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Diversity of the *Triticeae* genetic resources in the Karabakh region of Azerbaijan

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This paper gives an overview of the collection history for the species from the *Triticeae* Dum. tribe in the Karabakh region of Azerbaijan up to date of its occupation. By covering most of the Lesser Caucasus with the semi-desert and dry steppe climate, the Karabakh region of Azerbaijan has favorable conditions for grass diversity. There are 14 genera from the tribe *Triticeae* in Azerbaijan, of which historically the 10 genera also were found in the Karabakh region. The data in this article have been presented as a summary of information recorded in different literature sources, that would be useful for the planned monitoring of status, distribution, and preserving issues for the *Triticeae* species in the liberated areas.

Keywords: *Karabakh region of Azerbaijan, Triticeae tribe, Aegilops* L., *Triticum* L., *Hordeum* L., *Secale* L., *Agropyron* L., *wild cereals*

Epigraph: ***"****A peculiar species and varietal composition of plants, including a number of endemic forms, makes the Karabakh an area for further, more detailed study.***"**

Vavilov N.I., 1957

The Karabakh region of Azerbaijan. The Karabakh region (the name is originated from the connection of two Azerbaijani or Turkish words "Qara" – black, large, leader, dark, dense, impenetrable, picturesque, etc. and "Bağ"- garden) is located in the southwestern part of Azerbaijan extending from the highlands of the Lesser Caucasus down to the lowlands between the rivers Kur and Araz. This area of Azerbaijan was always represented by high biodiversity and geodiversity, as well as by agronomical and historical conditions (Əsgərov, 2021; Əsgərov və b., 2021; Hüseynova, 2021; Qurbanov, 2021; Mehdiyeva, 2021; Məsiyeva, 2021). Initial assessments of liberated territories of Karabakh region, after the Azerbaijan Patriotic War (27.09.2020 – 10.11.2020), showed that 30 years of Armenian occupation, the military operations initiated by occupants, the prohibited weapons used by them, and barbaric usage of natural resources resulted in extensive suffering of all the above-mentioned conditions of the region. The Azerbaijani authorities planned to allocate 2.2 billion manats (1.3 billion dollars) for the reconstruction of the territories of Karabakh, which returned under their control. To facilitate the restoration of the returned territories, the area was divided by government officials into two regional economic zones with its inclusive districts starting from the 7th July 2021: Karabakh region with an area of 7330 km^2 (Khankendi, Aghjabadi, Aghdam, Barda, Fuzuli, Khojalı, Khojavend, Shusha, Tartar) and the Eastern Zangazur region with an area of 7448 km^2 (Jabrayil, Kalbejar, Qubadli, Lachin and Zangilan). Western Zangazur (Gafan, Ghorus, Garakilse, Mehri) was torn from Azerbaijan and handed over to Armenia by the Soviet government in 1920 as a result of historically recurring periodic

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territorial claims of the aforementioned second country.

Climate of the Karabakh region. Karabakh region belongs to a semi-desert and dry steppe climate with low humidity, warm winters, dry and hot summers. According to the temperature regime, it belongs to the subtropical (average annual temperature is 13-14.5ºC), but according to the conditions of moisture in most of it - to the semi-desert, and in the foothill zone - to the dry-steppe (Мирзазаде, 2021). In places located above 2000-2300 meters, there are alpine and subalpine meadows. The average annual precipitation is about 400 mm, in high mountains, it is more than 800-900 mm. The duration of sunshine is 2000-2400 hours per year. The average temperature of the coldest months (January, February) does not exceed 2.5–0ºC or 0-5ºC. The average temperatures of the hottest months July and August are 25.50ºC and 25.20ºC, subsequently. In warm seasons (April-October), the possible evaporation is in the range of 400-800 mm. In June-September, the number of dry days ranges from 5 to 25 or less. The average annual wind speed is 2-3 m / second or less. The continentality of the climate fluctuates within the following limits: weak (less than 130), moderate (up to 165), and medium (up to 205). The duration of frost-free temperatures is 150-225 days a year, the air temperature below 0ºC throughout the territory lasts in the range of 10-100 days and is 10-50 days - in Jabrayil, Fuzuli, Khojavend, Aghdam, and Tartar, 20-50 days - in Khojaly and Khankendi, 50-100 days - in Shusha. In most areas, the snow cover does not melt for 10-120 days.

Soil types of Karabakh region. Karabakh covers most of the Lesser Caucasus (81.5%). The results of large-scale soil studies show that in the mountainous areas of the Karabakh region they are presented by primitive mountain - meadow, soddy mountain meadow, forest mountain meadow, dark mountain meadow, chernozem like mountain meadow, typical forest mountain brown, forest carbonate mountain brown, mountain forest brown typical, mountain meadow steppe, mountain forest brown cultivated, gray-brown mountain dark, mountain forest brown leached, mountain forest brown steppe, mountain chestnut dark soils, and in the plains the following types and subtypes were found: chestnut ordinary, chestnut long irrigated, meadow chestnut, gray, dark gray, gray typical, gray irrigated, gray meadow-meadow, floodplain meadow (alluvial meadow), chestnut dark soils. Distribution of areas by soil categories (according to data of 1992) (Ахадов, 2021):

1. Agricultural soils - 336742 ha;
2. The lands of settlements are only 5592 ha;
3. Lands of industry, transport, communications, defense, and other categories;
4. Lands of specially protected areas are 43947 ha;
5. Forest fund - 246187 ha;
6. The total land area of the water fund was 19,800 ha.

Vegetation cover of the Karabakh region. The vegetation of the Karabakh region (including the Karabakh steppe) is very diverse in composition, which reflects both the difference in ecological conditions and evolutionary changes. The main type of vegetation is the semidesert wormwood. Large areas are occupied by solonchak groupings, as well as meadow ones. Locally, forest vegetation is also represented in the form of tugai and lower forests, in places, shrubs, and there is also marsh vegetation. More than 2000 plant species are found in the area of vegetation. On the plains, a huge place is occupied by thickets of wormwood and other semi-desert plant species, on the soles of the mountains, steppe and steppe plant species prevail, on the slopes of the mountains there are shrubs and deciduous forests (pistachio, oak, etc.). Before Armenian occupation this region had 2 nature reserves - Basitchay Government Reserve, founded in 1974 with area equal to 107 ha in Zangilan district and Garagol Government Reserve founded in 1987 with area equal to 240 ha in Lachin district, and 4 wildlife sanctuaries (Lachin Government Sanctuary (founded in 1961 with area equal to 21.4 ha), Gubadli Government Sanctuary (founded in 1964 with an area equal to 20 000 ha), Dashalti Government Sanctuary (founded in 1988 with area equal to 450 ha) and Arazboyu Government Sanctuary (founded in 1993 with an area equal to 450 ha). All of these mentioned reserves and sanctuaries were founded by the decision of the government of Azerbaijan USSR.

Collection of cereals from the *Triticeae* tribe in the Karabakh region. The *Triticeae* tribe is the taxon within the subfamily *Pooideae* of grasses with the most economically important cereals (wheat, barley, rye, etc.), including 27 genera

and 501 species (Soreng et al., 2015), many of which have been domesticated, used in human consumption, animal feed or rangeland protection. Here, we presented the data about the distribution of species from the *Triticeae* tribe in the Karabakh going back to more than 30 years ago, as the collapse of the USSR and following the subsequent territorial claims of Armenia slowed down and nullified research works in these territories long before of their occupation. While presenting the data about cereal plants of the Karabakh, in order to avoid confusion related to their classification, we followed here taxonomic names and divisions accepted by the source literature, as well as the recent work of Asgerov (2016) about the land plants of Azerbaijan, where the *Triticeae* Dum. tribe indicated as having a total of 20 genera. Should be noted, that we did not present here the plant species distributed in the small part of the Karabakh, which covers the Kur-Araz Lowland as the information about cereals from this area was not engaged to the certain places in the appropriate literature.

