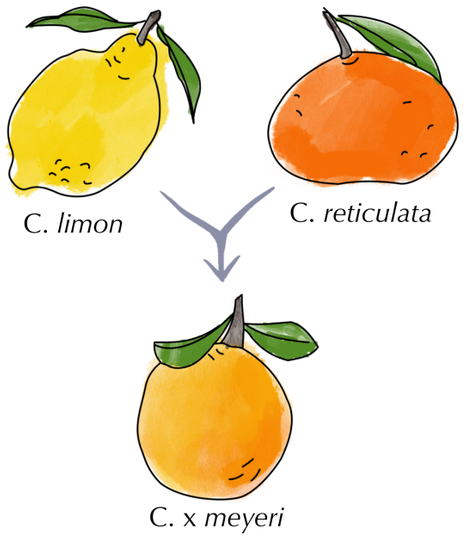
LIVING HYBRIDS

When you think of an example of how new species come to be, you would be right to think of a process that starts with some individuals getting separated from the original population. Evolving in different environmental conditions is generally enough to have these two groups become two different species with time. While a familiar and accurate example, there are other strange and wonderful ways that new species arise. Let's look at hybridization, where two different species' lineages combine to form something new. Your mind might jump to a mule, the sterile hybrid of a horse and a donkey. You'll see there's so much more to hybridization from the plants we eat and even to animals successfully hybridizing in nature.



Well known in plants

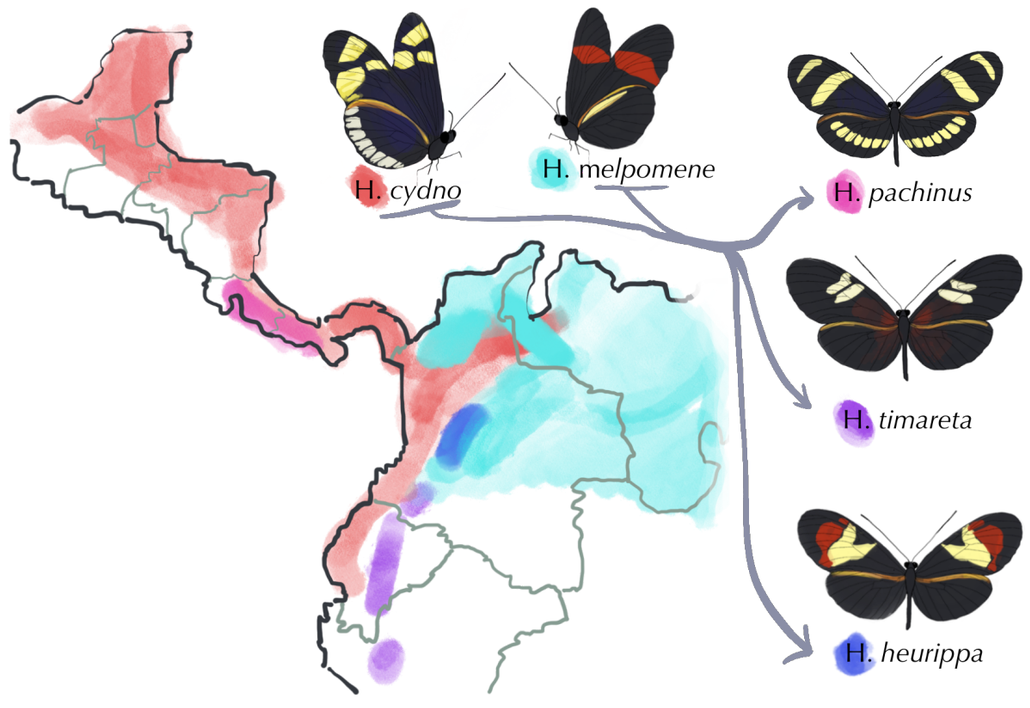
The plant kingdom is well-known for producing viable hybrids. We humans often exploit how well plants hybridize in order to combine the best traits for crops, like combining size and sweetness with cold and pest resistance. Hybridization in plants is often as simple as cross-pollination, but creating a desirable hybrid species that is stable can take years. Many of the foods that we eat are hybrids, from the staples of corn and rice, to hybrid fruit like the meyer lemon, the sweet and sour cross between a true lemon and a mandarin orange.

Hybridization in animals

Hybridization in animals is a very rare event. Often, when a new hybrid population emerges, it tends to disappear quickly, for example by being outcompeted by the original group. Remember the idea of separation in creating a new species? This can be physical separation, for example like an impassable mountain which prevents the new hybrids from competing with the original population. It can also be separation in other ecological features. One example would be differing food sources between new hybrids and parent groups that significantly reduces their competition, even when cohabitating the same area. Frequently, the separation from the parent group is not enough for new animal hybrids to thrive long enough to become a new species.

Let's look at a very special example of hybridization in animals, the Heliconius genus of butterfly. This group has its habitat in tropical and subtropical Central and South America. Heliconians are known for their amazing *mimicry*, a diversity of wing patterns that serve to trick potential predators and prey by resembling another species pattern. The wide array of wing colour patterns of heliconians serve another purpose relevant to hybridization. The mate choice of individual heliconian butterflies are driven by wing pattern: when a hybrid exhibits a new wing pattern, it no longer represents an ideal mate choice for either parent group. This form of separation reduces reproductive competition between the populations and is called *reproductive isolation*. This can be enough separation to give heliconian hybrids a chance, and there are relatively many proposed hybrids in the genus. Experimental evaluation of such a hypothesis calls for creating in-lab crosses and comparing the resulting wing patterns to wild examples.

Look at the illustration to see the two heliconians finding their home range in Central America and in the Andes, Heliconius *melpomene* and Heliconius *cydno*. Each of the remaining three heliconians have been proposed to be the hybrid offspring of H. *melpomene* and H. *cydno*; Heliconius *pachinus* found on Costa Rica's Pacific edge and Western Panama, Heliconius *heurippa* and Heliconius *timareta* from the eastern Andes[1].



[1]Jiggins, Chris D., et al. "Hybrid trait speciation and Heliconius butterflies." Philosophical Transactions of the Royal Society B: Biological Sciences 363.1506 (2008): 3047-3054.