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PRODUCTIVITY OF ARTIFICIAL GRASS STANDS DEPENDING ON THEIR SATURATION WITH ALFALFA

G. I. Demydas, Doctor of Agricultural Sciences, Professor
V. P. Kovalenko, P. U. Kovbasiuk, Candidates of Agricultural Sciences,
Yu. V. Demtsiura, a post-graduate student

The authors have analyzed productivity of alfalfa-cereal grass stands depending on the proportion of their saturation with alfalfa. On the basis of studies it was found which elements of technology influence stand productivity the most

Pure sowings, alfalfa-cereal grass stands, organic feed, fodder production biologization, productivity

The level of forage production in Ukraine does not meet the needs of livestock breeding nowadays. It is known that in terms of a single unit of feed rations of animals must have at least 105-110 g of digestible protein. Currently, on the average, 1 unit of forage has less than 25-30% of protein. It is established that such protein deficiency causes about 20-25% shortfall of animal products, fodder costs increase by 30-32%, and their prime cost – by 45-50%. Therefore, the urgent task is to increase production of high quality, balanced fodder.

The aim of the work is to study the formation of alfalfa-cereal grass mixtures depending on the proportion of alfalfa in them and determine the most productive grass mixtures for Northern Forest-Steppe of Ukraine, that provide high and stable yields for a long period of time.

The experiment was started in 2009, and the studies were conducted in the Right-bank Forest-Steppe during 2010-2013 in research laboratories of the Department of fodder production, irrigation and meteorology in steady rotations of Agronomy Research Station of the National University of Life and Environmental Sciences of Ukraine.

The research area soil is typical low-humic black soil; the soil texture is rough silt with average clay loam.

The researches were repeated for four times, variant distribution was systematic. The area of the research plot was 100 m², of the discount plot – 50 m².

The forecrops were stubble betweencrops sown after spring barley (white mustard + oats + peas). Alfalfa-cereal grass mixtures were sown under cover of oats, the rate of which was reduced by 30%. Cover crops were harvested for fodder purposes in the early panicle earing phase. Alfalfa-cereal grass mixtures were sown with the seeder SZT-3.6.

The study was performed according to conventional methods of fodder production, grassland science and crop growing. Solving of the problems, according to the research program, was carried out in a stationary experiment according to the scheme given in the table.

Farming of alfalfa-cereal grass mixtures is common for Forest-Steppe zone except of investigated problems. Grass stand was collected in the phase of cereal earing and legume budding.

Fertilizers were applied in combinations P_{60} K_{90}, and N_{90} P_{60} K_{90}, on the basis of obtaining at least 30 t/ha of green mass with due account for inventory of nitrogen, phosphorus and potassium in the soil, grass stand nitrogen fixation and removal of these substances by agrophytocenosis harvest.

In studies they were used such forms of fertilizers: 34% ammonium nitrate, 20% simple granular superphosphate and 40% potassium salt. Phosphate and potash fertilizers were applied each year in the fall, nitrogen ones – in early spring.

Weather conditions during the study were generally favorable to the growth and development of perennial grasses.

It was found that the yield of artificial grass stand is greatly affected by not only the weather, but the share of alfalfa in grass mixture as well.

The highest yield of alfalfa was obtained in the second year of use, when plants showed the greatest viability, had significant leaf surface and the largest stand density.

On the basis of four years of data it was established that the highest productivity grass mixture formed in terms of its saturation with alfalfa in the amount of 65-75%. Herewith, the variants either without fertilization or with applying only phosphorus-potassium P_{90} K_{60} had the highest yields during the years of research, which in average were 35 - 37.6 t/ha.

` Formation of high yield grass mixture in terms of such saturation with legumes was provided by high nitrogen fixation of alfalfa, which positively affected the growth and development of grass stand, and the formation of high yields as well.

It should be mentioned that in terms of saturation of grass stand with alfalfa up to 65-75% and applying N_{90} P_{90} K_{60}, the productivity appeared to be significantly lower and in average for the research years was 31.2-31.7 t/ha. Yield reduce can be explained by the fact that in terms of a large nitrogen fixation by alfalfa and applying fertilizers N_{90} P_{90} K_{60} the conditions of nitrogen nutrition deteriorate, and its negative impact on the growth and development of alfalfa causes its heavy loss in grass stand.

On the basis of studies it was found that saturation of grass mixture with alfalfa up to 45-55% provided high yields, but lower when compared to grass mixtures, where the proportion of alfalfa reached 65-75%.

The lowest yield was obtained in pure alfalfa grass stand, pure cereal crops (Digraphis arundinacea L. + red fescue) and grass mixture with its saturation with alfalfa lower than 35%.

As the studies showed pure crops of both alfalfa and cereal grasses form low yields, so are unpromising in grass growing.

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