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PROPERTIES OF STONY-GRAVELLY LIGHT SIEROZEM SOILS AND GRAPE CULTIVATION ON THEM

(A case study of Oltiariq District)

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Abstract

Grapevine growth, productivity and fruit quality are closely connected with soil properties, water availability and the correct selection of a cultivation site. This article examines the potential for developing viticulture on stony-gravelly light sierozem soils in the foothill areas of Oltiariq District, Fergana Region. It describes the suitability of sierozem, meadow-sierozem and meadow soils for grape cultivation and notes that quality yields may also be obtained on stony-gravelly land with a soil layer of at least 50–60 cm. The article outlines key considerations for establishing a vineyard, including site assessment, deep soil preparation, vineyard layout, protection from strong winds and access to irrigation. It also discusses the selection of grape varieties with different ripening periods and the cultivation of table and raisin grapes. Early- and mid-season varieties are identified in the source as suitable for stony-gravelly conditions in Oltiariq. The role of nursery site selection, crop rotation and water-saving practices, including drip irrigation, is also considered. The information presented provides a general basis for assessing viticulture opportunities in the district's foothill zone and for planning further research under local soil and climate conditions.

Keywords: grapevine, viticulture, stony-gravelly soils, light sierozem soils, soil properties, Oltiariq District.



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Introduction

During a meeting with a group of scholars at Tashkent State Agrarian University, President of the Republic of Uzbekistan Shavkat Mirziyoyev placed the development of horticulture and viticulture on the national policy agenda. He also heard specialists' views on establishing new crops and developing intensive horticulture, and set out tasks for the further development of agriculture. A number of resolutions and decrees of the President of the Republic of Uzbekistan are currently being adopted to support the further development of viticulture in the country.

Aim and objectives of the study. The study aims to examine the properties of stony-gravelly light sierozem soils in the foothill zone of Oltiariq District, Fergana Region, and to investigate grape cultivation under these conditions. Its principal objective is to assess the potential for establishing viticulture in such areas; particular attention is being given to developing this sector.

The main objectives of the study are as follows: to examine the properties of stony-gravelly light sierozem soils; to study grape cultivation on these soils; and to conduct phenological observations of grape development.

Research object and subject. The research concerns the establishment of viticulture on stony-gravelly light sierozem soils in the foothill part of Oltiariq District, Fergana Region; the identification of local and introduced grape varieties; and the study of their bioecological characteristics.

Research subject. The study examines grapevine morphology, growth, phenology, propagation and yield indicators under stony-gravelly light sierozem soil conditions, as well as the potential for introducing the findings into production.

State of prior research. No observations or research studies have been conducted on the development of viticulture on stony-gravelly light sierozem soils in



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Fergana Region. Experimental work is therefore being undertaken to support further scientific investigation.

Practical significance of the study. The findings may serve as an initial scientific source for studying grape cultivation and supporting the development of viticulture on stony-gravelly light sierozem soils.

The main part

A grapevine can grow and bear fruit in the same place for 40–50 years or longer. Its longevity, productivity, economic efficiency and ability to produce environmentally friendly fruit depend on the proper siting of vineyards, the careful selection of sites and varieties, and attentive maintenance. Establishing new vineyards, particularly under current market reforms, involves substantial capital expenditure. Errors in this process are difficult to correct. It is therefore important to select vineyard sites, prepare the soil, plan the vineyard layout, choose and position varieties, plant seedlings and carry out maintenance in a timely manner, drawing on scientific knowledge and advanced practice.

Uzbekistan's soil and climate conditions allow grape varieties with different ripening periods to be cultivated across the country. Vineyards are best established on open, well-lit, fertile land with a reliable water supply. Land on mountain and foothill slopes with gradients of up to 10° can also be used effectively for grape cultivation.

