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BIOMORPHOLOGICAL CHARACTERISTICS OF REPRESENTATIVES OF *AEGILOPS* L. GENUS

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Abstract:

In the article the development process (ontogeny) of some species belonging to the *Aegilops* L. genus of *Poaceae* Barnh. family: *Aegilops triuncialis* L., *Aegilops cylindrica* Host., *Aegilops tauschii* Coss., *Aegilops crassa* Boiss. was studied under natural conditions. In these species we observed three periods of ontogenesis: latent, pre-reproductive, reproductive periods and five types of age states: seed, seedling, juvenile, virginile and young.

Keywords: *Aegilops triuncialis* L., *Aegilops cylindrica* Host., *Aegilops tauschii* Coss., *Aegilops crassa* Boiss., ontogeny, latent, re-reproductive, reproductive.

Today, finding the types of the plants that are of practical importance studying them and applying the results in science is considered as one of our main tasks. In order to successfully carry out a task of this kind, it is necessary to thoroughly study the biology of the plants' individual development (ontogeny) and, in particular, its individual stages: latency period, virginal stage, reproductive and post-reproductive periods.

METHODS AND OBJECTS OF THE RESEARCH.

Studying the age states of the ontogenesis process in plant species is based on a number of qualitative features in them (Уранов, 1975; Ценопопуляции растений..., 1976) [1,2]

In Uzbekistan, the process of ontogenesis of some perennial representatives of the wheatgrass family was studied by Mahmudov (1986), and G. M. Khodzhaeva (2008) studied the same process of some annual representatives of this family. By A.A.Imirsinova (2019) some indicators of flowering dynamics and seed efficiency of *Aegilops* L. Were studied in the conditions of Uzbekistan. However, the biomorphological features of the representatives of the *Aegilops* L. genus during their ontogenesis have not yet been fully studied. While carrying out the current research on studying the age and period of representatives of this group, we referred to the classifications of the periods of ontogenesis proposed by A.A.Uranov (1975), T.A.Rabotnov (1950) [1,3,4,5,6].

On 20th of October, 2020 we planted the seeds of the species of *Aegilops* L. genus in the test ground of the Botanical garden, located in Andijan region of Ferghana Valley, and conducted our further research. The studied species were planted on irrigated lands at the same time (on October 20) on test grounds of 1 m^2 size with row spacing of 5 cm and a depth of 2-3 cm. The experiments were carried out on the basis of the methodological instructions of B.A.Dospekhov (1985) [7].

ANALYZING THE RESULTS OF THE RESEARCH

In these species we observed three periods of ontogenesis: latent, pre-reproductive, reproductive periods and five types of age states: seed, seedling, juvenile, virginile and young.

Latent period of the representatives of the *Aegilops* L. genus.

This is the resting period of the seeds. This period is represented by dormant seeds(se) of the species.

The seed weight of the species of this genus varies depending on the annual climate conditions. The weight of the seeds increases depending on the seed field during the years when there is enough soil moisture.

Our research work is devoted to the study of *Aegilops* L. genus species that can be found in the Fergana Valley. The seeds that were taken from the areas that are fundamentally different from each other according to the nature of their location in high-altitude areas (in the steps of the Khojabad district of Andijan region, h 780-790 m), Pop district, the mountainous area, of Namangan region (Kamchiksoy, h-1160-1200 m) and the Ferghana district of the Ferghana region (Yukori Vodil, h 400-500 m) in the riverine environment) gave the following results:

Ae. tauschii seed length - 5,67-7,11 mm long, width - 2,3 - 2,58 mm. 1000 seeds weigh between 7 - 8,6 mm.

Ae.crassa seed length - 7,31 mm, width - 2,64 mm. 1000 seeds weigh 9,2 gr.

Ae. cylindrica seed length - 7,03 - 7,08 mm; width - between 2,2 - 2,8 mm. The spikes are very fragile and can be separated from each other easily. 1000 seeds weigh 8,2 - 8,7 gr.

Ae. triuncialis seed length - 7,06 - 7,52 mm; width - 2,33 - 2,83 mm. 1000 seeds weigh 7,6 - 8,9 gr.

***Aegilops* L. genus species' pre-reproductive (virginil) period** covers the seedling (p), juvenile (j), immature (im), virginil (v) states of age. This period covers the stages from the appearance of herbaceous plant species to the appearance of generative organs.

Seedling (p). During this state, we noticed that seedlings retain contact with the seeds. The growth of embryo axis to the seedling was observed after the activation stage in the seeds of the studied species.

