

Invasion by exotic pasture grasses: impact of *Brachiaria* (*Urochloa decumbens*) on a Brazilian savanna

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Background

- Large proportion of the world's savannas were converted to pasture using introduced grasses
- These grasses are often invasive and are considered major conservation threats
- But, few studies have documented the magnitude of these effects on the native flora.

Potential impacts of invasive grasses on the native plant communities

- They can outcompete the native species
 - Changes in plant composition
- They can alter the availability of light, water and nutrients
- They can increase fire frequency and intensity

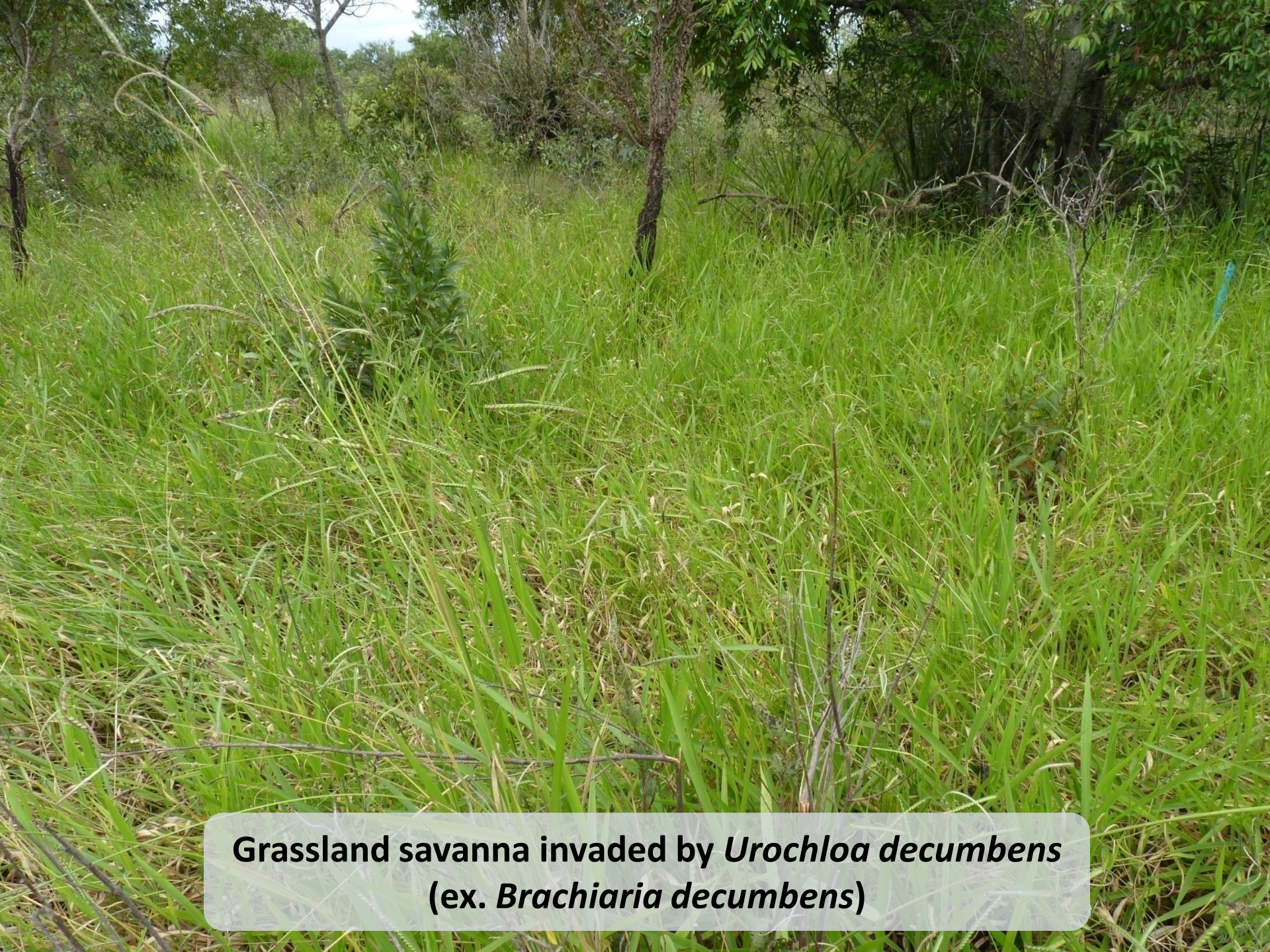
Cerrado: the Brazilian Savanna

- 2 million km²
- 40% has been converted to agriculture or pasture
- African grasses have been used for pasture and most of them have become invasive
- Now this grasses are a major threat to Cerrado





