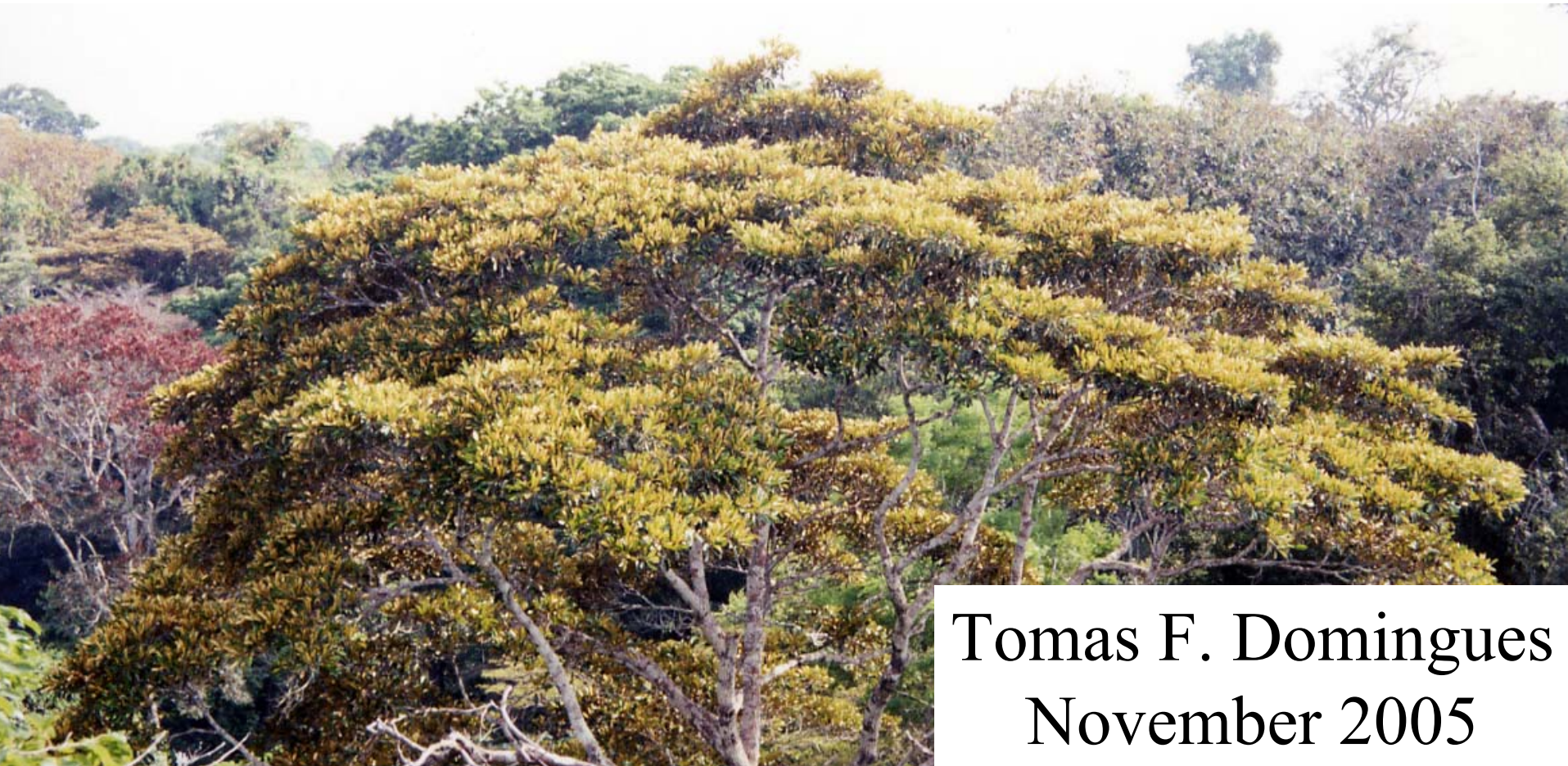
# Ecophysiological characteristics of eastern Amazonian vegetation