Under the natural conditions the seedlings germinated in the third decade of October (29.10.2020).

First pale coleorhiza grew. Coleorhiza length was 3,06±0,08 cm in *Ae. tauschii*, 2,02±0,1 cm in *Ae.crassa*, 2,6 ±0,1 cm in *Ae. Cylindrica*, 2,4 ±0,01 cm in *Ae. triuncialis*.

In this stage, the coleoptile and coleorhiza were visible. In the studied genus coleoptile grew and developed into photosynthetic plant.

As soon as the coleorhiza developed, the coleoptile also rised to the surface of the ground with its sharp tips. The lower part of the coleoptile was colorless, and the upper part was reddish. The length of the coleoptile was 2,38±0,01 cm in *Ae. tauschii*, 2,0±0,0 cm in *Ae. crassa*, 2,63±0,01 cm in *Ae. cylindrica*, 2,8 ±0,1 cm in *Ae. triuncialis*.

Shortly after coleoptile grew, in 6-8 days (13.11.2020) the first true leaves started to grow. Among the studied species this stage occurred nearly at the same time.

Ae. tauschii

Ae. cylindrica

Ae. crassa

Ae.triunsialis

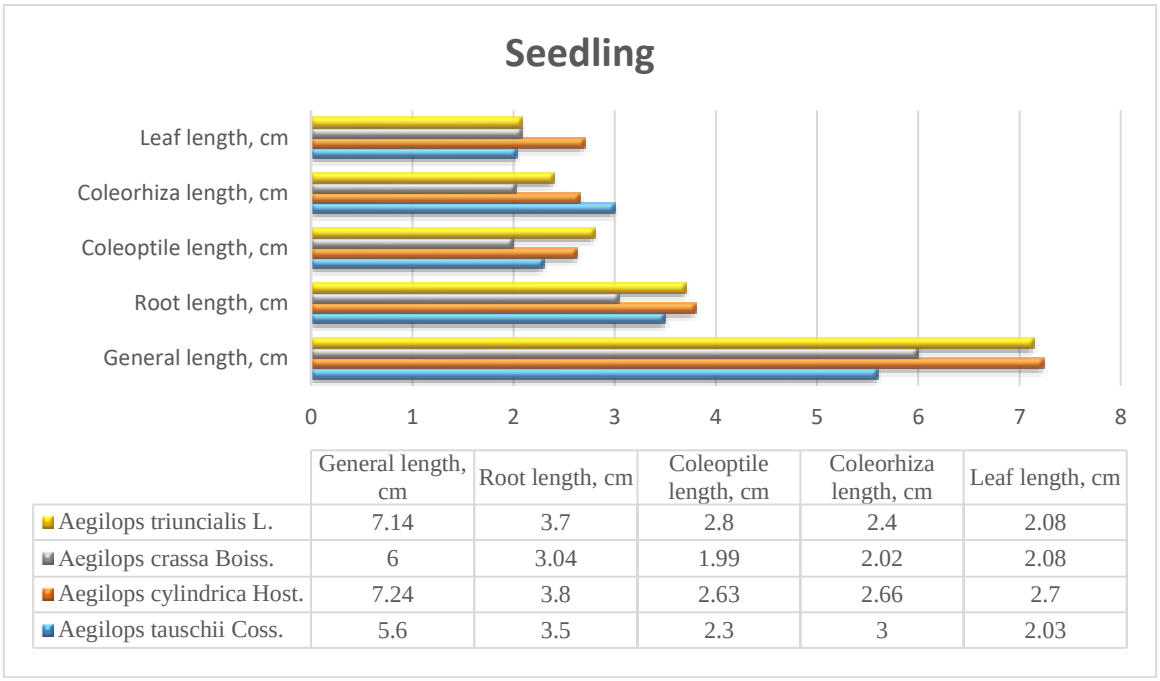
1- picture. Seedling (p) state of the species

The length of seedlings reached to 5,6±0,05cm in *Ae. tauschii*, 7,5±0,2 cm in *Ae. crassa*, 7,2±0,2 cm in *Ae. Cylindrica* and 7,1±0,2cm in *Ae. triuncialis*.

