

ТҮЙІН

Дамыған елдердің тәжірибесі көрсеткендей, егіншіліктің қазіргі заманғы жүйесіне көшудің негізі белгілі бір жергілікті шаруашылық жағдайына бейімделген ресурсты үнемдеу технологиялары болуы керек. Олар топырақ құнарлылығы мәселесін шешуге мүмкіндік береді.

РЕЗЮМЕ

Опыт развитых стран свидетельствует, что основой перехода на современные системы земледелия должны стать ресурсосберегающие технологии, адаптированные к конкретным местным условиям хозяйствования, позволяющие решить проблемы плодородия почвы.

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STUDY OF FODDER CROPS PRODUCTIVITY IN DIFFERENT SOWING TECHNOLOGY

Abstract

In southern areas of West Kazakhstan region, grasslands are the main sources of feed for agricultural animals. In this regard, restoration, improvement of forage land and increase of their productivity is an urgent task. The research revealed the productivity of forage crops in single-species and mixed crops in the semi-desert zone of the region.

Keywords: *bioresource potential, fodder protein, efficiency, one-specific crops, mixed agrophytocenosis*

Almost all the territory of West Kazakhstan region 13 566.9 hectares - is located in the arid zone and is the scene of intense, comprehensive, multi-directional business activity of the society. Currently in the southern areas of the region (7 741.1 hectares) there is a general degradation of natural grassland and desertification. In these areas, natural grasslands are the main sources of feed for agricultural animals [1, 2].

In this regard, restoration, improvement of forage land and increase of their productivity is an urgent task.

The work performed under the grant funding program of the Committee on Science of RK on the project "Study of bioresource potential forage restore methods of land semidesert zones" (state registration RK 0112 00505).

To evaluate the crop for the use on arable land and fodder crop rotation in the conditions of southern zone of West Kazakhstan region we have done a number of experiments on the forage crops in single-species and mixed crops on the territories of Syrymsky, Zhangalinsky and Bokeyurdinsky areas.

At the field experiments with forage crops, the surveys, observations for the beginning of phenological phases, growth of forage crops and analyzes were performed by the standard methods. Harvesting and keeping crop by the continuous method with the subsequent reduction to the standard humidity. Statistical processing of the research results by the analysis of variance using computer programs. Chemical composition and nutritional value of plant mass by the conventional methods. The area of plots 50 m², triple, location of plots is random.

Agrotechnics of cultivation and sorts of forage crops is adopted and zoned for the semi-desert areas of West Kazakhstan region.

Crop year in 2013 was a difficult. The initial period of the summer was characterized by low temperature, middle and end - very high. Under these conditions, the grain yield of barley was equal: 10.25 q/ha - in Zhangala, 6.78 q/ha - in Saralzhin and 13.58 q/ha in Buldurta. That is the highest grain yield of barley was in Buldurta, and the lowest is in Saralzhin.

The yield of green mass of winter rye ranged from 22.89 q/ha (Saralzhin) to 29.58 q/ha (Buldurta), in comparison the productivity of in comparison for green fodder ranged from 34.85 to 59.82 q/ha, and Sorghum sudanense - 62,89-76,21 q/ha.

In 2013, the highest collection of dry mass of forage crops was provided under the experimental plot located in Buldurta village. In this case, Sorghum sudanense grown for green fodder was the different. At the harvesting in the beginning phase of earing, dry mass yield of Sorghum sudanense was 18,83 q/ha, which is more in comparison with green fodder sorghum almost by 4 q/ha and winter rye more than 10 q/ha.

In our researches in conditions of 2013 Sorghum sudanense had a high collection of dry mass among all experimental plots, which confirms the drought resistance of this crop. In Zhangala, dry mass yield of this crop was at the level of 17,48 q/ha, in Saralzhin collection of dry mass was 16,25 q/ha. Collection of dry mass in all areas of sorghum occupies an intermediate position (9,11-14,96 q/ha).

