

Food and nutrition security: The role of pollination in enhancing food production

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Crop yield

Conventional intensification

Largeholdings
(landscape simplification)

Agricultural inputs

fertilizers
pesticides
hives

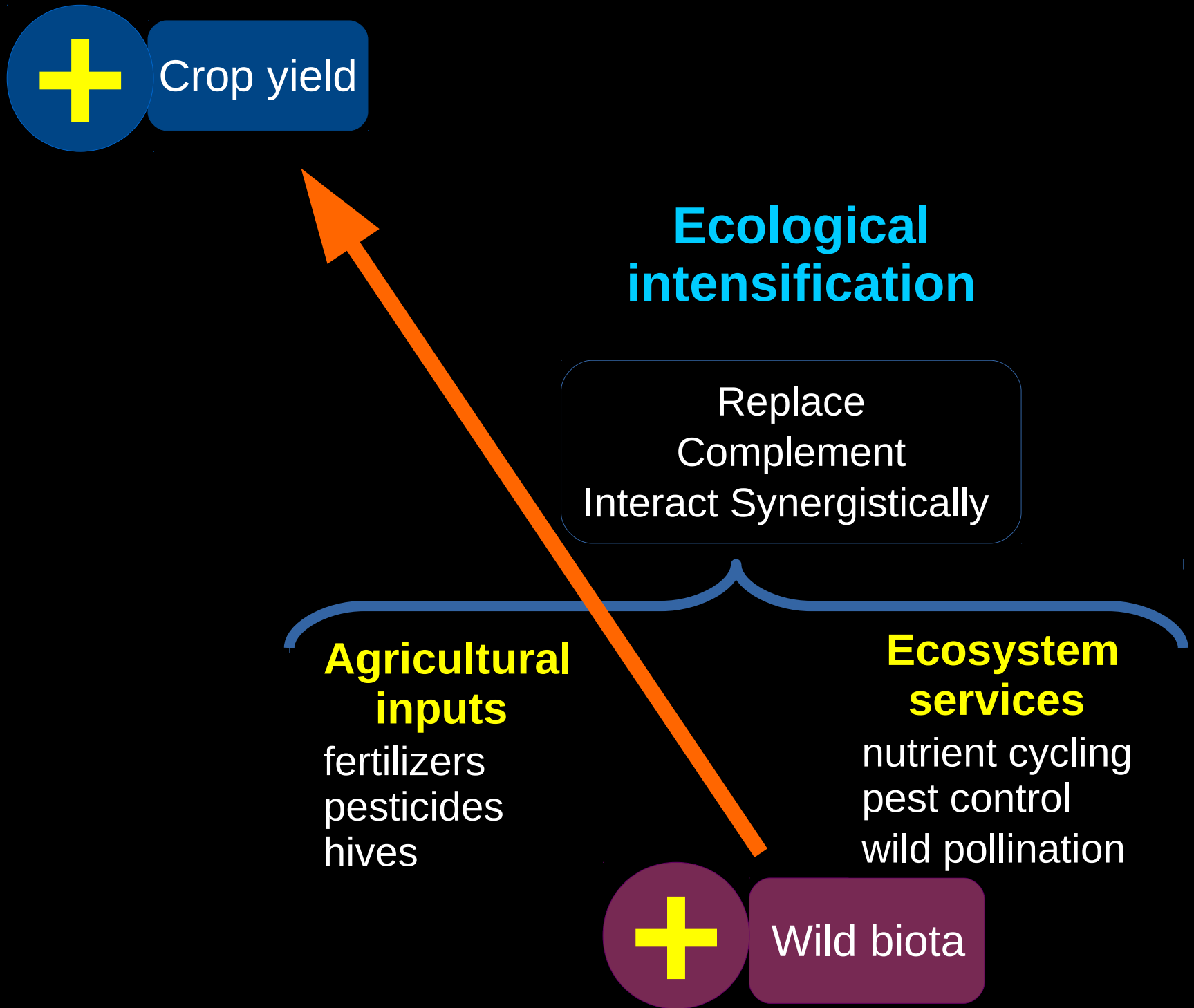
Crop production



Environment



Wild biota is being lost



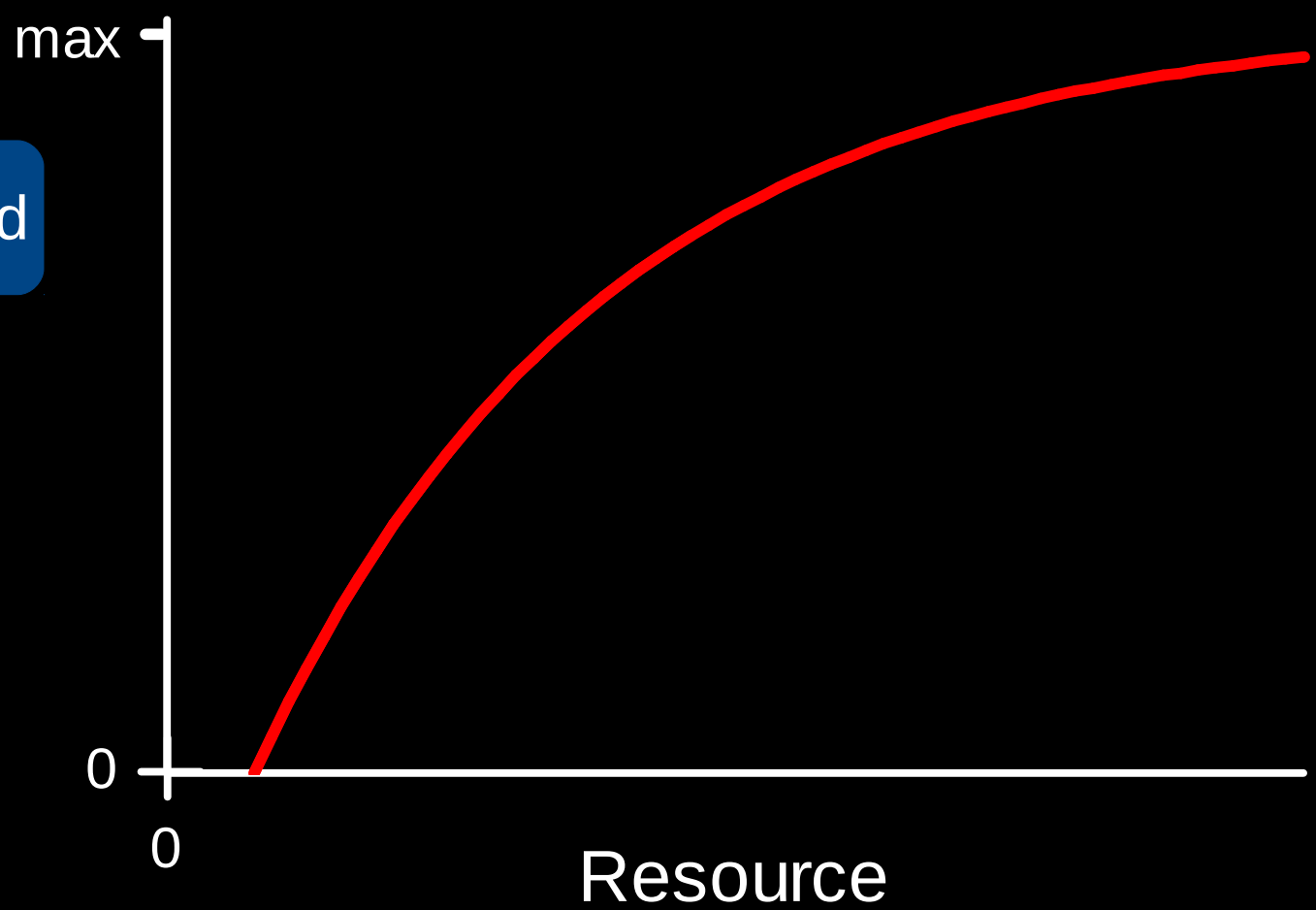
+ Crop yield

?

