

# Exclude the fire, and watch the forbs in the Cerrado say goodbye



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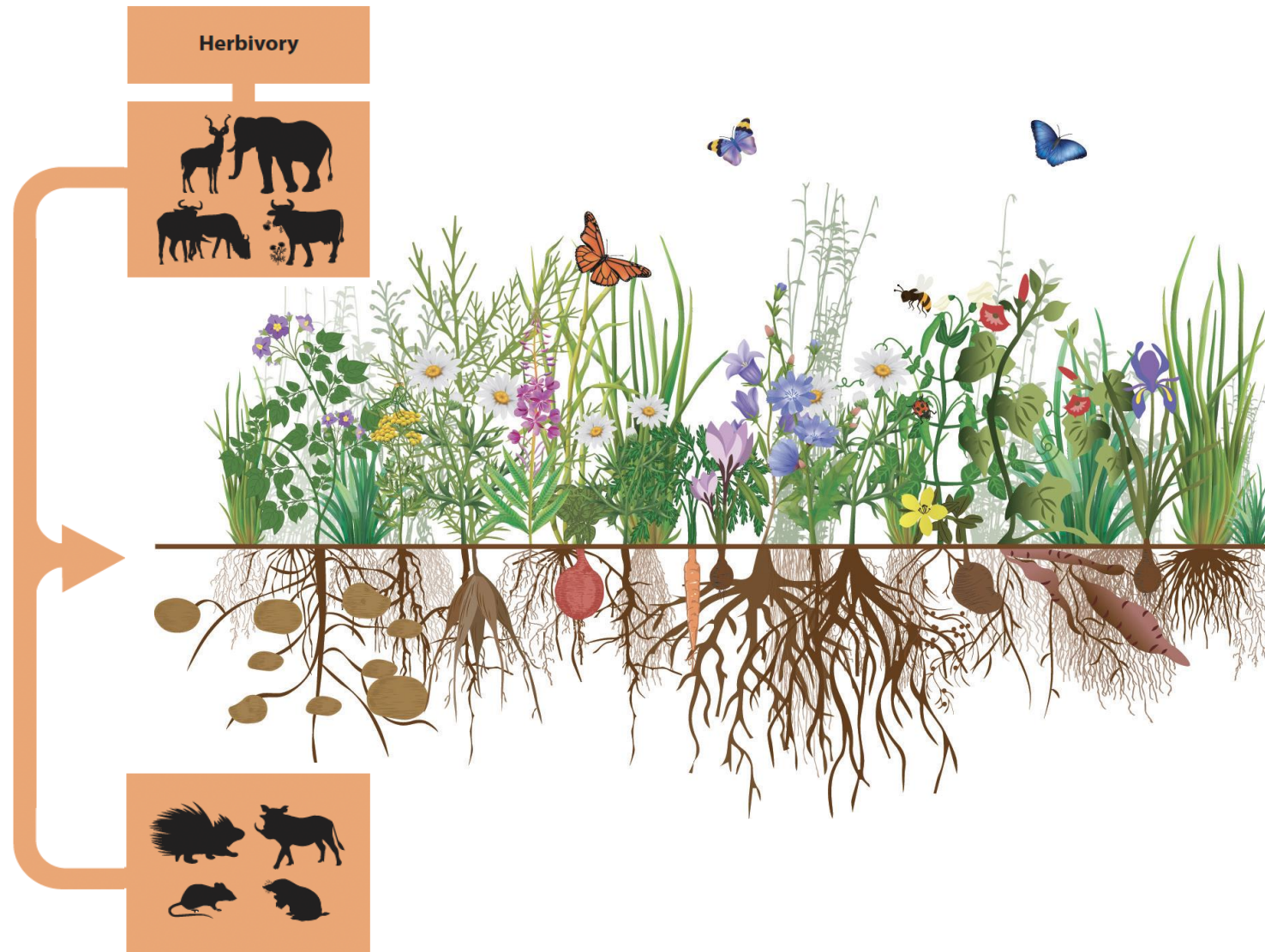


# Forbs: functional diversity, disturbance



**Forbs** play a major role in the herbaceous layer of tropical savannas: high species and functional diversity

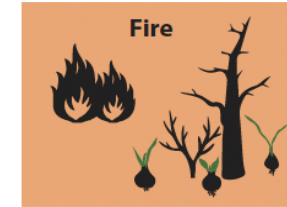
# Forbs: functional diversity, disturbance



