

# Plant Histology

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(12)

# Complex Tissue

# Vascular Tissue

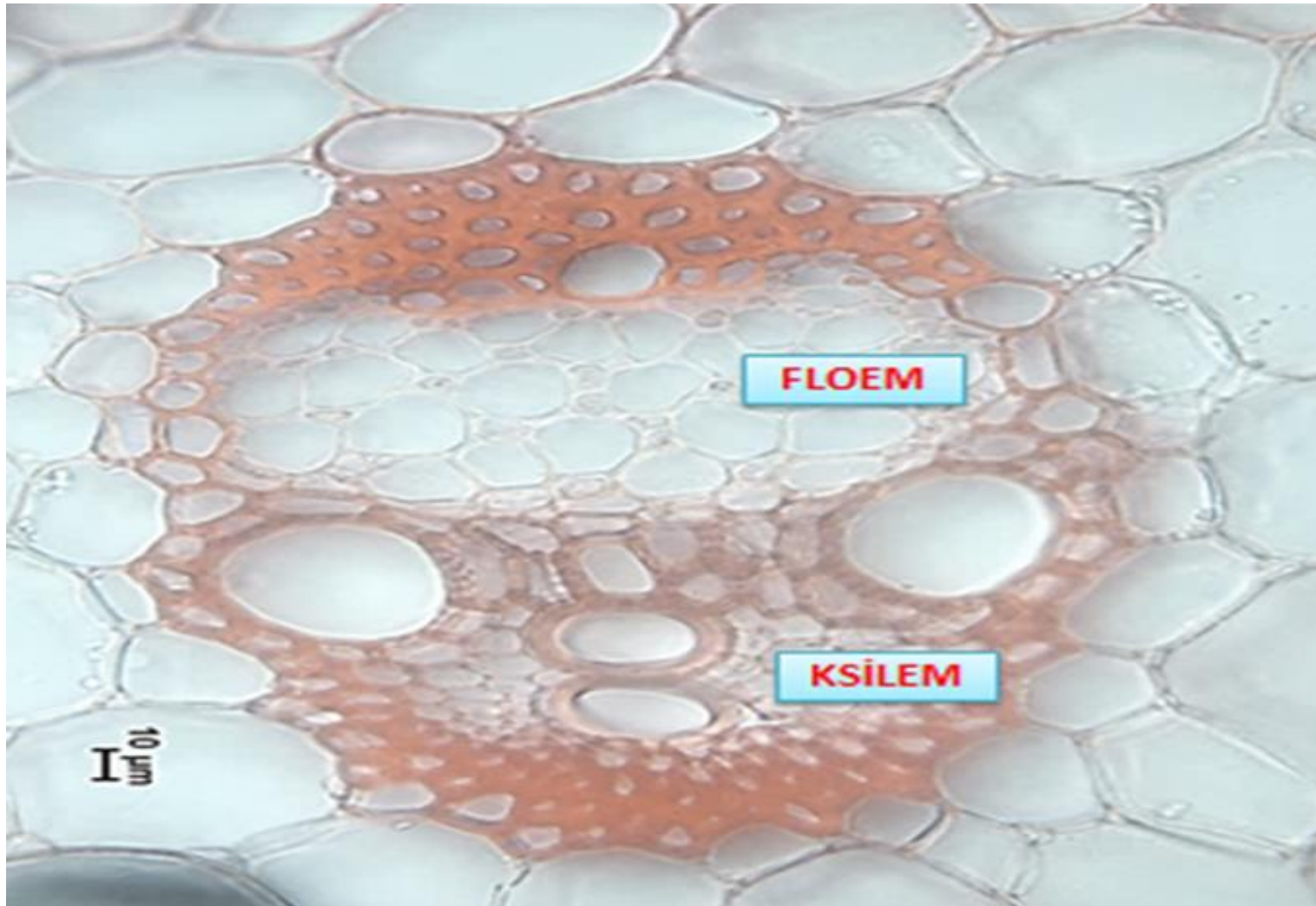
Vascular plants also are known as **Tracheophyta**.

Because Vascular plants have well developed conductive system. Main function of vascular tissue conduct water, minerals and food materials from root to leaves and additional function provide mechanical support.

## Vascular tissue composed two types of tissues:

- 1. Xylem:** for the conduction of water and mineral from root to leaves.
- 2. Phloem:** for the conduction of food from leaves to stem and root.

