



# Why ants are cool ?

## A overview on tropical ant ecology

Dr. Tiago V. Fernandes





# Questions

Where can we find ants ?

Have you been in a place with no ants ?

Why do you think people study ants?

# What is an ant ?



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Alex Wild  
alexanderwild.com



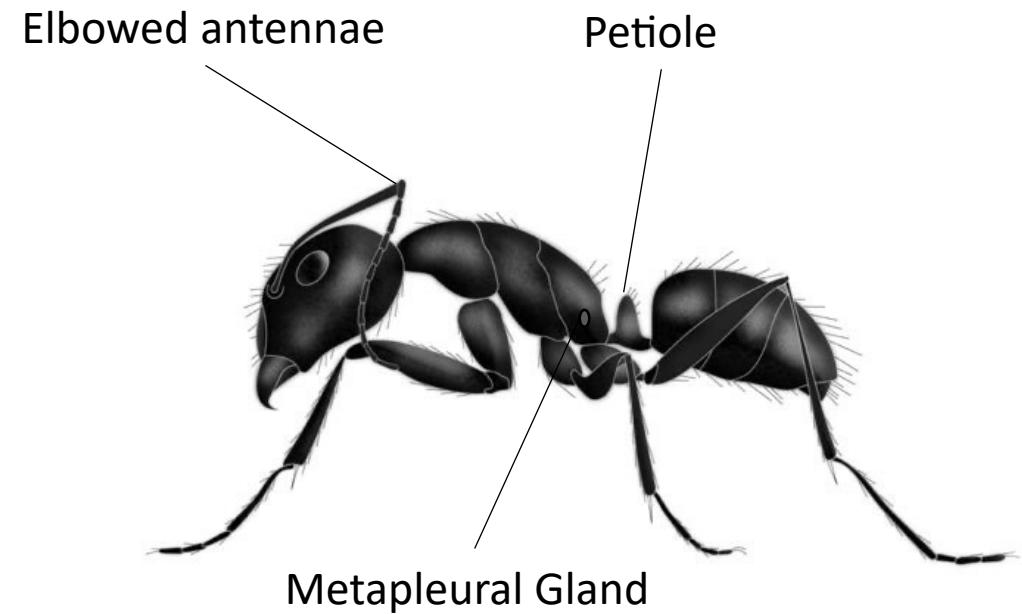
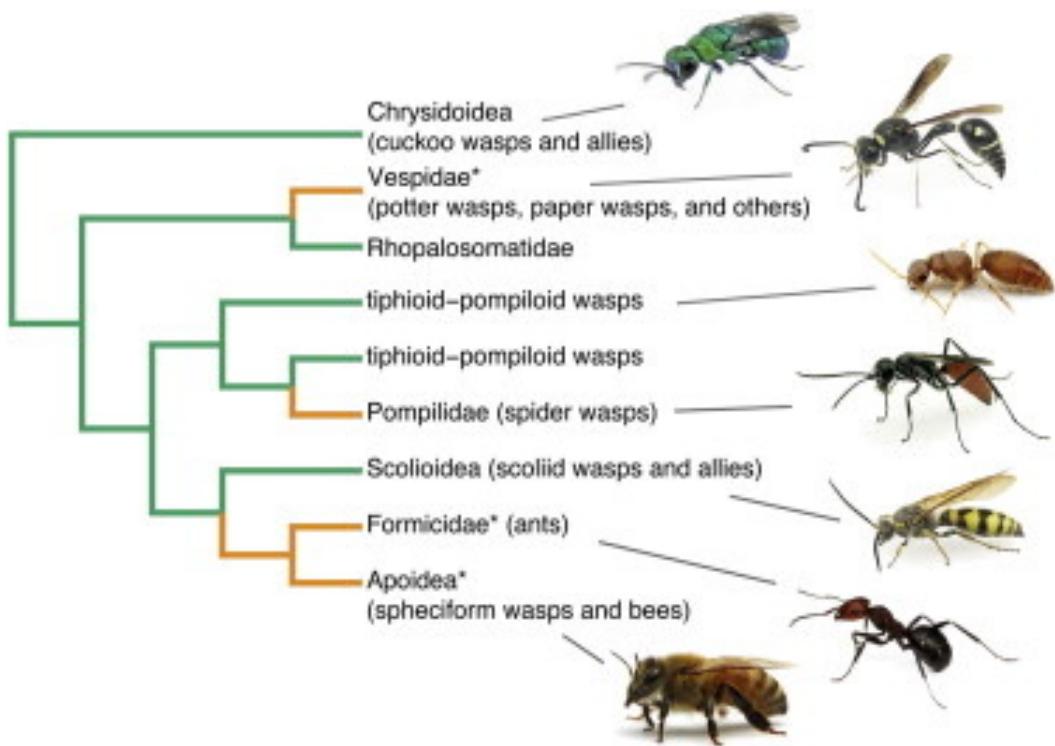
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# What is an ant ?

