Impact Factor:					
	ISRA (India) = 6.317	SIS (USA) = 0.912	ICV (Poland) = 6.630
	ISI (Dubai, UAE) = 1.582	РИНЦ (Russia) = 0.191	PIF (India) = 1.940
	GIF (Australia) = 0.564	ESJI (KZ) = 8.100	IBI (India) = 4.260
	JIF = 1.500	SJIF (Morocco) = 7.184	OAJI (USA) = 0.350

SOI: 1.1/TAS DOI: 10.15863/TAS

International Scientific Journal

Theoretical & Applied Science

p-ISSN: 2308-4944 (print) **e-ISSN:** 2409-0085 (online)

Year: 2025 **Issue:** 06 **Volume:** 146

Received: 26.06.2025
Accepted/Published: 30.06.2025 https://T-Science.org

Issue Article

Mehrioy Kurbanova
Andijan State Pedagogical Institute
teacher
mehrioyk@adu.uz

Azizakhan Imirsinova
National University of Uzbekistan
associate professor
imirsinovaaziza@gmail.com

THE SPREAD OF AEGILOPS IN THE FERGANA VALLEY AND BIOLOGICAL SUBSTANCES CONTAINED IN SPECIES

Abstract: *The article describes the distribution of species belonging to the Aegilops family in the Fergana Valley and the amount of protein and carbohydrates in the species.*

Key words: *Aegilops L., A. trinucalis, A. cylindrica, A. tauschii, A.crassa, distribution map, protein and carbohydrate.*

Language: *English*

Citation: Kurbanova, M., & Imirsinova, A. (2025). The spread of aegilops in the Fergana valley and biological substances contained in species. *ISJ Theoretical & Applied Science, 06 (146),* 119-123.

Soi: https://s-o-i.org/1.1/TAS-06-146-25 ***Doi***: https://dx.doi.org/10.15863/TAS.2025.06.146.25

Scopus ASCC: *1100.*

Introduction

Representatives of the genus *Aegilops* L. are ephemeral plants widely distributed in the Fergana Valley. Our research is aimed at morphobiological study of Aegilops representatives distributed in the Fergana Valley. One of our tasks is to identify priority species by comprehensively assessing their morphological characters in the valley and studying their geographical distribution.

Literature review.

Due to the great practical importance of representatives of this group, extensive scientific research is being conducted by leading scientific research centers around the world. In particular, modern scientific materials have been collected based on genetic (J.B.Wang, 2021; A. Kumar, 2021) [9, 4], molecular biological (J.B.Wang, 2000; Z.Tulpova 2019; X. Haiou, 2022) [9, 8, 11], cytogenetic (Е.Д. Бадаева, 1998, 2002; J. Dvorak, 2013; Li et al., 2019) [13,1, 10], biochemical (A.I. Abugalieva, T.V. Savin 2018) [12], and taxonomic (Р.Л. Богуславский, 2004; Н.Н. Цвелёв, 2005) [14, 15] data on representatives of *Aeiglops* L. Reproductive biology and ontogenesis features were covered by A.A. Imirsinova (2019) [3,5].

The microelements in the composition of representatives of this genus were studied by A.I. Abugalieva (2018). In this work, it was found that *Ae. ovata* and *Ae. triuncialis* have high levels of all microelements. He also based the ratio of microelements on the following: *Ae. triuncialis*>*Ae. ovata* (K, P, Mg, Fe, Zn)>*Ae. cylindrica* (Fe, Mn)>*Ae. triaristata* (S)>*Ae. squarossa* (Ca) [12].

Н.Н. Цвелев (1976) also noted that *Aegilops cylindrica*, *Aegilops tauschii* and *Aegilops crassa* are good pasture forage plants for all types of livestock [16].

Research methodology.

