

# Introduction to Botany. Lecture 27

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## 1 Questions and answers

- Quiz

## 2 Root

- Root morphology
- Anatomy and development of roots



## 1 Questions and answers

- Quiz

## 2 Root

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# Questions and answers

## Quiz



# Final question (2 points)

What is procambium?



# Final question (2 points)

What is procambium?

- Primary meristem which makes stele.

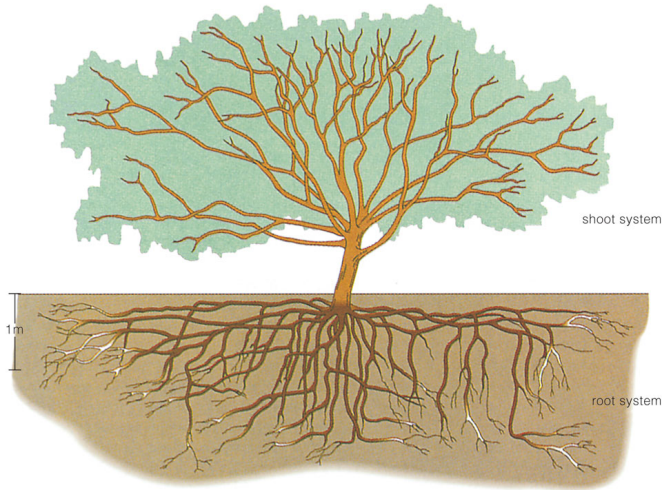


# Root

## Root morphology



# Root system and shoot system



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# Definition and functions

- Axial vegetative organ with a function of soil nutrition
- Other functions:
  - A Anchor
  - B Synthesis
  - C Storage
  - D Communication
- Features:
  - A No leaves
  - B Geotropic growth
  - C Locates in soil or water



# Types of roots

- Primary root: originates from root of seedling
- Secondary (lateral) roots: originate from primary roots
- Adventitious roots: originate from stems



# Primary root



# Adventitious roots

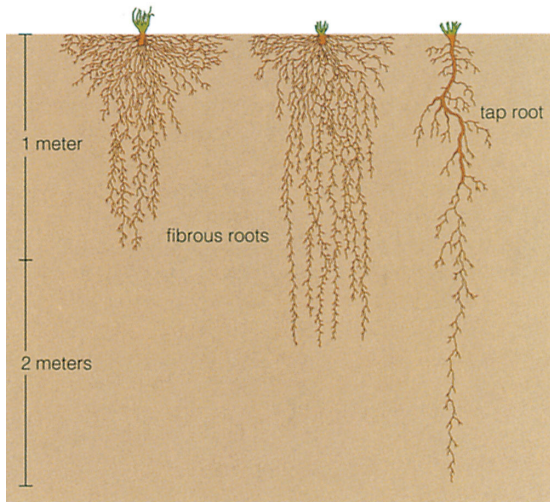


# Root systems

- Tap root system: with well developed primary root (most seed plants)
- Fibrous root system: without clearly visible primary root (monocots, ferns)



# Fibrous and tap root systems



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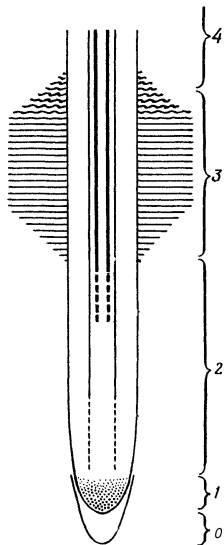


# Root

## Anatomy and development of roots



# Root zones



- Root cap
- Root meristem
- Elongation zone
- Absorption zone
- Maturation zone



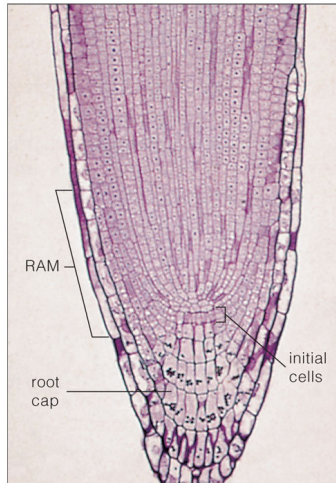


# Structure of root tip

- Initial cells (quiescent center)
- RAM
- Root tip growing both forward (root cap) and backward (other root tissues), initial cells determine the direction of growth
- If root tip touch barrier, it starts to make rotating movements



# Root tip



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# Periphery of root

- Rhizodermis (rhizoderm, root epidermis): fast-degrading cells
- Cortex, which includes also:
  - Endodermis (endoderm): 1-cell layer with specialized cell walls, located on the border with vascular cylinder
  - And (sometimes) exodermis (exoderm): similar to endoderm but located just under rhizodermis
- In some plants (i.e., orchids), cortex modified into velamen

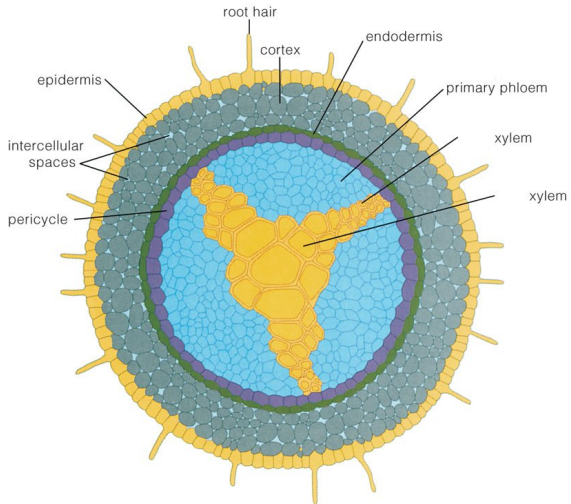


# Root center: vascular cylinder

- Pericycle
- Vascular tissues located in the center
- No central hollow, central parenchyma presents in monocot roots



# Anatomy of root



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# Summary

- Vascular tissues of root is a modified protostele or solenostele (monocots).



# Final question (2 points)



# Final question (2 points)

What are adventitious roots?





# For Further Reading



A. Shipunov.

*Introduction to Botany* [Electronic resource].

Mode of access:

[http://ashipunov.info/shipunov/school/biol\\_154](http://ashipunov.info/shipunov/school/biol_154)