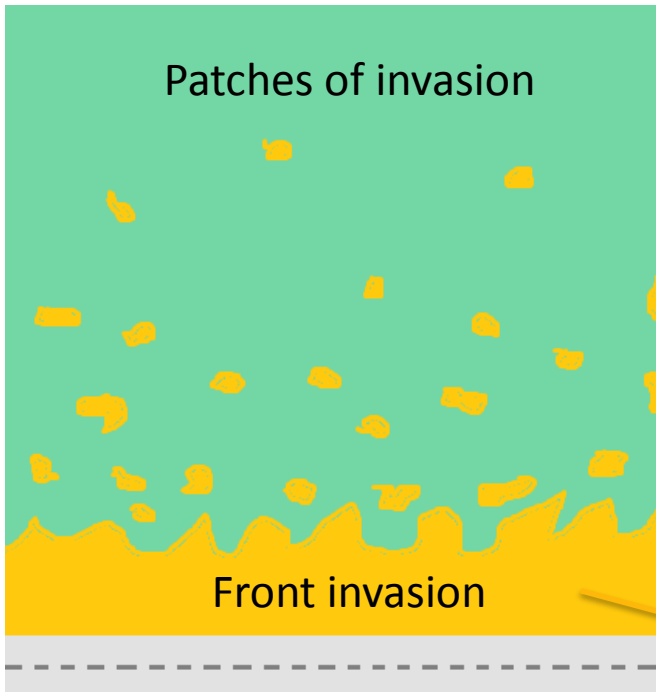
Non-invaded grassland savanna

A photograph of a grassland savanna landscape. The foreground and middle ground are dominated by a dense, lush green carpet of tall grasses, identified as Urochloa decumbens. The grass blades are long and narrow, with some showing signs of being cut or broken. In the background, there is a line of trees and shrubs, including a prominent tree with a thick, dark trunk and dense green foliage. The sky is visible through the canopy of the trees, appearing overcast. The overall scene depicts a natural environment where a specific grass species has become dominant.

**Grassland savanna invaded by *Urochloa decumbens*
(ex. *Brachiaria decumbens*)**

Invasion by *Brachiaria* (*Urochloa decumbens*)

- The most widespread invasive grass in Cerrado



We compared invaded vs non-invaded cerrado grasslands aiming at:

- To determine if the two communities differ in structure and diversity
- To determine if the losses due to the invasive grass differ among functional groups according to life forms (grasses, forbs, shrubs, sub-shrubs)

Sampling

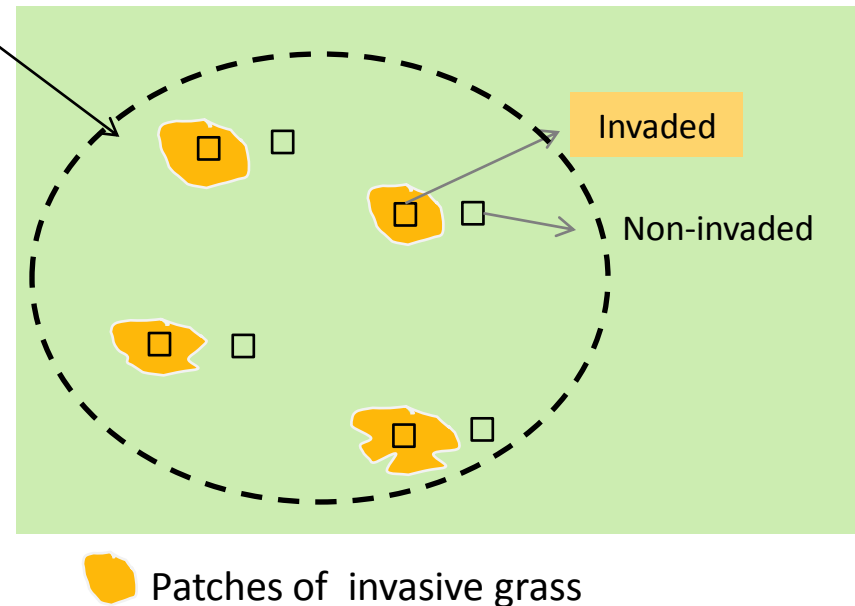
- Five sites (blocks) where the invasion occurs in isolated patches were sampled.
- In each block, four pairs of plots (2 m distance between plots).
- In total: 20 invaded plots and 20 non-invaded plots