**Herbivory:** above and  
belowground

# Forbs: functional diversity, disturbance

**Fire:** important to maintain forb diversity

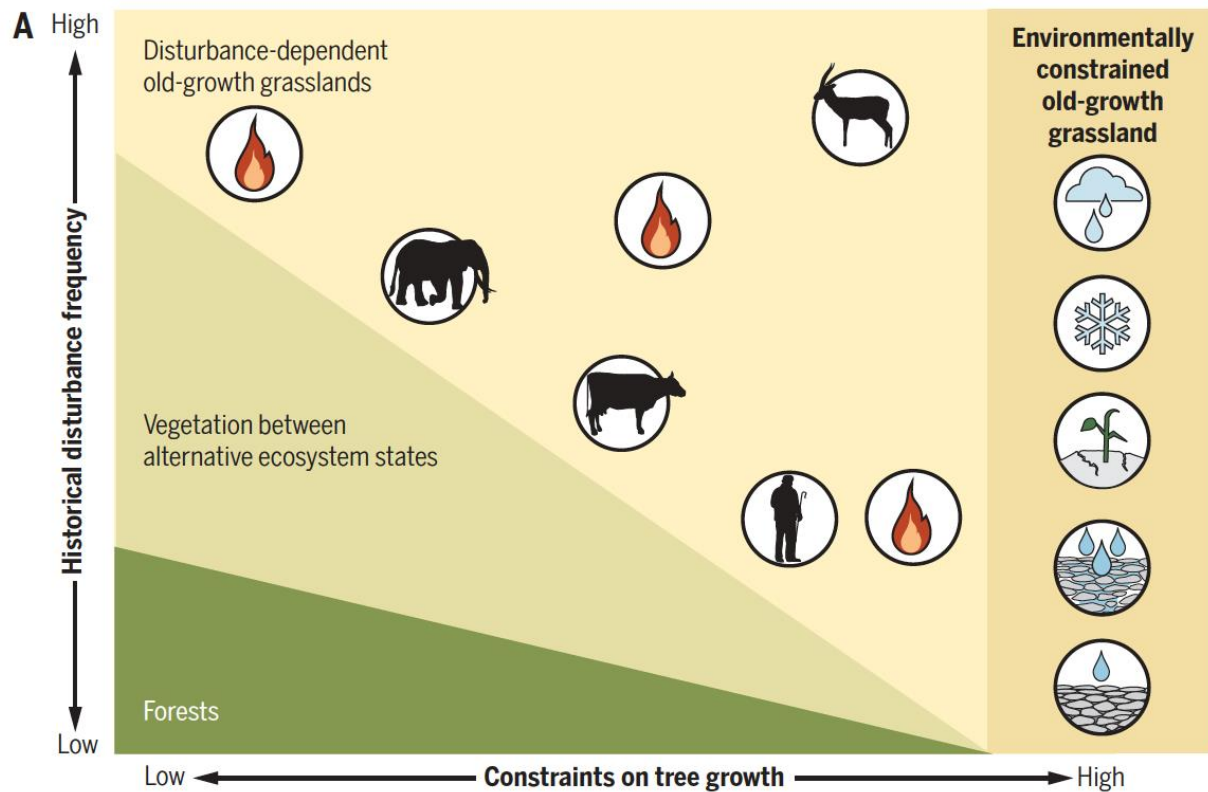


# Forbs: functional diversity, disturbance

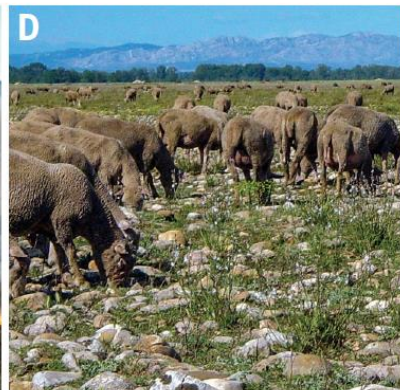
Presence of **bud-**  
**bearing organs** – bud  
bank



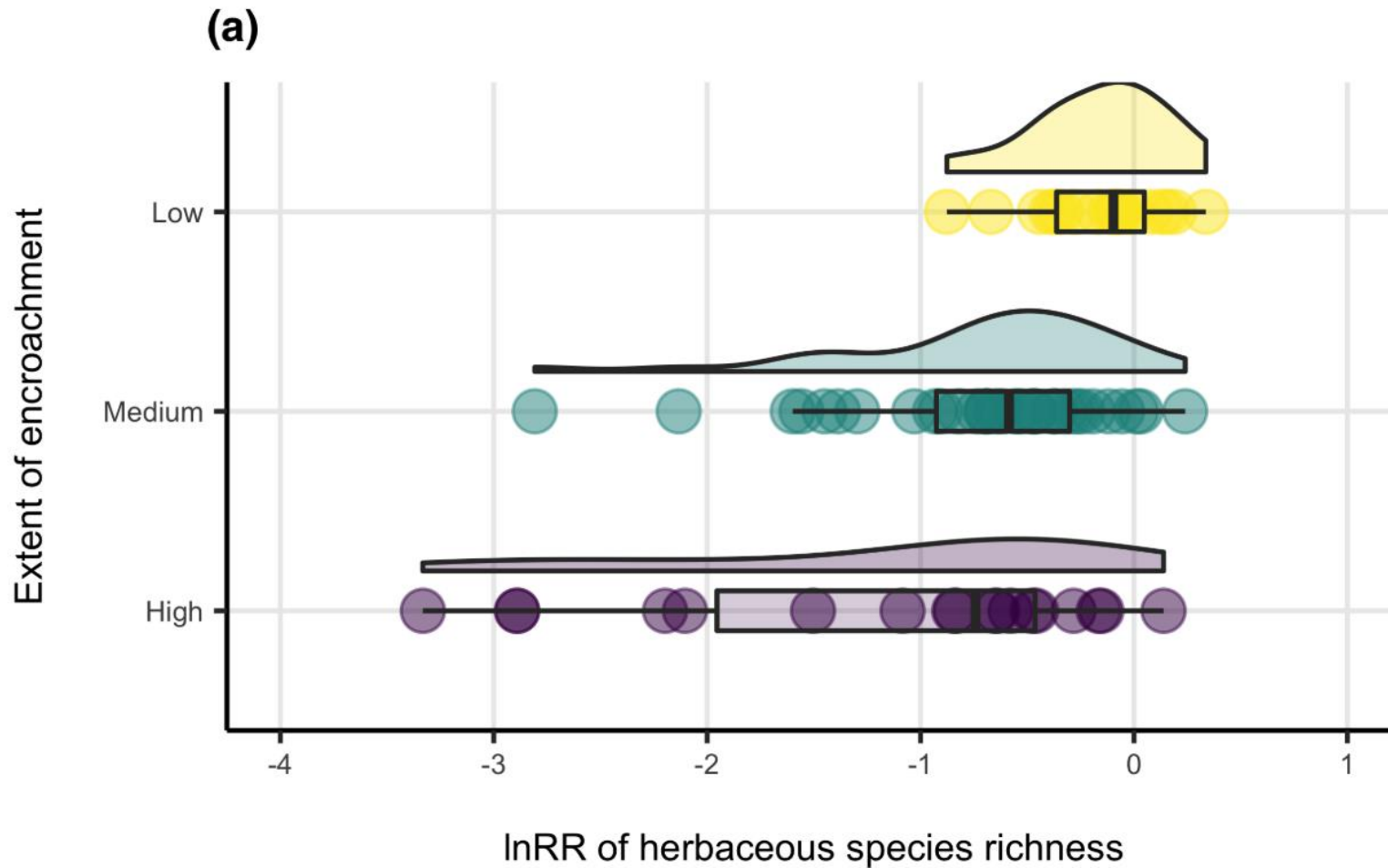
# Tropical open ecosystems: disturbance



- most tropical open ecosystems are **disturbance-driven system**
- **fire and herbivory**: major disturbances
- lack of disturbance: negative effects



