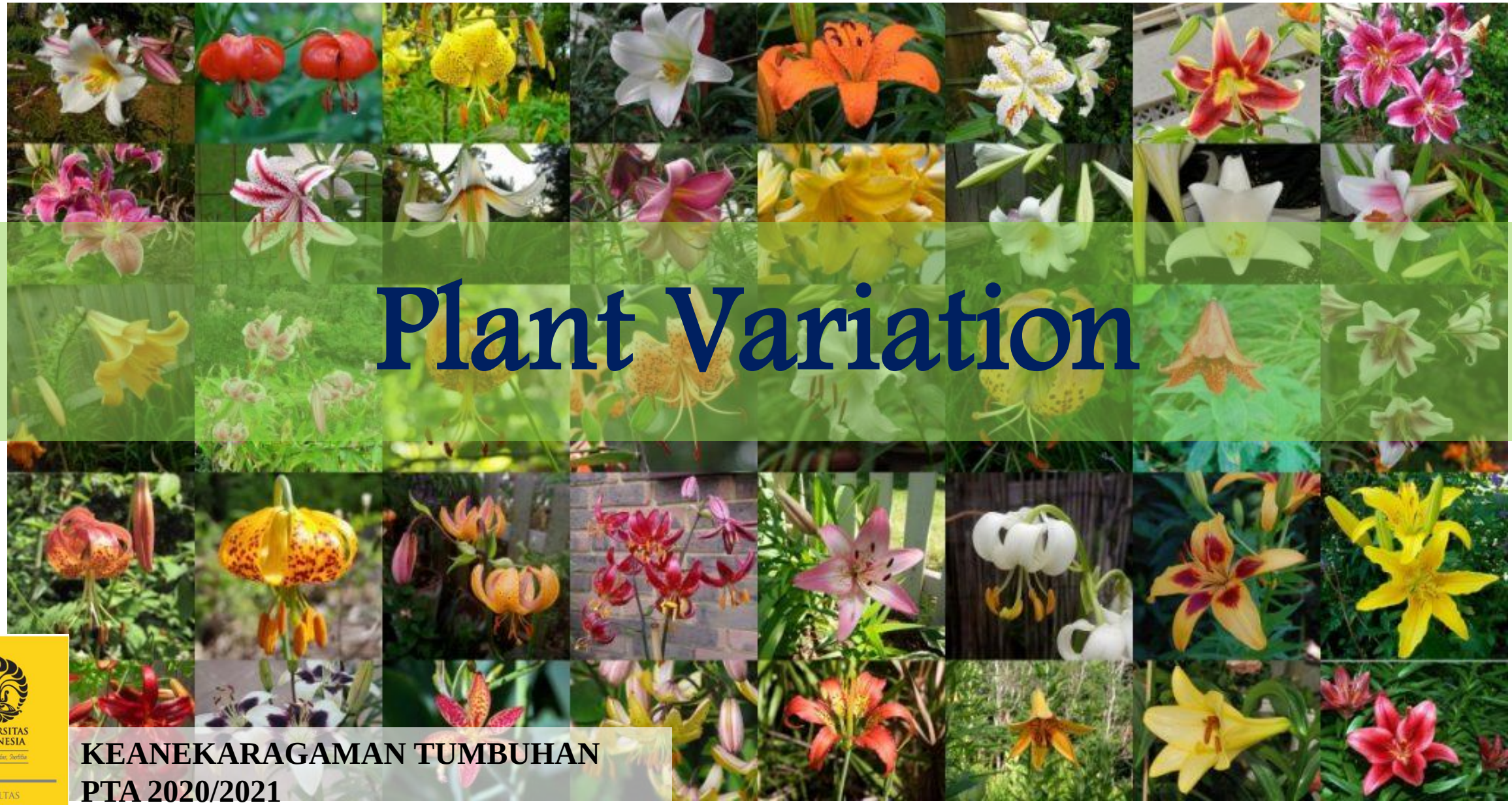

Plant Variation

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KEANEKARAGAMAN TUMBUHAN
PTA 2020/2021
KBI BOTANI