***Triticum* L.** Cultivated wheat and its close wild relatives belong to the genus *Triticum* L. There is a mention in the literature about turgidum wheat collections in the territory of Azerbaijan going back to 1844 and related with the name of Czech-German botanist and zoologist – F.A.Kolenati (Dorofeev, 1972). But the more extensive studies of this genus in Azerbaijan are related with the names of such scientists as L.L.Dekaprelevich (1924), N.N.Kuleshov (1927), K.A.Flyaksberger (1935), M.M.Jakubciner (1932, 1933б), I.D.Mustafayev (1959, 1961, 1964, 1967, 1969, 1970, 1973, 1980), V.F.Dorofeev (1972) etc.

Wild taxa of the genus *Triticum* L. (*T. urartu* Thum. ex Gandil. and *T. boeoticum* Boiss.) are occurring in the Middle East and South Caucasus (Transcaucasus) region, including Azerbaijan. For the Azerbaijan territory, the wheat species *T. boeoticum* was recorded for the first time by Jakubciner M.M. in 1932 from the Nakhichevan region. For the Karabakh region of Azerbaycan, for the first time, it was reported by Mustafayev I.D. (1957-1963) from Zangilan and Jabrayil districts. According to him, the polymorphism of this species in Karabakh was presented by 11 botanical varieties from a total of 22 occurred in Azerbaijan (Table 1), of which 4 (var. *pseudoalbum*, var. *reuteri*, var. *balansae*, var. *fuscum*) were common also for the Nakhichevan region and 1(var. *reuteri*) also for Shamakhi (Mustafayev, 1973). The remaining 10 botanical varieties that were uncommon for the Karabakh occurred only in the Nakhichevan region and 1 in the Shamakhi district of Azerbaijan. V.F.Dorofeev in his work presented the image of *T. boeoticum* thickets from the Aghoglan district (Banazar villiage) of Karabakh (Figure 1) without indicating its botanical data. If *T. boeoticum* was found at the 3 locations in Karabakh, the other wild wheat *T. urartu* was found also by Mustafayev only in one location – Zangelan district. He included these accessions into 2 botanical varieties: var. *spontanobrum* and var. *spontaneonigrum*. The second location for this species in the Azerbaijan territory is the Nakhichevan region (Əsgərov, 2016). *T. boeoticum* and *T. urartu* are considered as the donor of the A subgenome of modern wheat, harnessing broad genetic diversity for a number of traits including disease resistance, phenology, and morphology traits (Taheri et al., 2018; Talini et al., 2020). Therefore, its populations from indicated districts of Karabakh, as very valuable genetic sources, should be re-monitored and preserved.

The ancestral wheat *T. monococcum* L., diploid wheat whose A^mA^m genome is closely related to the A^u genome of *T. urartu* and the polyploid wheat, was domesticated from its wild form (*T. monococcum* ssp. *boeoticum*) about 12,000 years ago in the Karacadagh mountains (Marino et al., 2018). The first report about this species from the territory of Azerbaijan was made by N.N.Kuleshov in 1926. This species was cultivated widely in Shusha, Khankendi, Lachin, and several other mountains districts of Garabgh before 1930, but later started to be replaced by other naked wheat that considered to be more productive (Мустафаев, 1973). V.N.Vavilov (1964) defined 2 ecogeographical groups for the cultivated einkorns of Transcaucasia: proles *armeno-anatolicum* Vav. (small-sized spikes and leaves, thin stems) and proles *carabachicum* Vav. (large-sized spikes (8-9 cm) with the spikelets not infrequently having the two grains, wide leaves, long, strong and erect stems, which is hollow under the ear), but later L.L.Dekaprelevich added another 2 morpho-ecological types: *occidentale-georgicum* Dek. (close to the proles *carabachicum*) and *orientale-georgicum* Dek., which differentiates from the first type also by its weak growth, small spikes, and a short vegetation period (Dorofeev, 1972). Differing from the proles *armeno-*

anatolicum Vav., the plants from the proles *carabachicum* reminded Spanish samples by their habitus, presented only by the spring types with the mid-ripening date, and in harsh contrast with the aforementioned first proles, being very resistant to many diseases, they were comparatively susceptible to the hard smut (Vavilov, 1964). It was noted about the high agricultural culture in the Karabakh region. The local population regularly and annually selected the most productive spikes for sowing. Vavilov suggested, that the south part of the Karabakh region generated the most diversity of cultivated einkorn wheat, which were observed in the mixed communities with the emmer wheat (Vavilov, 1962). All forms of cultivated einkorn wheat *T. monococcum* in the territory of Azerbaijan belongs to the one ecogeographical group – proles *carabachicum* Vav. According to morphological polymorphism, Mustafayev defined 9 botanical varieties and 1 form for Azerbaijani populations of this species, of which 8 were described for the accessions from the Karabakh region (Мустафаев, 1973) (see Table 1).

The hulled wheat species *T. dicoccum* (Schrank) Schuebl. (=*T.turgidum* ssp. *dicoccon* (Schrank) Thell.) was cultivated in many regions of Azerbaijan, including Karabakh, starting from ancient times, information about its winter and spring farming fields in Khankendi, Shusha, and Lachin districts was traced in literature by Mustafayev until 1973. According to Vavilov (1964), this hulled wheat from Karabakh belongs to the eco-geographical group – proles *carabachicum* of subsp. *asiaticum* Stoletova (Asian subspecies). They differ from plants of proles *armeno-anatolicum* by late- ripening, large-sized spikes, and grains, large-sized spikelets, as well as the more strong stem and by resistance to the stripe and yellow rust (Vavilov, 1964). Mustafayev indicated the distribution of 4 subspecies and 24 botanical varieties for the territory of Azerbaijan, of which 21 from all mentioned 4 subspecies were described for Karabakh (Мустафаев, 1973) (see Table 1). It should be noted that subspecies *turgidoides* with its 10 botanical varieties registered by Mustafayev for the first time based on the accessions collected from districts of Karabakh. This species was widely used in interspecific and intergeneric hybridization works carried by him.

Durum wheat *T.durum* Desf. (syn. *T. turgidum var. durum* Desf.) and turgidum wheat *T. turgidum* L. also has a long history of cultivation in Azerbaijan, but mainly as a winter type. Most forms of durum and turgidum wheat in Transcaucasia were recorded for Azerbaijan, where they were characterized by wide morphological polymorphism because of their distribution in the wide range of altitude, for durum wheat between -16 to 1870 m above sea level. Classification of durum wheat in Azerbaijan was carried by P.E.Grebennikov (1948) and I.D.Mustafayev (1970). According to I.D.Mustafayev and L.V.Kadisheva (1970), all durum wheat species of Azerbaijan should be divided into 3 ecomorphological groups (*proles*) with their own subgroups (*subproles*) and forms: *azerbajdzhanicum* I.Must. et L.Kovd., *durocompactum - stepposum* I.Must. et L.Kovd. and *durooblongatum - silvaticum* I.Must. et L.Kovd. Taxonomically, all forms of durum wheat of Azerbaijan were included in 3 subspecies: *expansum* Vav., *horanicum* Vav. and *falcatum* Jakubz. and 33 botanical varieties, of which 20 were distributed in Karabakh. Among the regions of Azerbaijan, the richest one for the durum wheat botanical diversity is considered to be the Shirvan region. Turgidum wheat of Azerbaijan was included in subspecies *mediterraneum* Vav. and 2 ecomorphological groups: *proles capsicum* Vav. (mainly winter types and most distributed) and *proles orientale* Flaksb. (mainly spring type and less distributed). From a total of 40 botanical varieties of this species found in Azerbaijan, only 5 was recorded for the Karabakh region (Мустафаев, 1973) (Table 1).

