BLACK HALOXYLON PLANTS PHYTOGENIC EFFECT AT DIFFERENT DISTANCES ON WORMWOOD-EPHEMERAL VEGETATION PRODUCTIVITY

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Abstract

The study purpose is to determine the optimal distance between black haloxylon neighboring plants. The black haloxylon plants influence at different distances on aboveground phytomass annual growth of wormwood-ephemeral vegetation was studied by laying transects between neighboring individuals. With a very close location of its individuals (the distance between individuals is 3.6 m), the wormwood-ephemeral vegetation productivity decreases sharply, and with a significant distance from each other (the distance between individuals is 6.3-8.1 m) it sharply decreases. It has been established that under the Karnabchul conditions, this edificator species individual's optimal placement relative to each other is 4.5-5.4 m (on average 4.85 m). With this black haloxylon plants arrangement, their negative influence is significantly reduced, which leads to an increase in wormwood-ephemeral vegetation productivity.

Key words: black haloxylon, influence on environmental conditions, phytogenic field, distance between individuals, productivity, wormwood-ephemeral vegetation.

Introduction.

The arboreal shrub black haloxylon (Haloxylon aphyllum (Minkw.) Iljin), which, as the most effective phytomeliorant, is widely used in multicomponent creation shrub-grass pastures

and pasture protection belts (Shamsutdinov, 1975, 1987; Ashurmetov etc., 1998), has a high and cenosis-forming ability (Mirshnichenko, 1986; Shamsutdinov etc., 2016).

It has been established that under the black haloxylon phytogenic influence, sharp fluctuations in abiotic environmental factors significantly decrease and become more moderate. As a black haloxylon litter leaching result, salinization occurs, mainly in the phytogenic field inner part. Thus, the black haloxylon impact on environmental conditions, on the one hand, is positive: a more moderate microclimate is created in the phytogenic field (Shamsutdinov etc., 2016), which contributes to better growth and development, high yields accumulation of wormwood-ephemeral vegetation fodder mass (Shamsutdinov etc., 1998, 2014, 2016; Ubaydullaev, Mamatov, 2019) and wormwood-ephemeral vegetation occurs ecological niches differentiation (Shamsutdinov etc., 2013); on the other hand, negative, which is expressed in soil salinization and a decrease in the phytogenic field illumination (Shamsutdinov etc., 2016), due to which thickened black haloxylon forests significantly increase the reduced productivity area, and with strongly thickened ones, the area without vegetation of the lower tiers reaches 70-85 %. Therefore, the optimal distance establishment between neighboring black haloxylon plants, where their phytogenic fields merge so that the edificator species effective influence continuity on subordinate plants is ensured, is not only scientific, but also of great practical importance.

Purpose, object and research methodology.

In order to establish the optimal distance between black haloxylon neighboring plants in the "Plan-chop" Karnabchul tract in the black haloxylon-wormwood-ephemeral phytocoenosis, their influence on the annual increase in the wormwood-ephemeral vegetation aboveground phytomass was studied by laying transects between neighboring individuals.

To determine the herbal plants aboveground phytomass, transects 50 cm wide were built between the nearest individuals, their length depending on the distance between these black haloxylon neighboring individuals trunks. The transects were subdivided into 50x30 cm areas (Fig. 1). Plants that entered these sites were cut. Then they were dried and weighed. After that, the herbaceous plants aboveground phytomass parameters per 1 m^2 were determined.

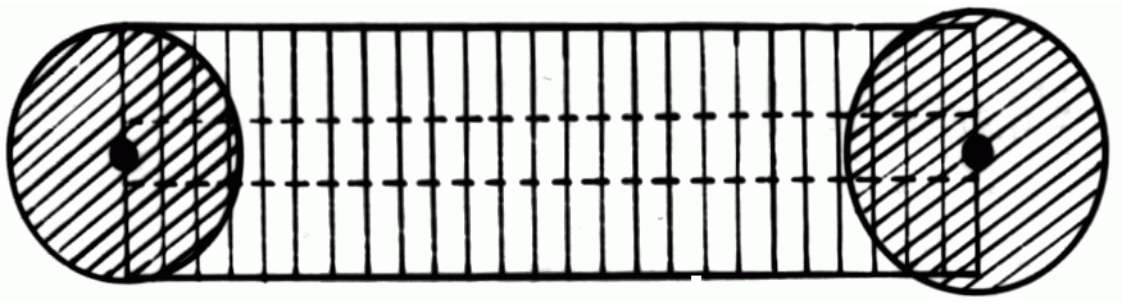
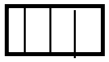


Fig.1. Scheme of constructing transects between individuals of black haloxylon

EXPLANATIONS:

 - black haloxylon crown projection;

 - transect for studying spreading wormwood;

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To determine the annual increase in spreading wormwood aboveground phytomass, transects 2 m wide were built between the same individuals where transects were laid to determine the herbaceous plants aboveground phytomass. These transects were divided into 200x30 cm areas (Fig.1). On these plots, the annual increase in the aboveground phytomass of this phytometer species was determined by cutting off the stern part with further drying and weighing. On the basis of the materials obtained, the indicators of the annual increase in the aboveground phytomass of wormwood per 1 m^2 were calculated. By adding up the indicators of the aboveground phytomass of herbaceous plants and the annual growth of wormwood spreading, the total annual growth of the aboveground phytomass of wormwood-ephemeral vegetation per 1 m^2 was determined.

The materials obtained were processed by the methods of mathematical statistics (Zaitsev, 1984).

