

THE STUDY OF THE ANATOMICAL STRUCTURE OF THE VEGETATIVE ORGANS OF THE ENDEMIC SPECIES *IRIS ALBERTI* REGEL IN THE INTRODUCTION OF THE BOTANICAL GARDEN OF UZBEKISTAN

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ABSTRACT: The anatomical structure of vegetative organs (leaf, leaf's vagina and stem) *Iris alberti* was studied under the conditions of introduction of the Botanical Garden of Tashkent. The next diagnostic signs were identified: in the leaf - a straight outline of the epidermal cells; immersed, the presence of numerous anomocytic type stomata on the abaxial side, their absence on the adaxial side; dorsiventral type of leaf mesophyll; in the vagina of the leaf - the parenchymal-bundle type; vascular bundles in all organs closed, collateral; stem of parenchyma-bundle type; in the cortex parenchyma of the crook there are annular conductive bundles; the primary crust of this species is separated from the central cylinder by a ring of lignified cells, that is, sclerenchyma.

Keywords: Anatomy, Leave, Leaf's vagina, Stem, Introduction, *Iris alberti*, Tashkent.

INTRODUCTION

The family of Iridaceae includes 75-80 genera and about 1800 species common in the tropical and subtropical countries of the globe. The genus *Iris* L. is the most polymorphic in the homonym family with more than 200 species (Takhtadzhyan, 1982). In the flora of Uzbekistan, this genus includes more than 30 species.

Iris alberti Regel – is endem of Central Asia (Kazakhstan), a perennial 30-40 cm tall plant with rhizomes, leaves simple, wide, erect, rounded at the apex, sessile, apex acute, smooth edge, leafy in the shoot another, in the basal - rosette (Vvedensky, 1935).

According to the taxonomic revision of the genus *Iris* L. in Central Asia F.O. Khasanov, N.K. Rahimova (2012) the species *Iris alberti* is included in the section Hexapogon (Bunge ex Alef.) Baker.

In the literature presented in the main information about the morphological signs (Red Data Book of the Republic of Uzbekistan, 2016) and taxonomic revision of the genus *Iris* (Hassanov & Rakhimova, 2012, 2016). The anatomical structure of vegetative organs of *Iris alberti* has not been studied. This determines the relevance and novelty of our research.

MATERIALS AND METHODS

The species was collected under natural growth conditions from Kazakhstan. The species is the endemic of Central Asia. Introduced in the Botanical Garden named after acad. F.N. Russanov (Institute of Botany and Zoology of the Academy of Sciences of Uzbekistan).

The vegetative organs of species of *Iris alberti* (leaf, leaf's vagina and stem) were fixed in 70° ethanol for anatomical study. The leaves epidermis was studied on the paradermal and transverse sections. Transverse sections of the leaf are made through the middle, and the vagina of the leaf and stem is the base. Each tissue was described,

epidermis according to S.F. Zakharevich (1954). Prepared were stained with methylene blue followed by sealing with glycerin-gelatin (Barykina, Veselova, Devyatov et al., 2004). Photomicrographs are made with a computer microphotoset with a digital camera Samsung ES70 and microscope of Motic B1-220A - 3.

RESULTS AND DISCUSSION

The leaves of *Iris alberti* are light green, falcate, bordered at the edge, more or less rough. On paraderm cut contours of epidermal cells, rectilinear, polygonal projection. The cells of the adaxial epidermis are larger than the cells of the abaxial epidermis. The leaves are amphistomatic. The stomata are located transversely to the longitudinal axis of the leaf. The shape of the stomata is rounded. Stomata most numerous on the abaxial side, on the adaxial side - absent. The terminal cells of the stomata on both sides of the leaf are almost the same length. The stomata are submerged. Type of stomata is anomocytic (Figure – 1 a, b).

