

Distributed Species of Family Liliaceae and Iridaceae in Tarkapchigai Botanical-Geographical Region (Uzbekistan)

Azizbek S. Abduraimov¹, Sultankul A. Daniyarov²

Gulistan State University, Gulistan, Uzbekistan

Abstract: *The research was carried in 2018-2019 years in Tarkapchigai botanical-geographical region. The article explores the representatives of the Liliaceae and Iridaceae families, which are scattered in the in Tarkapchigai botanical-geographical region. It is known that Central Asia is the center of origin of geophytes (monocotyledon). During the study, from the Liliaceae family in this area Tulipa L. (6 species), Gagea Salisb. (12 species), Fritillaria L. (1 species) and from the Iridaceae family Crocus L. (1 species), Iris L. (7 species), Gladiolus L. (1 species) of were recorded.*

Keywords: Flora, Liliaceae, Iridaceae, monocotyledon, Tarkapchigai botanical-geographical region

1. Introduction

At present, when studying flora, it is important to study them by dividing them into certain botanical regions. To date, there are several not quite consistent schemes of division of Central Asia into phytocorions, which demonstrate different approaches to the problem of zoning. All of them are insufficiently detailed for the territory of Uzbekistan. One of these areas is Tarkapchigai botanical-geographical region [1].

Includes the Western part of the Hissar range with its spurs, from the watershed of Kashkadarya and Mogiandarya in the northeast to the tip of ridge Kugitang in the South West. The district covers a vast territory, extremely heterogeneous in natural conditions, which is why there are noticeable

differences between different areas in the profile of the altitude zone and the nature of the vegetation cover. Tarkapchigai region includes the West Gissar ridge, located South of Guzar and Dekhkanabad, on the left side Kichik Uradari and in the basin of the river Tarkapchigai (mountains Ellikbash, Sakirtau and etc.). The South-Eastern border of the district runs along the left watershed ridge of Tarkapchigai, from the North landscapes of arid lowlands and srednegoriy, widespread outputs of variegated rocks and gypsum. The area was repeatedly visited by many major botanists, geobotanical and resource expeditions worked here, but the species composition of the flora is still almost not studied [2, 3, 4].

Scientific research was conducted in 2018-2019 years in Tarkapchigai botanical-geographical region (Figure 1).