## Order Hymenoptera



# Ants are eusocial insects – Divided in castes

All wingless ants are females

Queen



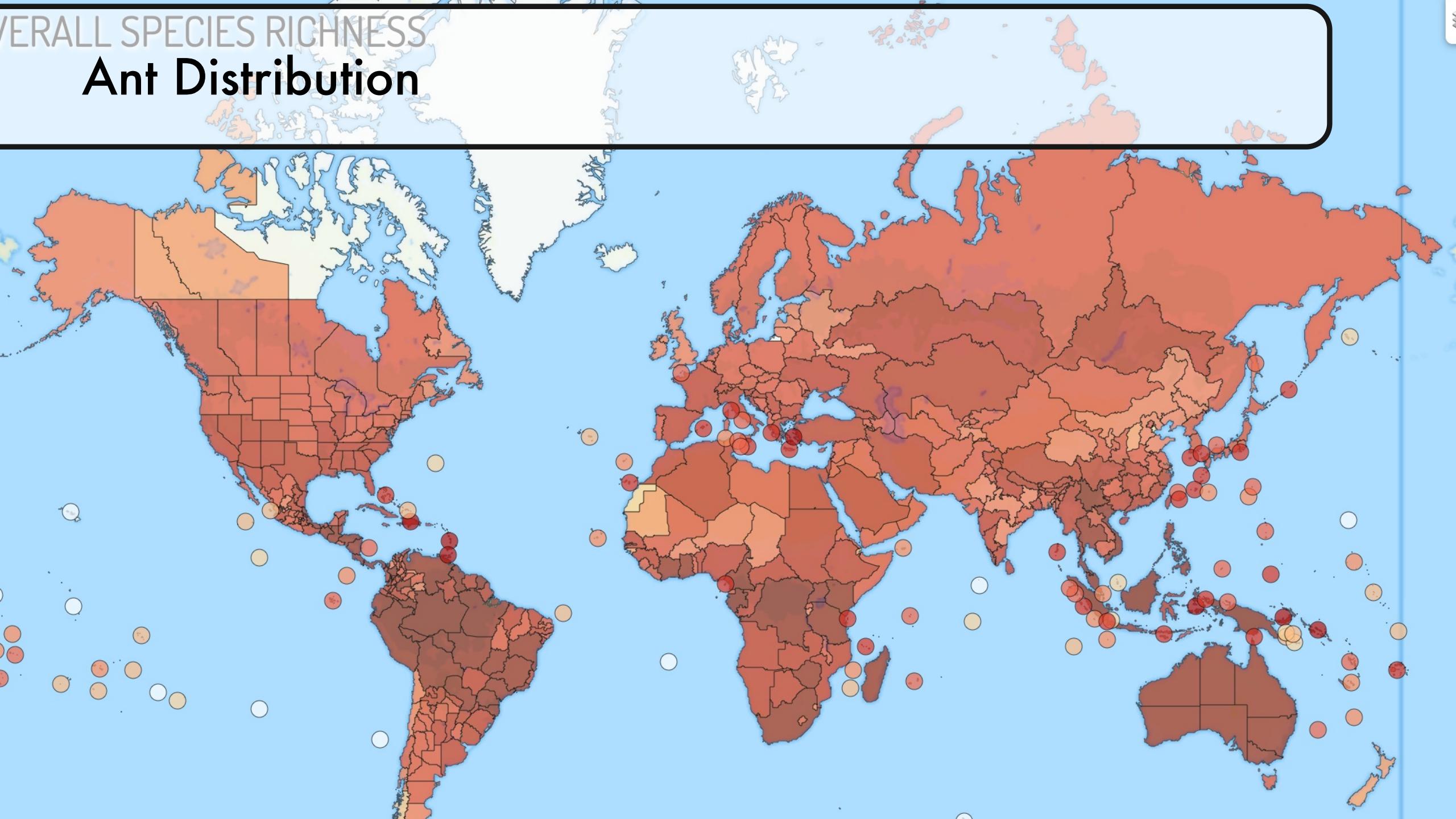
Male



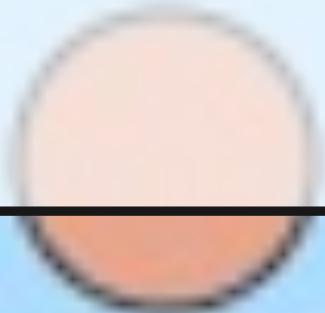
Workers



# OVERALL SPECIES RICHNESS Ant Distribution



# Ant Diversity Ecuador



# Country: Ecuador

## Field Guides

## Download Data

Images: 6,197

## **Imaged Specimens: 534**

## **Subfamilies: 11**

Genera: 97

**Species/Subspecies:** 829

### **Valid Species/Subspecies: 504**

**Endemic:** 75

Introduced: 21

**Country:**  **Colombia**

## Field Guides

## Download Data

Images: 8,419

**Imaged Specimens:** 869

## **Subfamilies: 11**

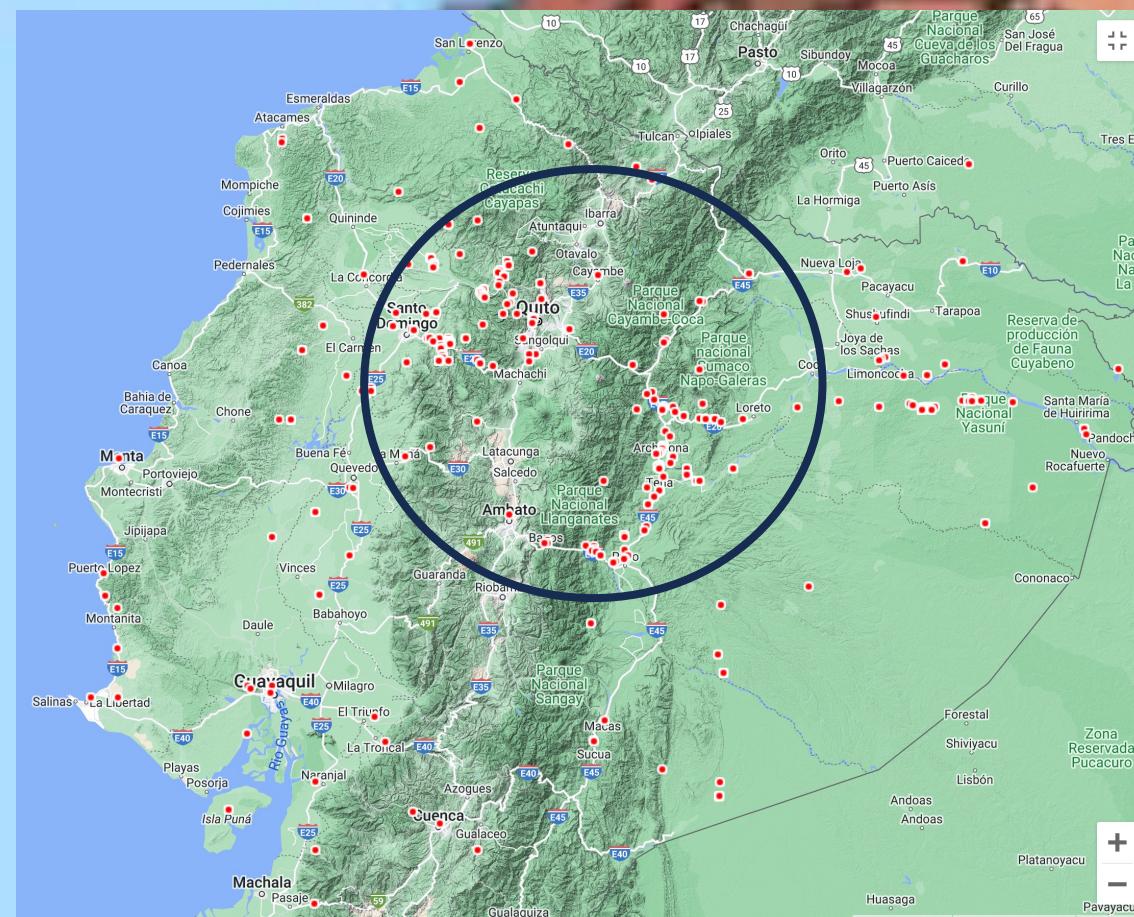
Genera: 104

**Species/Subspecies:** 985

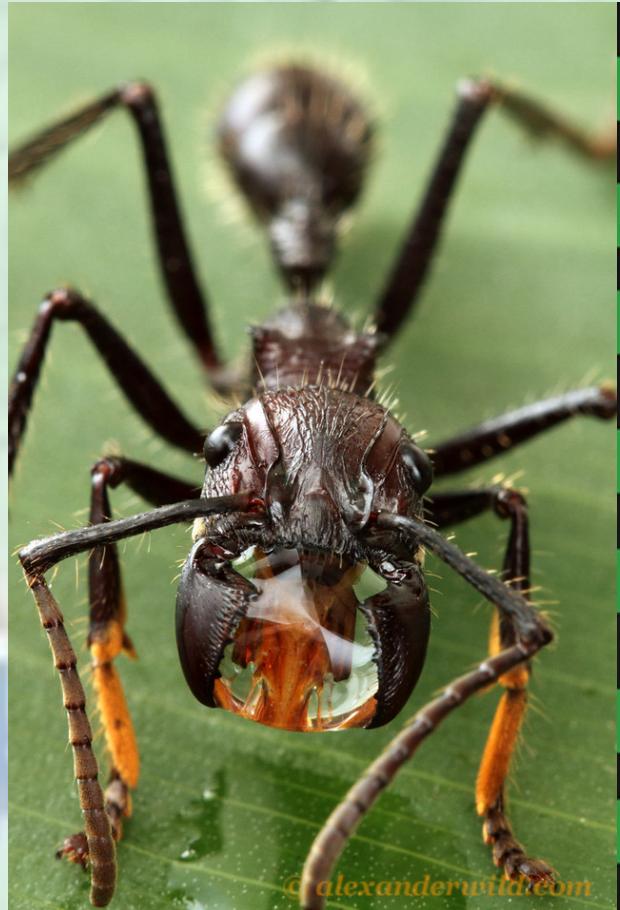
### **Valid Species/Subspecies: 655**

## **Endemic: 138**

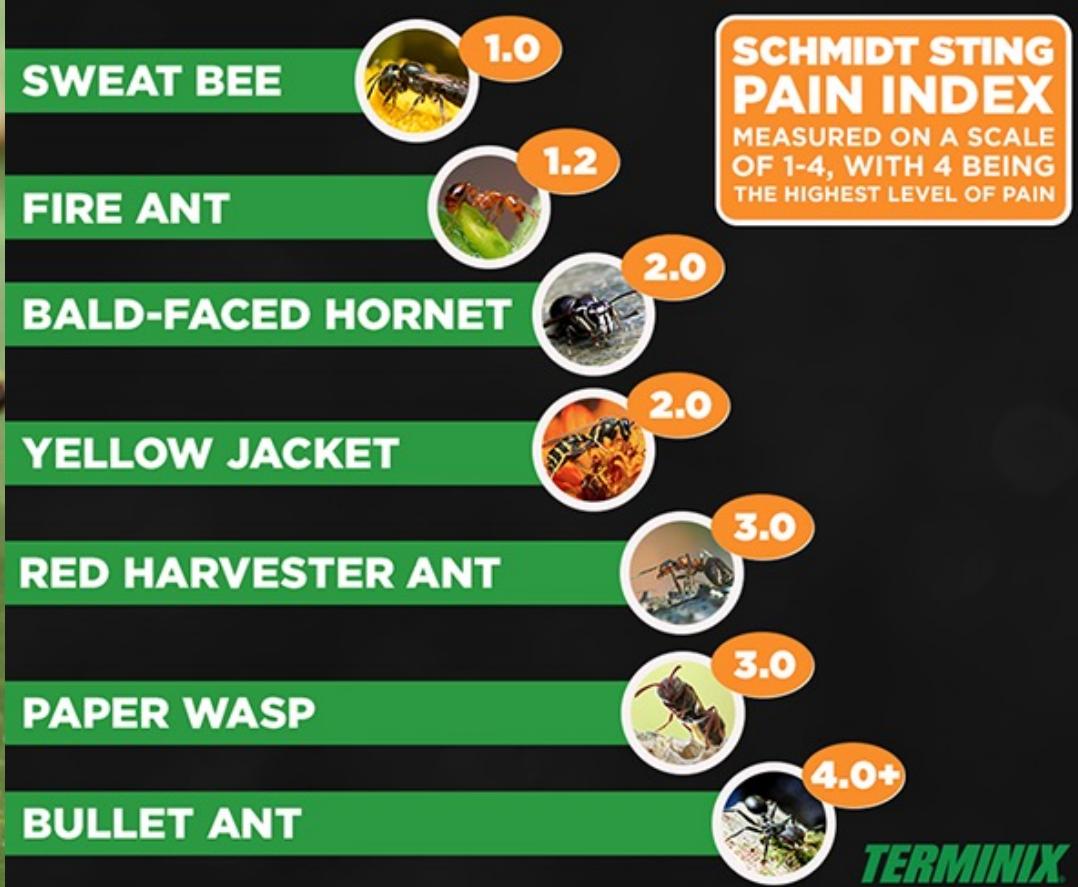
Introduced: 13



# *Paraponera clavata* – Bullet ant – Conga



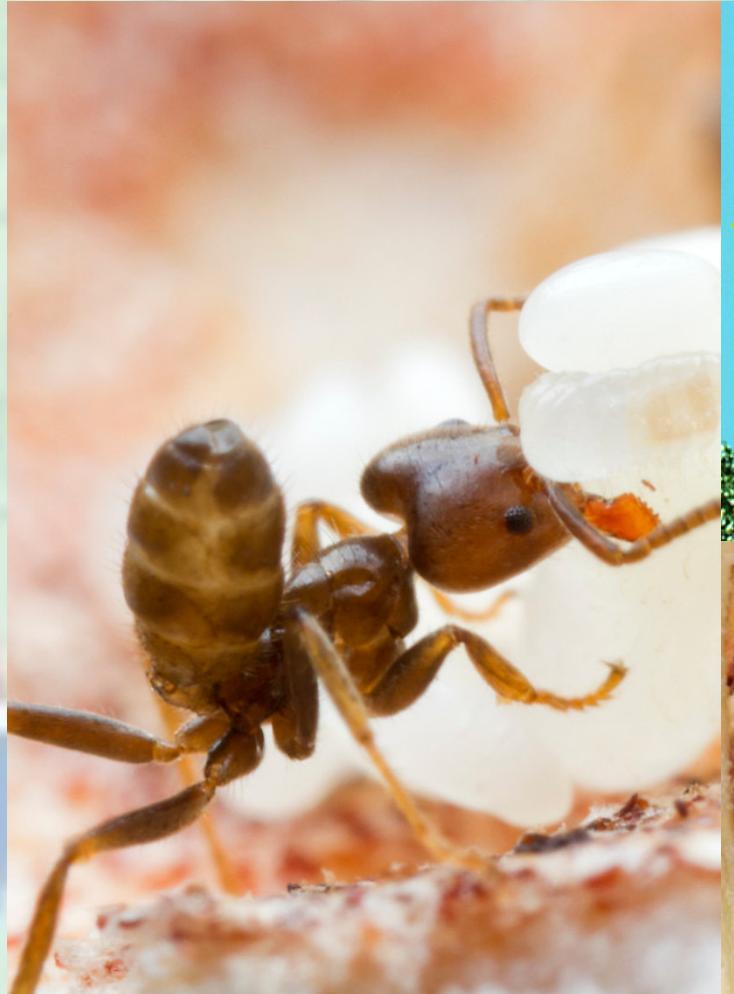
Most painful sting in the world



Mawé ritual



# *Azteca sp.* – Cecropia ant



Mutualism with Cecropia plants



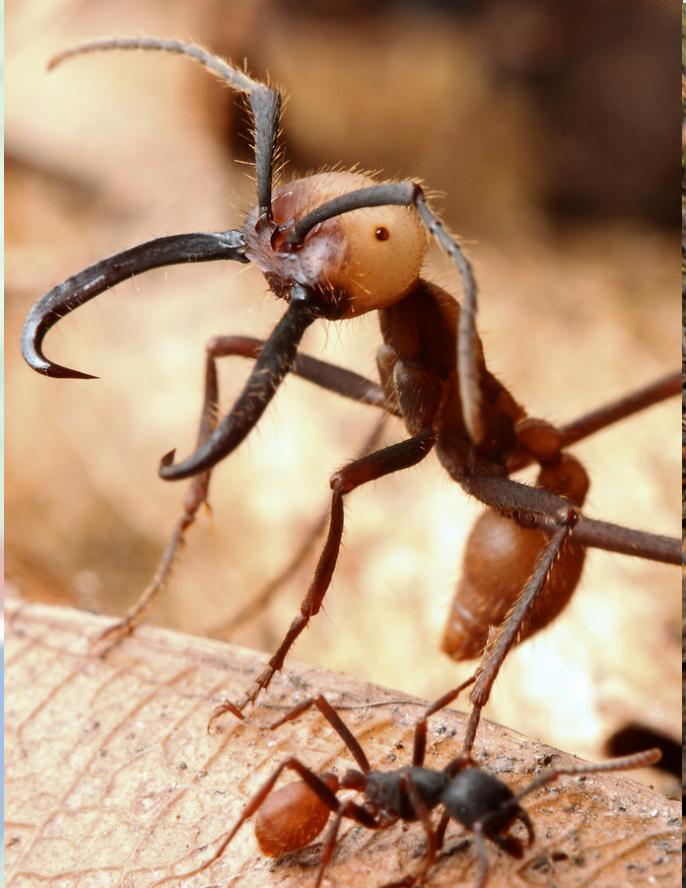
Mosquitos Repellent

# *Eciton burchellii* – Army ants - Correvenados

Nomadic ( Nest Bivoac )

Ant Bird  
follow them  
(~20 obligatory  
Over 100 facultative )

Use as sutures by  
traditional people



# *Ectatomma tuberculatum* - Chacarera



Plant protection



Biological control

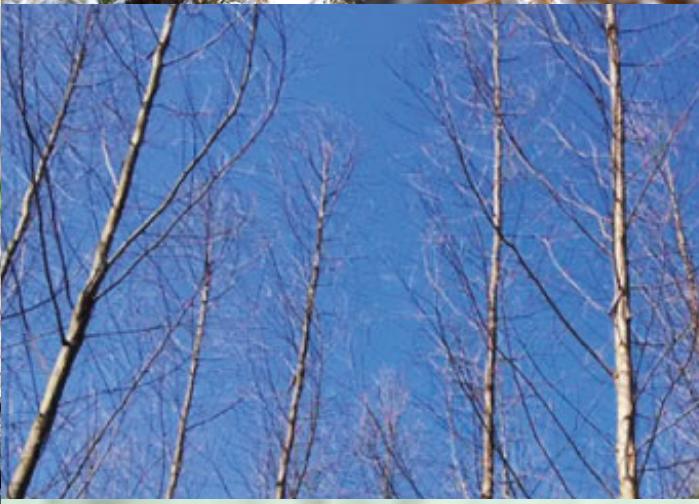


# *Atta Cephalotes* - Leaf-cutting ants – Hormigas Culonas

Cultivate fungus for over 15 Million Years  
( humans farming ~10,000 years )



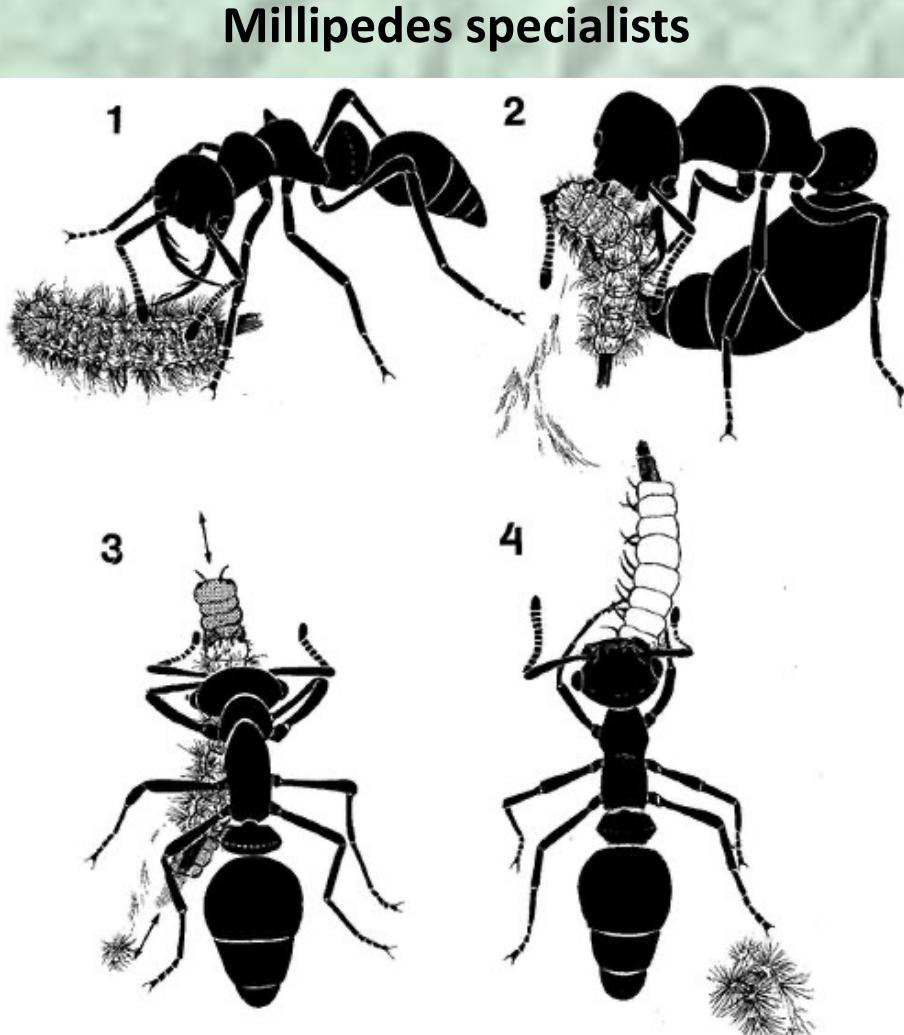
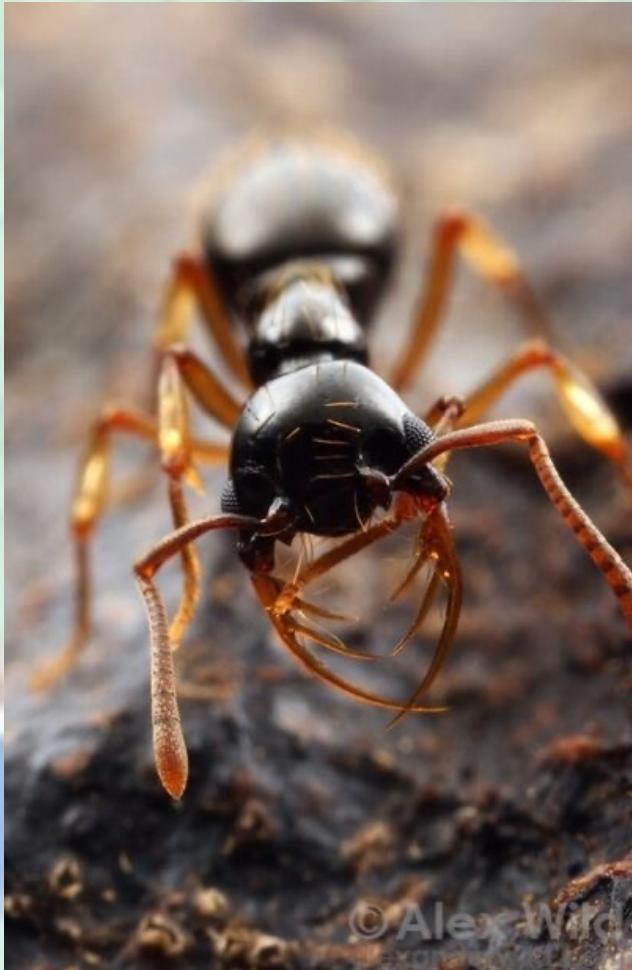
Considered a plague  
1–2 tons of plant /annually



Food source ( Afrodisic? )



