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The Species of the Genus *Gagea* Salisb. Is Distribution in the Flora of the Urgut Region (Uzbekistan)

Gulsauir T. Kurbaniyazova[1], Igor G. Levichev[2], Ulugbek Kh. Kadirov[1]

[1]Institute of Botany of the Academy of Sciences of the Republic of Uzbekistan, Tashkent, Uzbekistan
[2]Institute of Botany after Named V. L. Komarova Russia Academy Sciences, Sankt Peterburg, Russia
Email: kurbaniyazova94@list.ru

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Abstract

In this article, 1650 herbarium specimens of representatives of the genus *Gagea* Salisb. were used as research material from the collections of the National Herbarium of Uzbekistan (TASH). It presents a geographical coordinate system, habitats, phenology, and economic values. The distribution of species in Uzbekistan was indicated by the phytogeographic regions of the country. The herbarium material of *Gagea* Salisb. has been studied in TASH, SAMSU and MSU. The TASH Herbarium presents samples from 1914 to 2019. The review was written using information published between 1988 and 2019 from a number of reliable sources, including Science Direct, Springer, PubMed, EMBASE and Wikipedia.

Keywords

Gagea Salisb., Habitat, Phenology, Economic Significance, Altitude Zone, Geographical Map, Urgut Region

1. Introduction

The Republic of Uzbekistan is a Central Asian country with a rich local flora. Its territory belongs to the Iranian Turan region in the Tethys Floristic sub-kingdom of the Holarctic Kingdom, which is one of the world's largest centers of plant diversity [1]. Turan is a historical region in Central Asia. The term is of Iranian origin and may refer to a particular prehistoric human settlement, a historic geographical region, or a culture. The original Turanians were an Iranian tribe of the Avestan age.

Floristic research in Uzbekistan began more than 150 years ago, and the first

edition of the Flora of Uzbekistan was published in six volumes from 1941 to 1962 [2]. This treatment includes 4148 species of vascular plants (3663 of them are natives of Uzbekistan and 485 naturalized, alien and cultivated taxa). However, as far as we know, the fundamental synopsis and data on the distribution of many plant species were significantly outdated.

In the mountainous Central Asian province, the Kuhistan district covers the territory of the Jizzakh, Samarkand and Kashkadarya regions. The location of the district differs from other districts in its landscape, ecology, composition and diversity of plants.

The article is devoted to the results of a critical revision of the genus *Gagea* Salisb. (Liliaceae) in the flora of Uzbekistan according to field research and examination of herbarium collections of the Institute of Botany of the Academy of Sciences of Uzbekistan (TASH), Samarkand State University (SamSU), Komarov Botanical Institute of RAS, Institute of Botany and Phytointroduction, Ministry of Education and Science, Republic of Kazakhstan (AA) and Moscow State University (MW).

The first information about some species of the genus is known from herbalists of the XVI century. One of the first to be studied was *Gagea lutea* (L.) Gawl., named by R. Doconeus (1583) a forest bulb—"bulbus sylvestris" later Clusius, Chaebraei, Boerhaave, also K. Linnaeus describes two species of goose bows as *Ornithogalum luteum* and *Ornithogalum minima* (L.) Ker.-Gawl. Richard Salisbury (Salisbury, 1806) isolated 7 species from Ornithogalum, naming them after the botanist Thomas Gage. During the XIX century, representatives of the genus were once again described under other generic names. But the greatest additions to its composition occurred in the XX century. Only A. Pasher and A. Terracciano described 54 and 28 taxa, respectively. Each of them proposed their own kind system, but A. Terraciano did not finish his publication and therefore the Pasher system was used more.

From Central Asia, the first was described by *Gagea stipitata* Merkl. [3]. In the last work, 16 more goose bows are given, 10 of which are identified with European species. Subsequently, all 10 were described as independent. M. G. Popov and G. S. Chugaeva studied the genus in the region (they described and named 10 taxa). In it, as in A. I. Vvedensky [4], 83 species are given for the region, although their composition is somewhat different. A great contribution to the cognition of the genus was made by A. I. Vvedensky, who published the most perfect processing of goose bows among others [4]. The list of species of the genus *Gagea* Salisb. in Uzbekistan in 1941, A. I. Vvedensky, numbering 26 species. Currently, there are more than 100 species of the genus in Uzbekistan.

