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Commentary

A note on germination rate and capacity

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ABOUT THE STUDY

The process by which an organism emerges from a seed or spore is known as germination. The phrase is used to describe the growth of a pollen tube from a pollen grain of a seed plant, the sprouting of a seedling from an angiosperm or gymnosperm seed, and the creation of a sporeling from a spore, such as the spores of fungi, ferns, or bacteria (Ali, et al.,2020).

Germination rate and germination capacity

The germination rate in agriculture and gardening refers to how many seeds of a specific plant species, variety, or seedlot are likely to germinate over a specific time frame. An 85% germination rate, for example, means that around 85 out of every 100 seeds will likely sprout under ideal conditions over the specified germination period. It is a measurement of the germination time course and is typically stated as a percentage (Bennett, et al.,2010). The genetic makeup of the seed, the seed's physical characteristics, and environmental conditions all affect how quickly seeds germinate. The number of seeds required for a specific area or the desired number of plants can be determined using the germination rate. For seed scientists and physiologists, the term "germination rate" refers to the amount of time it takes for a seed to germinate after it has been sown. On the other side, germination capacity refers to the quantity of seeds in a population (i.e., seed lot) that can successfully complete germination (Bernula ,et al.,2020).

Repair of DNA damage

Age-related declines in seed quality are linked to the buildup of genomic damage. In order to address accumulated DNA damage, repair activities are triggered during germination. DNA may be repaired, in particular, single and double-strand breaks. The DNA damage checkpoint kinase ATM plays a significant part in coordinating the course of germination with responses to DNA damage the aged seed has collected over time (Cao, et al.,2005).

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Dicot germination

The embryonic root, also known as the radicle or primary root, is the component of the plant that first develops from the seed. It enables the seedling to start soaking up water and anchoring itself to the soil. An embryonic branch emerges from the seed after the root has absorbed water. The cotyledons (seed leaves), the portion of the shoot below the cotyledons (hypocotyl), and the portion of the shoot above the cotyledons make up this shoot's three primary elements (epicotyl). Different plant groups have different ways that the shoot appears (Carles, et al.,2002).

Epigeal: A botanical word for germination that occurs above the ground is epigeal germination (also known as epigeous germination). In epigeal germination, the hypocotyl lengthens and develops a hook, drawing the cotyledons and apical meristem through the soil as opposed to pushing them. Once it has surfaced, it straightens and pulls the budding seedlings' cotyledons and shoot tips forward. Plants that germinate in this method include papaya, tamarind and beans (Chen, et al.,2020).

Hypogeal: Hypogeal germination, also known as hypogenous germination, is another method of germination in which the epicotyl lengthens and produces the hook. The cotyledons remain underground during this kind of germination, where they eventually decay. Mango, gramme, and peas, for instance, germinate in this manner (Chen, et al.,2013).

Monocot germination

A coleorhiza and a coleoptile, respectively, protect the embryo's radicle and cotyledon in monocot seeds. The coleorhiza emerges from the seed first, followed by the radicle. Then, until it reaches the surface, the coleoptile is forced upward through the soil. It stops extending at that point, and the first leaves appear.

Precocious germination

Precocious germination is the term for when a seed begins to grow before going through all four phases of seed development globular, heart-shaped, torpedo-shaped, and cotyledonary stage (Choudhary, et al.,2009).

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