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# Ancient Crops Continuing for an Extended Period in Samtskhe-Javakheti Region of Georgia – a Review

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## Abstract

Ancient crops are a domesticated and locally adapted in the Georgia. High diversity of cultivated plants was characteristic feature for Samtskhe-Javakheti from ancient time. Cultivation of field crops, vegetables and fruits, as well as winemaking was main direction of agriculture. According to literature data filed crops were represented by wheat (*Triticum* spp.), barley (*Hordeum vulgare*), rye (*Secale cereale*), oat (*Avena sativa*), sorghum (*Sorghum halepense*), proso millet (*Panicum* spp.), foxtail millet (*Setaria* spp.), grapevines (*Vitis vinifera*), grain legumes such as Cicer, Lathyrus, Lens, Phaseolus, Pisum, Vicia, Vigna and some vegetables and industrial crops. Flax was cultivated here as oil plant.

Many fruits are associated to wild tree species distributed in the many territories of villages. The ancient crops were used by local people for thousands of years and many crops remained in the Samtskhe-Javakheti region. The human of longevity of individual in a population are oriented as predicting adaptation to healthy food. The ancient crop varieties of cereals are grown in the high mountains at 2160 m in this region. Georgian grapevines are only at 1350 m in Georgia and one crop 'Karzameti' is in castle near boundary to Turkey at 1450 m in the Akhaltsikhe district. Another project was the return of the Georgian wheat variety *T. aestivum* var. *Ferrugineum* 'Akhaltshikhis Tsiteli Dolis Puri' in Meskheti province, where it was shown on 10 ha and produced bread that was introduced in shops featuring organic products in Tbilisi as of 2008. Ancient crops are used for healthy food in Georgia.

**Keywords:** Ancient crops; Cereals; Flaxseeds; Fruits; Grape; Legume

## Introduction

Georgian territory (69.700 km<sup>2</sup>) covers both mountain ranges between 40° and 47° latitude east, and 42° and 44° longitude north. The Caucasus mountain system was formed ca. 28.5–23.8 million years ago as the result of a tectonic plate collision between the Anatolian and Arabian plate moving northward and the Eurasian plate. Georgia is a mountainous country made up of two separate mountain systems: the Greater Caucasus Mountain Range, lying northwest to east-southeast between the Black Sea and Caspian Sea; and the Lesser Caucasus Mountains, which run parallel to the greater range, at a distance averaging about 100 km south. It is made up of two separate mountain systems: the Greater Caucasus mountain range lying north-west to east-southeast between the Black Sea and Caspian Sea; and the Lesser Caucasus Mountains, which run parallel to the greater range, at a distance averaging about 100 kilometres south. Two thirds of the country is mountainous with an average height of 1200 m.a.s.l., with highest peaks of Mount Shkhara

(5184 m.a.s.l.) at the Western Greater Caucasus and Mount DidiAbuli (3301 m.a.s.l.) in the Lesser Caucasus [1-3].



Map 1: Samtskhe-Javakheti region in Georgia.

Samtskhe-Javakheti region is in the South Caucasus, Georgia [Map 1]. The region comprises six administrative districts: Akhaltshikhe, Adigeni, Aspindza, Akhalkalaki, Ninotsminda and

Tsalka. It adjoins to Turkey and Armenia in the south, Adjara (*Khulo district*) and Guria (*Chokhatauri district*) in the west-northwest, Imereti (Kharagauli and Bagdati districts) and Kartli (Borjomi district) in the north and KmevoKartli (*Tsalka and Dmanisi districts*) in the east. The territory of Samtskhe-Javakheti region is 6413 km<sup>2</sup> which represents 7.5 % of the entire territory of Georgia - 69700 km<sup>2</sup>. Administratively Samtskhe is represented by three districts - Akhaltsikhe, Adigeni and Aspindza with a total square of 2631 km<sup>2</sup>. Javakheti contains two districts- Akhalkalaki and Ninotsminda with a total territory of 2590 km<sup>2</sup>. This area is at an altitude between 900 and 3600 m a.s.l. [1].