Ancient wheat species *Triticum persicum* Vav. (=*T. carthlicum* Nevski) accessions collected from Azerbaijan were included in 6 botanical varieties, from Georgia – into 5, from Armenia – into 2. Total botanical varieties for the South Caucasia (Transcaucasia) is 11with the most distributed 3: *atramineum*, *rubiginosum*, and *fulliginosum*. In Karabakh occurred only 3 from 6 distributed in Azerbaijan (Мустафаев, 1973) (see Table 1).

Polish wheat *T. polonicum* L. (=*T. turgidum* ssp. *polonicum* L. (MacKey)) found in Azerbaijan were included in subsp. *mediterraneum* with 5 botanical varieties, of which 2 occurred in Karabakh (Мустафаев, 1973) (see Table 1). This species was suggested to have more desirable sensory properties than the products made with the flour of common wheat and durum wheat (Suchowilska et al., 2019).

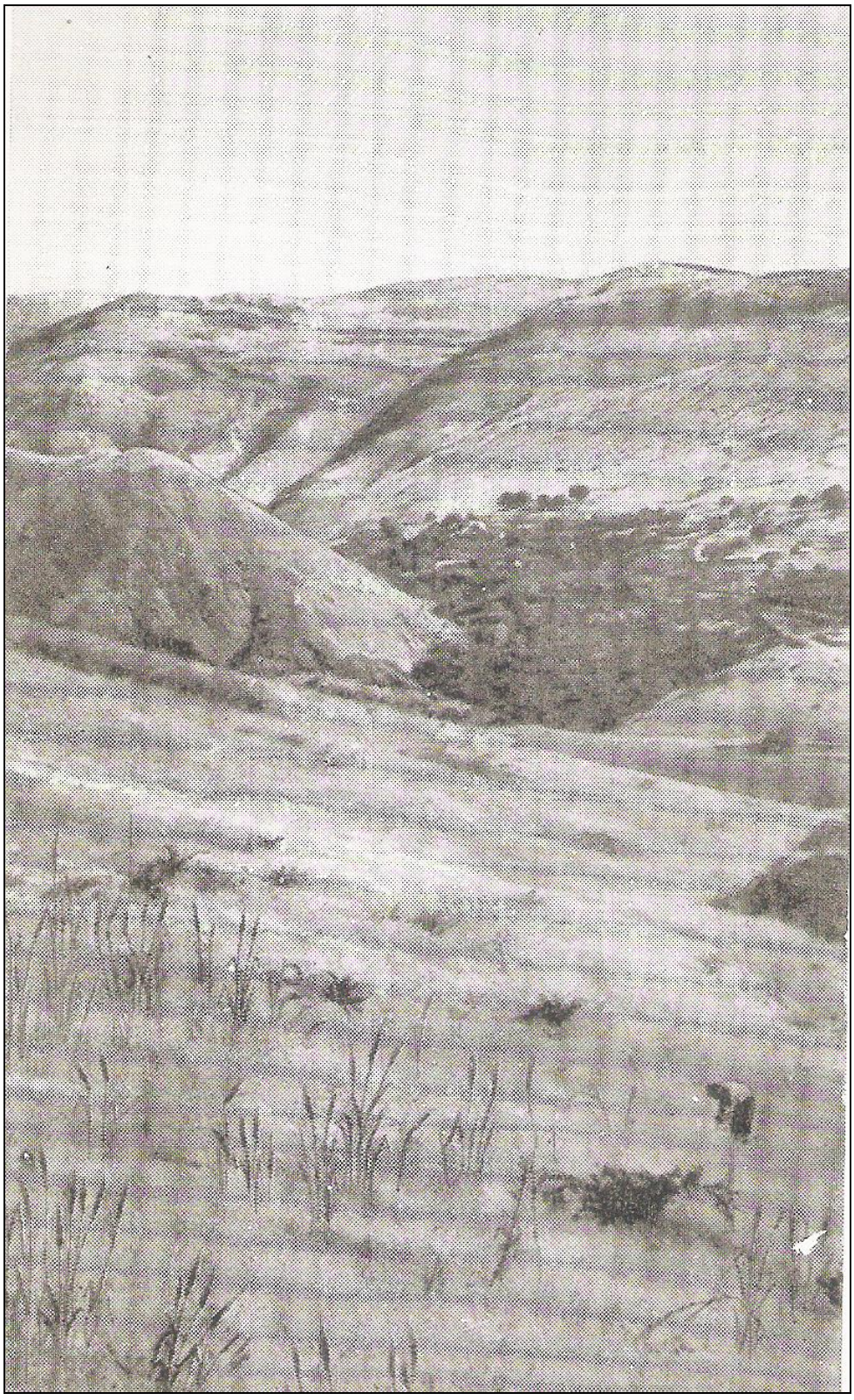


Fig. 1. Thickets of wild wheat *T. boeoticum* Boiss. in Aghoglan district of the Karabakh region, Azerbaijan (Dorofeev, 1972)

Table 1. Accessions collected during different expeditions conducted in the Karabakh region of Azerbaijan

Species	Location
***Triticum* L.**	
T. boeoticum Boiss.	
(*T. boeoticum* Boiss. ssp. *aegilopoides* Bayle. var. *pseudoalbum*)	
var. *pseudoalbum*Thum.	Zangilan, Jabrayil
var. *pseudozuccarinii* Kovarsk.	Zangilan
var. *mayssuriani* Zhuk.	Zangilan
var. *pubescentinigrum* Flaksb.	Zangilan
?	Aghoglan (Banazar viliage)
***(T. boeoticum* Boiss. ssp. *thaoudar* (Reut) Flaksb.)**	
var. *reuteri* Flaksb.	foothills of Jabrayil
var. *balansae* Flaksb.	Zangilan, Jabrayil
var. *balaclavicum* Kovarsk.	Zangilan
var. *fuscum* Zhuk.	Zangilan, Jabrayil
var. *mazettii* Flaksb.	Zangilan
var. *zangilanicum* Must.	Zangilan
var. *luteinigrum* Kovarsk.	Zangilan
***T.urartu* Thum.exGandilyan**	Zangilan
***(=T. boeoticum*Boiss. ssp. *urartu*Thum.)**	
var. *spontanobrum* Thum.	Zangilan
var. *spontaneonigrum* Thum.	Zangilan
●***T. monococcum* L. (proles *carabachicum* Vav.)**	
var. *laetissimum* Körn.	farming fields of mountains districts
var. *macedonicum* Papag.	Shushakend, Lachin, Khankendi
f. *eredvianum* Zhuk.	Khankendi (Garov viliage)
var. *pseudoflavescens* Flaksb.	Lachin and other farming fields of mountains districts
var. *vulgare* Körn.	Khankendi (Shushakend viliage)
var. *atriaristatum* Flaksb.	Lachin
var. *albohornemanii* Flaksb.	Lachin, Khankendi
var. *hornemanii* Clen.	Khankendi (Garov viliage)
var. *pseudohornemanii* Dek. et. Men.	Khankendi (Garov viliage)
● ***T.dicoccum* (Schrank) Schuebl.**	
ssp. *europaeum* (Perc.) Vav. proles *tardoeuropaeum* Flaksb.	Lachin, Khankendi, Shusha, Aghdara
var. *hybridum* Körn.	Lachin
var. *farrum* Bayle.	Khankendi, Shusha
var. *rufum* Schubl.	Lachin
var. *pseudorufum* Flaksb.	Lachin
var. *semicanum* Körn.	Lachin, Khankendi
var. *pseudoerythrurum* Must.	Aghdara
var. *macratherum* Körn.	Lachin, Khankendi
var. *atratum* Körn.	Lachin, Khankendi, Aghdara
ssp. *euroum* Flaksb. proles *transcaucasicum* Flaksb.	Khankendi
var. *luteotinctum* Flaksb.	Khankendi
var. *aeruginosum* Flaksb.	Khankendi
ssp. *asiaticum* Stol. proles *carabachicum* Vav.	Khankendi
var. *uniaeruginosum* Dorof.	Khankendi
ssp. *turgidoides* Must.	Khankendi, Shusha
var. *rubromuticum* Must.	Khankendi
var. *nigroalbomuticum* Must.	Khankendi
var. *nigrorubromuticum* Must.	Khankendi
var. *albospicatum* Must.	Shusha
var. *pseudoalbospicatum* Must.	Shusha
var. *rubrospicatum* Must.	Shusha
var. *pseudorubrospicatum* Must.	Shusha
var. *pseudonigroalbum* Must.	Lachin
var. *pseudonigrorubrum* Must.	Lachin
var. *nigrum* Must.	Aghdara