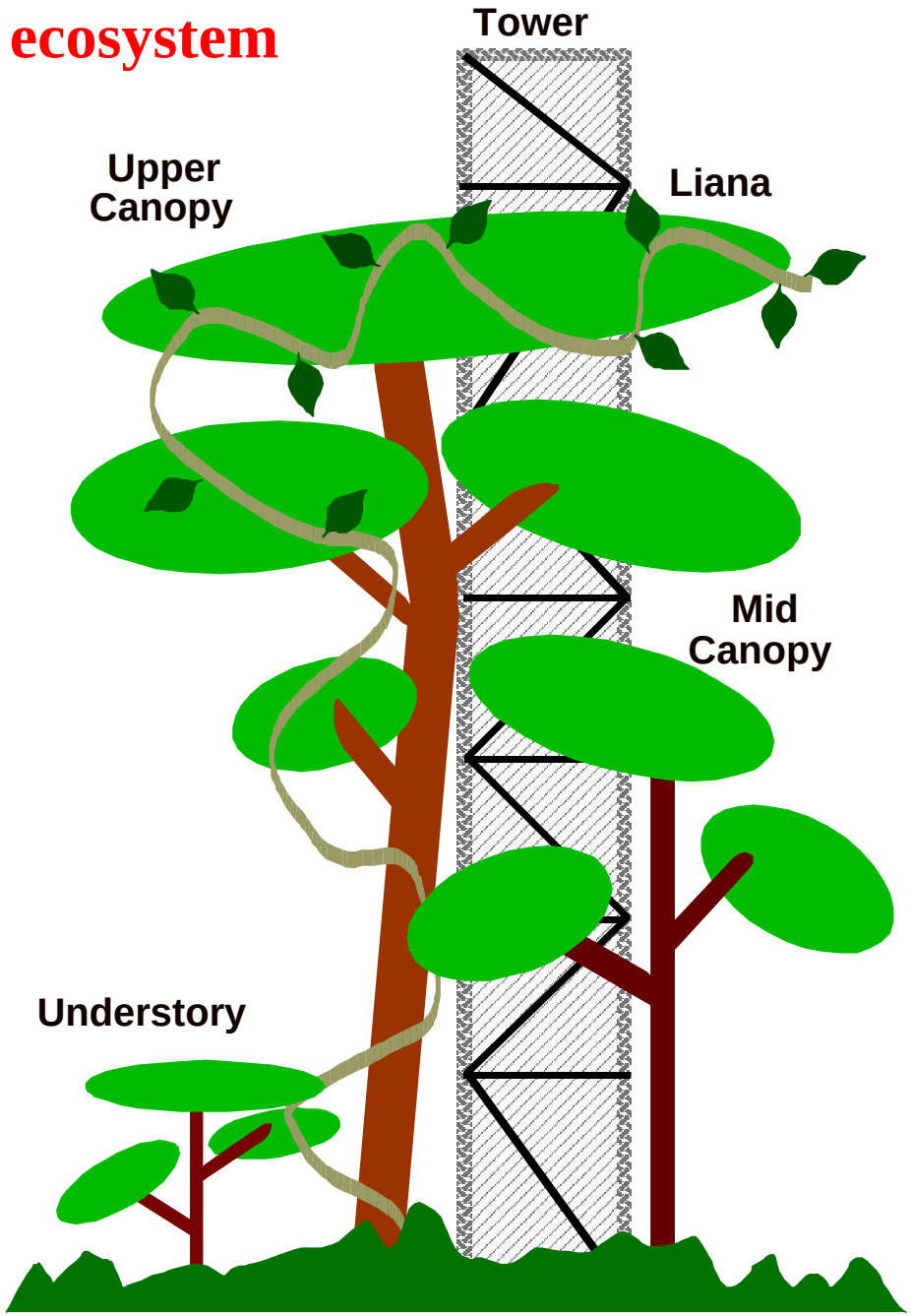


Tomas F. Domingues

November 2005

Variability of ecophysiological traits among plant species

**Forest ecosystem**

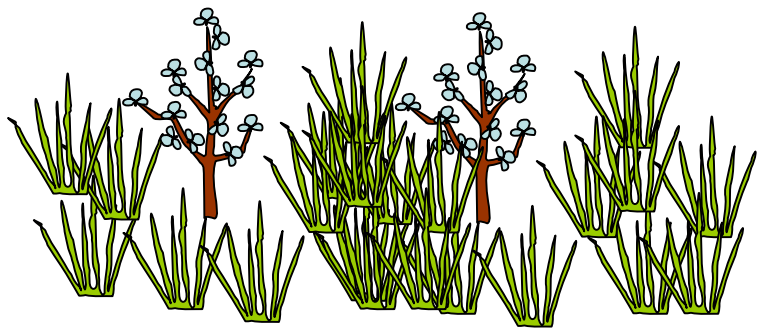


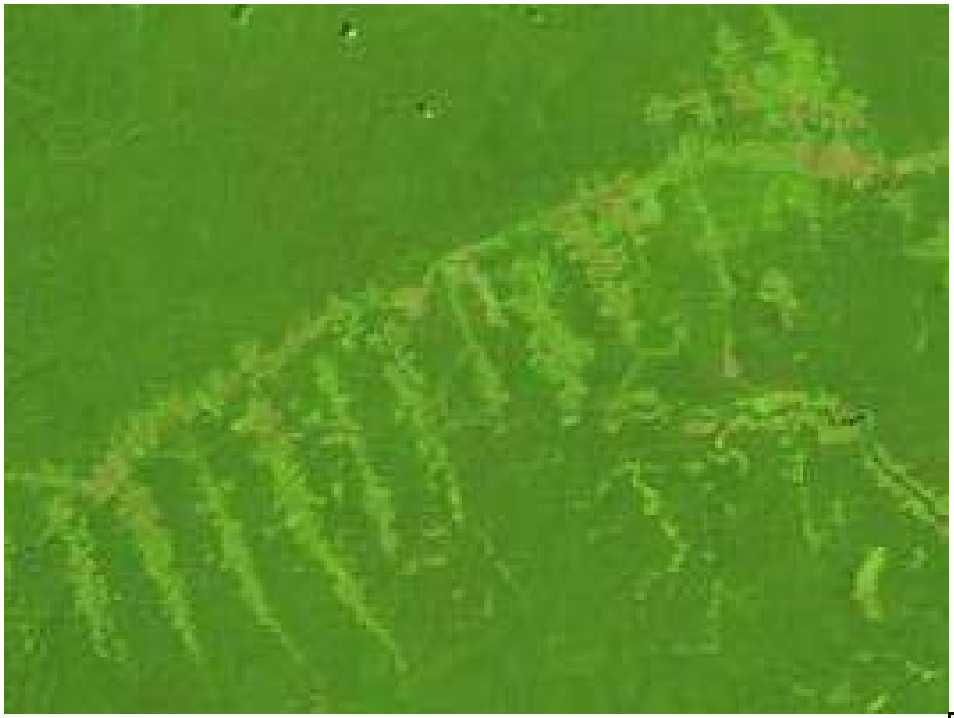

# Simplifying diversity

## functional groups

**Pasture ecosystem**

**Saplings and grass**

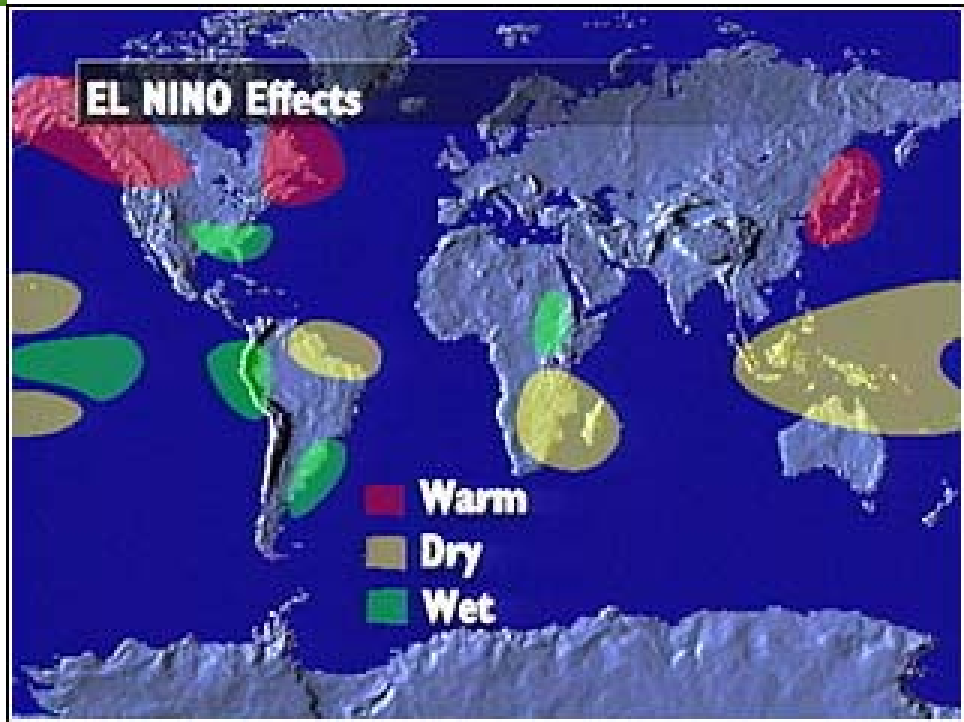




