ARABIDOPSIS THALIANA: THE BOTANIST`S LAB RAT

DEFINITION OF MODEL ORGANISMS

Species used in the lab to study biological processes with the assumption that novel findings in a simple system can provide insights into similar mechanisms in other complex organisms.

This expectation is based on the evolutionary principle (originally proposed by Sir **Charles Darwin**) that all living organisms originated from a **common ancestor** and share conserved mechanisms that makes life possible. Nevertheless, some developmental/metabolic pathways have diversified in different lineages over time.

CHARACTERISTICS OF GOOD EXPERIMENTAL MODELS

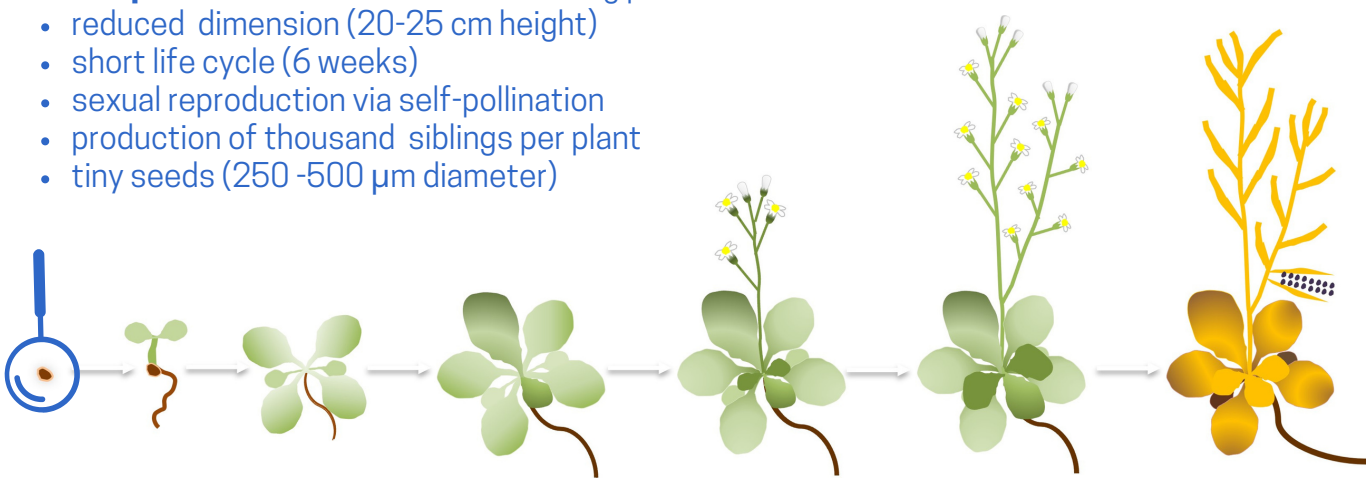
- ease of manipulation (to efficiently perform experiments)
- small size (to grow more individuals in a reduced space)
- short life cycle (to study more generations in short periods of time)
- high fertility rates (to produce large number of offsprings)

Escherichia coli ***Saccharomyces cerevisiae*** ***Drosophila melanogaster*** ***Cavia porcellus*** ***Mus musculus***

TOP MODEL FOR PLANT BIOLOGY

Arabidopsis thaliana is an annual flowering plant with:

- reduced dimension (20-25 cm height)
- short life cycle (6 weeks)
- sexual reproduction via self-pollination
- production of thousand siblings per plant
- tiny seeds (250 -500 µm diameter)



Arabidopsis can be esily grown in controlled conditions and is amenable to genetic transformation and genome editing. It's a useful tool for molecular genetics studies due to the availability of huge collections of biological materials, sequenced genomes, and OMICS datasets.

CRUCIAL DISCOVERIES IN ARABIDOPSIS

In the last decades, the use of *Arabidopsis thaliana* have facilitated the study **of plant-pathogen interactions**, the dissection of genetic pathways underlying essential developmental stages (e.g., **ABC model of flower formation**), and the analysis of key physiological processes (e.g., **light sensing and circadian clock**)

VALUABLE MEMBER OF THE BRASSICACEAE FAMILY

Arabidopsis is a weed that grows along roadsides, but it's also a member of the mustard family that includes agronomically important plants of the **Brassica genus** such as: Brassica napus (oilseed rape), Brassica rapa (turnip), various cole crops (cabbage, broccoli, cauliflower, brussel sprouts). As an example of applied research, discoveries in Arabidopsis have promoted the comprehension of inflorescence development in more complex edible crops such as Romanesco broccoli.