Outline

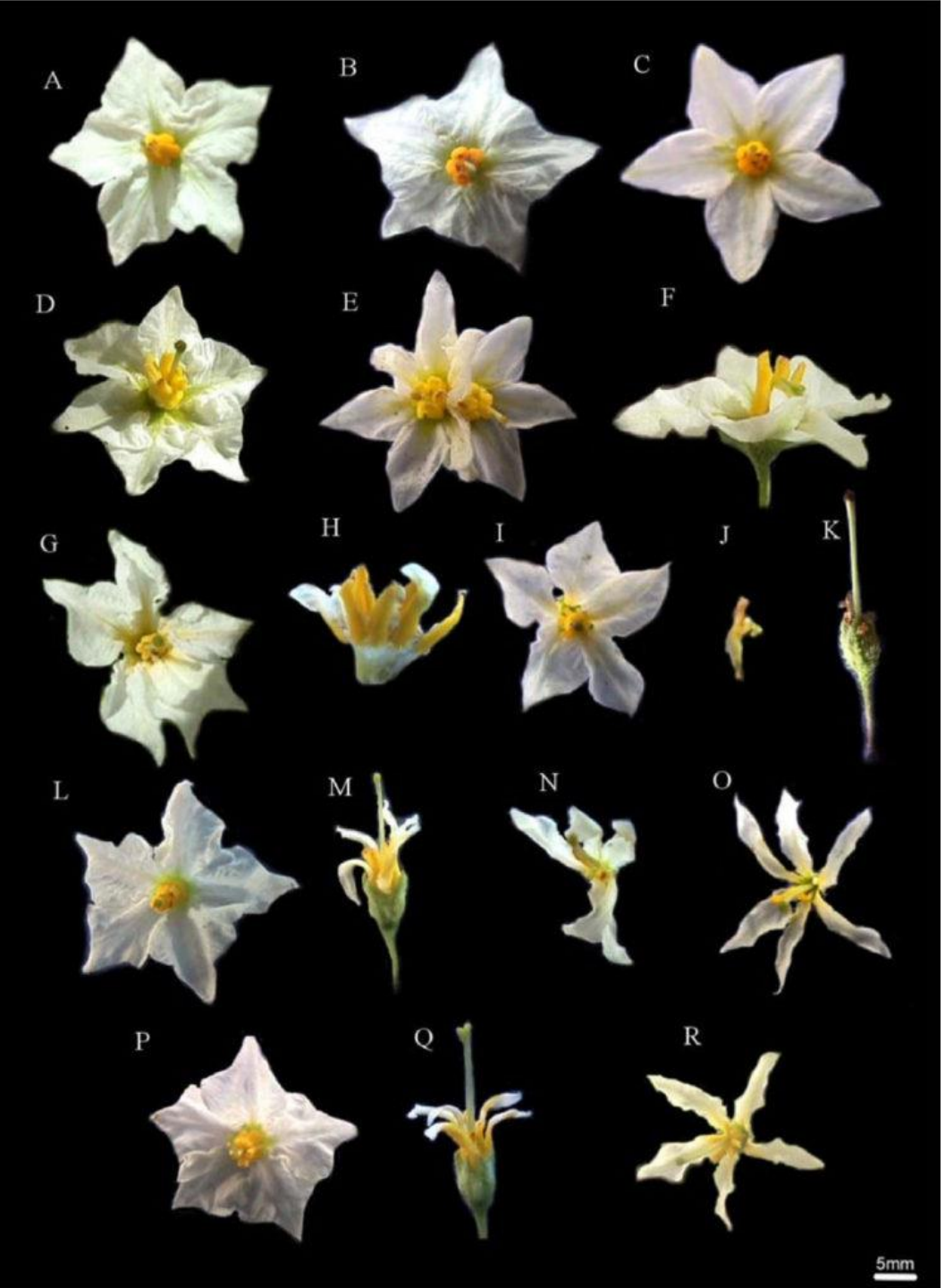
Plant Variation

Population variability

- developmental
- environmentally induced
- genetic

Plant Variation

- Is a deviation in structural, functional, or developmental character(s) of an organism from its parents, from others in the same population, or from other populations of the same species or related groups.



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- Population variability
- Genotypic variation and Phenotypic variation

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Population variability

Population variability includes three fundamental types:

1. developmental;
2. environmentally induced;
3. genetic.

1. Developmental variation

Ex:

adult vs immature seedlings – seedling leaves of *Fraxinus* is simple vs adult leaves pinnately compound