Continued table 1

Species	Location
●***T.durum* Desf.**	
gr. *leucurum* Al.	Aghdam, Jabrail, Fuzuli, Zangilan, Aghoglan, Khojavend, Khankendi
gr. *leucomelan* Al.	Aghdam, Fuzuli
f. *scabriaristatum* Must.	Aghdam
f. *transcaucasicum* Men.	Khankendi
var. *libicum* Körn.	Khojavend
var. *provinciale* Al.	Khojavend
var. *erythromelan* Körn.	Khojavend
var. *affine* Körn.	Aghdam
var. *horanoaffine* Jakubz.	Aghdam
var. *plinium* Körn.	Khojavend
var. *alexandrinum* Körn.	Khojavend
var. *murciense* Körn.	Khojavend
var. *reichenbachii* Körn.	Aghdam
gr. *hordeiforme* (Host.) Körn.	Aghdam, Jabrail, Zangilan, Fuzuli, Aghoglan, Khojavend, Aghdara, Khankendi, Shusha
f . *elongatum* Men.	Aghdam
f. *breviacutidentatum* Must.	Khojavend, Aghdara
f. *ekaterinovskense* Greb.	Aghoglan, Fuzuli
f. *rubellum* Must.	Aghdam
f. *oblongum* Must.	Aghdam
f. *brevidentatum* Men.	Fuzuli
var. *rubrospicatum* Stol.	Shusha
gr. *alboprovinciale* Flaksb.	Aghdam
f. *plenoalboprovinciale* Must.	Aghdam
var. *alboobscurum* Flaksb.	Aghdam
var. *valenciae* Körn.	Aghdam
gr. *melanopus* Al.	
var. *melanopus* Al.	Khojavend
f. *brevidentatum* Men.	Jabrayil
f. *elongatum* Men.	Aghdara, Shusha
f. *tristum* Must.	Aghdam
var. *apulicum* Körn.	Aghdam
gr. *niloticum* Körn.	
var. *niloticum* Körn.	Khojavend
f. *elongatum* Men.	Aghdam
var. *capitatoniloticum* Flaksb.	Aghoglan
gr. *coerulescens* Bayle.	Aghdam, Khojavend
f. *oblongum* Men.	Shusha
f. *elongatum* Men.	Aghdara
f. *cuspidentatum* Men.	Aghdam
var. *africanum* Körn.	Aghdam
var. *ramosoreichenbachii* Aliz.	Aghdara
var. *ramosoprovinciale* Aliz.	Aghdara
var. *ramosolencurum* (Gandil.) Aliz.	Aghdara
●***T.turgidum* L.**	
ssp. *mediterraneum* Vav.	
var. *melanatherum* Körn.	Aghdam
var. *nigrobarbatum* (Desv.) Körn.	Khankendi
var. *miscibile* Haciz.	Khankendi, Fuzuli
var. *dreischianum* Körn.	Fuzuli
var. *nachitschevanicum* Kulesch.	Aghdam
● T. persicum Vav. (*T.cartlicum* (Vav.) Nevski)	
var. *stramineum* Flaksb.	Aghdara
var. *rubiginosum* Zhuk.	Kalbajar, Lachin
var. *fuliginosum* Zhuk.	Aghdam
● *T. turanicum* Jakubz.	
var. *insigne* Perc.	Khojavend, Fuzuli

Continued table 1

Species	Location
var. *notabile* Perc.	
● ***T. polonicum* L.**	
ssp. *mediterraneum* Vav.	Khojavend, Fuzuli, Aghdam
var. *levissimum* Hall.	Fuzuli
var. *pseudolevissimum* Jakubz.	Fuzuli
●***T. spelta* L.**	
var. *pseudoalboarduin* Dorof.	Lachin
var. *flaksbergeri* Dorof.	Lachin
ssp. *vavilovi* (Jakubz.) Must	
var. *vaneum* Jakubz.	occurred in the farming fields
●***T. aestivum* L.**	
gr. *albidum* Al.	Fuzuli, Aghdam
gr. *lutescens* Al.	
f. *capitatum* Men.	Aghdam
var. *velutinum* Körn.	Aghdam, Fuzuli
var. *ramosolutescens* Must.	farming fields of mountains districts
gr. *alorubrum* Körn.	
f. *elongatum* Men.	Aghdam
var. *introitum* Vav.et Jakubz.(prol. *subrigidum* Vav.)	Fuzuli
gr. v*elutinum* (Schübl.) Körn.	Lachin, Khankendi, Aghdam, Khojavend, Aghoghlan
f. *pruinosum* Must.	Aghdara
var. *delfi* Körn.	Fuzuli
var. *pyrothrix* Al.	Aghdam, Zangilan
gr. *erythrospermum* Körn.	
f. *longidentatum* Men.	Aghdara
f. *longisculum* Must.	Aghdam
f. *glabriaristatum* Must.	Aghdara
f. *brevicrassispicatum* Must.	Fuzuli
var. *suberythrospermum* Vav.	Aghdam
gr. *nigriaristatum* Flaksb.	
f. *caduenum* Men.	Shusha
gr. *ferrugineum* Al.	
f. *tenuispicatum* Men.	Khojavend
f. *elongatum* Men.	Aghoglan
f. *oblongum* Must.	Aghdara
f. *densispicatum* Men.	Aghdam
f. *splendospicatum* Must.	Khojavend
f. *nigroferrugineum* Jakubz.	Fuzuli
f. *glaucospicatum* Must.	Jabrayil
var. *subferrugineum* Vav.	Aghdam, Fuzuli
var. *ferrugineum-compactoides* Kob.	Khojavend (Ningi viliage)
gr. *sardoum* Körn.	
f. *longidentatum* Men.	Aghdam, Aghoglan, Khankendi, Zangilan
f. *oblongum* Must.	Aghdam, Aghoglan, Khankendi, Zangilan
gr. *caesium* Al.	
f. *aristidentatum* Men.	Aghdara
f. *rigidum* Must.	Aghdara
f. *capitatum* Men.	Aghdara
var. *nigrocaesium* Dek.	Khankendi (Garov viliage)
var. *nigricans* How.	Aghdam, Zangilan
var. *bengalense* How.	Aghdam
var. *meridionale* Körn.	Zangilan
gr. *hostianum* Clem.	Fuzuli, Khankendi, Lachin
gr. *pseudehostianum* Flaksb.	Zangilan, Fuzuli
var. *pseudoturcicum* Vav.	Aghdam, Shusha, Aghdara
var. *turcicum Körn.*	Lachin
gr. *barbarosa* Al.	Aghdara, Khojavend, Aghdam, Fuzuli, Aghoglan
f. *oblongum* Must.	Aghdam
var. *kazvinicum* Vav.	Lachin