Geographically Samtskhe is represented by Akhaltsikhe depression with average elevation 800 – 1500 m a.s.l., mountain systems are Meskheti, Arsiani, Erusheti, Kasri, Gumbati and Vaniranges and southwestern-western slopes of Trialeti range. The highest peak is Kiumbet (2964 m a.s.l.). Main rivers are Mtkvari, Potskhovi, Kvabliani, Uraeli, Otskhe and Tsinubnistskali. Several lakes are in Samtskhe- Lake Satakhe or Karageli (1940 m a.s.l.) near v. Zarzma, Lake Tsunda (1340 m a.s.l.) near v. Sundain Aspindza district, as well, artificial three Jaji Lakes (2240 m a.s.l.) and Trialeti Lake near v. Lelovani in Adigeni district. Highest peaks are Didi Abuli (3304 m a.s.l.), Samsari (3284 m a.s.l.), Godorebi (3188 m a.s.l.), and Patara Abuli (2801 m a.s.l.). There are 56 lakes on Javakheti Plateau. The largest are Paravani (37.5 km<sup>2</sup>), Kartsakhi, Tabatskuri, Khanchali, Madatafa, Saghamo, etc. Main River is Paravani, with many minor tributaries such as Abulistskali, Murjakhetistskali, Baraletistskali, Chobaretistskali, etc.

The village's areas are oriented from 900 m to 2100 m and agrarian lands are now located in yard house. Many fruits are associated to wild tree and shrub species distributed in the high mountain (1250 -1800 m) and subalpine (1800-2300 m) forests in Meskheti. Samtskhe-Javakheti region has many ancient crop varieties used with very old farming traditions and owns linguistics of old civilization coinciding with early Neolithic epoch. The traditional landraces used by local people for thousands of years affected the health and human longevity of individuals in the Georgian population predicting adaptation to healthy food. Crop domestication is associated to existence of crop wild relatives (CWRs) on the territory of Georgia. There are many threats to these oldest of crops in the modern period [1,2].

The climate in the Samtskhe-Javakheti region is determined as continental. However, more recent survey is defining it as subtropical characterised by moderate precipitation, pronounced seasonal variations in climatic parameters, and a high level of solar radiation. According to these data region comprises two sub-climatic zones, mainly owing to the differing relief and orography. They are described as follows: The humid-subtropical mountainous climate with cold winter (<-5°C) and cool summer (<20°C), located in the Trialeti and Samsari Mountain ranges and Javakheti Plateau. The altitude, approximately 2500 metres, largely explains the lower temperatures in this region. The

high-mountain profile of the area accounts for its near extreme climatic conditions. The estimated mean annual temperature for the area is 9.5°C, with an estimated average of 1.4°C in January and 19.5°C in July. Generally, the region experiences cold and occasionally snowy winters and long, but mild summers.

Precipitation increases westward with proximity to the Trialeti range. Mean annual precipitation in the transitional climate region is approximately 508 mm, and 654 mm at the Georgian-Turkish border. The majority of the precipitation falls between April and October, with May and June being considered the months with most rainfall (82 mm/month and 88 mm/month, accordingly). The driest months of the year in these parts are December (32 mm/month) and January (30 mm/month). Precipitation data specific to the mountains and mountainous steppes near the Georgia-Turkey border are scarce. Wind speeds are reported with an estimated annual average of 5.4 m/s, although still predominantly northerly and north-westerly. However, speeds in excess of 12 m/s can occur for up to 50% of the year, with maximum wind speeds reaching as high as 30 m/s.

The mean number of gale days (days in which wind speeds are approximately 17-20 m/s) for the Javakheti region is relatively low, compared to the Meskheti, at 21 days per annum. The last climatic zone is affected by both easterly and westerly winds, becoming increasingly strong in the high mountains (greater or equal to 15 m/s). Cultivated crops, including such important field crops in the Samtskhe-Javakheti region represents today part of one of the oldest historical province of Georgia named Tao-Klarjeti or Upper Kartli [1,2,3]. Archaeological data clearly show that Caucasus and namely Georgia were settled from prehistoric time and agriculture was developed from early Neolithic era in this region [4]. From crops were cultivated bread wheat and millet in lowlands and '*Dika*' (*Triticum turgidum subsp. carthlicum*), emmer wheat, barley and rye.