Location in São Paulo State

□ Limits of the Ecological Station

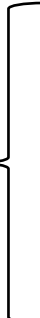
ÁGUAS DE SANTA BÁRBARA

Imagem Google 2012



Comparison between invaded x non-invaded plots

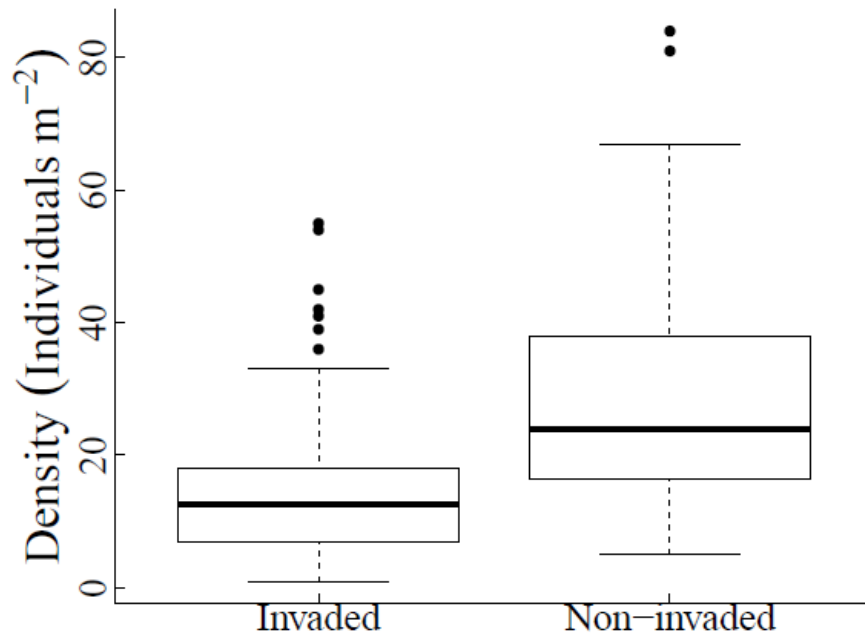
- All plants recorded within each plot were identified
 - classified as grasses, forbs, shrubs, sub-shrubs
 - separated in greater or smaller than 50 cm in height

- Ground cover
(visually estimated) 
 - Exotic grass (*Brachiaria*)
 - Native grasses
 - Forbs
 - woody plants

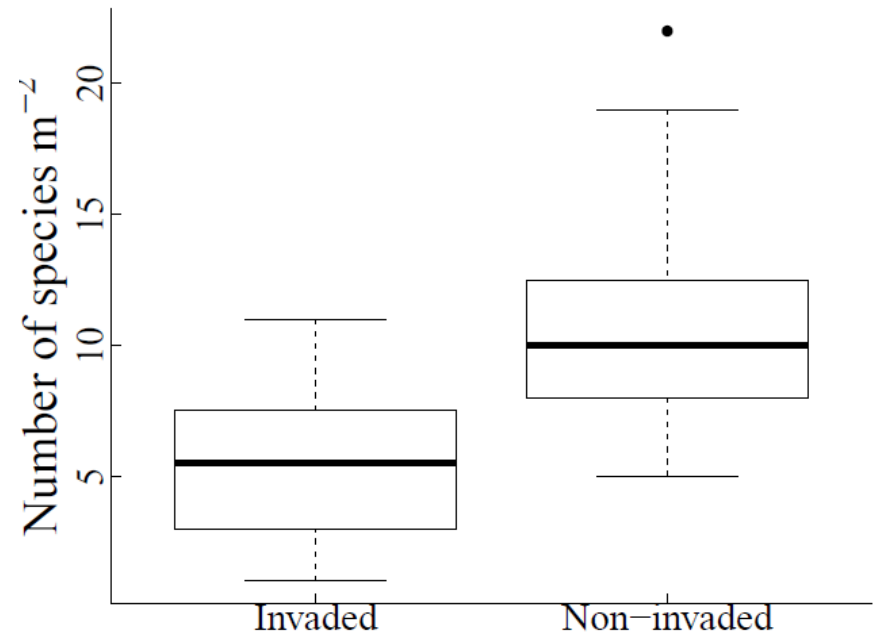
- Variables : Richness; Density and Ground cover