# *Thaumatomyrmex* sp.



**4 Registers in Ecuador**



# Biological Indicators

Fire intensity



Parr *et al.* 2014

Mining



Barrow *et al.* 2007

Urbanzition



Yamaguchi 2004

Deforestation and Logging



Dunn *et al.* 2004

Grazing practices



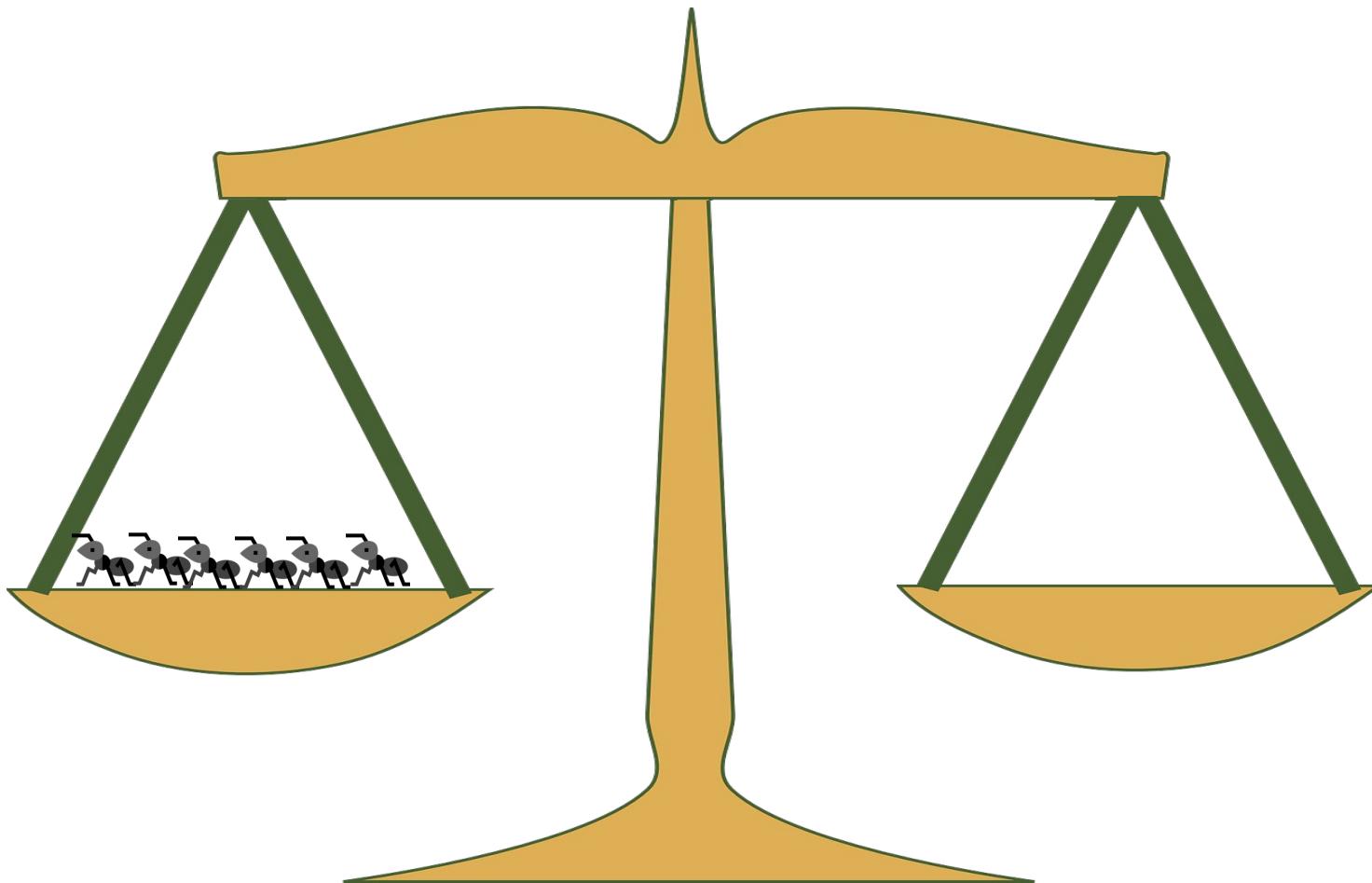
Hoffmann *et al.* 2000

Agriculture

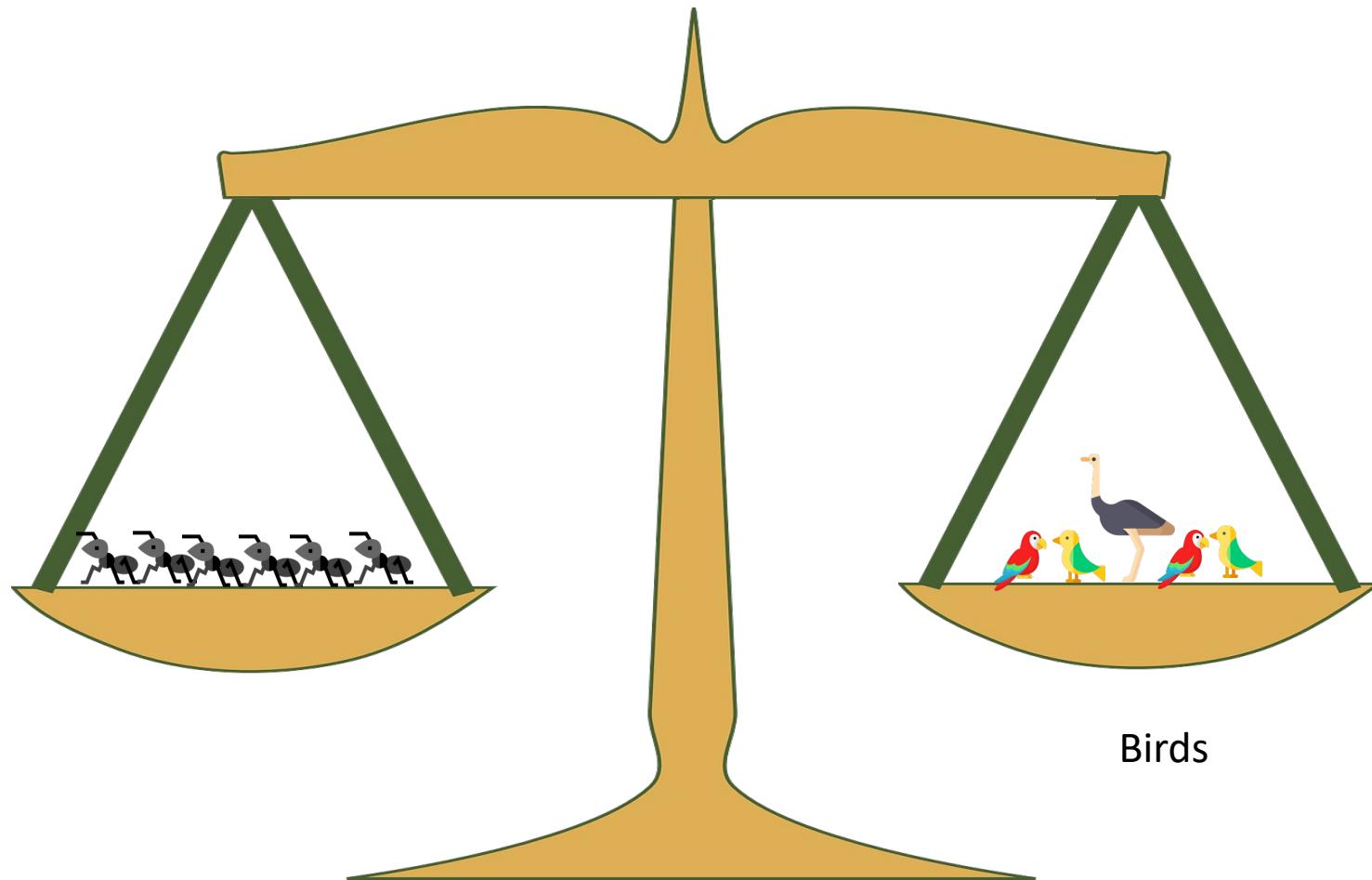


Perfect *et al.* 2007

# Ant biomass

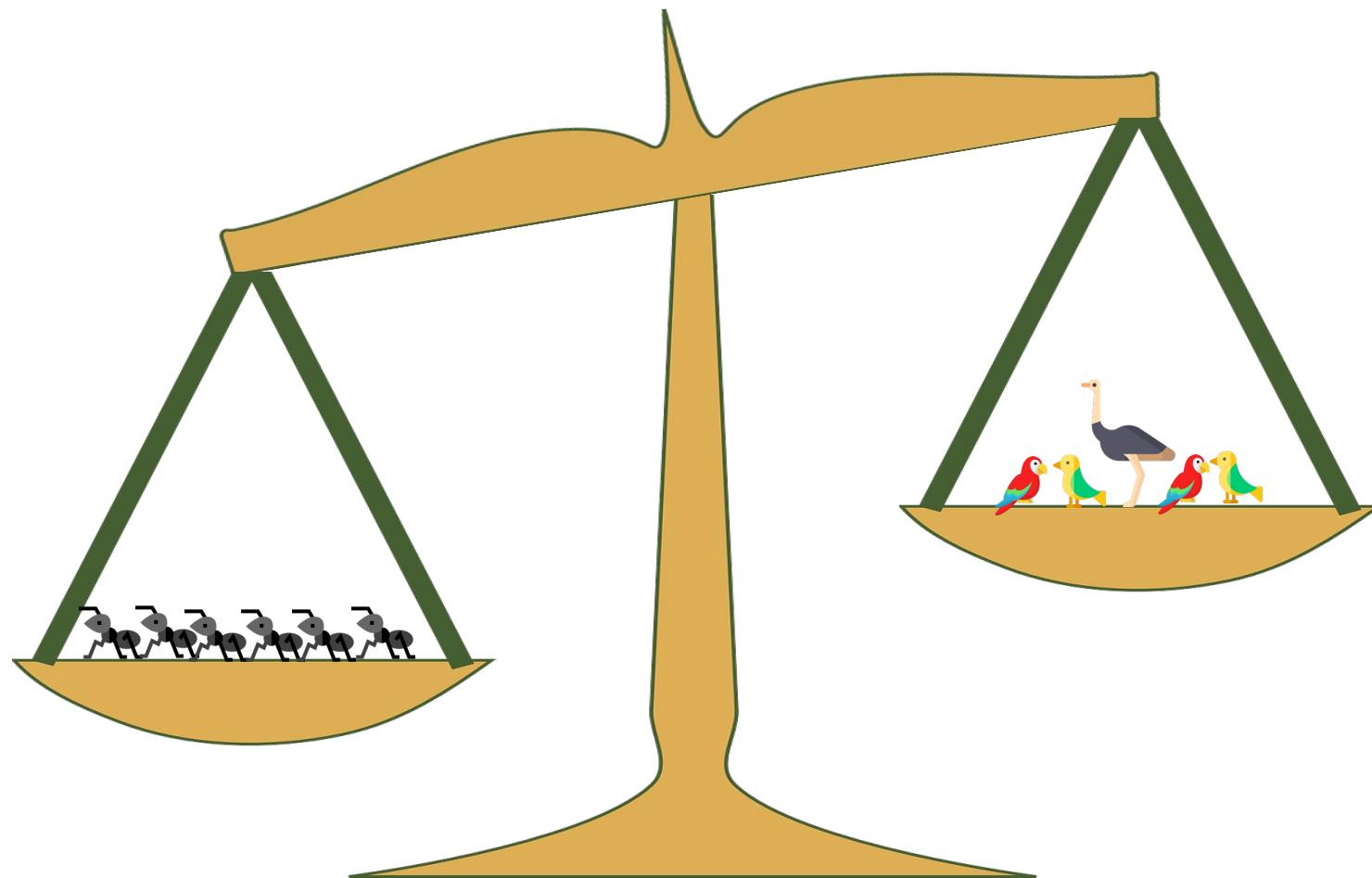