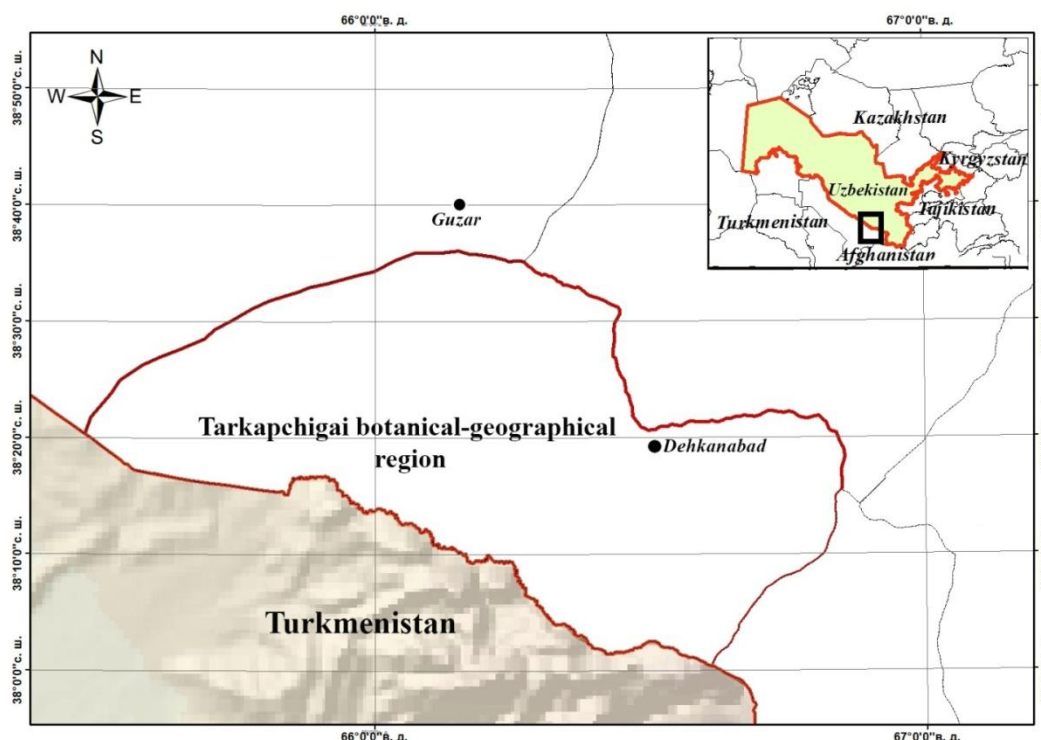


Figure 1: Map scheme of the study region (Uzbekistan)

Volume 8 Issue 12, December 2019

www.ijsr.net

Licensed Under Creative Commons Attribution CC BY

2. Material and methods

The object of the study is the species of the Liliaceae and Iridaceae family, which are common in the Tarkapchigai botanical-geographical region (Uzbekistan) (Figure 2).

This field work was combined with the classical and modern methods widely used in floristics. Field research it is based on the methods developed by A.V. Scherbakov and S.R. Mayorovs [5].

In the field studies, the taxonomic units of the herbarium specimens collected were 11-volume "Sredney Azii" (1963–2015) [6], 6-volume Flora Uzbekistana (1941–1962) [7], 30-

volume Flora USSR (1934–1964) [8]. The sequence of families within the flora Sporail plants Christenhusz et al. [9] system, Indoor Seed Flower Plants Based on APG IV [10] Modern System. The category and species are listed under the "Sredney Azii" [6] and the International Plants Names Index (www.ipni.org) [11], The Plant List (www.theplantlist.org) [12]. The authors of the species are R.K. Brummit, C.E. Powell [13] written using the manual.

Were used to identify rare and endemic species the International Red Data Book [14] Red Book of the Republic of Uzbekistan [15].

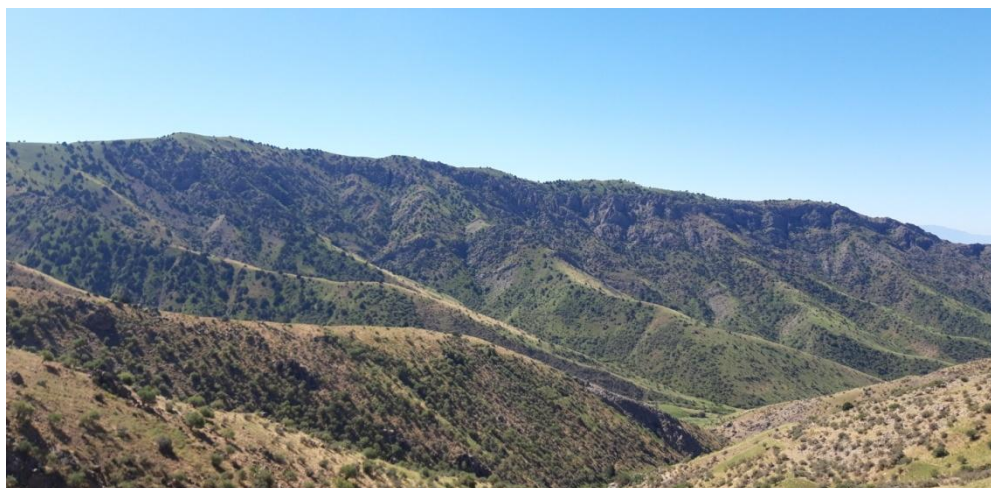


Figure 2: Tarkapchigai botanical-geographical region

3. Result and Discussion

For all species collected on field expeditions, herbarium labels of previously collected specimens stored at the National Herbarium (TASH) are also provided.

Initially, we will talk about the family of Liliaceae. The lily family, Liliaceae, consists of about 254 genera and about 4075 known species of flowering plants within the order Liliales [16, 17].