Results and discussion

The annual increase in wormwood-ephemeral vegetation aboveground phytomass, depending on black haloxylon plants distance from each other, turned out to be unequal. This indicator values, when plants of the edificator species are located close (at a distance of 3.6 m between them), change along a one-vertex curve, i.e. with distance from the first black haloxylon plant phytogenic field center to the second, the phytomass of wormwood-ephemeral vegetation first increases, reaching its maximum in the middle of the transect at 180-210 cm distance (59.14-61.81 g / m^2), and with further distance from the first and approaching the second center of the phytogenic field, a decrease in this indicator is observed (Fig.2). This indicates that with such a distance between plants of the edificator species from each other, their phytogenic fields overlap and phytogenic effects are observed throughout the entire length of this space**.**

When individuals of black haloxylon are located at 4.5 and 5.4 m distance from each other, the highest yields on pastures are accumulated in the near-crown spaces in comparison with the control areas of pastures. In the intercrown space, in the middle part of the transect, although a decrease in the value of this indicator is observed, it remains significantly higher than the control one (Fig. 2).

With further distance of black haloxylon plants from each other, as the intensity of the phytogenic field decreases towards the middle part of the transect, the annual growth of the

aboveground phytomass of wormwood-ephemeral vegetation significantly decreases: in the central part of the 6.3 m transect, this indicator is 33.75-41.39 g / m^2; 7.2 m - 24.34-35.29 g / m^2, and 8.1 m even lower - 23.33-32.83 g / m^2. It should be noted here that as the plants of the edificator species move away from each other, the space with low productivity also increases. On the 6.3 m transect, this space is located at 300-360 cm distance, at 7.2 m - 300-450 cm, and 8.1 m even more - 300-540 cm.

From the data given above, it follows that the greatest effect in terms of increasing the productivity of wormwood-ephemeral pastures is observed when the distance between two neighboring individuals of black haloxylon is 4.5-5.4 m. At a closer location, with an increase in the density of black haloxylon, their phytogenic fields overlap. As a result, within the phytogenic field, the zone with a high annual increase in the aboveground phytomass of wormwood-ephemeral vegetation decreases. Such a phytocenosis is dominated by a space under the influence of a minimal phytogenic field (undercrown space) of black haloxylon, where, as a result of soil salinization and a decrease in illumination (Shamsutdinov etc., 2016), spreading wormwood, bulbous bluegrass, thick-stemmed sedge and other plants are displaced. Ultimately, these pastures form an area of low productivity. At the same time, in plantations, where the distance between individuals of black haloxylon significantly increases, zones appear in the intercrown spaces that are not controlled by the phytogenic effects of the edificator species. Here, the annual increase in the aboveground phytomass of wormwood-ephemeral vegetation is noticeably lower than in the near-crown space.

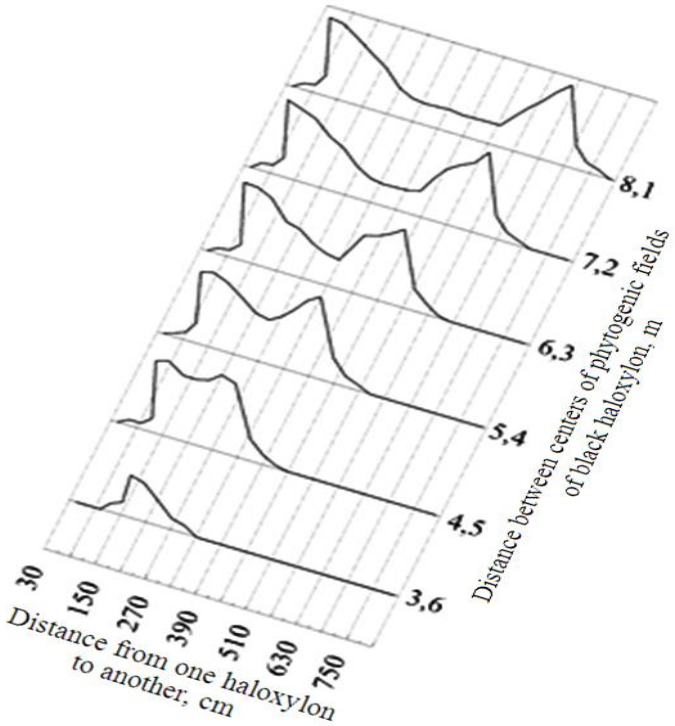

Fig.2. Annual growth of the aboveground phytomass (g / m^2 in air-dry weight) of wormwood-ephemeral vegetation, depending on the distance of black haloxylon individuals from each other

Conclusion

1. In black haloxylon-wormwood-ephemeral pastures, the plants productivity of the lower tiers depends on plants distribution of the edificator species (black haloxylon). With a very close location of its individuals (the distance between individuals is 3.6 m), as a result of a significant overlap of their phytogenic fields, the illumination significantly decreases and the zone with saline soil increases. And this leads to the displacement of light-loving and unstable plant species in soil salinity. Ultimately, the productivity of wormwood-ephemeral vegetation sharply decreases.
2. With a considerable distance from each other of individuals of black haloxylon (distance between individuals is 6.3-8.1 m), zones appear in the vegetation cover where the phytogenic effect of this edificator species is not observed. In these zones, the annual increase in the aboveground phytomass of wormwood-ephemeral vegetation sharply decreases and approaches the control.
3. On the pasture areas of Karnabchul, such a placement of individuals of black haloxylon should be considered optimal when the distance between them is 4.5-5.4 m (on average 4.85 m). With this arrangement of individuals of the edificator species and with their diffuse distribution in the entire phytocenosis, an integral phytogenic field of black haloxylon is created. In these pastures, the negative influence of black haloxylon is significantly reduced, the zones outside the phytogenic influence of this edificator species are reduced to a minimum. This, in turn, leads to an increase in the annual increase in the aboveground phytomass of wormwood-ephemeral pastures with the participation of black haloxylon, an increase in their stability both in composition, structure, and productivity.

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