The article presents the results of a study of the species diversity of the count and the number of waterfowl and near-water bird species during the spring migration on the lakes of Semey region. The features of accounting for the number of waterfowl and near-water birds during the spring migration, the influence and results of spring hunting are considered. Own research was carried out in hunting wetlands on the lakes Sasykkol, Krivankol and Balyktikol, belonging to the Semipalatinsk interdistrict society of hunters and fishermen of the city of Semey. The research material was real, diving ducks and other waterfowl, which are local and migratory species on the lakes Krivankol, Sasykkol and Balyktykol. In spring, birds fly to us, overcoming vast spaces, tired and exhausted. To continue migration and successful nesting, it is extremely important for them to have a large supply of fat resources. First of all, it concerns females. Spring hunting is a powerful limiting factor, as evidenced by scientific research.

***Key words**: birds, census, abundance, dynamics, population.*

IRSTI 68.35.00; 68.35.31

B. Nasiyev
Zhangir khan West Kazakhstan Agrarian-Technical University

STUDY OF THE EFFECTS OF CUT HEIGHT ON THE PRODUCTIVITY OF SUDAN GRASS

***Abstract:** The article presents research data on the development of adaptive technologies for cultivation of Sudanese grass in the dry steppe zone of Western Kazakhstan. Sudan grass – as a drought-resistant and plastic crop has a great appeal among farmers. One of the important points of its technology is the height of the cut of the mowing mass. According to research data, in Western Kazakhstan, to increase productivity and quality, it is advisable to mow the green mass of Sudanese grass at the level of 5 cm. In studies under this regime, the average yield of green mass of Sudanese grass for 3 years was 118.83 c/ha. With the productivity of feed units of 23.15 c/ha, protein collection was at the level of 2.16 c/ha. The cut height of 5 cm is optimal for growing Sudanese grass after harvesting.*

***Key words:** Sudan grass, adaptive technology, cut height, yield, quality.*

The solution to the problem of increasing the production of meat and milk can be provided by the accelerated development of feed production. To do this, it is necessary to review the structure of raw materials sources and the production technology of energy-saturated high-protein feed. To bring feed production to a higher level, it is necessary to further diversify crop production (increase in the structure of high-protein forage crops), increase productivity and eliminate protein deficiency by bringing the crude protein content to 13-14%, and exchange energy to 10-11 MJ per 1 kg of dry matter using adaptive and innovative technologies.

In this regard, in the near future, according to the program for the development of the agro-industrial complex until 2017-2021 as a whole, the crop industry will continue to diversify agricultural crops by replacing part of the wheat area with more popular crops (oilseeds, barley, corn, forage crops) [1].

An important factor in increasing the efficiency of crop diversification in Western Kazakhstan and reducing the dependence of crop productivity on weather conditions is the expansion of crops that are most adapted to unstable moisture, such as chickpeas, Sudan grass, sorghum, corn and sunflower.

In recent years, in Western Kazakhstan, due to the diversification of agricultural production, commodity producers have widely begun to cultivate drought-resistant Sudanese grass. High environmental plasticity and otavnost, the ability to form a good mass during the summer depression of perennial grasses, the ability to sow in several terms and excellent eating of green mass by all herbivores, put it in a number of indispensable components of the green conveyor. The value of Sudan grass is also invaluable as a universal crop that is equally suitable for making hay, haylage, grass flour and silage, as well as for using green mass for feeding and grazing. Sudanese grass after mowing or rational bleed quickly grows and within a day gives an increase of 5-10 cm. Due to its high quality, the Sudanese grass can be used in haymaking and pasture modes and in a green conveyor on field lands. The productivity of Sudanese grass both in the main mowing and Otava is largely determined by the mowing time, and the question of the period of use of Sudanese grass in the literature is interpreted very differently. Many authors recommend cleaning the Sudan grass for green food at the beginning of broom sweeping [9, 10]. Some researchers are inclined to recommend harvesting Sudanese grass for green food in the phase of complete tubulation [2]. The

nature of the growth of Sudanese grass is greatly influenced by the height of the cut of plants during harvesting. Most researchers recommend mowing at a height of 6-8 cm [3, 4].