Increased seasonality

Land use change

El Niño

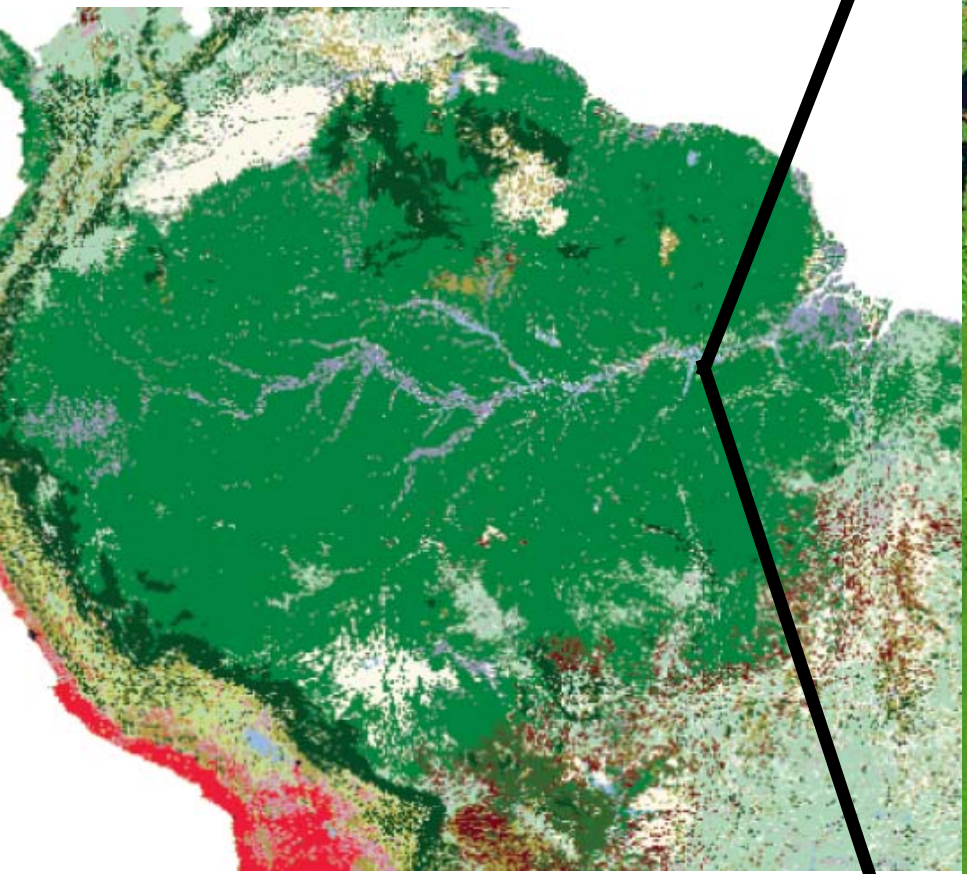


1 - Do species show different patterns of response to environmental factors?

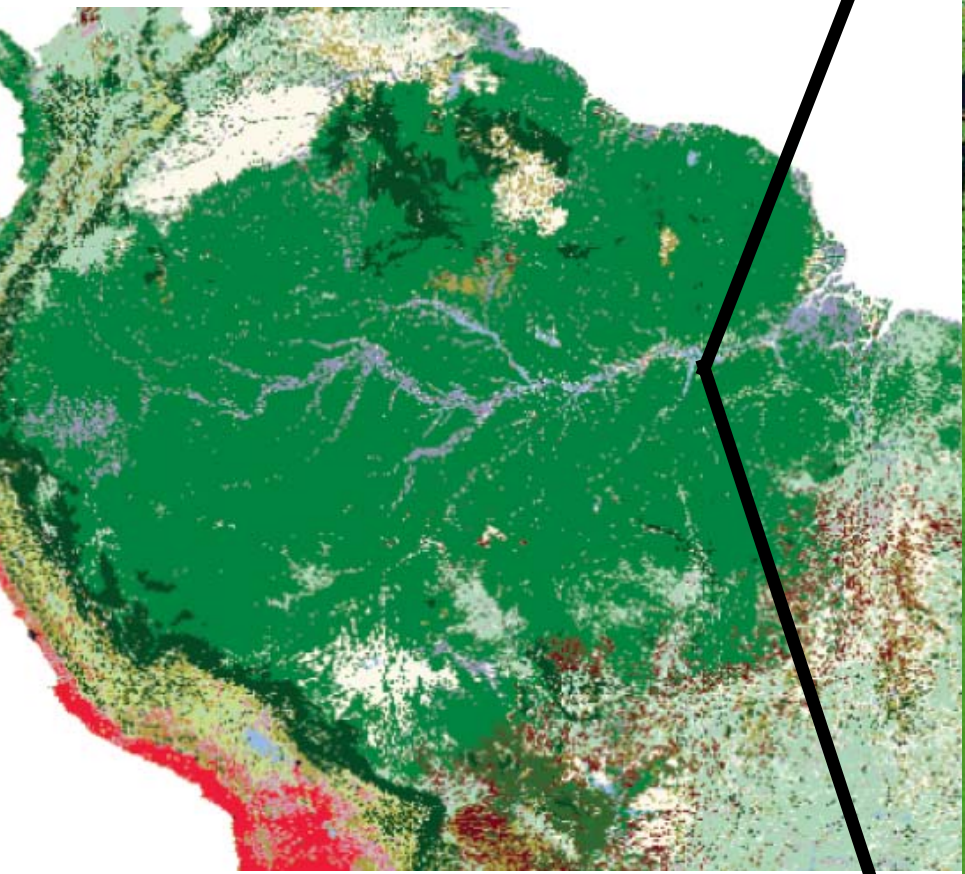
2 - Do functional groups have distinct ecophysiological characteristics?

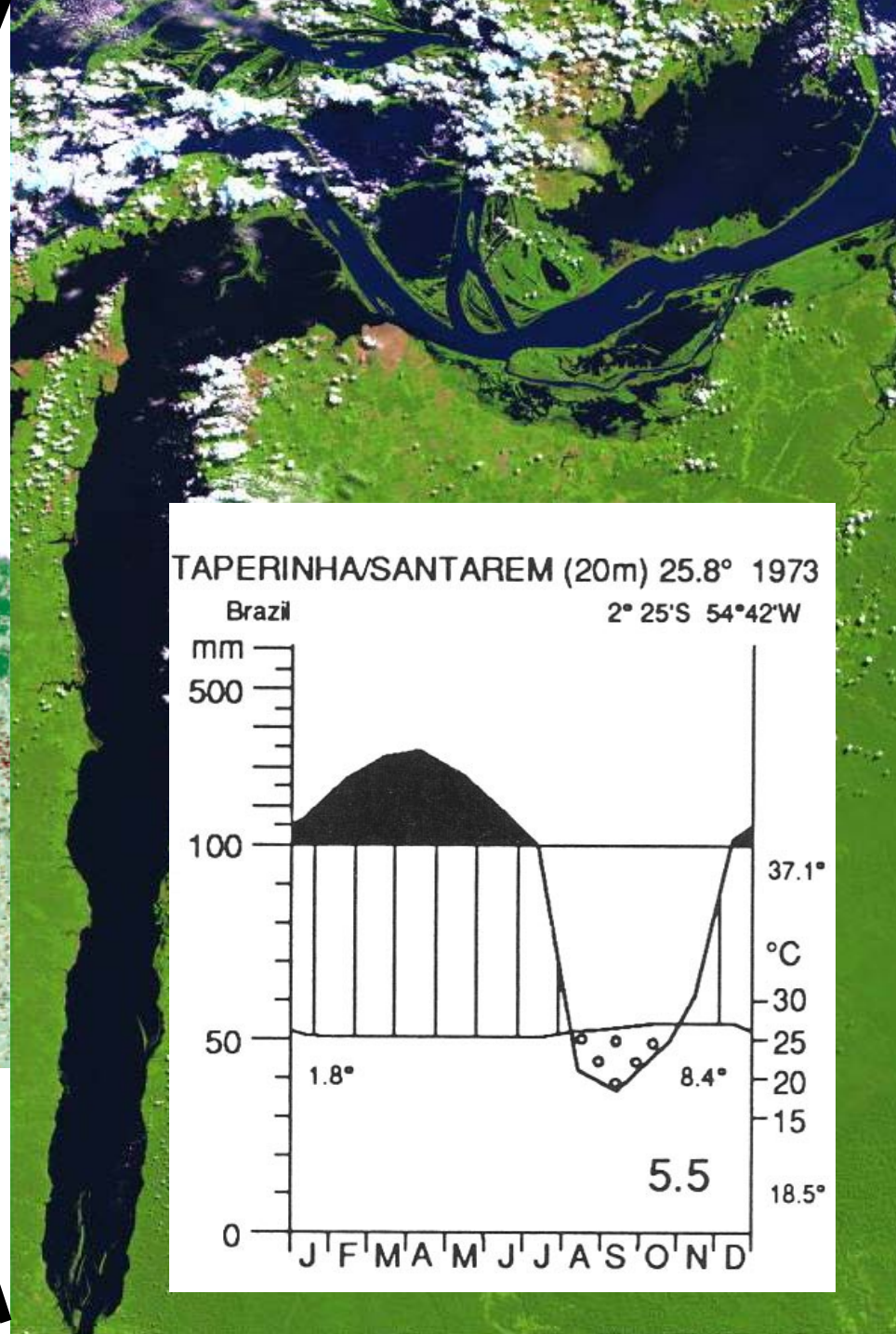
3 - Does wet and dry season influence photosynthesis?