# Ant biomass

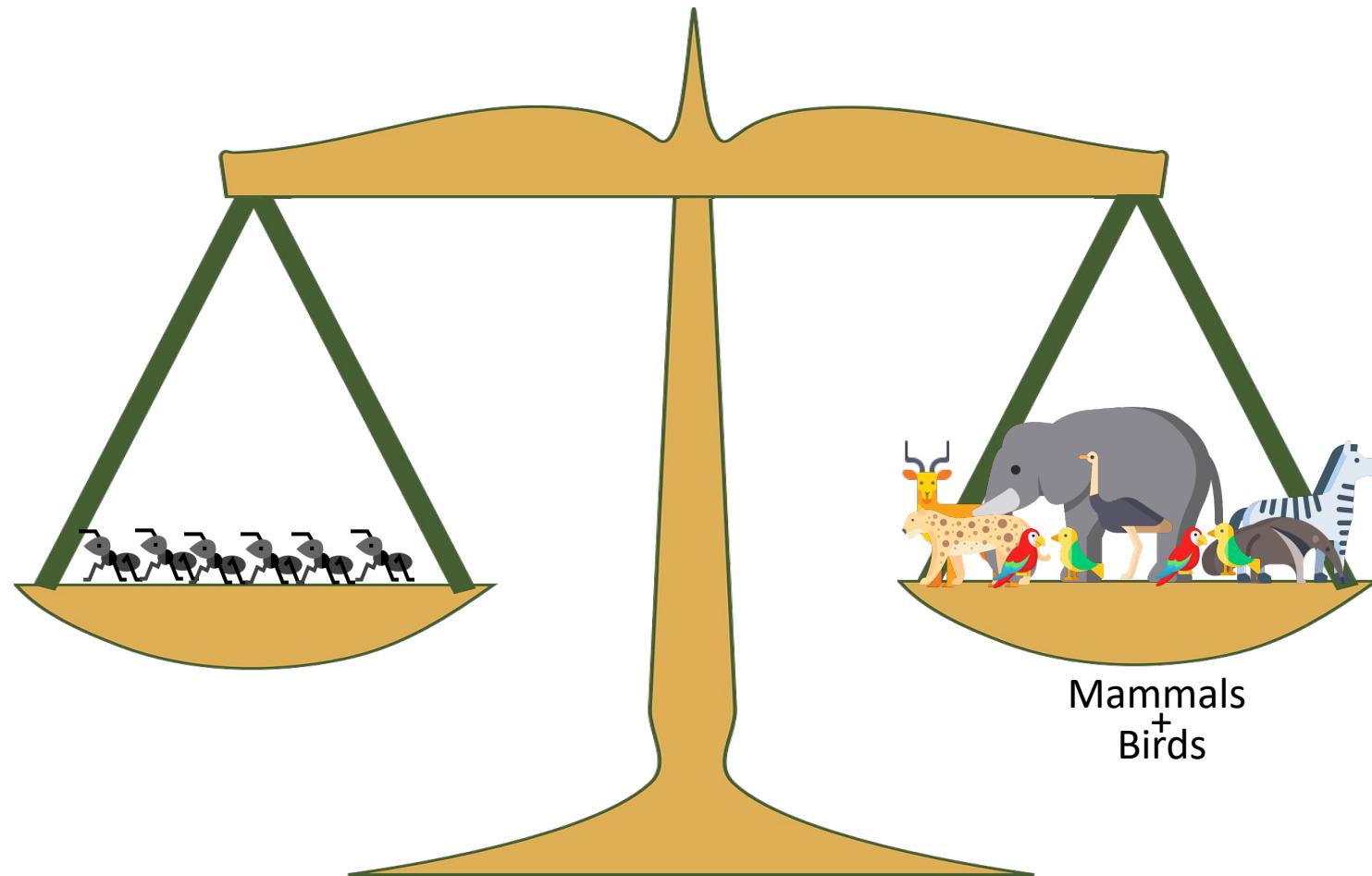


Birds

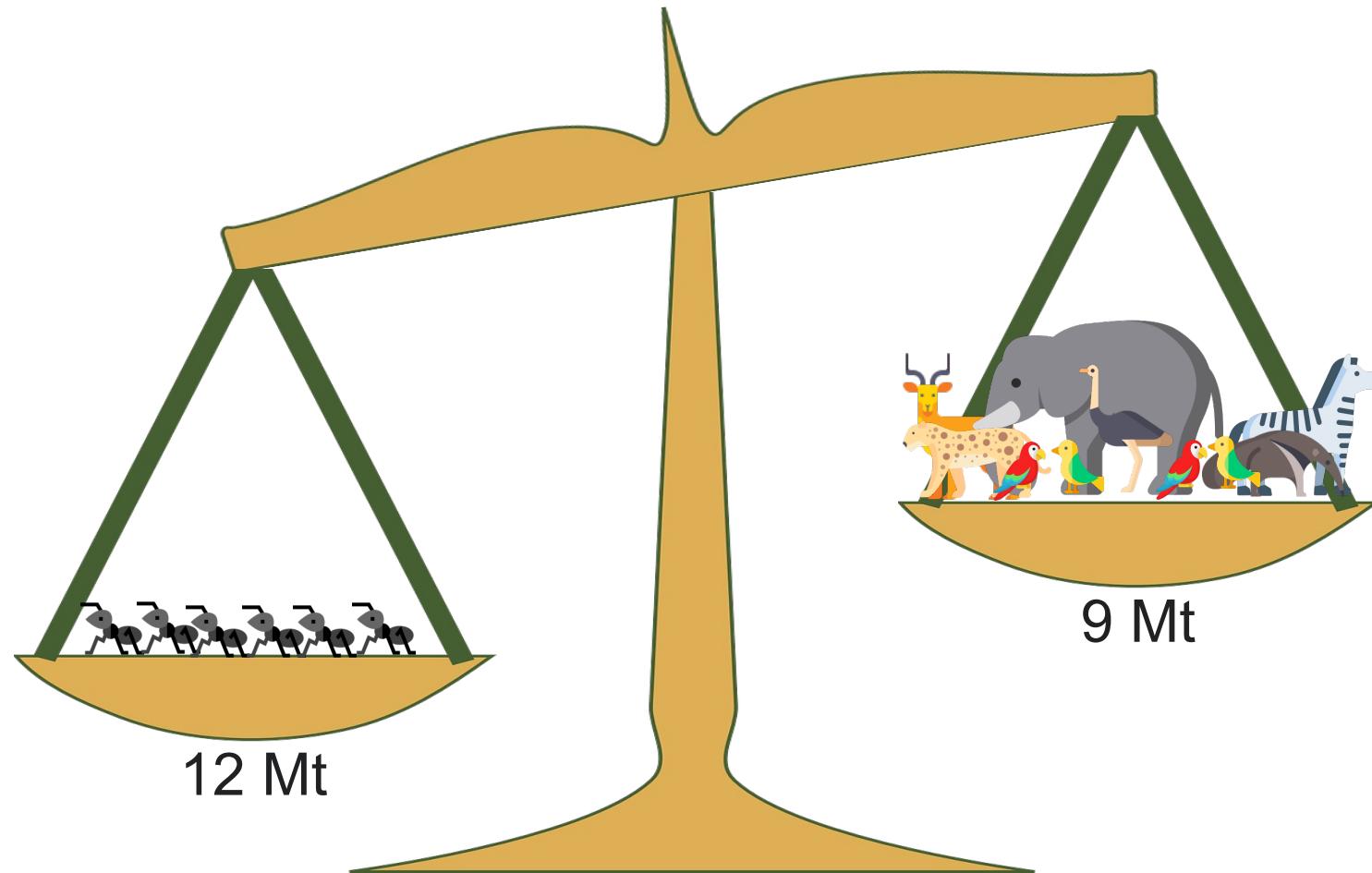
# Ant biomass



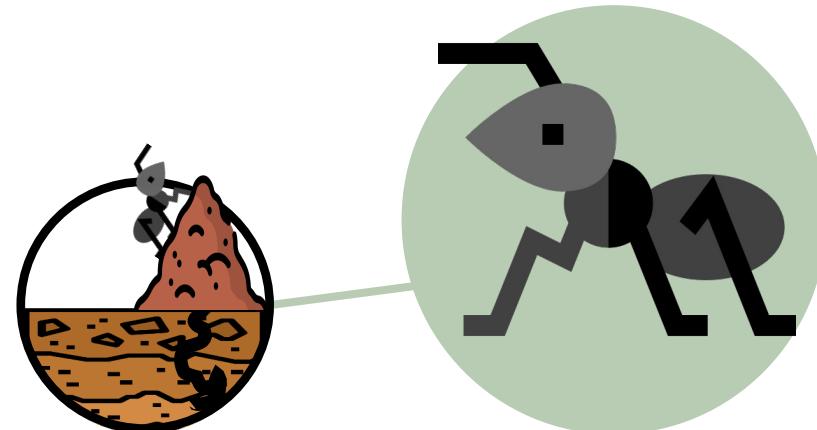
# Ant biomass



# Ants are one of the most abundant group of animals



# Ants are involved in several ecosystem processes

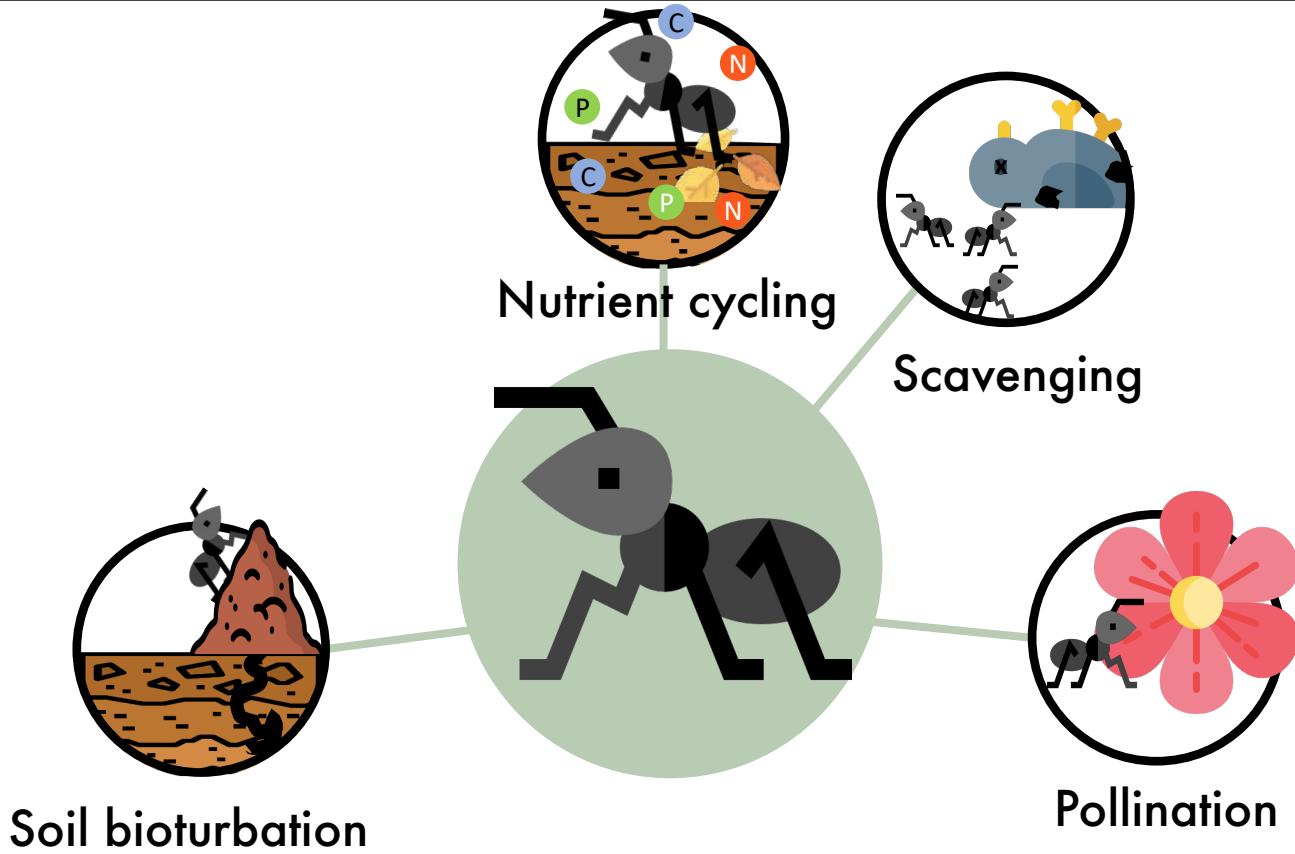


Soil bioturbation

# Soil bioturbation



# Ants are involved in several ecosystem processes



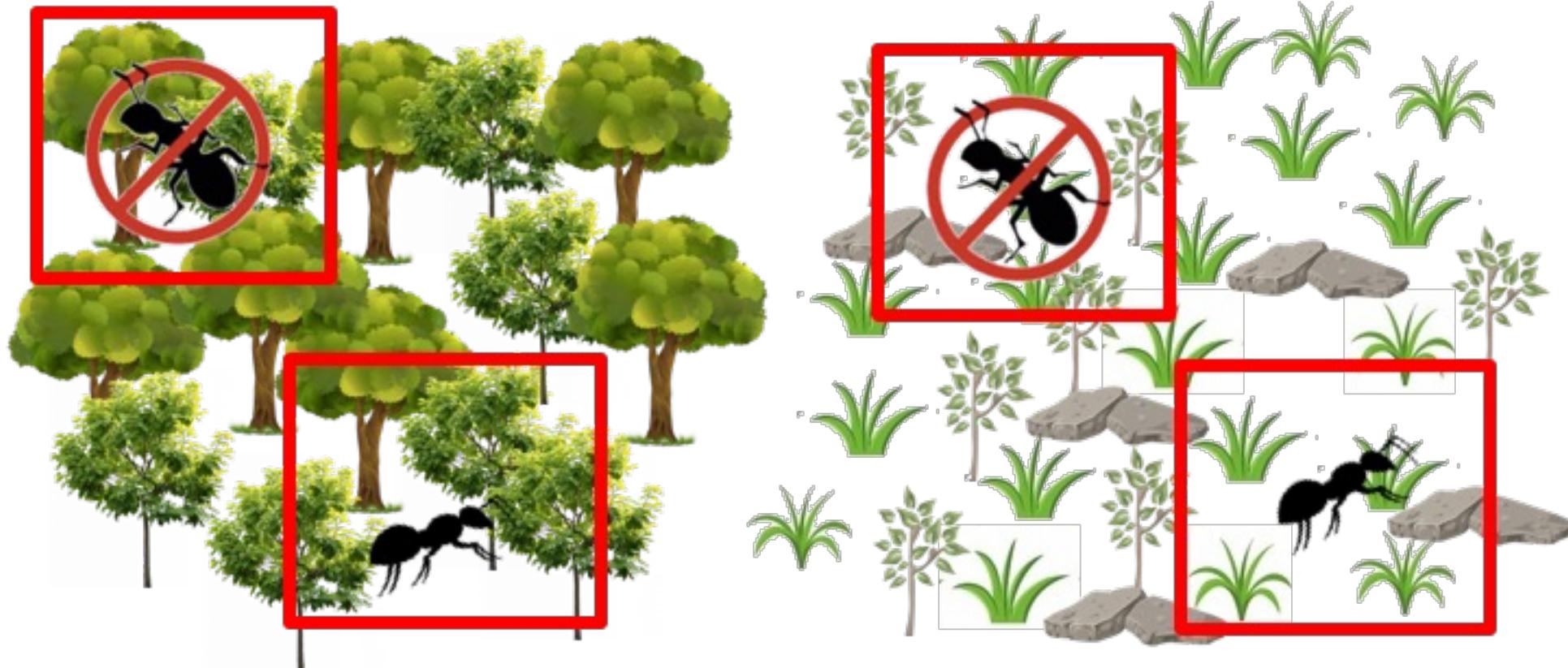
