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Anatomical and Morphological Structural Characteristics of Sloe - Prunus Spinosa L. (Rosaceae)

VÜSALƏ MUSTAFAEVA
Ganja State University
Azerbaijan

Abstract:

The sloe is the kind of plant from Rosaceae family, genus plum. It is a short bush, as well as a tree with the height of 3-4 meters. Branches are tough spiny, leaves are ellipse-shaped or inversely ovoid. It has small white flowers. The fruit is single-seed, round, small, wax-coated and black-and blue. It grows late.

Key words: cuticle, klorenkim, mouth, phloem, xylem, cuticle, epidermis

Wild sloe has spread in Asia Minor, Western Europe and at the shores of the Mediterranean Sea, as well as in Azerbaijan, Crimea, and Western Siberia. It is a cold-resistant and drought-resistant plant.

There is 5, 5-8,8% sugar (glucose, fructose), 0,8-2,8% apple acid in the fruit. It's eaten, dried, made jams and compotes, used in making of vodka, liqueurs and wine. 195 mg% on vitamin S accumulates in the leaves.

It blossoms in March-May, fruits ripen in July-August.

Comparative morphological, anatomical structure of the plant was studied for the first time. Below is information about it.

Leaf. The most important organ of the plant. Any of the plant's organ is not multifunctional as a leaf. A leaf carries out

photosynthesis (mouth cells, fence-shaped and spongy parenchyma cells and chloroplasts), respiratory (all tissue cells of leaf), transpiration (mouth cells), as well as many important functions such as guttation (larger and always open mouth cells, hidators).

Leaf structure is dorsoventral on the cross-section (picture 1). Both surfaces are covered by skin. These cells are round-shaped and settled closely, outer covers have thickened. They have been covered by cuticle from the outside. Cells of the top skin are larger and more transparent. There are not any chloroplasts found in these cells. It helps sun's rays to pass to leaf's mesophyll more freely and unhindered.

Fence-shaped parenchyma is monolayer, prosenchyma-typed, rich with chloroplasts, and provides the improving of the photosynthesis process more efficiently. Spongy parenchyma has grown even stronger. Holding more than half part of the leaf mezophyll, it contains 4-6 cell layers. They are voluminous and settled relatively sparsely. There are a few chloroplasts. There is a small amount of gaps among the cells. Studies have shown that as the altitude increases, the cells which contain leaf mezophyll are reduced, its covers thicken and settle more closely. Bales align in the leaf mezophyll, collateral-typed, covered by monolayer cells from the outside. Xylem is directed to the up surface of the leaf and phloem is directed to the down surface. Central bale (vein) has grown more strongly. There are 15-17 water pipes in a bale.

Stomata are found only on the lower surface of leaves. With increasing altitude in the mountains, stomata's volume has decreased while the number is growing. Skin cells is changing related to the height. Thus, their foreign cases thicken, cuticle constitutes 35-40% of epidermis with the outer case of epidermis. This plant can be regarded as a sign of adaptation to extreme climatic conditions.

Both leaf surface is covered with feathers, and their number is higher at the bottom surface.

In the anatomical structure of leaf xerophyte symptoms (Cells forming a dense deployment of leaf mezophyll, thickening of the cell cases, stomatas only at the bottom surface, covering with feathers of the both surfaces etc.) are more specific.

Stalk. At the cross-section the structure of a stalk (picture 2) is rounded at the bottom and cornered at the top surface. The outside is covered with a layer of skin cells in a circular shape. Thickened skin cells in the outer membrane surface is covered with a layer of cuticle. Inside to the skin there are 2-3 layers of klorenkim. These cells are small-scale and rich with chloroplasts. There are such structures as thylakoids, internal and external membrane, stromas, enzymes, ribosomes, RNA and DNA to realize photosyntesis in chloroplast. They are structurally and functionally related to each other, and there are extremely important processes at each of them. The other important aspect of photosyntesis is short period time realizing processes. Reaction to the light of the thousands of "chlorophyll " within chloroplasts ends up in a unbelievable short period of time as one thousandth of a second. Parenchyma occupies the major part of stalk tissue. These cells are circular shaped and they are small on the border part of klorenkim and transmitter ball, towards the center they are enlarged. This allows to intensive metabolism.