Ecosystem services
nutrient cycling
pest control
wild pollination

+ Wild biota

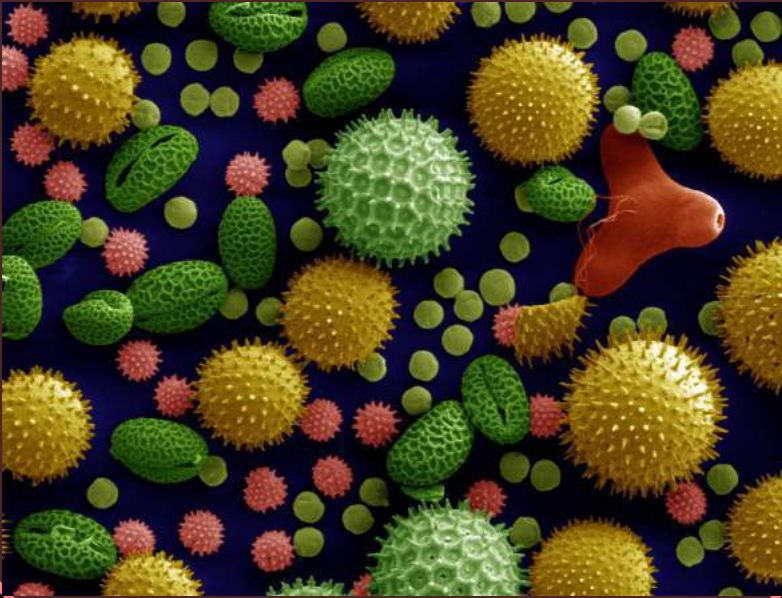
+ Crop yield



Ecosystem services
nutrient cycling
pest control
wild pollination

+ Wild biota

Pollen



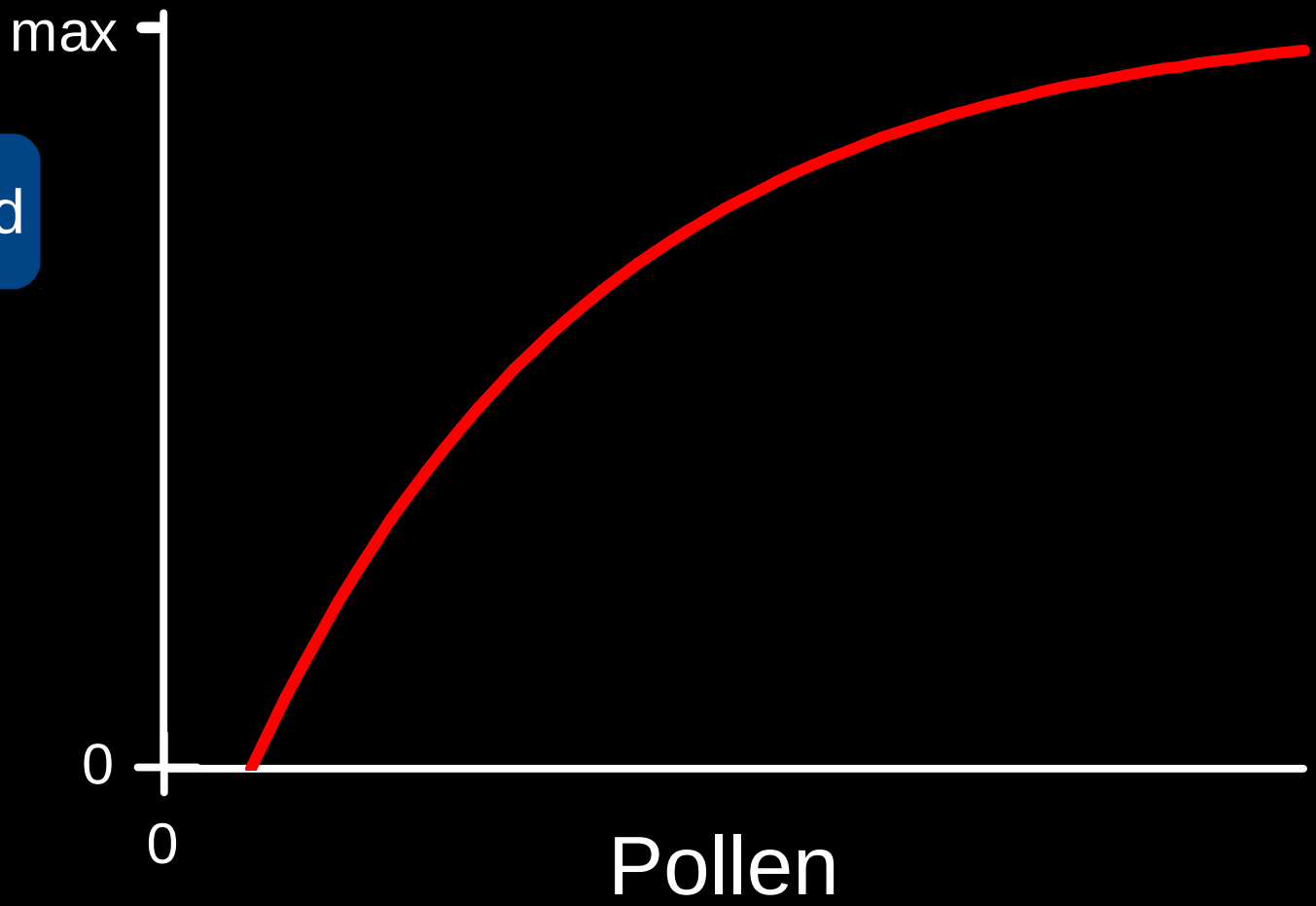