# Scavenging and nutrient cycling



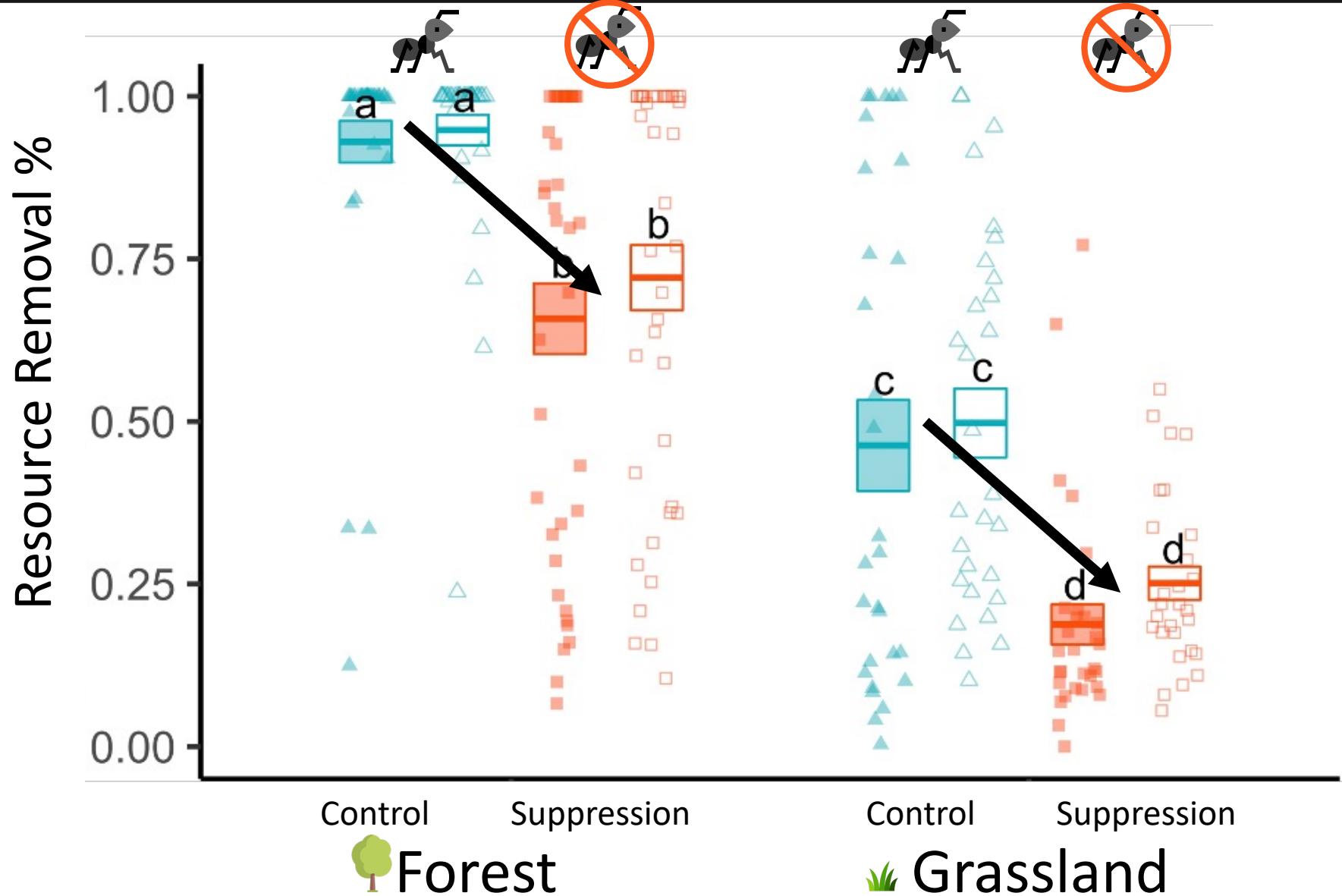
7.01.2008 11:48:21

# Measuring the ant role in ecosystem processes

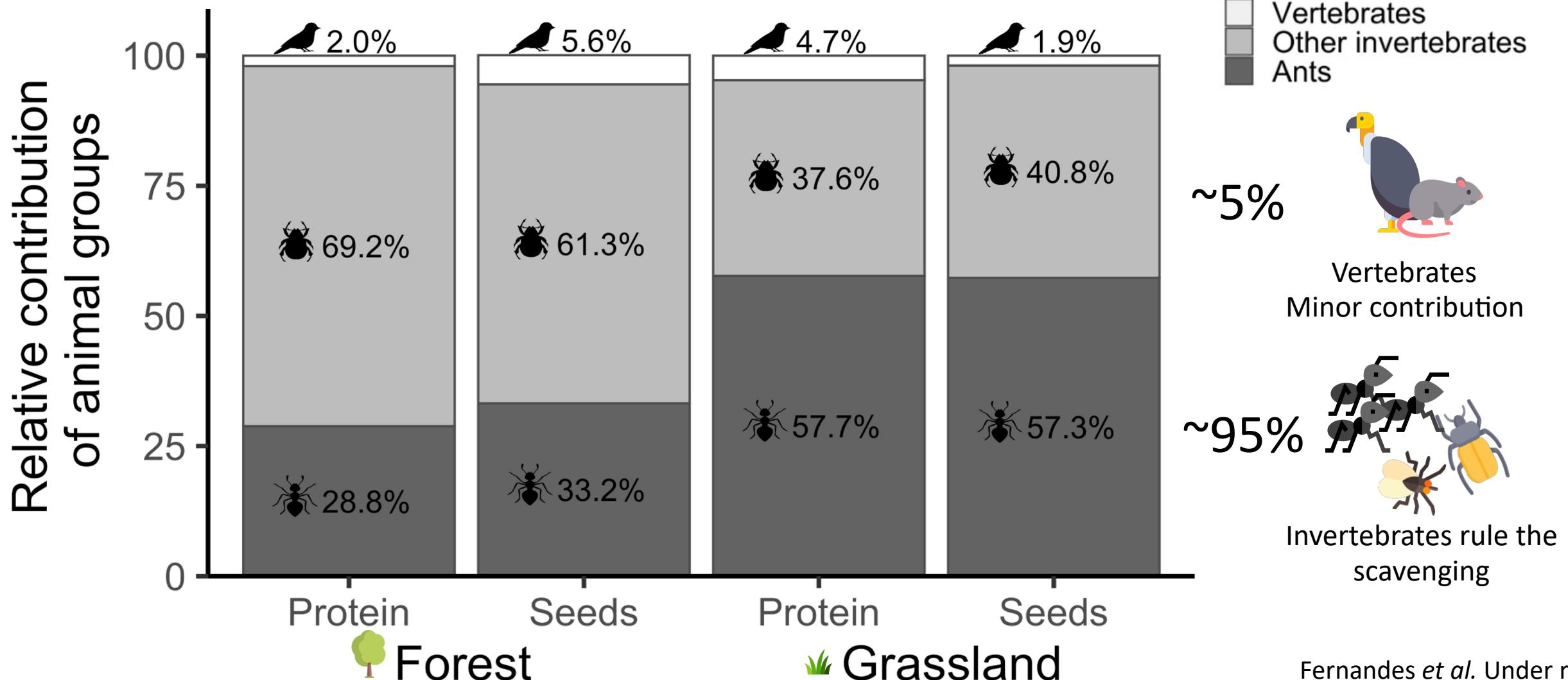
Ant exclusion experiments in Brazil



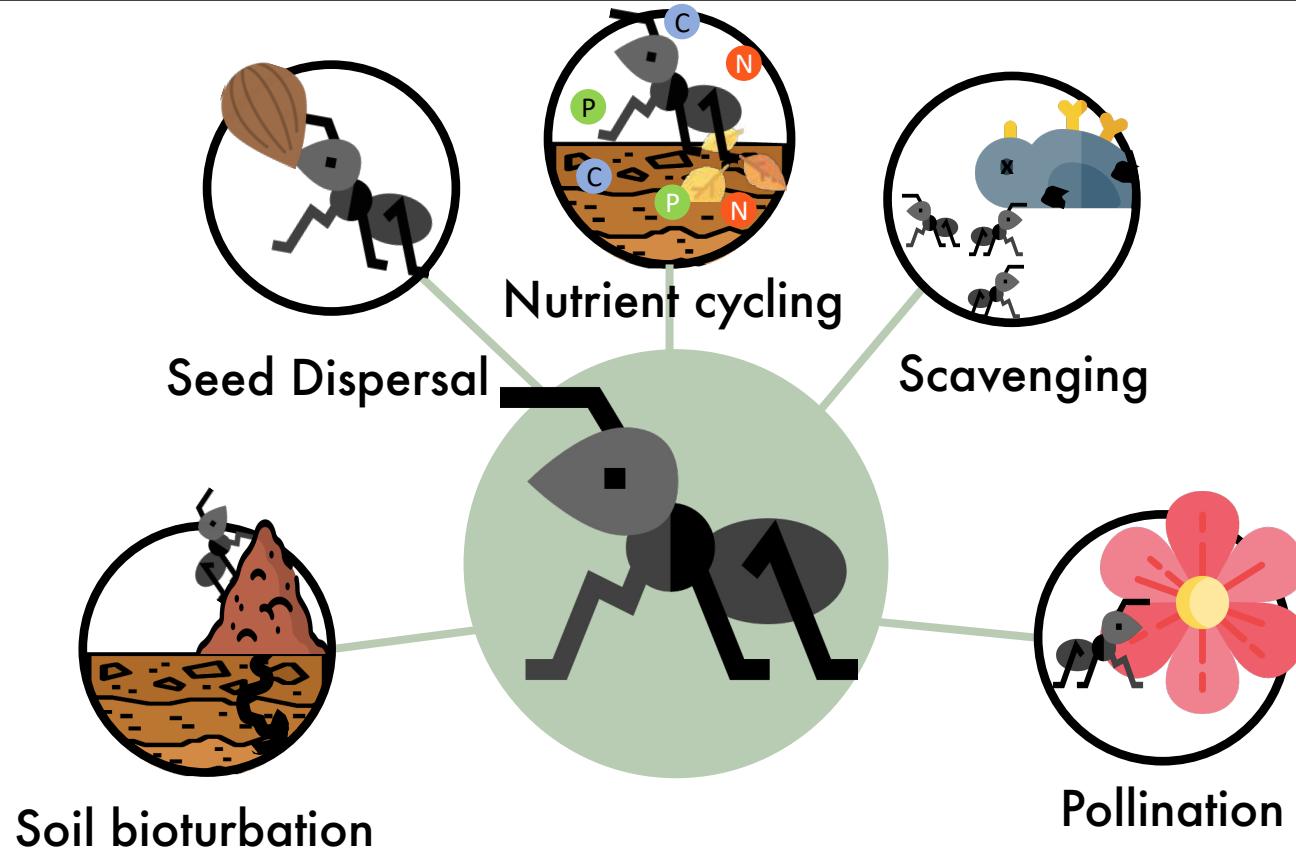
# Ant suppression decreases bait removal



# Scavenging and nutrient cycling



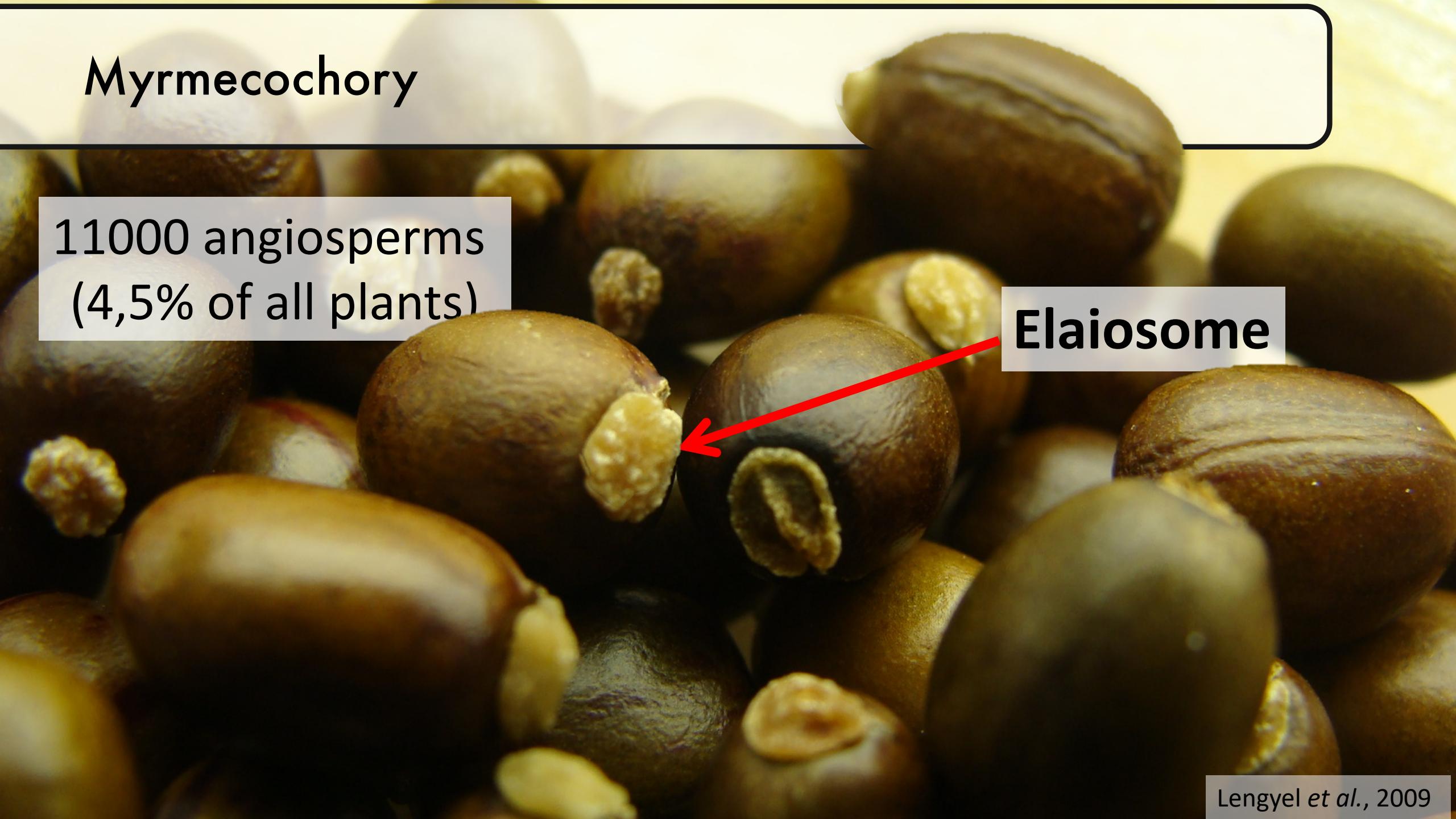
# Ants are involved in several ecosystem processes



# Myrmecochory

11000 angiosperms  
(4,5% of all plants)