The occupation of the territories leads to the changes of traditional agriculture. For example, the territory of South Georgian region named Tao-Klarjeti was occupied by Turkey in 1580 AD, when agriculture was substituted by cattle breeding, which caused abandonment of cultivated fields and their transformation into pastures [4]. According to old administrative documents after occupation of Georgian part by Turks, in former Georgian village Svir in Gurjistan Vilayet in Turkish, local population was paying taxes by crops, such as wheat, barley, rye, millet, chickpea, lentil, flax, alfalfa, etc. [5]. During our expedition in Gurjistan Vilayet in Turkish in 2006, we did not find any of the old traditional field crops cultivated nowadays in the villages. The agriculture in this region is abandoned and substituted by cattle breeding. All vineyards are cut and remained grapes gone wild to make thicket at roadsides and at the edges of the forests. Some vegetables were grown in small house gardens, such as cabbage, sugar beet, carrot, cucumber, tomatoes, etc. However, seeds are bought in markets and there was no information on origin of the seed material, when they might be aboriginal varieties [3].

Some vegetables were grown in small house gardens, such as cabbage, sugar beet, carrot, cucumber, tomatoes, etc. However, seeds are bought in markets and there was no information on origin of the seed material and when they might be aboriginal varieties. According to Vavilov [6], the primary domestication in the fourth center of crop origin and diversity named as the Near East included the South Caucasus, Asia Minor, Iran, and the Fertile Crescent. Local varieties, many of which are endemic species of Georgian ancient crops are known in this domesticated center. Especially, they are characterized by the introduction of the varieties of wheat, rye, oat, seed and forage legumes, herbs, fruits, and grapes for winemaking; 83 species all tolled [7]. The primary scientific argument of Vavilov (1992) on domestication of crops represents the idea that the centers of origin of cultivars should be characterized by high genetic and morphological variability of both wild and cultivated taxa.

About 525 names of autochthonous grapevine landraces known from Georgia show greatest genetic and morphological variability characterized by a wide range of color gamma and shapes of berries and pips [8]. The language of the Georgian people is not part of the Indo-European language and belongs to the proto-Georgian language group known as Kartveluri [9]. Moreover, the traditional landraces used by local people for thousands of years affected the health and human longevity of individuals in the population of Georgia country predicting adaptation to healthy food [10]. Georgian centenarians were reputed to have been over age 120 in 1959 and the percentage of males over age 70 was 0.9 % in 1959 and 1.07 % of women were over 70 [11]. This percentage of human longevity is diminished last time, when local population replaced ancient crops and agriculture is generally oriented on introduced cultivars from different countries [12]. The population has high ages in the villages which has the ancient crops with the healthy food in the high mountain areas of Samtskhe-Javakheti region.

### Traditional field crops of Samtskhe-Javakheti region

Nowadays the following field crops are remained in Samtskhe-Javakheti region:



**Figure 1:** 'Dika-Ipkli' - *T. turgidum* L. subsp. *carthlicum* in v. *Vargavi* of Aspindza District in 1689 m and coordinates: Latitude: N 41.49799; Longitude: E 043.36682.

**Wheat - *Triticum* L. (Poaceae):** It was one of the main crops in the past [13]. It was grown from v. Atskuri (800 m a.s.l.) to vv. Agari and Okami (2160 m a.s.l.). There fivespecies of wheat

are Georgian endemics: 'Dika'- *T. turgidum* L. subsp. *carthlicum* (Nevski) A. Love & D. Love (4n=28). Different wheat species were cultivated in these fields – white and red bread wheat, 'Dika' and 'Dika-Ipkli'. This crop was grown from 965 m to 1689 m in v. Vargavi (Figure1). Several species of wheat were cultivated in the region until 1930s years. These are 'Khorbali'- *T. turgidum* L. subsp. *turgidum* (4n=28) and 'Tavtukhi' - *T. turgidum* L. subsp. *durum* (Desf.) Husn. (4n=28), and bread wheat 'DolisPuri'- *T. aestivum* L. (6n=42) fields contain with many crops: 'Ipkli' and 'Khulugo'- *T. aestivum* L. subsp. *Aestivum*, 'Tsitelidolispuri' - *T. aestivum* var. *Ferrugineum*, 'Tetridolispuri' - *T. aestivum* var. *erythrosperrum*, 'Upkho tetra dolispuri'- *T. aestivum* var. *lutescens*, 'Upkhotsitelidolispuri'- *T. aestivum* var. *Milturum* (Figure 2).