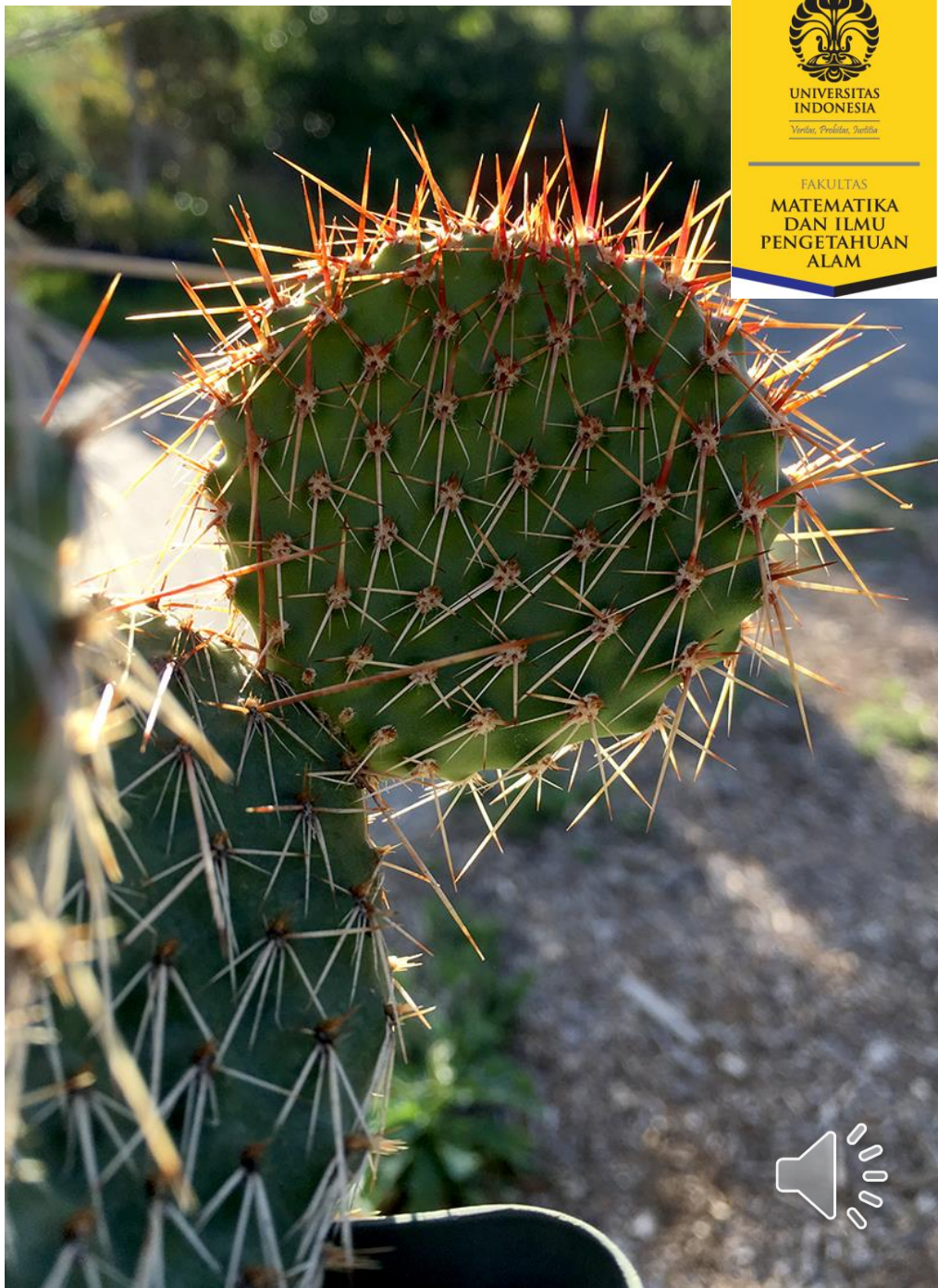
2. Environmental variation

Systematists must detect environmentally induced variation.

Ex:

Cactus

Image: *Illinois News Bureau*



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- **Environmental variation** – altering their pattern of growth in response to environmental differences.
- ***Norm of reaction***:

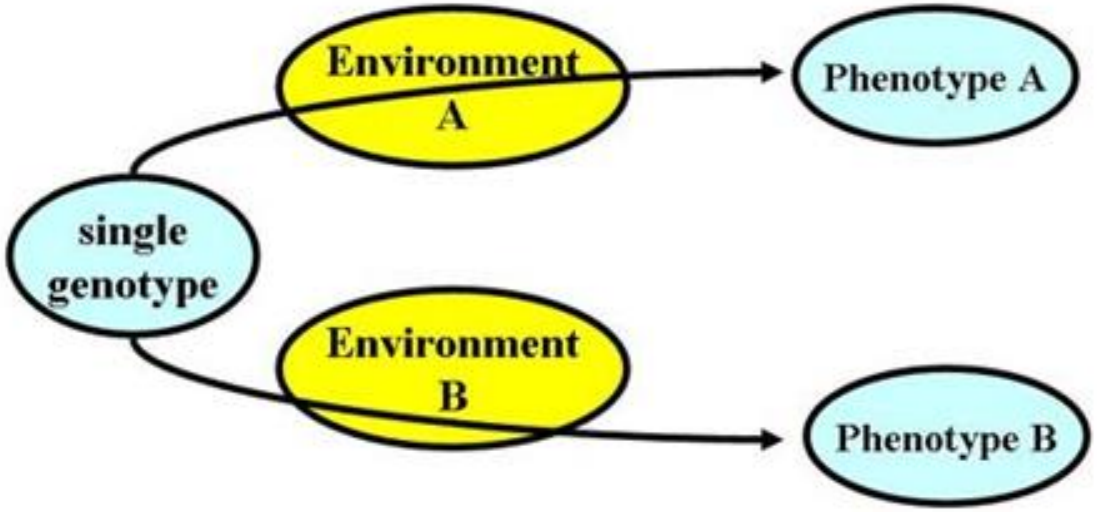
a) the pattern of phenotypic expression of a single genotype across a range of environments;

