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## **«PLANTA+. НАУКА, ПРАКТИКА ТА ОСВІТА»**

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## MICROMORPHOLOGICAL FEATURES OF THE LEAF LAMINA OF *CRATAEGUS CURVISEPALA* LINDM. AND *CRATAEGUS UCRAINICA* POJARK.

*Lamazian H., Alexandrenko A., Dvirna T., Pidchenko V.*

**Bogomolets National Medical University, Kyiv, Ukraine**

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**Introduction.** Medicinal plants, many of which are wildgrowing, have recently been under the the interest of scientists due to growing requests for safe natural remedies for pathological conditions with beneficial health effects [1]. Species of the genus *Crataegus* have a wide range of biological and pharmacological activity due to a significant range of biologically active substances [2]. In Europe, hawthorn preparations are mainly used as cardioprotective agents, however they can be used for treatment of a lot of different diseases [1, 2]. There are 28 species of hawthorn in the flora of Ukraine, among which one of the most common is *Crataegus ucrainica* Pojark [3]. The aim of our work is to investigate the micromorphological (anatomical) features of the leaf lamina of the Pharmacopoeial species *Crataegus curvisepala* (*C. curvisepala*) and the local species *Crataegus ucrainica* (*C. ucrainica*) in order to compare them and for further standardization of *C. ucrainica*.

**Materials and methods.** The leaf laminae of two species of *Crataegus* L. genus of flora of Ukraine were investigated. For this purpose herbarium material of the National Herbarium of Ukraine (*KW*) and freshly collected plant material were used. To study epidermal tissue under a light microscope (LM) in the paradermal plane, temporary micropreparations were prepared. Microscopic examinations were repeated ten times from different parts of the specimen. Observations and microphotographs were made using an Olympus CX23 light microscope and software for Levenhuk M1000 PLUS camera. Description of leaves anatomical features was carried out according to the method of B.R. Vasiliev [4] and S.F. Zakharevich [5].

**Results and discussion.** Qualitative results are presented below with reference to corresponding figures. Leaves of both species are hypostomatic (stomata are located on the lower side) (Fig. 1d-g, i, m). Contours of epidermal cells of the studied specimens are clear (Fig. 1a, b, h, j). Pubescence is simple, formed by simple trichomes (Fig. 1g, i, k, l), mainly located along the leaf margin and veins. The more detailed characteristic of the studied species of hawthorns are given below.

***Crataegus curvisepala.*** The adaxial epidermal cells have flexuose outlines and rectangular (3-5-angulars) projections (Fig. 1 a, b). The cuticle is folded and well-marked (Fig. 1b). Abaxial surface is principally similar to adaxial one. Adaxial surface cells are flexuose with rectangular projections (Fig. 1 c, e). Folded cuticle is well developed (Fig. 1d). There are anomocytic stomata, which longer axis are not oriented to the middle vein (Fig. 1d-f). Brush-shaped groups of calcium oxalate crystals were located along the veins (Fig. 1c).

***Crataegus ucrainica.*** The adaxial epidermal cells are flexuose, projections are rectangular. Cells of abaxial surface more flexuose - zigzag-shaped with explanate projections (Fig. 1h, i, j, m). The folded cuticle is weakly developed (Fig. 1h). The pubescence is mainly located along veins (Fig. 1k), but also scattered along the lamina (Fig. 1i, l). Trichomes are simple, long, with pointed tops (Fig. 1i, k, l). Basal cells of trichome form a characterful rosette consisted of 5-6 cells (Fig. 1g). There are anomocytic stomata, which longer axis are not oriented to the middle vein (Fig. 1i, k). Brush-shaped shaped groups of calcium oxalate crystals were present along the veins (Fig. 1j, m).

**Conclusion.** Thus, we have established the similar and distinctive micromorphological features of the leaf lamina of the studied species of hawthorn. Epidermal cells of both species are clear, well-marked, with developed folded cuticle, with aggregates of calcium oxalate crystals. The distribution of anomocytic stomata, in general, is characteristic of the genus *Crataegus L.* Distinctive features are the development of the cuticle, which is more developed in *C. curvisepala*, and the more flexuose outlines of the adaxial cells on the leaf surface in *C. ucrainica*. The obtained results are initial and require further study using other methods. However, we admit that the presence of some similar anatomical features indicates that *C. ucrainica* can be used as an admixture.

