

RECOVERY OF REPRESENTATIVES OF THE GENUS *AEGILOPS* L. FROM SEED IN FERGANA VALLEY

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Abstract:

In the course of the research, the geographical distribution of representatives of the *Aegilops* L. genus throughout the Fergana Valley, the seed reserve in the cenopopulations, and the regeneration from the seed were determined. A GIS map and species composition were determined based on the data obtained throughout the Fergana Valley. Among the species studied is *Aegilops crassa* Boiss. We observed that the ecological range of Fergana Valley is somewhat limited. This species was found only in the Khojabad district of Andijan region, Imam ota hillsides (940032'47.66"N, 72036'21.8"E, at an altitude of 807 m above sea level, at a latitude of 2010 south-west). The number of bushes was small, 19 per 1 m².

In recent years, the genus *Aegilops* L. has been the most intensively studied group of grasses, especially since its close relationship with wheat cultivars was discovered. In particular, it helps to improve complex traits such as abiotic tolerance for drought and heat, in increasing the productivity of wheat varieties. Therefore, studying the influence of climatic conditions on the change of the biological characteristics of the species of the genus, a their geographical distribution in the Ferghana Valley is of great scientific and practical importance.

Keywords: *Aegilops* L., *Aegilops trinucalis* L., *Aegilops cylindrica* Host., *Aegilops tauschii* Coss., *Aegilops crassa* Boiss., cenopopulation, GAT map, soil seed stock.

Introduction:

In recent years, many countries of the world have created National programs for the conservation of plant genetic resources. The basis of these programs is the preservation of species in situ. To date, the importance of the problem of preserving wild relatives of cultivated plants "in situ" in Uzbekistan is very great, and their comprehensive systematic analysis has not been fully covered. In recent years^{1, 2, 3}, are conducting extensive research. Human activities in agriculture and urbanization processes lead to the genetic erosion of wild relatives of cultivated plants. *Aegilops* L. family *Poaceae* Barnh. is considered one of the important categories of the family. The representatives of this group deserve attention because they are of great importance in creating useful genes in wheat varieties and in animal husbandry. In recent years, the genus *Aegilops* L. has been the most intensively studied group of grasses, especially since its close relationship with wheat cultivars was discovered. In particular, it helps to improve complex traits such as abiotic tolerance for drought and heat, in increasing the productivity of wheat varieties. Therefore, the study of the biological characteristics of the species of the series, and their geographical distribution is of great scientific and practical value. Such studies allow determining ways to preserve various ecological and biological diversity of plants.

At the same time, by studying the modern cenopopulation status and geographical distribution of these plants in different natural areas of the Fergana Valley, it is possible to assess the current status of representatives of the genus (*Aegilops* L.) throughout the valley and develop strategies for restoring cenopopulations.

Today, biomorphological and population studies are widely used in the world's leading scientific research centers to solve the issues of plant biodiversity conservation.

Material and Methods:

