

# Bioecological features and anatomical structure *Crocus sativus* L. to the introduction in Uzbekistan

Makhmudov Azizbek Valijonovich

Institute of the Gene Pool of Plants and Animals, Academy of Sciences of Uzbekistan

**Corresponding author:** Makhmudov Azizbek Valijonovich

**ABSTRACT:** We have studied the biological characteristics, morphological and anatomical characteristics of *Crocus sativus* L. were studied phenology, flowering biology and plant propagation. Studied a cross-section of the sheet (base, middle, tip). The structure of the flower (cross-section of the stigma, perianth, perianth tube, base anther) under conditions of introduction.

**Keywords:** *Crocus sativus*, introduction, anatomic structure and biology of flowering phenology, breeding.

## INTRODUCTION

Currently, the problem of preservation of plant biodiversity is particularly relevant in connection with the growing human impact on the environment. Collections of plants in the botanical gardens created by the introduction and acclimatization of species that are the basis of biodiversity a source of enrichment plants and green spaces with new decorative and medicinal species.

The genus is characterized by *Crocus* corms underground, single apical flowers with long tubular perianth white, yellow, violet or purple color. Some species bloom in spring, others - in the fall. Flowers appear out of the ground, before the leaves or simultaneously with, the ovary of the flower remains below ground level. Plants stem less [9].

The Index Kewensis accounts for about 80 species of crocus that inhabit Middle-earth, Central Europe, the Near East and Central Asia. Classification kind *Crocus* rather artificial, as the variability of different kinds of difficult choices leading signs used in grouping species [4].

The first attempt to classify the types of *Crocus* did Haworth (1809), divided the genus into two sections: *Piligeri* and *Depilati*, including views respectively of a pubescent throat and downy flower. [5]

Herbert (1846), was used for the initial group of species of crocus in the presence of basal leaf color (spatha), divided the section allocated to them on the basis of the structure of the outer shell of corms [6].

Abdullayev (2003) indicated that saffron may be useful in the chemoprevention of cancer in the near future [1].

## MATERIALS AND METHODS

*Crocus sativus* been introduced in 2011 in Tashkent (Botanical Garden. F.N. Rusanov). In the first year of the study studied phenology, flowering biology, reproduction and anatomical structure of plants in the conditions of introduction.

The anatomical work was done using fresh tissue samples stored in alcohol (70%). The cross sections of the flowers and leaves have been cut.

Saffron sowing - *Crocus sativus* L. - Corm of plant up to 20-25 cm, has a flattened globular corm, about 2.5-3 cm wide, covered with mesh and fiber scales and dark brown fibers from destroying the old scales. Leaves linear with the longitudinal band of white, 15-20 cm long and 2-3 mm wide. The flower grows on the stem end. Large light purple flower has a strong aroma. Plants in the conditions of introduction blooms in September and October (Fig. 1).

For the study of phenology used method I.N. Beydeman [2]. By studying the biology of flowering A.P. Ponomarev [3] seed production by T.T. Rakhimova [8]. The anatomical work was done using fresh tissue samples fixed in 70% alcohol.

In the context of the introduction of tubers planted 10 cm apart and 15 cm deep, with aisles of 40 cm. The vegetation of the underground parts of the plant began in the I-II decade of August. The diameter of the bulbs of 2-3 cm, the number of roots 50-56 pc., The length of roots 4.5-5 cm. The underground part of the overall plant 5.5-6 cm. Length seedling 4-5 cm, width 0.3-5 mm . In the third week of August to begin the aerial part of the vegetation. Total height of the plant 8-10 cm above-ground portion of 2.5-3.5 cm. The diameter of 2.5-3 cm bulbs, amount of roots 55-60 pc., Root length of 5 cm (Figure 1).