Mesophyll leaf on the transverse section of the dorsiventral type, which is represented by spongy cells from the abaxial side of the leaf. The epidermis is represented by one row of cells with a thin-walled cuticle layer. The cells of adaxial epidermis are larger than the cells of the abaxial epidermis. Spongy parenchyma is rounded, small-celled, consists of 5-6 rows, chlorophyllous (Figure - 1 c, d, e).

The main fibril is issued on the abaxial side. Under the abaxial epidermis and above the vascular bundles, an angular 16-17 row collenchyma is located. In the main vein there is 1 vascular bundles. Vascular bundles are located along the periphery of the abaxial side of the leaf, closed, collateral, numerous, consisting of phloem and xylem, with 7-8 large and small vessels (Figure 1 c, e).

In the center of the leaf's mesophyll there is a large and small-celled water-bearing parenchyma of various sizes, consisting of 5-6 rows (Figure 1d).

The vagina of the leaf on the transverse section of the parenchymal-bundle type. The epidermis is represented by one row of cells with a thin-walled cuticle layer. Parenchymal cells are rounded, large and small-celled, consisting of 9-10 rows, among the parenchymal cells there are hydrocrite cells. Vascular bundles closed, collateral, numerous large and small, consisting of xylem and phloem (Figure - 2 a, b, c).

The stem is single, in the transverse section it is round-oval, parenchymno-bunched. The epidermis is single-row, oval, thin-walled. Under the epidermis is a thin-walled, round-oval primary cortex consisting of 6-7 rows of cells (Figure 3a, b, d).

In the parenchyma of the cortex, ring-shaped vascular bundles of closed collateral type are located. Primary cortex is separated from the central cylinder by a ring of sclerenchyma. The thickness of this ring and the degree of lignification of the cells in some respects reflect the evolutionary advancement of the species. Sclerenchyma thick-walled, annular, consists of 5-6 rows of cells (Figure - 3 b).

