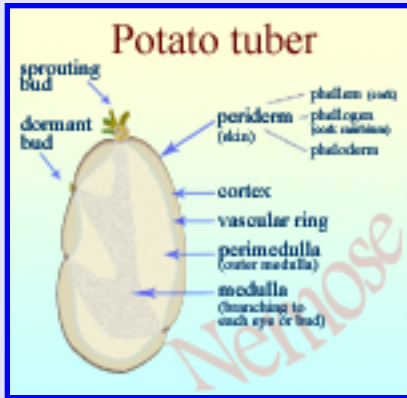


## *Solanum tuberosum*, potato

- Taxonomy
- Brief facts
- Developmental stages (Life cycle)
- Potato tuber anatomy illustrated



- Potato tuber anatomy explained
- References

cellular organisms - Eukaryota - Viridiplantae - Streptophyta - Streptophytina - Embryophyta - Tracheophyta - Euphyllophyta - Spermatophyta - Magnoliophyta - eudicotyledons - core eudicotyledons - asterids - lamiids - Solanales - Solanaceae - Solanoideae - Solaneae - Solanum - Solanum tuberosum

### Brief facts

- The potato is a herbaceous plant of the *Solanaceae*, or nightshade family, which contains several other well known cultivated crops such as tomato, eggplant, tobacco and pepper.

- The cultivated *Solanum tuberosum subsp. tuberosum* is considered to be originated from Andean and Chilean landraces developed by pre-Colombian cultivators. The wild species progenitors of these landraces probably derived from a group of ~20 similar wild species referred to as *S. brevicaulis* complex, distributed from central Peru to northern Argentina.
- Potato fruits, stems and leaves contain glycoalkaloids, toxic compounds, of which the most prevalent are **solanine** and **chaconine**.
- Potato's infamous pathogen is an oomycetes ***Phytophthora infestans*** (late blight, potato blight). Find out **about *Phytophthora infestans* species' life cycle, tissues, mating types, and bibliography at MetaPathogen.**

## Developmental stages (life cycle)

### Life Cycle Stages

The potato plant has a short life span ranging from 80 to 150 days from planting to maturity, with differences existing between varieties. Its developmental stages are often described in terms of tuberization and tuber development. The life cycle of a potato tuber is characterized by initiation and growth followed by a period of dormancy and finally sprouting resulting in the next (vegetative) generation.

- **sprouting tuber**

growth stage 1; the onset of sprout growth that follows dormancy termination is accompanied by substantial increases in cell metabolism; sprouts appear from the eyes of the primary tuber

- **vegetative**

growth stage 2; plant establishment; all vegetative parts of the plants (leaves, branches, roots and stolons) are formed;

stages 1 and 2 last from 30 to 70 days depending on planting date, soil temperature and other environmental factors, the physiological age of the tubers, and the characteristics of particular cultivars

- **tuber initiation**

growth stage 3; approximately 30-60 days after the seed tuber is planted, tuber formation begins; tubers are derived from lateral underground buds developing at the base of the main stem that when kept underground develop into stolons due to diageotropic growth; when the conditions are favorable for tuber initiation, the elongation of the stolon stops, and cells located in the pith and the cortex of the apical region of the stolon first enlarge and then later divide longitudinally; the combination of these processes results in the swelling of the subapical part of the stolon

- **developing tuber**

growth stage 4; during enlargement tubers become the largest sink of the potato plant storing massive amounts of carbohydrates (mainly starch) and also significant amounts of protein; furthermore tubers decrease their general metabolic activity and as such behave as typical storage sinks

- **mature tuber**

growth stage 5; potato tubers are harvested from 90 to 160 days after planting and this may vary with cultivars, production area, and marketing conditions; starch typically represents