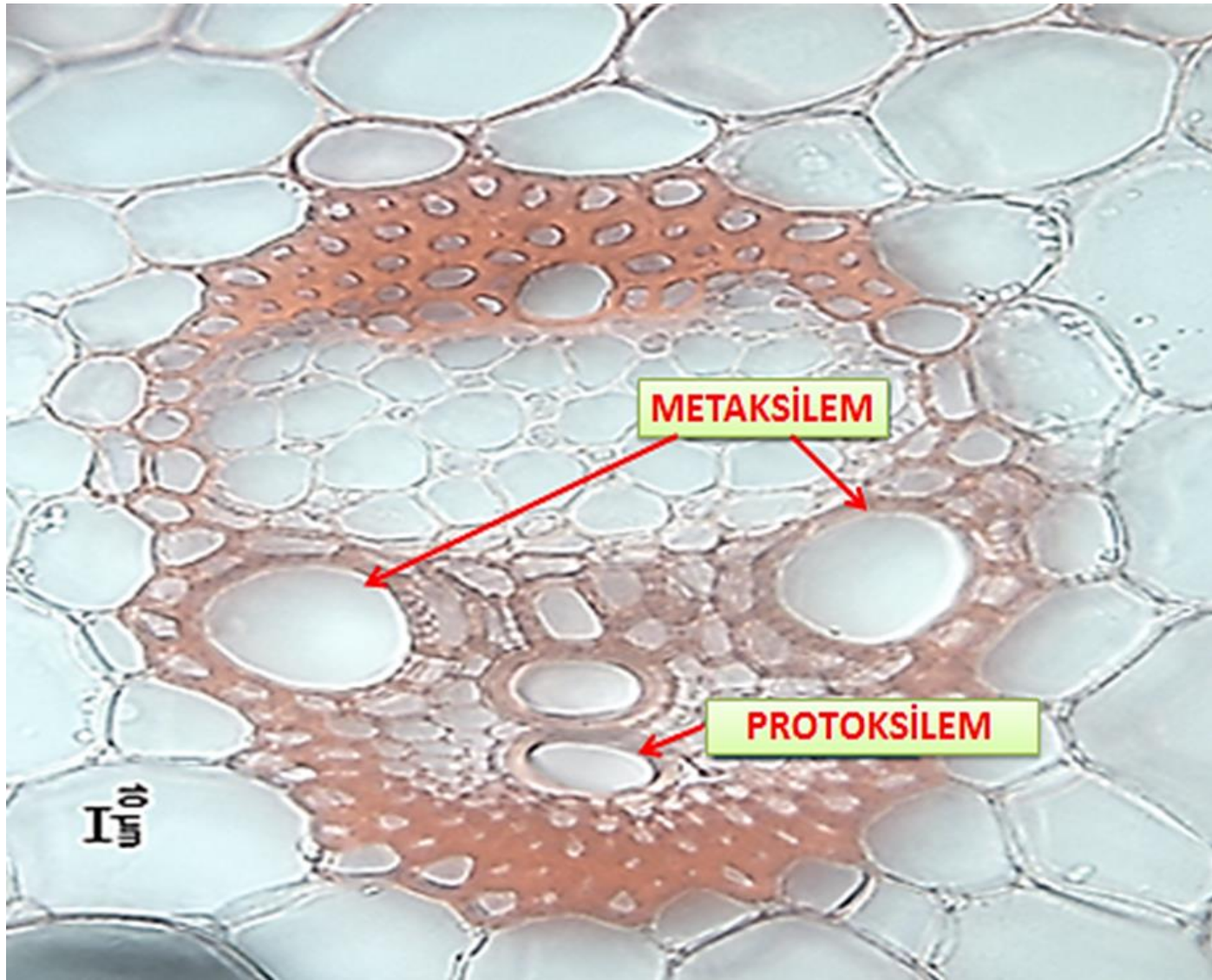
# Vascular bundles are formed by association of xylem and phloem



# What is xylem?

- *Xylem* is a conduction tissue in plants. This term is derived from greek word “xylos” means wood and proposed by Nägeli (1858). The main function is to conduct water, minerals from root to leaves.

- Two type of xylem tissue have been found in plants - **primary xylem** and **secondary xylem**. If the origin of xylem tissue has occurred from procambium of apical meristem, it is called as **primary xylem** and if it has occurred from vascular cambium the xylem is called as **secondary xylem**.
- The primary xylem develops earlier and are first formed elements called as **protoxylem** and a later formed part are called as **metaxylem**.





## *What are the Components or Elements of Xylem?*

- 1. Tracheids*
- 2. Vessels*
- 3. Xylem Fibres*
- 4. Xylem Parenchyma*

# Tracheid

*Tracheid* is fundamental cell type in xylem. Tracheids are elongated tube in shape and both of ends of them are tapering. They are dead and have secondary wall and bordered pits. Tracheids are the only xylem element in Pteridophytes and Gymnospermae and this is a primitive characters in plant kingdom.

## Patterns of secondary thickening in tracheids

1. *Annular thickening*
2. *Spiral or helical thickening*
3. *Scalariform thickening*
4. *Reticulate thickening*
5. *Pitted thickening*

# Vessel

- *Vessel* is also called as **trachea**. They are shorter and more larger than tracheid. They are dead and have secondary wall and bordered pits like tracheid.
- The part of vessel element wall bearing the perforation or perforations at the end wall is called perforation plate.


# Different types of perforation plates



**Simple perforation plate:** a plate with single perforation



**Multiple perforation plate:** a perforation plate with many perforations




**Scalariform perforation plate:** a multiple perforation plate with perforations arranged in parallel series



**Perforation bar:** Wall region of pores in scalariform perforation plate



**Reticulate perforation plate:** pores arranged in reticulate fashion



**Forminate type perforation:** many pores arranged more or less circular pattern

## Different types of thickening are:

1. *Annular thickening*
2. *Spiral thickening (helical)*
3. *Scalariform thickening*
4. *Reticulate thickening*
5. *Pitted thickening*

# Xylem Fibres

- They are also called *xylary fibres*. They are dead and have secondary wall and simple pits. Main function of xylary fibres provide mechanical support.

Two types of xylary fibres

1. *Fibre tracheids*
2. *Libriform fibres*

# Xylem Parenchyma

- They are living and have primary wall and simple pits. Main function of *xylary parenchyma* store starch, oil and the other ergastic substances.

Two types of xylem parenchyma:

1. *Axial parenchyma*
2. *Ray parenchyma*