Continued table 1

Species	Location
var. *griseum* Vav.	Khankendi
var. *rubromurinum* Flaksb.	Aghdam
●***T.compactum*** **Host.**	
ssp. *armeno-turkestanicum* Vav.	
var. *echinodes* Körn.	Kalbajar
var. *erinaceum* (Dek.) Körn.	Aghdam, Fuzuli, Khojavend
Aegilops **L.**	
Ae. biuncialis Vis.	Aghdara, Aghdam, Asgeran, Khojaly, Khankendi, Aghoglan, Jabrayil, Fuzuli
Ae. triuncialis L.	Aghdara, Aghdam, Asgeran, Khojaly, Khankendi, Aghoglan, Jabrayil, Zangilan, Khojavend, Shusha, Lachin, Fuzuli
Ae. cylindrica Host.	Aghdara, Aghdam, Asgeran, Khojaly, Khankendi, Jabrayil, Zangilan, Aghoglan, Fuzuli, Lachin
Ae. umbellulata Zhuk.	Zangilan, Aghoglan, Khojavend
Ae. columnaris Zhuk.	Zangilan
Aegilops tauschii Coss. *(syn. Ae. squarossa* L.)	Aghoglan, Jabrayil, Zangilan, Khojavend, Khankendi, Shusha, Aghdam, Lachin, Fuzuli, Aghdara
Ae.comosa Sibth.	Fuzuli
Ae. neglecta Req. ex Bertol. (=*Ae. triaristata* Willd.)	Aghoglan, Zangilan, Khojavend, Shusha, Khankendi, Aghdam, Lachin, Fuzuli
Hordeum **L.**	
H. bulbosum L.	Lesser Caucasus
H. glaucum Steud.	Lesser Caucasus
H. leporinum Link.	Lesser Caucasus
H. spontaneum C.Koch	Lesser Caucasus
H.murinum L.	Aghdam
H. lagunculiforme Bacht.	Aghoglan
H. violaceum Boiss.et Huet	Lesser Caucasus
Secale **L.**	
S. caldicum Fed.	Lesser Caucasus
●*S. cereale* subsp. *segetale*	Shusha
Elytrigia **Desv.**	
E. caespitosa (C.Koch)Nevski	South and Central Lesser Caucasus
E. elongata (Host) Nevski	Lesser Caucasus
E. elongatiformis (Drob.) Nevski	Lesser Caucasus
E. intermedia (Host) Nevski	Central Lesser Caucasus
E. pulcherrima (Grossh.) Nevski	Central Lesser Caucasus
E. repens (L.)Nevski	Lesser Caucasus
E. trichofora (Link) Nevski	Lesser Caucasus
E. turcica P.E.McGuire	Lesser Caucasus
Elymus L.	
E. transhyrcanus (Nevski) Tzvel. (=*Agropyron leptourum* (Nevski) Grossh.)	Altintaxta pass of Mount Great Kirs (Lachin-Khojavend road), Mount Girkhgiz (Lachin, Kalbajar, Khojali)
E. caucasicus (C.Koch) Tzvel. (=*Agropyron caucasicum* (C.Koch) Grossh.)	Northern Lesser Caucasus
E. caninus (L.) L. (=*Agropyron caninum* (L.) Beauv.)	Lesser Caucasus
Agropyron **Gaertn.**	
A. pectinatum (Bieb.) Beauv. (=*A. cristatum* auct. Cauc.)	Lesser Caucasus
Eremopyrum **(Ledeb.) Jaub.et Spach**	
E. hirsitum (Bertol.) Nevski	Lesser Caucasus
E. orientale (L.) Jaub.et Spach	Lesser Caucasus

Continued table 1

Species	Location
***Hordelymus* (Jess.) Harz**	
H. europaeus (L.) Harz (=*Hordeum europaeum* (L.) All.)	Western Lesser Caucasus
***Taeniatherum* Nevski**	
T. crinitum (Schreb.) Nevski (=*Hordeum crinitum*) (Schreb.) Desf.)	Lesser Caucasus

● – cultivated species

Khorasan wheat *T. turanicum* Jakubz. (=*T. turgidum* ssp. *Turanicum* (Jakubz.) Mac Key) found in Azerbaijan included 11 botanical varieties, of which 2 occurred in Karabakh. The total number of botanical varieties for this species is 13 and Azerbaijan has the largest amount of botanical varieties in the South Caucasus (Mustafayev, 1973). *T. turanicum* and *T. polonicum* were characterized by the significantly highest 1000-grain weight in both rainfed and irrigated conditions, which suggests that these wheat species might have promising alleles to be transferred into durum wheat to increase grain yield (Akman H., 2021).

Spelt wheat (*T. spelta* L.) belongs to the hexaploid group of cultivated *Triticum* wheat with fragile spikes and hulled kernels. This ancient cereal was created 7,000 years ago, most likely by the spontaneous crossing of wild grass species. By the mid-twentieth century, spelt wheat had an important role in the diet of humans, afterwards, it has been gradually replaced by yielding soft wheat (*T. aestivum* L.) (Ugrenovich et al, 2018). Spelt wheat is classified into 2 subspecies: *spelta* and *kuckuckianum* Gökg. The 17 botanical varieties of this species were found in Azerbaijan, if not to consider 2 varieties, which later included in species *T. vavilovi* Jakubz. (=*T. aestivum* ssp. *Vavilovii* (Thum.) Jakubz.). 2 botanical varieties of *T. spelta* and 1 (var. *vaneum* Jakubz.) from *T. vavilovi* were found in Karabakh. Vavilov suggested the South Caucasus as an origin for spelt wheat based on occurring here 2 spelt species totally with 50 botanical varieties (Dorofeev, 1972).

Being a young species the hexaploid wheat species T. *aestivum* L. is presented in Azerbaijan by 2 subspecies: *iranoasiaticum* Flaksb. and *indoeuropaeum* Vav. with a total of 65 botanical varieties, of which 15 were recorded for Karabakh. The most distributed botanical varieties in Azerbaijan were 4: *erythrospermum, ferrugineum, barbarossa* and *lutescens* (Мустафаев, 1973) (see Table 1). The 6 morpho-ecological groups of T. *aestivum* offered by Vavilov (1964) were: nachichevani, absheron-mughani, Armenian xerophytic, winter mountain Caucasian, spring mountain Caucasian and Azerbaijan-Dagestani foothills. Jakubciner (1957) defined also 6 ecological groups: Caucasian-subtropical, mountain Caucasian steppe, mountain Caucasian forest, mountain Caucasian forest-steppe, Transcaucasian lowland foothills, and Transcaucasian alpine. Dekaprelevich (1957) identified 11 ecotypes in his work "Wheat in USSR" (Dorofeev, 1972). Mustafayev (1973) included wheat of Azerbaijan from this species into 16 groups, of which 12 occurred among cultivated wheat species in Karabakh. He emphasized that among the groups of T. *aestivum*, the accessions from the gr. *barbarosa* Al. and gr. *pseudobarbarosa* Vav. were more susceptible to the leaf rust, from gr. *lutescens* Al., gr. *milturum* Al. and gr. *caesium* Al. – to the stripe rust, but more resistant to the first disease were accessions from gr. *albidum* Al., gr. *hostianum* Clem., as well as also from gr. *lutescens* Al., and resistant to the second disease – gr. *graecum* Körn., gr. *erythroleucon Körn*., gr. *hostianum* Clem., gr. *turcicum* Körn., gr. *barbarosa* Al. and gr. *pseudobarbarosa* Vav.

The wheat species *T. compactum* Host. (=*Triticum aestivum* ssp. *compactum* (Host.) Mac Key) were presented in the Karabakh region by 1 subspecies and 2 botanical varieties (Мустафаев, 1973) (see also Table 1).

The most complicated botanical diversity of wild wheat species and their spontaneous hybrids in the South Caucasus (Transcaucasia), including Azerbaijan, were observed in the foothill areas up to 600-800 m above sea level (Dorofeev, 1972).