The amount of reducing sugars was determined colorimetrically according to the method of Shomodi and Nelson (1952) [7]. This method works on the basis of the reduction of Cu^{2+} ions of sugars to Cu^{+}. Shomodi reagent (Na_2CO_3, $CuSO_4 \cdot 5H_2O$, $NaHCO_3$) and Nelson reagent (a mixture of ammonium

molybdate and sodium arsenate) were prepared for the reaction. After treatment with the reagents, the samples were incubated in a water bath, and then the formed colored complexes were evaluated spectrophotometrically at a wavelength of 610 nm. Measurements were performed on a Shimadzu UV-1800 spectrophotometer. Quantitative calculations were performed using a standard calibration graph based on glucose.

The protein content was determined according to the Lowry method [6]. For this, solutions A, B and C were prepared. Solution C was prepared by mixing solutions A and B in a ratio of 49:1. 400 µl of the sample was mixed with 2 ml of solution C and incubated for 10 minutes. Then 200 µl of Folin's reagent (diluted 1:1 with water) was added and the reaction was terminated by keeping it at room temperature for 30 minutes.

After the reaction, the optical density was measured using a spectrophotometer at a wavelength of 750 nm. The protein content was calculated according to a standard formula. This method is characterized by high sensitivity and accuracy and is widely used to estimate the protein content in biological samples.

Research results and their analysis

During our field research and samples from the National Herbarium of Uzbekistan (NHU), we can observe that the representatives of the genus are unevenly distributed in different parts of the valley. Most of the representatives of the genus are limited to the mountainous zone and are not found in pastures.

During the research conducted in the Fergana Valley, some species-rich regions were clearly identified. The research objects were found in the Imam Ota hillforts and Karnaychi village of the Khojaabad district of Andijan region; in the hillforts of the Teshiktash village of the Jalaquduk district.

In Fergana region, it was found in the Yukoro Vodil village of Fergana district and the Yukori Chimyon foothills. In Namangan region, the species was observed to be distributed in the foothills of Chust district and the foothills of Pop district, namely the Rezaksoy, Kyzylsuv, and Kamchiksoy foothills (Figure 1).

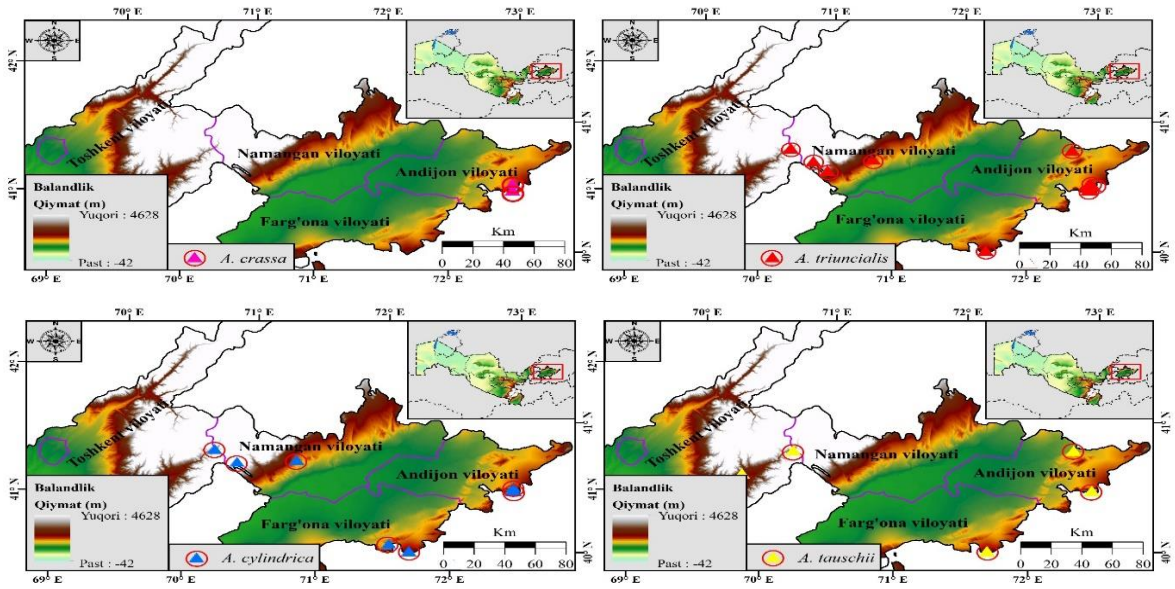

Figure 1. Maps of some studied species of *Aegilops* L. in the Fergana Valley based on the ArGIS program

