DEVELOPMENT

- Development refers to the series of transformations that occur in the structure and operations of an organism, organ, tissue, or cell, involving its creation, expansion, specialization, maturation, reproduction, aging, and eventual demise. Throughout its lifecycle, a plant undergoes developmental stages including seed germination, seedling emergence, the juvenile phase, maturation, flowering, seed production, and senescence. The transition from one stage to the next also constitutes development, such as the progression from leaf initiation to leaf expansion or from the vegetative to the reproductive phase, marked by flowering. Even the emergence of chloroplasts in cells upon exposure to sunlight represents a form of development. Ultimately, development leads to senescence, followed by the cessation of life.

Development stages of plant

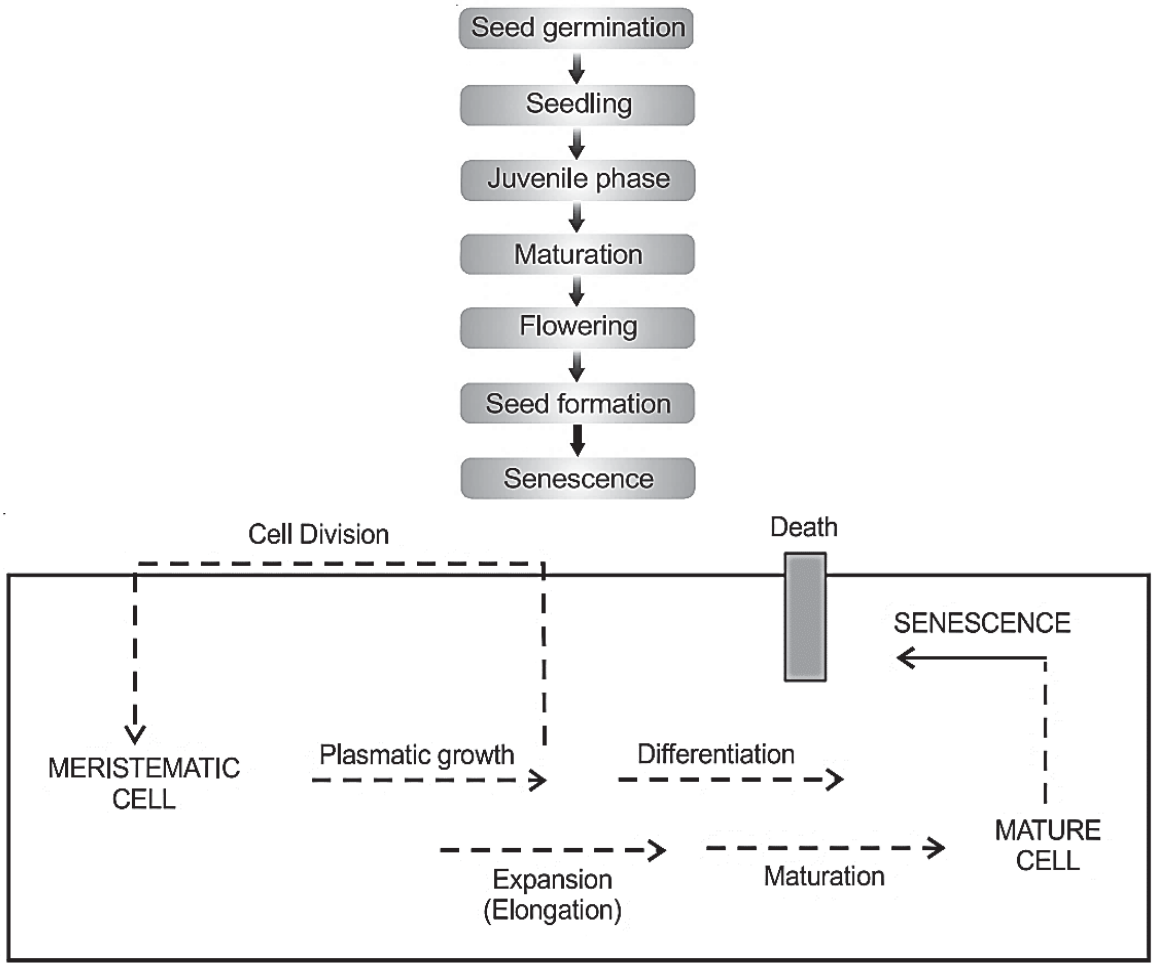

Fig. : Sequence of the developmental processes in a plant cell.

- The process of development is not always linear; plants exhibit plasticity, which denotes their ability to adopt different trajectories and produce varied structures in response to environmental cues. An example of this plasticity is heterophylly, observed in plants like cotton, coriander, and larkspur. In such species, leaves of juvenile plants differ in shape from those of mature plants. Additionally, variations in leaf shapes can be observed in buttercups growing in different habitats, suggesting that environmental conditions influence leaf morphology.

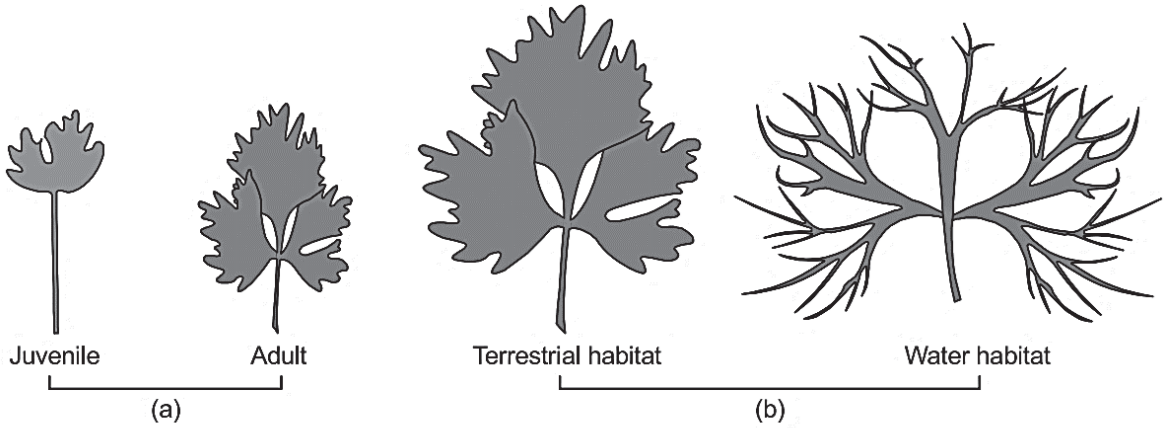

Fig. : Heterophylly in (a) larkspur and (b) buttercup

- It is evident, therefore, that development encompasses both growth and differentiation. Various intrinsic and extrinsic factors influence the developmental stages of a plant. Intrinsic factors include genetic factors, which operate within cells, and chemical substances like plant growth regulators (PGRs), which act between cells. External factors, termed extrinsic, encompass light, temperature, oxygen, carbon dioxide, water, and nutrients. These factors influence diverse events such as dormancy, seed germination, flowering, and plant movements occurring during plant development.