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CURRENT ASPECTS OF COMPATIBLE CROPS OF CORN AND SORGHUM

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Abstract. To create productive and adapted forage agrophytocenoses and more complete used of biological factors; mixed crops (compatible, compacted, sowing, strip, simple and complex grass mixtures) are increasingly used. In these crops, the possibility of effective use of agro climatic resources due to formation of highly productive and adaptive photosynthetic systems put.

Key words: crop production, mixed, compatible crops, agrophytocenoses, trophic connections

In world crop production, co-cultivation of field crops has been used for a long time - in China, India, Egypt, later - in Rome, Byzantium, and in the Middle Ages - in Europe. In nature, plants grow most often in the form of plant communities, so the idea of growing certain species of plants in the field's man borrowed from nature itself.

There are several concepts of co-cultivation: "mixed", "compatible", "compacted" crops, they are all mixed, but differ in the number of individual species and their spatial distribution in one crop. The main purpose in crop production is to increase yields and product quality, in feed production - mainly to improve feed quality.

Mixed crops have become widespread in Western Europe, where they used to grow a variety of field crops, both for grain purposes and for green manure and green fodder. Compatible crops are most common in Bulgaria, Poland, Romania, the Czech Republic, Slovakia, Germany and the former Yugoslavia [7]. The leading country in terms of growing compatible crops of fodder crops is Germany, where about 70% of total fodder production is obtain from compatible and intermediate crops [8].

The development of systems for the formation of sustainable agrophytocenoses and the expansion of the species composition of forage crops, including non-traditional, ensuring stable production of feed, balanced in essential nutrients, is a real way to include biological factors inn system of intensification processes.

Modern intensive crop production technologies require the use of chemical plant protection products against diseases, pests and weeds. Most herbicides, for example, have an appropriate species range of toxic effects, and their use in mixed crops is extremely limited.

For each soil-climatic zone, it is necessary to design more stable and productive with improved quality feed agrophytocenoses, taking into account the interaction of their components, differing in diversity in species and trophic relationships [1].

Compatible crops are the sowing of two or more species of plants in one field with the appropriate alternation of rows or individual strips of crops. For sowing the seeds of crops are not mix, but sown separately. The purpose of compatible crops, as well as mixed - to improve the quality of feed. Harvesting of such crops carried out perpendicular to the direction of the rows, which contributes to the mixing of the green mass of the components.

The advantage of compatible crops is that they allow differentiation of fertilizer application and crop care. At compatible, especially strip crops, cultures have less negative influence on each other; negative interaction virtually ruled out. When sowing crops with different stem heights, tall crops better lit, and the weight of one plant is greater than in single-species crops [9].

Agrophytocenoses, consisting of several species of cultivated plants, has a number of advantages over single-species crops: - forms a photosynthetic apparatus of a larger area, in different tiers and with increasing number of tiers increases the efficiency of assimilation of solar radiation by plants and their participation in photosynthesis;

Due to the placement of root systems of different species in the soil layers, minerals and moisture are more fully use.

Due to the difference in the maximum periods of consumption of moisture and nutrients by species included in the compatible agrophytocenoses, it is possible to avoid pronounced peak situations and to meet the needs of sowing in the main factors of life.

Introduction into sowing of species with different biological characteristics leads to a fuller use of hydrothermal resources of certain years and the formation of relatively stable yields. In compatible crops, a denser herbage is create, which allows you to successfully suppress weeds;

Agrophytocenoses with different species are less damage by pests and diseases than single-species crops. Dense vegetation slows down the development of water and wind erosion, helps to preserve soil fertility [2, 5].

From an economic point of view, poly-species crops are profitable due to more efficient, compared to single-species crops, land use, even distribution of workers' working time and maximum use of agricultural machinery [4].

In the process of physiological functions related to the consumption of nutrients and moisture, the release through the aboveground and underground parts of metabolic products, plants change the environment. Thus, an environmental factor for neighboring plants, and associated other living organisms. Therefore, in co-sowing for each component conditions other than one-species are create. This affects the supply of nutrients and moisture to plants and the amount of biomass formed and its chemical composition [7].

Thus, the main advantage of single-species crops is their high manufacturability. The disadvantages of the latter include the incomplete use of sown

area, especially crops of wide-row sowing, as well as low forage quality of individual crops. To eliminate these shortcomings in crop production use the joint cultivation of different crops - mixed and compatible crops, blends [3].

Currently, a considerable amount of experimental material on the combination of plant species in mixed crops has been accumulate. But the theory and practice of the ratio of components, regulation of the dynamics of growth and development of plants, mineral nutrition, use of allelopathic potential, phytocenotic selection has not been properly developed [1, 2, 5].

One of the main advantages of compatible crops is the increase of the total leaf surface, improvement of morpho-biological parameters of plants due to more optimal location of the leaf surface, and as a result the possibility of increasing the absorption of solar radiation and its fuller use for photosynthesis. Crops a significant amount of solar energy is lost forever [5].

Traditionally, the leading crop in our country for harvesting silage is corn. Nevertheless, due to the drought, it is impossible to get high yields of corn. One way to solve this problem is to replace corn with equivalent feed quality, but more productive in extreme conditions of sorghum hybrids.

Currently, special importance is given to the joint cultivation of corn and sorghum with compaction crops, which increases the protein content in the green mass, as well as the collection of nutrients per unit area [6]. According to M. Ya. Shevnikova researches, during the period of ejection of corn stalks, sugar sorghum and Sudan grass, the yield of their mixtures with soybeans was at the level of single-species crops of cereal components or slightly exceeded them.

According to the observations of B. S. Vekshyna [5], in dry years, corn, which is grown in combination with high-protein components, lags far behind in growth and development, between legumes and cereals there is competition for the use of soil moisture. Maize and sorghum belong to crops in which photosynthesis was carried out by type C_4.

The main difference from C_3 photosynthesis is less demanding to air saturation of CO2 and its high absorption is due to low release during respiration. These crops

are able to actively carry out the processes of assimilation and transformation of light energy at an air temperature of 35-40°C, as well as economically and highly productively use moisture to form a unit of dry mass. That is why the plants of corn and sugar sorghum are highly resistant to adverse growing conditions [8].

However, the green mass of single-species sorghum crops has a number of disadvantages, in particular lower protein content and more fiber compared to corn. Therefore, a promising method for silage production is the joint sowing of sorghum with corn, the use of which makes it possible to increase the yield of feed units and metabolic energy per one ha compared to single-species crops of traditional silage - corn.

The use of co-sowing of corn and sorghum increases the harvest, compared to crops of corn in its pure form, green mass by 57.4%, dry matter - by 30.8%, DOE - by 26.6%, crude protein - by 19.0 %.

As for the chemical composition and energy value of green mass of the above mixtures, the use of compatible crops of corn and sorghum will significantly reduce the energy nutrition of their vegetative mass, as the difference in DOE content in its 1 kg is insignificant.

The advantages of using compatible crops of sorghum with corn include the possibility of mowing them later compared to single crops of corn, because sorghum has a longer growing season.

Thus, in adverse weather conditions, in particular very dry summers, in order to increase silage production and energy savings, it is advisable to use sorghum as a component for compatible crops with corn, which allows increasing feed production per unit area by 50% - 60%, compared using single-species crops of corn, and helps to increase the efficiency of land use.

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