Extensive research conducted by Levichev allowed us to classify the genus *Gagea* as one of the leading genera in the flora of the Western Tien Shan and Pamir-Alai. In the floral lists of 1975-1980, this category was not even in the top ten. And now in modern samples containing all the collected information about the flora of the Western Tien Shan or Pamir-Alai, *Gagea* occupies the 3rd - 5th place among polymorphic categories. The number of species scattered in the

Western Tien Shan is 65, in the Pamir-Alai-more than 95 [5] [6]. In the list given by F. I. Karimov, 11 species are listed for the western part of the Fergana Valley, while 9 species are listed for the Pamir-Alai ranges. The number of endemics with a narrow range of distribution was 4 species. The number of species common to both mountain formations is 15.

2. Material and Methods

As a material for the study, 1650 herbarium specimens of representatives of the Liliaceae family from the collection of the National Herbarium of Uzbekistan (TASH) of the Institute of Botany of the Academy of Sciences of the Republic of Uzbekistan were used. We also reviewed and linked more than 111 samples of the *Gagea* Salisb. herbarium stored in the TASH department in the flora of Urgut to geography. The coordinates of the view records were imported into ArcGIS 10.0 and converted into a point map layer. The geographical coordinate system WGS84 was used as a database.

The distribution of species in Uzbekistan was indicated by the phytogeographic regions of the country [7]. The nomenclature part of the checklist includes accepted species names in accordance with the "Conspectus Florae Asiae Mediae" [8], the plant list database [9]. Attribution of the authorship of taxa in accordance with the "Authors of plants names" [4] and with the International Index of Plant Names [10].

The newly recruited and identified herbarium specimens were placed according to the Engler system, the catalog was compiled in accordance with the system of A. L. Takhtajan [11].

The author of the taxon involved A. Terracc., Pascher, Kar. et Kir., (Zucc.) Vved., Levichev, Stapf.

Botanical and geographical analysis based on the developed scheme of existing herbarium specimens of K. Sh. Tojibaev *et al.* [1].

A species of the genus *Gagea* Salisb. common in the flora of Urgut, based on the scheme of botanical and geographical zoning of Uzbekistan. Will determine the composition of the species and make a map-scheme of distribution in the Urgut geographical regions. Research was carried out using generally accepted methods [2].

For the first time in the course of these studies, each species of flora (based on herbarium specimens belonging to this species) was marked on the map in a 5 × 5 km cell. The samples collected in the study area since 1841 and the data collected by the author for 2017-2020 were considered.

3. Result and Discussion

The Urgut district of BG occupies the western part of the Zarafshan ridge to its summit [1] [12]. In this area, R. V. Kamelin [13] noted that 1281 species of tall plants are found in the flora of the Urgut district [2]. Despite the fact that many botanical studies have been conducted in this area, a complete list of tall plants

in this area does not yet exist. As a result of the study of samples found in the Central Herbarium Fund, 28 species of flora of the BG region were identified (Figure 1). The above data and samples stored in the National Herbarium of Uzbekistan (TASH) are used to give accuracy to the number of species of the category common in the flora of Urgut, the distribution of botanical and geographical regions according to one of the main tasks. In the scheme of botanical and geographical zoning of the territory of Uzbekistan, the Taiga Central Asian province is divided into 8 districts, 23 districts, the Turan province into 8 districts and 15 districts [19]. Of these, it is this area that connects Zarafshan and Turkestan R. V. Camelin [13] (Republic of Tajikistan) North Turkestan, Urgut, background, match, South Turkestan were zoned as follows: bolsa, K. Sh. Tojibayev, etc. [1] (Republic of Uzbekistan), which were assigned to the botanical and geophysical regions of North Turkestan, Molguzar, Urgut and Zievuddin-Zirabulok [2] [12] [13]. *Gagea* in the Fund of the National Herbarium (TASH) Institute of Botany of the Academy of Sciences of Uzbekistan. There are 2672 specimens of more than 100 species in the Central Asia category. More than 2150 samples were collected from the territory of Uzbekistan. Of these samples, it was found that 108 were recruited from Urgut. *Gagea* in the area as a result of the analysis of the herbarium in the TASH Fund. There are a certain 28