Table 1. Distribution of species of the genus *Aegilops* in different regions of the Fergana Valley

№	Species name	Place name	Width	Length	Height above sea level (m)
1	*A. trinucalis*	Khojaabad	$40^{0}32^{1}$	$72^{0}36^{1}$	780-790
2	*A. trinucalis*	Yukori Vodil	$40^{0}10^{1}$	$71^{0}43^{1}$	450
3	*A. trinucalis*	Kamchiqsoy	$41^{\circ}08^{1}$	$70^{\circ}23^{1}$	1160
4	*A. cylindrica*	Khojaabad	$40^{0}32^{1}$	$72^{0}37^{1}$	847
5	*A. cylindrica*	Yuqori Vodil	$40^{o}\ 10^{1}$	$71^{o}43^{1}$	467
6	*A. cylindrica*	Kamchiqsoy	$41^{o}08^{1}$	$70^{o}23^{1}$	1160

7	*A. tauschii*	Khojaabad	$40^{0}32^{1}$	$72^{0}37^{1}$	857
8	*A. tauschii*	Yukori Vodil	$40^{0}10^{1}$	$71^{0}43^{1}$	409
9	*A. tauschii*	Kamchiqsoy	$41^{0}08^{1}$	$70^{0}26^{1}$	1140
10	*A. crassa*	Khojaabad	$40^{0}32^{1}$	$72^{0}36^{1}$	807

Aegilops L. species are found in the natural flora of various parts of the Fergana Valley. Until now, these species have not been evaluated as fodder. The rapid hardening of the spikelets in representatives of the genus can injure the mouths of livestock. Therefore, we conducted this study, recommending that their seeds and species can be used as fodder during the virgin period, and the value of the feed quality for livestock was determined in the composition of the plants.

For the research, plant samples were collected in 200 g in 3 replicates.

The study determined the amount of crude protein and carbohydrates. The presence of protein in plants helps to provide animals with complete nutrients. The amount of reducing sugars in forage plants plays an important role in the nutrition and digestion of animals. These sugars are an easily digestible source of energy and help increase animal growth, milk and meat productivity. The spikelets of *Aegilops* species can damage the mouths of animals when they produce spikes, but they can be useful as fodder for animals when they do not produce spikes. Therefore, in our experiment, we determined the amount of protein and carbohydrates in their virginal period.

In the experiments, we can see that the differences in the protein content of the grasses were determined at the level of 9.4% to 12.6%, and the differences in the carbohydrate content were determined at the level of 13.6% to 21.0% (Table 1). These differences differed depending on the species and their distribution areas. The superiority of the protein content and carbohydrate content in the grasses was observed in the grasses of *A. crassa* collected from Khojaabad.

Table 2. Protein and carbohydrate content of the virginal wet biomass of some species of the genus *Aegilops*

Plant sprouts (mg/raw)					
Species name	**Place name**	**Average protein content**	**V, %**	**Carbohydrate content**	**V, %**
A.crassa	Khojaabad	155,3±0,07	12,6	41,7±0,1	21,0
A.triunsialis	Yukori Vodil	137,2±0,07	12,4	9,4±0,1	17,0
A.triunsialis	Kamchiqsoy	135,5±0,06	11,5	8,7±0,08	14,3
A.triunsialis	Khojaabad	137,2±0,08	14,1	9,4±0,1	16,3
A.tauschii	Yukori Vodil	144,3±0,07	12,4	21,8±0,1	14,4
A.tauschii	Kamchiqsoy	142,3±0,06	10,3	21,1±0,08	15,1
A.tauschii	Khojaabad	144,0±0,08	14,3	21,5±0,1	18
A.clyndrica	Yukori Vodil	125,4±0,06	11,3	6,1±0,1	14,8
A.clyndrica	Kamchiqsoy	124,7±0,05	9,4	6,0±0,07	13,6
A.clyndrica	Khojaabad	125,1±0,07	12,4	6,0±0,09	17,9

The amount of protein depends on factors such as the amount of nitrogen in the soil and the availability of moisture. Nitrogen increases protein, while excess moisture reduces it. Proteins that are insoluble in water are called gluten. Gluten is the protein substance remaining after washing starch and other compounds from the dough. The amount of crude gluten in wheat is 16 - 50%, in rye - 3.1 - 9.5%, and in barley - 2 - 19% [2].