***Aegilops* L.** The age for herbarium specimen of goat grass from Azerbaijan dates back to 1886 (van Slageren, 1994). Zhukovsky (1928) described five species of goat grasses for Azerbaijan: *Ae.*

biuncialis, Ae. neglecta (as *Ae. triaristata* Willd.), *Ae. triuncialis* L., *Ae. tauschii* (as *Ae. squarrosa* auct. non L.), and *Ae. cylindrica*. Eig (1929a) added *Ae. kotschyi* to this list, while Grossheim (1939) located seven species by adding another two species—*Ae. umbellulata* Zhuk. and *Ae. columnaris* (see also Dorofeev and Migushova, 1973). For Azerbaijan, Karyagin (1950) presented the above-mentioned seven species except for *Ae. columnaris*. Mustafayev (1961) located 13 species for the country: *Ae. ovata* L. [=*Ae. geniculata* Roth], *Ae. triaristata* [=*Ae. neglecta*], *Ae. biuncialis, Ae. triuncialis, Ae. crassa* Boiss., *Ae. cylindrica, Ae. comosa* Sibth. et Sm., *Ae. columnaris*, *Ae. squarrosa* L., *Ae. caudata* L., *Ae. ventricosa* Tausch, *Ae. umbellulata*and *Ae. uniaristata* Vis. (misidentifications regarding 4 species (*Ae. comosa* Sibth. et Sm., *Ae. caudata* L., *Ae. ventricosa* Tausch, and *Ae. ovata* L.) caused the number to be higher than has been proven since). Despite the historic presence of herbarium specimens of *Ae. juvenalis* (Thell.) Eig. and *Ae. peregrina* (Hack. in J.Fraser) Maire et Weiller from Azerbaijan (van Slageren, 1994) they have not been relocated in at least 50 years. (Eldarov et al., 2015).

The latest expeditions for the studies on botanical composition for goat grasses of Azerbaijan related with the names of Mustafayev (1961), as well as Dorofeev and Migushova (1966, 1969, 1973). In his expedition to the Karabakh, Мустафаев (1961) indicated the foothills and mountainous areas of Aghdara, Aghdam, Asgeran, Khojaly, and Khankendi regions of Karabakh as the places, that are especially distinguished for the diversity of the genus *Aegilops* L. The species *Ae. triuncialis* L. and *Ae.biuncialis* Vis. were the most common for those areas, *Ae.cylindrica* Host. relatively less, and very rare - *Ae.umbellulata* Zhuk., the latter is generally considered as a rare species for the territory of Azerbaijan (outside of Karbakh this species was found near the Girdman River in Ismayilli and Gilanchay River in Nakhichevan). In the humid areas of the mentioned regions, mainly *Ae. squarossa* L.(=*Aegilops tauschii* Coss.) and *Ae. cylindrica* Host. species have been observed to be more common. The *Ae.ovata* L. species was recorded for the first time for the territory of Karabakh on the mountain slopes at 900 and 1100 m above sea level in the Aghoglan (historical name for Hadrut) region, near Malibeyli, Girmizi, Sarishkend, and other viliages. It was found on the right side of the Gargarchay, which is along with Karkijahan, Khalfali and Zarisli rivers flowing from the eastern part of the Garabag range, near the settlement called Khanbagi on the Shusha-Khankendi road. However, later these accessions' names were determined as misidentification and they were identified as *Ae.umbellulata* by V.F.Dorofeev and E.F.Migushova (1971), who also made the same mistakes in their previous works, as well as the other scientists – I.Shmalgauzen (1897), V.I.Lipskiy (1899), A.V.Fomin and Y.Voronov (1909). The main reason confusing researchers was as noticed by Grossheim (1939) "the inconsistency between the diagnosis given by Zhykovsky for this species and the collected samples of it from the territory of Azerbaijan" (Dorofeev and Migushova, 1971). Considering the spikes of *Ae.umbellulata* accessions collected from Azerbaijan as the most large-sized compared with the samples from Turkey and Iran the latter authors suggested them as the new taxon: *Ae. umbellulata* subsp. *transcaucasica* Dorof. et Migusch (=*Ae. umbellulata* Zhuk. f. *girdmanica* Mustafayev and Aminov). The early collection of this species in Karabakh had been done by M.F.Sakhokia (1931) near the Aghdam and Gurvich Ts.E. (1936) near the village Shushakend (Гроссгейм, 1939; Dorofeev and Migushova, 1971).

Along with the fields of wild species, a large number of natural hybrids between *Aegilops* species and durum, as well as with bread wheat, were found in the Fuzuli region of Karabakh, on the Fuzuli-Jabrail road, and in the Jabrayil region. In 1961-1970, the employees of the All-Russian Institute of Plant Breeding conducted expeditions in the Karabakh region of Azerbaijan by collecting the 5 goat grass species (*Ae. squarossa* L., *Ae. cylindrica* Host., *Ae. triuncialis* L., *Ae. biuncialis* Vis. And *Ae. triaristata* Willd.) in Aghoglan at 800 m above sea level, 4 species (*Ae. squarossa* L., *Ae. cylindrica* Host., *Ae. triuncialis* L., *Ae. biuncialis* Vis.) in the Jabrayil region - 250 m, 4 species (*Ae.squarossa* L., *Ae.cylindrica* Host., *Ae. triuncialis* L., and *Ae. triaristata* Willd.) in Zangilan - 610 m, 3 species (*Ae. squarossa* L., *Ae. triuncialis* L. and *Ae. Triaristata* Willd.) in Khojavend region - 800 m, 3 species (*Ae. squarossa* L. , *Ae. triuncialis* L. and *Ae. triaristata* Willd.) in Khankendi region - 1120 m and 3 species (*Ae.squarossa* L.,

Ae.triuncialis L. and *Ae.triaristata* Willd.) at an altitude of 1000 m above sea level in Shusha region (see Table 1).

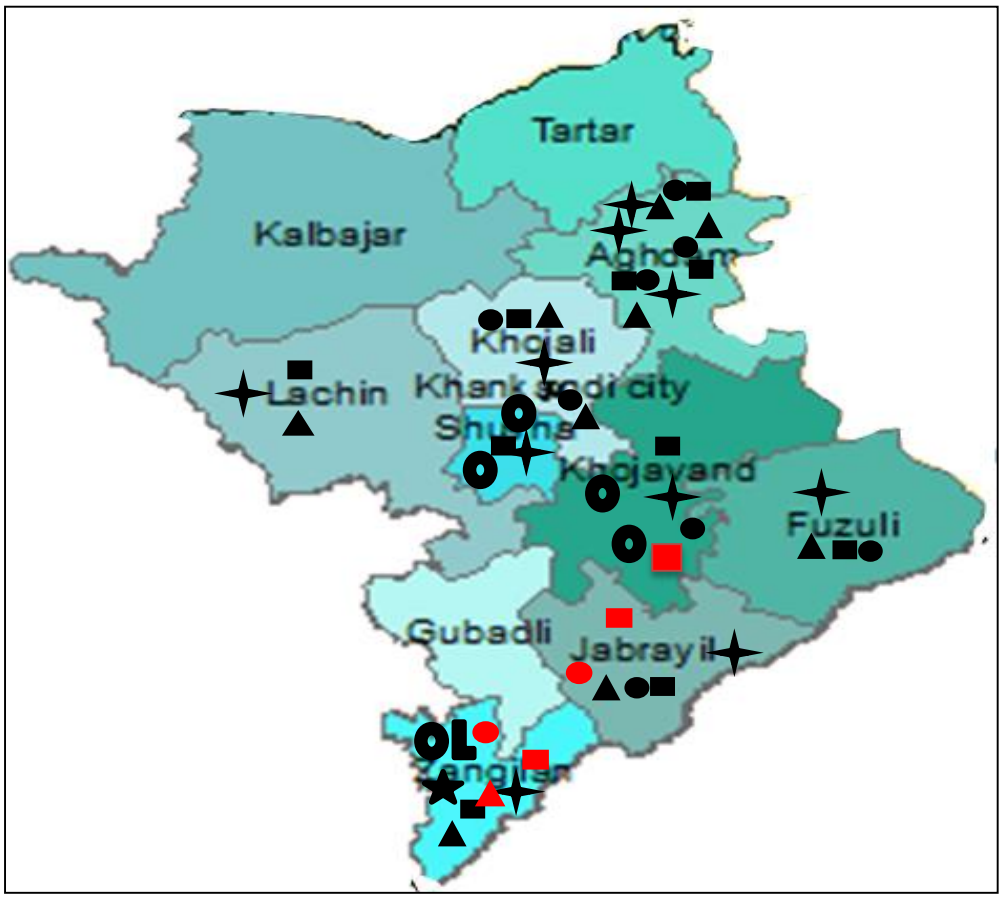
Hence, if Aghoglan could be considered as the location for the most diversity of *Aegilops* L., then Zangilan is the most valuable location for both genera - *Aegilops* L. and *Triticum* L. in Karabakh (see Fig. 2.). Therefore, special attention should be given to both locations in the planned monitoring works at the liberated areas of the Karabakh region.

