

The significance of alhagi in climate moderation and prevention of pastures degradation

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Abstract. The formation of the Aral Sea has a negative effect on the climate conditions of the Central Asian region, and the climate of Uzbekistan is characterized by sharp continental, abnormal heat and cold air. The summer heat has a significant effect on the flora and green cover of the hot pastures (yaylak).

1 Introduction

Global climate change, that is, an increase in air temperature by 1-2 degrees compared to the long-term norm, has a great negative impact on the environment, especially on the green cover of pastures. Currently, as a result of rising temperatures on the earth's surface, the area of desert territories is increasing and there is a need for the effective use of these territories. Pastures in these areas are suitable for year-round use and are the cheapest source of feed. But their productivity is very low, so it is very important to organize gardens of Alhagi to increase their productivity [1-18].

It is advisable to use phyto- and forest melioration methods of natural pastures to increase the productivity of small horned cattle and increase their number. For this purpose, it is important to establish hedgerows and artificial phytocenoses around the existing pastures. Because it has been found in many experiments to reduce the influence of a number of adverse factors of nature (wind speed, air temperature, soil and air humidity) and to increase the productivity of green cover by establishing hedgerows. For example, the productivity of agricultural crops increases in irrigated lands by establishing hedgerows, while the hedgerows established in desert areas prevent the movement of sand by the wind and create favorable conditions for plants growing in pastures.

The effect of hedgerows in desert and pastures (yaylak) is manifested in the establishment of a microclimate between the rows, good growth and development of plants. Pasture is one of the most important sources of feed for livestock. In different countries of the world, the area of pastures is different, in Australia it is 362.3, in the USA 256.0, in Spain 23.1, in Canada 20.8, in New Zealand 12.6, in Great Britain 12.5, in France 12.3, in Poland 5.2 and in Italy it is 5.2 million hectares [10]. Pastures in their states are divided into perennial herbaceous, shrubby, and semi-shrub pastures according to vegetation cover. The duration of feeding livestock in these pastures is also different, in the forest zone, this

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period is 125-150 days, in the forest-desert zone, 170 days, and in the desert zone, 200 days [2]. There are about 210 million sandy areas in Central Asia, and these areas are widely used for cattle breeding. In the territory of Uzbekistan, such areas are 25 million hectares [3].

Desert plants grow well even under severe xerothermic conditions, desert pastures provide cheap feed, year-round availability, high variability and diversity of nutrient levels [4]. One of the disadvantages of these pastures is their low productivity (1 – 3 centner/hectare of dry mass), seasonality and rapid changes in yield during the year [5].

According to scientists N.T. Nechaev, N.P. Pelt [6], L.S. Gaev [7], pasture productivity increased by 2 times in favorable years and decreased by 3-5 times in unfavorable years. At the same time, the processes of anthropogenic impact on the desert ecosystem have always been monitored [8]. The main tract of pastures in desert and semi-desert areas has become unusable as a result of overgrazing, cutting down trees for firewood, expanding the area of irrigated land, and building an irrigation and road network [9].

The impact of the external climate on obtaining a high and quality harvest from agricultural crops in the Bukhara region is very large. Especially in the summer months, during the ripening of wheat in May and June, a sharp rise in temperature causes the grain to harden without being fully formed, and the hot heat in July and August causes the cotton plant to drop its pods, flowers, and up to 10-day-old bolls. The reason for observing such a situation is the disappearance of the green cover of the desert and pastures on the cultivated areas, the soil and sand are heated, and the general weather is more than normal.

In recent years, the increase in air temperature on the globe has caused the area of desert areas to increase dramatically. Desert areas are widely used as pastures. The productivity of desert pastures in the territory of Uzbekistan is very low, that is, it is 1-3 centner/hectare. This limits the year-round use of desert pastures.

Based on the above problems, one of the important solutions for climate mitigation in cultural areas is the creation of green cover on desert pastures. One of the best plants for creating green cover in the Bukhara desert pastures is cranberry. It has the peculiarity of propagation by seeds and vegetative root buds. Reproduction by seeds (generative reproduction) of most species is due to the influence of the environment on the formation of reproductive organs. Flowering, seed ripening, natural germination, etc. are influenced by the external environment. As a result of the influence of environmental factors and other reasons, some plants have adapted to the method of vegetative propagation. One of these plants is alhagi (camel thorn).

Alhagi belongs to the legume family; there are 4 species of it in Uzbekistan (Picture. 1).
- * *Alhagi canescens* (Regel) B Keller Shap – gray alhagi - * *Alhagi kirghisorum* Schrenk – Kyrgyz alhagi - * *Alhagi pseudalhagi* (m.Bieb) Dasv.ex B. Keller Shap – artificial alhagi - * *Alhagi persarum* Boiss – Persian alhagi. According to the life form, yantok is a herbaceous, long-rhizome, thorny, perennial plant with strong lignified tap roots and drying surfaces towards the base (hemicryptophyte).