# Tropical open ecosystems: fire-exclusion

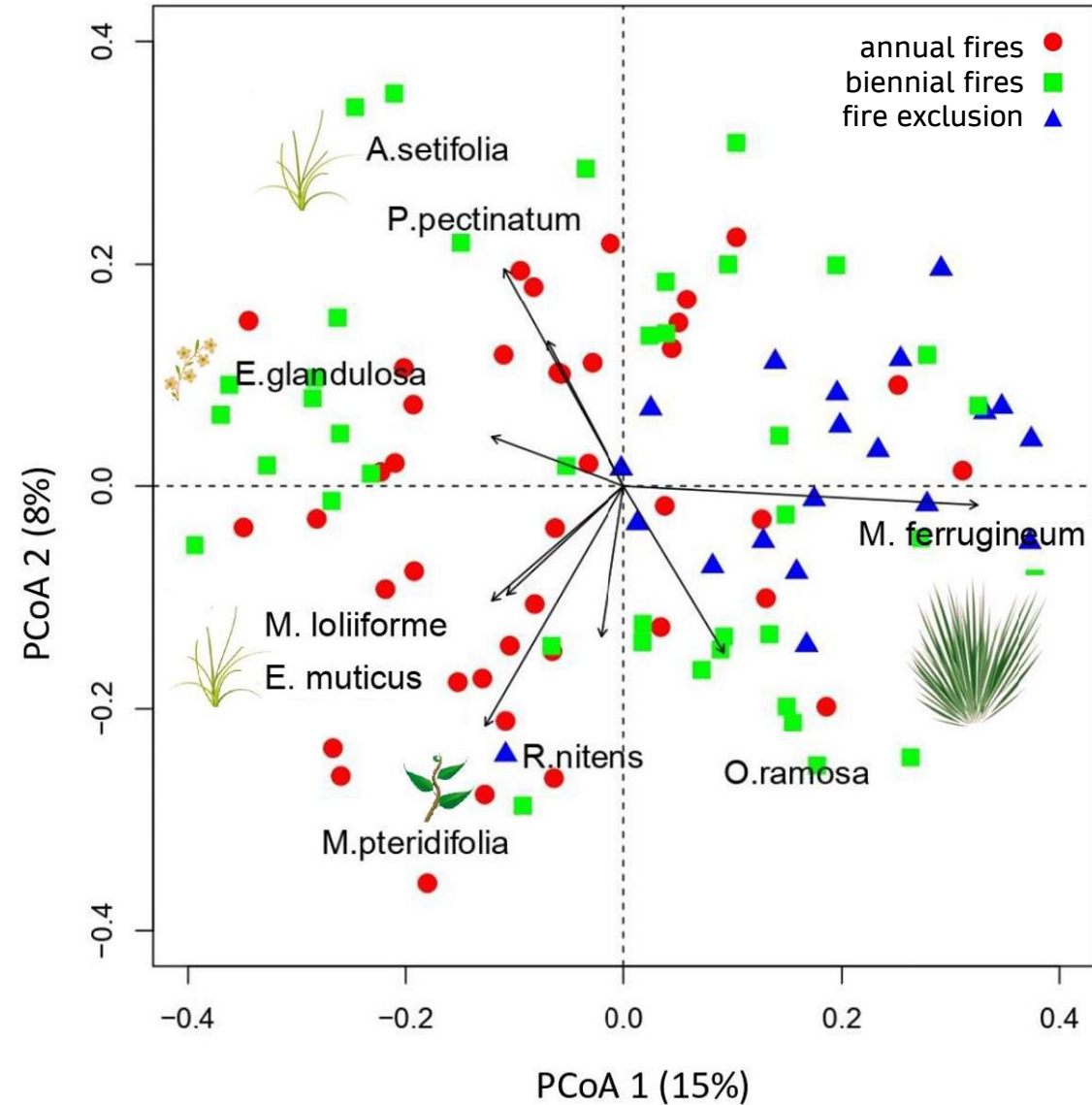


Encroachment affects  
**negatively** the  
herbaceous species  
**globally**

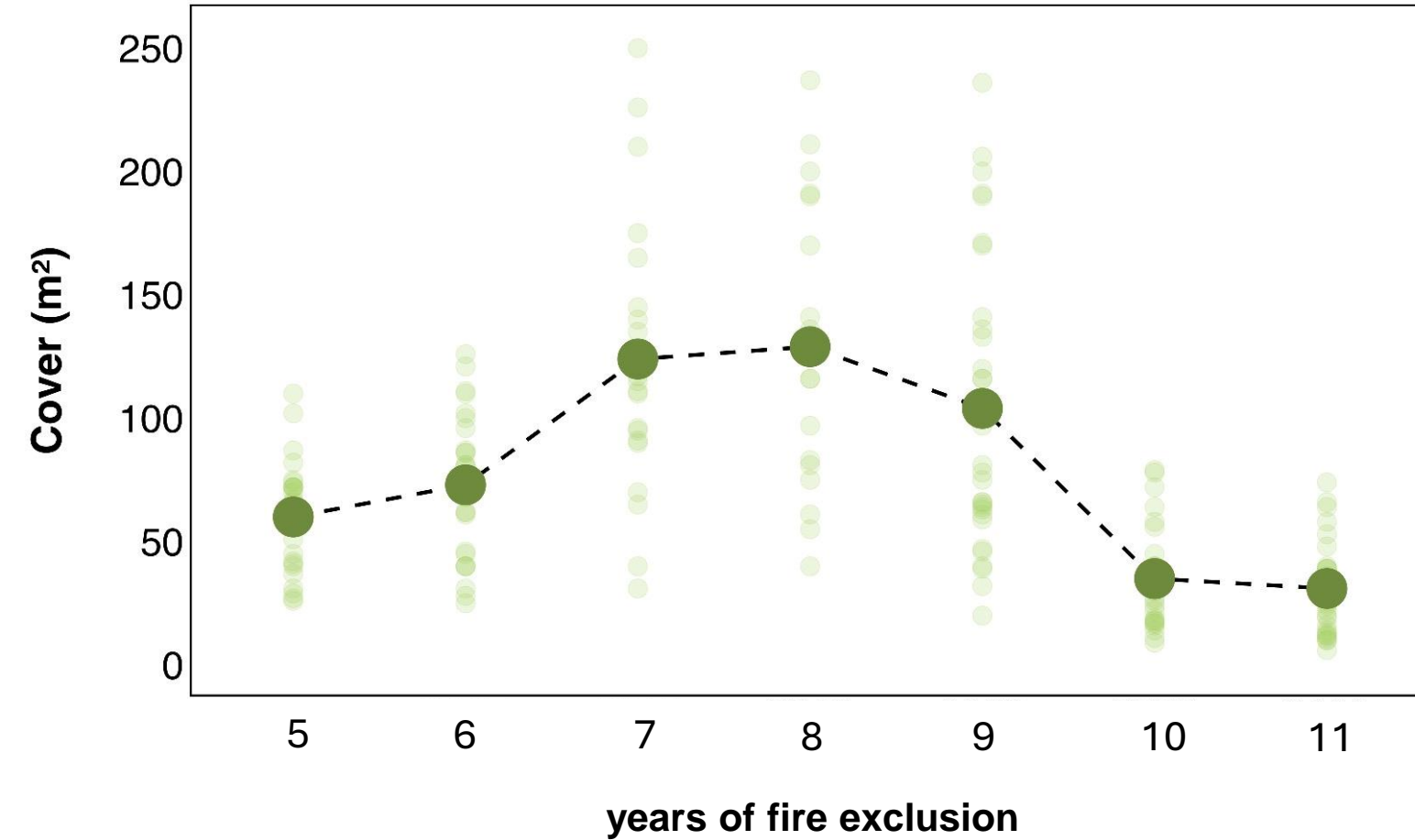
←  
negative effects

# Fire x aboveground forb community

- burned x fire-excluded areas **different plant communities**
- burned areas: **higher plant diversity**