The aim of the research is to study the dependence of the yield of Sudanese grass on the height of the cut of grass stands.

To achieve this goal, a field experiment was conducted in 2018-2020 at the experimental field of the Zhangir Khan wkatu the project: "Development of adaptive technologies of forage and oil-bearing crops cultivation in relation to the conditions of West Kazakhstan".

The objects of research are single-species crops of Sudanese grass.

Calculation of plants standing density on shoots and before harvesting allows to determine the influence of the studied factor on conditions of shoots and loss of plants during vegetation.

Study of growth dynamics allows to define the period of the most intensive growth.

Photosynthetic activity of cultures is studied by the standard technique [5]. Photosynthetic activity characterize productional processes of crops. The determination of the main photosynthetic parameters in the phases of crop development.

One leaf area was calculated by Anikeeva-Kutuzov folmula: LA= 2/3p*h, where p - width of leaf, cm; h-length of leaf, cm.

It is possible to determine influence of term and height of main hay crop on harvest of aftermath and general efficiency of culture by carrying out observation of recovery ability of Sudan grass.

Besides special researches for correct explanation of results of field experiments, regular visual observations of condition of crops in the same hours are made.

Determination of their botanical structure is carried out for the determination of qualitative composition of herbages.

The analysis of harvest structure allows to study influence of conditions of cultivation and methods of agrotechnology on features of harvest forage formation and oil-bearing crops, serves as indirect assessment of production quality.

Harvesting and accounting of harvest is carried out by continuous method.

Laboratory methods:

Chemical composition and nutritiousness of vegetable mass of forage crops and silage mass of sunflower by standard techniques:

general nitrogen and crude protein point 3 State Standard 13496.4-93;

crude cellulose by State Standard 13496.2-91;

crude fat according by State Standard 13496.15-97;

crude ashes by weight method by State Standard 26226-95;

nitrogen-free extract by subtraction from 100% of the contents of crude cellulose, crude ashes, crude fat and crude protein; phosphorus by photometric method according to State Standard 26657-97;

potassium by ardent and photometric method after wet combustion of State Standard 30504-97;

calcium by titrimetric method by State Standard 26570-95;

content of solid in green material by drying of hinge plate in a drying cabinet at the temperature of 105^0C to constant weight.

Methods of assessment of researches results:

Determination of economic efficiency adaptive technologies of forage and oil-bearing crops cultivation is carried out by calculation standard method based on flow charts.

Determination of productivity, quality of production and economic, biopower assessment will allow to determine efficiency of adaptive technologies of forage and oil-bearing crops cultivation.

Biopower assessment of the studied methods is carried out according to the methodical recommendations [6].

Now, one of the most widespread and perfect methods of statistical data processing of productivity in field experiments is dispersive analysis. In researches, statistical processing of researches results by the method of dispersive analysis is carried out with the use of computer programs [7].

Agricultural engineering: In the experiments, the zoned variety of Sudan grass Brodskaya 2 was used. the seeding rate is recommended for the dry-steppe zone.

Due to the biological characteristics of Sudan grass, tillering does not weaken throughout the growing season, which is one of the distinguishing properties of this crop in contrast to other annual fodder grasses.

In addition to the biological peculiarity to tillering, the formation of shoots and their number are noticeably influenced by environmental conditions (temperature, humidity) and applied agricultural technology, as well as the frequency and height of mowing. Too low mowing, up to 2-4 cm, is undesirable, since Sudan grass stores plastic substances in the tillering node and in the first internode. Therefore, with low mowing, together with the first internode, the supply of plastic substances is alienated, which, of course, inhibits subsequent growth. The growth of Sudan grass can occur in three ways: due to the formation of new shoots from gemma located in the axil of the leaves of the first internodes preserved after the cut; growth of shoots, the growth point of which was affected during mowing. Of the three named, the first path should be considered the main one - shoots arising from the tillering node account for up to 80%. Thus, the productivity of Sudan grass is significantly influenced by the height of mowing. This issue has not been studied in the conditions of dry steppe zone of West Kazakhstan. In this regard, we studied the following height of mowing in cm: 5, 10, 15.