***Secale* L.** is a small but economically important taxon, which includes wild relatives and landraces, comprising cultivated rye, containing annual, perennial, self-incompatible or self-compatible, cultivated, weedy, and wild taxa. Classification of the genus *Secale* is inconsistent and comprises 3–4 to 8 species from the phylogenetic studies in the last ten years (Maraci et al., 2018; Daskalova and Spetsov, 2020). According to Asgerov (2016), this genus is represented in Azerbaijan by 7 species, of which only the species *S. chaldicum* Fed. (syn. *S. strictum* (C.Pesl) C.Pesl.; *S.montanum* Guss.), commonly known as mountain rye, was found in Karabakh. Mountain rye is a cool temperature, perennial, known to be frost - and drought resistant and yet the intergeneric amphiploid with wheat was found to be tolerant to waterlogging (Tang et al., 2011). Its native range extends from the Sierra Nevada mountains in southern Spain in the west to Iran and the Caspian Sea in the east. Mountain rye shows great potential as a perennial forage crop in semi-arid and mountain regions (Rossi et al., 2020). There is a general agreement on *S. strictum* being the ancestral form, from which the divergence of *S. silvester* was proposed. *S. strictum* subsp. *africanum* is considered to have diverged from *S. strictum* during the early Pleistocene and evolved independently. *S. cereale* and *S. vavilovi*, on the other hand, are considered to be evolutionarily the youngest species (Maraci et al., 2018).

During his expedition (19.06.1960-25.06.1960), Mustafayev was also recorded distribution of *S. cereale* subsp. *segetale* in plant community with wild barley and goat grasses in the mountainous areas of Shusha at an altitude of 700-910 m above sea level.

***Hordeum* L.** are grasses, most conspicuously characterized by their inflorescence that is a spike instead of the panicle that occurs in most other grasses. This genus apart from cultivated barley (*Hordeum vulgare* subsp. *vulgare*) comprises more than 30 wild grass species distributed in temperate and arid regions of the world. The wild progenitor of the cereal is *H. vulgare* subsp. *spontaneum* from Southwest Asia. Together with bulbous barley (*Hordeum bulbosum*), the closest relative of the crop, and wall barley (*Hordeum murinum*) these species are grouped within subgenus *Hordeum*, while all other species belong to subgenus *Hordeastrum* (Blatner, 2018). There are 12 species of *Hordeum* in Azerbaijan, of which 2 are cultivated (*H. vulgare* and *H. distichum*), the area of Lesser Caucasus represented by 5 species (Əsgərov, 2016). The last data about the distribution of *Hordeum* species in the Karabakh region of Azerbaijan was given by Mustafayev (1961) and Kobilyanskiy (1966). *H. spontaneum* C.Koch. and *H. leporinum* Link. were recorded for Lachin, the latter also for Aghdam (570 m a.s.l.), *H. spontaneum, H. bulbosum* L. and *H. leporinum* – for Khojavend, *H. spontaneum* and *H. lagunculiforme* Bacht. for Aghoglan (Hadrut), *H. spontaneum,* and *H. bulbosum* – for Shusha, subsequently. *H. spontaneum* C.Koch in Fuzuli (500 m a.s.l.), on the Khojavend - Fuzuli road and wild barley varieties such as *H. bulbosum* L. have been reported to be widespread. *H. murinum L.* was found in Aghdam at an altitude of 500 m above sea level.

Bakhteev (1960) identified the bottle-shaped wild barley form, *H. lagunculiforme* Bacht., to be the ancestor of all cultivated *H. vulgare* forms. *H. vulgare* subsp. *spontaneum* (=*H. spontaneum* C.Koch.). *H. vulgare* subsp. *spontaneum,* belongs to the primary gene pool, a valuable source of genes for stress tolerance and adaptation to marginal environments and low-input farming systems, and a source of novel genes for disease and insect resistance. *Hordeum bulbosum* L. is the single species in the secondary gene pool, and has been used as a source of resistance to a number of diseases, such as powdery mildew, leaf rust, and scald, and as a source of resistance to barley mosaic virus. Crosses with cultivated barley mostly result in *bulbosum* chromosome elimination and production of *vulgare* haploids.



● – *Ae. biuncialis* Vis.; ■ – *Ae. triuncialis* L.; ▲ – *Ae. cylindrica* Host.; ▙ – *Ae. umbellulata* Zhuk.; ★ – *Ae. columnaris* Zhuk.; ○ – *Ae tauschii* Coss (=*Ae. squarossa* L.); ✦ – *Ae. neglecta* Req. ex Bertol. (=*Ae. triaristata* Willd.)
▬ – *T. boeoticum Boiss.* (=*T. boeoticum* Boiss. ssp. *aegilopoides* Bayle. var. *pseudoalbum*);
⬬ – *T. boeoticum* Boiss. ssp. *thaoudar* (Reut) Flaksb.;
▲ – *T.urartu* Thum. ex Gandilyan (=*T. boeoticum* Boiss. ssp. *urartu* Thu

Fig. 2. Distribution of wild cereals from genera *Aegilops* L. and *Triticum* L. in the Karabakh region of Azerbaijan

This phenomenon has been widely exploited in the production of doubled haploids used as mapping populations for genetic studies and for shortening the breeding cycle (Kang, Priyadarshan, 2007). *Hordeum murinum* subsp. *leporinum* L. (hare barley) is an annual grass species dominant in Mediterranean savannah-like ecosystems, with great relevance in pasture dynamics due to its fast growth and high palatability for livestock (Chano et al, 2021).

***Elytrigia* Desv.** Both genera - *Elytrigia* Desv. and *Elymus* L. were excluded from the tribe *Triticeae* in some taxonomical treatments (Цвелев, 2019). The genus *Elytrigia* Desv. is sharing a common genome originated from genus *Pseudoroegneria*, which is included in the genus *Elytrigia* Desv. according to the classification followed in this paper (Əsgərov, 2016) (Table 1).

Elytrigia Desv. is widely distributed throughout the world and is represented with species of various levels of ploidy including diploids, tetraploids, hexaploids, octaploids, and decaploids. *E. intermedia* and *E. repens* were grouped into three distinct levels of ploidy including diploids, tetraploids, and hexaploids. For *E. elongata, E. pontica*, and *E. caespitosa*, it was found that two ploidy levels were presented, and only one ploidy level was

in those of *E. hybrid, E. pycnantha, E. pungens, E. juncea*, and *E. alatavica* (Mao et al., 2010). The species of the genus are widely used in agriculture (*E. repens*, *E. elongata*, *E. intermedia*) as fodder herbs and erosion control (*E. repens*, *E. stipifolia* (Czern. ex Nevski) Nevski), as the herbs for medicine (*E. repens*). According to recent data, the genus includes about 50 species (Oliynyk and Gubar, 2019), in Azerbaijan, the 13 species is distributed, of which 8 species were found also in the Lesser Caucasus (Əsgərov, 2016) (see Table 1), i.e. possibly in the Karabakh region.

