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Scientific and technological fundamentals of organic meadow culture

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The purpose. To justify scientific and technological bases of development of organic meadow culture. **Methods.** General scientific — hypotheses, induction and deduction, analogy, generalization; special — field, laboratory, mathematical-statistical, calculation-comparative. **Results.** Scientific and technological fundamentals are generated of organic meadow culture which provide implementation of complex of measures not only on production of ecologically safety feedstuff for animals with maximal use of biological factors of intensification, but also save environment, in particular soils, water sources, biodiversity. The basic practical methods of heightening productive longevity of pod-bearing plants in artificial meadow legume-cereal agro-ecosystems is correct selection of ingredients in view of ecological-biological and cenosis factors, implementation of the method of disposition of grass family and leguminous ingredients. It provides serial disposition of grass family and leguminous ingredients in separate lines with rather narrow row widths or narrow strips, substitution of leguminous ingredients on years of use in legume-cereal grass stands, etc. **Conclusions.** Creation of perennial artificial grass stands with increased content of pod-bearing plants is one of the most perspective directions of support of organic meadow culture. Their productivity without fertilization on grey loess soils variates within the limits of 7 – 10 t/hectare of dry solid matter, that in 1,7 – 2,5 times is more in comparison with cereal grass stand. Among legume-cereal grass stands the most productive with the greatest accumulation of symbiotic nitrogen within the limits of 150 – 170 kg/hectare are Lucerne-cereal coenosises. As nature protection measure on natural forage grasslands it is desirable to apply phytomelioration, when instead of importation of chemical improvers (lime, dolomite powder, gypsum, etc.), which pollute environment, it is recommended to sow perennial grasses, resistant against the heightened acidity or soil salinity.

Key words: *bacteria preparations,* legume-cereal *phytocenoses, productivity, dry solid matter, liming, environmental control, organic production.*

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Natural forage is overwhelmingly both an environmentally friendly area and a source of (clean organic) environmentally friendly forage is an important part of eco-tourism, which in combination with organic production meets the requirements of sustainable development and sustainable use of nature [1, 2]. In the development of the tourism industry, it is necessary to develop and implement a program for the development of eco-tourism, in particular agrotourism, in which considerable attention is paid to the quality of food as an important element of quality of service.

An integral part of organic production is the development and implementation of a set of measures aimed at the conservation of flora and fauna of meadow pastures by creating a network of reserves, reserves, hunting and reindeer keeping and grazing animals in enclosures [3-6].

In organic feed production, increased attention should be paid to quality control of feed by certified laboratories. Feeds must meet the requirements of the state standards of Ukraine, which provides for control not only of basic quality indicators, but also of safety indicators [1].

In recent years, due to the intensification of the processes of climate aridization and xerophyticisation of the vegetation cover, there has been a need to search and implement in the Forest-Steppe and even Polissia for sustainable development. Drought-resistant species from the mesoxyrophytes and xeromesophytes group

for the sustainable management of organic forage production should introduce drought-tolerant species of forage plants or irrigation [7].

In farms certified for organic production there is a need for enhanced quality control of feed [8, 9].

Organic feed production combined with appropriate livestock management is an integral link between crop and animal husbandry and an important element of organic production as a whole. For Ukraine, the development of organic feed production should go hand in hand with the development of the livestock industry and the increase in the number of cattle, not only dairy but also meat. Livestock breeding makes it possible to obtain organic fertilizers, which are the source of nutrients in the soil for organic production. Optimal load per hectare of forage is to bring up to 1.5 heads of cattle or 15 sheep, which will make it possible to produce and bring into the soil 10 tonnes of organic matter, which will provide high and sufficient yield not only for crops of forage group, but also for other crops [10].

Natural forage and hayfields and pastures are a complex integrated system in which all components are functionally interconnected by the metabolic processes and energy flows. The patterns that characterize natural meadows are at the heart of existence and sowing meadows. In the formation of sown herbs, as a rule, it is necessary to include perennial cereals and legumes in the mixtures, taking into account the basic principles of component selection. Creating sowing grasses with a high content of legumes is one of the most promising areas for organic bulb farming. The inclusion of legumes in the composition of legume-cerebral coenoses without the introduction of mineral nitrogen increases the productivity of meadow land by 1.5-2.5, and the collection of protein - by 2-3 times compared with cereals [8, 9, 11]. Legumes are not known to be durable. Therefore, the main provisions and practical measures to increase their productive longevity in sown meadow legumes and cereals agrocenoses are formulated. Productive longevity of the legumes is influenced not only by the correct selection of components, but also by the ways of placement of cereals and legumes (the best way is by alternately placing cereals and legumes in separate rows with narrow aisles or narrow strips), replacement of legumes by years of use cereals, rational combination of mineral and symbiotic nitrogen by years of use, etc. [8, 9, 12].