# Study site



# Study site




TAPERINHA/SANTAREM (20m) 25.8° 1973
Brazil
2° 25'S 54°42'W
mm
500
100
50
0
1.8°
8.4°
5.5
37.1°
°C
30
25
20
15
18.5°
J F M A M J J A S O N D

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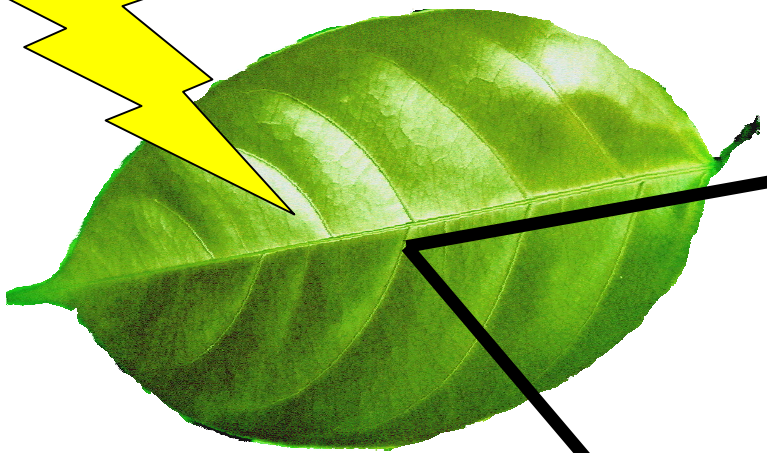
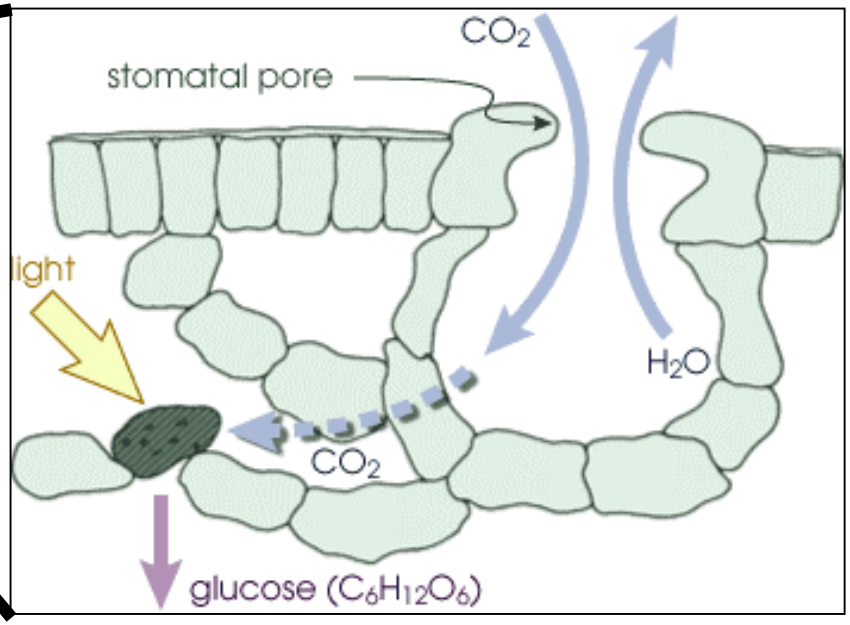
# Photosynthesis