Density and richness: greater in the non-invaded than in the invaded

Total density

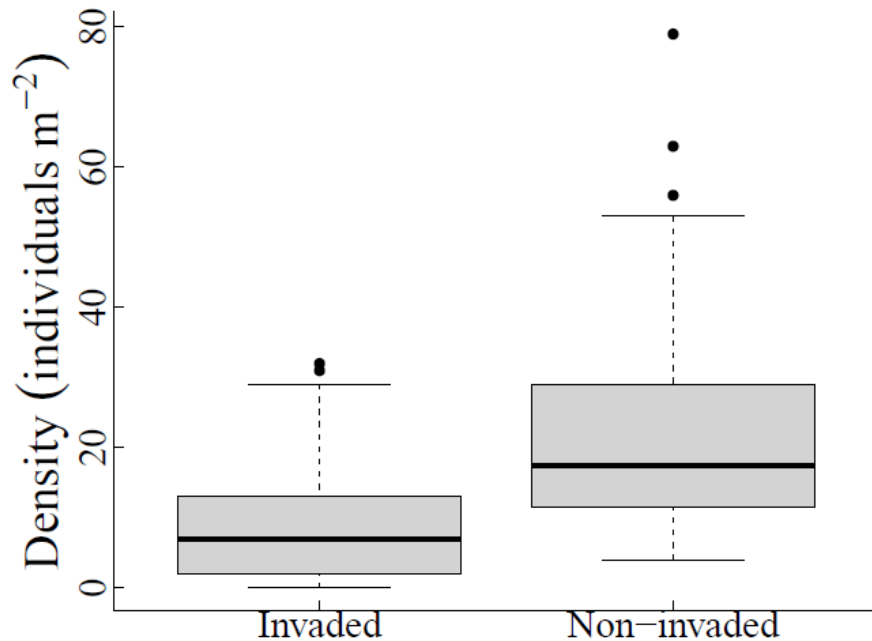


Total richness