As our research shows, the productivity of Sudan grass at different heights of mowing depends on the number of shoots with renewal gemma. With an increase in the height of mowing, the number of shoots having renewal gemma decreases, which also affects the intensity of growth.

In terms of years, the highest productivity of Sudan grass in the studies of cut height was determined in 2019, and the lowest in 2018. In 1 mowing in productivity, the intermediate position was occupied by crops of 2020.

In our research, with an increase in the height of mowing, the timing of mowing ripeness decreased, and the productivity of Sudan grass accordingly decreased. According to research data, on average for 2018-2020, the maximum yield of the green mass of Sudan grass was obtained when harvesting at the level of 5 cm 82.88 c/ha. Increasing the height of mowing to 10 cm reduces the yield of green mass by 14.67% (70.72 c/ha). When harvesting Sudan grass in a 15 cm mowing mode, the yield of green mass was 57.49 c/ha, which is the minimum of all options studied.

On average, in 2018-2020, the highest collection of dry mass of Sudan grass is provided with a green mass mowing height of 5 cm – 18.71 c/ha. When harvesting mowing mass at the level of 10 and 15 cm, there was a decrease in the collection of dry mass of Sudan grass to 15.99 and 12.94 c/ha.

As energy-protein assessment data show, on average, over 3 years of research in the relationship of feed value, the most effective was harvesting the draft mass at the level of 5 cm. when harvesting Sudan grass at the level of 5 cm of mowing mass, 15,34 c/ha of feed units, 1.50 c/ha of digestible protein and 18.67 GJ/ha of exchange energy was obtained, while the supply of feed units with protein was 97.78 g. When harvesting mowing mass of Sudan grass at the level of 15 cm, a decrease in the productivity of this crop was noted. With this mowing mode, the yield from 1 ha of feed units was 10.63 c/ha, digestible protein 1.05 c/ha at an exchange energy collection of 12.93 GJ/ha. The intermediate position for energy-protein value is occupied by a mowing mode of 10 cm: 13.11 c/ha of feed units, 1.29 digestible protein and 15.96 GJ/ha of exchange energy, while providing feed units with protein at the level of 98.40 g.

As it is known, aftermathability of Sudan grass is largely determined by the mowing height of mowing mass. Depending on the cut height, different number of renal renewal gemma remained not cut into unalienable stems from which new shoots appeared at different rates. Therefore, the duration of the inter-mowing periods was different. In the research with an increase in the height of plants cut, the duration of the intermowing period decreased and thus the period of mowing came earlier. When harvesting at a height of 15 cm, the period of after-grass mowing in 2018-2020, depending on the conditions of vegetation, came 20-26 days after 1 mowing, at a mode of 10 cm after 25-30 days, and at the height of 1 mowing at the level of 5 cm, the yield of after-grass came in 35-40 days. This is due to the fact that with an increase in the cut height, renewal gemma of stage-older ones with a high rate of development and low growth intensity remain on the stems.

As shown by the data of studies of 2018-2020 in the experiments, biometric indicators and productivity, as well as feed value, depended on the mowing height of Sudan grass in 1 mowing. In the second mowing, on average, for 3 years of research, the highest after-grass plant formation was formed during harvesting at the level of 5 cm – 45.50 cm. The lowest plant formation was

obtained during harvesting at the mode of 15 cm – 33.23 cm. The height of Sudan grass after-grass at the height of 10 cm was 39.04 cm.

The height of grass mowing influenced the leaf content in the crop, in the tilling capacity of Sudan grass plants.