The length of the cotyledons was 2±0,04cm in *Ae. tauschii*, 2,08±0,06cm in *Ae. crassa*, 2,7±0,04cm in *Ae. cylindrica*, 2,08±0,04 cm in *Ae. triuncialis*. The width was 1,55±0,03 mm in *Ae.s tauschii*, 1,71±0,03 mm in *Ae. crassa*, 1,9±0,02mm in *Ae. cylindrica*, 1,35±0,03 mm in *Ae. triuncialis*

The root system developed as well and reached 3,5±0,03 cm in *Ae. tauschii*, 3,4±0,03cm in *Ae. crassa,* 3,8±0,03cm in *Ae. cylindrica,* 3,7±0,05cm in *Ae. triuncialis*.

At the end of this stage as I.V.Borisova and K.P.Papov (1976) [8] stated as the assimilation leaves appeared in our objects the endosperm of seeds were spent for the growth of the species and the seedlings started to lose contact with the seeds.



	General length, cm	Root length, cm	Coleoptile length, cm	Coleorhiza length, cm	Leaf length, cm
Aegilops triuncialis L.	7.14	3.7	2.8	2.4	2.08
Aegilops crassa Boiss.	6	3.04	1.99	2.02	2.08
Aegilops cylindrica Host.	7.24	3.8	2.63	2.66	2.7
Aegilops tauschii Coss.	5.6	3.5	2.3	3	2.03

Juvenile (j) – a period of time when plants are not capable of flowering. This state of age differs from other stages with development of leaves and secondary roots in the root system. Species switch to the complete autotrophic nutrition. In the species of the genus the true leaves started to grow in the second decade of November (20.11.2020). Species went through winter hibernation during this stage of development. Third set of leaves grew in the first decade of February(3.02.2021). Moreover, at this age coleoptile wilting was observed. This is the total length of the species at the end of the juvenile state.Also, in the studied species at this age, caleoptile wilting was observed. This is the total length of the species at the end of the juvenile state:

Aegilops tauschii's general length was 16,53±0,1 cm, the number of leaves between 3-4. Average length of the leaves was 7,21±0,1 cm, width was 3,2±0,06 cm. The general length of the root system reached 5,76±0,06 cm.

In *Ae. cylindrica* general length was 16,58±0,1 cm, the number of leaves at this age state was 4-5. The leaf length was 8,19±0,07 cm, its width was 3±0,06 mm. Average length of the roots was 7,6±0,1 cm.