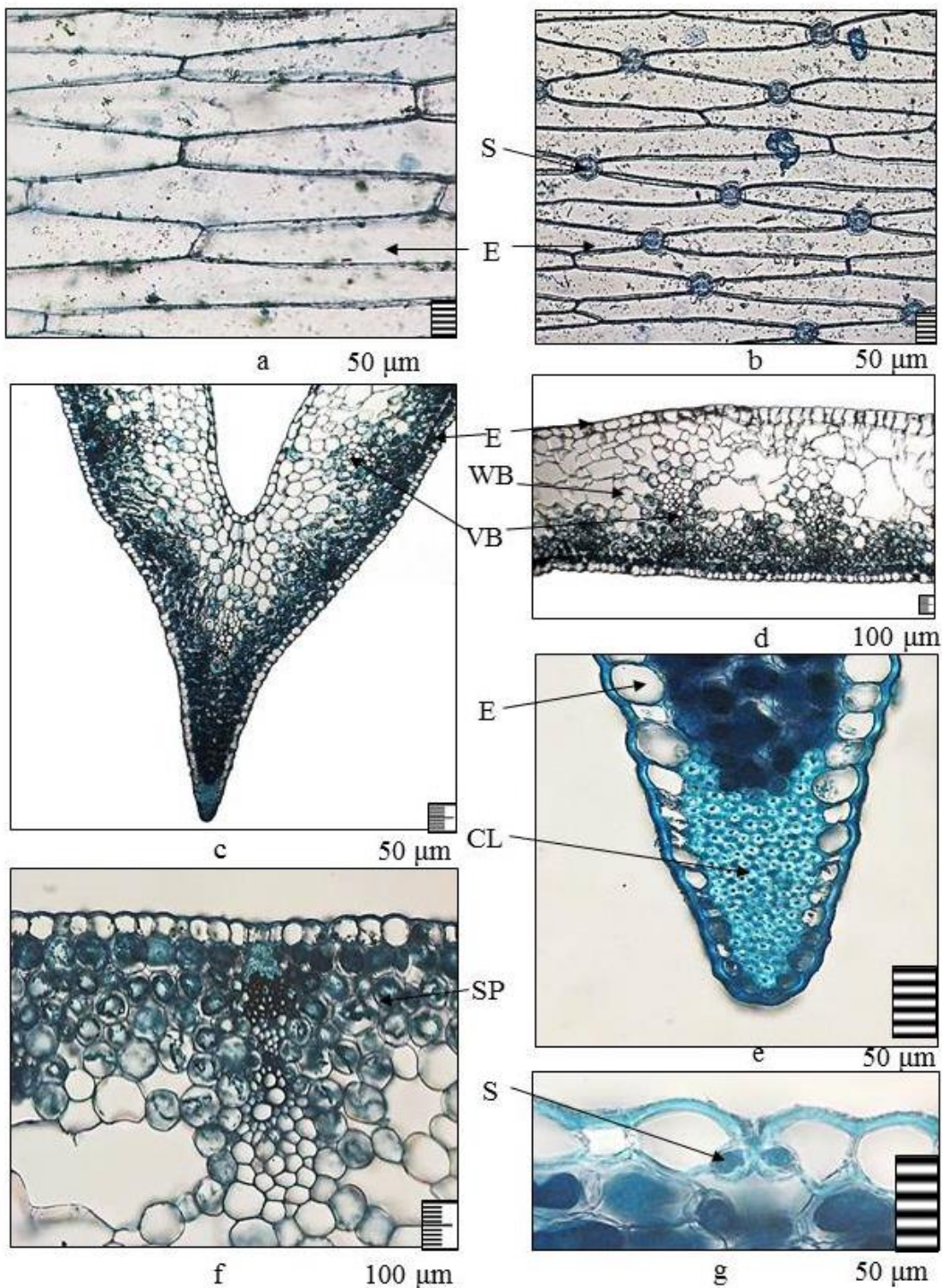


Figure 1. Structure of the epidermis and mesophyll leaf of *Iris alberti*:

a - adaxial epidermis; b - abaxial epidermis; c-d - leaf mesophyll;
 e - collenchyma on the abaxial side of the epidermis; f - spongy chlorophyllous parenchyma; g - submerged stomata. **Legend:**
 CL – collenchyma,
 E – epidermis, S – stomata, SC – sclerenchyma, SP – spongy parenchyma,
 VB – vascular bundle, WB – water-bearing parenchyma.

