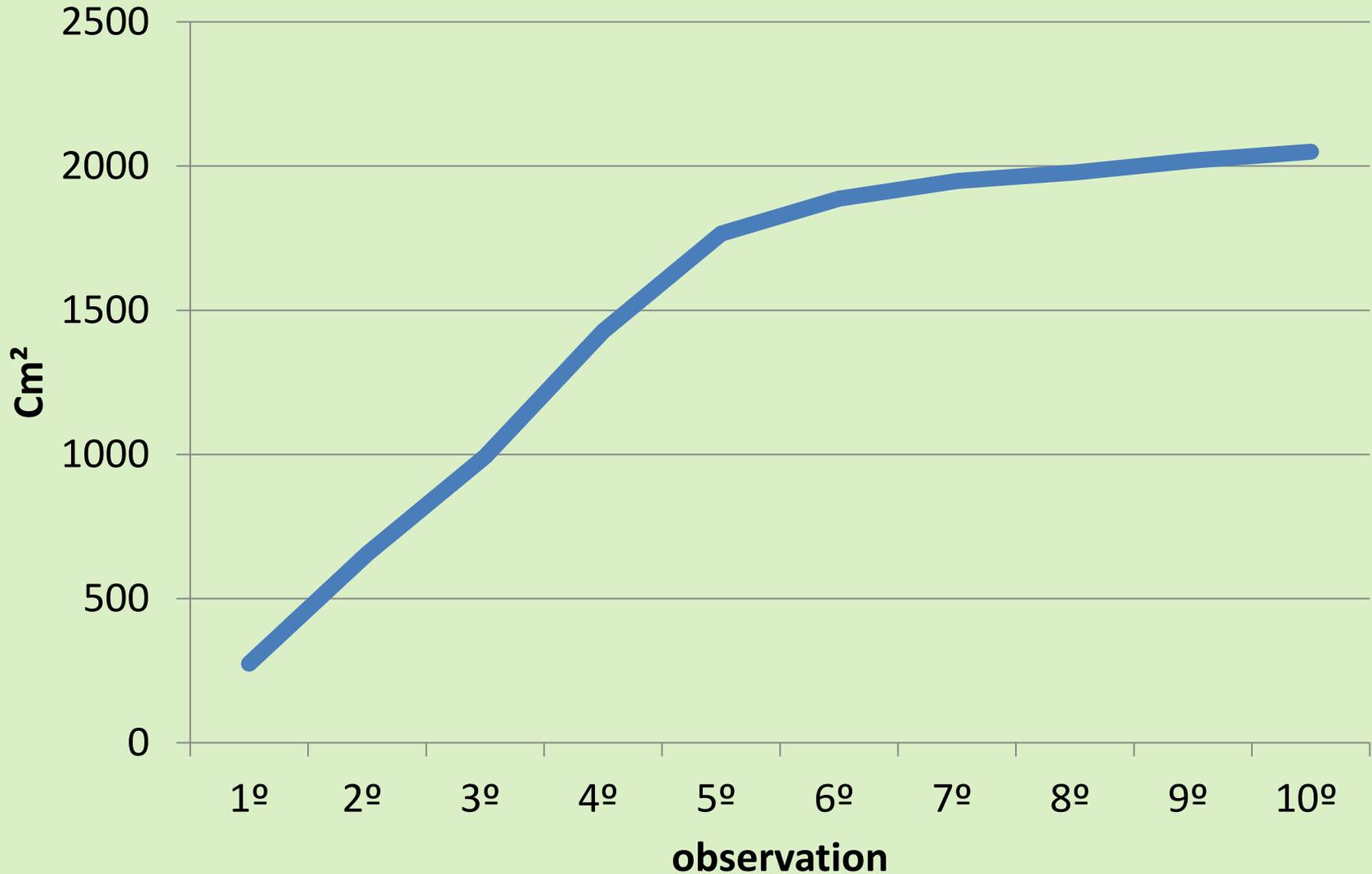
■ target species

■ ruderal

# Results – greenhouse experiment

- In the greenhouse, only two species from the reference ecosystem were recorded: *Fimbristylis autumnalis* (Cyperaceae) and *Axonopus pressus* (Poaceae)

# Cover of invasive grasses in field experiment



First day



After 165 days



- The plots covered by hay had smaller densities of ruderals and exotic grasses.
- In terms of species richness, these treatments also showed the lowest values.

# Conclusions

- The bad results are probably due to the absence of viable seeds of endemic species in the soil seed bank and also in the hay collected in the end of the dry season.
- In the absence of the endemics, the cleared areas are rapidly colonized by invasives or ruderals.
- Apparently the campo cerrado has low resilience and, once disturbed, its recovery can be very slow or even impossible.