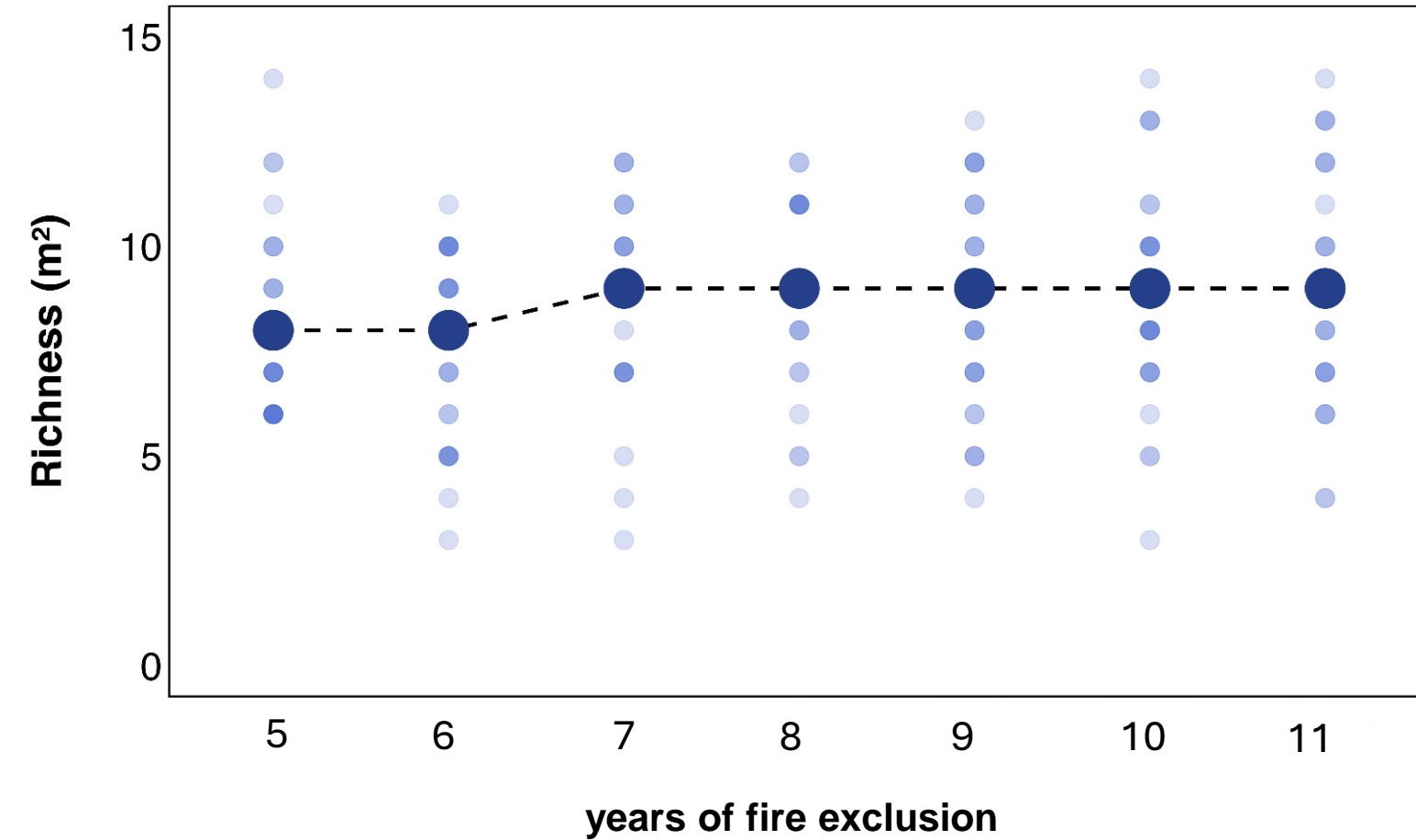
# Fire x aboveground forb community



- forb cover **decreases** over time



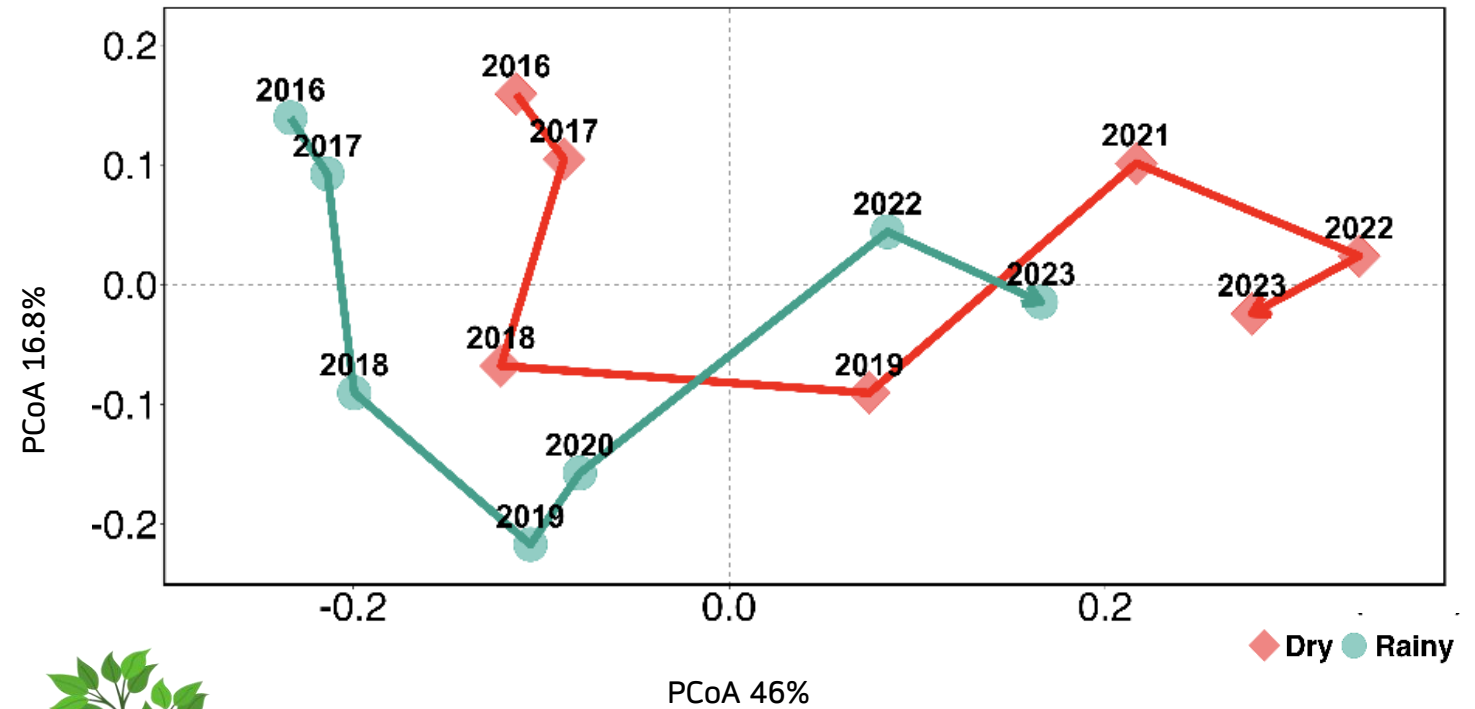
