

# Problems of the Effect of Ground Waters When Growing Low-Grown Seedlings of the Growth of Aprons and Pears in Pegant Soils

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**Abstract:** *This paper is devoted to the problem of growing planting material of apple and pear on clonal rootstocks, designed to create intensive gardens on saline soils. Salinization is a global problem in agriculture in arid and semi-arid regions of Uzbekistan. For the countries of Central Asia, there is a large area of secondary saline lands. The high concentration of salts in the soil profiles does not allow growing traditional crops in these lands. In this regard, this article covers the problems of the influence of groundwater, as well as their mineralization, the content of salts in them when growing low-growing seedlings of apple and pear rootstocks on saline soils.*

**Keywords:** groundwater, salinity, aggressiveness, saline soil, apple trees, pear, low-growing seedlings, rootstocks

## 1. Introduction

As is known, the close groundwater level for apple and pear is not acceptable. That apple and pears do not like very humid places. And as soon as their root system grows to the accumulation of groundwater, it will undergo a process of decay, and soon the trees die. Apple trees of certain varieties will grow well and develop if the groundwater level does not exceed two meters, the allowable depth of fresh groundwater is 1.5-2.0 m. Mineralized groundwater, namely such water in the arid regions of Uzbekistan, should lie deeper. Besides the groundwater level, their mineralization also plays an important role, i.e. their salt content. The site is considered suitable for gardening, if at low salinity of groundwater (from 0.5 to 1 gram per liter) their level does not exceed 2 meters. With significant salinity - up to 6 g / l, groundwater should be at least 3-4 m from the surface. For winter apple varieties, the minimum depth of mineralized groundwater is 3.0-3.5 m, summer varieties put up with a groundwater level closer to the surface — 2.5-3.0 m. Apple should not be planted on saline, saline and high carbonate (more than 12-15% of CaCO<sub>3</sub>) soils. In a humid climate, soil with a very dense clay horizon, lying at a depth of 40-90 cm, is unsuitable for planting apple trees. It becomes an insurmountable barrier to the roots, and therefore the tree will die in the first years of life. As for pears, this culture makes almost the same requirements for soil conditions as the apple tree. Some features create stocks. Pear, grafted on a pear, demanding on moisture, but does not tolerate close to the surface groundwater. It does not tolerate salinization, does not like compacted soils. A pear grafted on a quince, develops well on weakly saline soils, and with shallow groundwater, tolerates compacted soils.

Salinization is a global problem in agriculture in arid and semi-arid regions of Uzbekistan. For this reason, more than 1.5 million hectares of agricultural land are lost every year. For the countries of Central Asia, the presence of large areas of re-saline lands is typical. The high concentration of salts

in the soil profiles does not allow the cultivation of traditional crops in these regions in these lands.

## 2. Materials and methods of research

The Republic of Uzbekistan is a suburb of the island of Amudarya. The Territorial Horizons are the most extensive and extensive rivers in the world, with the exception of the cemetery. Malye has a wide range of cooking utensils, which can be used in the production of non-ferrous and non-ferrous metals in the subsoil of the subsoil.

Consider the effect of groundwater in growing low-growing seedlings of apple and pear rootstocks on saline soils under the conditions of the Khorezm region of the Republic of Uzbekistan.

The practical significance of our research lies in the fact that as a result of a complete study of the plant soil layers of the Khorezm region, having studied the accumulation of salts in the soils and underground layers of groundwater, assessing the impact of aggressiveness on the stocks, namely, taking into account the influence of a water-soil environment with aggressive properties, the salinity of groundwater and the amount of soluble salts, the amount of sulfate and chlorine ions in soil and water, specific proposals have been developed to improve the salinity of apple and pear trees Water nym at 50h25 see Scheme seating.