Spring crops of winter rye did not provide an adequate collection of dry mass yield. In the context of the growing season 2013, winter rye failed to gain high vegetative mass, the most collection of dry mass was at 6,84-8,35 q/ha.

Table 1 – Feeding value of annual forage crops in the semi-desert zone of West Kazakhstan region, 2013

Crop name	Fodder units q/ha			Crude protein, q/ha			Exchange energy Exchange energy hJ/ha		
	Bul- durta	Zhan- gala	Saral- zhin	Bul- durta	Zhan- gala	Saral- zhin	Bul- durta	Zhan- gala	Saral- zhin
Barley	13,71	10,26	6,89	1,56	1,19	0,84	12,31	9,25	6,19
Winter rye for green fodder	8,01	7,74	6,70	1,26	1,20	1,07	8,25	6,89	6,08
Sorghum for green fodder	16,75	12,57	10,11	1,59	1,22	1,03	14,85	11,1	9,02
Sorghum sudanense for green fodder	18,83	16,95	16,08	1,97	1,92	1,73	16,53	15,1	14,2

Feeding value of the crops is characterized by containing feed units and crude protein. In our studies, high levels of feed units and crude protein were obtained from Sorghum sudanense – 16,08 - 18,83 q/ha and 1,73-1,97 q/ha, with sorghum green fodder – 10,11-16, 75 and 1,03-1,59 q/ha, respectively. Green mass of winter rye has the content of feed units 6,7-8,01 q/ha, crude protein 1,07-1,26 q/ha.

The efficiency of barley in the terms of feed units and crude protein was significantly lower and was 6,89-13,71 q/ha and 0,84-1,56 q/ha. Nevertheless, the provision of feed units with raw protein at fodder was significantly higher than in those crops that were cultivated for green mass. So this indicator in barley (113,8-122 g respectively on experiment sites) was greater than that of sorghum and Sorghum sudanense (95-101,9 and 104,7-107,6 g respectively experiment sites) (Table 1).

To evaluate the merits of fodder crops, the exchange energy output per area unit is an important indicator. In our tests, the highest level of the exchange energy was noticed at Sorghum sudanense options (14,2-16,53 hJ/ha) and sorghum for green fodder (9,02-14,85 hJ/ha). Winter rye yielded them

almost twice (6,08-8,25 hJ/ha) and this indicator at barley was equal to 6.19 (Saralzhin) to 12.31 hJ/ha (Buldurta).

Currently to provide agricultural animals with complete food, the value of mixed crops of forage crops increases, which have been proved by many scientists' researches from different countries [3, 4, 5].

Various combinations of crops with Sudanese barley were tested in the mixed crop.

In all 3 experimental plots on green and dry mass, relatively low productivity was at the variant of barley and rye and was 50.21, 44.23, 39.25 and 10.05, 9.16, 8.20 q/ha respectively. On variants of barley in combination with the green sorghum productivity (90.36, 79.71, 68.81 q/ha) and dry weight (16.29, 14.73, 13.08 q/ha). These figures are slightly higher at the sowing of barley with Sorghum sudanense: 101.85, 90.87, 79.27 and 21.34, 19.82, 17.66 q/ha, respectively. Mixtures of forage crops, sown in Buldurta showed higher productivity compared to the crops in Zhangala and Saralzhin.

Based on the results of chemical analysis of green mass on the yield of fodder units and crude protein, forage crops merits were evaluated. The yield of fodder units and the content of crude protein was relatively higher in the variant of Sorghum sudanense mixture in combination with barley (20.27, 18.82, 16.77 and 1.91, 1.79, 1.55 q/ha).

The yield of fodder units and crude protein per 1 hectare compared to this one was a little bit lower on the option in conjunction with barley rye (9.04, 8.24, 7.38 and 1.03, 0.95, 0.88 q/ha) (Table 2).