Vine growth, productivity and fruit quality depend to a considerable extent on soil properties. In Uzbekistan, sierozem, meadow-sierozem and meadow soils are considered suitable for grape cultivation. Quality yields can also be obtained on stony-gravelly land where the soil layer is at least 50–60 cm deep. Wind exposure should also be considered when selecting a vineyard site. Areas exposed to strong winds and lacking shelterbelts are hazardous for grapevines.



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Before planting grapevines, organic and mineral fertilisers are applied and the land is deeply ploughed. In particular, deep ploughing with a vineyard (plantation) plough to turn the soil to a depth of 60–70 cm improves the soil's physical and chemical properties and its air, water and thermal regimes, as well as plants' ability to absorb nutrients. It stimulates soil microbial activity, regulates water permeability and moisture-retention capacity, and suppresses weed germination, among other benefits. After land has been allocated for a vineyard, a site plan is prepared. It identifies the vineyard blocks and plots, roads, water sources, locations for shelterbelts, field shelters, storage buildings and other facilities. The relief of the allocated land, soil profile and varietal characteristics of the vines should be taken into account in the design.

To obtain higher yields from particular varieties and facilitate the proper implementation of variety-specific agronomic practices, it is generally advisable to select five to seven table-grape varieties with different ripening periods and five to six raisin varieties. This approach helps make efficient use of available labour, meet demand for table grapes over an extended period and provide processing plants with a steady supply of raw material. Table and raisin varieties have high requirements for nutrients, moisture, light and warmth.

Early- and mid-season varieties perform well on stony-gravelly land. Varieties with functionally female flowers (Husayni, Charos, Khasayni, Mercedes, Kishmish and Kelin Barmog) are planted together with polliniser varieties. These varieties are considered suitable for the conditions of Oltiariq and are reported to have high yields. They continue to be cultivated because of their high nutrient content and good quality, and are exported to various countries. Oltiariq District also has seven large refrigerated storage facilities, where different grape varieties are stored until May and supplied in marketable condition.



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A level, slightly sloping and weed-free site, with fertile soil and no infestation by diseases or agricultural pests, should be allocated for a grape nursery. A continuous water supply should be available. It is advisable to locate nurseries close to a main road.

A five-field crop rotation system is used to maintain the high fertility of nursery soils. Under this system, three fields are planted with alfalfa and two are used as nurseries. Alfalfa is considered the best crop for this purpose in Uzbekistan. If alfalfa is unavailable, it may be replaced by inter-row cultivated crops or vegetables. For normal irrigation, a gradient of 0.004–0.008° is stated to be suitable; the source's following explanation of this gradient is incomplete and unclear. When selecting a vineyard site, the grapevine's requirements for soil conditions and wind regime should also be considered. As noted above, grapevines adapt readily to various soil types, including sites that are poorly suited to other agricultural crops. This characteristic is used to stabilise sandy areas and to develop stony and gravelly soils in mountains and foothills, as well as land where groundwater lies close to the surface. Depending on local conditions, supplementary water sources and drip irrigation are used in foothill zones. This is currently a useful means of conserving water.

Conclusions

The information considered in this article indicates that viticulture can be developed on stony-gravelly light sierozem soils in the foothill areas of Oltiariq District, provided that the soil profile and local growing conditions are taken into account. The source reports that quality grape yields can be obtained where the soil layer is at least 50–60 cm deep. Site selection should also consider sunlight, water availability, slope and exposure to strong winds.



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Before planting, the land should be properly prepared. Deep ploughing, vineyard planning, suitable irrigation and protection from wind can help create conditions for vine establishment and maintenance. Variety selection should reflect local soil and climate conditions; the article identifies early- and mid-season varieties as suitable for stony-gravelly land. Nursery sites should be fertile, supplied with water and managed to maintain soil productivity.

Overall, successful grape cultivation depends on choosing suitable planting material and varieties, assessing the site carefully and carrying out timely agronomic practices. Further field research is needed to evaluate the performance and productivity of individual varieties under the specific conditions of Oltiariq District.

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