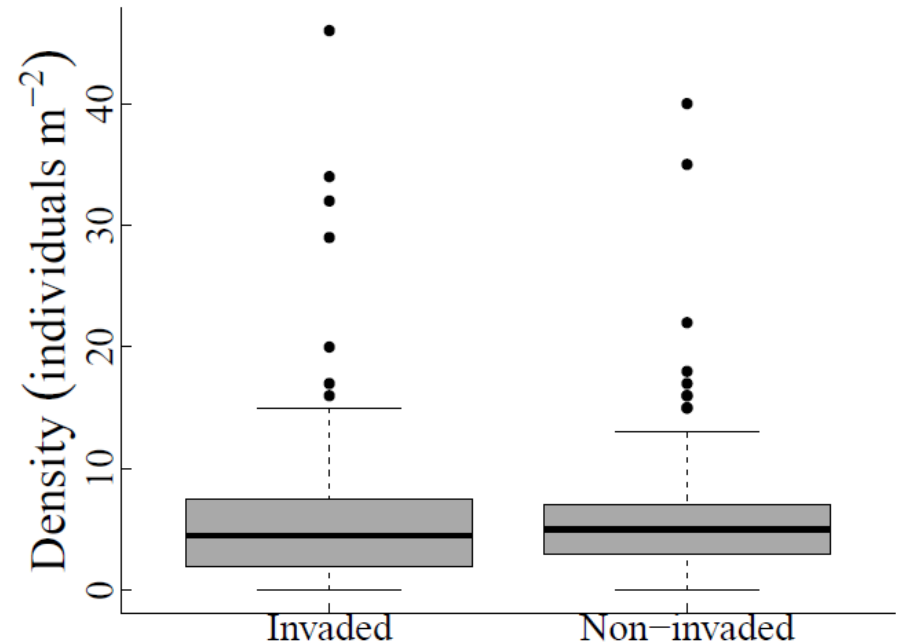


Impact restricted to smaller (< 50 cm) plants

Density (<50 cm)



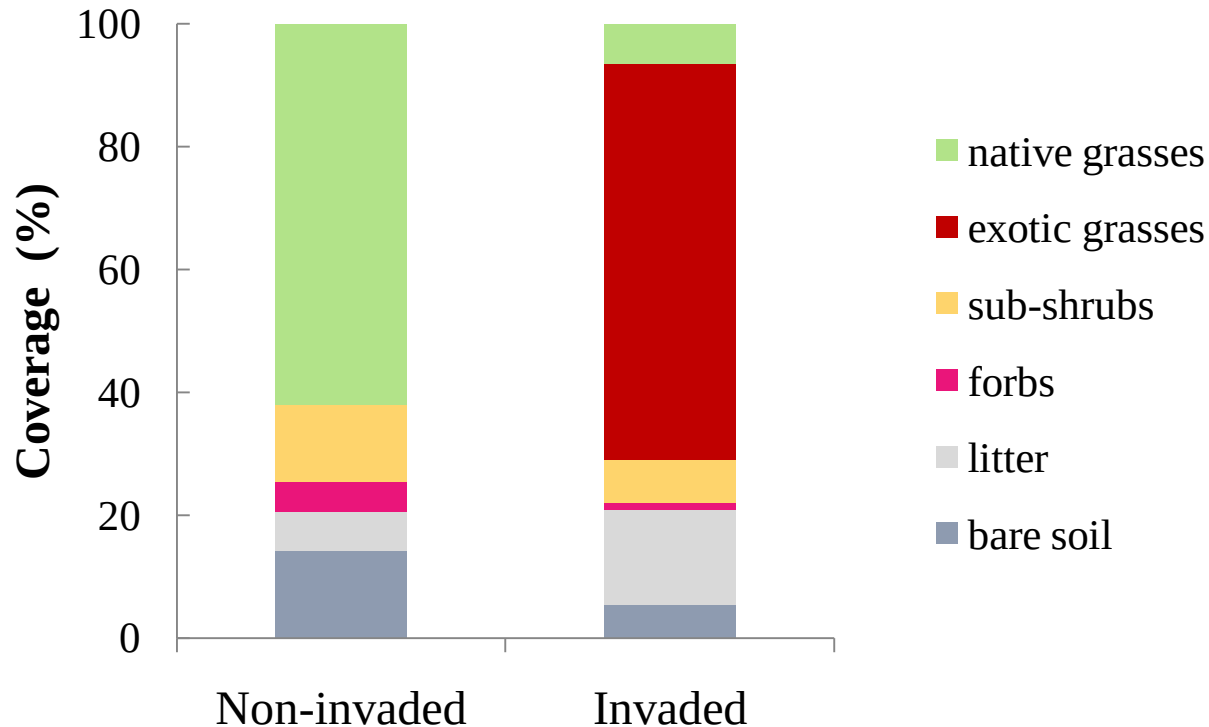
Density (≥50 cm)