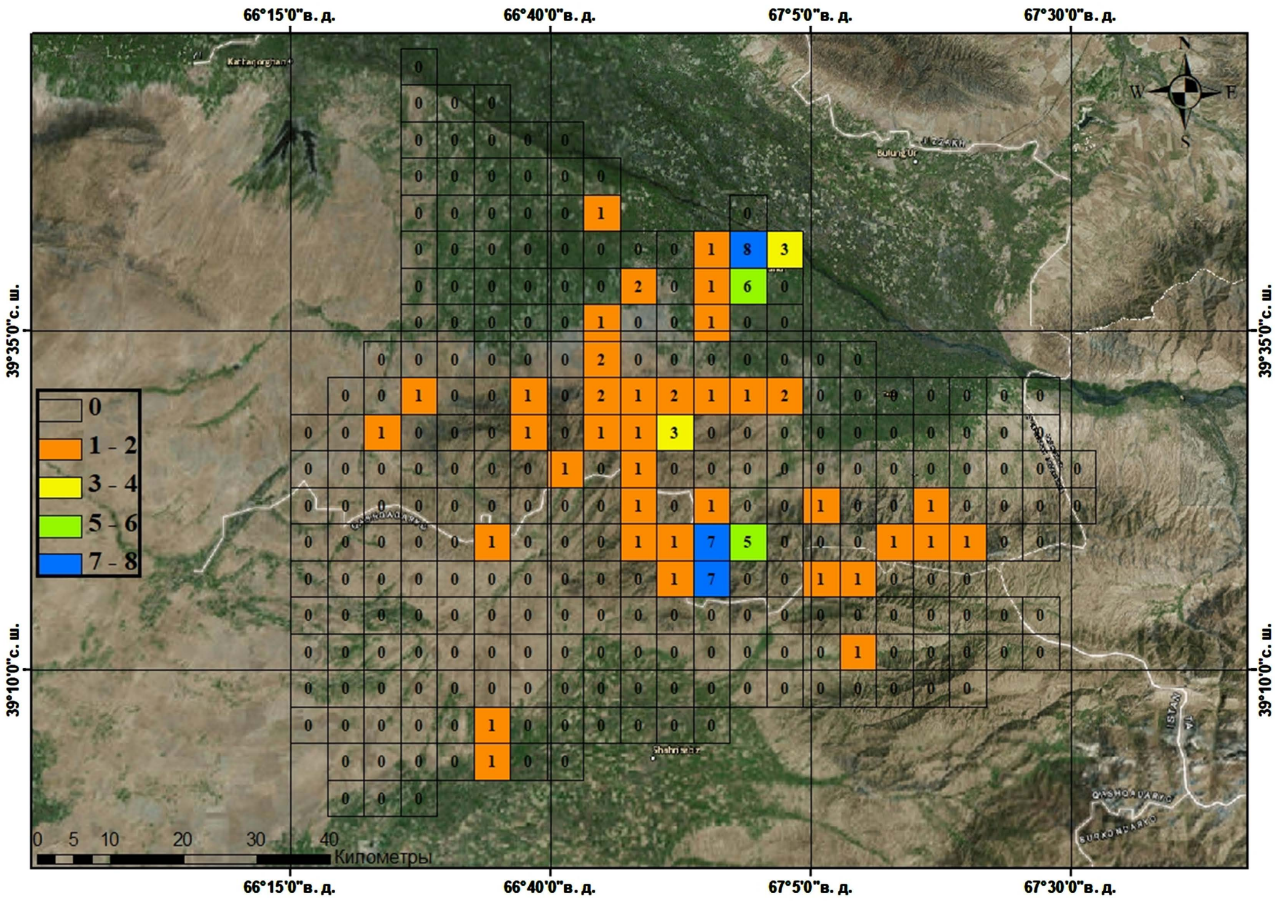

Figure 1. Grid map of species of the genus *Gagea* distributed in the flora of the Urgut botanical-geographical region.

species (*G. afghanica* A. Terracc., *G. capusii* A. Terracc., *G. chomutovae* (Pascher) Pascher, *G. delicatula* Vved., *G. emarginata* Kar. et Kir., *G. gageoides* (Zucc.) Vved., *G. graminifolia* Vved., *G. gymnopoda* Vved., *G. hissarica* Lipsky, *G. kamelinii* Levichev, *G. kuljuktauensis* Levichev sp. nov, *G. liotardii* (Sternb.) Schult. & Schult. f., *G. minutiflora* Regel, *G. olgae* Regel, *G. ova* Stapf, *G. x ovastia* Levichev, *G. pseudominutiflora* Levichev, *G. pseudoreticulata* Vved., *G. reinhardii* Levichev, *G. stipitata* Merckl. ex Bunge, *G. subtilis* Vved., *G. taschkentica* Levichev, *G. tenera* Pascher, *G. vegeta* Vved.). These species were carried out using samples stored in the National Herbarium Fund of the Botanical and Geographical Zoning of the district.