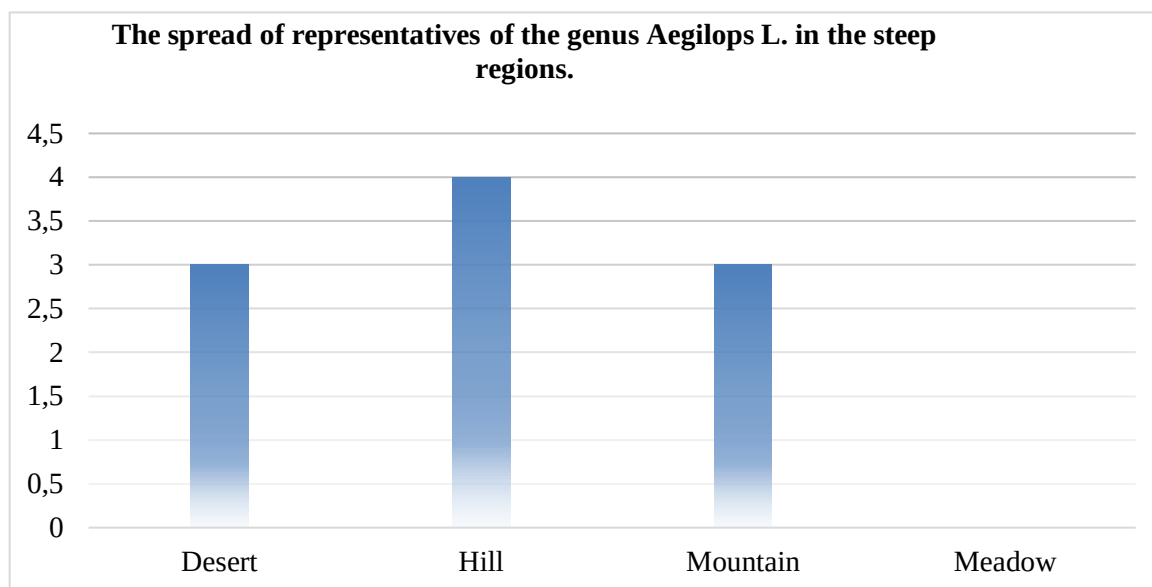


Figure 1. Meeting of representatives of the genus *Aegilops* L. by vertical regions

The regeneration of plants from seeds and the stress factors affecting them are highlighted^{8,13}. In the literature, information about the regeneration of representatives of the wheat family from seeds in the natural environment was almost not found.

We analyzed the reproduction of representatives of the genus in cenopopulations by studied areas. The following results were obtained during the conducted research.

Table 1. Location of representatives of the *Aegilops* L. genus in the soil layers of the seed reserve in the soils of the Fergana Valley, pcs./m² (2021).

Cenopopulation	Seed reserve in soil layers, pieces/m ²					
	Total	Percent %	0-2 cm		2-5 cm	
			piece	%	piece	%
<i>Aegilops trinucalis</i> L.						
CP 1 (Imam Ota)	551,2±30,3	100	530,9±31,3	96,3	20,6±3,8	3,7
CP2 (YukoriVodil)	113,7±11,5	100	98,3±12,5	86,4	15,4±2,0	13,6
CP 3 (Kamchiksay)	328,7±9,5	100	313,5±8,5	95,3	15,2±1,5	4,7
<i>Aegilops cylindrica</i> Host.						
CP 1 (Imam Ota)	208,7±6,3	100	180,3±5,6	86,4	28,4±1,7	13,6
CP 2 (Yukori Vodil)	224,6±1,0	100	196,2±0,3	87,3	28,4±3,3	12,7
CP 3 (Kamchiksay)	246,8±10,6	100	204,9±9,9	83,0	41,9±3,4	17,0
<i>Aegilops tauschii</i> Coss.						
CP 1 (Imam Ota)	295±4,8	100	245,7±14,0	83,3	49,3±2,2	16,7
CP 2 (YukoriVodil)	102,8±1,1	100	89,5±1,3	87,0	13,3±0,25	13,0
CP 3 (Kamchiksay)	230,8±0,8	100	162,2±0,8	70,2	68,6±1,0	29,8
<i>Aegilops crassa</i> Boiss.						
CP 1 (Imam Ota)	90,4±3,0	100	77,5±2,6	85,7	12,9±0,7	14,3

We recalculated our observations for every 1m² in 10 samples. *Ae. trinucalis* in CP1, the average total number of seeds per 1 m² was 551.2, of which 530.9 (96.3%) were on the soil surface and 20.6 (3.7%) at a depth of 2-5 cm. The total number of accents in CP 2 of the same type was 113.7 units. 98.3 (86.4%) grains were found at a depth of 0-2 cm, and 15.4 (13.6%) grains were found at a depth of 2-5

cm. There was a total of 328.7 seeds in CP 3 (Kamchiksoy), of which 313.5 (95.3%) seeds were in 0-2 cm and 15.2 (4.7%) seeds in 2-5 cm.