Figure 1. underground and above-ground part of *C. sativus*

Leaves of *C. sativus* in an amount of 6-10, narrow, linear, dark green, bottom with two white stripes and bright middle of the section, appear during or after flowering. Flowers in the amount of 1-4, fragrant, large corolla with a simple perianth, bisexual, coming out as if from a tuber surrounded by every two-sheeted cover covering tube perianth almost its entire length. Pedicels short, clear, triangular, 1.5-2 cm long. Perianth gamopetalous correct, funnel-shaped, 10-15 cm long tube it, 8-10 cm long, narrow, cylindrical, at the bottom of unpainted, light top purple, hairy in the throat. Stamens 3, ovary lower, elongated, almost cylindrical, trilocular, a column length of 10-12 cm, coming from the top of the ovary, the line at the bottom of a color less, yellow top, ending three stigmas, 3-3.5 cm long, tubular , up slightly extended, the inside of the longitudinal split with truncated crenate fringed tops. Stigmas dark orange, yellow at the base, initially erect, then folded and hanging at the end (Fig. 2).



Figure 2. Flowers *Crocus sativus* L

Regrowth of the leaves and the appearance of buds in *C. sativus* in Tashkent conditions observed in the II-III decades of September, sometimes in October, depending on weather conditions of the year. The earliest flowering noted 13.09, 22.10 more later. Flowering finished in II-III decade of October. Saffron is diluted tubers in appearance

resembling bulbs (seeds it does not), who get three and four year-old plants. The end of the vegetation observed in the first half of May. The vegetation duration of the 200-210 days (Figure 3).

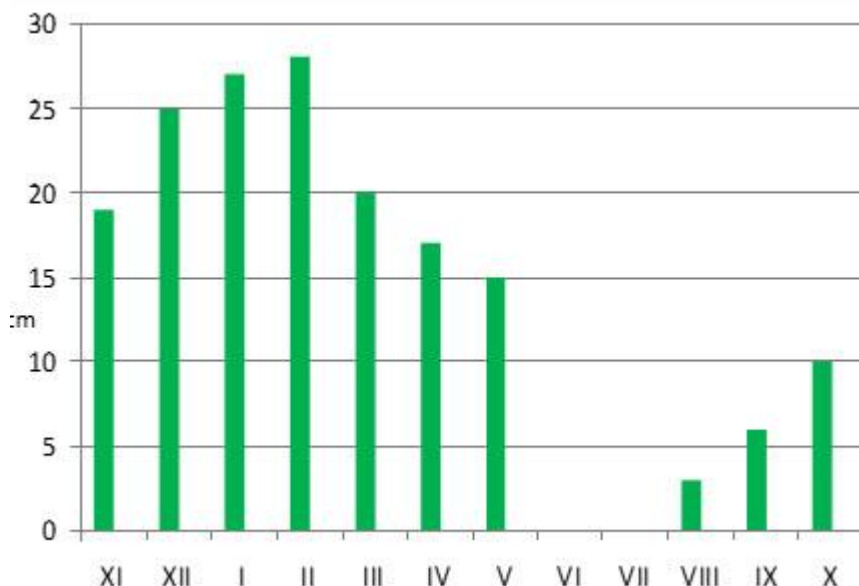


Figure 3. Phenology *C. sativus* under introductions (Tashkent Botanical Garden. FN Rusanov)

In the study of the biology of flowering saffron seed determined the optimum humidity, air temperature and the temperature of the soil surface (Figure 4).