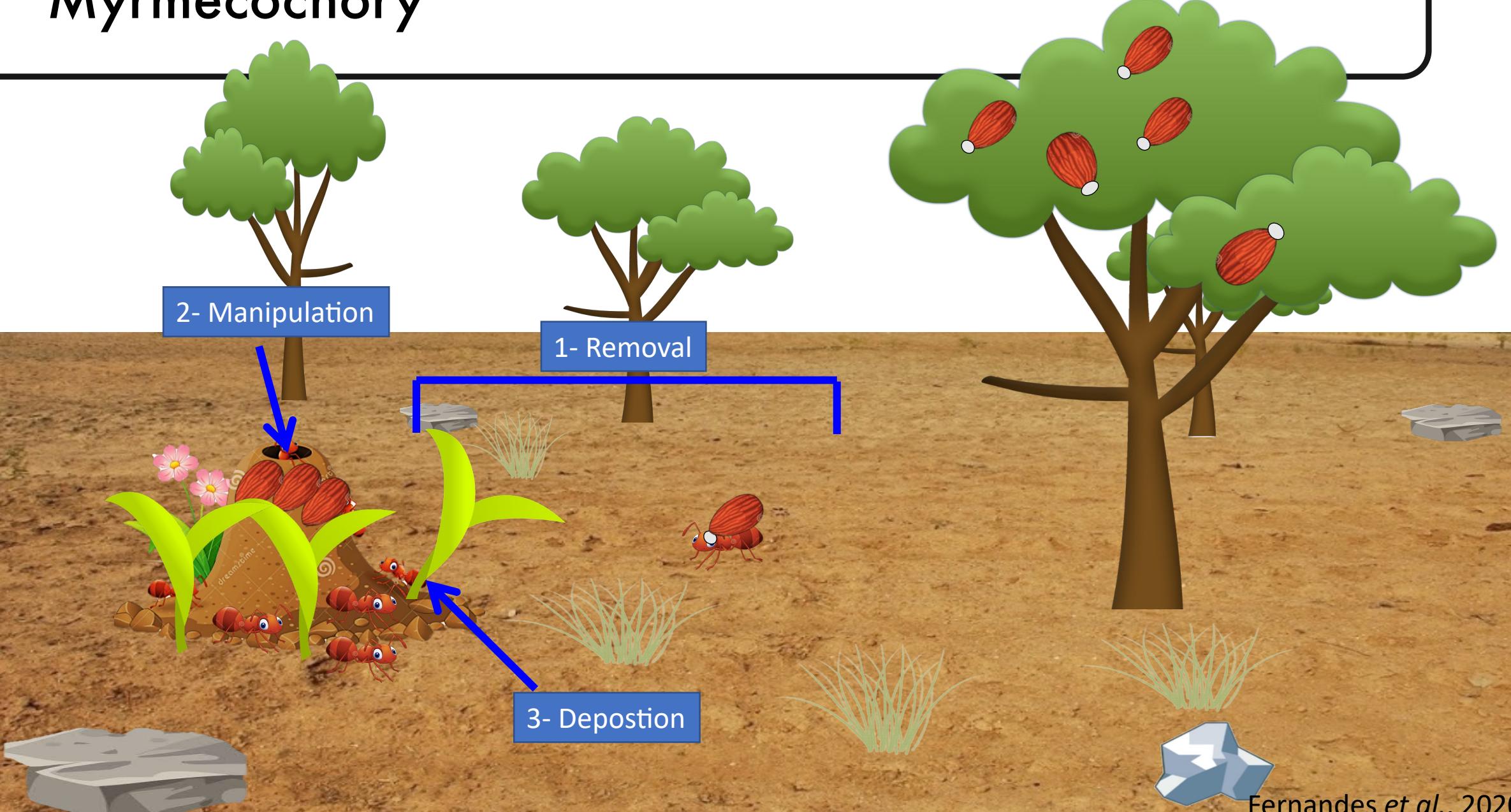
Elaiosome



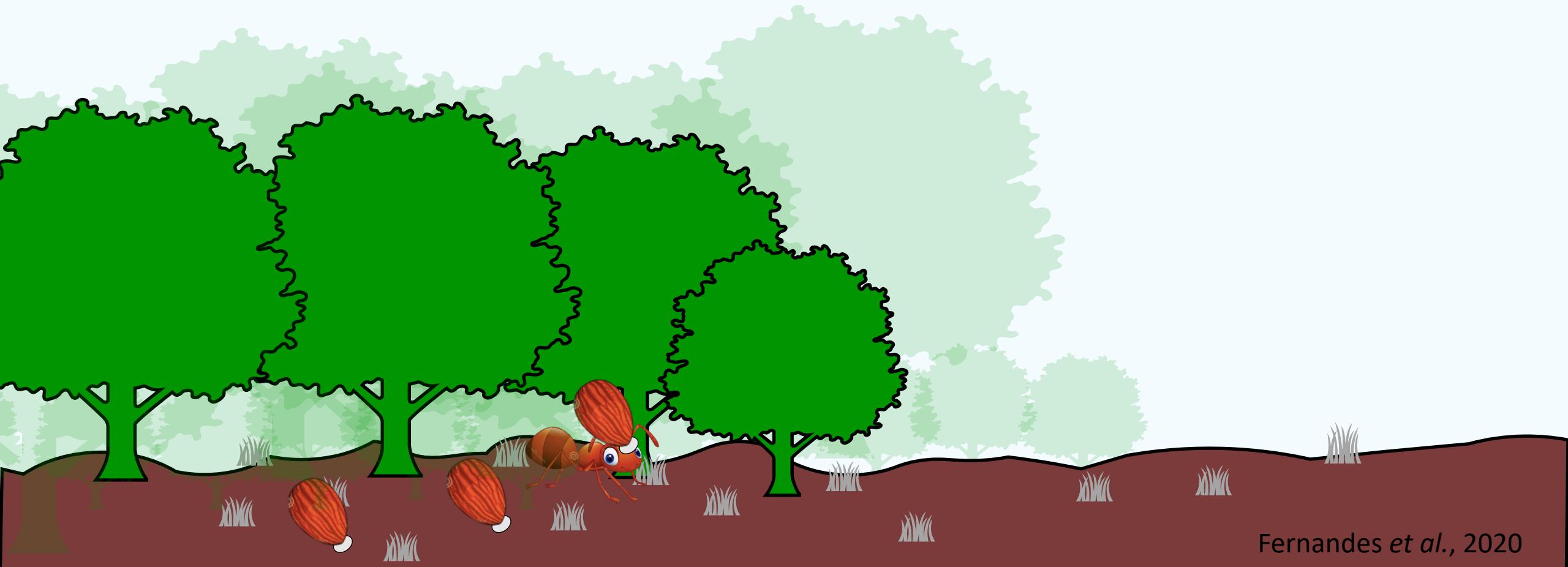
# Myrmecochory



# Myrmecochory



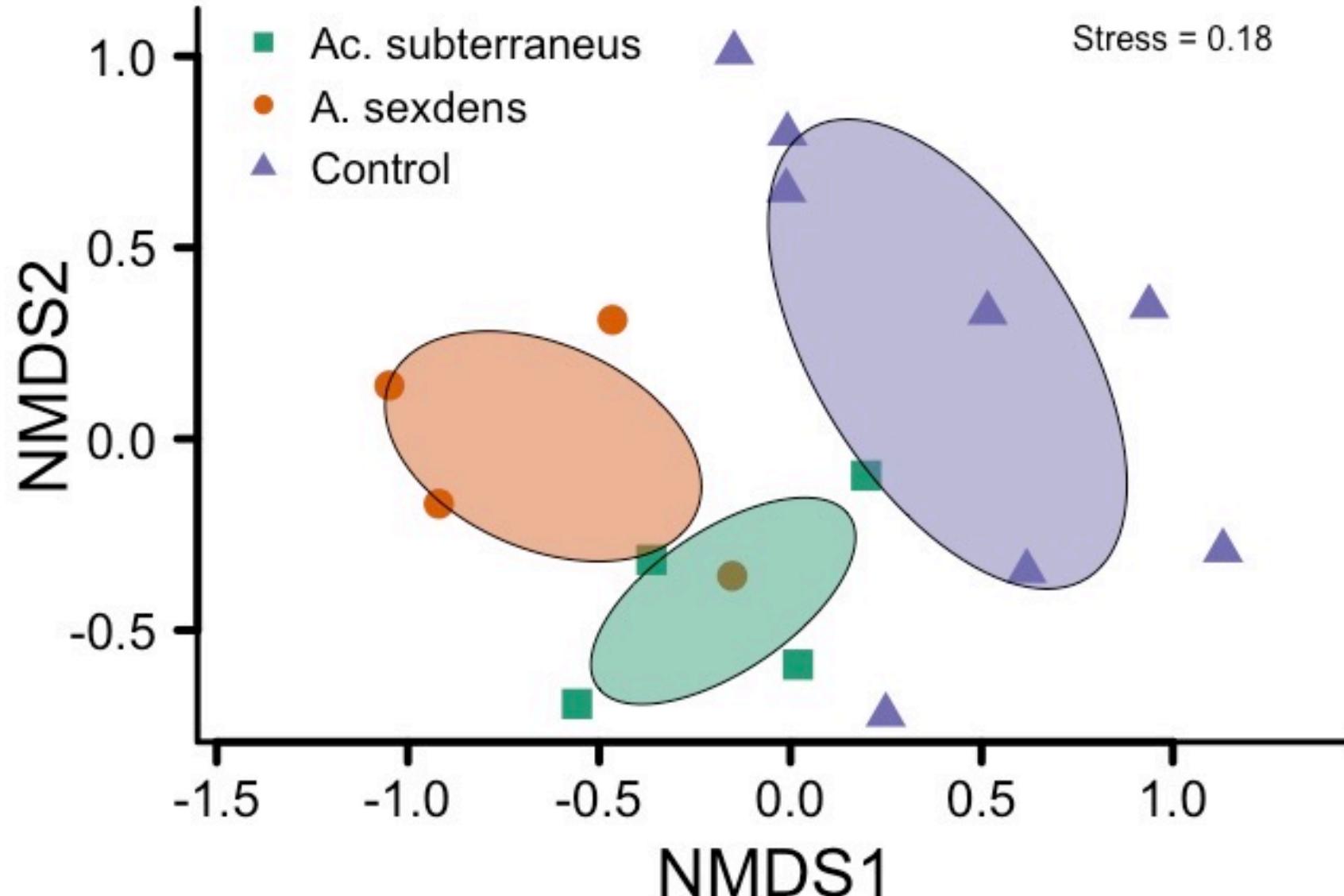
# Removal - Reforestation



# Removal - Reforestation

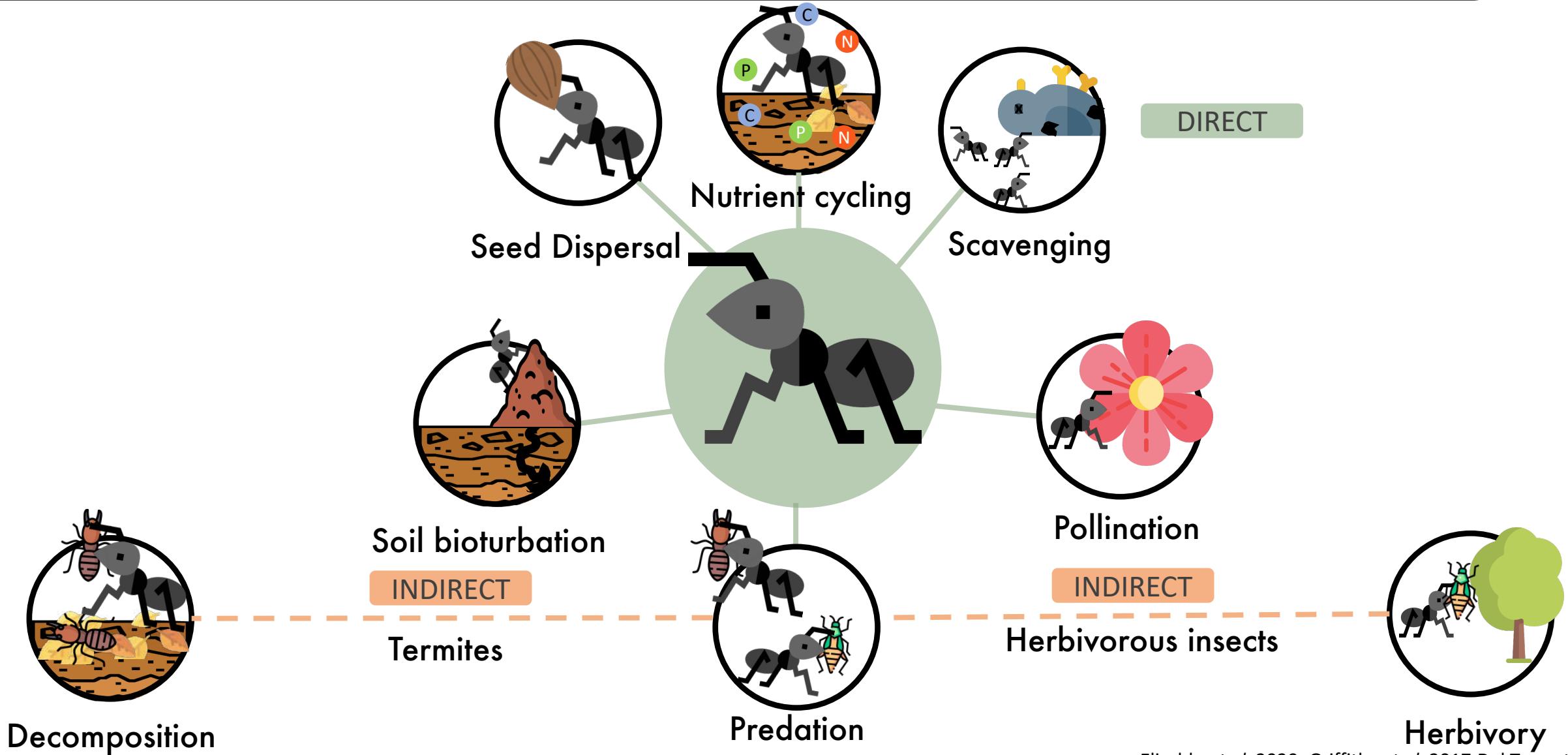


# Manipulation – Change fungi composition on seeds



Effects in germination  
depends on the species

# Ants are involved in several ecosystem processes



# Decomposition

Fundamental to carbon and nutrient cycling



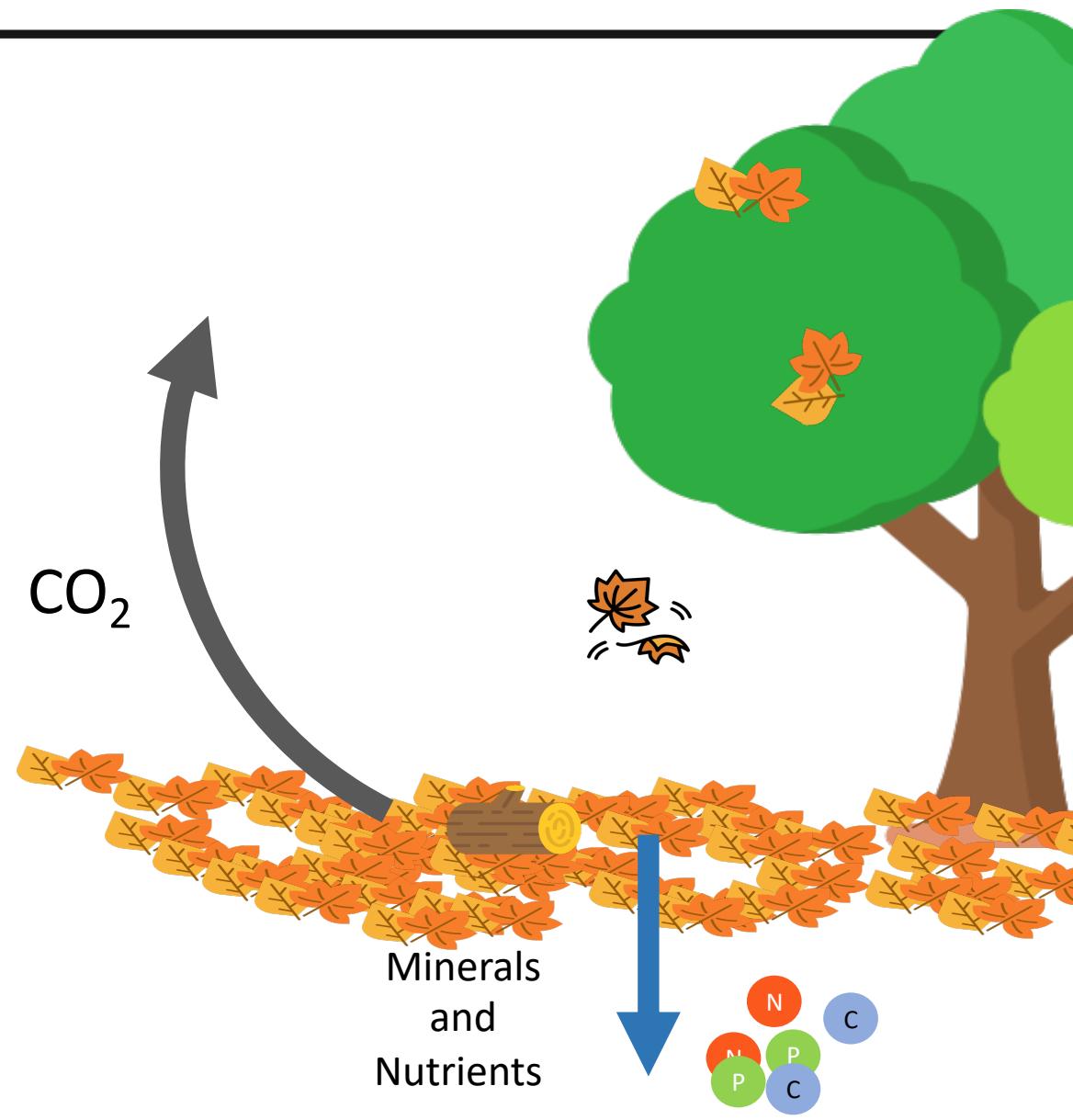
Termites

Up to 64% of wood decomposition in rainforest