***Elymus* L.** *Elymus* L. (wild rye) is a large genus that contains about 150 species distributed across a wide range of ecological sites across temperate and subtropical regions of the world. *Elymus* L. includes many economically important forage grasses as well as species that possess useful genes for disease resistance, stress tolerance and adaptation, which can potentially be transferred to cereal crops through gene introgression (Qi et al., 2013). Several *Elymus* species have been developed as forage cultivars (e.g., blue wildrye (*E. glaucus* Buckley), thickspike wheatgrass (*E. lanceolatus* Scrib. & J.G. S.M), Canada wild rye (*E. canadensis* L.), slender wheatgrass (*E. trachycaulus* Link), Snake River wheatgrass (*E. wawawaiensis* J. Carlson & Buckley), and Virginia wildrye (*E. virginicus* L.). To date, multiple *Elymus* species have been hybridized in a variety of pre-breeding initiatives (for example, there are at least 17 *Elymus*-wheat hybrids) (Frawley et al., 2020).

There are at least 4 species from this genus in Azerbaijan, of which 1 species - *Elymus transhyrcanus* is distributed only in the Karabakh region of Azerbaijan, the status of distribution for another 2 species – *Elymus caninus* (L.) L. (syn. *Agropyron caninum* (L.) Beauv.) and *Elymus caucasicus* (C.Koch) Tzvel. (syn. *Agropyron caucasicus* (C.Koch) Gross.) should be checked as the Lesser Caucasus was among of their site of growing in Azerbaijan.

***Agropyron* Gaertn.** is an important wild relative of wheat that has the genome of P: diploid, PP, 2*n*=2*x*=14; tetraploid, PPPP, 2*n*=4*x*=28; and hexaploid, PPPPPP, 2*n*=6*x*=42. Most *Agropyron* species are excellent sources of forage and habitat for livestock and wildlife, and they are also valued for weed control, habitat use, soil stabilization, and watershed management. *Agropyron* species possess a lot of useful characteristics, such as tolerance to drought and cold, resistance to diseases, and high yield traits. It is a quality forage for grassland improvement and a valuable genetic resource for wheat (Che et al., 2018). This genus is represented in Azerbaijan by 4 species, of which the most distributed *A. pectinatum* is the only one that was found in Karabakh. *A. pectinatum* is a warm-loving and light-loving xerophyte, valuable perennial forage plant (Luo et al., 2021).

***Eremopyrum* (Ledeb.) Jaub. et Spach** is a well-circumscribed genus with an annual habit and oblong to orbicular fragile spike-like inflorescence that is used in wheat improvement. To date, 18 species and many infraspecific taxa have been described, but the number of species accepted varies from four to nine. The Plant List (2013) currently recognizes four species and 44 synonyms (Romero et al., 2018). There are at least 5 species from this genus in Azerbaijan, of which for the 2 species – *E. hirsitum* (Bertol.) Nevski and *E. orientale* (L.) Jaub.et Shpach - the Lesser Caucasus was shown among of the places of distribution. Therefore, the Karabakh area should be checked to determine the status of these species.

***Hordelymus* (Jess.) Harz is** the genus that comprises only a single allotetraploid species - *H. europaeus* (L.) Jess. ex Harz [= *Elymus europaeus* L.] (2n=4x=28) (wood barley) with two genomes: TH (T from *Taeniatherum*, H from *Hordeum* according to Löve 1984) or TN (T from *Taeniatherum*, N from *Psathyrostachys* according to Bothmer et al., 1994). Analyses of sequence data from plastid genes and single-copy nuclear genes showed close phylogenetic relationships of wood barley with such genera as *Psathyrostachys*, *Pseudoroegneria*, and *Henrardia*. All these findings indicated its importance in the understanding the evolution and differentiation within the tribe *Triticeae*. For these reasons, *Hordelymus* was subjected to extensive ecological, floristic, and phylogenetic studies (Mizianty et al., 2006; Klimko et al., 2015). The area of the Lesser Caucasus among others in Azerbaijan shown as a site for the growing of wood barley.

***Taeniatherum* Nevski** (genome TaTa, 2n=2x=14) contains three diploid species, *Ta. caput-medusae*, *Ta. crinitum*, and *Ta. asperum*. The subspecies *caput-medusae* is a native species to

Europe and is mostly restricted to Spain, Portugal, southern France, Algeria, and Morocco. Subspecies *crinitum* is found from Greece and the Balkans east into Asia, and the range of subspecies *asperum* completely overlaps the other two subspecies (Kostivkovsky and Young, 2000). These species are the annual herbs represented by only one species - *Ta. crinitum* (Shreb.) Nevsky (syn. *Hordeum crinitum* (Shreb.) Desf.) in Azerbaijan and its Lesser Caucasus area is among its distribution places.

It should be noted that the all information presented above regarding the Karabakh region mainly reflects the available historical data. Starting from occupation since to date there was no large-scale monitoring of wild cereal species in the Garabakh region of Azerbaijan. The main reason for this was the long occupation period of these areas – 30 years. The importance of diversity protection of wild cereals in the Karabakh region is based also on their value to be served as donors of the resistance to biotic and abiotic stresses for the cultivated wheat. For over the past 30 years, scientists did not have access to the areas to conduct their research works, including investigation of plant composition and diversity of the region. Thus, one of the main goals of correct restoration of the region is to carry out studies on plant composition of Karabakh to obtain relatively new results compared with historical data, as the successful restoration requires the identification of species status and diversity that are adapted to the ecological conditions of the restoration sites.

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Azərbaycanin Qarabağ bölgəsində *Triticeae* genetik ehtiyatlarinin müxtəlifliyi

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Məqalədə buğda tribası *Triticeae* Dum. taksonu daxilində Azərbaycanın Qarabağ bölgəsi üçün işğaldan əvvəl təsvir edilən növlərin kolleksiyalarına dair tarixi məlumat verilir. Kiçik Qafqazın çox hissəsini əhatə edən, yarı səhra və quru çöl iqlimi olan Azərbaycanın Qarabağ bölgəsi müxtəlif taxıl bitkiləri üçün əlverişli şəraitə malikdir. Azərbaycan ərazisində *Triticeae* tribasından 14 cinsə aid olan dənli bitkilər yayılmışdırlar ki, onlardan tarixən ən azı 10 cinsə aid növlər həmçinin Qarabağ üçün də təsvir edilmişdir. Məqalədə müxtəlif elmi mənbələrə əsaslanaraq təqdim edilən məlumatlar Qarabağ bölgəsinin işğaldan azad edilmiş və minalardan təmizlənmiş ərazilərin *Triticeae* tribasına aid olan növlərin statusunu və yayılmasını müntəzəm monitorinqi üçün planlaşdırılmış tədqiqatlar üçün faydalı olacaqdır.

Açar sözlər: *Azərbaycanın Qarabağ bölgəsi, Triticeae Dum. tribası, Aegilops* L., *Triticum* L., *Hordeum* L., *Secale* L., *Agropyron* L., *yabanı taxıllar*

Разнообразие генетических ресурсов *Triticeae* в Карабахском регионе Азербайджана

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В данной статье дается исторический обзор коллекций видов из трибы *Triticeae* Dum., описанных для Карабахского региона Азербайджана до периода его оккупации. Покрывая большую часть Малого Кавказа, обладая полупустынным и сухим степным климатом, Карабахский регион Азербайджана имеет благоприятные условия для создания разнообразия злаковых трав. В Азербайджане распространены 14 родов злаковых растений, относящихся к трибе *Triticeae*, из которых исторически самое меньшее 10 родов были описаны также для Карабаха. Представленные в статье данные основываются на различных литературных источниках и будут полезны для проведения постоянного мониторинга статуса и распространения видов из трибы *Triticeae* на освобожденных и разминированых территориях.

Ключевые слова: *Карабахский регион Азербайджана, триба Triticeae Dum., Aegilops* L., *Triticum* L., *Hordeum* L., *Secale* L., *Agropyron* L., *дикорастущие злаки*