**Figure 2:** Many crops of wheat are in v. Jobareti, of Aspindza District: bread wheat 'Khulugo'- *T. aestivum* L. subsp. *Aestivum*, 'Tsitelidolispuri' - *T. aestivum* var. *ferrugineum*; 'Upkho tetra dolispuri'- *T. aestivum* var. *lutescens*; 'Upkhotsitelidolispuri'- *T. aestivum* var. *milturum*; in 1510 m and coordinates: Latitude: N41.57130; Longitude: E 043.14409.



**Figure 3:** 'Makhobeli' – *Cephalariasyriaca* : A. flowers; B. the fruits. The seeds of 'Makhobeli' are accepted with wheat seeds and all are included in bread.

Usually, this combination of wheat taxa is associated with wild weed 'Makhobeli' *Cephalaria syriaca* (L.) Schrad.exRoem & Schult (Caprifoliaceae) occurring most often in such wheat fields (Figure 3). Each species of aboriginal wheat was represented by several varieties. Most known of them are varieties of bread wheat – "DolisPuri". Two varieties were very gratifying [14] one of them with red spikes called Red Bread Wheat of Meskheta (*T. aestivum* var. *ferrugineum*). Principal problems of agriculture in arid regions remained until now. Bread wheat (*T. aestivum* var. *erythrosperrum*) was sown in Javakheti in the past. One local variety of *T. turgidum* subsp. *Carthlicum* 'Dika' cultivated almost in all villages of Meskheta is called Makhnia Bread, which takes onto an idea that it might be derived from *T. aestivum* var. *macha* and it is other crop and it is degraded from 1950s years [5].

'Dika' as another variety was Tofbashi, which in Turkish language means "bigspiket wheat". The local Meskhetian variety of 'Dika' has straight spike with awn. The spike of Tofbashi, however, is quadrate and round and has big grains from all sides i.e. are not flattened [5]. Emmer wheat – *T. dicoccum* Schrank ex Schübl. was growing in Tsalka district; Javakheti and Meskheti until the end of XIX and early XX centuries. It was mainly cultivated in high mountain regions. It was spring corn. The emmer wheat cultivated in Meskheti has double grains and local Moslem population was called it 'Kabgaja'. *T. turgidum* subsp. *durum* wheat was distributed in Meskheti from ancient time. The fields of this species were distributed from 500 to 1000 m a.s.l. *T. turgidum* subsp. *carthlicum* substituted this wheat at more height elevations. The local name of durum wheat was 'Shavfkha' and the population was called as 'Kara Kilchig'.

Nowadays, there is only bread wheat to be cultivated in the region. Mainly, there are introduced varieties – local Georgian 'Ufkho.1', American variety – Kopper, Turkish – Sultan, Georgian breed – 'Vardzia'. The local population often has now idea on the origin and character of variety as they are purchasing the seeds on the market without any instructions and information. 'Dika' fields have been found in v. Rustavi, Aspindza district [3]. Javakhian 'Dika' is cultivated in Javakheti till today. It represents mixture of bread wheat and 'Ipkli' [15].

**Barley – *Hordeum vulgare* L. (Poaceae):** It was the second important crop in Samtskhe-Javakheti after wheat [5] and main crop in high-mountainous Javakheti. Until 1970s, here was growing two varieties of barley – white and black, which differ by form, one has flat and another round spikes. According to old administrative documents v. Ptena located on arid land was paying taxes by barley amounted in 1000 pitcher, while wheat was paying only as 500 pitchers from the same village. Barley was shown on both irrigated and non-irrigated lands [5]. It was mixed with 'Dika' and such mixed field was called 'Kerdika field' and corn as 'Kerdika'. Nowadays, a foreign variety of barley is widely cultivated in Samtskhe-Javakheti. Two-row summer barley was cultivated mainly in high mountain regions.

The cultivars of two-row spring barley *H. vulgare* ssp. *distichon*: 'Akhaltlesi' - *H. vulgare* var. *nutans* (Schübl. & G. Martens) Alef. (2n=14), 'Dzvelteslishavpkha' - *H. vulgare* var. *nigrum* Wild. (2n=14), Naked Barley - *Hordeum vulgare* L. var. *nudum* Hook. f. and all these crops are distributed up to 2160 m a.s.l. in all high mountain areas. These crops are mixed in the field with spring wheat - 'Dika' - *T. turgidum* subsp. *carthlicum*. Four-row spring barley - *H. vulgare* subsp. *tetrastichon* [Stokes] Čelak. is rare with the spring cultivar 'Tetri Keri' - *H. vulgare* var. *pallidum* Ser. Six-row barley - *H. vulgare* ssp. *tetrastichum* and *H. vulgare* ssp. *hexastichum* are coming from other countries and remains now in many areas of Georgia. The local variety of barley – Akhaltlesi is widely cultivated in the region. The barley 'Kershveli' is cultivated due to efforts of society 'Dika' in Akhaltsikhe distr. v. Tkemlanaby several peasants.

