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## ИЗВЕСТИЯ

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК  
РЕСПУБЛИКИ КАЗАХСТАН

## NEWS

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OF THE REPUBLIC OF KAZAKHSTAN

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**K. Zholamanov, Jahid Ahmad Shams**

Kazakh National Agrarian University, Almaty, Kazakhstan.

E-mail: kem\_707@mail.ru

**TIMES SOWING AND RATE SEEDING A SUDAN-GRASS  
IN THE CONDITIONS EDUCATIONAL-EXPERIMENTAL STATION  
“AGROUNIVERSITY” ALMATY REGION**

**Abstract.** In each soil and climatic zone crops of a Sudan-grass need to be carried out to the best for the agrotechnical terms providing formation of the most big yield. The harvest size, quality of the grown-up seeds and rational use of seed material depends on a right choice rate seeding of a Sudan-grass. Sowing time and seeding norm depend on biological features of culture and a grade, the area and the purposes of cultivation, soil climatic conditions, a contamination of fields and other factors. It is established that in the conditions EES "Agrouniversity" Almaty region, the greatest productivity of the Sudan-grass on average in two years has been established crops 24.04-02.05, at norm seeding 2,5 million pieces/ga-279,5 center/hectare in time.

**Keywords:** Sudan-grass, sowing time and rate seeding, shoots, bushiness, productivity.

The most important question of an intensification of agricultural production in Kazakhstan is creation of a steady fodder supply. The field forage production is the main source replenishment of fodder resources, allowing providing the necessary livestock production for high-quality sterna.

Among this group of cultures the Sudan-grass – S.Sudanense (Riper) Stapfis is considered perspective. A Sudan-grass is the best bluegrass fodder annual grass. Its high productivity and fodder advantages are successfully combined with drought resistance and a capability to use a maximum of rainfall [1; 2].

This culture differs from other fodder herbs in the fact that in case of big harvests it gives high-quality hay. In droughty weather conditions it provides stability of harvests in comparison with traditional forage crops and is capable to grow quickly after beveling and can be used on a silo, grass meal and green material [3].

On content of the most valuable part of forage is a squirrel, hay of a Sudan-grass is on the first place among cereal herbs. Sudan-grass is one of the most productive cultures, both on a bogharic, and on the irrigated arable land where it is generally used in the after crop and after reap seeding. After bevelling or rational drain it, unlike other one-year plants, quickly grows and within a day gives a surplus of 5-10 cm. This capability allows using it widely in the green conveyor in the bogharic and the irrigated conditions, in the separate and mixed seeding [3].

Basic reason is lack of technologies zone of its cultivation in the conditions of irrigation. The biology of culture allows farms to manage the seeds; however the accepted technology of cultivation of a Sudan-grass on green material substantially differs from technology of its cultivation for the purpose of receipt seeds [4].

At the same time it should be noted that the reason of low productivity of a Sudan-grass, is not development elements of technology of its cultivation in the conditions of a foothill zone Almaty region. With respect there to studying of elements technology of cultivation of a Sudan-grass which basis is the choice of the most adaptive grade, determination of optimum sowing time and a regulation seeding determined the choice and relevance of a subject of researches.

Materials and methods. The purpose of researches is the development of optimum sowing time and seeding rate of a Sudan-grass in the conditions of EES "Agrouniversity" Almaty region for obtaining the maximum productivity and its use in the green conveyor.

Object of the research was the fodder culture, an annual bluegrass grass – a Sudan-grass, grades Odesskaya-25. Researches were conducted in the territory of Enbekshikazakh district of Almaty region on light brown types of soils. Accounts and observations were made by the corresponding approved techniques.

Results of researches. In forming of high productivity of the Sudanese crops in optimum terms are important for each specific climatic zone.

Numerous observations in different zones of the country show that seeds of the Sudanese begin to sprout, but very slowly, at a soil temperature, at a depth of seal at least 8-10, in case of 14-16 germination goes quicker, most intensively in case of 28-30, but it doesn't mean that seeding can be postponed waiting for high temperatures as it is integrated to a soil siccation, also adversely affecting emergence shoots and development of plants.

Results of our experience showed that on emergence shoots of the Sudanese, and from here and on the choice of the most reasonable sowing time the great influence is exerted by temperature and humidity of the soil during this period (Table 1).