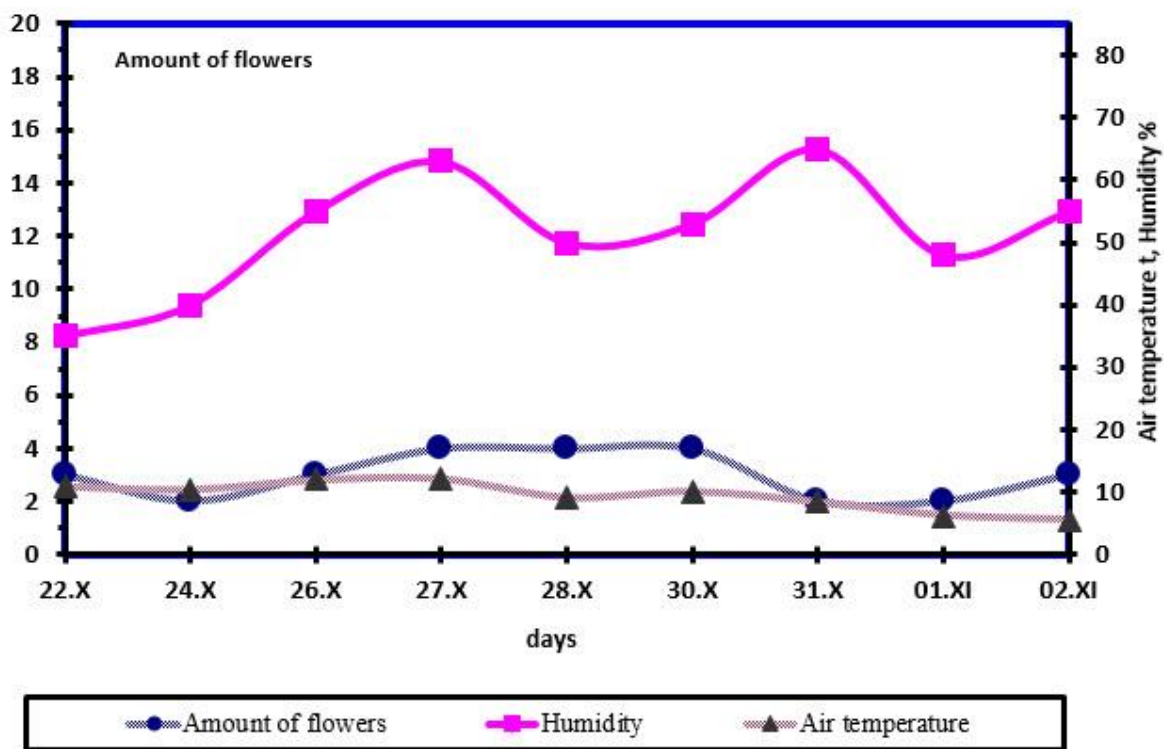


Figure 4 - Biologiya flowering *C. sativus* under introductions (Tashkent Botanical Garden. F.N Rusanov)

**The anatomical characteristics.**

Samples of plants (*C. sativus*) were collected in the experimental plot Tashkent Botanical Garden. The anatomical work was done using fresh tissue samples fixed in 70% alcohol.

Base sheet: triangular in cross section. The adaxial part of the sheet has a keel with two large vascular bundles and the two sides of the sheet is strongly bent inward and form a cavity. Curl the edges of the blunt, there is hair and stomatal apparatuses (Fig. 5a-b-c).

The epidermis large-keel, thick-walled (Table 1). Mesophyll keel consists of 4 rows of palisade cells, which are located between two major conductive beam. Vascular bundle consists of a group of 22-28 vessels and phloem cells, beams over a large group of cells sclerenchyma.

Abaxial portion of the sheet to the centre pointed, thick-walled, single consist of cells of the epidermis under which there are a number of 3-4 palisade cells (Fig. 5-B).

In both side portions are large-2 and 6-small conductive beams. Large vascular bundles especially strongly scarified.

In the middle of the sheet between the beams is large-parenchyma, it occupies a large area of the sheet (Fig. 5-g. D. E.).