Crop production



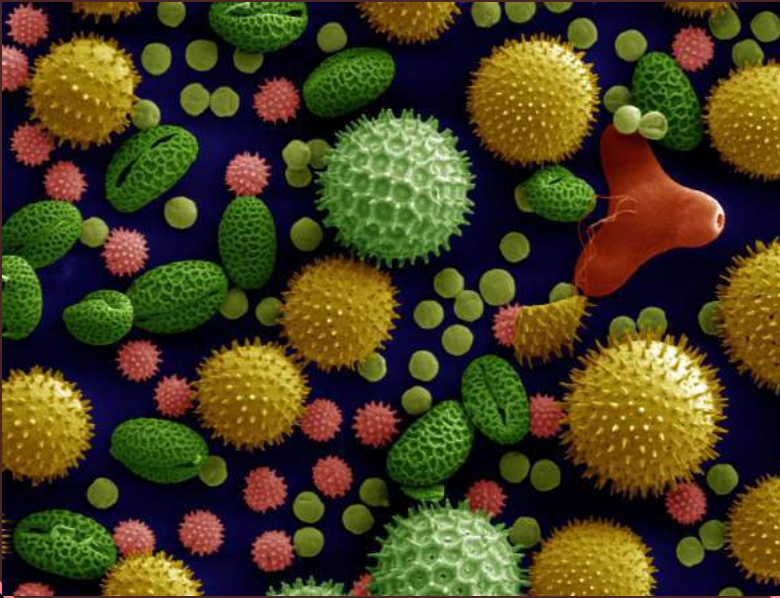
Environment



+ Crop yield



Pollen



Crop production



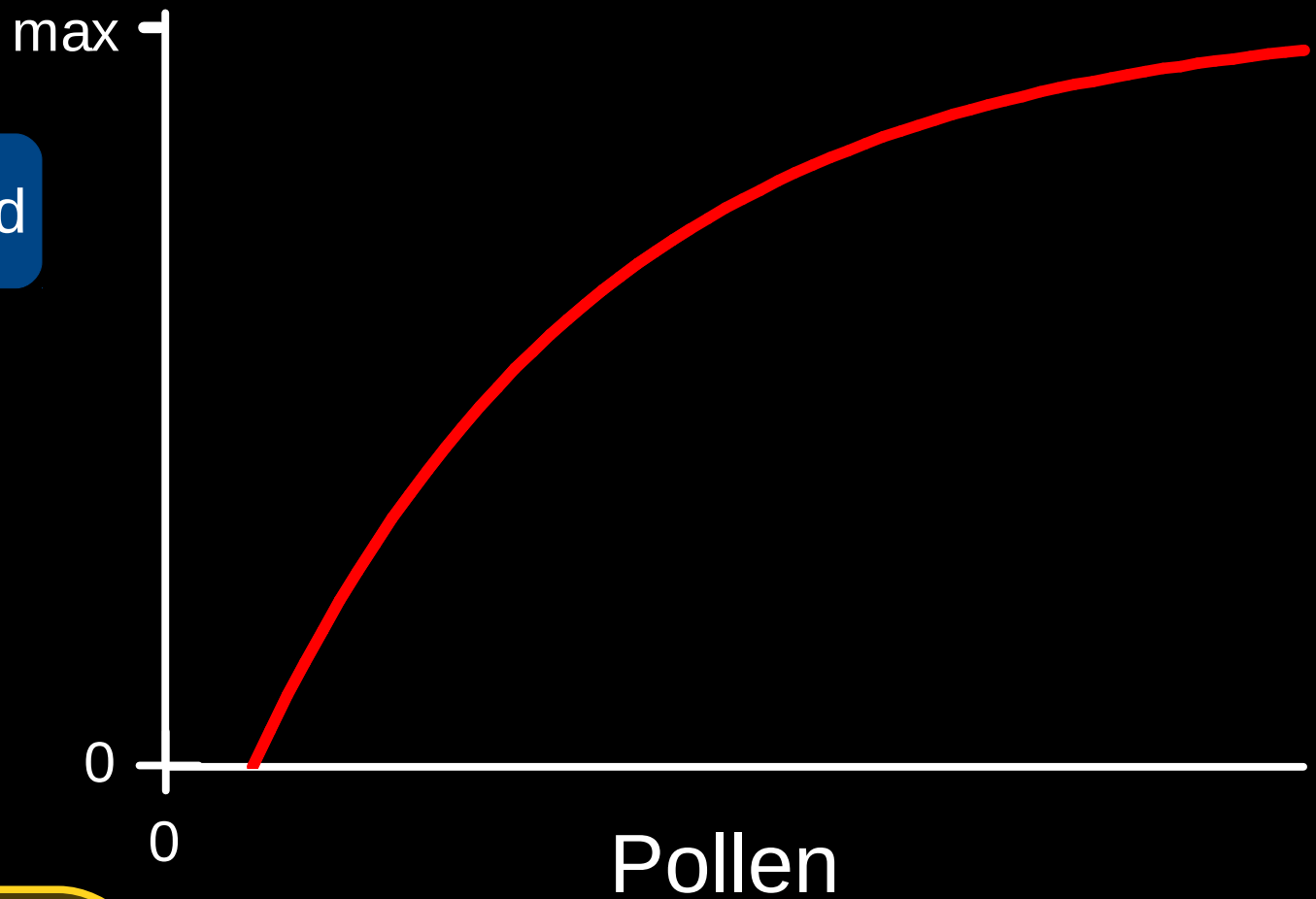
Flower visitors



Environment



+ Crop yield

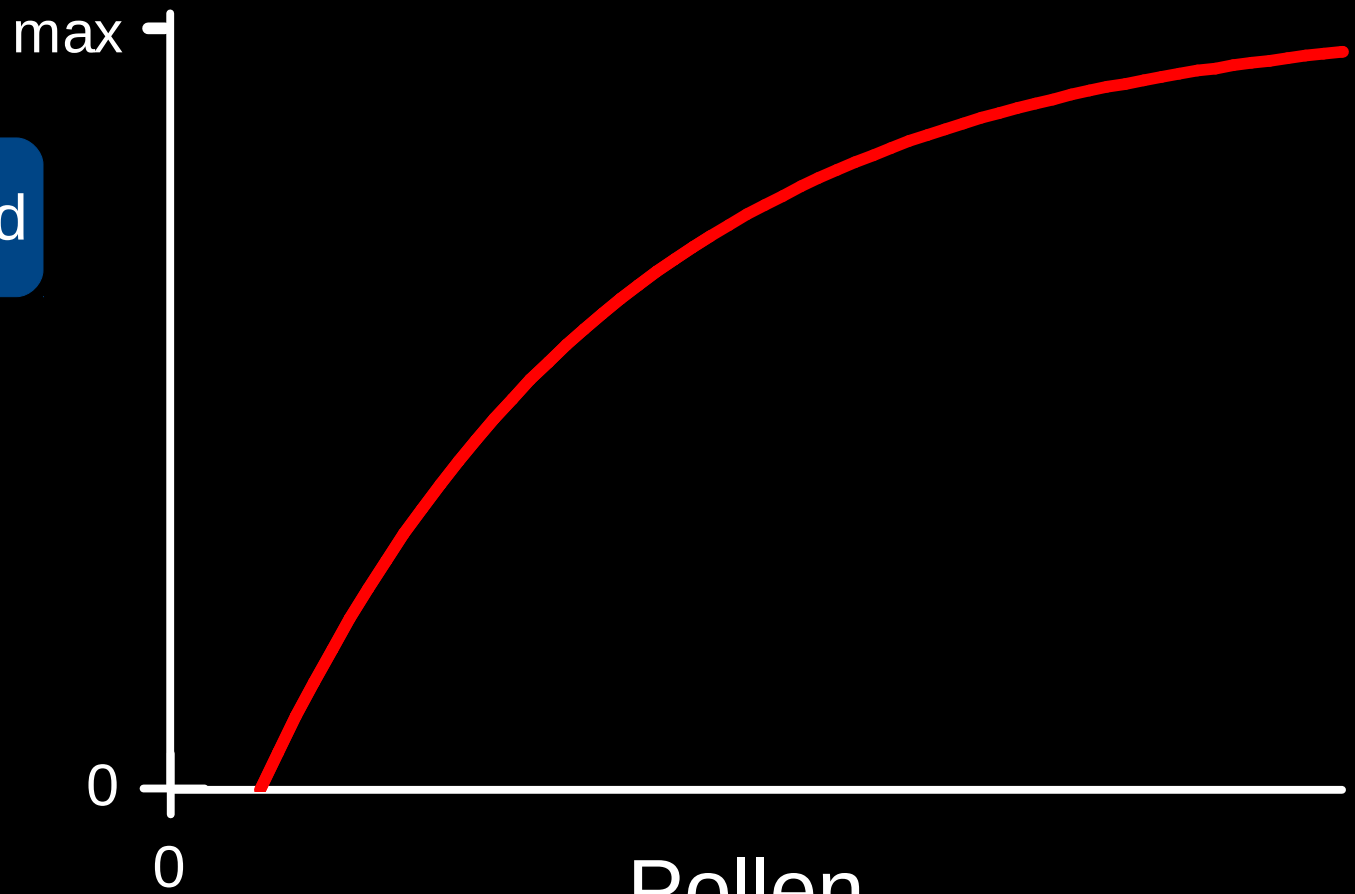