Ae. cylindrica Host. It was found that 208.7 seeds of the species were located in the 0-2 cm layer and 28.4 (13.6%) in the 2-5 cm soil layer. In Kamchiksoy cenopopulation, 246.8 seeds of the species were found, of which 204.9 (83%) were in the 0-2 cm soil layer, and 41.9 (17%) were in the 2-5 cm layer. In the Upper Vodil cenopopulation of this species, the total seed reserve in the soil was 224.6 pieces, of which 204.9 pieces (83%) were in the 0-2 cm soil layer, and 41.9 pieces (17%) were in the 2-5 cm depth.

There were 295 seeds in the Imam ota cenopopulation of *Ae. tauschii*, 245.7 (83.3%) in the 0-2 cm soil layer and 49.3 (16.7%) seeds of the species were found in the 2-5 cm layer. There were 102.8 seed reserves in CP 2, of which 89.5 (87%) were scattered in the 0-2 cm soil layer and 13.3 (13%) in the 2-5 cm layer. In CP 3, the total number of seeds in the soil was 230.8 pieces, 162.2 (70.2%) seeds were found in the 0-2 cm soil layer, and 68.6 (29.8%) seeds were found in the 2-5 cm layer.

Ae. crassa The total seed stock of crassa was 90.4 units on average, 77.5 (85.7%) units in the 0-2 cm layer of the soil, and 12.9 (14.3%) units in the 2-5 cm layer.

Among the studied species, *Ae. trinucalis* L. in the Imam ota cenopopulation, the seed stock was higher (551.2 units) than other species. This is due to the fact that the species are densely and uniformly located in this area, and the anthropogenic factors are somewhat limited. The lowest rate of *Ae. crassa* was observed in the cenopopulation of the species crassa (90.4). This species is very rare here. This is mainly caused by irregular grazing of livestock and anthropogenic factors Fig.2.3.4.5.

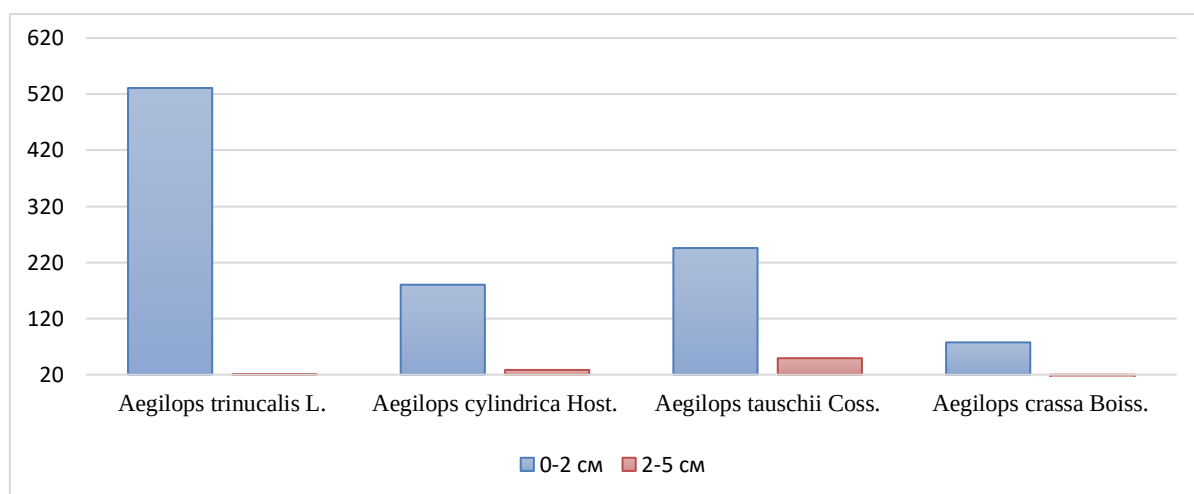


Figure 2. Soil stock of *Aegilops* L. representatives in Andijan region hilly soils (seed quantity in grains).