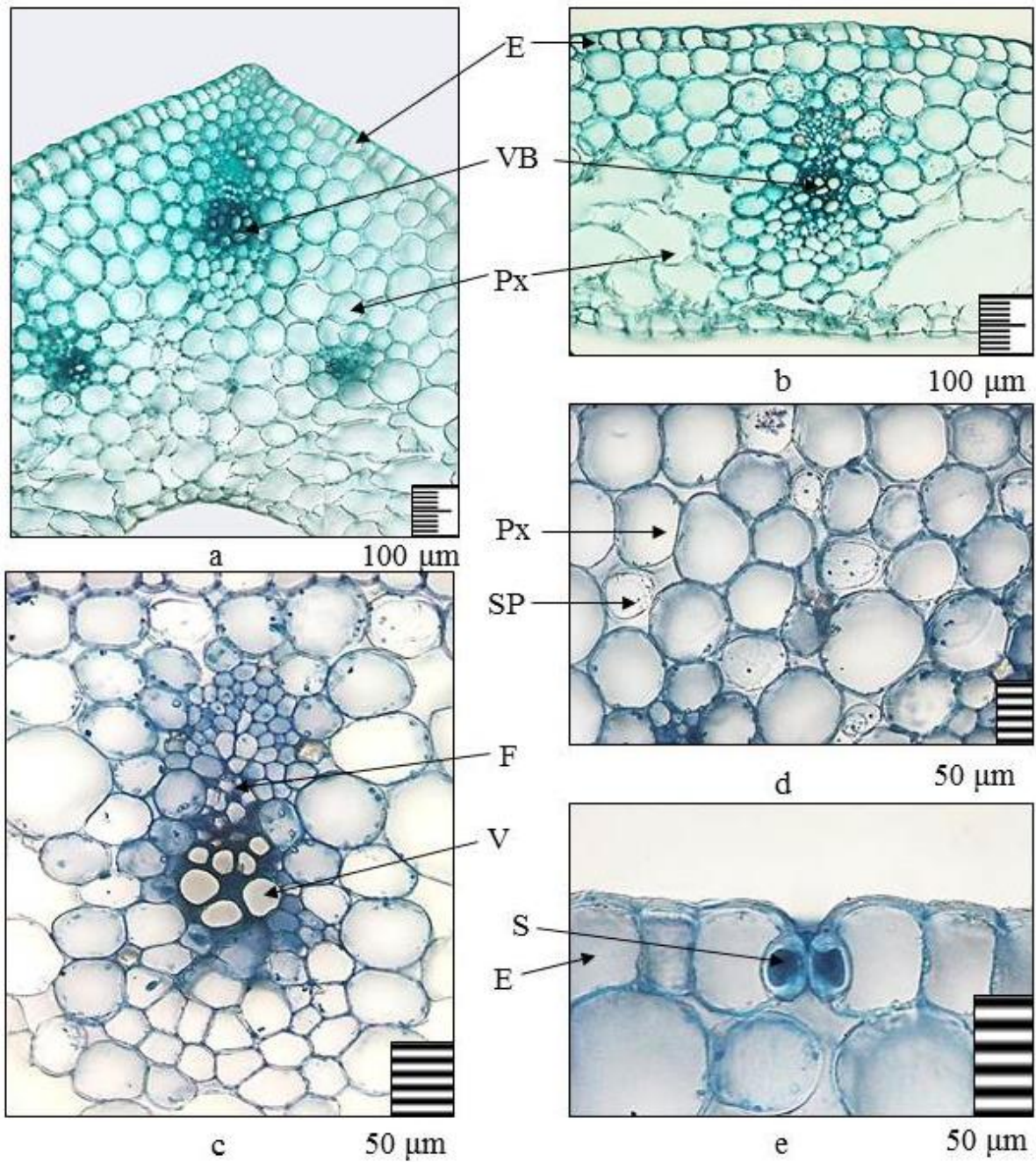


Figure 2. The structure of the vagina leaf *Iris alberty*:
 a-b - detail; c - vascular bundle; d - parenchymal and hydrocite cells;
 e - submerged stomata. Legend: E – epidermis, F – phloem, HC – hydrocite cells,
 Px – parenchyma, S – stomata, V – vessels, VB – vascular bundle.