In the course of targeted studies conducted by researchers in recent years, many species have been identified for science and the flora area (*G. kuljuktauensis* Levichev sp. nov). These species are cultivated in collaboration with the Russian scientist Levichev and scientists of the Institute of Botany.

A lot of research has been done on the cytematics, distribution and phylogeny of the genus around the world. As a result, new species have been identified [14]-[27]. In Uzbekistan, too, a lot of research has been carried out on the distribution and populations of Geophyte plants. Especially a lot of work has been done on the genus of *Tulipa* [28] [29] [30] [31]. Several new populations for science have been identified in these studies. The results obtained are used in net systematic mapping of species [32] [33] [34] [35] [36].

Until now, studies reflecting the systematic distribution of species in the local flora are a new direction not only in Uzbekistan, but also for the whole of Central Asia. The maps were created on the basis of 6974 herbarium specimens available for 1281 species belonging to 475 genera and 89 families in the UBGR flora [2]. More than 120 herbariums belonging to 28 species in the field of research of the genus *Gagea* are currently stored in the fund of the National Herbarium of Uzbekistan (TASH). Of the 277 squares present in these samples, it was determined that they were distributed in 44 units, which is 15.8% of the total number of squares. The maximum number of species in these four-headed grid was 8 units. Researchers have found that the following species *G. olga*, *G. ova*, *G. chomutovae*, *G. capusii*, *G. pseudominutiflor*, *G. kamelinii*, *G. stipitata*, *G. subtilis* are widely collected herbarium specimens from collectors.

As a result of the analysis of the collected data, the Urgut region of *Gagea* was compiled of species of the genus (data on distribution, ecology, phenology, habitat, nomenclature of species are listed unchanged, as they are presented on the basis of herbarium labels). Below is the composition of this list:

1) *Gagea* afghanica A. Terracc.

Phenology: Flowering March-April, fruiting April-May

Area: Central Asia (Kyzylkum, Karakum). Northern Afghanistan

Spread to Zarafshan ridge (Samarkand district, okr. Samarkand, 02.04.1921, Raikova sn; near Samarkand, on a sandy hill near Dargom, 04.04.1921, Raikov sn).

2) *Gagea capillifolia* Vved.

Phenology: Flowering May-July, fruiting June-August

Area: Central Asia: Tien Shan, Kopetdag

Distribution in Zerafshan ridge (Samarkand county, Kulikalon, 15.06.1916, Berger sn).

3) *Gagea capusii* A. Terracc.

Phenology: Flowering March-April, fruiting April-May

Area: Central Asia (Tianshan, Pamir-Alai).

Distribution in Zerafshan ridge (Samarkand county, mouth of Sazagan in the mountains under the Urtabel pass, 14.05.1925, Popov 216; Amankutan, 21.05.1933, Drobov, Sakhobutdinov 10; Amankutan, Yulsai, 07.04.1936, Nikanorov sn; Amankutan, Yulsai, 18.04.1937, Nikanorov sn; Agalyk, 06.04.1941, Zakirov sn; Amankutan, 25.04.1957, Vvedensky, Kovalevskaya 179; Takhtakaracha Pass, 11.04.1958, Vvedensky, Kovalevskaya, Cherneva 43; Takhtakaracha pass, 18.05.1980, Nabiyev, Shermatov, Kazakbayev, Levichev 77; Amankutan pass, 08.03.1982, Levichev 61; bass. r. Kashkadarya, kish. Hazrati-Bashir, 1080 m. n. o. m, 15.03.2019, Kodirov, Mahmudov, Akbarov sn).