**Rye – *Secale cereale* L. (Poaceae):** It is one more grain crop distributed in Samtskhe-Javakheti. It was very competitive with wheat and barley in high-mountainous regions. Nowadays, its field is found in v. Chunchkha in ground of peasant Zurab Beridze [14]. The name and origin of the variety is unknown. The naturalization of rye and its occurrence in the wheat fields as weed is normal in both Meskheti and Javakheti regions. In mountains, it occupied abandoned wheat fields as weed. It is supposed that weedy form might be another species of rye – *S. segetale* [Zhuk.] Roshev., which is usually mixed with cultivated rye. At the same time the mountainous regions of Javakheti is known as area of distribution of two wild species *S. anatolicum* Boiss. and *S. montanum* Guss., which might be entering corn fields as weedy species. The environmental conditions in the region are very good for distribution and cultivation of rye [16].

**The Oat – *Avena sativa* L. (Poaceae):** Nowadays, it occupies very small area among crop fields in Samtskhe-Javakheti. The origin of seed material is unknown. The local population is purchasing the seeds in the market and receives no information or instructions on its origin [17].

**Millet – *Panicum miliaceum* L. (Poaceae):** Cultivation of millet in Samtskhe-Javakheti is confirmed by archeological findings and ethno botanical evidences.

**Grapevines - *Vitis vinifera* L. (Vitaceae):** Cultivated grapevines are Georgian varieties - 'Saperavi', 'Rkatsiteli', 'Tavkveri', 'Chvitoluri', 'Kachichi', 'Shonuri', and 'Uchakhardani' are genetically related to wild grape species—*V. vinifera* subsp. *sylvestris* populations located in gorges of River Mtkvari, R. Lekhura, and R. Alazani [1]. One of the oldest Georgian grape cultivar 'Krikina' which is morphologically nearly identical to wild grapevine, shows the genetic similarity to the most ancient Georgian cultivars 'MeskhuriShavi' cultivated on Meskhetian terraces. In the past, the wild grape providing an important initial impulse to the domestication of grapevine was abundant in the Minor and Greater Caucasus mountain regions. One crop 'Karzameti' is in castle near boundary to Turkey at 1450 m in the Akhaltsikhe district.

**Pea – *Pisum sativum* L. (Fabaceae):** It is grown in house gardens in small amounts as food legume till today. More often it is mixed as weed in the fields with different grain crops – barley, rye. It is used as forage and for hay, especially in Javakheti.

**Chickpea – *Cicer arietinum* L. (Fabaceae):** Tentatively, it is currently cultivated by several peasants in v. Smada, Adigeni district.

**Lentil – *Lens culinaris* Medik. (Fabaceae):** It was sown in Meskheti till 1970s. Nowadays, it is not cultivated more. There was small grained form of lentil in Javakheti (*Lens esculenta* var. *microsperma* Baumg.) sown in high mountainous area.

**Faba bean – *Vicia faba* L. (Fabaceae):** Faba bean is one of the oldest cultivated plants. In Meskheti it has special name 'Kolangari'.

**Common vetch – *Vicia sativa* L. (Fabaceae):** It is used as forage and for hay. It was distributed in Javakheti.

**Bitter vetch – *Vicia ervilia* (L.)Willd (Fabaceae):** It is distributed in Meskheti and Javakheti. There are cultivated and wild forms of this species. It is used as forage and for soil enrichment with nitrogen.

**Flax – *Linum usitatissimum* L. (Linaceae):** Flax was one of the oldest and very important field crops in Meskheti and until recently, flax was cultivated only in Javakheti [2]. According to literature data [3] there were three different varieties – flat, Tsitsmata and black flax. Flat flax was cultivated in bigger amount than two others. Until recently, flax was cultivated in Javakheti, where flax seeds were used to obtain pharmacologically pure oil used for medicinal purpose.