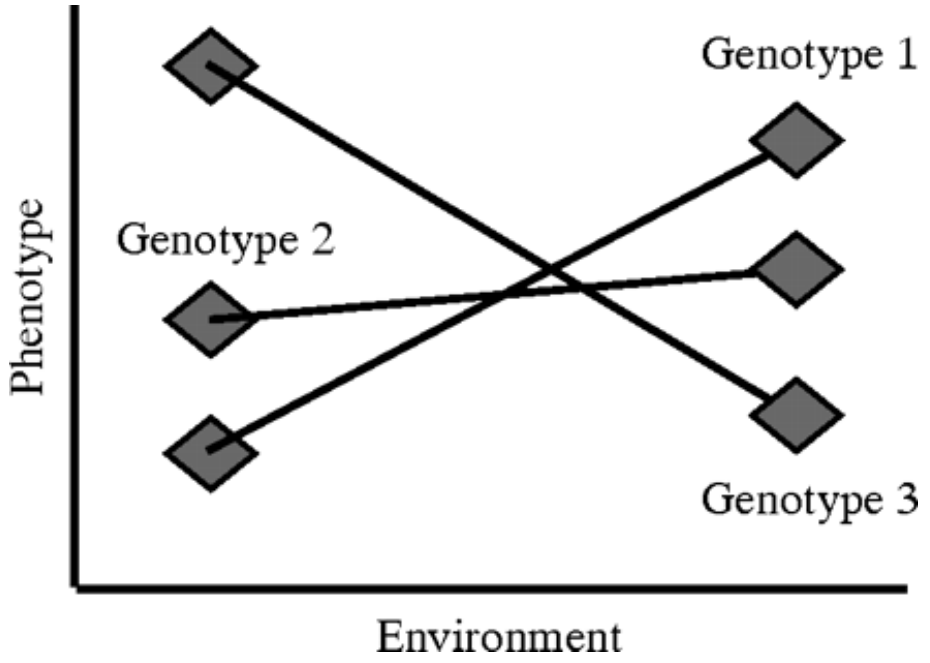
b) a curve that relates, for a given genotype, the contribution of environmental variation to observed phenotypic variation;

