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QUALITY INDICATORS AND NUTRITIVE VALUE OF *Glycyrrhiza glabra* L. DEPENDING ON DEVELOPMENTAL STAGES IN THE NORTH-EASTERN PART OF LESSER CAUCASUS

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КАЧЕСТВЕННЫЕ ПОКАЗАТЕЛИ И ПИТАТЕЛЬНАЯ ЦЕННОСТЬ *Glycyrrhiza glabra* L. В ЗАВИСИМОСТИ ОТ ФАЗ РАЗВИТИЯ В СЕВЕРО-ВОСТОЧНОЙ ЧАСТИ МАЛОГО КАВКАЗА

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Abstract. The soil and climate conditions in Azerbaijan enable the extensive development of the licorice along with other technical crops. The licorice has been known to people since ancient times, and today in various fields of national economy, in medicine, in solving the problem of feeding with agricultural products, creating a diverse feed base for livestock is one of the most important problems. In the article, the quality indicators and nutritional value of licorice were studied depending on the development phase in the north-eastern part of the Lesser Caucasus.

Аннотация. Почвенно-климатические условия в Азербайджане способствуют развитию солодки голой наряду с другими техническими культурами. Солодка известна с древних времен и сегодня используется в различных областях народного хозяйства, в медицине. Она является ценным кормовым продуктом. Изучены качественные показатели и пищевая ценность солодки голой в зависимости от фазы развития в условиях северо-восточной части Малого Кавказа.

Keywords: Glycyrrhiza, seeds, planting, nutritive value.

Ключевые слова: солодка, семена, посадка, питательная ценность.

Introduction

The experience of developed countries has shown that it is impossible to achieve normal economic development of society without agriculture with an effective mechanism of action. The protection of the economic interests of the state and the effective meeting of the needs of society depend directly on the establishment of efficient agricultural production, which is able to meet the needs of the population for food products and the needs of the processing industry for raw materials, in addition to the developed industry. In addition to these, it is necessary to take into account the socio-economic importance of the rapid development of agriculture from a political, social and strategic point of view [2, 6].

It should also be noted that the modern level of agriculture in the Republic of Azerbaijan cannot fully meet the requirements of the market economy, the population's food products, and livestock's

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nutritional needs. This problem also manifests itself in the growing mismatch between demand and supply.

When we approach the solution of the issue from this level, in order to organize the proper feeding of agricultural animals in our country, the fodder that is planned to be used first and grown industrially depends on the soil and climate conditions of the region. A database should be created based on the results of scientific research on quality indicators and nutritional value, and it is possible to achieve a solution to the problem by using it.

Methodology

Azerbaijan, one of the oldest habitats of the licorice plant, is located in the eastern part of Transcaucasia, between 38025′ and 41055′ north and 44050′ and 50023′ east. In accordance with this regularity, the soil cover was formed in the same way as the plant flora. Among these riches, the unique soil and climate conditions of Kura-Araz lowland have been formed. The vegetation of the area is semi-desert, thicket, meadow, swamp, etc. consists of plants.

Seeds and rhizomes were collected from natural and cultivated areas and planting material was prepared for experiments on the study of hairless licorice. For hairless licorice, a flat area with a soil surface slope of no more than 0.50 was chosen. The soil for sowing the seeds of the licorice plant is prepared in the summer and autumn seasons. The seeds were buried in the soil at a depth of 0-2.0 and 2.0-4.0 cm. The sowing operation was carried out with the SUPO-9-01 sowing unit.

Agrotechnical maintenance and other necessary works in the experiment area (except those planned in the scheme of the experiment) were carried out on the basis of general recommendations agreed to be implemented in the region.

Discussions

It is impossible to make feed rations from unknown, unstudied feeds and organize proper feeding of animals. Because the evaluation of the nutritional value of feed by the zootechnical method is mainly based on the indicators of chemical composition of feed, digestibility of feed and the effect of feed on productivity [5, 7].

It is also known that a large number of different types of plants, including licorice, are used for feeding agricultural animals with green and dry grass in indoor and summer camp conditions. It should be noted that the quality and nutritional value of feed is primarily determined by the chemical composition of the plant.

The study of the chemical composition of feed was one of the main issues facing the science of feeding farm animals at the end of the 18th century, and very simple elements were analyzed [2, 4]. When analyzing the feed, first water then dry matter is determined. Dry matter itself is divided into ash, nitrogenous and non-nitrogenous compounds, nitrogenous compounds or crude protein into proteins and amides, non-nitrogenous compounds into oil, cellulose, non-nitrogenous extractive substances, and non-nitrogenous extractive substances into sugar and starch.

Hairless licorice plant is used as green fodder at the end of budding, before flowering. During this period, it contains an average of 20% dry matter, and about 1/3 of it is protein. After flowering, it becomes rough very quickly, and it is badly eaten by animals. Therefore, its use in the preparation of silage is very beneficial for the farm from an economic point of view.

On the contrary, it is eaten with great appetite by animals in the form of dry grass in closed conditions, especially by buffaloes and small-horned animals.

The quality indicators of the hairless licorice plant, that is, the nutrients contained in it, are not the same depending on the growth phases of the plant. This can be clearly seen from Table.