Flower visitors



+ Wild biota

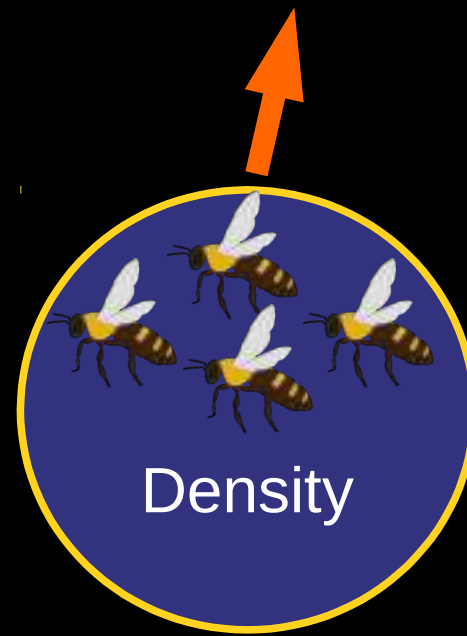
+ Crop yield



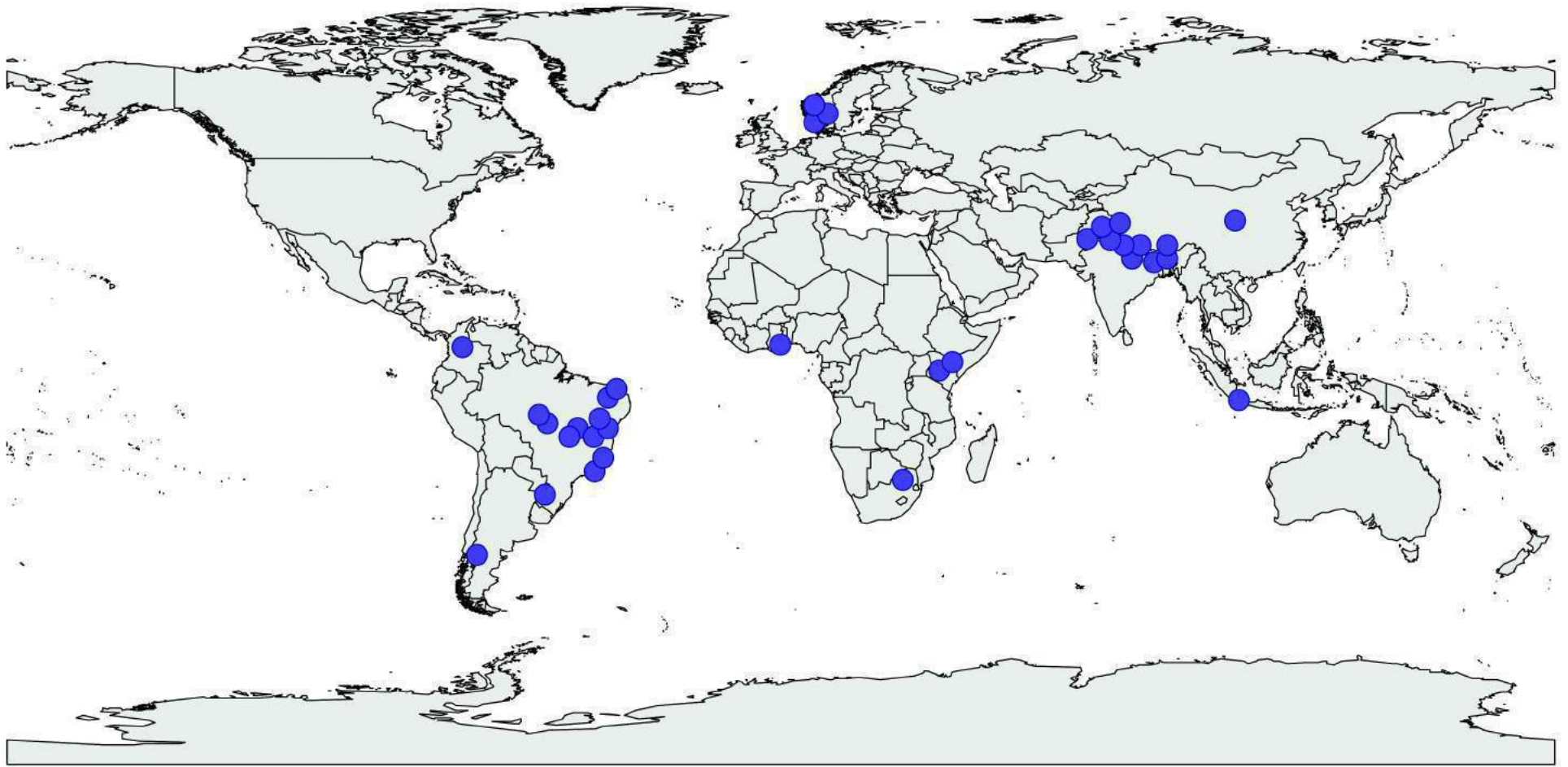
Flower visitors



Pollen



Density



344 fields

33 crop systems

5-year period (2010-2014)