Phloem is directed to the down surface of a stalk, and xylem is directed to the up surface. Xylem improved strongly. Xylem rays are about 17-19, there are 3-5 water pipes in each ray. Phloem is consisted of sieve-shaped pipes, neighbor cells and phloem parenchyma. Transmitter ball is specific only for this type and taxonomically important as a diagnostically sign. Stalk is surrounded by feathers from the outside.

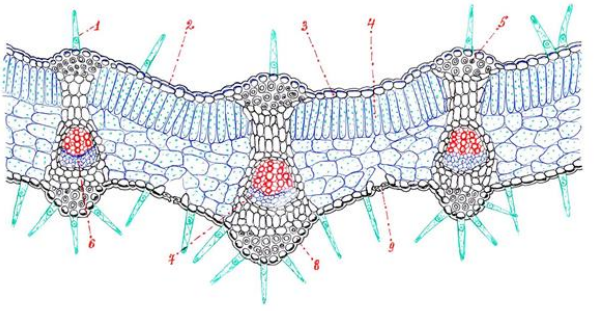
It is a xerophyte according to the ecological group.

Shoot. (Picture 3). A shoot is cornered structural at the cross-section. Closely covered by simple feathers from the outside. Epidermis is monolayer, round-shaped, covered with cuticle. Inside to the epidermis there have grown 2-3 layers of

klorenkim. These cells are small-scale and settle closely, rich with chloroplasts. Klorenkim has appeared in a shoot as an adaptation of an organic food lack. Inside to the klorenkim there is a shell parenchyma of 4-6 layers. These cells are round-shaped and settle closely. These cells have a high degree of complex physiological ability. They play an active role in the course of duties pertaining to the live protoplasm. Thus, they take part in photosynthesis, cleavage reactions, collection of reserve nutrients, secretion of waste substances and etc. Also it helps to deliver the organic substances produced by the plant itself to the all live tissues.

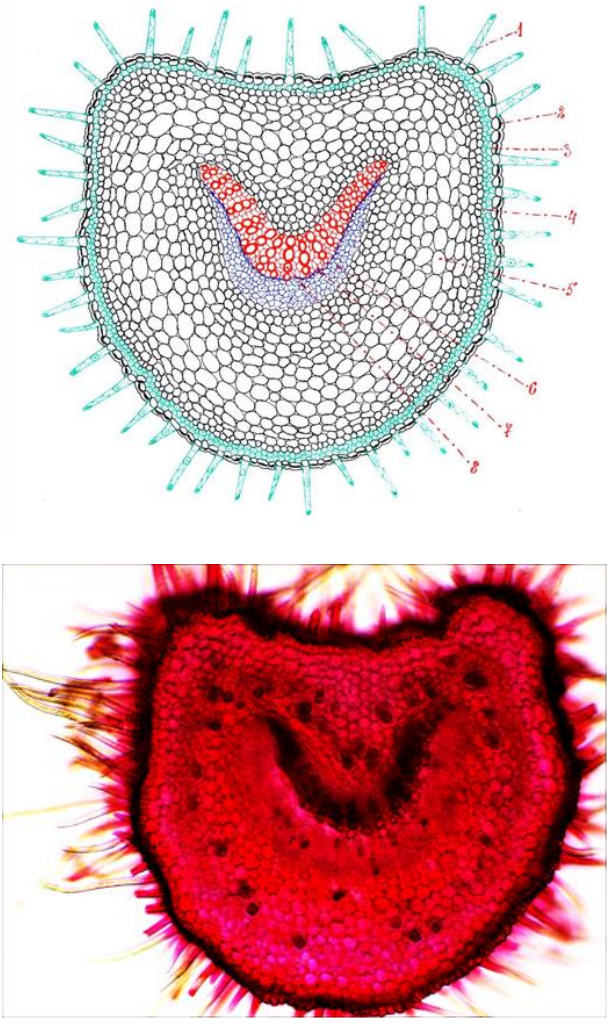
A shoot is ball-structural. The number of balls is 8-10. Balls are open and collateral-typed. Xylem has developed more powerful in balls. There are 3 xylem rays in balls, 11-12 water pipes in every ray. Phloem is directed to the outside of balls. Sieve-shaped pipes and neighbor cells are seen clearly in phloem. Strongly developed core is covered shoot's center. These cells are large in size and located close.