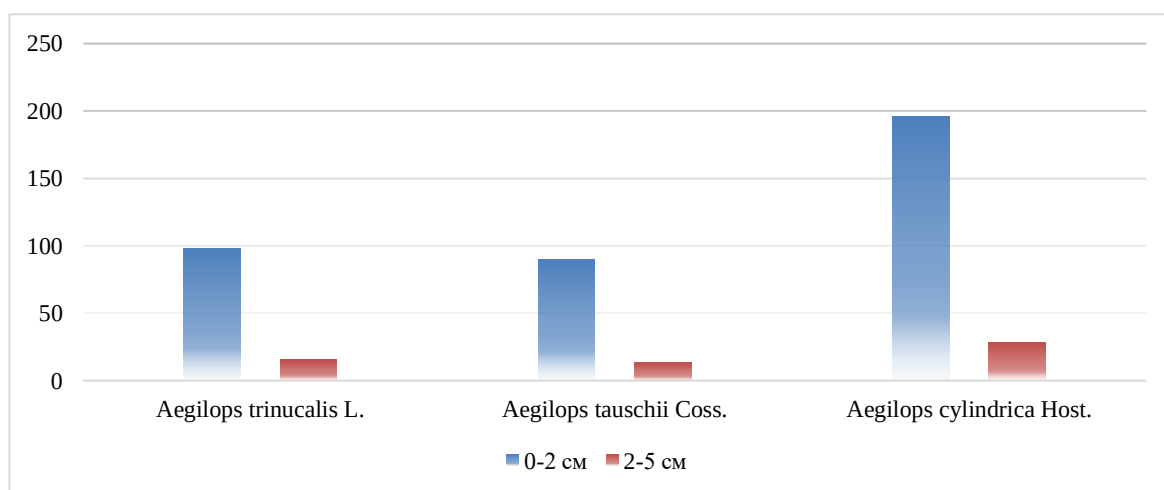


Figure 3. Soil stock of *Aegilops* L. representatives in Andijan region hilly soils (seed quantity in grains).

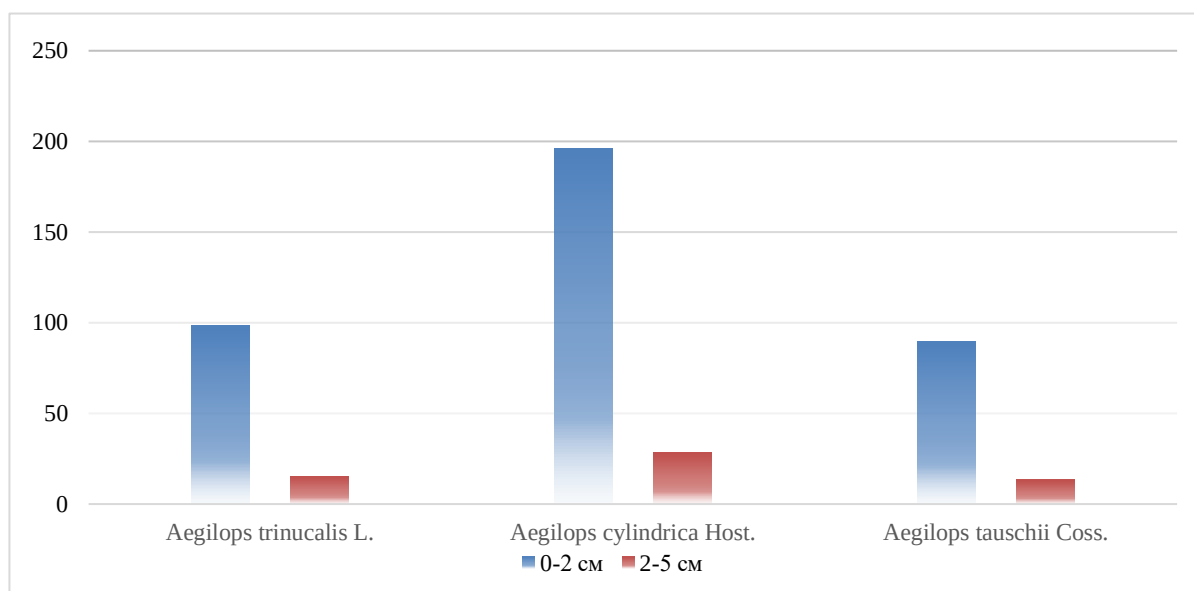
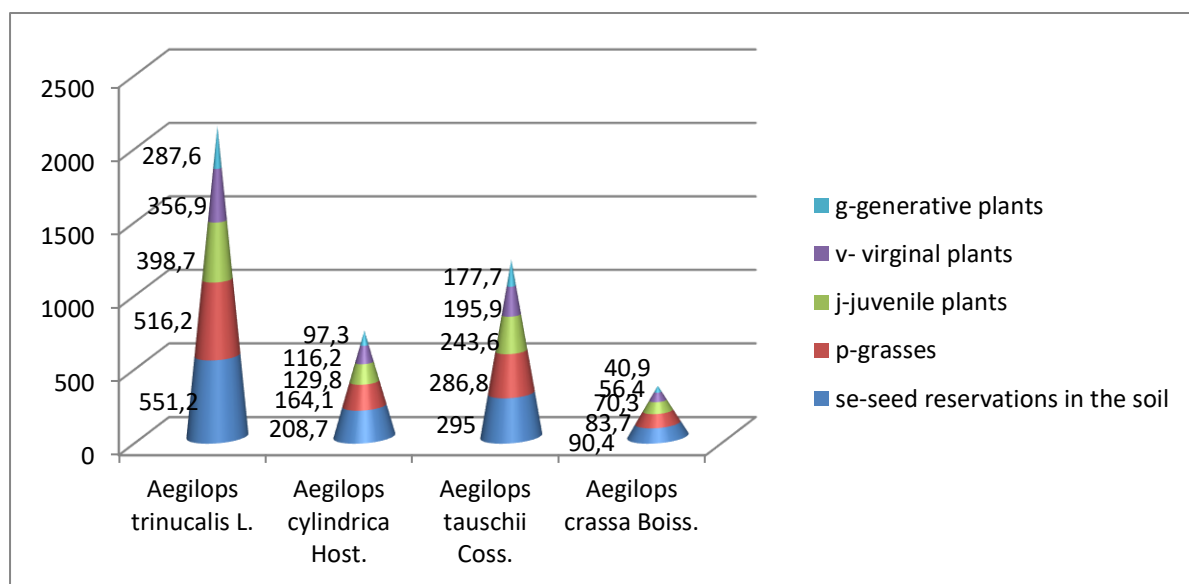