4) *Gagea chomutovae* (Patcher) Patcher

Phenology: Flowering April, fruiting May

Area: Gray Asia (Kyzylkum, Karakum). Northern Afghanistan

Distribution in Zerafshan ridge(near Samarkand, near Dargom, 27.04.1919, Homolitsky sn; near Samarkand. on the foothills in the Agalyka, 12.04.1920, Homolitsky sn; Amankutan, Maidansaya, 12.04.1936, Nikanorov sn; pereval 1980, Nabiev, Shermatov, Kazakbayev, Levichev 80; kish. Sarikul mev. sk. 1200 m, 15.03.2019, Kodirov, Mahmudov, Akbarov sn; okr. kish. Amankutan, 1814 M. N., 08.04.2019, Kodirov, Zhuramuradov, Akbarov sn; okr. kish. Saigus, altitude 1400 m. n. o. m, 12.04.2019, Kodirov, Zhuramurodov, Akbarov 12).

5) *Gagea delicatula* Vved.

Phenology: Flowering July, fruiting August

Area: Central Asia, Pamir-Alay

Distribution in Zerafshan ridge (on sev. slope to the Zerafshan glacier, 16.07.1927, Drobov 206).

6) *Gagea emarginata* Kar. et Kir.

Phenology: Flowering April-May, fruiting May-June

Area: Central Asia (Dzungarian Alatau, Tianshan, Pamir-Alai).

Distribution in Zerafshan ridge (Sazagan village, in Urtabel pass, 13.06.1920, Popov 203; Sazagan village, in Urtabel pass, 14.05.1925, Popov 209; 214; Agalyk, okr. Samarkand, 14.04.1940, Chugaeva sn).

7) *Gagea gageoides* (Zucc.) Vved.

Phenology: Flowering April-August, fruiting May-August

Area: Central Asia, Iran

Distribution in Zerafshan ridge (Aman-Kutan. Yul-sai. About Sage plots, 04/18/1931, Nikanorov 3; okr. kish. Aksai, Aktau, 16.05.1931, Butkov, Vvedensky 127; okr. village. Urgut, Allaran, 01.05.1936, Gnezdillo 2; Allaran, near village

Urgut. ur. Tashissyk, 13.05.1979, Li, Tsukervanik 20).

8) *Gagea gymnopoda* Vved.

Phenology: Flowering April-June, fruiting May-July

Area: Central Asia

Distribution in Zerafshan ridge (Sangijuman, 05/25/1937, Fayziev sn).

9) *Gagea graminifolia* Vved.

Phenology: Blooms April-June, bears fruit May-July

Area: Central Asia

Distribution in Zerafshan ridge (Iskander near the Juma station, 02.04.1920, Homolitsky sn; near Samarkand, R. Dargoma, 04.04.1921, Raikova sn; bass. r. Kashkadarya, near Kyzylgaura, 19.05.1938, Kudryashev, Sumnevich 202; ocd. Samarkand, 20.03.1940, Zakirov sn; Chirakchinsky district, okr. Chirakchi, 12.03.1942, Arnoldi sn; Kitabsky district, 3 km to the SE, 21.03.1942, Arnoldi sn; Bass. r. Kashkadarya, kish. Hazrati-Bashir at 1080 sq·m., 03/15/2019, Kodirov, Mahmudov, Akbarov sn).

10) *Gagea hissarica* Lipsky

Phenology: Flowering June-July, fruiting July-August

Area: Central Asia (Pamir-Alai, Tianshan).

Distribution in Zerafshan ridge (river Kashkadarya, near the bridge at village. Khazalyak, 11.07.1938, Kudryashev, Sumnevich 824).

11) *Gagea kamelinii* Levichev

Phenology: Flowering March-April, Fruiting May

Area: Western Tien Shan, Pamir-Alai

Distribution in Zerafshan ridge (Aman-kutan, 12.04.1931, Nikanorov sn; Aman-kutan. Yul-sai, 07.04.1936, Nikanorov sn; Agalyk, 07.04.1941, Zakirov sn; Tashkent-Termez tract. Under the Takhta-Karacha pass, 11.04.1958, Vvedensky, Kovalevskaya, Cherneva 42; vil. Sarikul, h = 1200 m, 15.03.2019, 15.03.2019 sn; Agalyk, 6 - 7.04.1941, Zakirov sn).

12) *Gagea kuljuktauensis* Levichev sp. nov

Phenology: Flowering March, fruiting April

Area: Pamiroalai.