In the experiments, the highest leaf formation of after-grass was determined during harvesting in the mowing mode of 5 cm – 42.45%, and the smallest in the mowing mode of 15 cm – 28.75%. When harvesting mowing mass at the level of 10 cm, leaf formation of after-grass was 37.13%. When harvesting at the level of 5 and 10 cm, Sudan grass plants had tilling capacity of 4.12-4.16 and when raising the mowing height to 15 cm, the number of shoots per 1 plant was at the level of 4.08 pieces.

On average, for 2018-2020, in the experiments, the preservation of Sudan grass plants beforeafter-grass mowing was at the level of 73.90-76.52 %.

In 2 mowing, the productivity and feed value of Sudan grass after-grass depended on the timing of 1 mowing. At the same time, in 2 mowing, the highest productivity was determined on the crops of Sudan grass in 2019. In 2020, due to dry weather conditions, there was a decrease in the productivity of Sudan grass.

On average, for 2018-2020, the most productive plant formation with high energy-protein indices was obtained when harvesting mowing mass in the mowing mode of 5 cm. In this mode, the collection of green and dry mass was 35.95 and 8.88 c/ha, and the yield of feed units and digestible protein is at the level of 7.81 and 0.66 c/ha at the collection of exchange energy 9.20 GJ/ha.

Harvesting 1 mowing mass at the height of 15 cm reduced the productivity and fodder value of Sudan grass in 2 mowing. In this mode, on average for 3 years, the productivity and feed value of after-grass were minimal and amounted to: 20.18 c/ha green mass, 5.03 c/ha dry mass, 4.43 c/ha feed units, 0.31 c/ha digestible protein and 5.21 GJ/ha exchange energy. The mode of mowing Sudan grass at the height of 10 cm in terms of after-grass productivity in 2 mowing in terms of productivity and fodder value occupies an intermediate position.

The total productivity of Sudan grass for 2018-2020 depended on the height of 1 mowing.

At the same time, the highest productivity with high protein collection and exchange energy was determined during the mowing regime of Sudan grass at the height of 5 cm. Increasing the mowing height of mowing mass to 10 and 15 cm reduces the productivity and feed value of Sudan grass plant formation (Table 1).

Table1 – Total productivity of Sudan grass depending on the height of mowing for 2 mowing, average for 2018-2020

Indication	Height of mowing mass, cm		
	5	10	15
Green mass, c/ha	118,83	99,07	77,67
Dry weight, c/ha	27,59	23,03	17,97
Feed units, c/ha	23,15	19,31	15,06
Digestible protein, c/ha	2,16	1,77	1,36
Provision of feed units with protein, g	93,30	91,66	90,30
Exchange energy, GJ/ha	27,87	23,28	18,17

References

1. Official Internet resource of the Prime Minister of the Republic of Kazakhstan [electronic resource]. − 2017. − URL: www.primeminister.kz/page/article_item-89. (accessed 12.10.2020).
2. Elsukov M.P. One-year forage crops. – M.: Kolos, 1967. − 97p.
3. Aleynikov L.D. Stern for a small farm. – M.: V.O. Agropromizdat, 1989. − P. 30 -31.
4. Tsoi I.V., Vovchenko A.N. Biology of Sudan grass growth and increase in efficiency. − M.: V.O. Agropromizdat,1989. − P.226-247.
5. Nichiporovich A.A., etc. Photosynthetic activity of plants in crops: (Methods and problems of account in connection with formation of harvests). − M, 1961. − 135 p.
6. Methodical recommendations about biopower assessment of crop rotations and technologies of cultivation of forage crops. − M, 1989. − 72 p.
7. Dospekhov B.A. Technique of field experiment. − M.: Agropromizdat, 1985. − 358 p.