They are monocotyledonous, perennial, herbaceous, often bulbous geophytes. Plants in this family have evolved with a fair amount of morphological diversity despite genetic similarity. Common characteristics include large flowers with parts arranged in threes: with six colored or patterned petaloid tepals (undifferentiated petals and sepals) arranged in two whorls, six stamens and a superior ovary. The leaves are linear in shape, with their veins usually arranged parallel to the edges, single and arranged alternating on the stem, or in a rosette at the base. Most species are grown from bulbs, although some have rhizomes. First described in 1789, the lily family became a paraphyletic "catch-all" (wastebasket) group of petaloid monocots that did not fit into other families and included a great number of genera now included in other families and in some cases in other orders. Consequently, many sources and descriptions labelled "Liliaceae" deal with the broader sense of the family. The family evolved approximately

52 million years ago during the Late Cretaceous to Early Paleogene eras. Liliaceae are widely distributed, mainly in temperate regions of the Northern Hemisphere and the flowers are insect pollinated. Many Liliaceae are important ornamental plants, widely grown for their attractive flowers and involved in a major floriculture of cut flowers and dry bulbs. Some species are poisonous if eaten and can have adverse health effects in humans and household pets. A number of Liliaceae genera are popular cultivated plants in private and public spaces. Lilies and tulips in particular have had considerable symbolic and decorative value, and appear frequently in paintings and the decorative arts. They are also an economically important product [16, 17].

3 genus with the participation of this family (*Tulipa*, *Gagea*, *Fritillaria*) was recorded.

Tulipa – genus is represented by 63 species [18] in Central Asia, which is more than 60% of all species of the Earth (according to various data total amount of species of tulip on the Earth varies from 50 to 100). Such a great variety of species shows a leading position of Central Asia in process of formation of *Tulipa* genus species diversity. From the 63 species in Uzbekistan 34 are grown, Kazakhstan—37, Kyrgyzstan—22, Tajikistan—24, and in Turkmenistan—16 species. There are 34 species of tulips in Uzbekistan. During the research, 6 species were recorded in the Tarkapchigai botanical-geographical region (Figure 3.). Five of the listed species are listed in the Red Book of the Republic of

Uzbekistan (*Tulipa lanata*, *T.korolkovii*, *T. micheliana*, *T. uzbekistanica*, *T. carinata*). *Tulipa turkestanica* is included in the Red Book of the Republic of Uzbekistan, published

until 2006 [15, 19, 20]. It should be noted that *T. uzbekistanica* is an endemic of the Tarkapchigai botanical-geographical region.



Figure 3: Population of *Tulipa micheliana* (Tarkapchigai)

Gagea - is a large genus of spring flowers in the lily family. It is found primarily in Eurasia with a few species extending into North Africa and North America. The genus Goose onions has about 70 species distributed in temperate regions of Eurasia and North Africa (from forest tundra and glaciers in the mountains to semi-deserts). The genus is named after the English naturalist Sir Thomas Gage (1791-1820). They were originally described as species of *Ornithogalum*, which, together with the usual yellow colour of the flowers, explains the English name yellow star of Bethlehem for the common European species, *Gagea lutea*. Their yellow stellate flowers in spring cover mountain meadows, gravelly slopes and rock cracks, found in the steppe, sometimes on saline soils, limestones, individual clumps in deciduous forests and lawns in parks. In addition to seed propagation, they intensively propagate vegetatively with the help of daughter bulbs, which are formed on the bottom of the mother's bulb, in the axils of the basal or stem leaves, sometimes in place of the buds. The genus *Lloydia* is close to geese, comprising about 20 species of alpine plants in the Northern Hemisphere [21, 22, 23, 24]. There are 73 species of *Gagea* in Uzbekistan.

In the Tarkapchigai botanical-geographical region 12 species of the genus were identified.

Fritillaria - a genus of bulbs in Liliaceae very closely related to *Lilium* with over 100 species distributed through the temperate regions of the northern hemisphere. Its main centres are in south-east Europe and south-west Asia with secondary centres in western North America and eastern Asia. It is possibly the genus most esteemed by specialist bulb-enthusiasts in Europe at present. Over a third of the species are used in decorative horticulture of open ground in rock gardens, on lawns, planted in groups near shrubs. These plants are quite difficult to grow, but their emerging flowers are worth the effort. Flowers solitary or collected in

racemose and umbellate inflorescences; yellow, orange, brown tones prevail, but there are white, violet, reddish [25, 26, 27]. There are 8 species of *Fritillaria* in Uzbekistan. During the study, *Fritillaria bucharica* Regel was recorded (Table 1).

