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ВИЗНАЧЕННЯ ЩІЛЬНОСТІ ЛЮЦЕРНО-ЗЛАКОВОГО ТРАВСТОЮ ЗАЛЕЖНО ВІД ВИДОВОГО СКЛАДУ ТА РІВНЯ МІНЕРАЛЬНОГО ЖИВЛЕННЯ В УМОВАХ ПРАВОБЕРЕЖНОГО ЛІСОСТЕПУ УКРАЇНИ

Анотація. У статті наведено результати трьохрічних досліджень з вирощування люцерно-злакових травосумішок в умовах Правобережного Лісостепу України. Досліджено вплив видового складу травосумішок, норми висіву люцерно-злакового травостою та норм мінерального живлення на формування щільності ценозів, встановлено найоптимальніші види злакових компонентів, норми висіву люцерни посівної для створення травосумішок із люцерною посівною. Встановлено, що показник щільності люцерно-злакових травосумішок залежав від погодних умов, видового складу травосумішки, норм висіву та удобрення. Найбільшу кількість пагонів 1285шт./м² забезпечила травосумішка до складу якої входять люцерна посівна, стоколос безостий, пажитниця пасовищна. Суттєвий вплив на щільність травостою забезпечило вплив мінеральних добрив N₆₀P₆₀K₉₀ та стимулятор росту Фумар.

Ключові слова: люцерно-злакова травосумішка, видовий склад, удобрення, щільність.

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ОПРЕДЕЛЕНИЕ ПЛОТНОСТИ ЛЮЦЕРНО-ЗЛАКОВОГО ТРАВСТОЯ В ЗАВИСИМОСТИ ОТ ВИДОВОГО СОСТАВА И УРОВНЯ МИНЕРАЛЬНОГО ПИТАНИЯ В УСЛОВИЯХ ПРАВОБЕРЕЖНОЙ ЛЕСОСТЕПИ УКРАИНЫ

Аннотация. В статье приведены результаты трехлетних исследований по выращиванию люцерно-злаковых травосмесей в условиях Правобережной Лесостепи Украины. Исследовано влияние видового состава травосмесей, нормы высева люцерно-злакового травостоя и норм минерального питания на формирование плотности ценозов, установлено оптимальные виды злаковых компонентов, нормы высева люцерны посевной для создания травосмесей с люцерной посевной. Установлено, что показатель плотности люцерно-злаковых травосмесей зависел от погодных условий, видового состава травосмеси, норм высева и удобрения. Наибольшее количество побегов 1285шт./м² обеспечила травосмеси в состав которых входят люцерна посевная, костер безостый, райграс пастбищный. Существенное влияние на плотность травостоя обеспечило влияние минеральных удобрений N₆₀P₆₀K₉₀ и стимулятор роста Фумар.

Ключевые слова: люцерно-злаковая травосмесь, видовой состав, удобрения, плотность.

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DENSITY DETERMINATION OF ALFALFA-CEREAL HERBAGE DEPENDING ON SPECIES COMPOSITION AND LEVEL OF MINERAL NUTRITION IN CONDITIONS RIGHT-BANK FOREST-STEPPE OF UKRAINE

Abstract. The article presents results of three-year studies on cultivation alfalfa and cereal grasses in conditions Right Bank Forest-steppe Ukraine. The influences of grass mixtures species composition, seeding rates of alfalfa and cereal grasses and doses of mineral nutrition on density formation of coenoses, the most optimal types of grass components, seeding rates of alfalfa for creation grass mixtures with alfalfa was established. was find out, that density of alfalfa-cereal grass mixtures depended on weather conditions, species composition of grass mixture, seeding rates and fertilizing doses. The largest number of shoots 1285 pcs / m² was provided by grass mixture, which includes alfalfa, awnless brome and perennial ryegrass. Substantial influence on grass density was provided by influence of mineral fertilizers N₆₀P₆₀K₉₀ and growth stimulator Fumar.

Key words: alfalfa-cereal grass mixture, species composition, fertilizing, density.

Problem formulation. In our time, the main problem in cattle fattening is balancing by protein feed, therefore, alfalfa and cereal grasses play an important role in high-

yielding use, and they have an important ecological security role and energy saving value. All this in complex, gives better results than cultivating annual and single-species

feed crops, and is a further subject searching of grasses intensification in combination with elements of technologies their cultivation [1].

Yield, feed value, durability, resistance to a certain mode of meadow land using significantly depends on the species and varietal composition of the formed herbage. One of the main conditions for the productive sowed herbage creation is proper selection of grasses and grass mixtures, with taking into account biological and cenotic features of the components, level of mineral nutrition, as well environmental and agrotechnical factors [2,3].

Analysis of recent research and publications. Sensible selection of grass mixtures for various uses plays an important role in creation of highly productive herbage. For the proper selection of grass mixtures, it is necessary to establish internal and interspecific functional relationships between plants in phytocoenoses, which necessitates studying the biological properties of individual components, grown on typical black soils, from the moment of their germination [4].