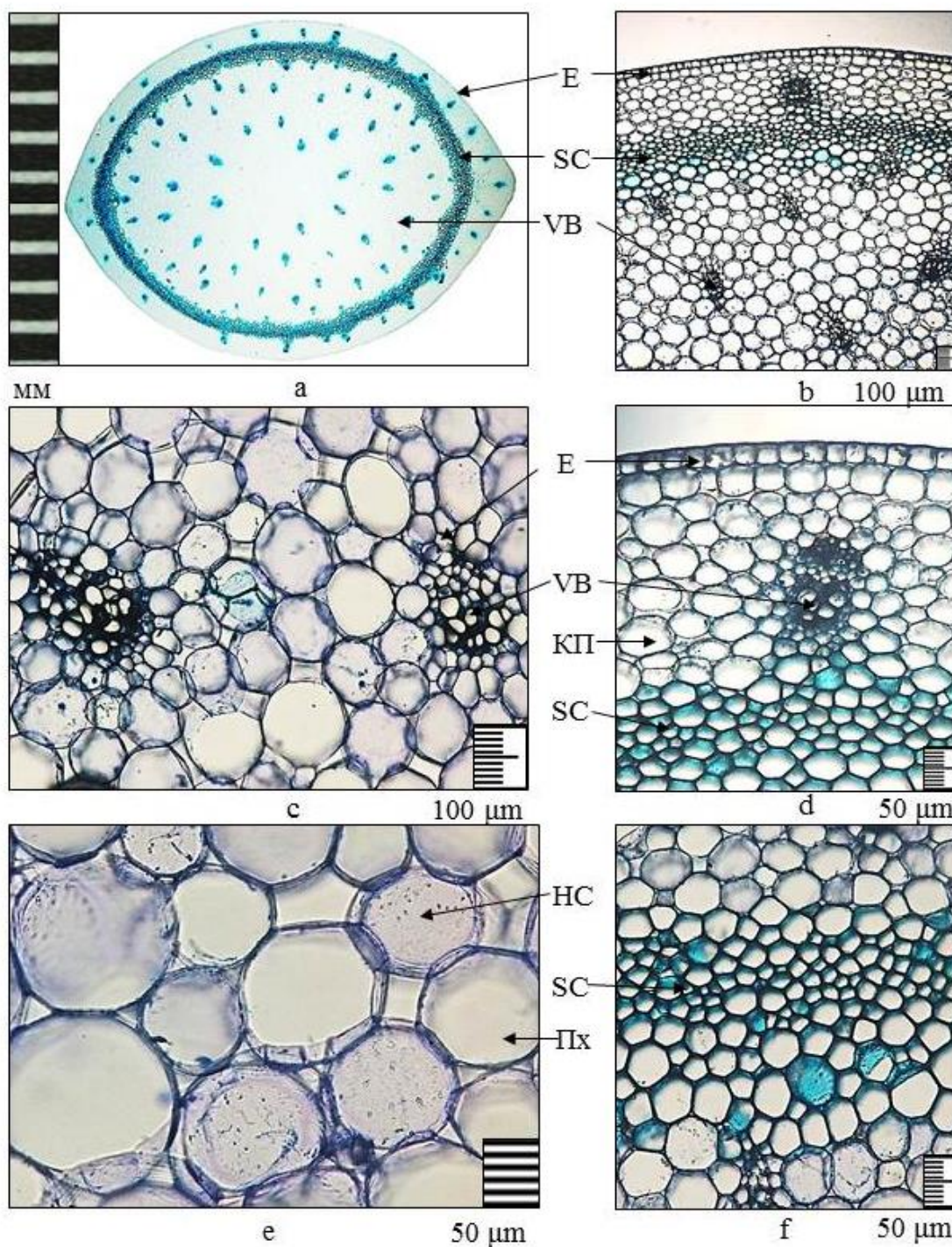


Figure 3. Structure of the stalk *Iris alberti*:
 a - scheme; b - detail; c - vascular bundles; d - cortex parenchyma;
 e - core; f - sclerenchyma ring. Legend: E – epidermis, F – phloem,
 HC – hydrocyst cells, Px – parenchyma, SC – sclerenchyma, VB – vascular bundle.

The central cylinder is extensive, thin-walled, round-oval. Among the thin-walled parenchymal cells of the central cylinder there are numerous conducting beams which randomly scattered along the main tissue. Among the parenchymal cells of the central cylinder there are hydrocitic cells (Figure – 3 a, b, c, d).

Thus, the anatomical structure of vegetative organs (leaf, leaf's vagina and stem) *Iris alberti* has been studied. The following diagnostic features are revealed: in the leaf - the rectilinear outline of the epidermal cells; Submerged, numerous on the abaxial side stomata of anomocytous type, their absence on the adaxial side; dorsiventral type of leaf mesophyll; spongy chlorophyll-bearing parenchyma; large water-bearing parenchymal cells, in the vagina of the leaf - parenchyma-bundle type; vascular bundles in all organs closed, collateral; on the transverse section, the shape of the stem is round-oval, parenchymal-bundle; epidermis thin-walled; In the parenchyma of the cortex there are ring-shaped conducting bundles of a closed collateral type; cells of the primary crust thin-walled; the primary crust of this species is separated from the central cylinder by a ring of lignified cells, that is, sclerenchyma. These identified signs can serve when identifying plant material.

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