Table 1: Distribution species of family Liliaceae in Tarkapchigai

Genus	
<i>Tulipa</i>	
1	<i>Tulipa lanata</i> Regel
2	<i>Tulipa korolkovii</i> Regel
3	<i>Tulipa micheliana</i> Th.M. Hoog
4	<i>Tulipa turkestanica</i> Regel
5	<i>Tulipa uzbekistanica</i> Botschantz. & Scharipov
6	<i>Tulipa carinata</i> Vved.
Gagea	
7	<i>Gagea X absurda</i> Levichev
8	<i>Gagea afghanica</i> A. Terracc.
9	<i>Gagea capillifolia</i> Vved.
10	<i>Gagea chomutowae</i> (Pascher) Pascher
11	<i>Gagea gageoides</i> (Zucc.) Vved.
12	<i>Gagea graminifolia</i> Vved.
13	<i>Gagea villosula</i> Vved.
14	<i>Gagea olgae</i> Regel
15	<i>Gagea kunawurensis</i> (Royle) Greuter
16	<i>Gagea reinhardii</i> Levichev
17	<i>Gagea taschkentica</i> Levichev
18	<i>Gagea vegeta</i> Vved.
Fritillaria	
19	<i>Fritillaria bucharica</i> Regel.

Five species of the Liliaceae family are listed in the Red Book of the Republic of Uzbekistan. It should be noted that all species belong to the *Tulipa* species (Fig. 2). Only *Tulipa uzbekistanica* is in status 1, and other species of tulips are listed in Red Book 2 status (Figure 4.).

*Tulipa korolkovii**Tulipa micheliana**Tulipa uzbekistanica**Tulipa carinata**Tulipa lanata***Figure 4:** Included in the "Red Book" of the Republic of Uzbekistan (Liliaceae)

Iridaceae is a family of plants in order Asparagales, taking its name from the irises, meaning rainbow, referring to its many colours. There are 66 accepted genera with a total of 2244 species worldwide [28]. It includes a number of other well known cultivated plants, such as freesias, gladioli and crocuses. Members of this family are perennial plants, with a bulb, corm or rhizome. The plants grow erect, and have leaves that are generally grass-like, with a sharp central fold. Some examples of members of this family are the blue flag and yellow flag. Almost all iris plants are perennial herbaceous plants, often ephemeroïds, with rhizomes, tubers, corms (unlike bulbs, they are formed mainly due to the growth and flattening of the stem) and bulbs.

Members of Iridaceae occur in a great variety of habitats. About the only place they do not grow is in the sea itself, although *Gladiolus gueinzii* occurs on the seashore just above the high tide mark within reach of the spray. Most species are adapted to seasonal climates that have a pronounced dry or cold period unfavourable for plant growth and during which the plants dormant. As a result, most species are deciduous. Evergreen species are restricted to subtropical forests or savannah, temperate grasslands and perennially moist fynbos. A few species grow in marshes or along streams and some even grow only in the spray of seasonal waterfalls [29, 30, 31]. 3 genus with the participation of this family (*Crocus*, *Iris*, *Gladiolus*) was recorded.

Crocus – is a genus of perennial flowering plants, native to a large area from coastal and subalpine areas of central and southern Europe (including the islands of the Aegean), North Africa and the Middle East, across Central Asia to western China. The genus *Crocus* is placed botanically in the iris family (Iridaceae). *Crocus* is a genus in the Iridaceae family that is widespread. There are about 90 species, of which approximately 30 are cultivated [32, 33, 34]. There are 2 species *Crocus* in Uzbekistan. Studies have shown that the species has 1 species in the Torpopchigai botanical-geographical region.