Traditional vegetables are represented by sugar beet, carrot, radish, onion and garlic. Local variety of onion is manybulb onion, which has another name – Shirakula (Akhaltsikhe distr. v. Gurkeli). Another variety is Onion from Skhvilisi, cultivated so far in vv. Skhvilisi, Julga and Tskaltbila.

Traditional vegetables are represented by sugar beets, spinach, carrots, radishes, turnips, onions, Welsh onion, leeks and garlic. Beet - *Beta vulgaris*, is an ancient cultivated plant whose tubers and young leaves were used in Georgian cooking. Leaves primarily came from the variety *B. vulgaris subsp. cicla* (L.) W.D.J. Koch '*TsiteliMkhali*' that was grown in lower elevations up to 1400 m a.s.l. Another beet variety - *B. vulgaris L. subsp.vulgaris* '*SasufreCharkhali*' is rare. Carrot - *Daucuscarota*, was edible as a wild species in all areas of Georgia since prehistoric times. The cultivated carrot is widespread in peasant's house gardens in lowland areas. Onion - *Allium cepa* and garlic - *A. sativum*, are ancient cultivated plants available in all regions of Georgia. Red onions are very popular in Georgian people. *A. sativum* is called 'Georgian garlic' - '*Kartuliniori*'. Another variety is 'Russian garlic' representing *A. ampeloprasum* L. Leek - *A. porrum*, is typical in western Georgia. Welsh onion - *A. fistulosum* currently grown in several high mountain areas.

Until the 1970s, it was widespread in Imereti, but at present, Chinese shallot - *A. cepa* var. *aggregatum* G. Don has completely supplanted Welsh onion. Radish – *Raphanus sativus*, is grown in lower elevations in gardens and is cultivated by farmers for the market. Herbs are represented by numerous species: parsley, coriander, tarragon, sweet basil, savory, garden cress pepper weed, dill, fennel, celery, garden lettuce, peppermint. Herbs are cultivated in small sections of house gardens even in urban settlements. Sometimes, people have herbs indoors in pots. Fruits are valuable cultivars in Georgia. Wild and cultivated fruit crops reveal high species and genetic diversity in Georgia and represent rich material for future breeding activities. Many fruits have wild relatives representing the same species and direct ancestors of local cultivars.

Some introduced crops have become very popular and widespread. They are introduced from different countries. Such crops as cucumber (*Cucumissativus*), found in all regions of Georgia since medieval times, eggplant (*Solanummelongena*), marigold (*Tagetespatula*), used in almost all traditional meals; and black pepper (*Piper nigrum*) were introduced from India. Watermelon (*Citrulluslanatus*) from South Africa was cultivated in the Caucasus since medieval times. Maize (*Zea mays*), sunflower (*Helianthus annuus*), tomato (*Solanumlycopersicum*), bean (*Phaseolus vulgaris*), pepper (*Capsicum annum*), and potato (*Solanum tuberosum*) were introduced to Georgia from the Americas at about the same time as in Europe [4].

Tea (*Camellia sinensis*) and citrus fruits (*Citrus limon*, *Citrus reticulata*, *Citrus sinensis*) came from China in the 1830s. Nicotianarustica - '*tutuni*' in Georgian has been cultivated for a long time and is found in the most regions, including high mountain areas, of Georgia. Samthkhe-Javakheti region has become a secondary center of diversity for most of these crops. Ancient crops of bean, maize, tomato, and cucumber can be found on height from 900 – 1300 m a.s.l. The potato is in Height Mountains to 2160 m of this region. Agriculture has many areas in Samtskhe-Javakheti region.

### Place and Time of Origin of Cultivated Plants

It is of interest that according to many authors [1,18] in spite of high plant diversity in tropical and warm temperate lowland areas, major food crops have come mainly from high mountain valleys, isolated from each other to a large extent and with a very great habitat range. Here people made selections of wheat, barley, oat, rye, potatoes and maize which were eventually cultivated. It is suggested that [19,20] the high mountain areas were suitable for cereal domestication because they are seasonal in climate, with a wide range of temperature and rainfall due to differences of altitude. Here were closed ecological systems of grasses and legumes where mutant forms could thrive and become established.