# Fire x aboveground forb community



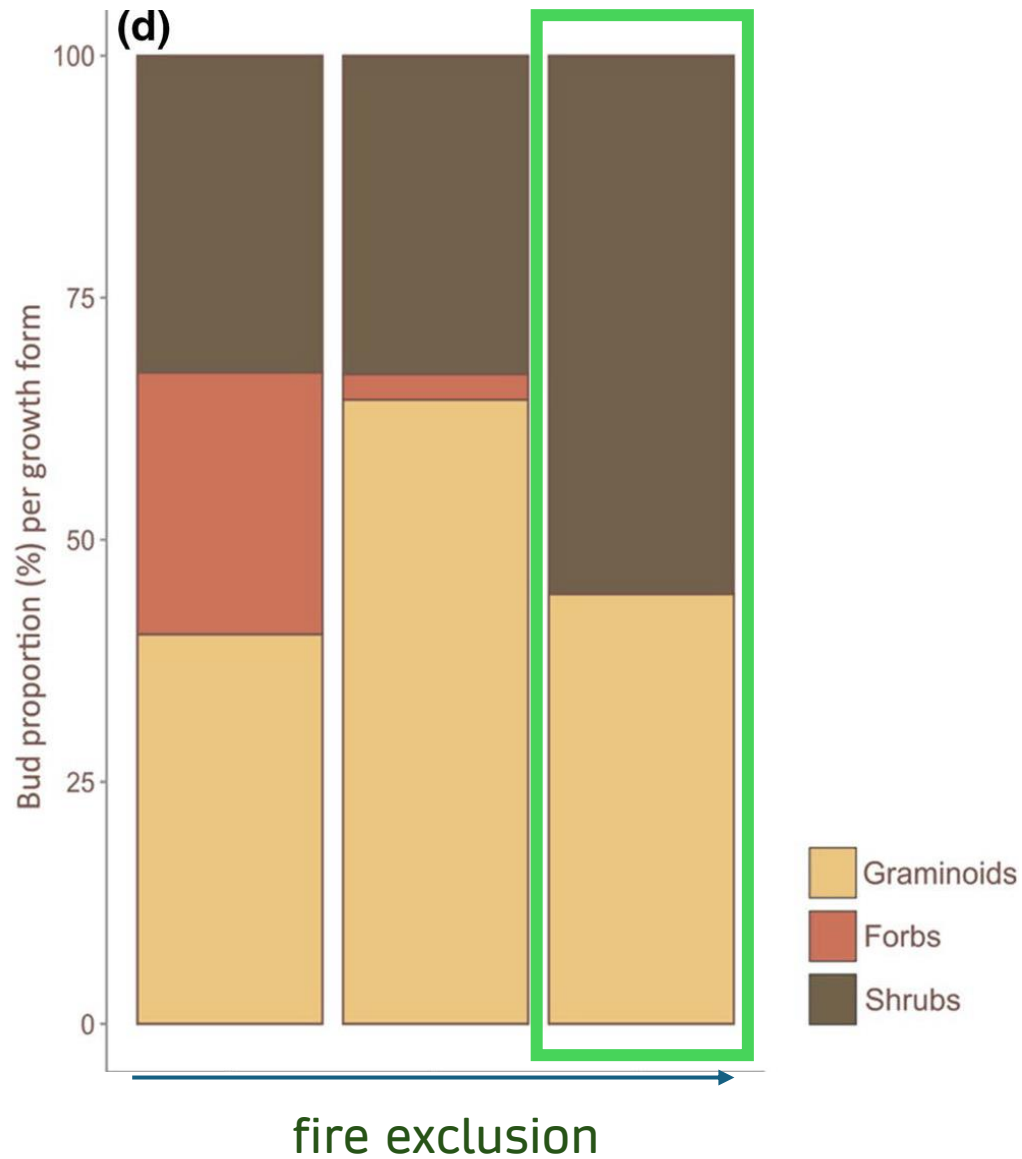
- forb richness does not change, BUT.....