Figure 4. Soil seed of representatives of the genus *Aegilops* L. of Fergana region cenopopulation.

Germination of the studied species in natural areas coincided with the end of September and the beginning of October.



Khojabad district of Andijan region is a region rich in species of representatives of the group, and the recovery from seeds in isolated cenopopulations gave the following results.

The Imam ota cenopopulation of *Aegilops trinucalis* L. is an area with a limited human factor, and the average seed stock (se) was 551.2 units. Germination of species in this area took place on 21.09.2021. The number of sprouted grasses (p) was 516.2 pieces, and 398.7 pieces remained in the young state of yuvinel (j). Species in transition to this age state. The young state of Virgenil (v) was realized in this area in the last third of February. At this stage of ontogenesis, 356.9 plants survived. During the generative (g) period, 287.6 plants developed and we calculated their seed productivity.

Aegilops cylindrica Host. The spread area is located in the eastern part of Imam Ota Edirets, and anthropogenic transformation is somewhat high in this area. Viable seeds in the soil were 208.7 units, and the resulting lawns produced 164.1 units. 129.8 plants remained in the juvenile stage of development. 116.2 plants remained in the virginal state, while 97.3 plants remained in the generative period.

In the cenopopulation of *Ae. tauschii*, the average number of seeds in the soil was 295 per 1 m². There were 286.8 pieces of sprouted grass, and 25.2 pieces of plants died during the transition to the young state. 243.6 plants developed and passed to the virginal stage. At this age, there were 195.9 plants, and 97.3 plants survived to the generative stage.

As a result of the expeditions carried out along the valley, *Ae. crassa* was found only in the highlands of Khojabad district. The number of viable seeds in the soil was 90.4, and the number of germinated grasses was 83.7. 70.3 pieces of plants were preserved in the juvenile state. While 56.4 plants survived the virgin stage, 40.9 plants reached the flowering stage and bore fruit fig6.