In the field of horticulture, some scientists were engaged in the influence on different varieties of seedlings of underground water-soil aggressive environment in the Republic of Uzbekistan, conducted research, but the results of their work were not published in scientific journals. In our opinion, the root system of seedlings, the retention of new planted seedlings are greatly influenced by the salinity of groundwater and the amount of soluble salts in groundwater, for this purpose, studies were conducted and results were obtained, the aggressive water-ground environment, salinity

of groundwater, properties salts dissolved in groundwater, factors of water-ground environment, affecting the rootstocks of low-growing varieties of apple and pear. These experiments in gardening under the conditions of the Republic of Uzbekistan were not previously involved for short growing apple and pear rootstocks, and in connection with this application of such a method, the ground waters that have different features were divided into four groups. The stocks corresponding to each group were grown on the basis of the aggressiveness of the water-soil environment, the degree of mineralization and the content of soluble salts, and recommendations were developed based on the results of the analysis. The distribution by groups of groundwater, by the degree of mineralization, and the content of soluble salts are summarized in Table 1.

The first group. Water-soil environment with weak aggressiveness. The salinity of groundwater in it is less than 1200 mg / l, the amount of water soluble salts is less than 0.20%. The total amount of sulfate and chlorine ions in water is less than 500 mg / l, in soil less than 0.06%.

For such conditions the following is recommended: for varieties of saplings it is necessary to apply light protection measures. Soils in these areas are washed under the influence of infiltration waters. At the same time, the processes of evaporation and salinization are not very developed and groundwater recharge is more than the amount of expenses for evaporation. Endurance in such conditions, tolerance to sulfate was observed in the "Hazarasp, Boborab" variety, corresponding to the M-9 stock.

The second group. Water-soil environment with medium aggressiveness. This water-soil environment has little effect on the roots of seedlings of varieties tolerant to sulfate. The salinity of groundwater in it is less than 5,000 mg / l, the amount of water soluble salts is less than 0.70%. The total amount of sulfate and chlorine ions in water is less than 3000 mg / l, in soil less than 0.50%.

For such conditions, the following is recommended: sulphate-tolerant stocks should be used and take into account that in areas where such groundwater is formed, the soil is seasonally washed in the river valleys, not salinated, salts do not accumulate, and a moderately acidic solvent process

prevails. Tolerance to such conditions, tolerance to sulfate was observed in the variety "Letny Khazarasp, Kavrak", corresponding to the stock MM-102.

The third group. Water-soil environment with strong aggressiveness. In this water-soil environment, the roots of seedlings require strong protection, it is required to choose rootstocks that are tolerant of sulphate. The salinity of groundwater in it is about 9000 mg / l, the amount of water soluble salts is up to 1.50%. The total amount of sulfate and chlorine ions in water is up to 6000 mg / l, in soil up to 1.0%. In zones where this environment is widespread, evaporation prevails over replenishment, continental salinization is observed.

For such conditions, the following is recommended: in the practice of choosing rootstocks for varieties of seedlings, it is necessary to apply strong root protection measures or medium protection measures for sulphate-tolerant seedlings. Tolerance to such conditions, tolerance to sulfate was observed in the varieties "Red Apple", "Winter Hazarasp", corresponding to the stock of MM-106.

The fourth group. Water-soil environment with very strong aggressiveness. In this water-soil environment, the roots of seedlings require strong protection, it is required to choose rootstocks that are resistant to sulfate, which have shown security. The salinity of groundwater in it is more than 10,000 mg / l, the amount of water-soluble salts is more than 1.5%. The total amount of sulfate and chlorine ions in water is more than 7000 mg / l, in soil more than 1.0%. In zones where such an environment prevails, soils are highly saline, the processes of evaporation, acid dissolution and continental salinization are strongly pronounced.

### 3. Results and discussion

For such conditions, it is recommended in the practice of selecting rootstocks for varieties of seedlings to apply strong protective measures for saplings tolerant to sulfate. In the experiments conducted for this group of water-ground environment, not a single stock of the six selected rootstocks M-7, M-9, MM-102, MM-104, MM-105, MM-106 was tested, the seedlings died in the first same year.