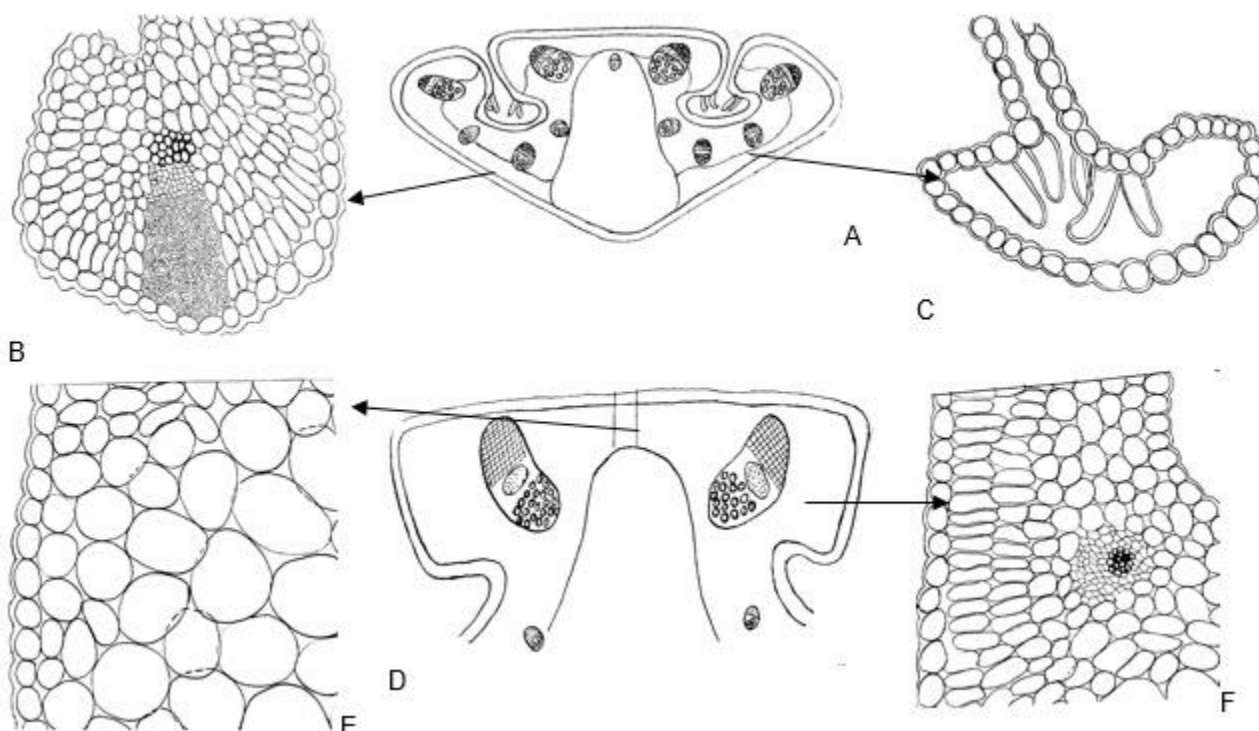


Figure 5. A cross section of the base sheet *Crocus sativus* L. A - Scheme; B - The recesses of the sheet; B - left and top notch; D - Grounds of the keel; E- parenchyma; F- Detail of the middle keel

The middle sheet in a cross section slightly deviation (Fig. 6-a). The general structure is the same as the base sheet, but differs in the number of conductive beams (8) and size, as well as palisade cells (1-2) (Fig. 6 a-b-c). Parenchymal cells to the number of rows are smaller (Fig. 6 d). Index palisade 2.4 sclerification vascular bundles more pronounced.

Upper sheet oblong-oval shape (Fig. 7 a. b.) Is different from the bottom and middle part of the sheet, the smaller size of the leaf, palisade index, the number of conductive bundles (4), rows of palisade cells (1-2), the volume of parenchyma (Figure 7a-b). On either side of the keel area there are hairs in (Fig. 7 c.), Who have other types of *Crocus* not occur.

Thus, *Crocus sativus* L. clearly expressed palisade parenchyma in the base plate occupies a larger area than in the middle portion and the top sheet. Vascular bundles sclerification more, and larger than that of other types of *Crocus*.