The content of protein and carbohydrates in the seeds of the studied species is important for breeding and the food industry. According to the results of the research, the protein content of the seeds ranges from 14.1 to 21.6%, and the carbohydrate content ranges from 18.6 to 25%. A high protein content was observed in the grain of *A. triuncialis* collected from Kamchiksoy and *A. tauschii* from Khojaabad, while the carbohydrate content was also observed in the grain of *A. tauschii* collected from the Kamchiksoy region.

Table 3. Protein and carbohydrate content in seeds of *Aegilops* species

Plant seeds (mg/raw)					
Species name	**Place name**	**Average protein content**	**V,%**	**Carbohydrate content**	**V,%**
A.crassa	Khojaabad	184,8±0,1	17,5	138,4±0,1	21,6
A.triunsialis	Yukori Vodil	202,0±0,1	18,4	149,8±0,1	24,9
A.triunsialis	Kamchiksoy	202,1±0,1	17,0	149,4±0,1	21,6
A.triunsialis	Khojaabad	202,0±0,1	21,6	149,8±0,1	24,4
A.tauschii	Yukori Vodil	220,6±0,1	21,6	138,1±0,1	24,5
A.tauschii	Kamchiksoy	219,9±0,1	16,3	137,3±0,1	18,6
A.tauschii	Khojaabad	219,7±0,1	20,5	138,2±0,1	25,0
A.clyndrica	Yukori Vodil	173,3±0,1	17	110,8±0,1	20,9
A.clyndrica	Kamchiksoy	173,0±0,1	14,1	110,5±0,1	19,0
A.clyndrica	Khojaabad	173,0±0,1	17	110,6±0,1	21,6

In conclusion, it can be said that the chemical composition of the grass of the *Aegilops* genus is a nutritious food until the seeding stage. After the seeds ripen, the plant becomes much tougher, so its edibility and nutritional value decrease significantly. Their chemical composition is also affected by the ecological factors of the region. In our experiments, the content of protein and carbohydrates was high in the Khojaabad and Kamchiksoy regions.

The accumulation of food reserves in ephemeral pastures is directly related to the hydrothermal regime of the meadow and is highly variable over the years [3]. In the years studied, it was found that the total vegetation period of *Aegilops* species in the Kamchiksoy region was +5554.3 °C- +5739.4 °C, the development index was 1.7-I>1, in the Yukori Vodil region the total positive temperatures were +5554.3 °C- +4561.9 °C, the development index was 1.6-I>1, and in the Khojaabad district it was +5329.7 °C- +5034.9 °C, the development index was 1.4-I>1. As the temperature increases, the metabolic processes of plants accelerate. This affects the synthesis and decomposition of reserve substances. At moderate temperatures, more reserve substances accumulate, since the photosynthesis process is active. For the studied species, the sum of positive temperatures was +5554.3°C ... + 5739.4°C and +5329.7°C ... +5034.9°C, respectively. The reserve organic substances had a high indicator.