The productivity of legumes and grass mixtures without the application of mineral fertilizers, due to the action of symbiotic nitrogen, is usually high. According to our data, their productivity on gray forest soils for inclusion in grass mixtures of different types of perennial legumes in the control version without the use of bacterial preparations and lime fluctuated within 7.30-10.72 t / ha of dry weight. And it was 1.7-2.5 times higher in comparison with the stalkless stalk (Table 1).

From the use of nitrogen-fixing and phospho-mobilizing drugs, it increased by 5-21%, and from liming - by 6-10%. On all legumes and cereals, the greatest productivity gains were due to the combined use of nitrogen-fixing and phospho-mobilizing drugs. Lucerne sowing and oyster goat responded best to the lime soil in compatible crops.

Long-term studies show that legume components in the legume-cerebral coenoses, depending on soil and climatic factors in Polesie and the northern part of the forest-steppe, accumulate in the range of 50 to 200 kg / ha of symbiotic fixed nitrogen. Average weighted indicators of its accumulation of legumes are shown in table 2. Most of it in compatible crops with cereal species accumulate alfalfa sowing and aspartic sand.

1. Productivity of mixtures of perennial legumes with thistle without depending on the use of bacterial preparations and liming of soil, t / ha of dry weight (average for 2016-2018)

Herbaceous mixture (types of grasses and seed rates, kg / ha)	Liming	Microbiological preparation			
		control	nitrogen- fixing	phosphorus mobile-phased	nitrogen-fixing + phosphorous mobile-phased -
Clover meadow –10 + stockworm– 15	control	7,30	7,77	7,45	7,92
	liming	7,60	8,22	7,48	8,48
Lucerne sowing - 10 + Stockworms - 15	control	9,58	10,76	10,62	11,83
	liming	10,72	11,02	10,90	11,92
Horned lollipop –7+ stocky tail - 15	control	8,90	10,10	9,24	10,62
	liming	8,91	10,27	9,36	10,73
Eastern goat – 15 + Stockworm -	control	7,46	8,29	7,63	8,47
	liming	7,95	8,54	8,41	8,65
Stockless Blade - 30 (control)		4,26			
Stockless Blade – 30 + N_{120}		6,69			
HIP_{05} by factors, t / ha of dry weight: herbage - 0.44; bacterial preparation - 0,38; liming - 0,36					
Note. Control - an option without lime, without the use of bacterial preparations, and without the introduction of nitrogen on the scalp.					

To enhance the ecological role of meadow land, measures are being taken to improve grassland ecosystems in combination with conservation measures, which are to preserve a wide range of biodiversity of native and sown grassland vegetation and to protect soil from erosion, and to protect water from pollution.

It should be borne in mind that as a conservation measure on natural forage, it is desirable to use phytomelioration, when instead of chemical ameliorants (lime, dolomite flour, gypsum, etc.), which undoubtedly pollute the environment, sow perennial grasses, acid resistance or increased resistance. Phytomeliorative ability on saline soils is characterized by sweetcorn, which, in addition to high yields, tolerates toxic salts.

In the case of organic production, it is advisable to apply organic fertilizers (manure, siderata, etc.) at doses of 10-30 t / ha in terms of manure, when the fodder lands are leached on the mechanical composition of soils. The dose of non-litter manure (semi-liquid, liquid and slurry effluents) is calculated by the maximum content of nitrogen or nutrient (nitrogen, phosphorus or potassium) [7].

2. Approximate amount of symbiotic fixed nitrogen accumulated by legumes in meadow legume cereals phytocenoses, kg / ha

Herbs	Symbiotic Nitrogen
Herbaceous sowing	
Lucerne cereal	150-170
Clover and grass	130-150
Creeper-cereal-grass	110-130
Sweet-cereal	100-120
Esparto cereal	150-170
Natural herbage	
Leguminous cereals of different types of legumes	70-100
Note 1. Data are given for bean component content at (50-60)%. At the content of legumes at the level of (30-50)% symbiotic nitrogen is accumulated in 1.2-1.5 times less, and for (60-80)% - in 1.2-1.5 times more. Note 2: Data are provided for optimal soil and climatic conditions for a particular type of legume component. Adverb 3. The experiments used alfalfa sowing, horned glacier and sand aspartame.	

Conclusions

The scientific and technological foundations of organic bulbs include the introduction of a set of measures not only for the production of environmentally friendly animal feeds with the maximum use of biological factors of intensification, but also for the conservation of the environment, in particular soils, water sources, biodiversity and more.

Creating long-growing seedlings with a high content of legumes is one of the most promising areas of organic growing. Their fertilizer-free productivity ranges from 7.30-10.72 t / ha of dry weight, 1.7-2.5 times higher than cereals.

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