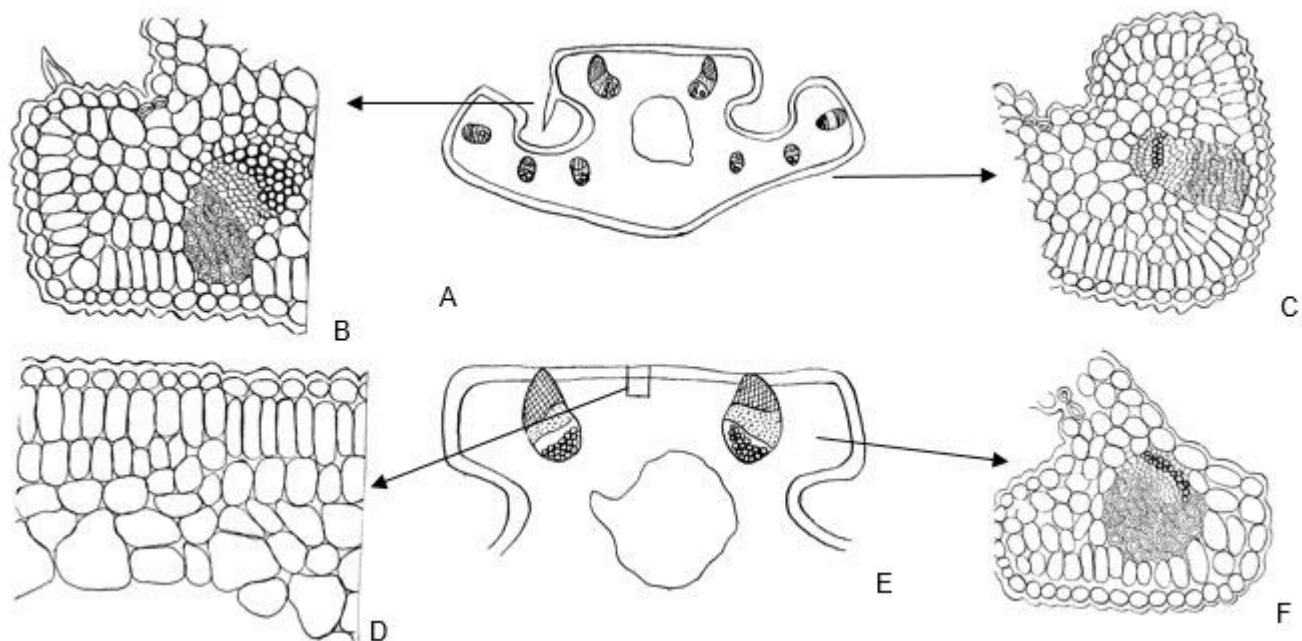


Figure-6. A-Driving middle tier; B - Detail of the left side of the keel with trichomes; C-Detail lower recesses; E- Keel middle tier; D - The parenchyma of the keel; F- Part of the keel to the vascular bundles

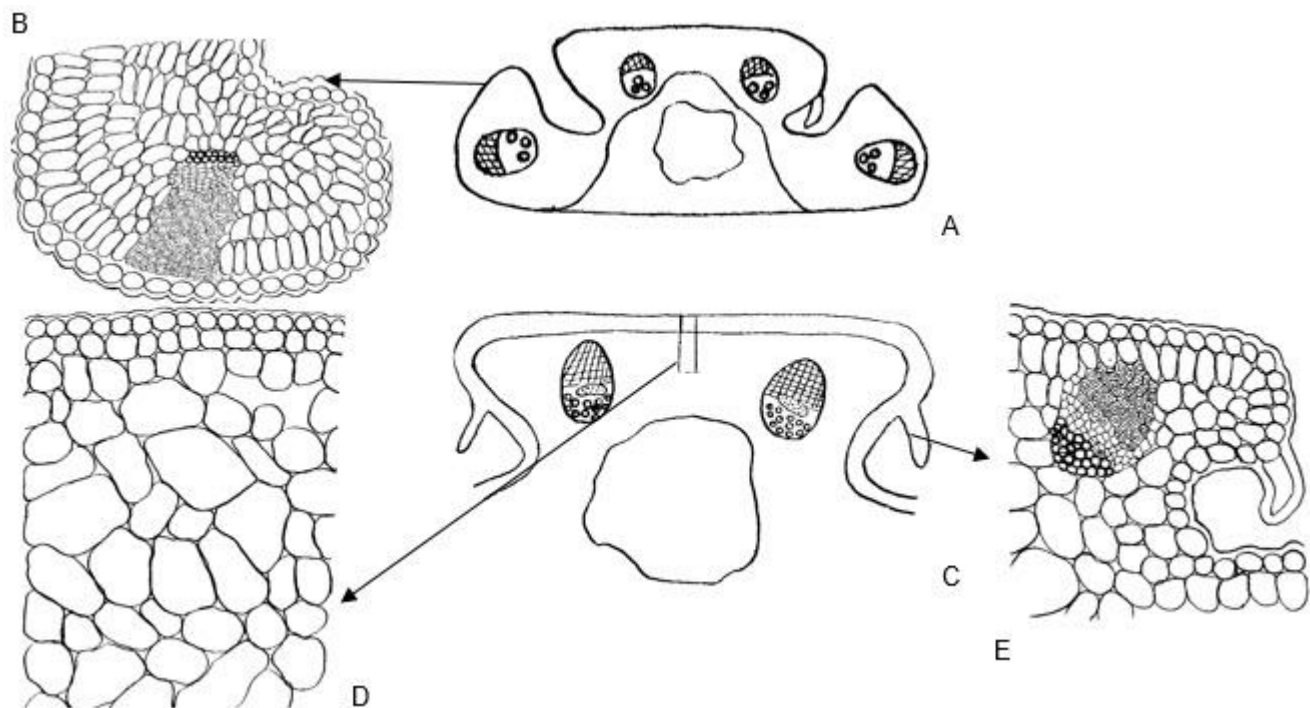


Figure 7. A cross section of the sheet of the upper tier. A Top-tier scheme; B- Lower opening; C - Keel upper tier; D- parenchyma; E- keel law of the country with trichomes