An important indicator which influence on meadow coenoses formation and transformation is grass density. From magnitude of this indicator also depends yield of the culture [5]. With it increasing the overall productivity of alfalfa-cereal mixtures also increases. Grass density depends, to a degree, on soil-climatic conditions and provision by soil nutrients.

Thus, can be established, that on density of both, valuable sowed herbage and motley grass, strongly influence have intensity of grass mowing and, as well, the types and methods of fertilizing. In particular, amount of cereal components is affected on the presence or absence of mineral nitrogen. Grasses, in most cases, react positively on

phosphorus and potassium fertilizers introduction[8].

Purpose of study. Was to establish density formation of alfalfa and cereal herbage, depending on specific grass characteristics and investigated factors for further management improvement of the plants resistance mechanisms alfalfa and cereal herbage and productivity formation through fertilizing system and growth stimulator Fumar.

Methods of research. Research on the study of alfalfa and cereal herbage density, depending on cultivation technology in the northern part of Right-bank Forest-Steppe of Ukraine, was conducted at the scientific laboratory of fodder production and stationary crop rotation of department at Production Unit of the National University of Life and Environmental Sciences of Ukraine "Agronomic Research Station" (Pshenychne village, Vasylykivsky district, Kyiv region), on typical black low-humus soils, rough-pew-loamy by mechanical composition. Experimental station is located in the Right-bank Forest-Steppe, which is a part of Bila Tserkva agro-soil region. Plowing layer has a grainy-dust-free, sublime-nut-grainy structure. The parent rock is at a depth 210 cm and contains 9-11% calcium carbonates. By mechanical composition, soil has 37% of physical clay and 63% of sand. Humus content in the arable layer is 4.2-4.6%, absorption capacity is 31-32 mg-ek per 100 g soil, degree of saturation with the bases is about 90%. In a soil layer 0-20 cm contains 0.2-0.31% of total nitrogen, 0,15-0,25% phosphorus and 2,3-2,5% of potassium. The content of mobile phosphorus is 4.0-5.5 mg per 100 g soil (high), exchangeable potassium – 15.0-16.5 mg per 100 g soil (above average), easyhydrolyzed nitrogen – about 14-16 mg / 100 g (higher the average). Reaction of soil solution is close to the neutral pH of salt extract 6.7-7.0.

Таблиця 1

Density of alfalfa grass mixtures depending on species composition and level of mineral nutrition (average for 2014-2016), pcs / m²

| Grass mixture and sowing rate | Fertilizing | Alfalfa | Cereals | Total |
|---|---|---------|---------|-------|
| Alfalfa 16 kg/ha | Without fertilizers (<i>control</i>) | 686 | – | 686 |
| | P ₆₀ K ₉₀ | 709 | – | 709 |
| | N ₆₀ P ₆₀ K ₉₀ | 756 | – | 756 |
| | N ₆₀ P ₆₀ K ₉₀ + growth stimulator Fumar | 770 | – | 770 |
| Alfalfa 12 kg/ha + meadow fescue 8 kg/ha + reed fescue 10 kg/ha | Without fertilizers (<i>control</i>) | 457 | 620 | 1077 |
| | P ₆₀ K ₉₀ | 489 | 643 | 1132 |
| | N ₆₀ P ₆₀ K ₉₀ | 508 | 677 | 1185 |
| | N ₆₀ P ₆₀ K ₉₀ + growth stimulator Fumar | 517 | 680 | 1197 |
| Alfalfa 10 kg/ha + awnless brome 14 kg/ha + perennial ryegrass 10 kg/ha | Without fertilizers (<i>control</i>) | 497 | 647 | 1144 |
| | P ₆₀ K ₉₀ | 523 | 678 | 1201 |
| | N ₆₀ P ₆₀ K ₉₀ | 547 | 705 | 1252 |
| | N ₆₀ P ₆₀ K ₉₀ +growth stimulator Fumar | 558 | 727 | 1285 |
| Alfalfa 12 kg/ha + reed fescue 14 kg/ha + reed fescue 14 kg/ha | Without fertilizers (<i>control</i>) | 478 | 628 | 1106 |
| | P ₆₀ K ₉₀ | 501 | 659 | 1160 |
| | N ₆₀ P ₆₀ K ₉₀ | 531 | 690 | 1221 |
| | N ₆₀ P ₆₀ K ₉₀ + growth stimulator Fumar | 540 | 701 | 1241 |
| Alfalfa 10 kg/ha + cock's-foot grass 8 kg/ha + reed fescue 8 kg/ha | Without fertilizers (<i>control</i>) | 467 | 630 | 1097 |
| | P ₆₀ K ₉₀ | 497 | 661 | 1158 |
| | N ₆₀ P ₆₀ K ₉₀ | 516 | 687 | 1203 |
| | N ₆₀ P ₆₀ K ₉₀ + growth stimulator Fumar | 530 | 695 | 1225 |
| Alfalfa 8 kg/ha + awnless brome 17 kg/ha + reed fescue 8 kg/ha | Without fertilizers (<i>control</i>) | 460 | 618 | 1078 |
| | P ₆₀ K ₉₀ | 493 | 645 | 1138 |
| | N ₆₀ P ₆₀ K ₉₀ | 510 | 678 | 1188 |
| | N ₆₀ P ₆₀ K ₉₀ + growth stimulator Fumar | 522 | 684 | 1206 |

