



*Heliconius erato*, ecuadorian Amazon

# Pollen eaters

12 million years ago a dietary adaptation triggered a radical change in the biology of one genus of butterflies. The *Heliconius* butterflies are a group of 40 species that, out of the 18,000 butterflies described worldwide, are the only ones able to actively collect, eat and digest the pollen produced by the plants they visit. This shift allowed them to enjoy greater reproductive power, stronger chemical defenses and longer lifespans.

## Collecting

Compared to their closest relatives, *Heliconius* have longer proboscises with larger hair like structures on its surface. But they also probe flowers in a different way, with longer visits and more proboscis 'thrusts' than other species. This helps the butterfly form clusters of pollen on the proboscis.

*Heliconius* use their proboscis to collect pollen. Its length is 17 mm, about 5 mm larger than other non-pollen feeding butterflies.

## Digesting

A fluid rich in enzymes helps to break down the walls of the pollen grains. By repeatedly unrolling their proboscis they mix the liquid through the pollen grains. Gradually, the solid lump of pollen grains becomes a wet, nutrient rich mush that can then be taken up by the proboscis. This whole process can take several hours.



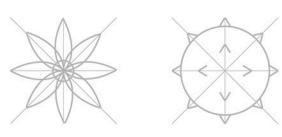
## Foraging for pollen

Some flowering vines have evolved to rely on *Heliconius* for pollination, and attract them by producing new flowers every day for up to a year. *Heliconius* learn their location, visiting multiple vines in the same order, at the same time, everyday.



## Pollen Power!

Pollen provides more resources than nectar, altering how caterpillars and adults behave.



	Nectar	vs.	Pollen
<b>sugar</b>	high		low
<b>amino acids</b>	low		high
<b>result</b>	butterflies will need to get all the amino acids as caterpillars		caterpillars can invest more in chemical defenses

## Living longer

By providing a source of essential amino acids, pollen enables adult *Heliconius* to repair and replace tissue. Notably, both males and females can continuously produce eggs and spermatophores without showing the declining reproductive output characteristic of other butterflies. This is true despite *Heliconius* also more than doubling their life span, living to up to six months!