The structure of the flower *Crocus sativus* L. 3-lobed capitate stigma in a cross section consists of parenchymal, cells oval or round shape. In the center is a spout not sclerification vascular bundle (Fig. 8 a-b-c).

Mature anther in a cross section consists of two layers, the outer - epidermal, domestic - fibrous. Papilliform large-epidermis (Fig. 8 e-e-e). in cross section form of oval tube perianth, parenchymal. Vascular bundles numerous, and their disorderly arrangement with 5-10 vessels (Fig. 8 d.). Above is a group of bundles of sclerenchyma cells.



Located between the beam-walled oval, rounded parenchymal cells (Fig. 8 g). Perianth form in cross-section plate, consist of 5-6 rows of parenchyma cells. The epidermis-row, abaxial larger than adaxial. Vascular bundles perianth small, not formed with two small vessels.

Thus, the tube perianth, perianth itself consists of a multi-row parenchyma cells. Conductive tube perianth small bundles.

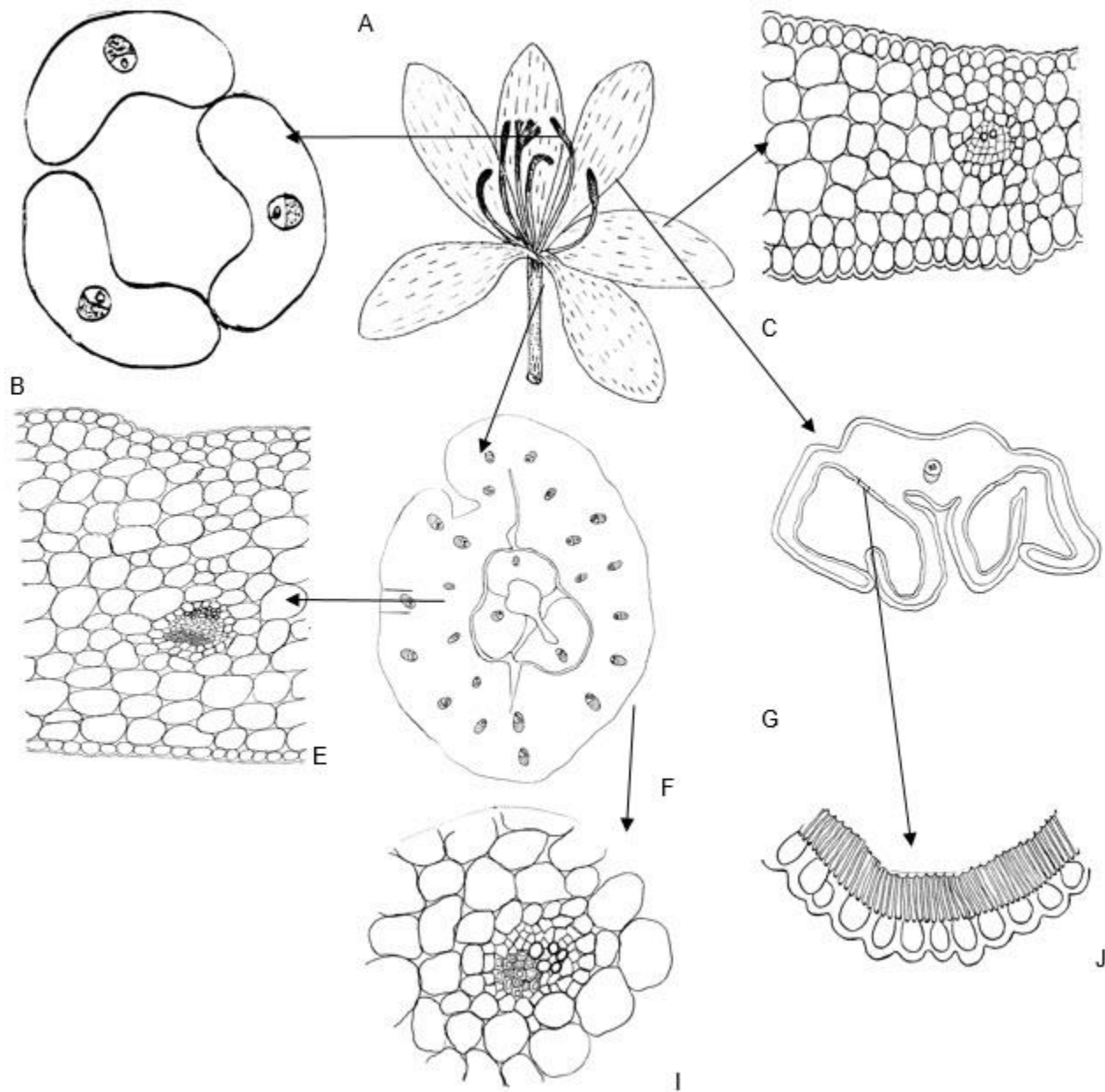


Figure-8. The structure of the flower *Crocus sativus* L. A - A general view of a flower; B- Driving stigmas; C - Detail perianth (petals); F - Scheme perianth tube; E - part perianth tube; G - Circuit the base of the anther; J - Anther detail; I - Vascular bundle

Table 1. Structural indicators base sheet *Crocus sativus* L.

Indicators	<i>Crocus sativus</i> L.	
The epidermis height	23,43 ± 0,84	
The epidermis width	22,91 ± 0,43	
The thickness of the outer wall	7,08 ± 0,31	
Palisade cell: height	38,57 ± 0,93	
Palisade cell width	15,88 ± 0,36	
Index palisade	2,4	
Amount of rows	leaf base 1-2; Side parts 3-4	
Amount of rows of palisade cell layer	2	3
Amount of vascular bundles	4+8	
The diameter of the vessel. height	16,67 ± 0,40	
The diameter of the vessel. width	18,63 ± 0,27	

*C. sativus* successfully grown, propagated only vegetative (seeds it does not) conditions in Tashkent. Mature plants are competitive to local weeds, resistant to pests and diseases.