Iris- genus of about 300 species of plants in the family Iridaceae, including some of the world's most popular and varied garden flowers, centred in the north temperate zone. It takes its name from the Greek word for a rainbow, which is also the name for the Greek goddess of the rainbow, Iris. Some authors state that the name refers to the wide variety of flower colors found among the many species. Some of its most handsome species, however, are native to the Mediterranean and central Asian areas. The iris is the fleur-de-lis of the French royalist standard. It is a popular subject of Japanese flower arrangement, and it is also the source of orrisroot, from which "essence of violet" perfume is made. Irises are either bulbous or rhizomatous (with thick, creeping underground stems) and have six petal-like floral segments, the more erect inner ones called standards and the usually drooping outer ones called falls [29, 30, 35]. 45 species of *Iris* are spread in Uzbekistan. In the course of the study it was noted that there are 7 species in the Tarkapchigai botanical-geographical region.

One of the listed species (*Iris svetlanae*) is included in the Red Book of Uzbekistan 1 status.

Gladiolus (from Latin, the diminutive of *gladius*, as word) is a genus of perennial cormous flowering plants in the

iris family (Iridaceae). It is sometimes called the 'sword lily', but is usually called by its generic name (*Plural gladioli*). The genus occurs in Asia, Mediterranean Europe, South Africa, and tropical Africa. The center of diversity is in the Cape Floristic Region. The genera *Acidantha*, *Anomalesia*, *Homoglossum* and *Oenostachys* formerly considered distinct, are now included in *Gladiolus* [36]. There are 1 species of genus *Gladiolus* in Uzbekistan. The occurrence of *Gladiolus italicus* was observed in the Tarkapchigai botanical-geographical region. This species is included in the Red Book of Uzbekistan 1 status (Table 2).

Table 2: Distribution species of family Iridaceae in Tarkapchigai

Genus	
Crocus	
1	<i>Crocus korolkowii</i> Regel & Maw
Iris	
2	<i>Iris vicaria</i> (Vved.) T. Hall & Seisums
3	<i>Iris longiscapa</i> Ledeb.
4	<i>Iris narbutii</i> O.Fedtsch.
5	<i>Iris halophila</i> var. <i>sogdiana</i> (Bunge) Grubov.
6	<i>Iris songarica</i> Schrenk
7	<i>Iris stolonifera</i> Maxim.
8	<i>Iris svetlanae</i> (Vved.) F.O.Khass.
Gladiolus	
9	<i>Gladiolus italicus</i> Mill.

Iris svetlanae and *Gladiolus italicus* (Iridaceae) are listed in the Red Book of the Republic of Uzbekistan (Figure 5). Representatives of this category are widely used as ornamental plants. In addition, many species of *Iris* have been introduced to the Tashkent Botanical Garden. For this reason, it is important to study the populations of the constituents and their current status. Assessment of their distribution and population status can provide definitive conclusions about these species in the future.



Iris svetlanae



Gladiolus italicus

Figure 5: Included in the "Red Book" of the Republic of Uzbekistan (Iridaceae)

During the study, of the families belonging to the Liliaceae and Iridaceae families were distributed in %. The highest values are in the *Tulipa*, *Gagea* and *Iris* categories. According to R.V. Kamelin [37], F.O. Khasanova [38], K.Sh. Tojibaev [39] The Mountain Central Asian province is

the center of origin of modern speciation among monocotyledonous geophytes. This is confirmed by our research (Figure 6).

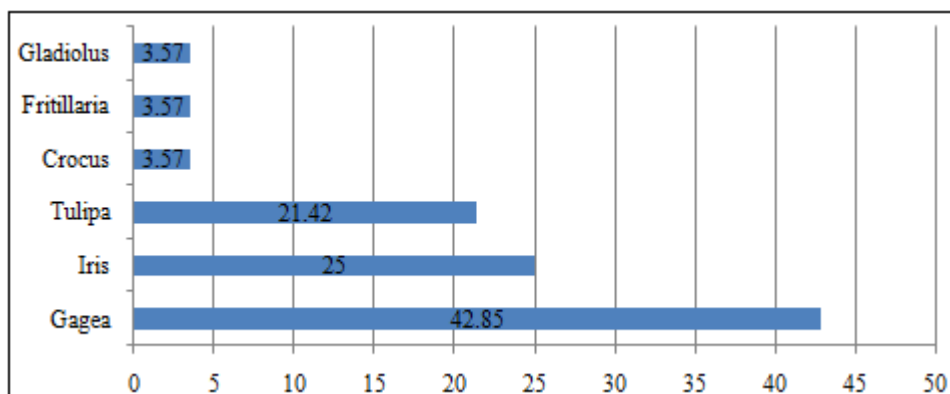


Figure 6: Distribution of genus (%)