Same results for species richness

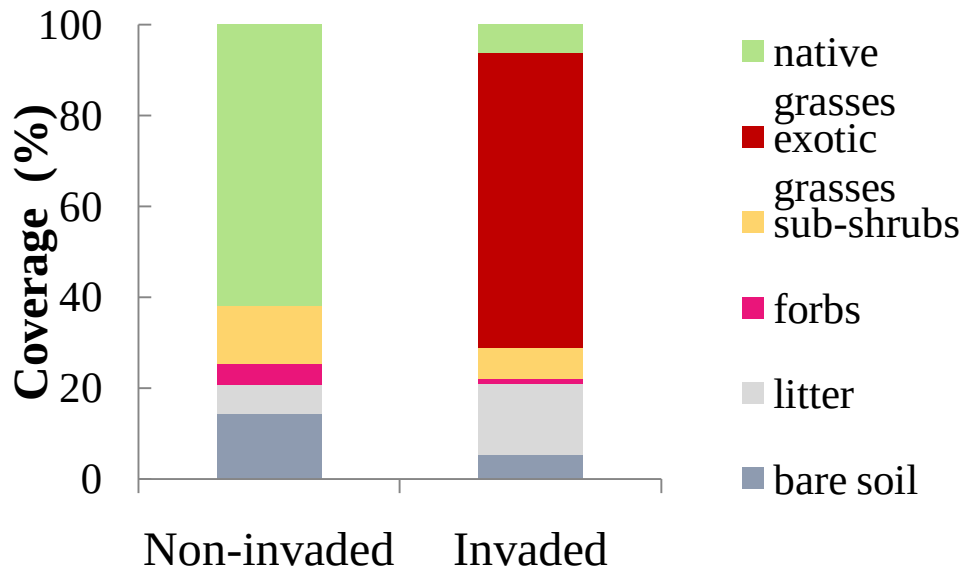
Different life forms differentially affected

Ground cover: native grasses most affected



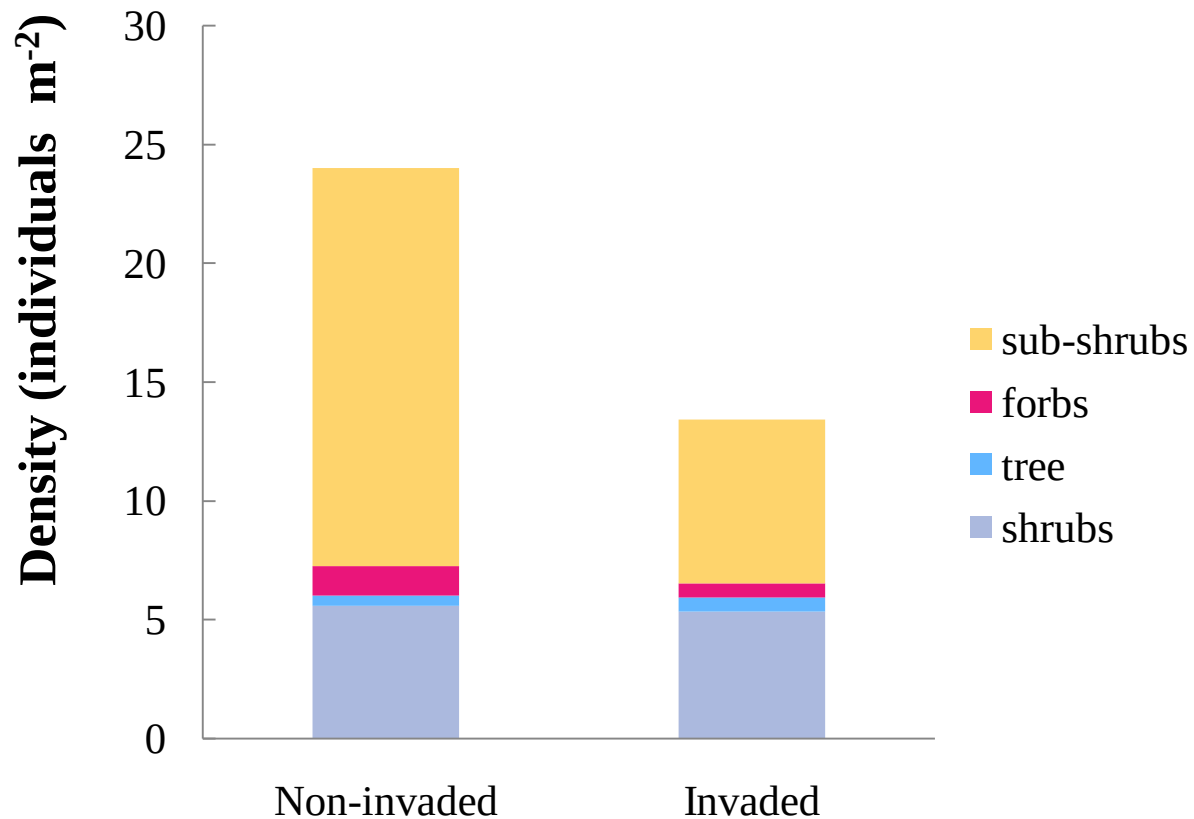
Different life forms differentially affected