In the context of the introduction of vegetation begins I-II decade of August, flowering begins in the second ten days of September, sometimes early October. The duration of flowering 15-20 days. Vegetation finished first, sometimes the second decade of May. Duration growing season 200-210 days.

The anatomical structure shows that *Crocus sativus* L. clearly expressed palisade parenchyma at the base of the sheet covers a larger area than in the middle and the top sheet. Vascular bundles sclerification more, and larger than that of other types of *Crocus*. For example, *Crocus alatavicus* Regel et Semen [7].

Thus, the success of this type of cultivation in the culture will enrich the assortment of medicinal plants used in the pharmaceutical industry.

In future research, we will study the chemical composition of all of saffron. It will also create massive plantations in Uzbekistan.

## REFERENCES

- Abdullaev F.I (2003). *Crocus sativus* against cancer. Archives of Medical Research 34: 354.
- Beydeman I. Methods of studying plant phenology and plant communities. N. : Ed. USSR Academy of Sciences, 1974, pp 84-86.
- Ponomarev A.N The study of flowering and pollination. Field geobotany. Ed. EAT. Lavrenko, AA Korchagin. - M, L. : Publishing House. USSR Academy of Sciences, 1960. pp 9-11.
- Index Kewensis. An enumeration of the genera and species of flowering plants. Vol. II. Oxford, MD CCCXCV.
- Haworth A. H. 1831. *Narcissearum* Monographia. 2-d ed. London.
- Herbert W. 1821. Appendix to the Bot. Reg. London.
- Makhmudov A.V. Bioecological features and anatomical structure *Crocus alatavicus* Regel et Semen to the introduction in Uzbekistan. Journal European applied sciences.Germany. №7 2015.pp 11-17.
- Rakhimova T.T. Plant ecology and fitocenology. T: 2009. pp 11-14.
- Kapinos G.E Biological laws of development bulbous and corm plant in Absheron. Baku. 1965. P. 118.