



## ANATOMICAL STRUCTURE OF THE LEAVES OF *CRASSULA CORDATA* (CRASSULACEAE)

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Crassulaceae DC. is a family of plants belonging to dicotyledons with a succulent leaves. They occur mostly in warm regions, especially many species distributed in Africa. Grow usually in sandy or mountainous areas and among the rocks, in habitats where water is scarce. The conditions which they live in cause that their leaves are modified to a greater or lesser extent. In a succulent leaf the chlorenchymatic tissue is not differentiated into the palisade and spongy layers. It forms clearly distinguishable water tissue with the large volumes of vacuoles. In leaf, additional amounts of water are stored as reserves during drought. The cells are tightly packed, the intercellular spaces are small. Such structure is also connected with the CAM photosynthesis. In Crassulaceae collecting of carbon dioxide takes place at night, and then used during photosynthesis during the day. It is adaptation for increased efficiency of water too. Moreover, in the large vacuoles, besides water, malate is accumulated – an intermediate compound in CAM. The epidermal tissue is also active in adaptation, often the outer call wall is thickened, covered a thick layer of cuticle, sometimes with a wax deposit.

The aim of this study was to investigate the anatomy of the leaf of *Crassula cordata* Thunb. using the light microscopy.

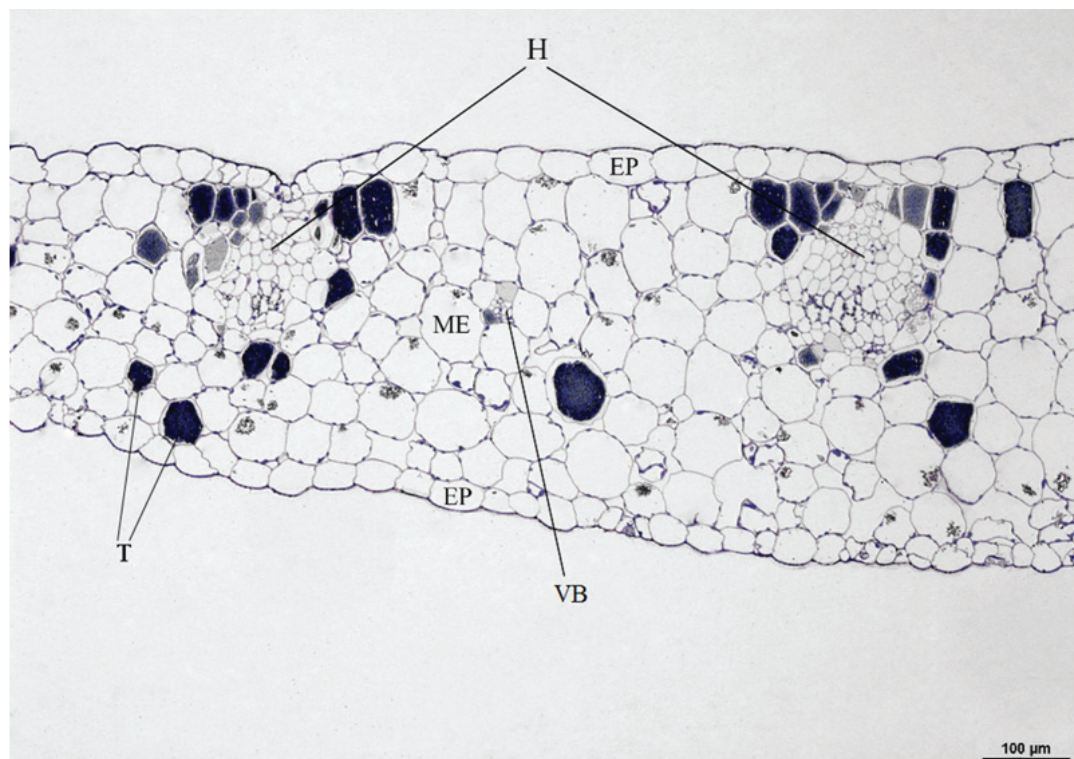
Mature leaves of plants were cut into small pieces and fixed in 2.5% glutaraldehyde and

2.5% formaldehyde in 0.1 M cacodylate buffer. Than tissue was post fixed in 2% osmium tetroxide, dehydrated in a graded acetone series and embedded in Spurr resin. Sections of 0.5-1.0  $\mu\text{m}$  were cut using glass knives on a microtome and observed under light microscopy.

*Crassula cordata* is a typical leaf succulent plant. It has a characteristic morphology and



**Fig. 1.** Habit of *Crassula cordata*.



**Fig. 2.** Light micrograph of a cross section of the leaf *Crassula cordata*: **H** – hydathodes; **EP** – epidermis; **ME** – mesophyll; **T** – tannin cells.

small size (Fig. 1). This also indicates the anatomical structure of the leaf, observed on the cross-sections (Fig. 2). Single-layered epidermis is composed of thick-walled, elongated cells. It is covered with a thick layer of cuticle. In the abaxial surface stomata was observed. Parenchyma is relatively uniform. The same cells perform the functions of water storage and photosynthesis. Mesophyll is not differentiated into palisade and spongy layer. Cells are tightly packed with

small intercellular spaces. In mesophyll cells can be seen large vacuoles and plastids near the cell wall. These characteristics make good use of the volume for water storage. On the adaxial surface of leaf numerous hydathodes are present. Epithem, tissue which forms hydathodes, is composed of thick-walled, tightly packed, small cells with visible nucleus. Mesophyll cells surrounding vascular bundle and hydathodes contain vacuoles filled tannin substances.