Distribution in Zerafshan ridge (bass. r. Kashkadarya, vil. Khazalyak, 11.07.1938, Kudryashev, Sumnevich 824; bass. River Kashkadarya, vil. Hazratibashir, 1080 m. n. o. m, 15.03.2019, Kodirov, Mahmudov, Akbarov sn).

13) *Gagea liotardii* (Sternb.) Schult. & Schult. f.

Phenology: Flowering March-April, fruiting April-May

Area: Central Asia

Distribution in Zerafshan ridge (near village Amankutan, 1814 M. N., 08.04.2019, Kodirov, Zhuramurodov, Akbarov sn).

14) *Gagea minutiflora* Regel

Phenology: Flowering April-June, fruiting May-July

Area: Central Asia, Tianshan (Kopetdag)

Distribution in Zerafshan ridge (Kashkadarya river, Rabat pass, 19.05.1936, Gnezdillo 108; Amankutan, Yulsai, 07.04.1936, Nikanorov sn; Agalyk, 6 - 7.04.1941, Za-

kirov sn; okr. kish. Amankutan, 1814 M. N., 08.04.2019, Kodirov, Zhuramurodov, Akbarov sn).

15) *Gagea olgae* Regel.

Phenology: Flowering February-April, fruiting March-May

Area: Central Asia (Western Tianshan, Kopetdag).

Distribution in Zerafshan ridge (district of the city of Samarkand, Dargomskaya step, 07.04.1919, Homolitsky sn; Zerabulak station, 24.05.1928, Lepeshkin sn; district. Samarkand, Chupanat, 27.02.1940, Popov sn; Samarkand, 04.03.1941, Fayziev sn; near Samarkand on the roof of Khodjaahrar, 09.03.1941, Fayziev sn; near Urgut, 12.03.1976, Bulganova sn).

16) *Gagea ova* Stapf

Phenology: Flowering March-April, fruiting April-May

Area: Middle Asia (Tianshan, Kopetdag). Northern Iran

Distribution in Zerafshan ridge (near Aksai, Butkov 38; okr. g. Samarkand, 21.04.1918, Homolitsky sn; near city Samarkand, at the former area. Makarova on the camp highway, village Baulikhona, 07.04.1920, Homolitsky sn; near Samarkand, village Chumuchlyk, R. Siab, 20.06.1938, Romanenko sn; bass. R. Kashkadarya, Khazalyak village, 11.07.1938, Kudryashev, Sumnevich 865; Kitabs district, 21.03.1942, Arnoldi sn; Amankutan, 28.03.2019, Yusupov, Makhmudzhanov 122; 122/1).

17) *Gagea x ovastia* Levichev

Phenology: Flowering April-May

Area: Central Asia (Kyzylkum, Karakum), Northern Afghanistan

Distribution in Zerafshan ridge (district of Samarkand, hills near Slab, 02.04.1921, Raykova sn; Samarkand county, near villages. Alma-Irishan, 10.05.1925, Popov 129).

18) *Gagea pseudominutiflora* Levichev

Phenology: Flowering March-April, fruiting May-June

Area: Western Tianshan, Southwestern Asia

Distribution in Zerafshan (Takhtakaracha pass, Sazagan village, 04/16/1915, Popov 125; approx. Samarkand, to Dargom, 04.04.1921, Raikova sn; Urtabel Pass, 14.05.1925, Popov 215; Chupanata hills, 06.03.1940, Chugaeva sn; Takhtakaracha Pass, 26.04.1957, Vvedensky, Kovalevskaya 183; Amankutan pass, 22.05.1976, Pratov, Tsukervanik, Makhmedov 644; Takhtakaracha Pass, 18.05.1980, Nabiyev, Shermatov, Kazakbayev, Levichev 60).

19) *Gagea pseudoreticulata* Vved.

Phenology: Flowering March-April, fruiting April-May

Area: Central Asia (Western Tianshan), Northern Afghanistan

Distribution in Zerafshan ridge (Takhtakaracha Pass, 04/16/1915, Popov 125; approx. Samarkand, to Dargom, 04.04.1921, Raikov sn; okr. Amankutan, 05.06.1940, Chugaeva sn; Amankutan pass, 22.05.1976, Pratov, Sukervanik, Makhmedov 644).