# Fire x aboveground forb community

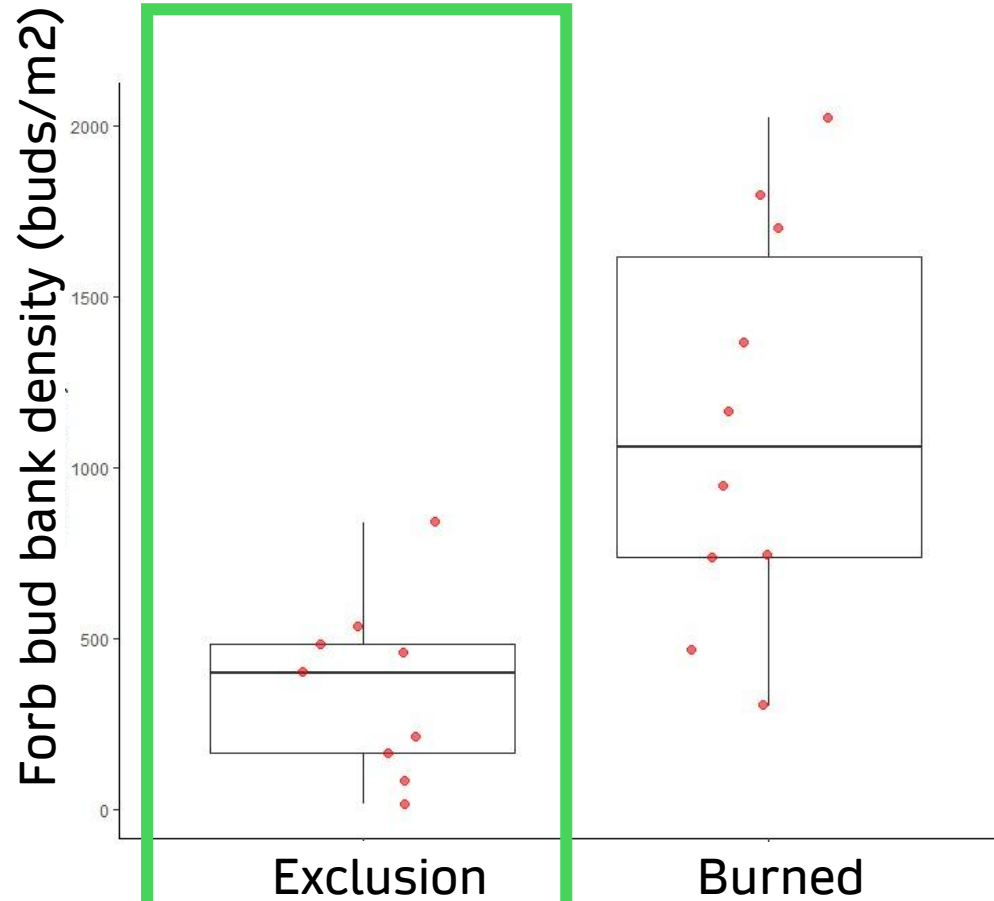
- plant communities **change** along time: replacement of species