ОРУ БИІКТІГІНІҢ СУДАН ШӨБІНІҢ ӨНІМДІЛІГІНЕ ӘСЕРІН ЗЕРТТЕУ

Б.Н. Насиев

Мақалада Батыс Қазақстанның құрғақ дала аймағында судан шөбін өсірудің бейімделген технологияларын әзірлеу бойынша зерттеулердің деректері келтірілген. Судан шөбі – құрғақшылыққа төзімді және пластикалық дақыл ретінде фермерлер арасында үлкен сұранысқа ие. Оның технологиясының маңызды сәттерінің бірі – жасыл массасының ору биіктігі. Зерттеулер көрсеткендей, Батыс Қазақстанда өнімділік пен сапаны арттыру үшін судан шөбінің жасыл массасын 5 см деңгейінде шабу керек. Көрсетілген режимдегі зерттеулерде орта есеппен 3 жыл ішінде судан шөбінің жасыл массасының өнімділігі 118,83 ц/га құрады, жемшөп бірлігінің өнімділігі 23,15 ц/га болған кезде ақуыз өнімділігі 2,16 ц/га деңгейінде болды.

Түйін сөздер: *судан шөбі, бейінді технология, ору биіктігі, өнімділік, өнім сапасы.*

ИЗУЧЕНИЕ ВЛИЯНИЯ ВЫСОТЫ СРЕЗА НА ПРОДУКТИВНОСТЬ СУДАНСКОЙ ТРАВЫ

Б.Н. Насиев

В статье приводятся данные исследований по разработке адаптивных технологии возделывания суданской травы в зоне сухих степей Западного Казахстана. Суданская трава – как засухоустойчивая и пластичная культура имеет большую првлекательность среди фермеров. Одним из важных моментов ее технологии является высота среза укосной массы. Как показали данные исследований, в Западном Казахстане для повышения продуктивноси и качества, целесообразно скашивать зеленую массу суданской травы на уровне 5 см. В исследованиях при указанном режиме в среднем за 3 года урожайность зеленой массы суданской травы составила 118,83 ц/га. При продуктивности кормовых единиц 23,15 ц/га сбор протеина был на уровне 2,16 ц/га. Высота среза на уровне 5 см является оптимальным для отрастания суданской травы послк уборки.

Ключевые слова: *суданская трава, адаптивная технология, высота среза, урожайность, качество.*

IRSTI 68.05.29

B. Nasiyev, A. Galiyev
Zhangir khan West Kazakhstan Agrarian-Technical University

THE RESULTS OF AGRO-ECOLOGICAL MONITORING OF RANGELANDS

Abstract: *The article discusses the results of research on the degradation of vegetation cover of forage lands in the semidesert zone. As shown by geobotanical research data, a clear predominance of vegetation degradation over other processes of desertification is characteristic of forage lands in the Bokeyurdinsky and Zhangalinsky districts of the West Kazakhstan region. The analysis of materials obtained in the course of scientific research on the territories of forage lands in the semi-desert zone of Western Kazakhstan allowed us to distinguish 3 classes of desertification by degradation of vegetation cover. In zhangali district, vegetation and soil cover of pastures of Zhanakazan rural district are most degraded; in the rest of The territory, degradation has 1 and 2 degrees.*

Key words: *degradation, vegetation, productivity, pastures, desertification.*

The progressive desertification of the semi-desert zone of Western Kazakhstan is caused by the development of two main processes related to human economic activity: degradation of vegetation cover and degradation of soil cover. On the territory of the southern regions of the region, on a much smaller scale, there are processes of man-made desertification caused by technical means (machines, mechanisms) during the construction of mines, wells, industrial facilities, roads or when using vehicles in off-road conditions, which often leads to the complete destruction of very fragile arid ecosystems. A distinctive feature of vegetation and soil cover of desolate steppes is complexity. It is caused by a large lack of moisture and huge evaporation in which vegetation and soils react to the slightest changes in the water regime of surface horizons. In addition to aridity, its formation is facilitated by the youth of the territory, the strong salinity of soil-forming rocks and the equalization of the terrain [1, 2, 3, 4].

When studying the vegetation cover of forage lands, we used satellite multispectral images of average (15-30 m/pixel) resolution obtained from the Landsat TM spacecraft.