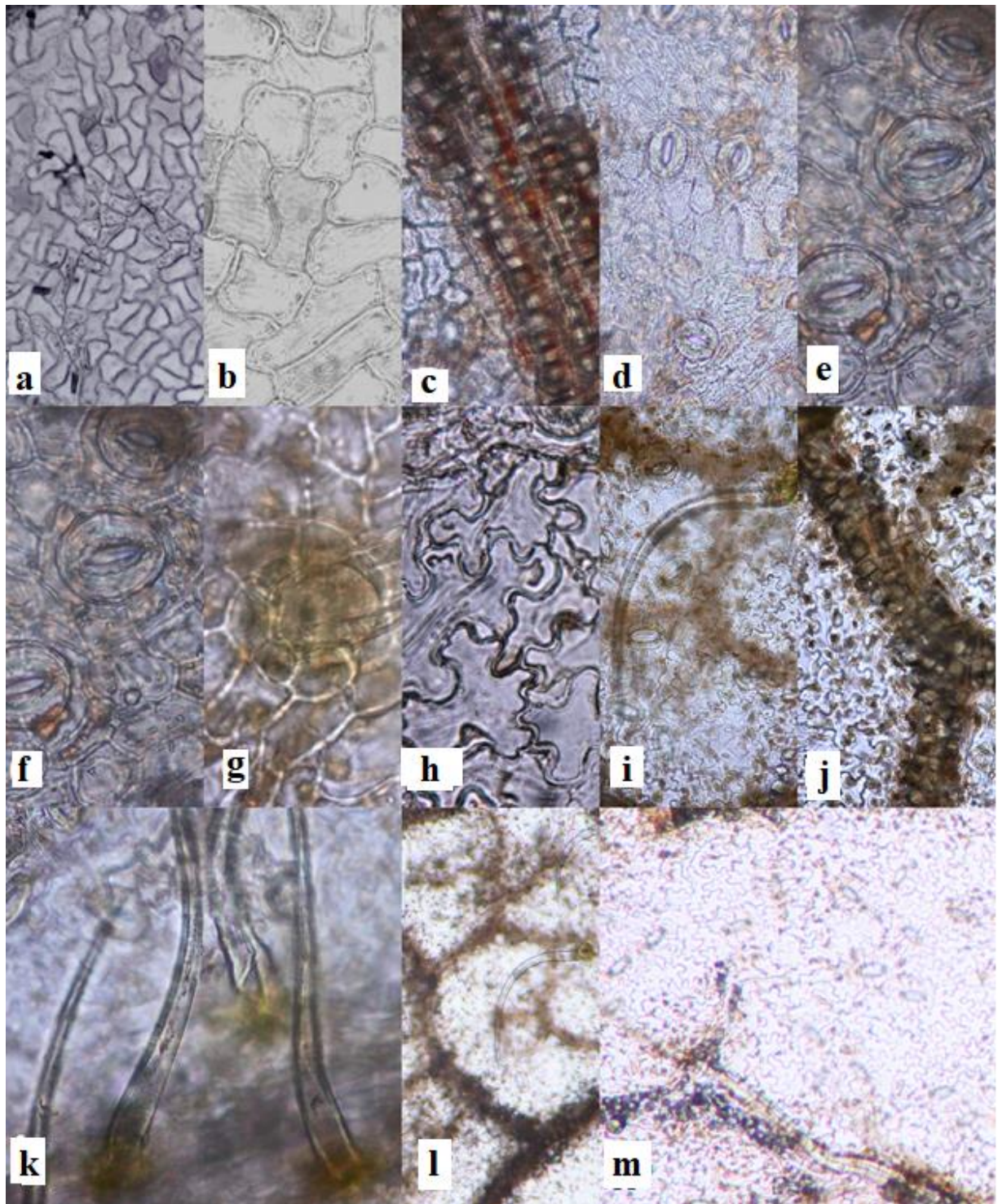


Fig. 1. Anatomy of the leaf lamina structure: a, b - adaxial surface of *C. curvisepala* leaf, c - calcium oxalate on the abaxial surface of *C. curvisepala* leaf, d-f - abaxial surface of *C. curvisepala* leaf; g-m - abaxial surface of *C. ucrainica* leaf.

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