# Fire belowground forb community

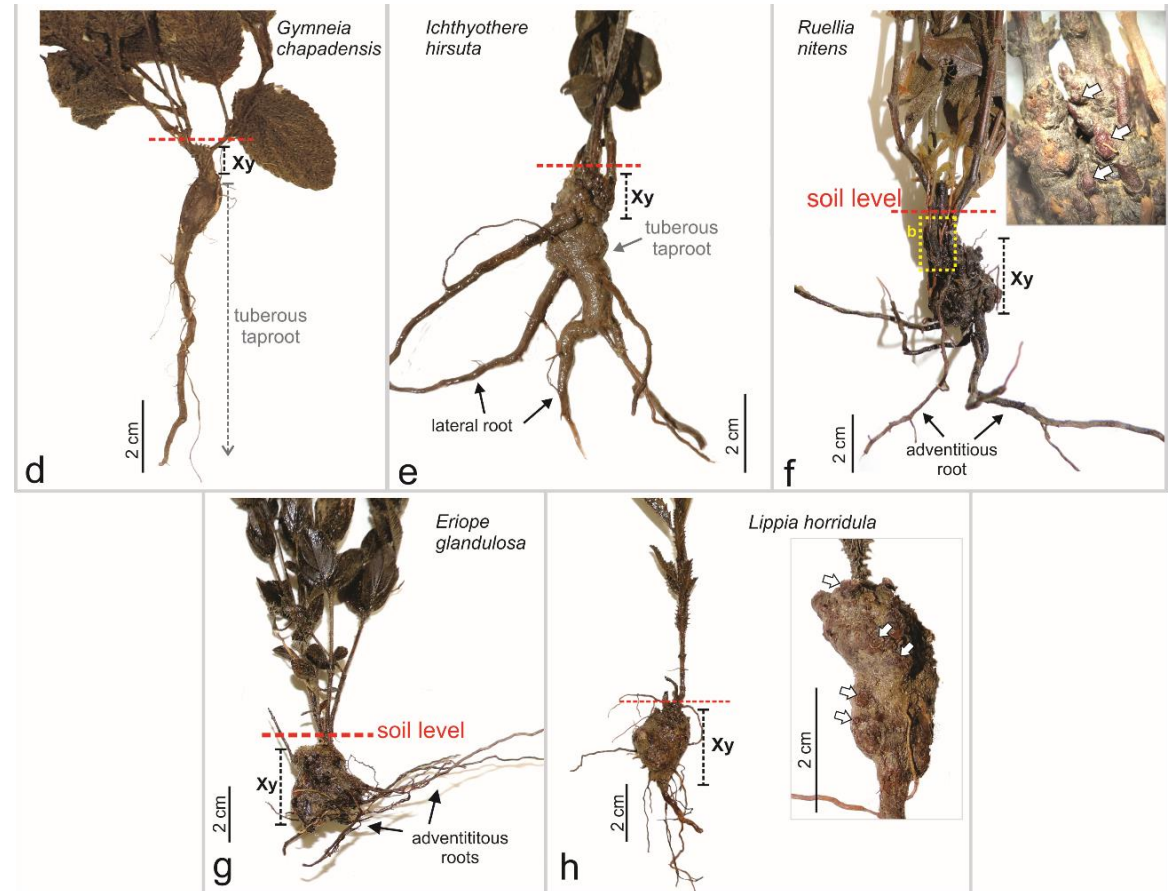
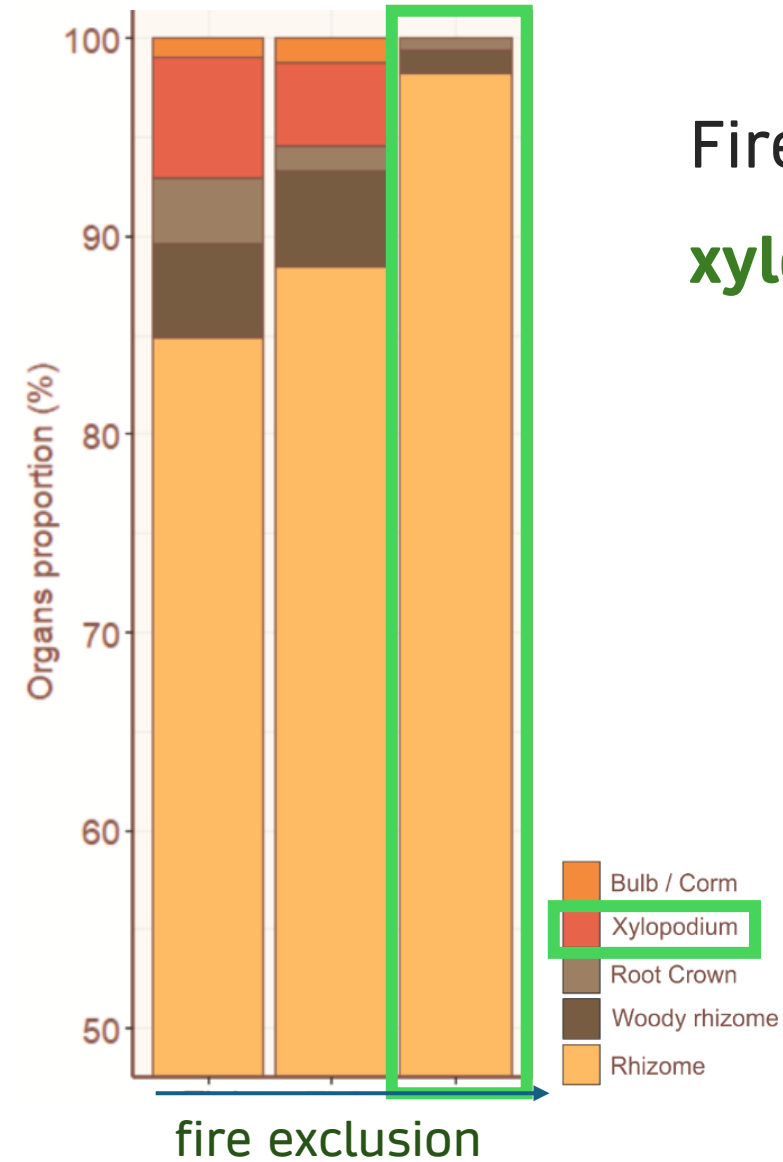