Ae. tauschii

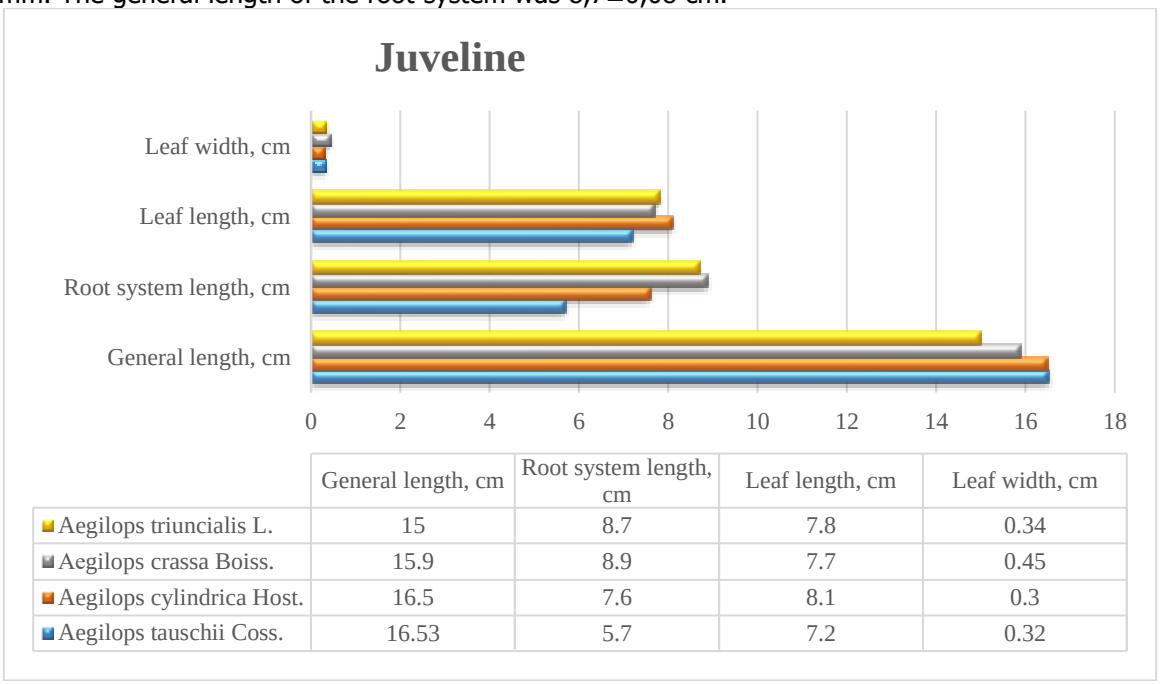
Ae. cylindrica

Ae. crassa *Ae.triunsialis*

2- picture. Juvenile (j) state of the species

Ae. Crassa was 15,92±0,1cm, with 3-4-5 leaves, 7,7±0,06 cm long, with the width 4,0±0,06 mm. The root system penetrated into the soil layers with its 8,95±0,1cm long roots.

Ae. Triuncialis was 15±0,2cm long, the number of leaves 4±0,08, its length was 7,8±0,07cm, its width reached 3,4±0,04 mm. The general length of the root system was 8,7±0,08 cm.

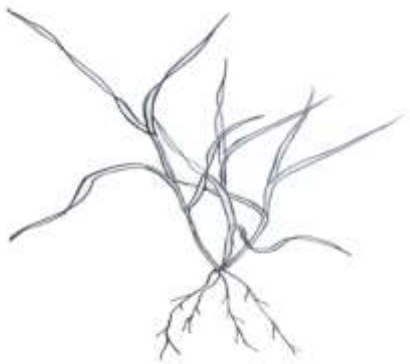


	General length, cm	Root system length, cm	Leaf length, cm	Leaf width, cm
Aegilops triuncialis L.	15	8.7	7.8	0.34
Aegilops crassa Boiss.	15.9	8.9	7.7	0.45
Aegilops cylindrica Host.	16.5	7.6	8.1	0.3
Aegilops tauschii Coss.	16.53	5.7	7.2	0.32

Virginile (v) – this state of age more extensive axillary branching is present. This stage was observed in the second decade of March (13-20.03.2020). The root system developed and young racemes started to develop in new shoots.

In *Ae. tauschii* the number of bushes was 16,9±0,3, in *Ae. cylindrica* 13,5±0,1, in *Ae. crassa* 12,9±0,2, in *Ae. triuncialis* 14,2±0,1.

Ae. tauschii



Ae. cylindrical

Ae. crassa

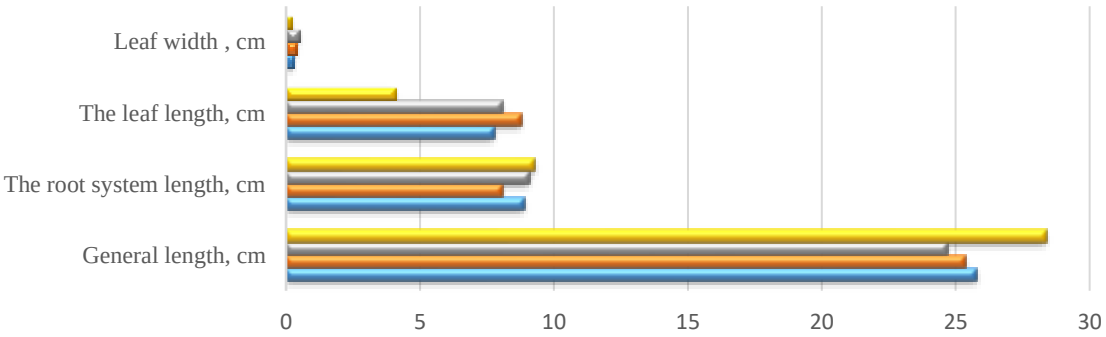
Ae.triunsialis

3- picture. Virginile (v) state of species

The general length of the species of the genus at this state was longer than it was in their juvenile state. *Ae. Tauschii* was 25,8±0,4 cm, *Ae. cylindrica* was 25,4±0,4 cm, *Ae. crassa* was 24,7±0,4 cm, *Ae. triuncialis* was 28,4±0,2 cm.

The root system developed and the third set of roots started to grow. The root length was 8,9±0,1 cm in *Ae. tauschii*, 7,7±0,1cm in *Ae. cylindrica*, 9,1±0,1cm in *Ae. crassa*, 9,3±0,07 in *Ae. triuncialis*.