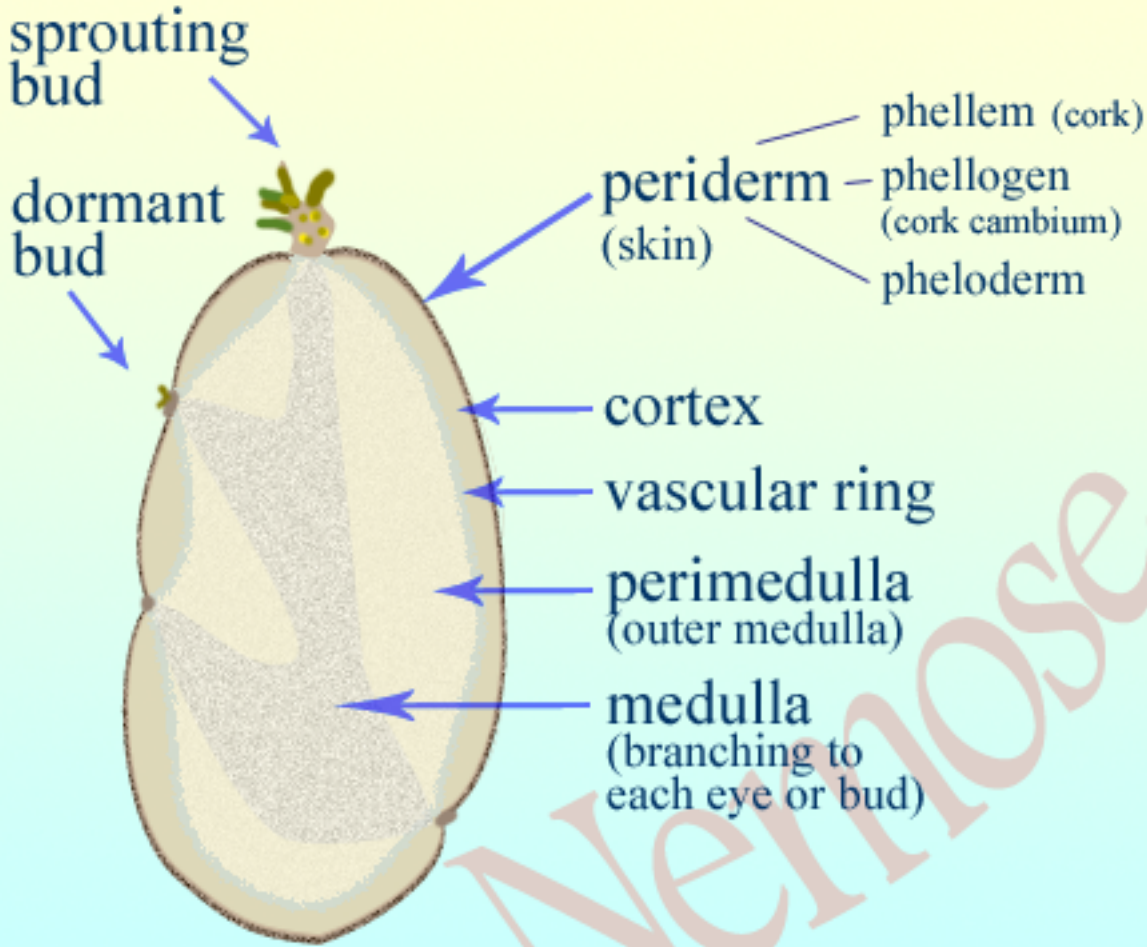
20% of the fresh weight of mature tuber; after potato vines die back the skin of tuber thickens and hardens, which provides greater protection to tubers during harvest and blocks entry of pathogens to the tuber

- **dormant tuber**

although dormancy is defined as the absence of visible growth, dormant meristems are metabolically active; in general, rates of many cellular processes such as respiration, transcription, and translation are suppressed during dormancy; non-dividing, dormant tuber meristems are arrested in the G-1 phase

## **Potato tuber anatomy illustrated**

# Potato tuber



## Potato tuber

- tuber MeSH

the potato tuber is an enlarged portion of an underground branch of a stem called a stolon or rhizome

- tuber eye

the buds from which next season's growth will emerge; eyes are concentrated near the apical end of the tuber, with fewer near the stolon or basal

end; eye number and distribution are characteristic of the variety

- tuber skin

tuber skin is composed of two layers of cells: an outer layer of single cells called the epidermis, underlain by several layers of corky cells called the periderm; the periderm layer may contain a pigment that produces coloured potatoes

- tuber cortex

tissue between skin and a vascular ring

- vascular ring

vascular ring contains cells that transport nutrients from the above ground stems to the medulla

- tuber medulla

medulla represents the primary storage area for the potato tuber

- tuber perimedulla

located between the vascular ring and medulla

- stolon

a slender horizontal stem of a plant that grows near the surface of the ground; it can sprout buds that can become new plants; potato tubers grow at the end of stolons

# References

## PubMed articles

- Spooner DM et al. A single domestication for potato based on multilocus amplified fragment length polymorphism genotyping. *Proc Natl Acad Sci U S A.* 2005 Oct 11. **PMID: 16203994**
- Ronning CM et al. Comparative analyses of potato expressed sequence tag libraries. *Plant Physiol.* 2003 Feb; 131(2):419-29. **PMID: 12586867**
- Fernie AR, Willmitzer L. Molecular and biochemical triggers of potato tuber development. *Plant Physiol.* 2001 Dec; 127(4):1459-65. **PMID: 11743089**

## Websites

- [Solanum tuberosum L.](#)
- [Potato Growth and Development](#)
- [Botany of the Potato Plant](#)
- [Potato Association of America Handbook](#)



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