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Table

QUALITY INDICATORS OF HAIRLESS LICORICE DEPENDING ON DEVELOPMENT PHASES AND NUTRITIONAL VALUE (average)

Phases of plant development and organs	*In dry matter, in %*				*1 kg of dry matter*			
	Protein	*Oil*	*Cellulose*	*Ash*	*Feed unit*	*Energy unit*	*Digested protein, q-la*	*Carotine mg/kg*
	In seed propagation							
In the budding phase	16,2	3,6	23,7	9,6	0,96	0,98	119	101
At the beginning of flowering	15,3	3,1	25,5	8,8	0,86	0,91	106	81
In full bloom	12,1	2,5	31,6	8,7	0,65	0,80	84	60
On the leaf of the plant	27,7	4,2	16,3	14,2	-	-	-	108
In the stem part of the plant	6,1	2,3	41,0	9,9	-	-	-	13
	In reproduction with rootstocks							
In the budding phase	18,3	3,9	24,8	9,9	0,97	0,98	135	113
At the beginning of flowering	17,7	3,5	26,6	8,9	0,89	0,91	123	93
In full bloom	14,4	2,9	32,7	8,8	0,71	0,80	100	71
On the leaf of the plant	29,8	4,4	17,4	15,7	-	-	-	116
In the stem part of the plant	8,3	2,7	42,1	10,9	-	-	-	17

In our study, in order to study the quality indicators and nutritional value of hairless licorice depending on the development phases, in 2020-2021, at different burial depths (0-2.0 cm; 2.0-4.0 cm), at different times (20-25.XI; 26-30.XI and 1-5.XII), sowing was carried out in separate planting scheme and norms (666 hectares; 333 and 222 thousand seeds capable of germination). With the seeds obtained from the variants, the optimum sowing time was 26-30. XI, in the 30 x 10 cm planting scheme, at the density of 333 thousand plants, in the depth2.0-4.0 cm. and with rhizomes, the optimal planting period is 3-5.II months, 70 x 15 cm planting scheme, 95 thousand plants density, 6.0-8.0 cm burial depth. The results of the best options are given in Table 1.

During the analysis, it was found that the nutrients contained in the licorice plant are not the same depending on the growth phases of the plant. In order to know which growth phase is richer in plant nutrients, the plants collected in different phases were dried in a cool place under laboratory conditions, analyzed according to approved methods, and their composition was studied and determined. The quality indicators of the dry mass collected in the full flowering phase were slightly lower.

So, with seeds, the content of the dry grass collected from on the 26th-30th of the 11th month of the optimal sowing period, in the 30 x 10 cm planting scheme, at a density of 333 thousand plants, in the 2.0-4.0 cm buried version there is 12.1% protein, 2.5% fat, 31.6% cellulose, 8.7% ash, 60 mg carotene, 0.65 g fodder unit, 0.80 g energy feed unit, 84 g digestible protein.

And with rootstocks, the optimal planting time is 3-5 months, in a 70x15 cm planting scheme at a density of 95,000 plants and at a burial depth of 6.0-8.0 cm. the collected dry grass contains 14.4% protein, 2.9% fat, 32.76% cellulose, 8.8% ash, 71 mg carotene, 0.71 g feed unit, 0.80 g energy feed unit is determined that 100 g of digestible protein.

It was determined by us that the biochemical composition of individual organs of hairless licorice plants obtained from both optimal variants showed different results even in the same phase. The results obtained without propagation with rootstocks were superior to the results obtained without propagation with seeds on all indicators.

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From Table, it is clear that the optimal sowing time, burial depth and plant density in our experiments proved that the quality indicators of the leaf of the hairless licorice plant are higher than the stem part. Thus, the analysis of the leaf part showed that the optimal sowing with seeds the content of the dry mass collected from on 26-30.XI months from sowings carried out, in 30 x 10 cm planting scheme, at 333 thousand plant density, at 2.0-4.0 cm burial depth there is 27.7% protein, 4.2% fat, 16.3% cellulose,14.2% ash, 108 mg carotene, while in the stem part, these indicators are respectively 6, 1%, 2.3%, 41.0, 9.9% and 13 mg [2, 3].

And with rootstocks, the optimum planting time is 3-5 months, from the version carried out in the 70 x 15 cm planting scheme at a density of 95,000 plants and at a burial depth of 6.0-8.0 cm. Although the composition of the collected dry grass was in accordance with the above, it prevailed.

Collected in the budding phase and sown with seeds, the content of the dry mass collected from on the 26th-30th of the 11th month of the optimal planting period from sowings carried out, in the 30 x 10 cm planting scheme, at a density of 333 thousand plants, from the version carried out of 2.0-4.0 cm burial depth there is 16.2% protein, 3.6% fat, 23.7% cellulose, 9.6% ash, 101 mg carotene obtained , 0.96 feed units, 0.98 energy units, 119 g of digestible protein [4].

Similarly, in the period of 3-5 months of the optimal planting period, planted with roots and rhizomes collected in the budding phase, in a 70 x 15 cm planting scheme, at a density of 95 thousand plants, the composition of the dry grass collected from the version carried out at the burial depth of 6.0-80 cm was in accordance with the above, they were still superior. Thus, in dry mass, 18.3% of protein, 3.9% of fat, 24.8% of cellulose, 9.9% of ash, 113 mg of carbohydrates, 0.97 feed units, 0.98 energy units, 135 g was digestible protein.

Conclusion

The soils of the north-eastern part of the Small Caucasus are suitable for the cultivation of licorice, and it is cultivated for the purpose of obtaining high-quality green mass, dry grass, seeds, as well as "licorice root". As a result of the research, it was determined that the quality indicators of the hairless licorice plant, that is, the nutrients contained in it, are not the same depending on the growth phases of the plant. Based on the analysis, it should also be noted that the leaves of the hairless licorice plant quality indicators are much higher compared to the quality indicators of the stem.

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