The species of alhagi produce generative organs well in natural conditions, produce flowers, pollinate and produce seeds. Germination of linden seeds germinates well in laboratory conditions (humidity 70-90%, temperature 30-35%) and germination is 40-60%. By the method of scorification, it is possible to reach 95-98% A number of scientists observed the sprouting of the berry from its seed under natural conditions. A number of scientists observed the sprouting of the berry from its seed under natural conditions. For example, M.N. Davleshina in the deserts of Nurota [11],



Fig.1. Alhagi in its natural conditions.

A.D. Gushin states that they could not determine the germination of yantak seeds in the conditions of Tashkent [12]. It has been proven that the seed germination of Alhagi can be preserved for up to 100 years [13], but in 1977-1978, Kh. Mavlanov found and observed many sprouts of yantak on the shores of Oktom Lake in Bogot district of Khorezm region [14].

Alhagi seeds are stony seeds, which are surrounded by a hard shell (husk). Due to the poor moisture permeability of this skin, the moisture required for the germination of the zygote in the seed is not absorbed. In nature, the bad quality of its seeds is related to the anatomic and physiological structure of its seeds. The weight of 1000 seeds is 5-6 grams. The lack of water content prevents the zygote from growing in the seed. Here, hereditary characteristics should also be taken into account. In fact, because alhagi is a forest plant by origin, a large amount of water and a high temperature of +35+40 degrees are required for the germination of its seeds. Such conditions are difficult to find in the desert (hilly) region at the same time (early spring), that is, the humidity may be sufficient in spring (March) but the temperature is low.

Because the seeds of the yantok are hard and stony, their viability is preserved for a long time (hyper-viability). In the summer months, the temperature is sufficient (high), but the humidity is low, which prevents its germination. Two environmental factors, water and temperature, must be sufficient (suitable) for the normal growth of the sycamore plant in hilly areas. It is in the conditions of Bukhara that the rise of flood waters in the summer months increases the possibility of germinating seeds of yantok in fertile lands. Therefore, it is necessary to collect pulses of alhagi, clean the seeds and plant them and organize alhagi fields. (Figures -2,3.)



Fig. 2. Alhagi seeds (pulses).



Fig. 3. Drying alhagi seeds

4 Conclusion

According to scientific data, in nature, alhagi has the characteristic of 3-6% seed reproduction. As can be seen from the above, it is very unlikely that the berry will reproduce from seeds in nature. But despite the fact that it is very difficult to reproduce from seeds, this plant is widespread in the countries of Central Asia and, similarly, in many countries of the globe. In most areas, they occupy very large areas. In natural conditions, the thickness of seedlings can be from 2-3 thousand bushes to 10 thousand bushes per hectare. The species of alhagi are necessary raw materials for the preparation of nectar, essential oil, vitamins, dyes and healing preparations, and non-alcoholic beverages. In addition, it can be widely used for food purposes, to enrich the soil with nitrogen, to strengthen mobile sands, and to prevent soil erosion. But alhagi has been a valuable fodder, pasture and the only hay plant for desert and semi-desert livestock since ancient times.

The underground part of alhagi is 10-20 times longer than its surface part. In areas with close underground water, along reservoirs and canals, its root reaches 2-4 meters, and in deserts and semi-deserts, it can reach 30-40 meters. Like the vertical root, lateral horizontal roots can develop into strong branches and reach 40-50 meters. Its diameter varies from 0.5 cm to 5 cm depending on age. The wide distribution of alhagi in nature and its occurrence in various soils (gypsum, loam, stony, saline) and in unfavorable climate (high temperature) conditions of water scarcity depend on its strongly developed root system that always reaches underground water. Due to its origin as a forest plant, its demand for water is quite high. One alhagi bush can clear up to 2.5 liters of water on a sunny day, alhagi bushes on one hectare can absorb up to 350 tons of underground water and make it clear. By using these aspects of alhagi, it is possible to moderate the surrounding weather by establishing alhagi fields in the pastures of Bukhara. This makes it possible to get a high yield of other agricultural crops by preventing the arrival of hot summer heat from pastures and deserts to cultivated areas [15]. In addition, it is important to establish and seed orchards, considering that yants improve water circulation in nature and have a positive effect on the microclimate of the area where they grow. On average, 20-30 grams of bilberry pods of alhagi were harvested from bilberry orchards in Gijduvon district of Bukhara region, which is important for the development of alhagi seed production.

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