In the anatomical structure of a shoot has been found the ball-structure which rarely seen in trees and bushes. Numerous fluff covered the shoot's surface becomes thorns at the next phases of development. The plant is xerophytes according to the ecological group.



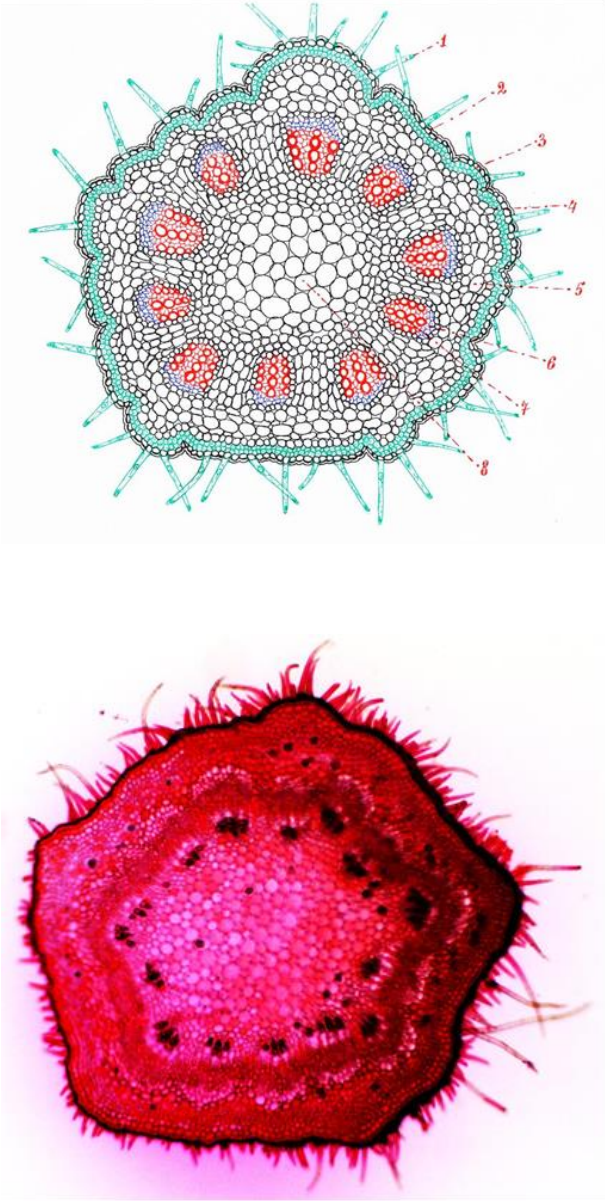
Picture 1. Priunus spinoza. Anatomical structure of the leaf

1 – feather, 2 –cuticle, 3 – skin, 4 – fence-shaped parenchyma, 5 – angular kolenkim, 6 – phloem, 7 – xylem, 8 – the bottom skin, 9 – stomata



Picture 2. Priunus spinoza. Anatomical structure of the stalk

1 – feather, 2 – cuticle, 3 – skin, 4 – klorenkim, 5 – shell parenchyma, 6 – phloem, 7 – cambium, 8 – xylem



Picture 3. Priunus spinoza. Anatomical structure of the shoot

1 – feather, 2 – cuticle, 3 – skin, 4 – klorenkim, 5 – shell parenchyma, 6 – phloem, 7 – xylem, 8 – core

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