



THE FORAGE POTENTIAL OF CROTALARIA JUNCEA AND ITS ROLE IN SOIL ENHANCEMENT

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Abstract: *This study explores the agronomic and ecological benefits of Crotalaria juncea as a forage crop in arid and semi-arid regions. The research was conducted in the Jizzakh region, where the plant's growth dynamics, survival rate, and yield potential were analyzed. The results demonstrate that Crotalaria juncea exhibits high adaptability to dry conditions, with a survival rate of 82–88% and a maximum yield of 19.2 t/ha, significantly surpassing natural pasture productivity. Additionally, its ability to fix nitrogen enhances soil fertility, making it a promising candidate for sustainable agriculture and livestock feeding. The study highlights the necessity of integrating Crotalaria juncea into pasture improvement programs to address forage shortages and maintain ecological balance.*

Keywords: *Crotalaria juncea, forage crop, soil improvement, nitrogen fixation, pasture productivity, arid regions, sustainable agriculture.*

Relevance of the topic. Improving the forage production system and increasing its productivity in the agriculture of our republic is one of the important tasks. Crotalaria juncea is of great importance as a nitrogen-fixing and soil fertility improving plant, which is not only a source of high-quality forage for animals, but also a means of soil improvement. Currently, the problem of low productivity and seasonal variability of forage crops in arid regions, in particular in semi-desert and hilly regions, remains relevant. Also, the increasing demand for feed resources in livestock farming, the intensive use of natural pastures and their degradation due to man-made impacts require innovative approaches to forage production.



In order to overcome these problems, it is important to study the possibilities of using high-protein and agroecologically effective crops such as *Crotalaria juncea*. This plant has a short growing season and plays an important role in increasing soil fertility and improving the quality of forage. Therefore, this study aims to in-depth study of the growth conditions of *Crotalaria juncea*, its response to agrotechnological measures, and its impact on forage quality.

Research source and methods. The research work was conducted in pastures with light-brown soil in the hilly areas of Jizzakh region. For the study, *Crotalaria juncea* was planted and tested, and its growth and development characteristics, as well as its impact on yield and forage quality were evaluated.

During the planned field experiments, phenological observations, biometric measurements, assessment of forage reserves, and determination of agroecological indicators were carried out. This study used internationally accepted scientific and methodological approaches in plant science, forage crop breeding, and plant physiology.

The results will serve to develop effective recommendations for increasing the nutritional quality of *Crotalaria juncea*, improving soil fertility, and optimizing forage production in arid regions.

Results and analysis of the study. The study was conducted in field experiments organized to study the agroecological characteristics of *Crotalaria juncea* in the hilly regions of Jizzakh region. This area is located at an altitude of 660–680 meters above sea level, characterized by light-gray soils and a dry climate. The soil composition consists of fine-grained clay and loam, creating moderately favorable conditions for plant development.

Indicators	Results
Research location	Jizzakh region, foothill areas
Altitude (m)	660–680
Soil type	Light gray soil, clay and sandy deposits
Germination rate (%)	82–88
Vegetation period	3 years



Plant height (cm)	75–130
Survival rate (%)	Stable (number of plants remained unchanged during vegetation)
Maximum yield (t/ha)	19.2 т/га
Yield difference compared to natural pastures	4–5 times higher
Importance for livestock	High-quality forage source
Ecological significance	Improves soil fertility, fixes nitrogen

This table highlights *Crotalaria juncea* as a valuable crop for forage and soil enrichment.

In the field experiments, *Crotalaria juncea* was planted and its growth processes, viability and productivity were studied. In the initial vegetative stage of the plant, the germination rate was high, and intensive growth was observed mainly in the first year. However, in subsequent years, the viability of the plants was stable, and the number of bushes did not change much. According to the results of the study, the survival rate of *Crotalaria juncea* seedlings was in the range of 82–88%, which confirms the high adaptation of this plant to arid conditions.

The maximum growth and harvest period of *Crotalaria juncea* fell on the third year of its vegetation. The plant height in different conditions ranged from 75–130 cm, which is a high result for forage crops in arid regions. The highest yield reached 19.2 t/ha, which is 4–5 times higher than that of natural pastures.

These results confirm the possibility of recommending *Crotalaria juncea* as a source of high-quality forage for livestock. At the same time, its biological nitrogen-fixing properties serve to increase soil fertility and ensure ecological stability.

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