At this state the morpgological indicators of the species increased. The leaf length was the following: *Ae. tauschii* - 7,8±0,1 cm*, Ae. cylindrica* - 8,8±0,1 cm, *Ae. Crassa* - 8,1±0,03 cm, *Ae. Triuncialis* - 4,1±0,05 cm, its width: *Ae. Tauschii* - 3±0,07 mm, *Ae.cylindrica* - 3,9±0,1 mm, *Ae.crassa* - 5,2±0,1 mm*, Ae. triuncialis* - 2,1±0,03 mm. The number of leaves in the main stem was the following: *Ae. Tauschii* - 5±0,1*, Ae. cylindrica* - 4,4±0,06, *Ae.crassa* - 5±0,04, *Ae. Triuncialis* - 4,5±0,1.



	General length, cm	The root system length, cm	The leaf length, cm	Leaf width , cm
Aegilops triuncialis L.	28.4	9.3	4.1	0.2
Aegilops crassa Boiss.	24.7	9.1	8.1	0.5
Aegilops cylindrica Host.	25.4	8.1	8.8	0.4
Aegilops tauschii Coss.	25.8	8.9	7.8	0.3

REPRODUCTIVE PERIOD OF THE SPECIES OF *AEGILOPS* L. GENUS.

The beginning of the tuber phase in cereals means that these species have entered the reproductive period. The initial stem grows and forms a spike [9].

The reproductive period of ontogenesis of annual monocarpic plants is present only at one age state. The reproductive period is divided into generative (g) and latent generative (g_0) states. (Программа и методика..., 1986; Онтогенетический атлас..., 1997) [10,11].

All the species of *Aegilops* L. genus are annual monocarpic plants. As the stems grow, segments are formed. The species we studied formed 3-4 segments. The spines of each species developed inside a leaf sheath located in the uppermost formed segment. With the formation of a second-order segment, spikes also began to appear on the stem. This period began to be realized in the first decade of April (1.04.2021) under the conditions of the "Botanical Garden" of the Andijan region. This age period *Ae. triuncialis's* growth and development occurred earlier than in other species.

Ae. tauschii

Ae. cylindrica

Ae. crassa *Ae.triunsialis*

4- picture. Reproductive (g) state of the species

In the species we studied the growth process, as Yakubzhonov (2009) noted, stopped at the end of the flowering period, when grain formation began [9].

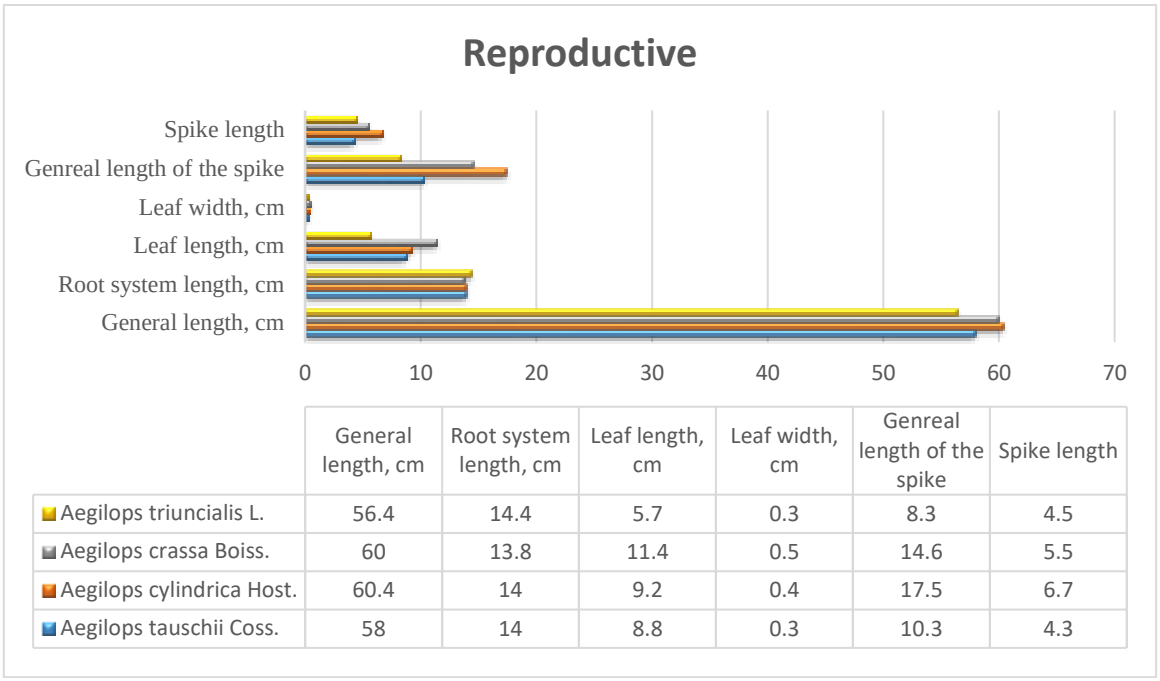
At this stage of development the general length of the species reached the following numbers: *Ae. tauschii* - 58,01±0,4 cm, *Ae.cylindrica* - 60,4±0,3 cm, *Ae. crassa* - 60±0,3 cm, *Ae.triuncialis* - 56,4±0,2 cm.