c) is a range of phenotypes produced by a genotype across different environments

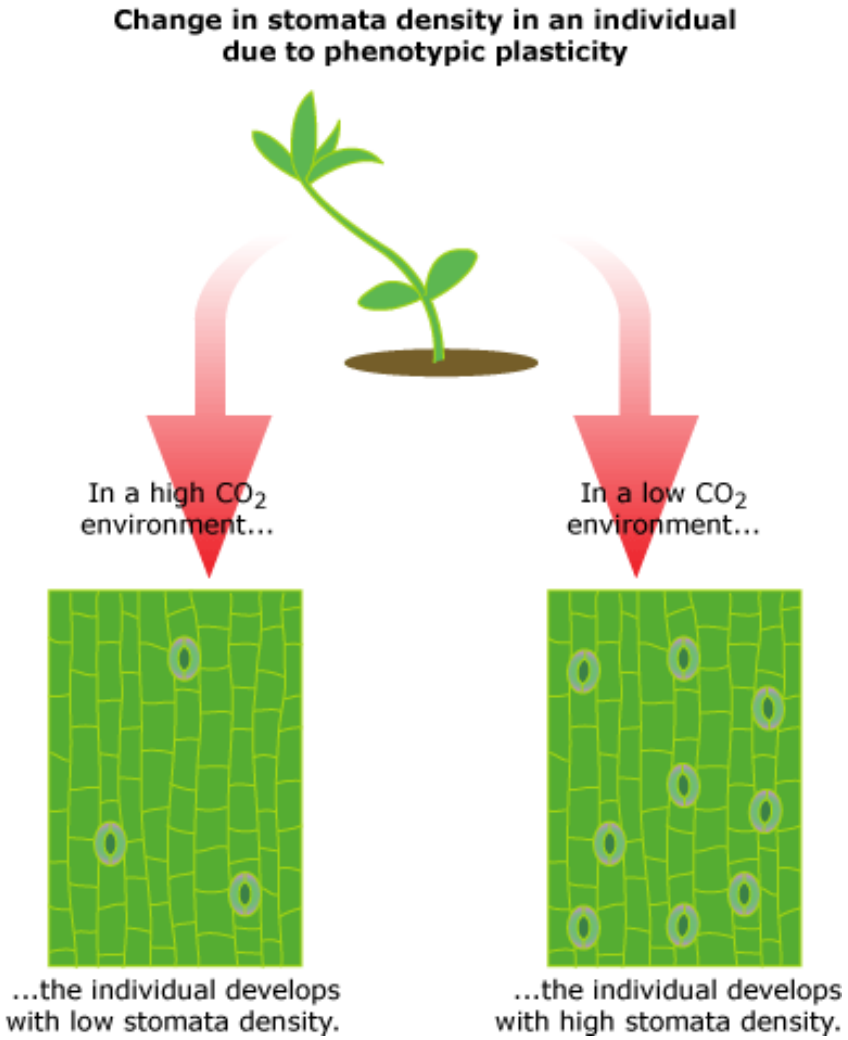
Phenotypic plasticity

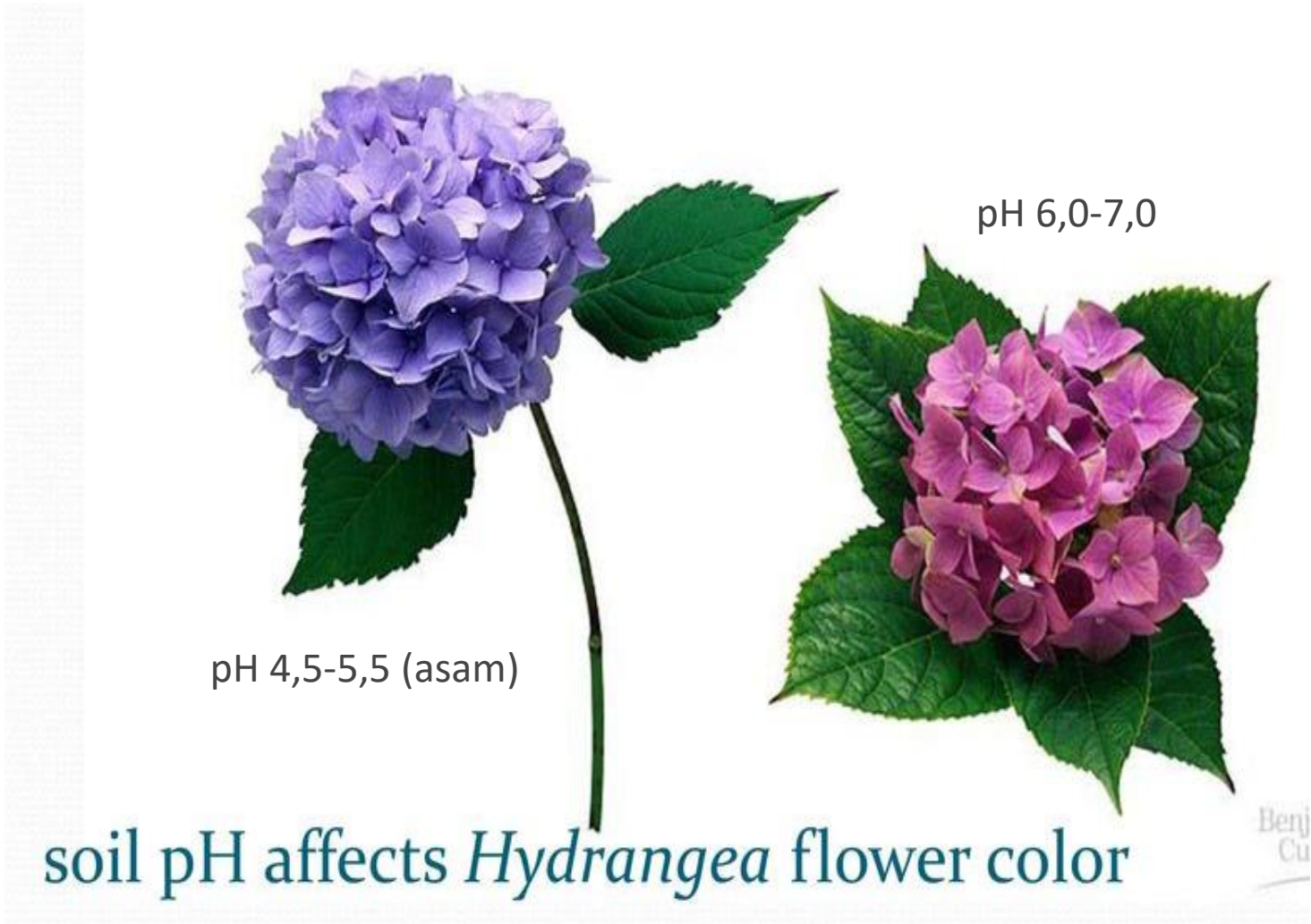
- **Phenotypic plasticity** is usually defined as a property of individual genotypes to produce different phenotypes when exposed to different environmental conditions





