

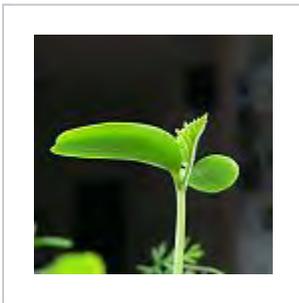
# Shoot

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In botany, **shoots** consist of stems including their appendages, the leaves and lateral buds, flowering stems and flower buds.<sup>[1][2]</sup> The new growth from seed germination that grows upward is a **shoot** where leaves will develop. In the spring, perennial plant shoots are the new growth that grows from the ground in herbaceous plants or the new stem or flower growth that grows on woody plants.

In everyday speech, shoots are often synonymous with stems. Stems, which are an integral component of shoots, provide an axis for buds, fruits, and leaves.

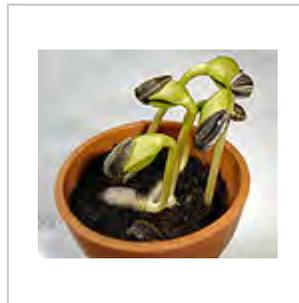
Young shoots are often eaten by animals because the fibres in the new growth have not yet completed secondary cell wall development, making the young shoots softer and easier to chew and digest. As shoots grow and age, the cells develop secondary cell walls that have a hard and tough structure. Some plants (e.g. bracken) produce toxins that make their shoots inedible or less palatable.



The shoot of a  
cucumber



Edible shoots of  
Sachaline



Sunflower  
seedlings  
germinate



A young hass  
avocado shoot

## Shoot types of woody plants

Many woody plants have distinct **short shoots** and **long shoots**. In some angiosperms, the short shoots, also called **spur shoots** or **fruit spurs**, produce the majority of flowers and fruit. A similar pattern occurs in some conifers and in *Ginkgo*, although the "short shoots" of some genera such as *Picea* are so small that they can be mistaken for part of the leaf that they have produced.<sup>[3]</sup>

A related phenomenon is **seasonal heterophylly**, which involves visibly different leaves from spring growth and later lammas growth.<sup>[4]</sup> Whereas spring growth mostly comes from buds formed the previous season, and often includes flowers, lammas growth often involves long shoots.



Development of fruiting spurs on an apple tree. Left: A two-year-old shoot; Right: A three-year-old shoot with fruit spurs



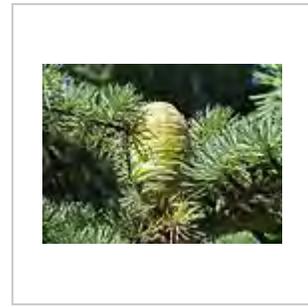
Long shoot growth



A mature fruiting spur on a Nashi pear tree, *Pyrus pyrifolia*



On long shoots of *Cedrus deodara* individual leaves may have buds in the axils.



*Cedrus deodara* forms short shoots (from buds) along the long shoots.

## See also

- Bud
- Heteroblasty (botany), abrupt change in the growth pattern of some plants as they mature
- Lateral shoot
- Sterigma, the "woody peg" below the leaf of some conifers
- Thorn (botany), true thorns, as distinct from spines or prickles, are short shoots

## References

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3. Gifford, E.M.; Foster, A.S. (1989), *Morphology and evolution of vascular plants*, New York: W. H. Freeman and Company
4. Eckenwalder, J.E. (1980), "Foliar Heteromorphism in *Populus* (Salicaceae), a Source of Confusion in the Taxonomy of Tertiary Leaf Remains", *Systematic Botany*, **5** (4): 366–383, doi:10.2307/2418518, JSTOR 2418518

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