Ground cover: native grasses most affected



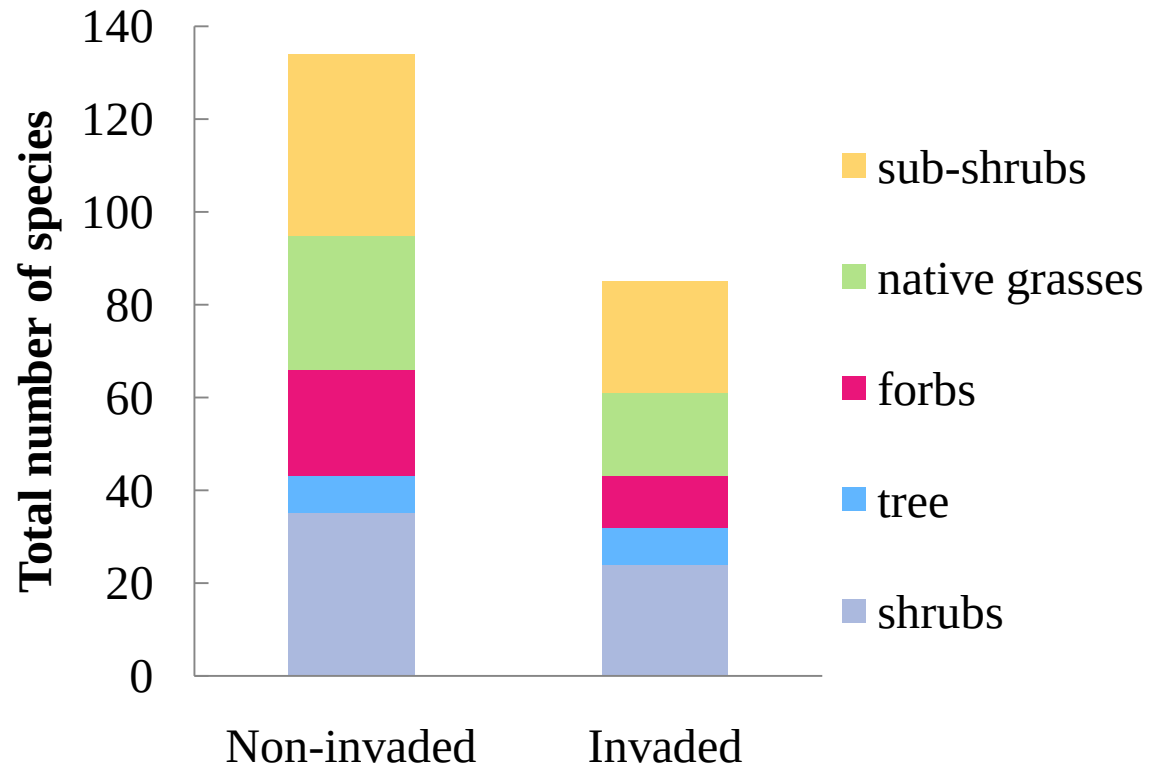
Different life forms differentially affected

Plant density: sub-shrubs and forbs most sensitive



Different life forms differentially affected

Plant richness: forbs, sub-shrubs and native grasses most sensitive



Some species strongly affected by the invasion



Licania humilis



Jacaranda decurrens



Calea triantha



Byrsonimia subterranea



Chrysolaena obovata



Native grasses

Conclusions

- Despite being relatively recent, the invasion of *cerrado* grasslands by *U. decumbens* has caused remarkable changes in the community structure and species losses.
- The small plants of the ground layer suffer the highest impact. They will hardly survive the invasion by exotic grasses in the long term.





Thanks!