Characters that are easily modified: size and number




pH 6,0-7,0
pH 4,5-5,5 (asam)
soil pH affects *Hydrangea* flower color

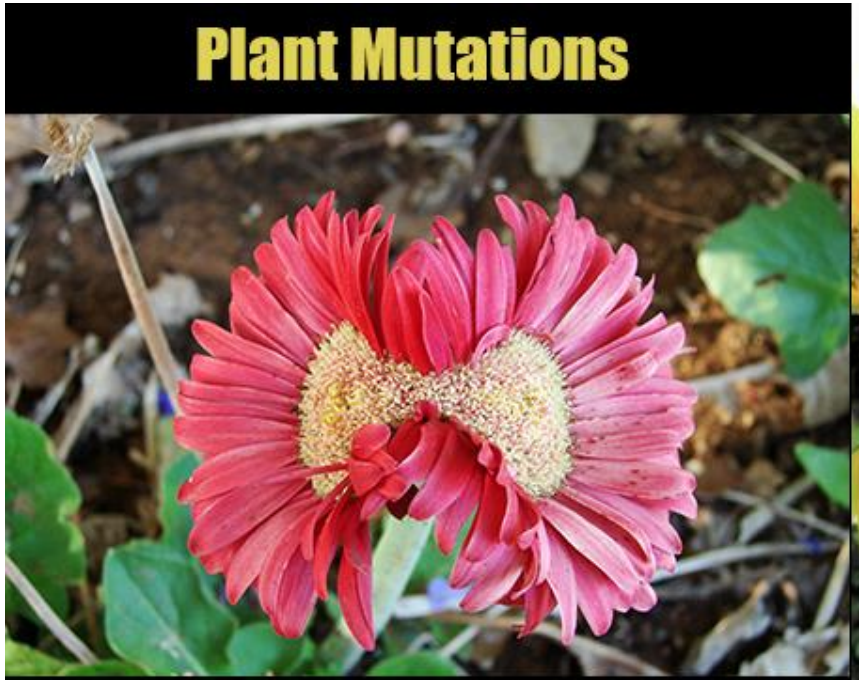
3. Genetic variation

- **Genetic variation**/genotypic variation: differences in genotypes within a population or species as a result of *mutation, recombination, and gene flow or interaction*
- Heritable