● EXTENSION OF KNOWLEDGE BASE

- ADAPTIVE MANAGEMENT
- CAPACITY BUILDING
- MAINSTREAMING



PROTOCOL TO DETECT AND ASSESS POLLINATION DEFICITS IN CROPS: A HANDBOOK FOR ITS USE



Smallholdings



Largeholdings

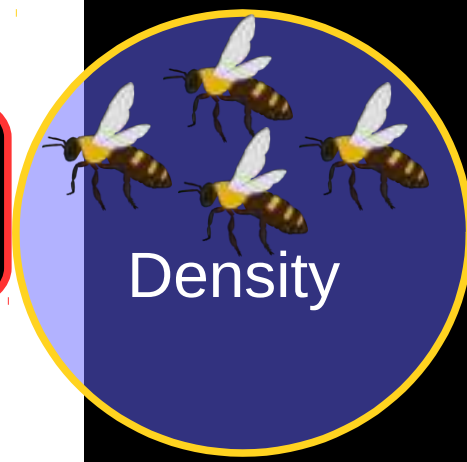
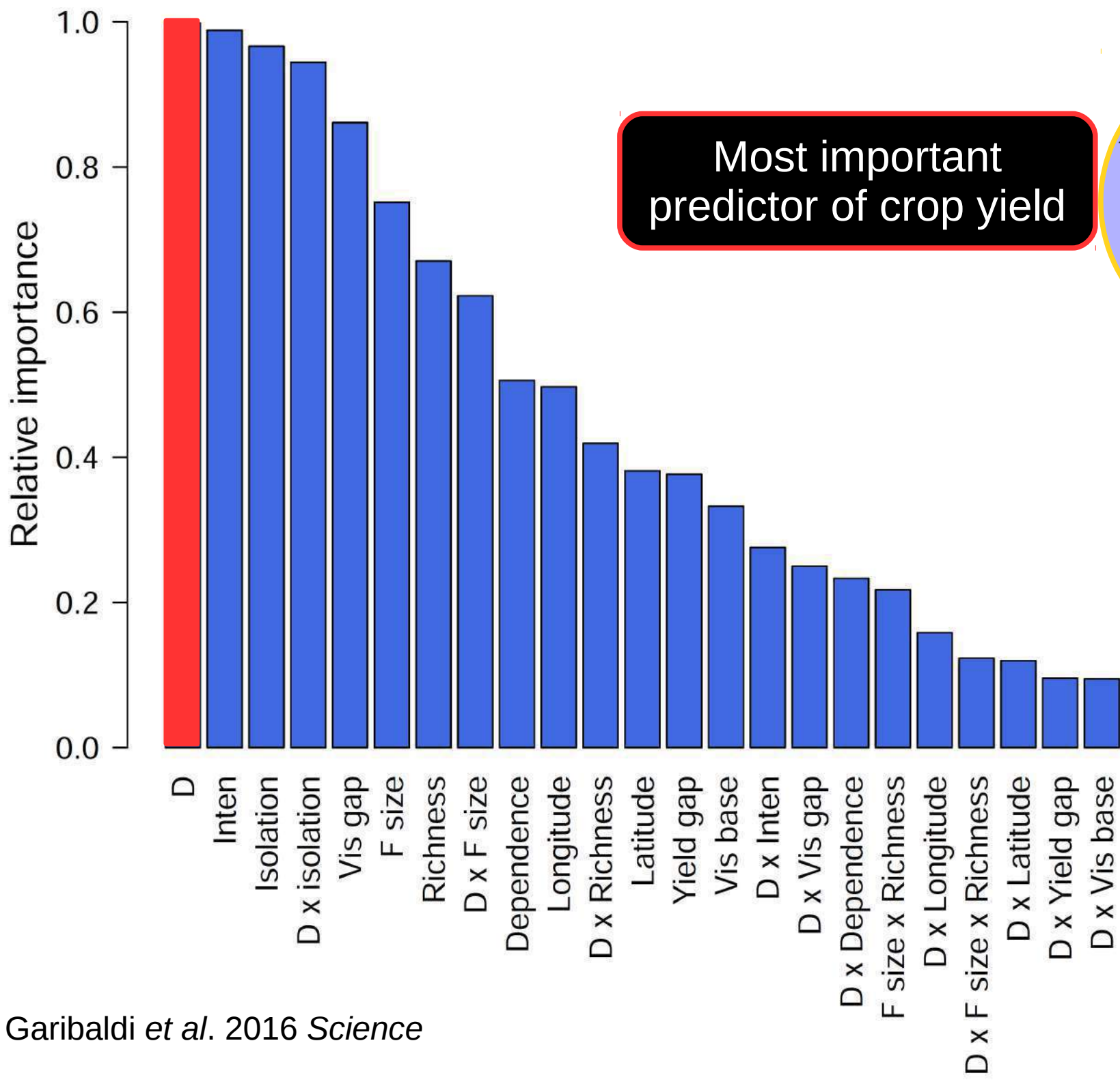
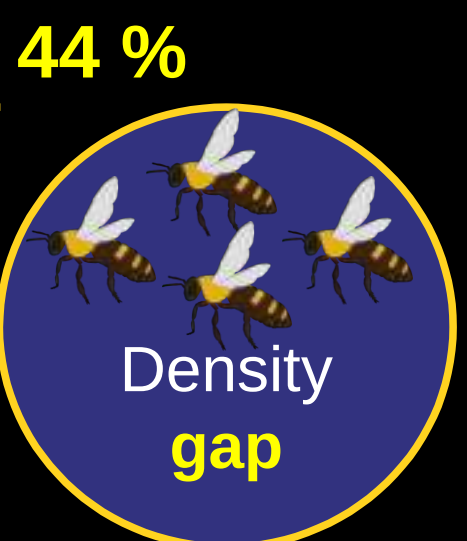
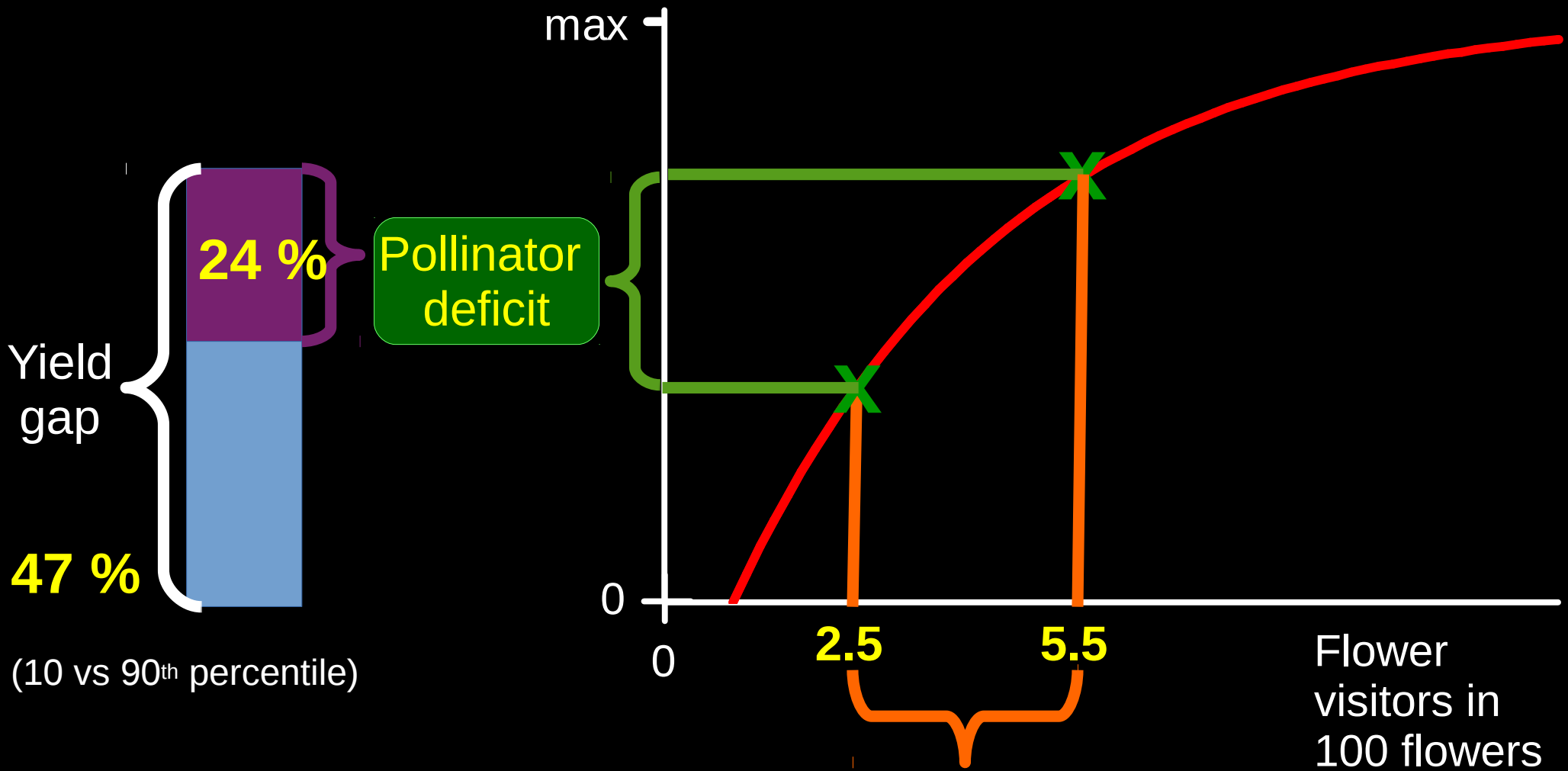