**Table 1:** Distribution by groups of groundwater according to the degree of mineralization and the content of soluble salts

Group	Groundwater salinity, mg/l	The amount of water soluble salts in the soil, %	The total amount of sulfate and chlorine ions in water, mg / l	The total amount of sulfate and chlorine ions in the soil, %
The first group	< 1200	< 0,20	< 500	< 0,06
The second group	≈5000	≈0,70	≈3000	≈0,50
The third group	≈9000	≈1,5	≈6000	≈1,0
The fourth group	>10000	> 1,5	> 7000	> 1,0

From the above and 1-table data, as a result of careful study of salt accumulation in the plant-soil layer of the Khorezm region, salt content in groundwater and soil, assessment of the influence of aggressive water-soil environment on apple trees, it can be concluded that The technology of growing rootstocks of seedlings that are resistant to aggressive water-soil environment, it is important to consider the following factors:

- 1) The influence of water-soil environment, which has an aggressive feature of a certain force.
- 2) Groundwater mineralization and the amount of soluble salts in groundwater.
- 3) The total amount of sulfate and chlorine ions in water and soil.

In our opinion, drainage waters with a salinity below 1.5-2.0

g / l should not be lowered below 1-2 meters, especially in years when irrigation water is scarce. Drainage water with a strong mineralization is considered a large reserve [1].

#### 4. Conclusions

Taking into account the above factors, as well as the research and published articles in scientific periodicals, it can be stated that the influence of the degree of soil salinity on low-growing rootstocks of apple and pear trees in Table No. 2 gives the limit of the PH state of the soil and its effect on the conditions for growing new varieties seedlings resistant to salt water.

From the data in Table-2, we can draw the following conclusions: for growing fruit seedlings of apple and pear trees, considered in these tests, P<sup>H</sup> is considered optimal when the condition is 6.5-7.0. As the degree of P<sup>H</sup> increases, various problems are observed.

Taking into account the above negative effects, when switching to gardening for planting seedlings on dense and very dense types of intensive and super intensive gardens, the quality of planting material will increase accordingly. On the basis of our results obtained from studies conducted in saline soils, it can be noted that our indicators are close to the results of experiments made by scientists earlier [2].

As a result, at present, a special interest in diversifying the incomes of farmers in the area under consideration is growing in most cases on the saline soils of fruit trees. To meet these conditions in our studies, the best results were obtained when planting an apple on such rootstocks as M-9, MM-102, MM-106, and for pears grafted on quince type "A", type "BA-29" in conditions of Uzbekistan for cultivation in intensive type gardens.

Thus, the lack of scientifically based recommendations of a practical nature makes it necessary to conduct detailed research aimed at improving the technology of propagation of rootstocks, growing seedlings on productive trees in saline soils, for the preservation, growth and productivity of fruit trees like apples and pears. In this regard, the study of the adaptability of clonal rootstocks of apple and pear to the growing conditions in the Khorezm region and their reproduction is one of the main urgent tasks in the Republic of Uzbekistan.

**Table 2:** P<sup>H</sup> state of the soil and its influence on the conditions of growing new varieties of seedlings resistant to saline waters

P <sup>H</sup>	Problems	Effect on the survivability of the roots of seedlings
< 5,5	Cl or Mg deficiency in the soil. Add lime required	Causes of short stature plants: 1. Low cation change volume 2. Contamination (Al <sub>3</sub> +) 3. Phosphorus deficiency.
5,5 – 6,5	Lack of lime in the soil.	For many plants, such conditions are considered acceptable, there is a tendency to phosphorus deficiency.
6,5 – 7,5	Soil p <sup>H</sup> range optimal.	The percentage of acidic cations (% BS) close to 100 %.
7,5 – 8,4	Lime in the soil participates	The soil has good filtering and circulation features. Phosphorus and

	freely.	microelements are absorbed sufficiently.
>8,4	Indicates a high soil natality.	The physical properties are very bad, the filtration is very complicated. The soil has the possibility of dissolving organic matter (humus). High P <sup>H</sup> is considered dangerous to plants.

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