OBSERVED VARIATION WITHIN ONE POPULATION

Mutation

- Minute change: substitution of a single nucleotide pair in the DNA
- Major change: chromosome structure or number (due to deletion, inversion, aneuploidy, polyploidy)

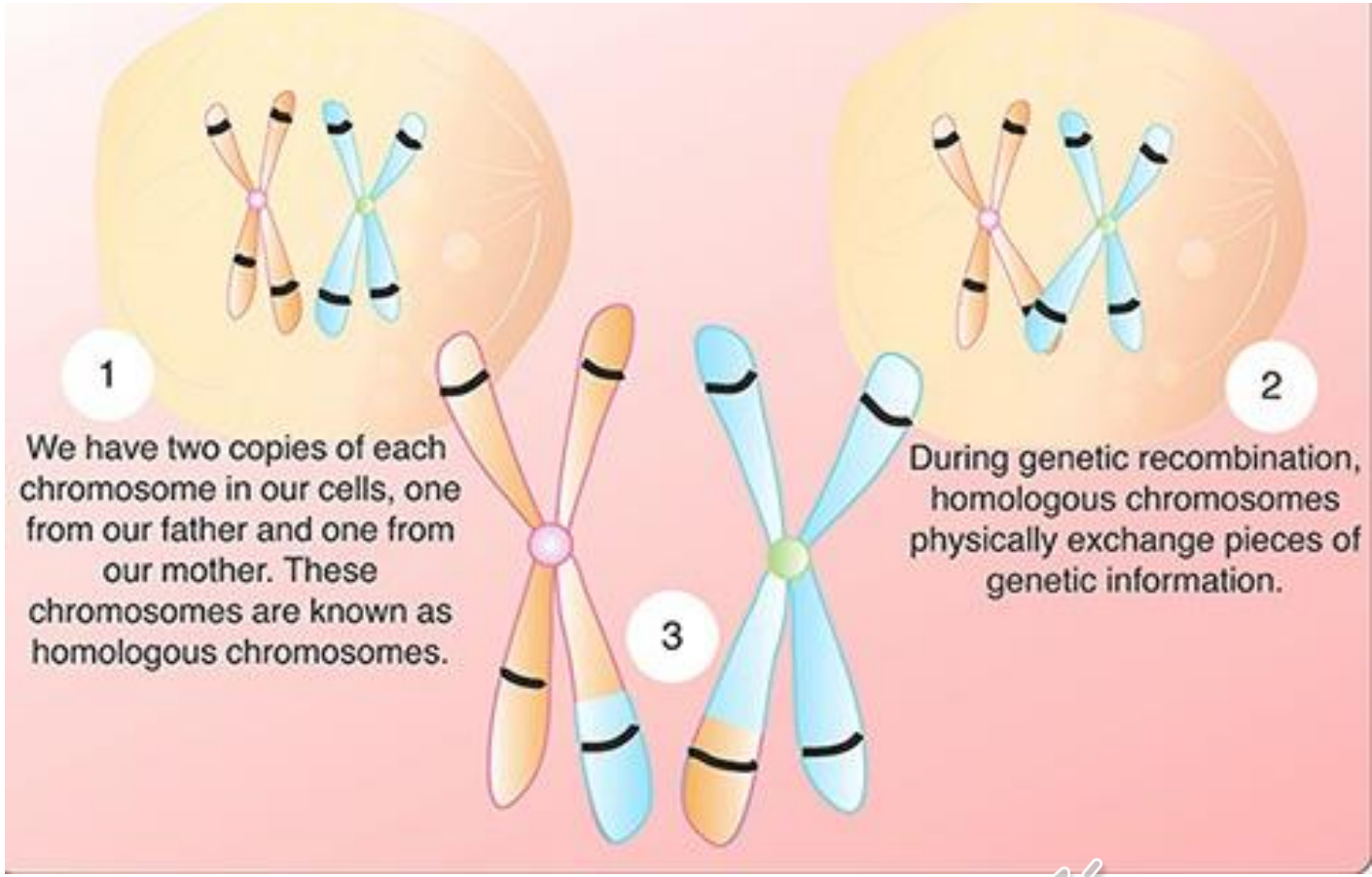


Minute change

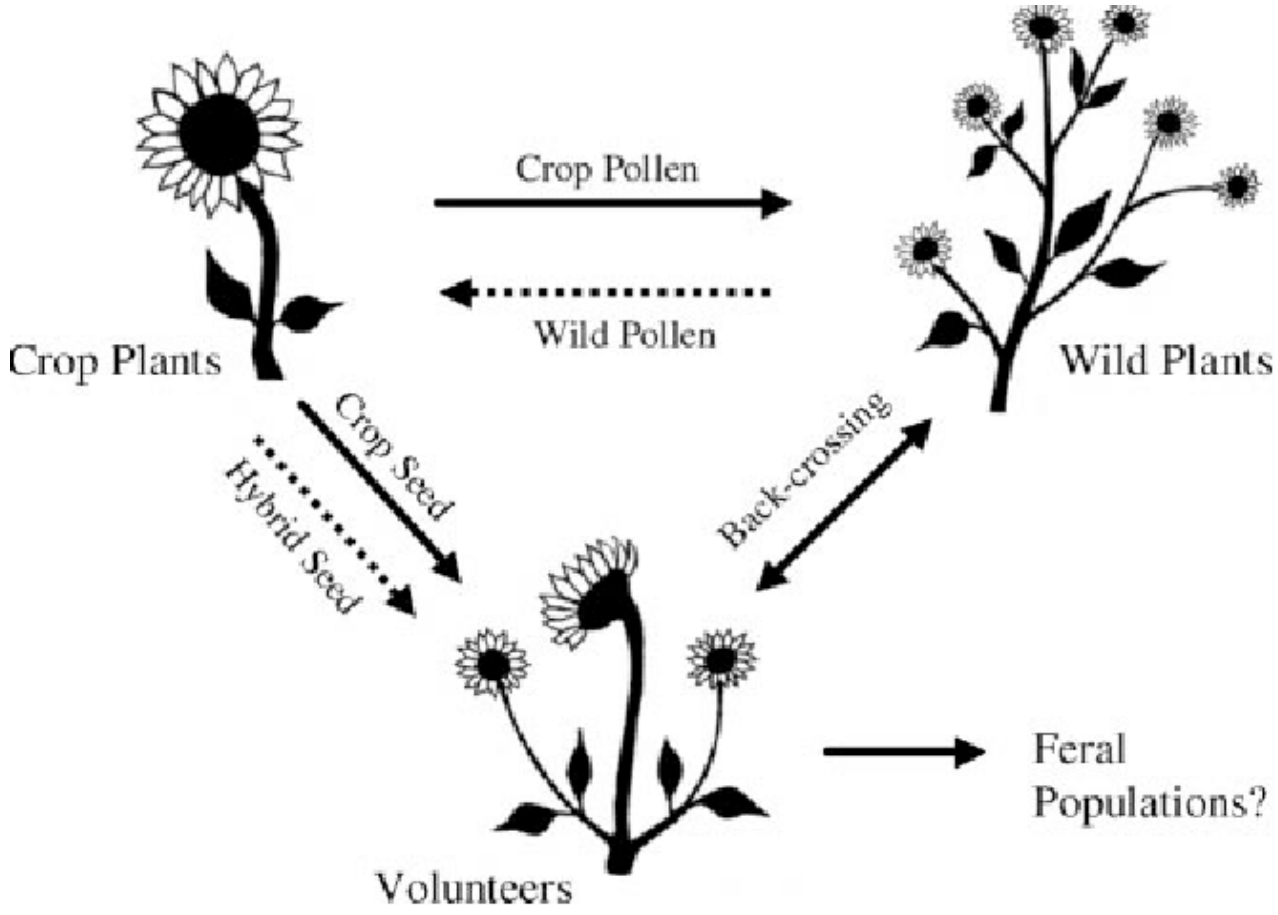
Major change

Recombination

- The movement and exchange of genes between breeding populations – gene flow
- Recombination produce new gene arrangements by crossing fertilization and by the crossing over of segments of homologuos chromosomes followed by independents assortment at meiosis
- Many genotypic variations in a population maybe due to recombination of genic differences that have existed in the population for many generations.