Table 1 – Influence of sowing time on emergence shoots of the Sudanese (an average for 2015-2016)

Calendar term	Humidity soil to absolutely dry to the weight, %	Average temperature soils at a depth 10 cm, °C	Period from crops before emergence of full shoots, days
08.04-18.04	28,90	4-6	10
24.04-02.05	29,30	8-10	8
06.05-11.05	26,06	12-14	6

Germination of seeds and speed emergence of shoots are in direct dependence on temperature condition of the soil. In process of temperature increase, process of germination of seeds accelerates.

Results of our researches show that at crops of the Sudanese in various terms soil temperature at a depth of seal of seeds reaches various sizes that crops – shoots have significant effect on period duration. In days of research duration of this period depended mainly on temperature condition of the soil as its humidity (other important factor germination of seeds) in a section of the most part terms sowing was close to optimum.

Identification of optimum sowing time and rate seeding of the Sudanese cultivated on a green forage in relation to specific soil climatic conditions allows not only to receive, with other things being equal, the greatest harvests after crop weight and seeds. Therefore many aspects of technology of cultivation of the Sudanese in this zone demand studying, especially concerning sowing time and rate seeding.

One of the major factors for germination seeds and further development of plants, is existence in the soil of moisture. Field viability was in big dependence on quantity of the sowed seeds per unit area, temperature and humidity of the soil.

Seeding of the Sudanese often happen thinned because low completeness shoots that, finally, leads to a strong contamination and decrease in a harvest of seeds.

In our experiences it is established that with increase in rate seeding quantity of not ascended seeds increased as their considerable part was in a dry layer of earth.

The highest completeness of shoots is noted at norms of seeding 1,5-2,5 million pieces, with increase in norms of seeding up to 3,0 million pieces at 1 hectare field viability decreased on all options.

From data of Table 2 consistent pattern, field viability of the Sudanese at sowing time is determined 08.04-18.04 with increase in norm of seeding from 1.5 to 3 million pieces on 1 hectare decreases from 78,3 to 69,0%, at sowing time 24.04-02.05 decreases from 79,7 to 70,7%, at sowing time 06.05-11.05 decreases from 84,4 to 68,3%.

Thus, even at the same norm of seeding, but at various density placement seeds in a row field viability of their considerable changes: the more densely in a row seeds, the lower the field viability are placed.

Table 2 – Influence of sowing time and rate seeding on field viability seeds of the Sudanese (on average for 2015–2016 yy.)

Sowing time	Rate seeding of seeds, one million pieces/hectare	Quantity of the ascended plants, piece/sq.m	Field viability, %
08.04 – 18.04	1,5	117	78,3
	2,0	149	74,9
	2,5	177	71,1
	3,0	207	69,0
24.04 – 02.05	1,5	119	79,7
	2,0	152	76,0
	2,5	181	72,6
	3,0	212	70,7
06.05 – 11.05	1,5	126	84,4
	2,0	157	78,6
	2,5	179	71,9
	3,0	205	68,3

The significant influence on growth and development of plants is rendered by density of their standing, to a large extent determining the level of use of inventories of nutrients and water.

With change of density of standing depending on sowing time at the Sudanese bushiness coefficient, growth of plants, leaf formation, area of a sheet surface change. We established quite certain dependence between these indicators and regulations and sowing time of the Sudanese.

It is established that flush educational capability of the Sudanese increased on all options of sowing time as with reduction regulations of seeding. So, bushiness of plants is considerably changed in case of various density of their standing.

From data Table 3 it is shown that a bushiness plants of a Sudan-grass in 2015 in case of the same regulations of seeding (1.5; 2.0; 2.5; 3.0 in one million germination of seeds on 1 hectare), but in case of different sowing time was different, the greatest indicators of a bushiness plants of the Sudanese were established in case of the second sowing time (24.04-02.05), similar data were obtained also in 2016, the greatest bushiness in two years was received in case of the second sowing time and a regulation seeding 2,5 one million pieces/ga-2,6.

Thus, bushiness plants of the Sudanese considerably depended from density of their standing on the unit area.

Table 3 – Bushiness plants of the Sudanese depending on sowing time and rate seeding

Sowing time	Rate seeding of seeds, million pieces/hectare	Years		Average for 2 years
		2015	2016	
08.04 – 18.04	1.5	2.0	2.3	2.2
	2.0	2.7	1.5	2.1
	2.5	2.2	1.1	1.7
	3.0	1.9	0.9	1.4
24.04 – 02.05	1.5	2.4	2.6	2.5
	2.0	2.5	2.4	2.5
	2.5	3.1	2.1	2.6
	3.0	2.8	1.7	2.3
06.05 – 11.05	1.5	2.3	2.2	2.3
	2.0	2.8	2.1	2.5
	2.5	2.9	2.0	2.5
	3.0	1.9	1.9	1.9

Sudanese as one of the main forage crops differs in high productivity – on an exit of green material, hay and seeds. For this reason it is carried to number of the best forage crops.