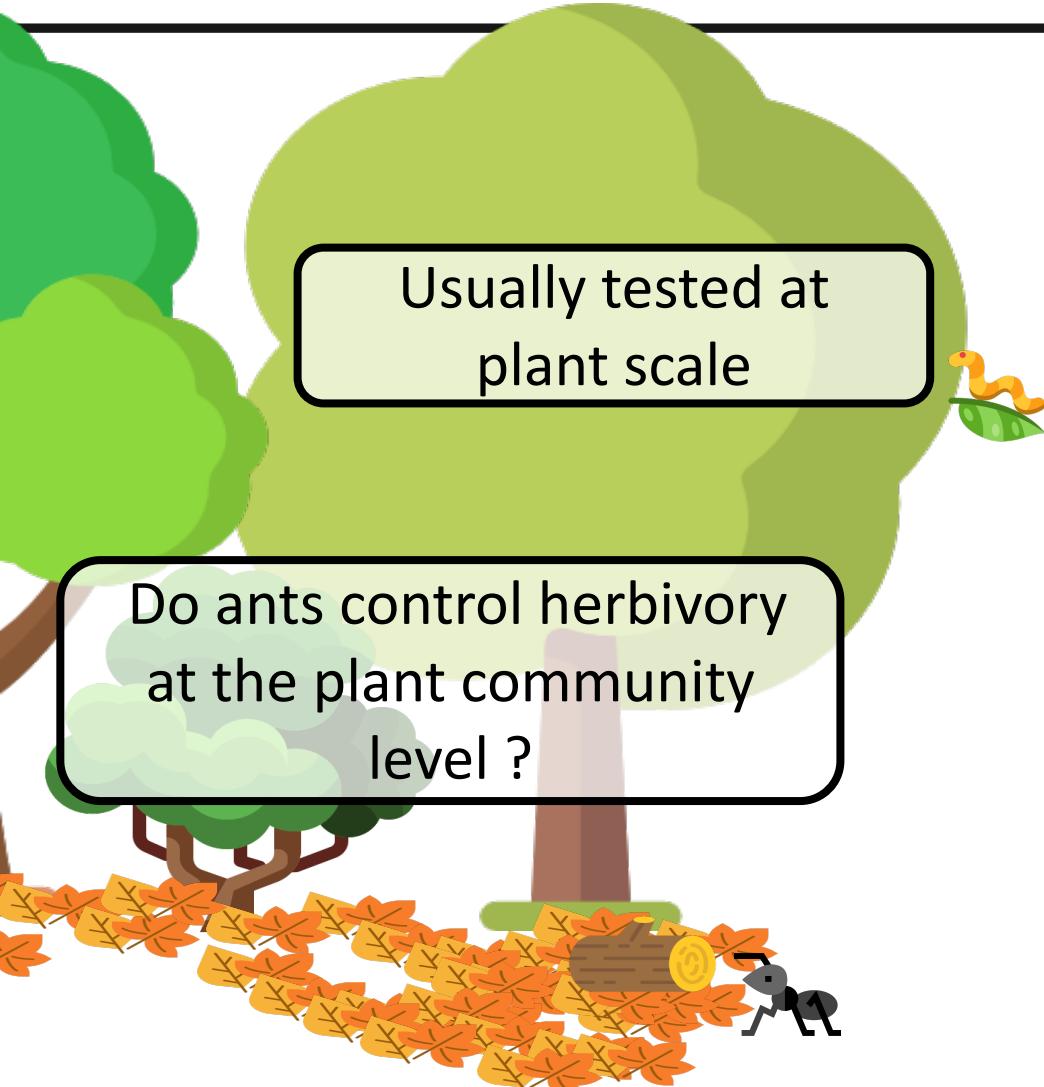
Ants

The main termite predators



Minerals  
and  
Nutrients

# Herbivory

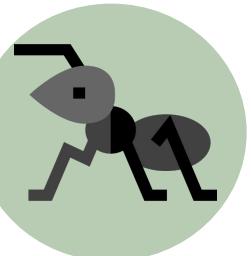


Key processes that affect plant establishment, development and reproduction



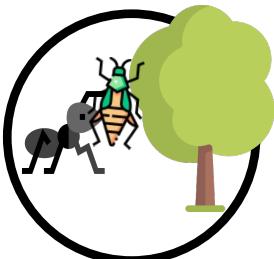
Herbivorous insects

Leaf consumption by insects in the planet is ~8%



Ants

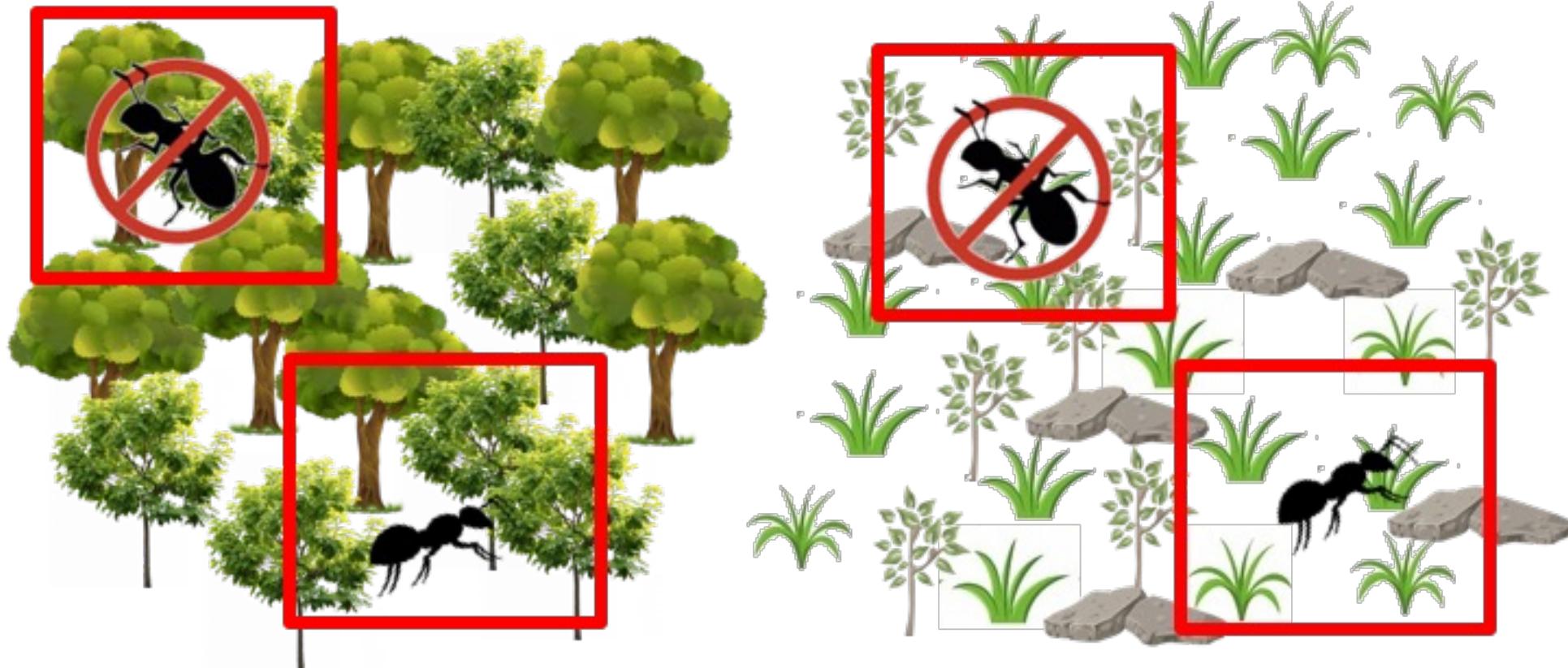
By preying on insects ants protect plants



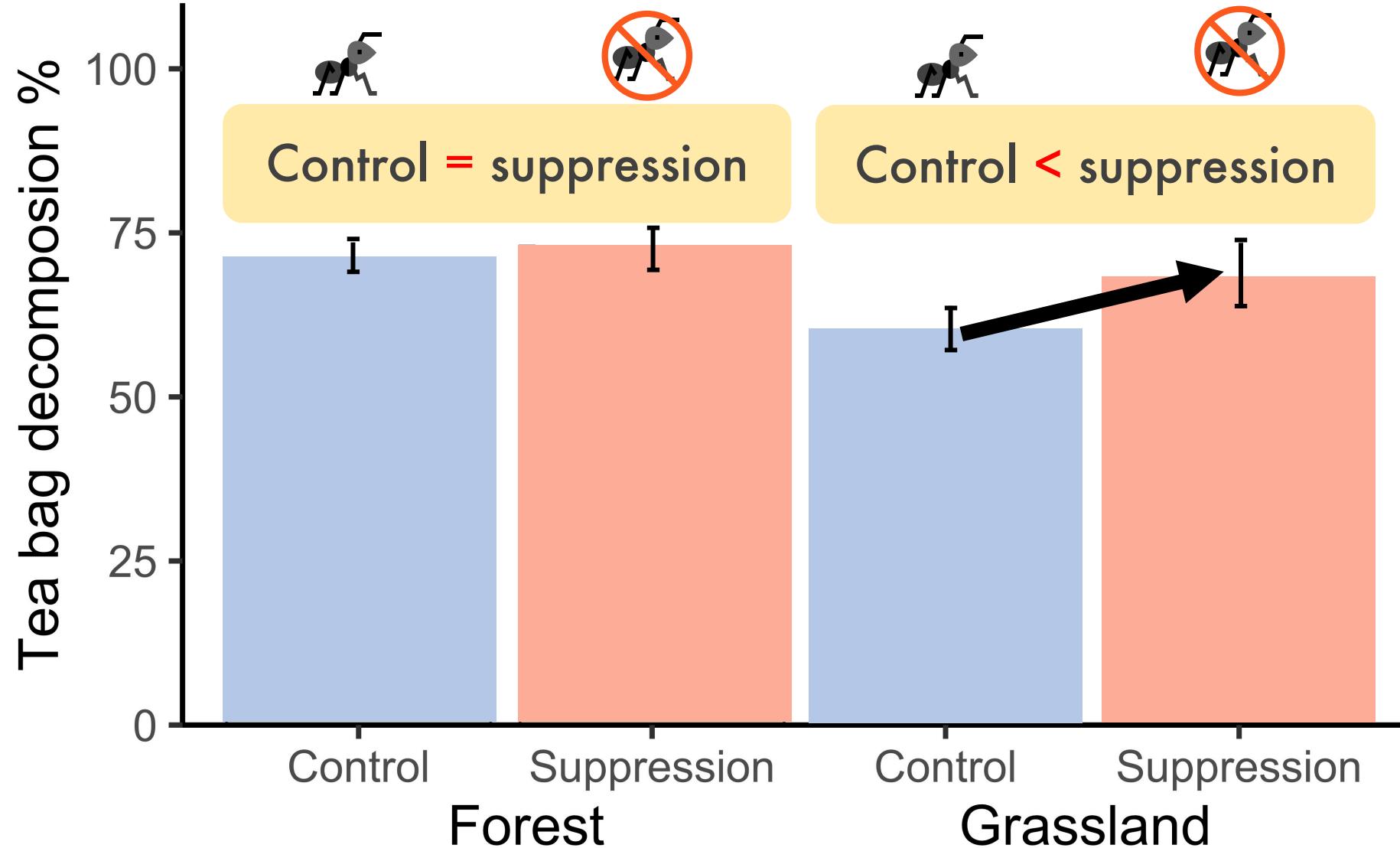
Well studied in the mutualism context  
(myrmecophites and myrmecophiles )