Aliran Gen

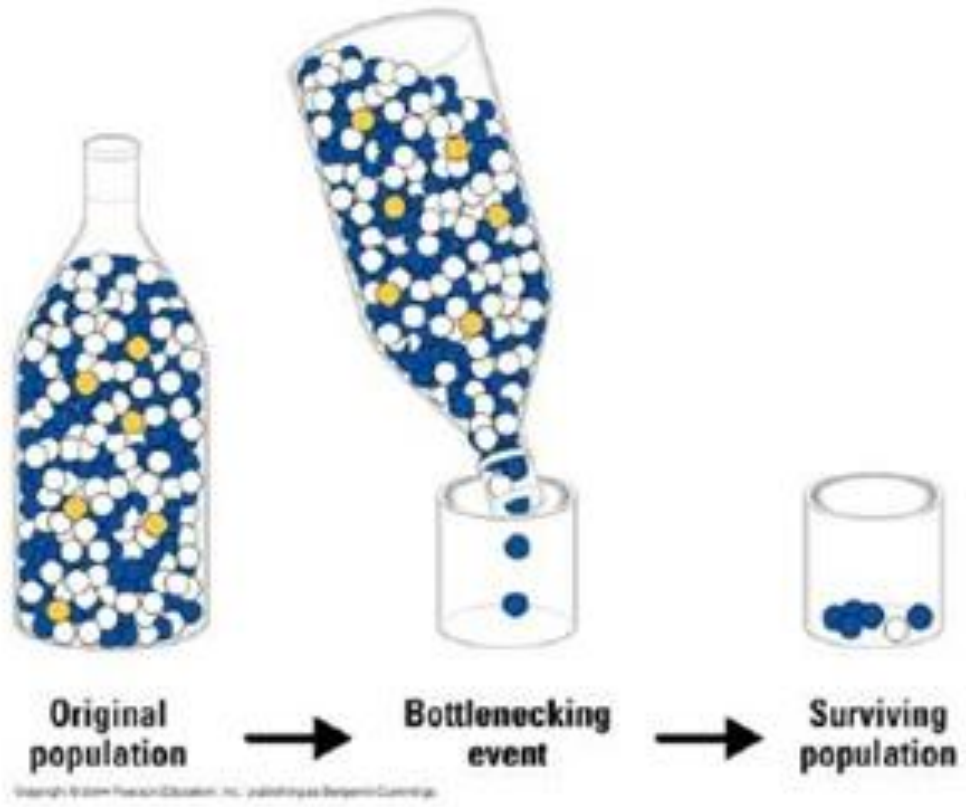


- Gene flow is the *exchange of genes* between different populations of the same species, produced by migrants and commonly resulting in changes in gene frequencies at many loci (locations) in the recipient gene pool.

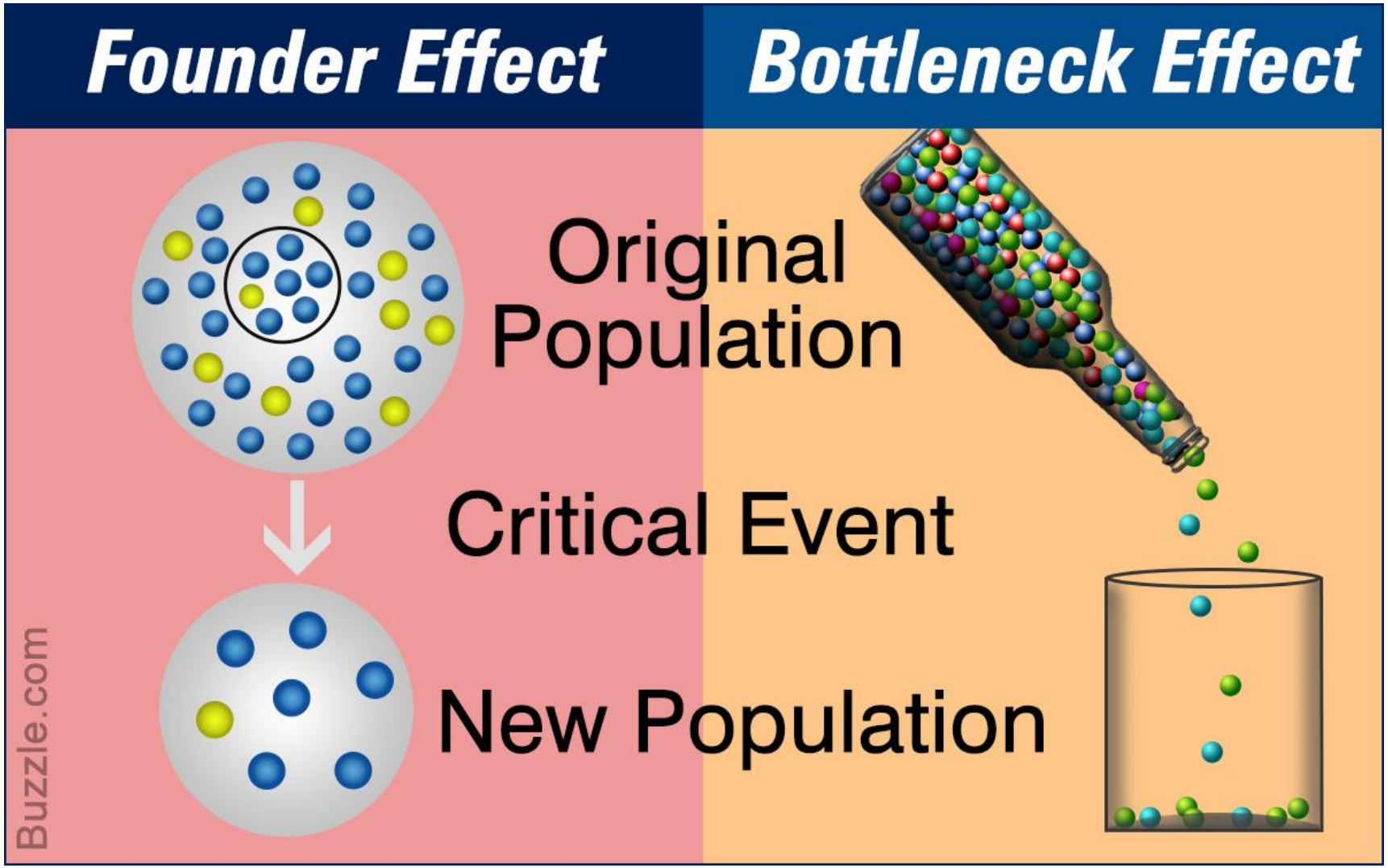
Gene flow: *Helianthus annuus*

Genetic Drift

- Genetic drift is the random fluctuations of gene frequencies as a result of sampling errors.
- Drift occurs in all populations, but its effects are most striking in small populations.
- Due to periodic reductions in population size, genetic drift can affect gene frequencies.
- Genetic drift – bottleneck effect



Founder Effect → Genetic drift in a new colony



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