These literatures on influence early and late times sowing of the Sudanese on a harvest green material and hay are very contradictory that once again testifies to need developments of zone technologies.

Analysis in Table 4 shows that the greatest productivity of the Sudanese in time sowing 08.04-18.04 on average in two years, was established in case of a regulation seeding 2,5 million pieces/ga – 266,5 center/hectare, in time sowing 24.04-02.05 greatest productivity of the Sudanese were also established in case of a regulation seeding 2,5 million pieces/ga-279,5 center/hectare, greatest productivity of the Sudanese time sowing 06.05-11.05 was established in time in case of a regulation seeding 2,5 million pieces/ga-250,5 center/hectare.

Table 4 – Productivity Sudanese depending on time sowing and rate seeding, c/hectare

Sowing time	Rate seeding of seeds, million pieces/hectare	2015		2016		Average for 2 years	
		green weight	hay	green weight	hay	green weight	hay
08.04-18.04	1,5	225	54,9	182	51,0	203,5	52,9
	2,0	243	55,7	197	57,7	220,0	67,4
	2,5	299	63,4	234	63,3	266,5	63,3
	3,0	241	58,9	227	61,4	234,0	60,1
SED <sub>05</sub> , c/hectare						7,2	
24.04-02.05	1,5	236	55,7	209	52,4	222,5	54,0
	2,0	251	58,4	221	56,2	236,0	57,3
	2,5	311	68,0	248	67,3	279,5	67,6
	3,0	235	72,2	252	68,2	243,5	70,2
SED <sub>05</sub> , c/hectare						6,82	
06.05-11.05	1,5	240	60,0	210	52,5	225,0	56,3
	2,0	248	62,0	225	56,3	236,5	59,2
	2,5	252	63,0	249	62,3	250,5	62,7
	3,0	245	61,3	243	60,8	244,0	61,1
SED <sub>05</sub> , c/hectare						11,5	

Table 4 shows that with increase in a regulation rate seeding of the Sudanese to 2,5 million pieces/hectare germination of seeds on 1 hectare productivity green material and hay considerably increases, but further increase in sowing regulations led only to the insignificant growth of productivity.

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**Қ. К. Жоламанов, Джахид Ахмад Шамс**

Қазақ ұлттық Аграрлық университеті, Алматы, Қазақстан

**АЛМАТЫ ОБЛЫСЫ «АГРОУНИВЕРСИТЕТ» ОТШ ЖАҒДАЙЫНДА СУДАН ШӨБІНІҢ СЕБУ МЕРЗІМІ МЕН СЕБУ МӨЛШЕРІНІҢ ӨНІМДІЛІГІНЕ ӘСЕРІ**

**Аннотация.** Мақалада судан шөбінің оңтайлы себу мерзімі мен мөлшері жөніндегі деректер келтірілген. Алматы облысы «Агроуниверситет» ОТШ жағдайында судан шөбінің екі жылдық орташа өнімділігі – 279,5 ц/га, тұқым себу мерзімі 24.04-02.05, себу мөлшері 2,5 млн. дана/га екені анықталған.

**Түйін сөздер:** судан шөбі, себу мерзімі мен мөлшері, өскін, түптілік, өнімділігі.

**К. К. Жоламанов, Джахид Ахмад Шамс**

Казахский национальный аграрный университет, Алматы, Казахстан

**СРОКИ ПОСЕВА И НОРМЫ ВЫСЕВА СУДАНСКОЙ ТРАВЫ В УСЛОВИЯХ УОС «АГРОУНИВЕРСИТЕТ» АЛМАТИНСКОЙ ОБЛАСТИ**

**Аннотация.** В статье приводятся данные об определении оптимальных сроков посева и норм высева суданской травы. Установлено, что в условиях УОС «Агроуниверситет» Алматинской области наибольшая урожайность суданки в среднем за два года – 279,5 ц/га была установлена в срок посева 24.04-02.05 при норме высева 2,5 млн. шт/га.

**Ключевые слова:** суданская трава, сроки посева и нормы высева, всходы, кустистость, урожайность.

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