Assimilation

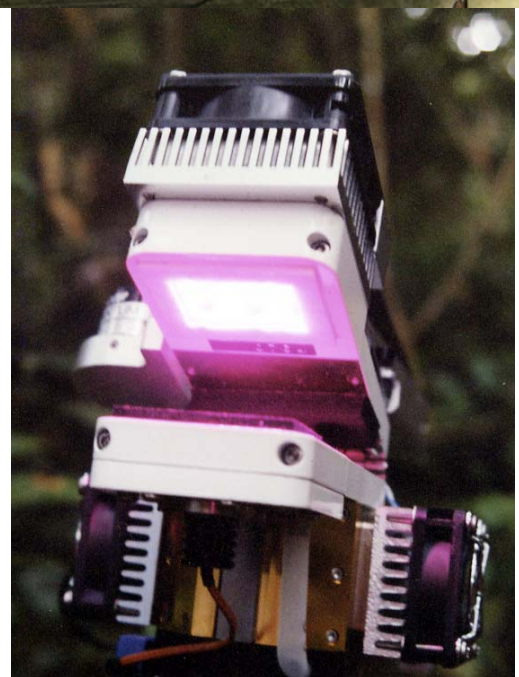
Transpiration

Light

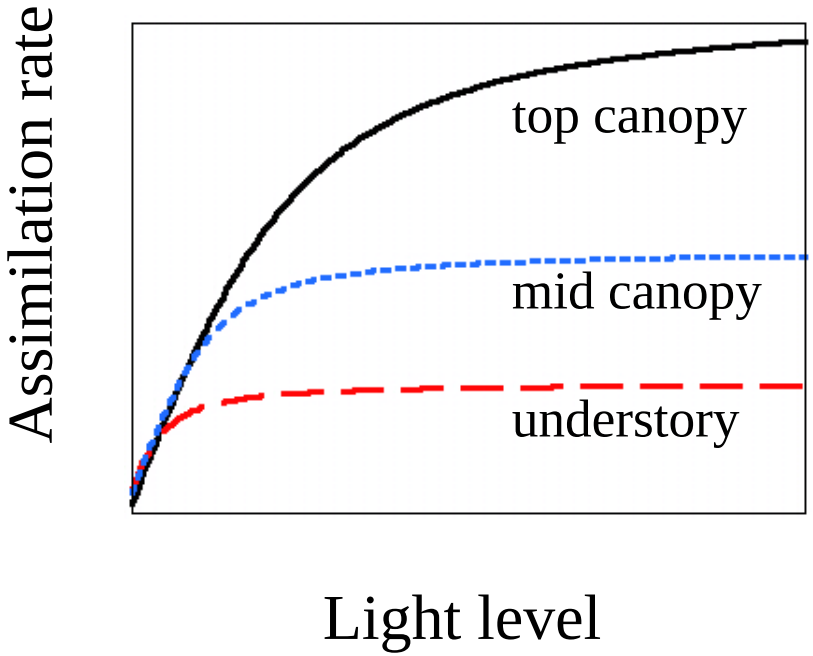


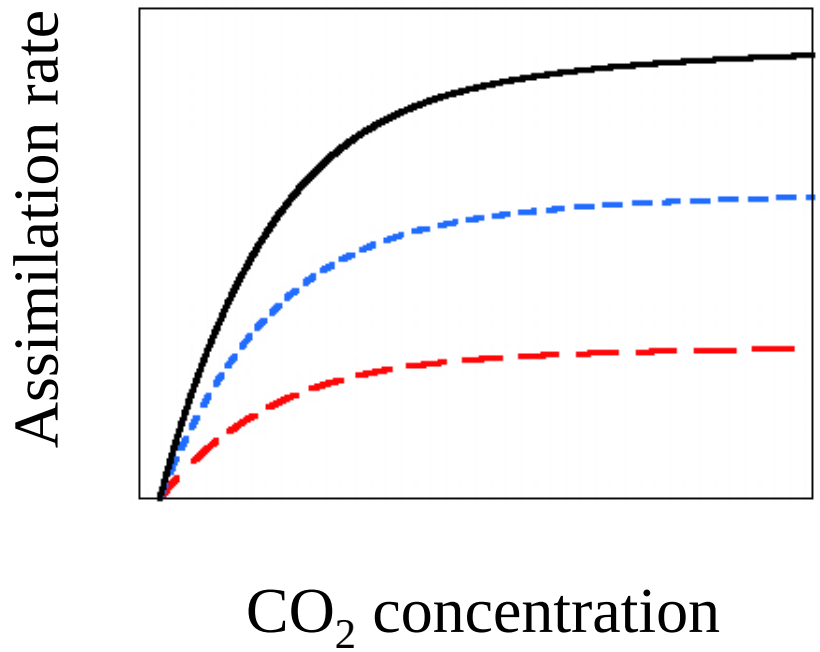


# Portable gas exchange system

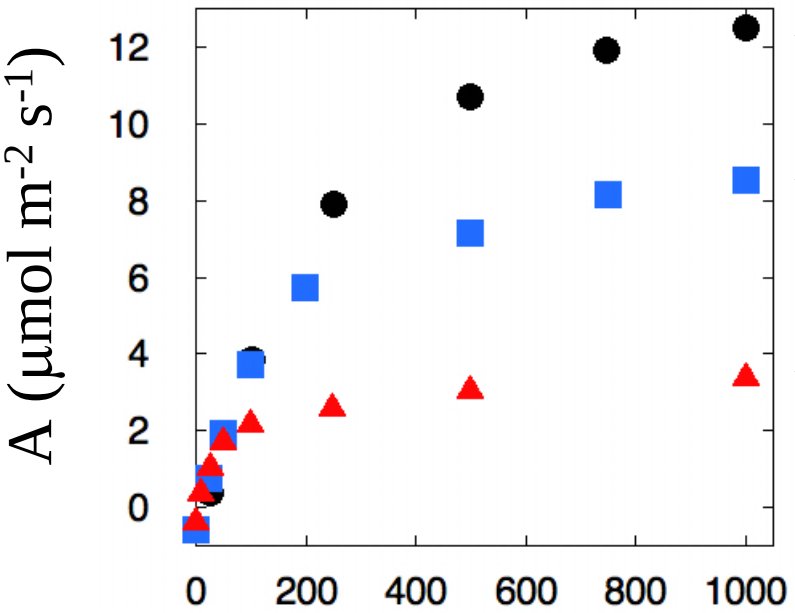



# Response curves



# Variability among species



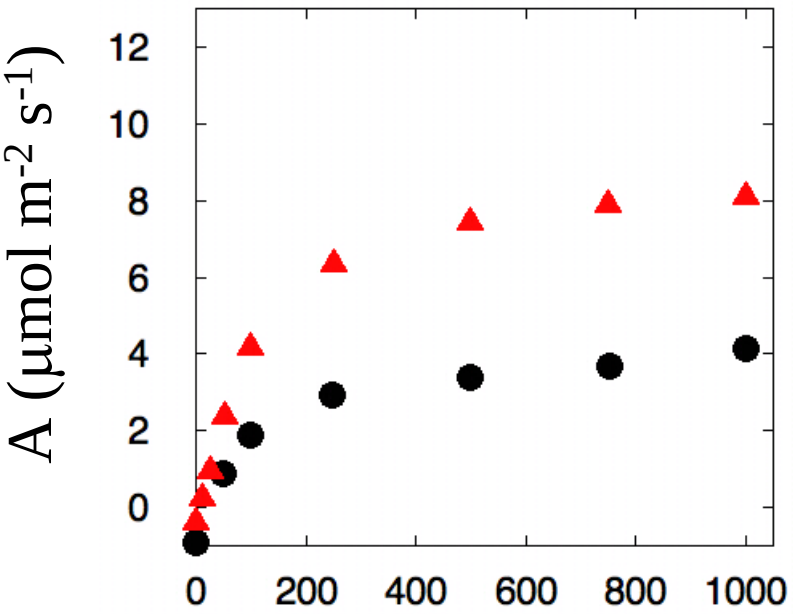

← *Manilkara huberi* (top canopy)

← *Protium puncticulatum* (mid canopy)

← *Rinorea neglecta* (understory)