References:

1. Dvorak, J. (2001). *Triticum Species (Wheat). Encyclopedia of Genetics* 2001, pp.2060-2068.
2. Hamzayev, A.X., Mavlonov, B.T., & Shernazarov, M. (2016). *"Oziqa yetishtirish texnologiyasi"*. Samarqand, 2016. O'quv qo'llanma. pp.55-56.
3. Imirsinova, A.A. (2019). Studying of reproductive biology of some tribe Triticeae Dum. family Poaceae Barnh. in different conditions of Uzbekistan. *International Journal of Current Research.* Vol. 11, Issue, 07. July, 2019. DOI: https://doi.org/10.24941/ijcr.35926.07.2019.5782-5785-pp
4. Kumar, A., et al. (2021). *A walk towards Wild grasses to unlock the clandestine of gene pools for wheat improvement: A review*. Plant Stress. 2021. pp. 1-12. Retrieved from www.sciencedirect.com/journal/plant-stress
5. Kurbonova, M., & Imirsinova, A. (2024). Aegilops L. ontogenesis of genus representatives. *International Scientific Journal Theoretical & Applied Science*, p-ISSN: 2308-4944 (print) e-ISSN: 2409-0085 (online) Year: 2024 Issue: 11 Published: 09.11.2024 Volume: 139. http://T-Science.org
6. Lowry, O.H., Rosebrough, N.J., Farr, A.L., &Randall, R.J. (1951). Protein measurement

with Folin phenol reagent. *J. Biol. Chem*, 1951, №1, pp.265-275.

7. Nelson, M.I., Kelsey, R.G., & Shafizaden, F. (1982). Anhancement enzymatic hydroly-ses by Simultaneus attrition of cellulosed Substrates. *Bio-technol and Bioeng*, 1982, Vol. 24, pp. 293-294.
8. Tulpova, Z., et al. (2019). Integrated physical map of bread wheat chromosome arm 7DS to facilitate gene cloning and comparative studies. *New Biotechnology* 48 (2019) 12-19. www.elsevier.com/locate/nbt.Pp.1-12
9. Wang, J.B., Wang, C., Shi, S.H., & Zhong, Y. (2000). Evolution of parental IT S regions of nuclear rDN A in allopolyploid Aegilops (Poaseae) species. *Herediats*. 2000, Vol. 133, pp. 1 - 7.
10. Wang, L.H., Luo, L., Nie, M.C., Zhou, F., McGuire, Y., Distelfeld, P.E., Dai, A., Song, X., & Dvorak, C.P. (2019). Recombination between homoeologous chromosomes induced in durum wheat by the Aegilops speltoides Su1-Ph1 suppressor. *Theor. Appl. Genet.* 132, 3265e3276.
11. Xia, H., Cheng, T., & Xin, Ma. (2022). Genetic relationships between populations of Aegilops tauschii Coss. (Poaceae) using SCoT molecular markers. July 2022. *Caryologia-Firenze*-75(1):141-153 Unfollow journal DOI: 10.36253/caryologia-1444
12. Abugalieva, A.I., Esimbekova, M.A., Kozhahmetov, K., & Savin, T.V. (2018). *Fenotipicheskoe i geneticheskoe raznoobrazie kollekcij dikih sorodichej pshenicy (rod Aegilops L.): vyjavlenie istochnikov priznakov dlja sbalansirovannogo ih ispol`zovanija i sohranenija «EX SITU».* Mehanizmy ustojchivosti rastenij i mikroorganizmov k neblagoprijatnym uslovijam sredy. Sbornik materialov (v dvuh chastjah) Vserossijskoj nauchnoj konferencii s mezhdunarodnym uchastiem i shkoly molodyh uchenyh. Irkutsk. 2018. pp. 36-40.
13. Badaeva, E.D. (2002). Issledovanie filogeneticheskogo rodstva pjati poliploidnyh vidov Aegilops L. iz klastera U-genomov metodom hromosomnogo analiza. *Genetika*, 2002, T. 38, № 6, pp. 799 - 811.
14. Boguslavskij, R.L., & Golik, O.V. (2004). *Rod Aegilops L. kak geneticheskij resurs selekcii.* (236p.). Har`kov.
15. Cveljov, N.N. (2005). *Problemy teoreticheskoj morfologii i jevolucii vysshih rastenij*. Sbornik izbrannyh trudov, Moskva-Sankt-Peterburg: Tovarishhestvo nauchnyh izdanij KMK, 2005, 407 p.
16. Cveljov, N.N. (1976). *Zlaki SSSR.* (p.155). Leningrad.