20) *Gagea reinhardii* Levichev

Phenology: Flowering March-April, fruiting April-May

Area: Central Asia (Western Tianshan), Northern Afghanistan

Distribution in Zerafshan ridge (Kashkadarya river, Shunrokhna, 05/19/1936, Gnezdillo 114; okr. kish. Saigus 1400 m, 12.04.2019, Kodirov, Zhuramurodov, Akbarov 15; 16).

21) *Gagea stipitata* Merckl. ex Bunge

Phenology: Flowering March-April, fruiting April

Area: Central Asia (Western Tianshan, Kopetdag), Afghanistan, Iran

Distribution in Zerafshan ridge (Samarkand, Siab river, village of Makhau, 15.05.1920, Homolitsky sn; near Samarkand, Siaba, 02.04.1921, Raikov sn; near Samarkand, a hill near Dargom, 04.04.1921, Raikov sn; near village Aksai, 05.05.1931, Butkov sn; bass. r. Kashkadarya, village Khazalyak, 11.07.1938, Kudryashev, Sumnevich sn; the coast of Siab near Samarkand, 20.03.1940, Zakirov sn; Takhtakaracha Pass, 11.04.1958, Vvedensky, Kovalevskaya, Cherneva 31).

22) *Gagea subtilis* Vved.

Phenology: Flowering May, fruiting June

Area: Tashkent (Mogoltau), Samarkand (Zaamin)

Distribution in Zerafshan ridge (Takhtakaracha Pass, 18.05.1980, Nabiyev, Shermatov, Kazakbayev, Levichev 53; Amankutan, 28.03.2019, Yusupov, Makhmudzhanov 122/2).

23) *Gagea taschkentica* Levichev

Phenology: Flowering March-April, fruiting July-August

Area: Central Asia

Distribution in Zerafshan ridge (near Samarkand, on the bank of the Dargoma river, 04.04.1921, Raykova sn; bass. r. Kashkadarya, on the road from Chirakchi village Chashtyube, 07.05.1938, Kudryashev, Sumnevich 17; bass. r. Kashkadarya, near village Khazalyak, 11.07.1938, Kudryashev, Sumnevich 865; hills of Chupanat, near Samarkand, 06.03.1940, Chugaeva sn; R. Zarafshan, 18.04.1983, Skarikova sn).

24) *Gagea tenera* Pascher

Phenology: Flowering March-April, fruiting April

Area: Central Asia: Tianshan, Kopetdag; Northern Iran, Eastern Transcaucasia

Distribution in Zerafshan ridge (near Samarkand, the coast of Kumsai near Daul, 02.04.1920, Homolitsky sn; near Samarkand, along the Siab, 02.04.1921, Raikov sn; near Samarkand, the coast of Siab, 03/20/1940, Zakirov sn; near Sarikul, 1200 m, 15.03.2019, Kodirov, Mahmudov, Akbarov sn).

25) Gaga *vegeta* Vved.

Phenology: Flowering April

Area: Central Asia

Distribution in Zerafshan ridge (village Sazagan, Arabel pass, 14.05.1925, Popov 218; village Amankutan, 25.04.1957, Vvedensky, Kovalevskaya 175; kish. Amankutan, 11.04.1958, Vvedensky, Kovalevskaya, Cherneva 26; Takhtakaracha pass, 11.04.1958, Vvedensky, Kovalevskaya, Cherneva 35).

26) *Gagea ferganica* Levichev

Phenology: Flowering March-April, fruiting June-July

Area: Central Asia

Distribution in Zerafshan ridge (Karakemer, 07.04.1914, Sprygin, Popov 385).

27) *Gagea maracandicum* M. Pop. ex Levichev, ined.

Phenology: Flowering March

Area: Pamiro Alai.

Distribution in Zerafshan ridge (Agalik mountains. Samarkand, 1940, Chugaeva; Agaliksky mountains. Oasis, 1940, Fayziev). Everything is SamSU.

28) *Gagea sogdiana* M. Pop. ex Levichev

Phenology: Flowering March

Area: Pamiro Alai.

Distribution in Zerafshan ridge (near Samarkand Agalik, 00.00.1940, Chugaeva sn; near. Samarkand Agalik, 00.00.1940, Popov sn). Everything is SamSU.

