

Chapter 5: Seeds - Structure and Germination

Structure of Dicot and Monocot Seeds

Seeds are structures formed after fertilization and contain the embryonic plant. They are classified into **dicot** and **monocot** seeds based on the number of cotyledons.

1. Dicot Seed (Example: Bean Seed):

- **Structure:**
 - Two cotyledons.
 - Seed coat: Outer layer consisting of testa and tegmen.
 - Hilum: Scar where the seed was attached to the fruit.
 - Micropyle: A tiny pore for water absorption.
 - Embryo: Consists of plumule (future shoot), radicle (future root), and cotyledons (store food).
- **Germination:** Epigeal (cotyledons emerge above ground).

2. Monocot Seed (Example: Maize Grain):

- **Structure:**
 - One cotyledon (scutellum).
 - Seed coat fused with the fruit wall.
 - Endosperm: Large and stores food.
 - Plumule and radicle are enclosed in protective sheaths (coleoptile and coleorhiza).
- **Germination:** Hypogeal (cotyledons remain underground).

Differences between Monocot and Dicot Seeds:

Feature	Dicot Seed (Bean)	Monocot Seed (Maize)
Cotyledons	Two	One
Endosperm	Absent (food in cotyledons)	Present (separate from embryo)
Seed Coat	Distinct	Fused with pericarp
Germination Type	Epigeal	Hypogeal

Germination of Seeds:

Germination is the process by which a seed develops into a new plant.

Types of Germination:

1. **Epigeal Germination:**
 - Cotyledons are pushed above the ground.
 - Example: Bean seed.
 2. **Hypogeal Germination:**
 - Cotyledons remain underground.
 - Example: Maize grain.
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Conditions for Seed Germination:

1. **Water:** Activates enzymes and softens the seed coat.
 - **Experiment:** Soak seeds and observe swelling and sprouting.
 2. **Oxygen:** Required for cellular respiration.
 - **Experiment:** Seeds in an airtight jar fail to germinate.
 3. **Temperature:** Enzyme activity is optimal within a specific range.
 - **Experiment:** Seeds placed in warm, cold, and room temperature conditions.
 4. **Light (in some cases):** Some seeds require light for germination.
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Conclusion: Seed germination is influenced by environmental conditions. The differences between dicot and monocot seeds and their germination types highlight the diversity in the plant kingdom. Understanding these processes helps in agriculture and plant propagation.