Resources are allocated to match environmental conditions

# Variability among species

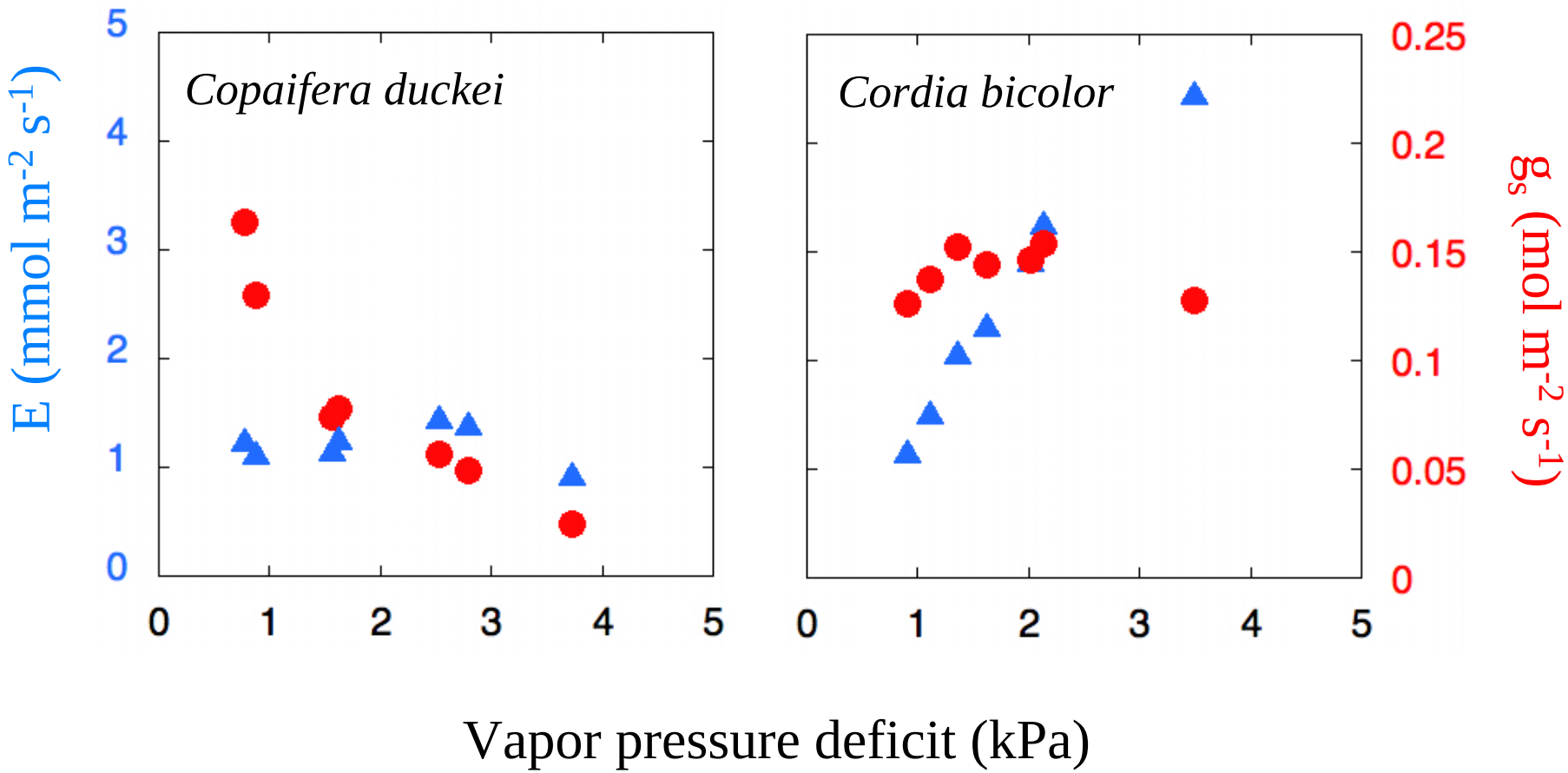


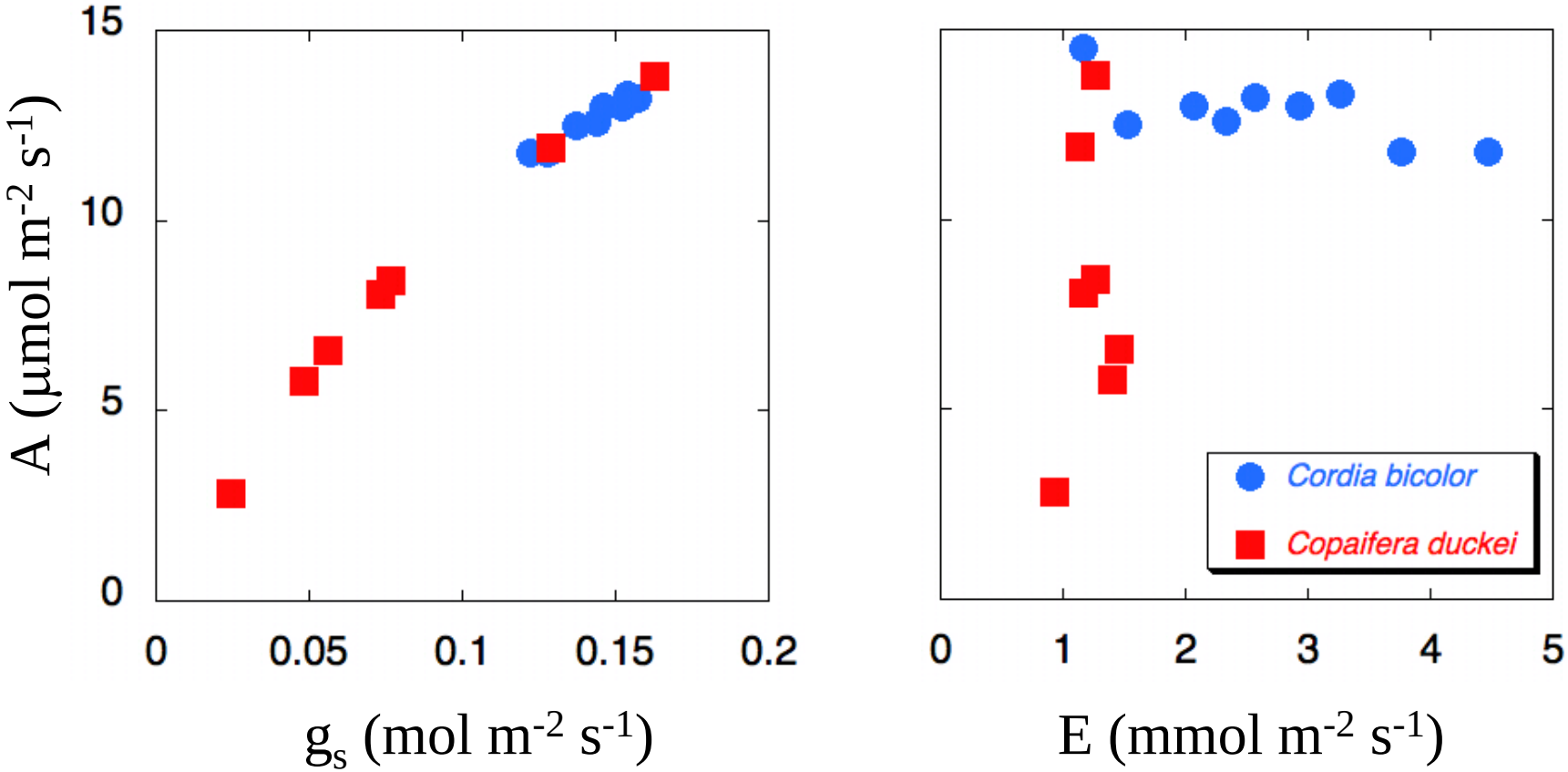

← *Sclerolobium paraense* (understory)

← *Micropholis* sp. (top canopy)

Other factors are also important!

# Variability among species






Species composition does matter!

# Summary

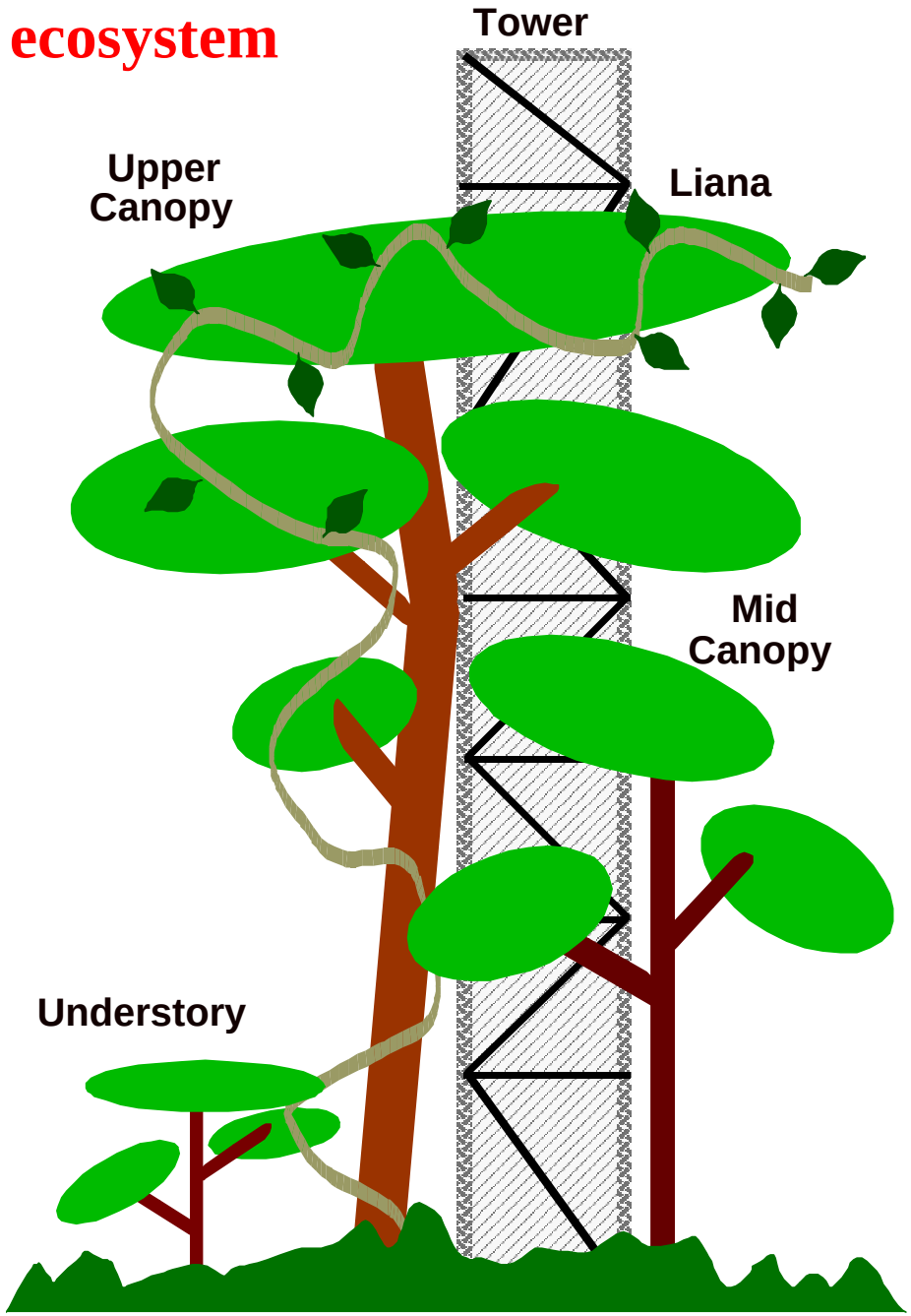
- Considerable variability among species
- Environment explains part of the variation
- There are different patterns of response