Here also were isolated human communities exerting their selection pressures for larger seed size, adaptation to drought, humidity and extremes of climate. These were ideal conditions for mutations and selections, especially for large seed size. Georgia and particularly the Samtskhe-Javakheti region is mountainous area. It comprises Shavsheti, Erusheti, Adjara-Imereti, Trialeti, Chobareti, Abul-Samsari ranges and Javakheti plateau. It is part of the old world where domestication of crops occurred. It is often considered as part of Near East was many field crops was domesticated. The first sign of cereal domestication is the evidence that ears of cultivated cereal crops became less brittle in difference with their wild relatives characterized with shattering of spikes into spike lets upon maturity, which is essential for seed dispersal [21]. It is generally assumed that most Triticeae crops have been domesticated from their wild relatives by selection of non-shattering individuals which sporadically appear in wild populations as rare mutants [22].

A hypothesis was proposed that rye and wheat forms with varying ear fragility may have arisen as a result of interspecific hybridization processes between different wild species [21]. The Neolithic (= food-producing) agricultural development in West Asia depended primarily on the cultivation and subsequent domestication of three species:

(1) einkorn wheat (*Triticum monococcum*) domesticated from wild progenitor *T. boeoticum*,

(2) emmer wheat (*T. dicoccum*) domesticated from *T. dicocoides*, and

(3) two-row barley (*Hordeum vulgare* subsp. *disticum*) from *H. spontaneum*. The domestication is a sustained multi-generational relationship in which one group with the unconscious selection by the early farmer for heads with a non-shattering rachis. The wild mode of seed dispersal gradually disappeared, the wild-type germination of seeds on the ground was lost, and there was an increase in kernel size and yield potential. The plants which evolved with these traits subsequently lost their ability to survive in the wild.

It is assumed that the domestication of ancient cereals such as tetraploid wheat and barley seem to have originated in the hilly country surrounding the Syrian-Mesopotamian Plains [23] between 10,000 and 8000 BP [24]. West Asia, and particularly Syria, has not only been a cradle of human civilization but also includes areas where domestication of wild plants may have first occurred [24]. By 7000 BP, both wheat and barley had spread to the Harsuna settlements of northern Iraq. The region includes two of the most important Vavilovian centers origins of food crops - the Near East and the Mediterranean. These two regions fall within the pattern of global genetic diversity also described by [23]. Findings of free-threshing hexaploid wheat are known in archaeological sites in Anatolia between 6000 and 7000 BC [25].

Agriculture appears in South Caucasus in the 6th millennium [26]. The ancient archeological findings of cereal grains in Georgia are known from Trialeti and Samegrelo (Dikha-Gudzuba, Zugdidi distr.) from Neolith at the end of 3rd millennium and in 2nd millennium [13]. Very recent studies on einkorn wheat domestication using amplified fragment length polymorphism (AFLP) show that *T. boeoticum* was domesticated in southeast Turkey in the Karacadag Mountains close to Diyarbakir [27]. The Samtskhe-Javakheti region is located between the Trialeti range and this place in Turkey and might be considered as area where cultivation of cereals occurred in very early historical to the time period.

## Conclusion

The flora of the Caucasus region includes many ancient species, and many forms are still dominant or co-dominant in the hotspot's plant communities. The region is harbors a remarkable concentration of economically important plants, particularly wild crop relatives such as wheat, rye and barley,

as well as grape, legumes and technical plants like flax. The most studied and detailed by archeology and history is the Near East. In spite of the fact that there are many cases of extinctions of landraces in Georgia, loss of a whole species. Monitoring in the area of Georgia needs report on arable lands ingredients or archeological excavations. The term genetic erosion is concerned to crop plants, and it will need contributions of scientific results to confirm the extinction and threats for landraces and local cultivars. It was basically grape, wheat, and barley agriculture although other crops like common millet, Italian millet, pea, lentil, chickpea, faba bean, etc. Therefore, it is necessary to investigate the landraces origin and use in the historically remnant country as Georgia.

The agriculture of the Caucasus region includes many ancient crops, and many forms are still dominant in the crop communities. The Samtskhe-Javakheti region also harbors a remarkable concentration of economically important crops such as wheat, rye and barley, as well as grape, legumes and technical plants like flax. The most studied and detailed by archeology and history is the Near East. The remaining of the ancient crops is in the Samtskhe-Javakheti region and they are used as healthy foods for the local population. The ancient crops are not used in the businesses and it has a good data for the need contribution of scientific results for use healthy food as for ancient crops and local cultivars.

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