As a result of the conducted studies of the genus *Gagea*, which is found in the flora of Uzbekistan, has more than 100 species in the flora of Uzbekistan (not yet described species, ined), it was found that there are 28 species in the flora of Urgut, and an updated species composition of the genus was formed. The main fund of the unique scientific object of the National Herbarium of Uzbekistan has determined the presence of 111 species of herbarium specimens from 28 species of the genus *Gagea*, which are found in the flora of Uzbekistan (**Figure 2**).

Although there are herbarium specimens of all species of this genus in the flora of Uzbekistan, there are several (from 3 to 10) specimens of 5 species of *G. liotardii* (Sternb.) Schult. & Schult. f. (3), *G. kuljuktauensis* Levichev sp. nov (4), *G. gymnopod*a Vved. (8), *G. reinhardii* Levichev (8), *G. delicatula* Vved. (10).

In the future, targeted field studies aimed at collecting herbarium specimens of these species are being conducted, and it is planned to enrich their high-quality herbarium samples from various districts and ecological spaces.

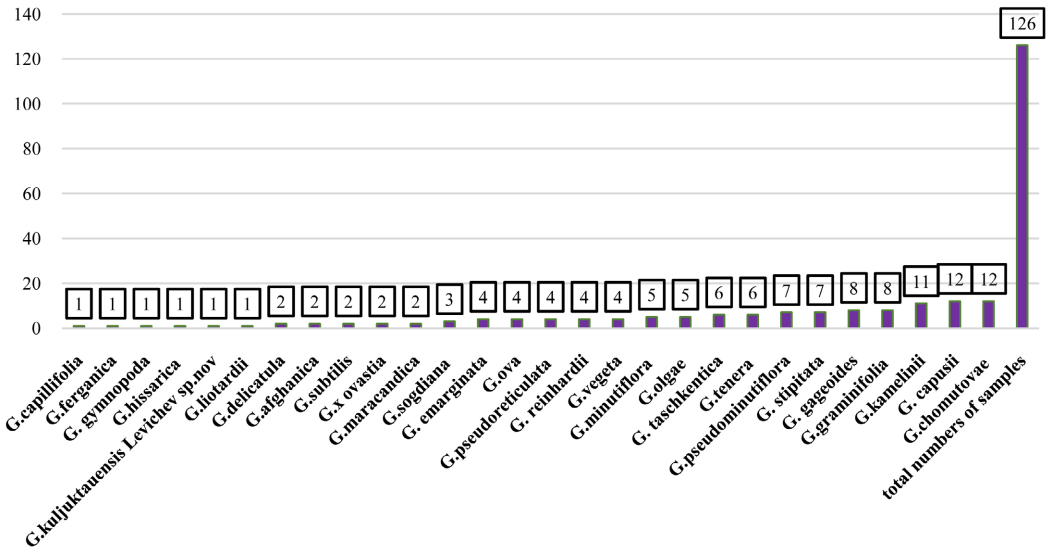

Figure 2. The number of herbarium samples in Urgut region.

In 1960-1980 years, the aggravation of anthropo-, techno-, zootechnical impact is one of the reasons that led to the reduction of ecological spaces of this species. Therefore, as a result, there are few herbarium specimens of this species, and in the future, targeted efforts will be required to search for new ecological spaces and geographical areas of the species, to carry out specific measures to prevent the extinction of each species.

The main reasons for the low number of dialects of the coat of arms of this category are the following: most species have a narrow distribution zone; low level of coverage and traction in the ecological space; in recent years, the category has not been studied as an object of special research; purposeful field research on the collection of new herbarium specimens has not been carried out.

In search of herbarium specimens of species of the genus *Gagea*, which are stored in the TASH fund, there was a huge hiss of Vvedensky A. I., Popov M. G., Sovetkina M. M., Korotkova E. E., Homolitsky P., Abolin R. I., Drobov V. P., Kudryashev S. N., Butkov A. Ya. Levichev I. G. and a number of other scientists.

4. Conclusion

Based on taxonomic and botanical-geographical analysis, it was proved that the Urgut botanical-geographical region, as an integral part of the Mountainous Province of Central Asia, is one of the Centers of modern speciation and species diversity for the *Gagea* category, as well as its position as the Urgut botanical-geographical region as one of the regions of great importance. The results obtained are used in species monitoring. Collected herbarium samples are also used for taxonomic analysis.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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