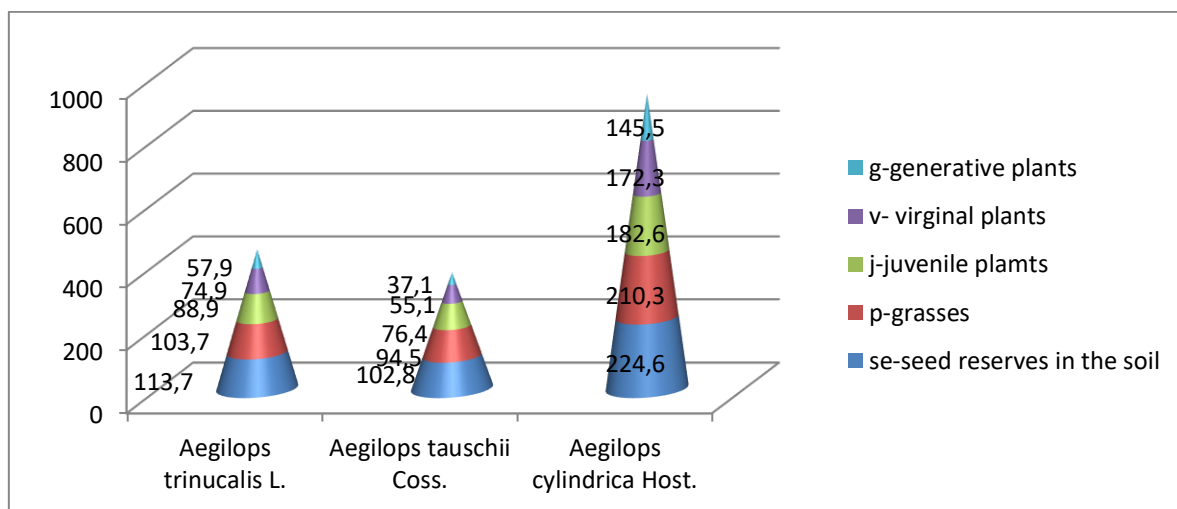


Fig 6. Reproduction of *Aegilops* L. from seed in the desert steep region (Fergana, 2022)

Representatives of the species were found in the desert steep region of Fergana region (around the Aksu stream). Only three species of the genus (*Aegilops trinucalis* L., *Ae. tauschii* Coss., *Aegilops cylindrica* Host.) were found in this area.

The number of viable seeds of *Aegilops trinucalis* L. in the soil was 113.7, and the number of germinated grasses (p) produced 103.7. About 10 seeds did not germinate for various reasons. Most of the plants in the grass stage died in this area (14.8 units). The number of young plants reached 88.9 units. The human factor is high here, and 74.9 plants have survived to the virginal stage. At this stage too, 17 plants died due to the heavy use as fodder. During the generative period, 57.9 plants were preserved.

The soil seed stock of *Ae. tauschii* was 102.8 units, and the recovered lawns were 94.5 units. Most of the lawns died, and 76.4 plants continued to grow at a young age. We observed that 55.1 plants survived to the virginal stage. 37.1 plants survived to the generative stage and yielded.

