

Introduction to Botany. Lecture 23

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1 Questions and answers

- Quiz

2 Leaf

- Leaf characters
- Repetitive characters
- Terminal characters
- Leaves in nature



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Questions and answers

Quiz



Final question (2 points)

What are difference(s) between homoiohydric and poikilohydric plants?



Final question (2 points)

What are difference(s) between homoiohydric and poikilohydric plants?

- Save water vs. do not save water
- Do not survive desiccation vs. survive desiccation



Leaf

Leaf characters



General characters

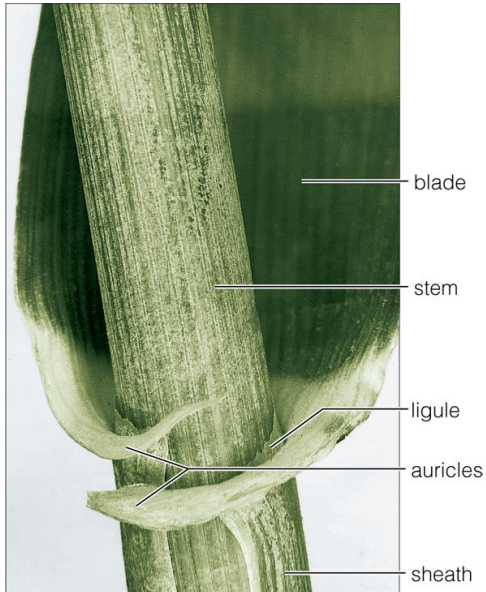
- General characters apply to the whole leaf
- Stipules (present or not, how many etc.)
- Other leaf base organs (sheath, ocrea, ligules etc.)



Stipules



Leaf base



Leaf

Repetitive characters



Repetitive characters

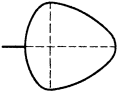
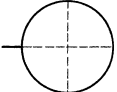
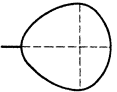
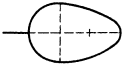
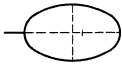
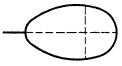




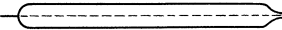
Repetitive characters are the same on each level of leaf hierarchy:

- Shape
- Dissection
- Petiole (stalked/non-stalked etc.)






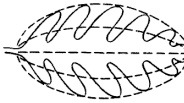


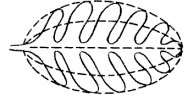
Repetitive characters of same type may combine



Shape

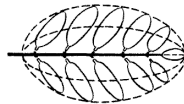
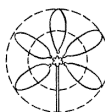
	Maximum width closer to leaf base	Maximum width in the middle	Maximum width closer to the apex
Length = width or slightly more	 Deltate	 Circular	 Cuneate
Length > 1-1.5 x width	 Ovate	 Elliptic	 Obovate
Length > 3-4 x width	 Narrowly ovate	 Lanceolate  Oblong	 Narrowly obovate
Length > 5 x width	 Linear		

Dissection

		Tri-	Palmately	Pinnately
Simple leaves	Lobed (from 1/4 to 3/4)			
				
	Dissected (from 3/4 to midrib)			

Compound leaves

(leaflets stalked, with joints)



Leaf

Terminal characters



Terminal characters

Terminal (leaflet) characters are applicable only to terminal parts (normally, leaflets) of leaves:

- Form of base
- Form of tip
- Type of margin
- Surface
- Venation



Terminal characters: base of leaf blade

- Rounded
- Truncate (straight)
- Cuneate
- Cordate
- Sagittate



Terminal characters: leaf apex

- Rounded
- Mucronate
- Acute
- Obtuse
- Acuminate
- Retuse



Terminal characters: leaf margin

- Without teeth: smooth
- With teeth
 - Dentate
 - Serrate
 - Crenate
- Could be double-dentate, triple-serrate etc.



Terminal characters: leaf venation

Main vein Lateral veins	No	One	Several
	Apodromous	Hypho-	Acro-
Several	...	Ptero-	Actino-



Plan of leaf description

- ① General characters (leaf as a whole):
 - A. stipules (present / absent, deciduous / not);
 - B. base (sheath / no sheath, ligule / no ligule, auricles / no auricles)
- ② First level of hierarchy: repetitive characters:
 - A. symmetry (symmetrical / asymmetrical);
 - B. shape;
 - C. dissection;
 - D. petiole (length)
- ③ Second level of hierarchy
- ④ Third level of hierarchy and so on
- ⑤ Terminal characters (leaflets):
 - A. base [of leaf blade] (rounded, truncate, cuneate, cordate, sagittate);
 - B. apex (rounded, mucronate, acute, obtuse, acuminate, retuse);
 - C. margin (whole, dentate, serrate, crenate; degree of order);
 - D. surface (color, hairs etc.);
 - E. venation (apo-, hypho-, acro-, ptero-, actinodromous)