4. Conclusions

The survey was conducted in 2018 - 2019 in the Tarkapchigai botanical-geographical region. Critically analyzed species belonging to the Liliaceae and Iridaceae species were collected from field surveys and stored in the National Herbarium (TASH) Foundation. The analysis shows that 19 species of the Liliaceae family and 9 species of the Iridaceae family have been registered in the area. Seven of the above species are listed in the Red Book of the Republic of Uzbekistan. Species are declining under the influence of various factors. This requires research on species. The results obtained will be used to form the flora of the Tarkapchigai botanical-geographical region. Data on rare, endemic and endangered species are used in long-term monitoring of these species.

5. Acknowledgements

The work was performed as part of an applied project PZ-20170925257 of the Institute of Botany of the Academy Sciences Republic of Uzbekistan.

References

- [1] Tojibaev K.Sh., Beshko N.Y., Popov V.A. (2016) Botanical-geographical district of Uzbekistan. St. Petersburg: Nauka, - No.10 (101). - P. 1105-1130.
- [2] Abduraimov A. S., Doniyorov S.A. (2018) The study of the flora of the Torchpchigai botanical - geographical region. "Biodiversity in flora of Uzbekistan: challenges and achievements". Materials of Republican scientific-practical conferences. Against.. p. 51-53.
- [3] Kudryashev S.N.(1941) Plant community of Guzar. - Tashkent: Uz Fan., -239 p.
- [4] Mustafaev S.M. Plant resources of the Kashkadarya river basin. Abstract. dis.kand. biol.science. - Tashkent, 1966. - 31 p.
- [5] Shcherbakov A.V., Mayorov S.R. Inventory of flora and the basis of herbarium (Methodological recommendations). Moscow: Partnership of scientific publications of KMK, 2006. 48 p.
- [6] Key to plants of Central Asia. A critical abstract of flora. In I – X. T. - Tashkent: Fan, 1968-2016.
- [7] Flora of Uzbekistan. In 6 vol. - Tashkent: ed. Uzbek Academy of Sciences, 1941-1963.
- [8] Flora of the SSR. In 30 t. M.L. : ed. USSR Academy of Sciences, 1934-1960
- [9] Christenhusz M.J.M., Reveal J.L., Farjon A., Gardner M.F., Mill R.R. & Chase M.W. A linear sequence of extant families and genera of lycophytes and ferns // Phytotaxa, 2011. – Vol. 19. – pp.7–54.
- [10] An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV // Botanical Journal of the Linnean Society, 2016. Vol. 181. pp. 1–20.
- [11] International Plants Names Index (www.ipni.org)
- [12] The Plant List (www.theplantlist.org)
- [13] Brummit R.K. & Powell C.E. Authors of plants names. – Kew: Royal Botanic Gardens (U.K.), 1992. – 732 p.
- [14] The IUCN Red List of Threatened Species
- [15] Red Book of Uzbekistan (2009) Plants and Fungi. Chinor Publishing House, Tashkent, Vol. 1, 356 p.
- [16] Christenhusz, M. J. M.; Byng, J. W. (2016). "The number of known plants species in the world and its annual increase". Phytotaxa. **261** (3): 201–217. doi:10.11646/phytotaxa.261.3.1.
- [17] Tamura, M. N. (1998). "Liliaceae". Flowering Plants · Monocotyledons. pp. 343–353.
- [18] Vvedensky, A.I. and Kovalevskaya, S. (1971) Genus of *Tulipa* L. of Plants of Central Asia. Tashkent : Fan , 2, 94-109.
- [19] Abduraimov, O.S., Shomurodov, H.F. (2015) The Ontogenesis and Ontogenetic Structure of *Tulipa micheliana* Th. Hoog (Liliaceae) Coenotic Populations in Uzbekistan,UAE. Journal of Novel Applied Sciences , 4, 1089-1096.
- [20] Tojibaev K, Beshko N. (2015) Reassessment of diversity and analysis of distribution in *Tulipa* (Liliaceae) in Uzbekistan. *Nordic journal of Botany*. 33.(3): 224-234.
- [21] Zarrei, M.; Zarre, S.; Wilkin, P.; Rix, M. (2007). "Systematic revision of the genus *Gagea* Salisb. (Liliaceae) in Iran". Botanical Journal of the Linnean Society. **154**: 559–588. doi:10.1111/j.1095-8339.2007.00678.x.
- [22] Tison, J.M. (2009). An update of the genus *Gagea* Salisb. (Liliaceae) in the Iberian peninsula. *Lagascalia* 29: 7-22
- [23] Levichev I.G. (1999) Phytogeographical analysis of the genus *Gagea* Salisb. (Liliaceae) // Komarovia. – Moskov: Acad. Sci. Russ., – №1. – pp. 45-57.
- [24] Levichev I.G. (1999) The morphology of *Gagea* Salisb. (Liliaceae) I. Subterranean organs // *Flora* 194, – pp. 379-392.