Foto por A Klein

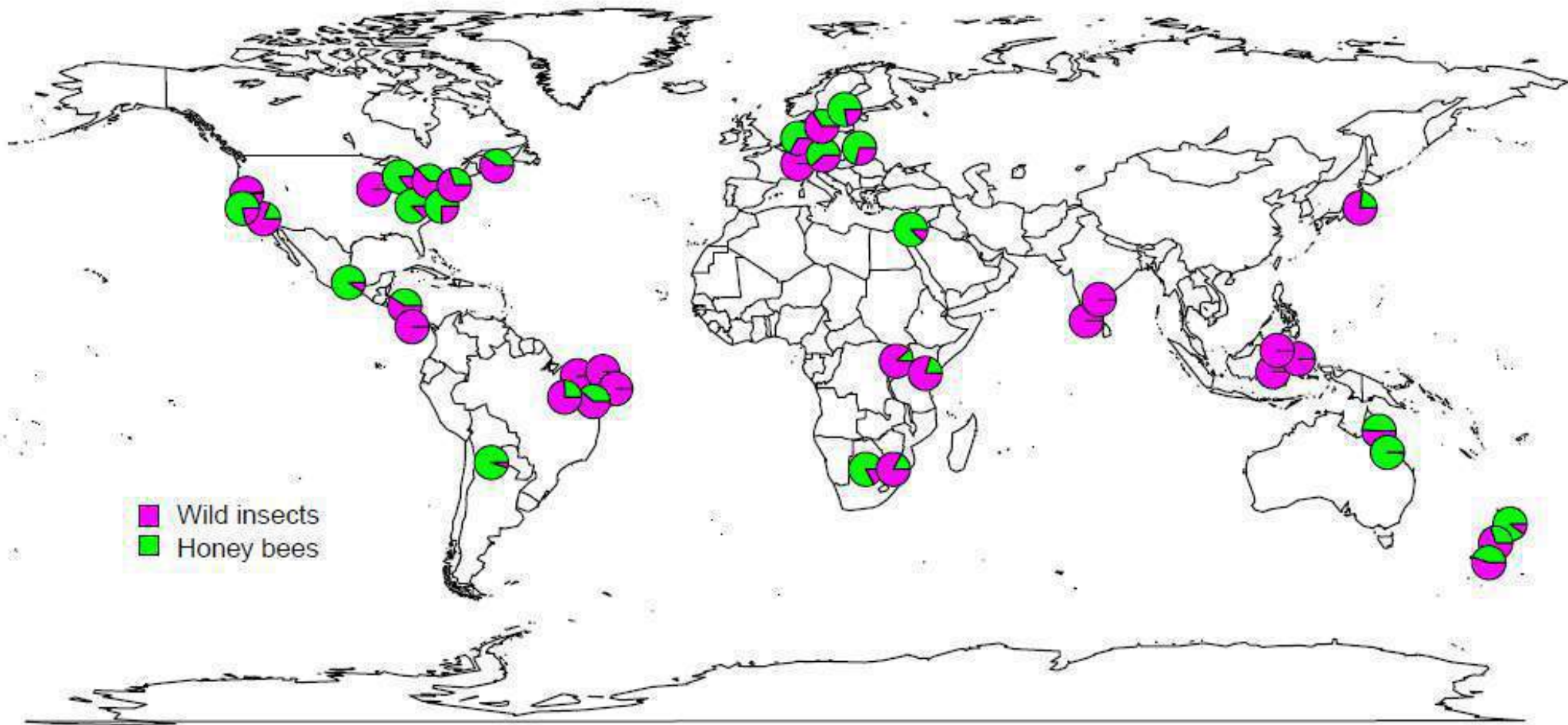






44 %

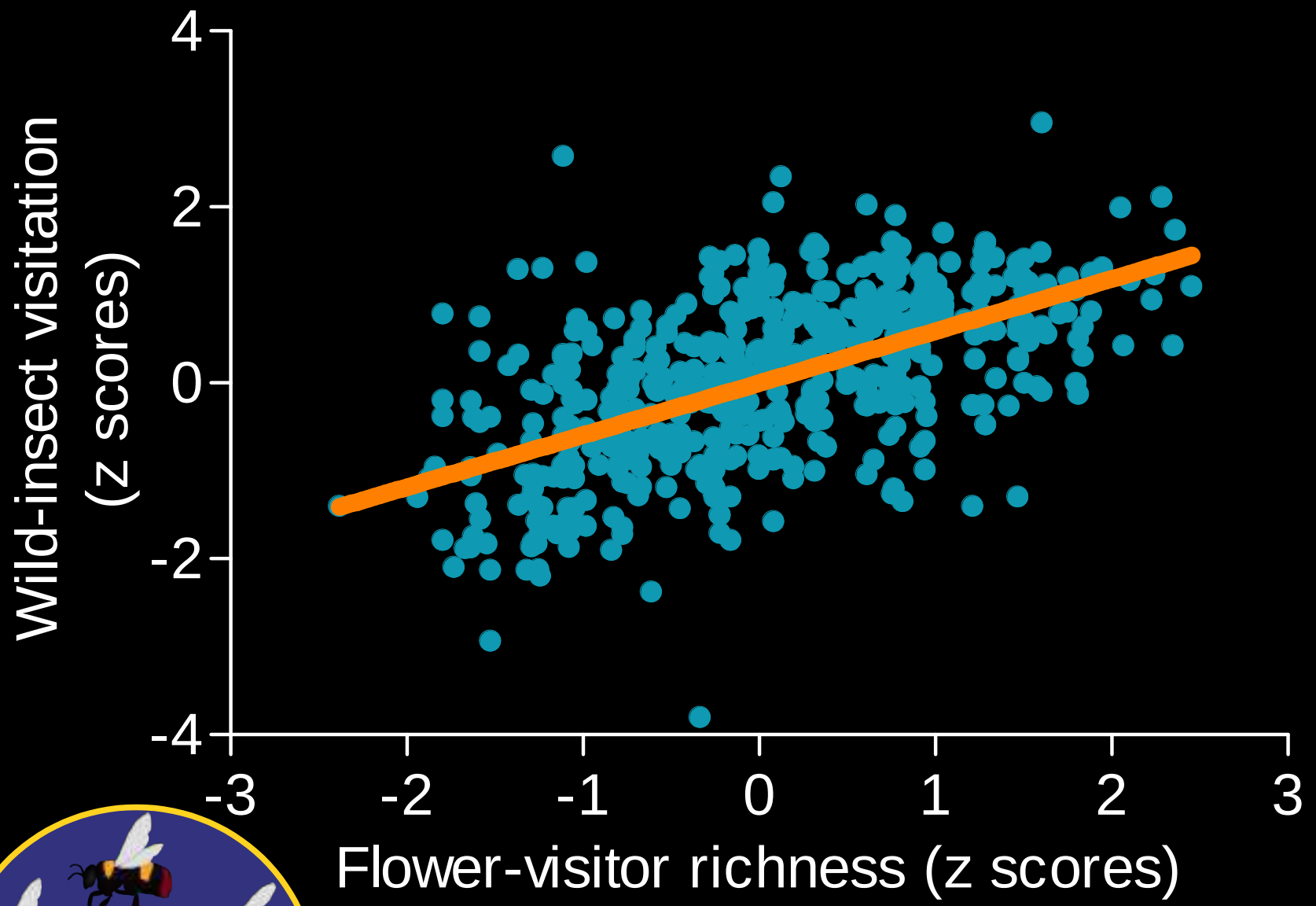
For **larger holdings**, such level of yield benefits only occurred if they sustained high flower-visitor **richness**