Leaf

Leaves in nature



Heterophyly

- Juvenile and adult leaves
- Water and air leaves
- Sun leaves and shade leaves



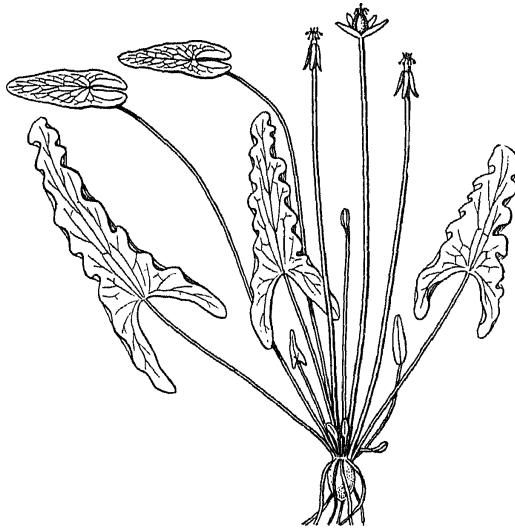
Juvenile leaves of *Juniperus* sp.



Juvenile leaves of *Eucalyptus* sp.



Submerged and floated leaves of *Ondinea*



Leaf mosaic

- Distribution of leaves of plants in a single plane, usually perpendicular to light rays
- Provides the least shading of leaves by one another



Leaf mosaic of red maple (*Acer rubrum*)

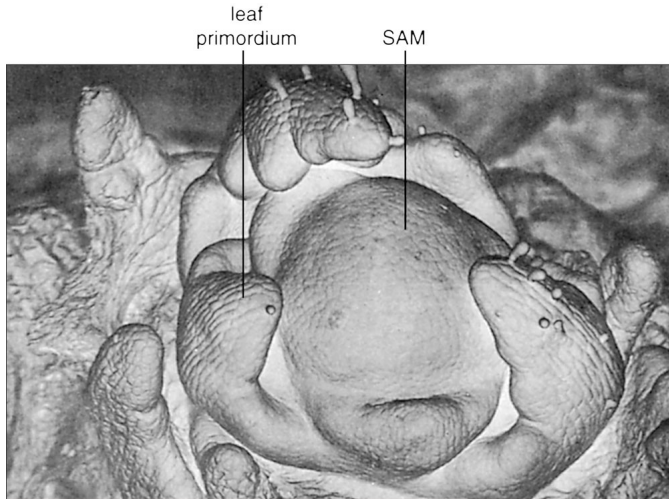


Seasonal life of leaves

- Leaves arise from SAM through leaf primordia
- Old leaves separate from plant in a region called abscission zone



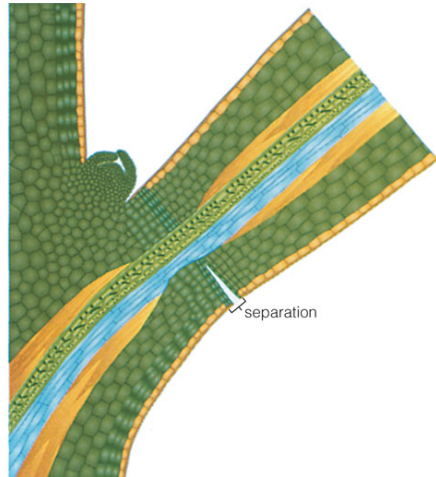
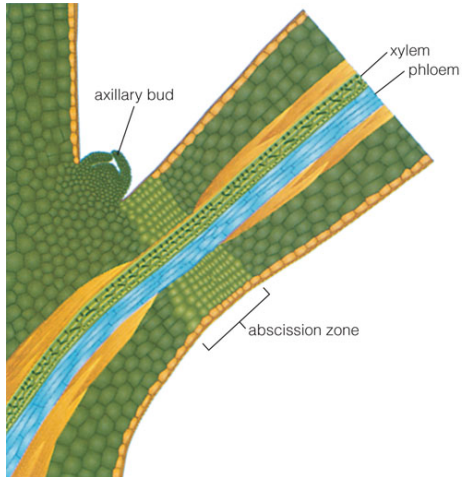
Leaf primordia



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Abscission zone



Summary

- Leaves have **general**, **repetitive** and **terminal** characters
- **Heterophylly** is a co-existence of different types of leaves on the same plant
- **Abscission zone** helps the separation of leaf at the end of season



Final question (3 points)



Final question (3 points)

Please draw the leaf:

- With petiole
- 1st level: pinnately lobed, obovate; 2nd and further levels absent
- Cordate base
- Acuminate tip
- Smooth margin
- Acrodromous venation



For Further Reading



A. Shipunov.

Introduction to Botany [Electronic resource].

2016.

Mode of access:

http://ashipunov.info/shipunov/school/biol_154