- [25] Laurence Hill. (2011) *Fritillaria* A List of Published Nemes // Compiled by. – pp.2-20.
- [26] Day, Peter D. et al. (2014) Evolutionary relationships in the medicinally important genus *Fritillaria* L. (Liliaceae). *Molecular Phylogenetics and Evolution*. **80**: 11–19. doi:10.1016/j.ympev.2014.07.024. PMID 25124097.
- [27] Fay, Michael F.; Chase, Mark W. (2000) Modern concepts of Liliaceae with a focus on the relationships of *Fritillaria*". *Curtis's Botanical Magazine*. **17** (3): 146–149. doi:10.1111/1467-8748.00258.
- [28] Christenhusz, M. J. M.; Byng, J. W. (2016) The number of known plants species in the world and its annual increase". *Phytotaxa*. **261** (3): 201–217. doi:10.11646/phytotaxa.261.3.1.
- [29] WCSP (2014) *Iris* . World Checklist of Selected Plant Families. Retrieved 2 June
- [30] Peter Goldblatt. (1990) Ph.D - Phylogeny and classification of Iridaceae. *Ann. Missouri Bot. Gard.* **77**: 607–627.
- [31] Manning, John; Goldblatt, Peter (2008). *The Iris Family: Natural History & Classification*. Portland, Oregon: Timber Press. pp. 138–42. ISBN 0-88192-897-6.
- [32] Maw G. (1886) *A Monograph of the Genus Crocus*. Dulau & Co. London . Mathew B.127 p.
- [33] Rukšāns J. (2010) *Crocuses a complete guide to the genus*. Timber Press Portland London P. 216
- [34] Bavcon J. (2010) *Žafrani (Crocus L.) v Sloveniji = Crocus (Crocus L.) in Slovenia*. Ljubljana: Botanični vrt, Oddelek za biologijo, Biotehniška fakulteta, pp. 176.
- [35] Nursel İkinci et al. (2011) Molekular phylogenetics of the *Juno Irises, Iris* sungeus *Scorpiris (Iridaceae)*, based on six plastid markers. // *Botanical Journal of the Linnean Society*, 2011, 167, – pp-281-300.
- [36] Goldblatt P. & de Vos M. P. (1989) The reduction of *Oenostachys*, *Homoglossum* and *Anomalesia*, putative sunbird pollinated genera, in *Gladiolus* L. (Iridaceae-Ixioideae). *Bulletin du Muséum national d'histoire naturelle. Section B, Adansonia* **11** (4): 417–428, 1989.
- [37] Kamelin R.V. (1973) *Phlorogenetic analysis of the natural flora of the mountainous Central Asia*. L .: Nauka, - 356 p.
- [38] Tojibaev K.Sh. (2010) *Flora of the southwestern Tien Shan (within the Republic of Uzbekistan): Abstract. dis. ... doc. biol. sciences. - Tashkent, -- 35 p.*
- [39] Khasanov F.O. (2008) *Genus Allium L. in the flora of Central Asia: Abstract. dis. ... doc. biol. sciences. - Tashkent, 2008 .-- 35 p.*