Fire exclusion – decline in bud bank density of forbs – **xylopodium**



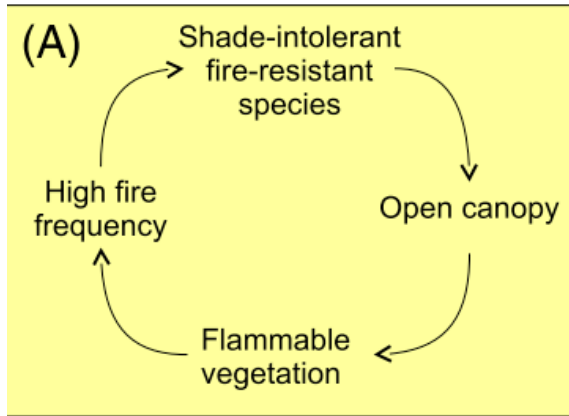
# Fire belowground forb community

Fire exclusion – decline in bud bank density of forbs –  
xylopodium



# grasses x trees – what about the forbs?

Open biome  
Low biomass state



Stabilizing feedback

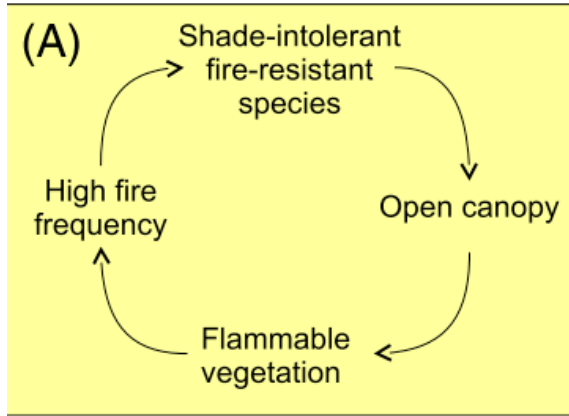


- forbs will benefit from frequent fires: both above- and belowground



# grasses x trees – what about the forbs?

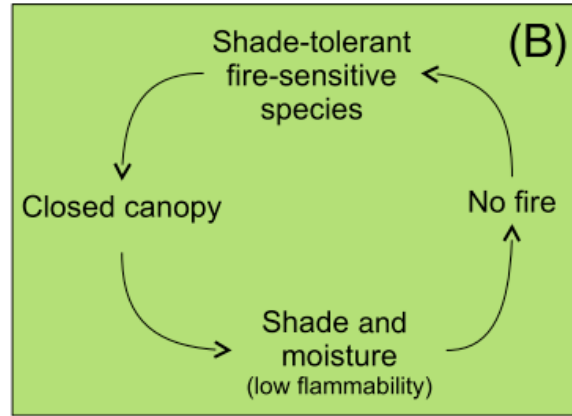
Open biome  
Low biomass state



Stabilizing feedback



Closed biome  
High biomass state



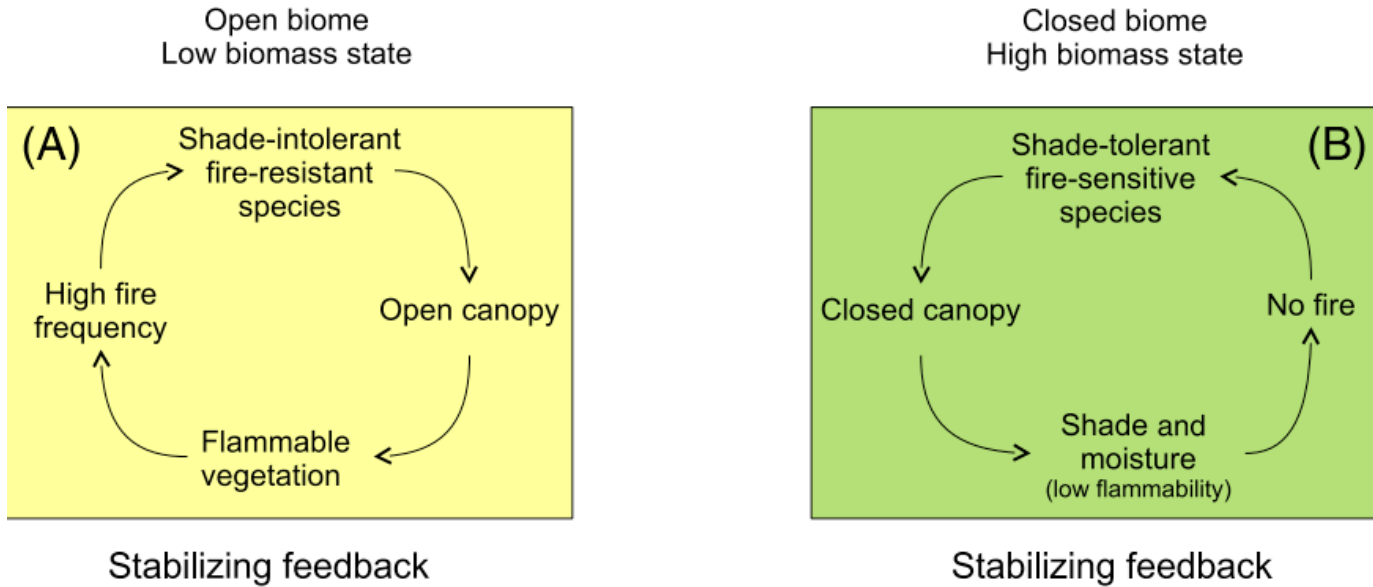
Stabilizing feedback



- forbs from savannas disappear – no sun, no forbs – game over!



# grasses x trees – what about the forbs?



- many forbs disappear from the aboveground community – few persist (persistence of the belowground organs – most disappear as well)



# Thank you!

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