1 - Do species show different patterns of response to environmental factors?

2 - Do functional groups have distinct ecophysiological characteristics?

3 - Does wet and dry season influence photosynthesis?

**Forest ecosystem**




# Simplifying diversity

# functional groups

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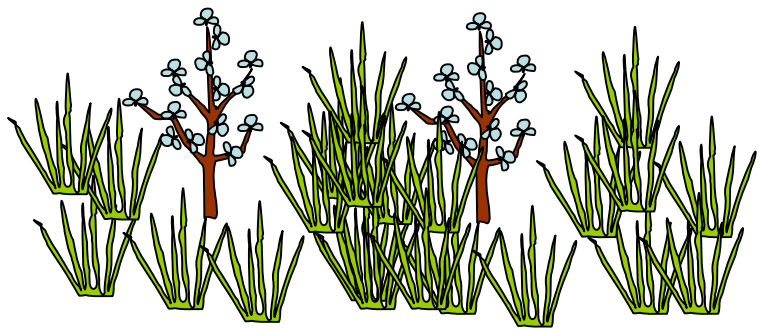
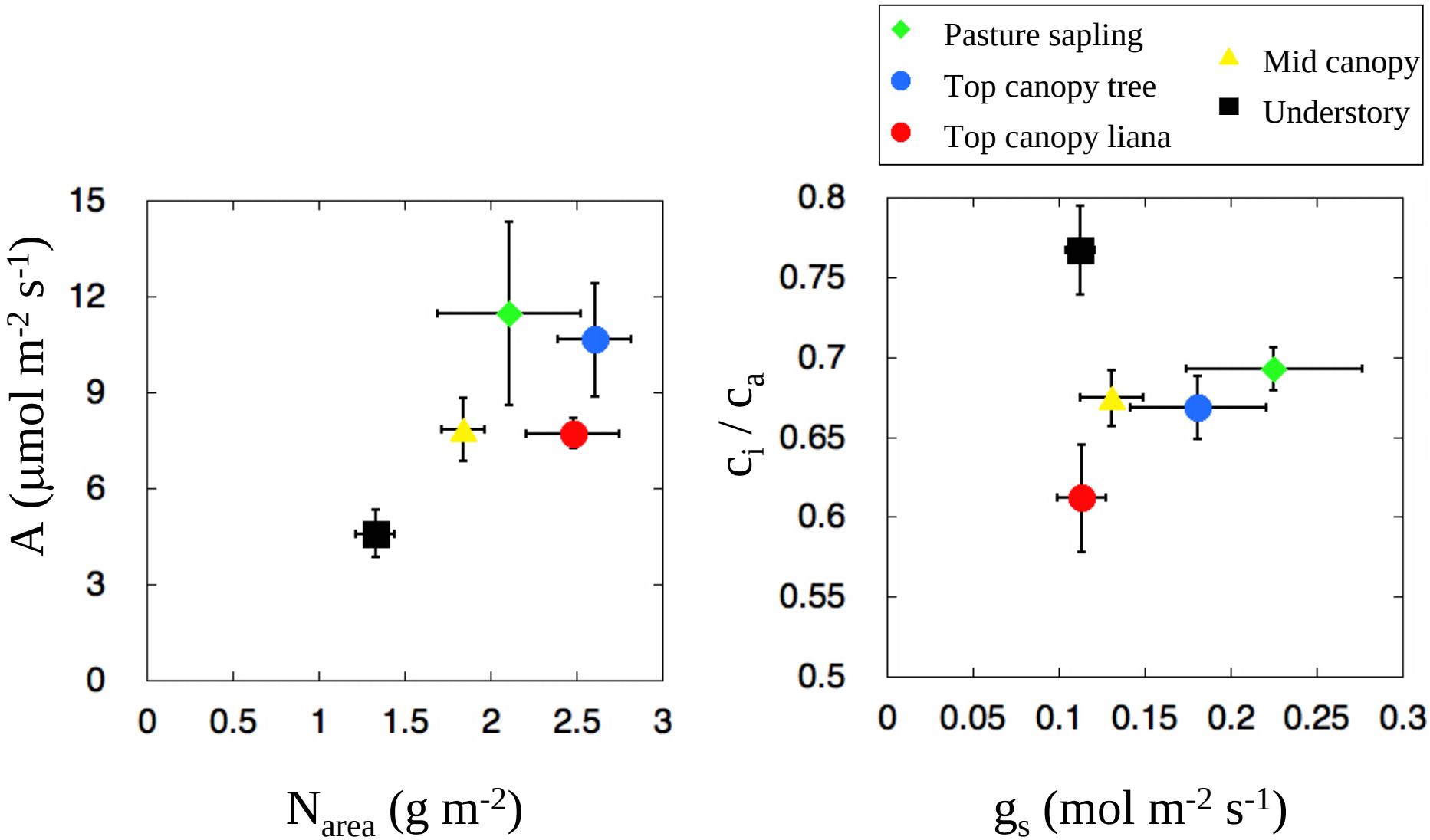


# Functional groups have different ecophysiological patterns



# Summary

- Functional groups show distinct ecophysiological characteristics
- Key leaf parameters are useful to characterize groups

1 - Do species show different patterns of response to environmental factors?

