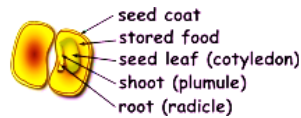


Germination

Hidden inside every seed is a tiny embryonic plant complete with root, stem and leaves, ready to sprout when suitable conditions appear. It is able to remain alive, although dormant, through conditions that may be unfavorable for immediate growth. When suitable conditions occur a seed will begin to germinate.



Parts of a Seed

The seed's plant-parts are not 'true' leaves, stem and roots, but are effective enough to launch the plant into its growth phase when true leaves, roots and stems appear. Flowering plants whose seeds have one embryonic leaf (cotyledon) are called monocotyledons. Flowering plants including Tomatoes have two cotyledons are called dicotyledons or dicots.

When warmth, moisture, and oxygen become available a seed begins to germinate.

- Warmth – Minimum – Tomato plants will not germinate at temperatures below 50°C
Maximum – Tomato plants will not germinate at temperatures exceeding 95°F
Optimum – Tomato plants germinate best between 65°F and 72°F

Moisture – Seeds tend to remain dormant as long as they are dry. Water softens the seed coat.

Oxygen – Dormant seeds need little oxygen; however, all green plants need oxygen to “breathe”, live and grow.



Seed pod

The embryonic plant begins to grow and the seed coat swells and breaks open under the pressure of the growing seedling within the seed coat. As long as the environmental conditions remain favorable the plant will continue to grow, the stem and the cotyledon(s) pushing upwards and the root(s) extending downwards.



Emerging seedling

As the emerging seedling begins to grow, its dependence on stored food diminishes and the transition to its own photosynthetic food production begins. It will not survive unless ample light is added to the water, warmth, and oxygen needed for germination.

Definition

A seed can be considered to have successfully germinated when two (2) distinctly separate cotyledons (embryonic leaves) can be seen. This process will usually take place between 5 and 20 days depending upon local conditions.

Each seed produces only ONE stem. If more than one stem appears in a peat pot, it indicates that multiple seeds have been planted.

In some cases the seed coat itself will be pushed upwards as it adheres to a cotyledon like a small helmet.



Germination – seeds developing two embryonic leaves



TOMATOSPHERE™

In the Tomatosphere project we are dealing primarily with tomato seed germination. Germination is, of course, a process whose duration varies according to the type of seed and the local environmental conditions to which the seed is exposed.

Our interest is in both the rate (time), and the success, of tomato seeds in the germination process.

In order to ensure, as much as possible, the self-consistency of all observations made by numerous independent observers, the following criteria will be used to define the condition "successfully germinated".

For purposes of this experiment, a seed can be considered to have successfully germinated when two (2) distinctly separate cotyledons (embryonic leaves) can be seen.