Table 2 – Feeding value of mixed crops of forage crops in the semi-desert zone of West Kazakhstan region, 2013

Crop name	Fodder units q/ha			Crude protein, q/ha			Exchange energy Exchange energy hJ/ha		
	Bul- durta	Zhan- gala	Saral- zhin	Bul- durta	Zhan- gala	Saral- zhin	Bul- durta	Zhan- gala	Saral- zhin
Barley + winter rye	9,04	8,24	7,38	1,03	0,95	0,88	8,03	7,32	6,54
Barley + Sorghum sudanense	20,27	18,82	16,77	1,91	1,79	1,55	17,67	16,41	14,64
Barley + sorghum	15,64	13,85	12,42	1,61	1,48	1,40	13,49	12,07	10,79
Barley + millet	10,91	9,50	8,43	1,07	0,97	0,82	9,57	8,41	7,42

Relatively high level of fodder units' provision with raw protein was noticed at barley option combined with winter rye (114-120 g). This figure in other variants was approximately the same and amounted 94-112 g, respectively. Relatively higher exchange energy detected in all 3 experimental plots at the option of Sorghum sudanense sowing in the combination with barley - 17.67, 16.41 and 14.64 hJ/ha. Relatively low value of the exchange energy was noticed at the option of sowing barley with winter rye (8.03, 7.32, 6.54 hJ/ha) and barley with millet (9.57, 8.41, 7.42 hJ/ha). At the option of involving barley and sorghum, this figure was at 10,79-13,49 hJ/ha.

Thus, the comparative study of annual plants showed that crops grown as green fodder have significant advantages compared with forage crops.

The highest nutritive value in the semi-desert zone of West Kazakhstan region is at mixed agrophytocenosis of barley and Sorghum sudanense.

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ТҮЙІН

Батыс Қазақстан облысының оңтүстік аудандарында мал азықтық алқаптар қоғамдық малды тұрақты жем-шөппен қамтудың негізгі көзі болып табылады. Сондықтан мал азықтық алқаптарды қалпына келтіру, олардың өнімділігін арттыру – маңызды мәселе. Зерттеулерде облыстың жартылай шөлейтті аймағында мал азықтық дақылдардың таза және аралас егістіктердегі өнімділігі анықталды.

РЕЗЮМЕ

В южных районах Западно-Казакхстанской области кормовые угодья являются основными источниками поступления кормов для сельскохозяйственных животных. В связи с этим, восстановление, улучшение кормовых угодий и повышение их продуктивности являются актуальной задачей. Исследованиями установлена продуктивность кормовых культур в одновидовых и смешанных посевах в полупустынной зоне области.

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SELECTION OF LONG-TERM HERBS AND THEIR GRASS MIXTURES FOR FODDER FARMLANDS

Abstract

For the uninterrupted provision of agricultural animals with complete feed, the cultivation of perennial grasses in single-species and mixed crops is important. The researches revealed productivity of perennial grasses in various crops. Featured agrophytocenoses of perennial grasses can provide the production of high protein feed in forage farmlands of West Kazakhstan region.

Keywords: *perennial grasses, mixed agrophytocenoses, single-species crops, feed protein, exchange energy.*

In modern conditions, one of the factors in the stabilization of biological farming and fodder production is field grass cultivation. Perennial grasses compared to other forage crops are inexpensive, more fully use moisture and nutrients, have a positive impact on structure formation in the soil. Accumulated research data and best practices indicate that perennial grasses retain a major role in improving water and soil physical properties and obtaining high-protein and low-cost feed [1, 2, 3].

It should be noted that researches on the development of highly productive herbage with perennial grasses in relation to the conditions of different zones of West Kazakhstan region were not conducted fairly. This was the basis of studies on this issue.

The work performed under the grant funding program of the Committee on Science of RK project "Development of innovative techniques in the production of high feed forage lands" (№ 0112 state registration RK 00498).