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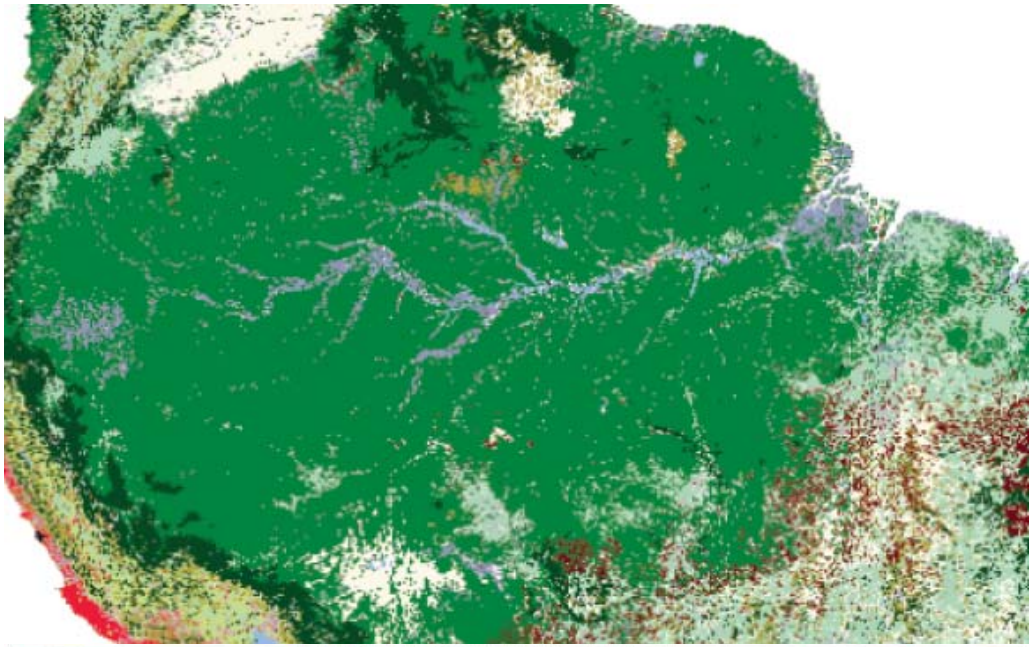
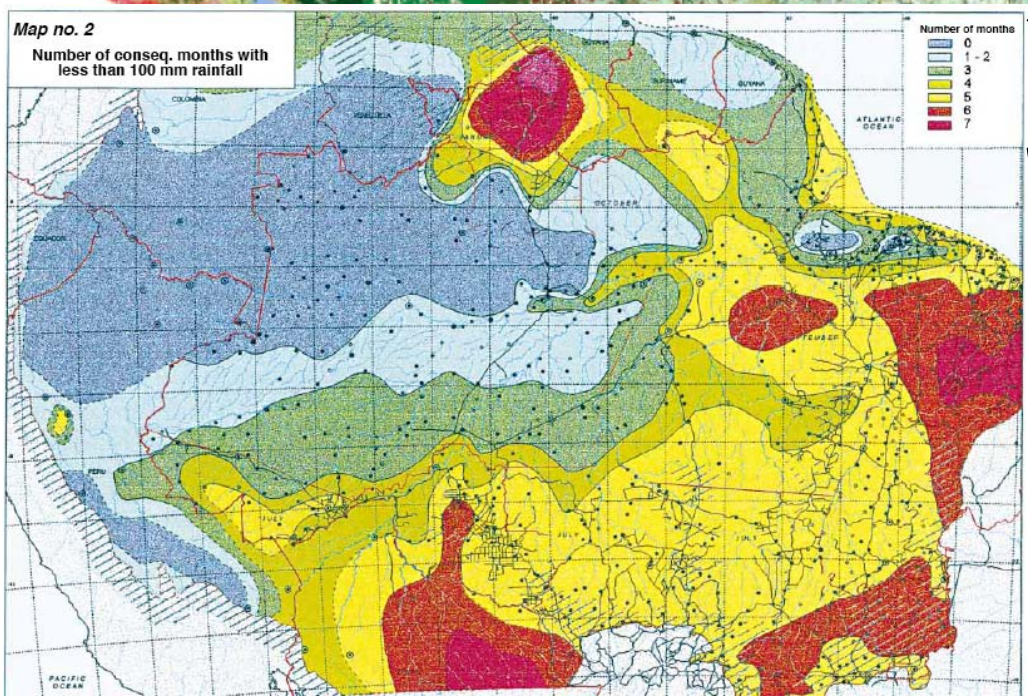


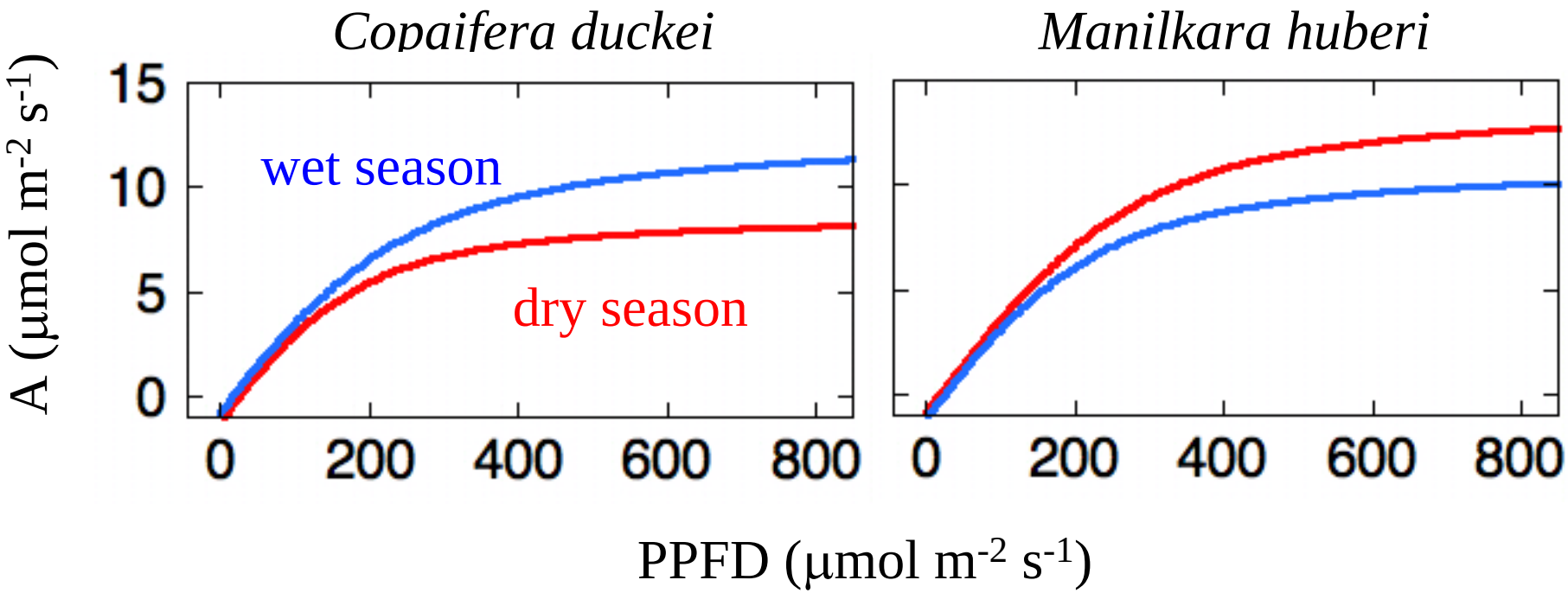



Months with precipitation < 100 mm

- 0
- 1 - 2
- 3
- 4
- 5
- 6
- 7

Sombroek 2001

# Effects of season




35% of species showed lower assimilation during the dry season

Dry-season versus Wet-season

| Species |
| --- |
| *Priono stemma* aff. *a* |
| *Tetrapterys sp.* |

# Stand level

<u>Limited evidence</u> of changes with season

# Conclusions

- Considerable variability among species
- At the species level, assimilation varied in concert with assimilation capacity and stomatal conductance
- At the community level, no seasonal influence over photosynthesis

"To finish this account of the advantages of Santarém, the delicious bathing in the clear waters of the Tapajós may be mentioned. There is here no fear of alligators; when the east wind blows, a long swell rolls in on the clean sandy beach, and the bath is most exhilarating"

Henry Walter Bates, 1863