# Measuring the ant role in ecosystem processes

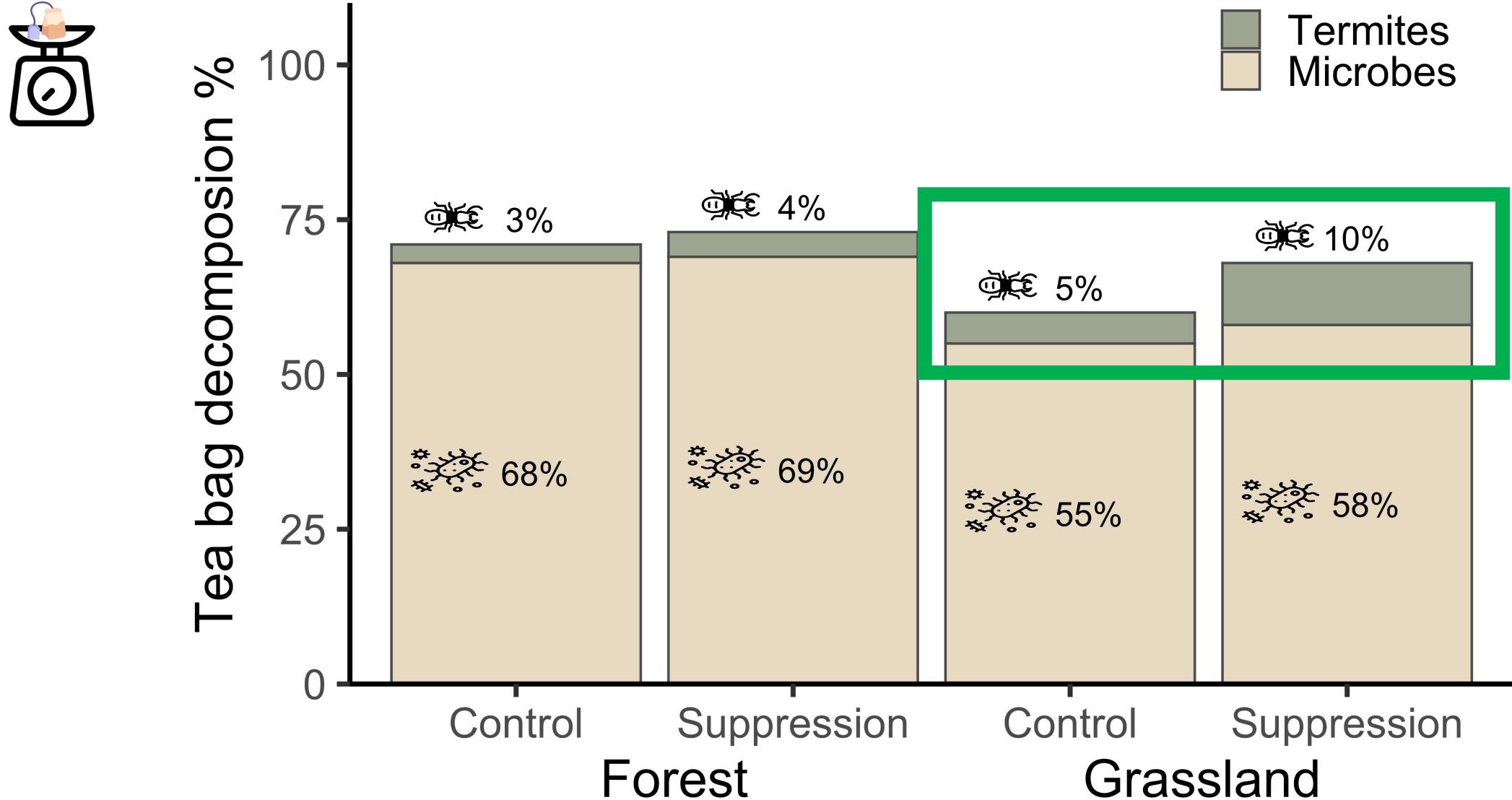
Ant exclusion experiments in Brazil



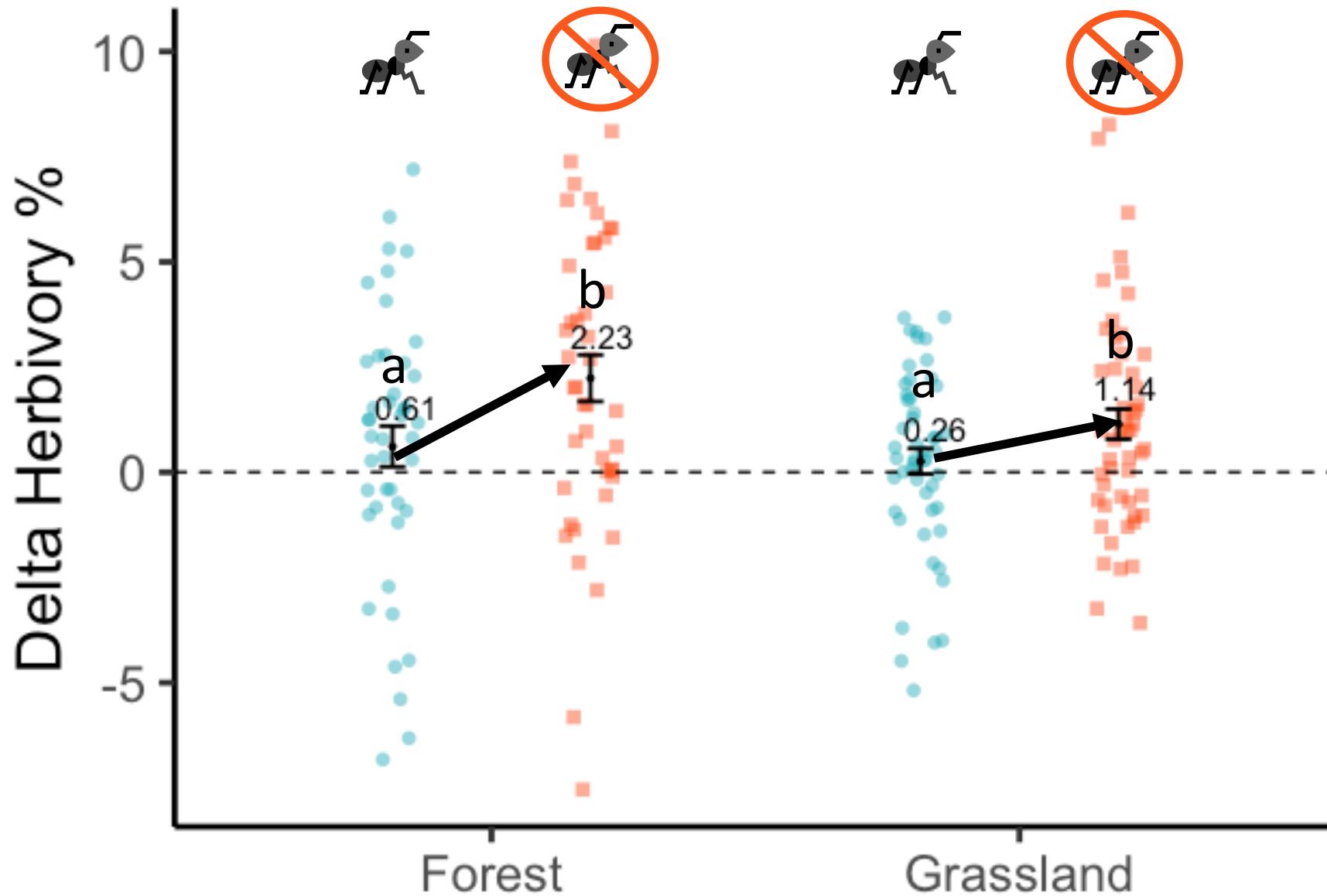
# Decomposition



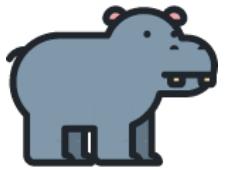
# Tea bag mass loss



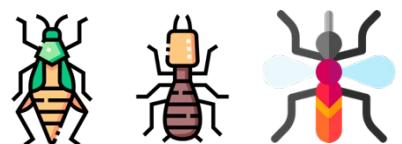
# Herbivory in community plant level



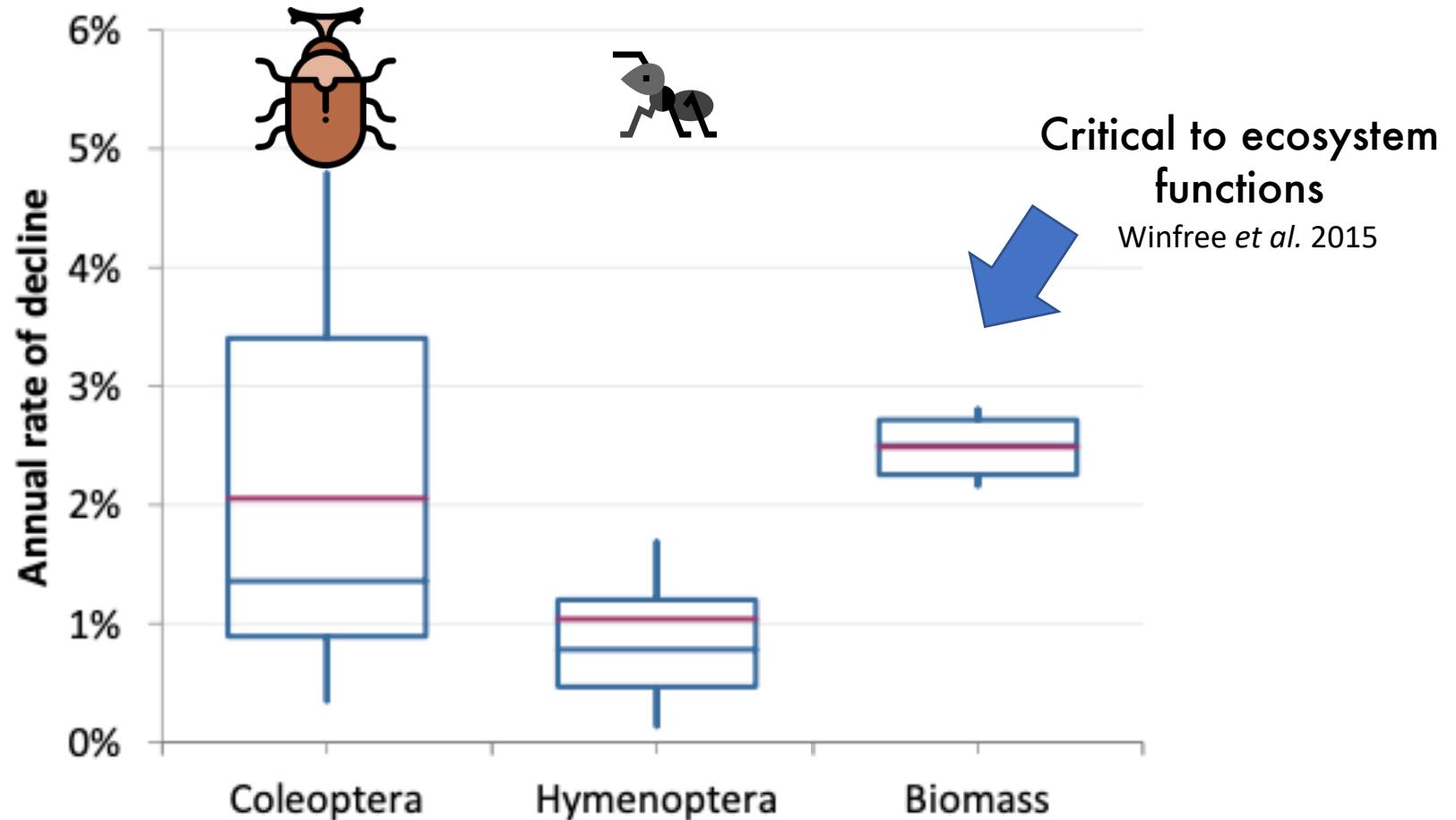
# Community changes - Biomass loss



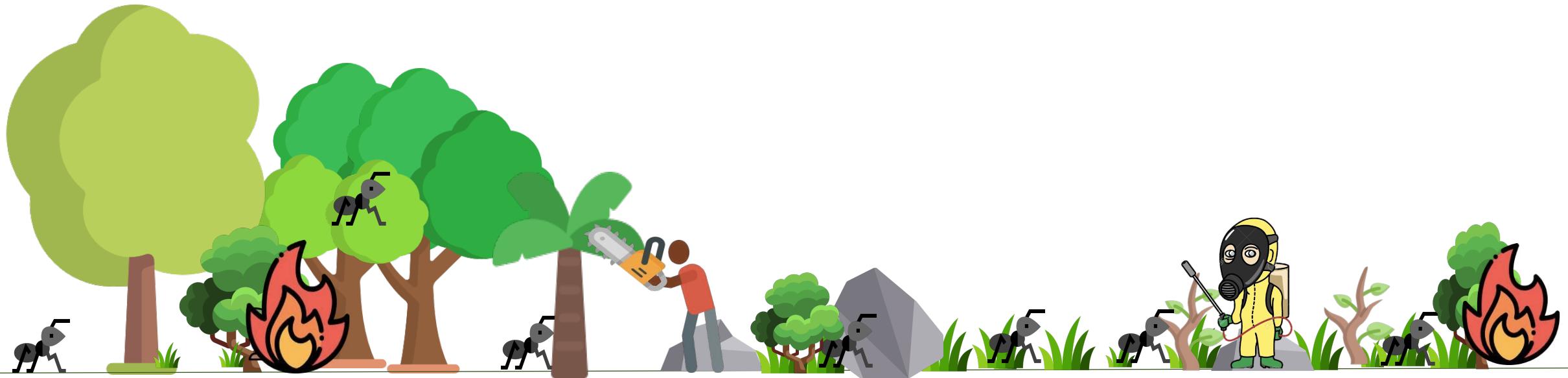
Vertebrates  
22% species



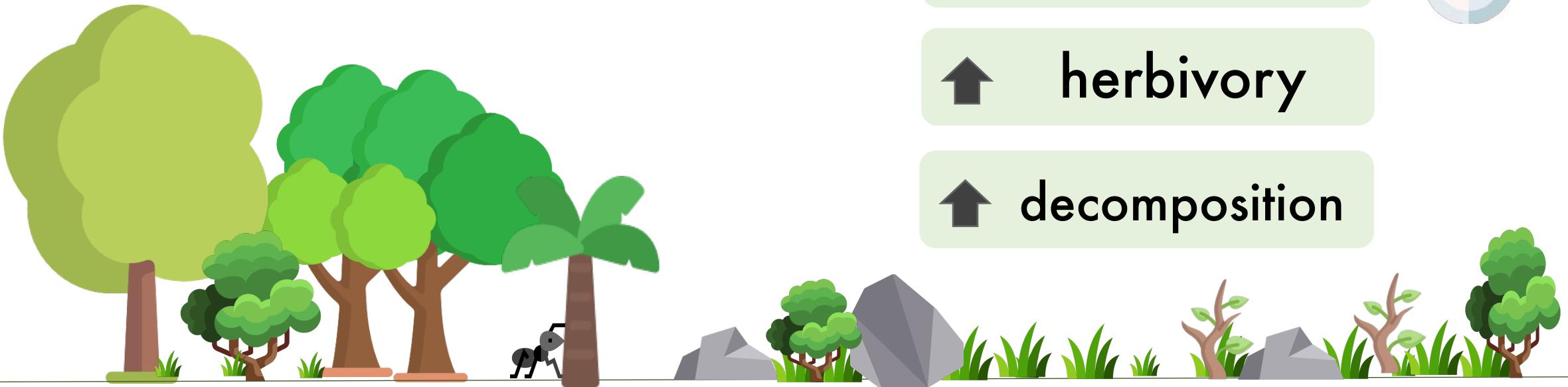
Invertebrates  
41% species



# Disturbances in ant communities also impair ecosystem processes



# Disturbances in at communities also impair ecosystem processes

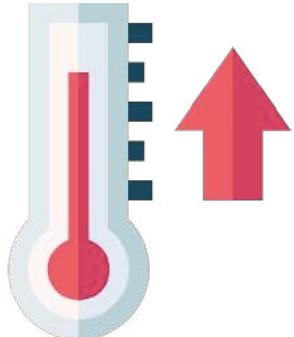


↓ scavenging

↓ seed dispersal

↑ herbivory

↑ decomposition



## Take Home Messages

By looking at those little things we can understand big processes

Ants are key actors in many ecosystem processes

Insect conservation is fundamental to the maintenance of ecosystems

Ants are cool! 😎



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Thank You