According to the methodology and determined program, by spring sowing in 2014 was followed a three-factor experiment after precursor one-year cereals, namely maize on green fodder. Repeat of experiment – quadruple. All grass mixtures were fertilized in accordance with scheme of experiment by following types of fertilizers: nitric – in the form of ammonium nitrate (34% a. i.), potassium – potassium magnesia (26% a.i.), phosphorus – superphosphate (18.7% a.i.), as well as growth stimulator Fumar in the range 2l / ha on phase of grass tillering and alfalfa stooling.

Research was carried out in accordance with generally accepted methods for fodder production and meadow growing [6].

Main results of research. It is known that the density of any herbage, including alfalfa, is an important indicator, since shoots are an important organ on which the leaf surface is formed, which has a decisive role in yield formation [7].

Taking into account importance of this indicator, in conducted experiments was studied changes in the density of alfalfa and cereal herbage depending on species composition, seeding rates and fertilizing levels. Among the studied elements the most influential factors in terms of density were species composition and fertilizing. Significant changes in herbage density were observed in the first year of research. Due to these factors, during all years of research, the most intense tillering formation was observed in awnless brome, perennial ryegrass, as well in all grass mixtures with these species. Crops were characterized by intense growth and formed herbage with greater height, leaf width, intense sprout formation, which positively affected on its botanical composition, leaf surface formation and yield (Table 1).

Thus, alfalfa-cereal grass mixtures, which consisted of awnless brome, perennial ryegrass, provided a large number of shoots, their greater height and leaf surface, which ultimately contributed to the formation of higher yields. At the same time, the mentioned cultures were distinguished not only by intense sprout formation but also by high phytocoenic activity. Thus, in grass mixtures, they used resources of the environment more thoroughly than other types; therefore, during the years of research they formed quickly and became dominant in above-ground phytomass accumulation.

On the basis of research, it was found that largest density (Table 1) was formed by grass mixtures: alfalfa +

awnless brome + perennial ryegrass with mineral fertilizers $N_{60}P_{60}K_{90}$ and growth stimulator Phumar application it was 1285 pieces / m^2 . Applying of such important technology element as mineral fertilizers introduction, can to some extent control the process of forming optimum density of herbage, and significantly affect herbage productivity and quality of the feed.

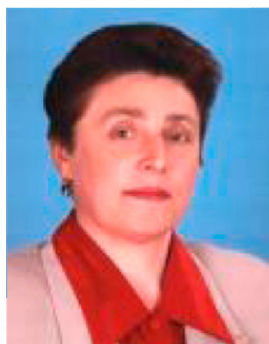
Little bit lower density, was provided by grass mixtures, which consisted from alfalfa + meadow fescue + reed fescue, without fertilizer, it was 1077 pcs. / m^2 .

It is common knowledge that yields of grasses consists from different types of shoots, their organs, and density of standing. In addition, plant density – an important factor that determines intensity and nature of relationship between plants.

Conclusions. Consequently, density of alfalfa-cereal mixtures is one of important indicators, which directly affects on yield of perennial grasses and most depends on species composition and level of mineral nutrition. The greatest number of shoots and density increasing were observed in grass mixtures: alfalfa + awnless brome + perennial ryegrass with mineral fertilizers $N_{60}P_{60}K_{90}$ and growth stimulator Phumar application it was 1285 pcs. / m^2 .

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СТРУКТУРА ВРОЖАЮ РІПАКУ ЯРОГО ЗАЛЕЖНО ВІД ШИРИНИ МІЖРЯДЬ ТА НОРМИ ВИСІВУ НАСІННЯ В УМОВАХ ПРАВОБЕРЕЖНОГО ЛІСОСТЕПУ УКРАЇНИ

Анотація. Наведено результати досліджень, спрямованих на вивчення та визначення комплексного впливу норм висіву та ширини міжрядь на формування продуктивності рослин ріпаку ярого сорту Сіріус та гібриду Озарно в умовах Правобережного Лісостепу України, а також визначення зв'язків між досліджуваними показниками зі структурними елементами врожаю. Дослідження проводились протягом 2015-2017 рр. в умовах стаціонарної польової сівозміни кафедри рослинництва у ВП НУБіП України «Агрономічна дослідна станція». Ґрунти — чорноземи типові (глибокі) малогумусні, грубопилувато-легкосуглинкового механічного складу. Дослідження проводилися з сортом Сіріус та