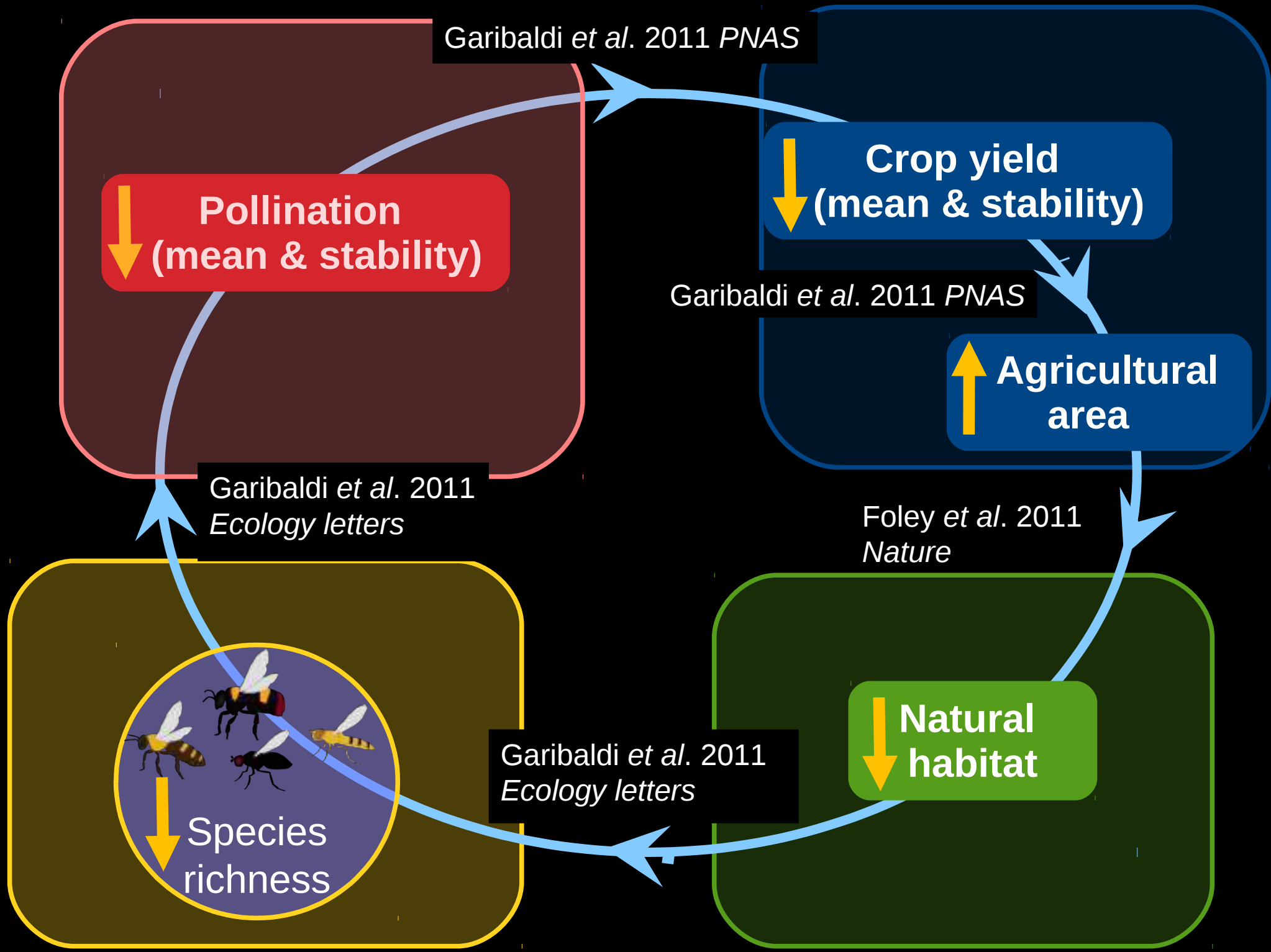




Greenleaf 2003







Garibaldi et al. 2011 PNAS

↓
Pollination
(mean & stability)

↓
Crop yield
(mean & stability)

Garibaldi et al. 2011 PNAS

↑
Agricultural area

Garibaldi et al. 2011 Ecology letters

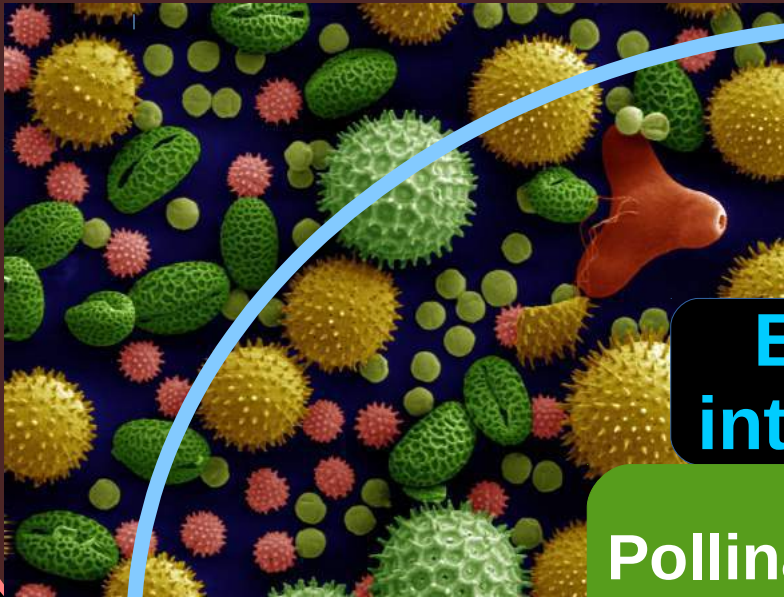
Foley et al. 2011 Nature

↓
Species richness

Garibaldi et al. 2011 Ecology letters

↓
Natural habitat

Pollen



Crop production



Ecological intensification

Pollinator-friendly practices

Flower visitors



Environment





On-field

**Pollinator-friendly
practices**

Off-field