The root system developed as well and its length was the following: *Ae.tauschii* - 14±0,1 cm*, Ae. Cylindrica* - 14±0,1 cm*, Ae. crassa* - 13,8±0,1 cm*, Ae. triuncialis* - 14,4±0,1 cm.

At this age state the length of the species' leaves was the following: *Ae. tauschii* -8,8±0,1 cm, *Ae. cylindrica* - 9,2±0,07 cm, *Ae. crassa* -11,4±0,06 cm, *Ae. triuncialis* - 5,7±0,02 cm, its width was: *Ae. tauschii* - 3,8±0,04 mm, *Ae.cylindrica* - 4,4±0,02 mm, *Ae.crassa* - 4,9±0,01 mm, *Ae. triuncialis* - 3±0,01 mm. The number of flowers in the species studied was: *Ae. tauschii* - 29,8±0,2, *Ae. cylindrica* - 23,4±0,3, *Ae. crassa* - 25±0,3, *Ae. triuncialis* - 14,7±0,2.

M.A. Pavlova (2012) stated in her works that the duration of flowering in plant species depends on the number of its lateral reproductive shoots, and they, in turn, are determined by the density of plant placement [12]. The flowering process in the studied species ended on the following dates: *Ae. tauschii* - 10.05.2021, *Ae. cylindrica* - 16.05.2021, *Ae. crassa* - 17.05.2021 , *Ac. triuncialis* - 14.05.2021.

The life span of plant flowers varies from tens of minutes to several weeks [13]. In the species studied, the flowering process lasted from 3-5 (*Ae. triuncialis*) to 5-8 (*Ae. cylindrica, Ae. tauschii, Ae. crassa*) days. The main blooming time of flowers during the day corresponded to 6^{30}-9^{00}. The process of plant flowering is closely related to many environmental factors: temperature, light regime, mineral nutrition processes [14]. During the flowering period, the average air temperature was 230C, the maximum 360C, the average humidity was 6.9%, the maximum wind speed was at 13 points.



	General length, cm	Root system length, cm	Leaf length, cm	Leaf width, cm	Genreal length of the spike	Spike length
Aegilops triuncialis L.	56.4	14.4	5.7	0.3	8.3	4.5
Aegilops crassa Boiss.	60	13.8	11.4	0.5	14.6	5.5
Aegilops cylindrica Host.	60.4	14	9.2	0.4	17.5	6.7
Aegilops tauschii Coss.	58	14	8.8	0.3	10.3	4.3

The indicators of the number of shoots in the species of *Aegilops* L. genus (n =10)

Name of the species	**Number**		
	spikes	flowers	grain
Aegilops tauschii	8,1±0,1	48,5±0,7	14±0,6
Aegilops cylindrica	8,7±0,03	42,3±0,3	14±0,2
Aegilops crassa	7,3±0,03	50,1 ±0,5	14,2±0,07
Aegilops triuncialis	4,7±0,01	30,3 ±0,4	8,6±0,02

In monocarpic species ontogenesis ends when the seeds appear but in the polycarpic species this process speeds up the senile period [15].

The development process of the studied species came to its end with the reproductive period. We can state that this corresponds with the information given in the studied literature (Онтогенетический атлас, 1997; P.M Григорьевич, 2000).[11,16] During the experiment the reproductive period of the species of genus lasted from 77 to 105 days.

COCLUSION

In conclusion, we can say that the duration of the phases of development and the processes of ontogenesis of the studied species depends on the species' biological characteristics, diversity and climatic conditions. Under favorable environmental conditions (23 ±10°C) seed germination was higher than in natural conditions. The process of ontogenesis has not been completed, the post-reproductive period was not observed in them. Also, the state of immature age did not significantly differ in the studied species.

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