



**HAWTHORN TREES ( CRATAEGUS) IN THE MOUNTAINS AND  
MOUNTAINOUS AREAS SONGARICA C. KOCH AND CRATAEGUS  
PONTICA C. KOCH ) IMPORTANCE OF SOIL RECLAMATION IN  
IMPROVING PROPERTIES**

**N.P.Mukhsimov, B.X.Mamutov, N.X.Ju'rayeva**

*Research Institute of Forestry, Tashkent, Uzbekistan*

*Email: [nurullo.mukhsimov@mail.ru](mailto:nurullo.mukhsimov@mail.ru),*

*E-mail: [nargizajorayeva2124@gmail.com](mailto:nargizajorayeva2124@gmail.com),*

*ORCID ID: [0009-0007-4995-6221](https://orcid.org/0009-0007-4995-6221), 0009-0007-7176-7988.*

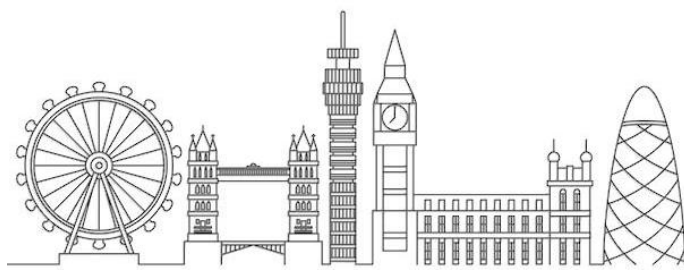
**Abstract.** *The article analyzes the melioration effect of hawthorn species ( Crataegus songarica C.Koch and Crataegus pontica C.Koch) growing in mountainous and hilly areas on the physical, chemical and biological properties of the soil. Based on scientific data, the effect of the hawthorn root system on soil structure, moisture regime and soil microflora is described.*

**Keywords.** *Dry mountain and sub-mountain areas, Crataegus songarica C. Koch, Crataegus pontica C. Koch, land reclamation properties, morpho-ecological properties, root system, soil physical and biological properties, soil porosity, water retention capacity, annual soil loss, microorganisms, symbiosis.*

**Introduction.** Hawthorn ( Crataegus L. ) — to the Rosaceae family belonging was many annual tree or bushman plant is the type. It is in nature mainly Europe, Asia and In North American territories wide widespread in Uzbekistan hawthorn mainly two species - Crataegus singer C. Koch ( Sugdiana ) hawthorn ) and Crataegus pontic C. Koch ( Pontica ) hawthorn ) Zarafshan, Turkestan, Hisar, Nurato and Blackberry mountain in the ranks widespread. These species, especially the mountain and mountain got in the regions soil to the conditions relatively demanding no, to the land durable and to the cold durable (Figure 1).

As is known, mountainous in the regions soil erosion, water mode disruption and fruitful of the layer loss - soil of degradation main from their appearances one is considered As a result of erosion physical, chemical soil and biological characteristics it gets worse, this and water and air mode and plants to grow negative impact shows [1,2,3].

In this case, the lands natural reclamation the situation of improvement the most effective from the methods one this is, of course, the soil tree and strengthening with shrubs, especially hawthorn ( Crataegus songarica, C. pontica, C. turkestanica ) of the types use effective is considered [3].





a)

b)

v)

g)

**Fig. 1. a)**  
**Sogdian hawthorn**

**b). Sogdian**  
**hawthorn fruit**

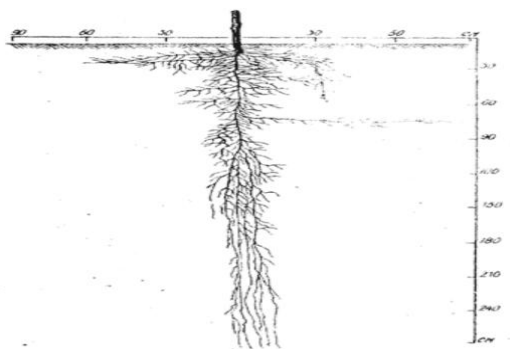
**c). Pontic**  
**hawthorn**

**g). Pontica**  
**hawthorn fruit**

Hawthorn morphology and ecology features. Hawthorn dry climate under the circumstances to grow adapted mesophyte-xerophyte plant is rocky and cliff on the ground both successful grows. Root xylent to the system owner 3-6 m deep in the soil come in, come in towards wide This allows it to extract water from deep layers of the soil even in drought conditions and increases its tolerance to dry environments. Main of the root diameter 1-2 cm in young trees, 1-2 cm in older trees and it is 6-8 cm [ 3,4,5 ].

The root system is adaptable to a variety of soil conditions and grows well in both rocky and sandy soils. In the hard rock layer, adventitious roots spread out at an angle of 30-45° from the main root. They spread widely in the 40-100 cm layer of soil, firmly anchoring the tree. Adventitious roots play a major role in absorbing nutrients and water from the soil (Figure 2).

Hawthorn roots often grow in symbiosis with mycorrhizal fungi. This symbiosis improves the absorption of minerals and accelerates the growth of roots into the deeper layers of the soil. In winter, the root structure is resistant to cold temperatures, not being damaged even in conditions down to -25°C [3].



**Figure 2. a). The root system of a two-year-old hawthorn seedling.**



**Figure 2. b). The root system of a three-year-old hawthorn seedling.**





**MODERN PROBLEMS IN EDUCATION AND THEIR SCIENTIFIC SOLUTIONS**

In mountainous and alpine environments, adult hawthorn trees increase soil organic matter content by 15–25% and water retention capacity by 10–18% [3,4].

**Table 1. Effect of hawthorn trees on soil physical and biological properties**

Indicators	Control (area not planted with hawthorn)	Field planted with hawthorn	Difference (%)
Soil porosity (%)	46.2	53.7	+16.2
Water retention capacity (%)	22.4	28.9	+29.0
Annual soil loss (t/ha)	17.6	6.3	-64.2

According to research conducted by scientists from Lancaster University in the UK, A. Ola., IC Dodd, and J. N. Quinton [5], it was found that adult hawthorn trees planted in mountainous and hilly areas increased the porosity of soils by 16.2% compared to the control area (without hawthorn planting), increased the water retention capacity of soils by 29.0%, reduced the leaching of fertile soils on slopes by 64.2%, and increased the number of microorganisms in the soil by up to 83.2%.

**Conclusions.** Hawthorn species serve as an effective land reclamation tool in improving the physical, chemical and biological properties of soils in the marshy mountainous and hilly areas. They provide effective water retention through the root system, the development of soil microflora and the stability of the land cover. Therefore, it is recommended to widely use the *Crataegus songarica* and *Crataegus pontica* species in forest reclamation works in the marshy mountainous and hilly areas of our republic.

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