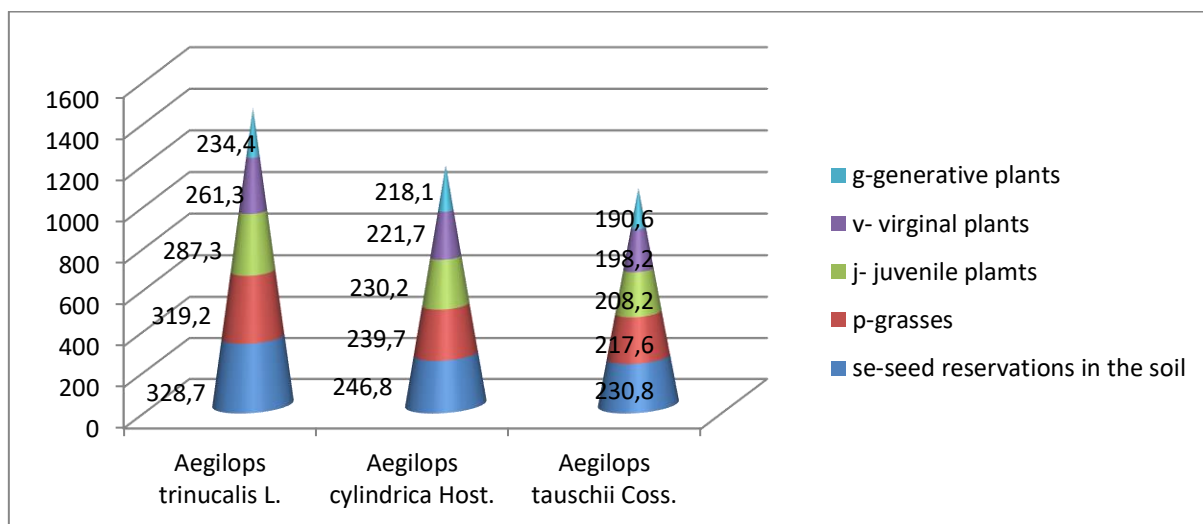


Figure 7. Reproduction of *Aegilops* L. from seed in the steep mountain region (Namangan, 2022).

Aegilops cylindrica Host., the seed reserve in the soil was 224.6 units, and the number of sprouted grasses was 210.3 units. The number of dead seeds is 14.3. During the grass stage of this species, many sprouts died, and the number of plants that passed to the young stage was 182.6. 172.3 plants were preserved in the virginal state. 145.5 plants passed to the generative stage, and the largest number of plants died during the transition from the grass stage to the yuvinel stage fig.7 (27.7 plants).

Three species of representatives of the genus were also found in the desert steep region of the Fergana Valley (*Ae. trinucalis* L., *Ae. cylindrica* Host., *Ae. tauschii*).

The number of viable seeds of *Aegilops trinucalis* L. in the soil was 328.7, and 319.2 plants germinated. 287.3 specimens of the studied species passed to the juvenile state, and the rest died. 261.3 plants that have passed to the virginal young state. During the generative period, 234.4 plants were preserved.

Aegilops cylindrica Host. of viable seeds in the soil of this area amounted to 246.8 units. The number of lawns formed from them was 239.7 pieces, and 230.2 pieces of plants were saved in the yuvinel stage. 221.7 units of plants developed to the virginal stage, and 218.1 units were produced by the plants that passed to the generative stage.

The soil seed reserve of *Ae. tauschii* in this area was 230.8 units, and the number of sprouts was 217.6 units. 208.2 plants survived to the juvenile state. The number of plants that have passed to the virgin age state is 198.2 units, and the number of bushes that have passed to the generative age state and produced grain is 190.6 units.

Conclusion:

In Fergana region (desert) - *Aegilops triuncialis* L., *Ae.cylindrica* Host., *Aegilops tauschii* Coss.; In Andijan region (hill) - *Aegilops triuncialis* L., *Ae.cylindrica* Host., *Aegilops tauschii* Coss., *Aegilops crassa* Boiss.; In Namangan region (mountains) - *Aegilops triuncialis* L., *Ae. cylindrica* Host. species met.

Among the studied regions, in Andijan and Fergana regions of the Fergana Valley, due to the increase of anthropogenic influence, the soil seed reserve of the representatives of the genus and the self-regeneration of species from it to the generative stage gives a somewhat low indicator. Therefore, it is important to preserve the representatives of this group in natural ecotopes, where the representatives of this group have acquired specific adaptations over the years.

Aegilops crassa Boiss. distribution in the Fergana Valley is somewhat limited, this species was found only in the Khojabad District of Andijan Region, Imam Ota hillside (940032'47.66"N, 72036'21.8"E, at an altitude of h-807 m above sea level, at a latitude of 2010 in the southwest).

Author's declaration

-Conflicts of Interest: None.

-We confirm that all the Figures and Tables in the manuscript are ours.

Author's Contribution:

First author is one of the authors who collected all the samples, and wrote the manuscript and second author was a scientific advisor and participated in data analysis and processing.

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