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USE OF MAIZE AND SORGHUM FOR SILAGE PRODUCTION IN A FAMILY DAIRY FARM

USO DE MILHO E SORGO PARA PRODUÇÃO DE SILAGEM EM UNIDADE FAMILIAR DE PRODUÇÃO DE LEITE

Ariadne Freitas Silva[1]
Brasilino Moreira de Lima[1]
Euclides Reuter de Oliveira[1]
Hellen Felicidade Durães[1]
Janaina Tayna Silva[1]
Murillo Matias Lima[1]
Nathalie Ferreira Neves[1]
Orlando Filipe Costa Marques[1]
Willian Da Silva Gouvea[1]
Jefferson Rodrigues Gandra[2]
Andrea Maria de Araujo Gabriel[3]

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ABSTRACT: The objective of this work was to assist a small producer in the implantation of an area of corn and sorghum for the production of silage for feeding dairy cows during the dry season, from 2018 to 2020. The work was carried out at the Mariane site, in the Capão Bonito I settlement, in the municipality of Sidrolândia - Mato Grosso do Sul. Periodic visits were carried out to survey the property's production system, and the implementation of 1.5 ha for silage production was therefore recommended. and feeding the animals during the dry season. Soil analysis was carried out, followed by the recommendation of fertilization, in both cultivation areas, with the use of lime for pH correction. For planting fertilization, application of phosphorus in the form of rock powder and chicken litter was indicated. In the 2018 harvest, the planting of K9960 vip3 hybrid corn was oriented for silage production, while in the 2019 harvest it was recommended to plant the biomass sorghum "Bolivian giant sorghum" Agri 002E. Thus, the planting of corn and sorghum provided enough roughage to feed the animals during the dry season, maintaining milk production.

KEYWORDS: Agriculture, Dairy cattle, Extension.

RESUMO: Objetivou-se, com este trabalho, auxiliar um pequeno produtor na implantação de área de milho e sorgo para produção de silagem destinada a alimentação de vacas de leite no

[1] Universidade Estadual de Montes Claros - UNIMONTES
[2] Universidade Federal do Sul e Sudeste do Pará – UNIOESTE
[3] Universidade Federal da Grande Dourados – UFGD

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período da seca, do ano de 2018 a 2020. O trabalho foi desenvolvido no sitio Mariani, no assentamento Capão Bonito I, município de Sidrolândia - Mato Grosso do Sul. Foram realizadas visitas periódicas para levantamento do sistema de produção da propriedade, sendo então recomendada a implantação de 1,5 ha para produção de silagem e alimentação dos animais no período da seca. Foi realizada análise do solo, seguida da recomendação de adubação, nas duas áreas de cultivo, com o uso de calcário para correção do pH. Para a adubação de plantio foi indicada aplicação de fósforo na forma de pó de rocha e cama de frango. Na safra do ano de 2018 foi orientado o plantio do milho hibrido K9960 vip3, para produção de silagem, já na safra de 2019 foi recomendado o plantio do sorgo biomassa "sorgo gigante Boliviano" Agri 002E. Assim o plantio do milho e do sorgo proporcionou produção de volumoso suficiente para alimentar os animais no período da seca, mantendo a produção de leite.

PALAVRAS-CHAVE: Agropecuária, Bovinocultura de leite, Extensão.

INTRODUCTION

Brazilian agricultural production has undergone major changes in recent years. However, small producers have difficulties increasing their production, mainly due to the difficulty of being advised by technicians in the use of technologies.

Among the various activities practiced by small producers, the dairy activity stands out for generating financial resources during all months of the year. In Brazil, it is estimated that 60% of milk production comes from family farming (MAPA 2018), however, most of the time, producers find it difficult to maintain production, mainly due to the costs of feeding the animals, leading to a drop in production and compromising your income.

To increase milk production in small farms, technical assistance is needed, so those producers can use techniques that maximize the inputs available on the property. In this respect, the rural extension carried out by the universities acts as an alternative to help the producer to develop his production, besides that, the insertion of this among the producers makes it possible to apply the knowledge developed by the research, bringing technology and development to society and playing their social role.

Given the above, the purpose of the work was to establish an area for the cultivation of forage for the production of silage for feeding dairy cows, based on the practice of managing the soil with an imprint on animal production, where it will serve as a model for other settlers or small producers.

MATERIAL AND METHODS

The work was carried out at the Mariani site, in the Capão Bonito I settlement, in the municipality of Sidrolândia-MS, from January 2018 to March 2020. The property consists of 20.8 hectares, where the main activity developed is cattle raising. milk.

For the implantation of the grass cultivation area, visits were made to diagnose and survey the conditions of the property to maintain milk production. In the first visit, held in January 2018, the main points that hindered production were diagnosed, where it was found that one of the main problems was the difficulty of providing food to the animals in the dry period of the year, as the producer did not make use of no technique for preserving roughage for supplementation of animals during this period and, at that time, pastures are unable to produce enough biomass in both quantity and quality to meet the nutritional requirements of the animals. In addition to not storing food for the dry season, the property's pasture areas had low productivity, due to low soil fertility and inadequate pasture management.

Given the above, an area of 1.5 hectares was chosen for planting fodder for the production of silage. In the first step, soil samples were collected and sent to the laboratory for fertility analysis and later recommendation of correction and fertilization practices, according to SOUSA et al., (1987).

The work was carried out over two years, with the recommendation of implanting the K9960 vip3 hybrid corn crop in 2018, and in 2019 it was recommended to implant the “Bolivian giant sorghum” sorghum Agri 002E for silage production, due to the good nutritional value and productive capacity of these forages.

Both for the planting of corn and sorghum, after the soil correction, the area was harrowed for unpacking and incorporation of organic matter. Sowing was carried out using a mechanical seeder, with a spacing of 80 cm between rows and 6 plants per linear meter, so that the plants had high development and biomass production.

After the corn harvest, due to the sandy soil characteristic, it was recommended to plant millet, for the production of straw and to help recover the structure and organic matter of the soil, favoring the cultivation of the following year. The area was graded for unpacking, and after sowing conventional millet seeds available in the local market for planting. The seeds were distributed by haul and incorporated into the soil. After the growth of the millet, it was incorporated into the soil and the area remained at rest until the beginning of the next rainy

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season of the agricultural year 2019/2020 when recommendations were made for planting the sorghum.

After the cultivation cycle, of 100 days for corn and 120 days for sorghum, the production evaluation was carried out by randomly cutting 5 points of a linear meter, excluding the edges, after, the material was weighed, collected a sample and sent to the laboratory for determination of a dry matter, and thus, the weight found was extrapolated to an area of 1 hectare, after the corn was harvested through mechanized harvesting with the use of forage traction coupled to the tractor. The harvested material was stored in a surface silo and the material was compacted with the aid of a tractor throughout the harvest and filling of the silo.

The productivity assessments of the areas were carried out annually, in addition to bromatological analyzes regarding the content of Dry Matter, Fiber in Neutral Detergent, Fiber in Acid Detergent, Crude Protein, and Mineral Matter, to evaluate the nutritional value of the food supplied to animals according to AOAC (1995).

RESULTS AND DISCUSSION

The recommendations for soil correction and fertilization for the corn area, according to soil analysis, are shown in Figure 1. To correct the pH, 900 kg of lime/hectare were applied. For planting fertilization, the application of 600 kg of phosphorus/hectare in the form of rock powder was recommended. The recommendation of this input was made due to its slow availability over time, reducing leachate losses, in addition to being a by-product of lower acquisition cost. According to Junior et al. (2020), rock dust can be used to fertilize crops instead of chemical fertilizers to maintain good production levels.

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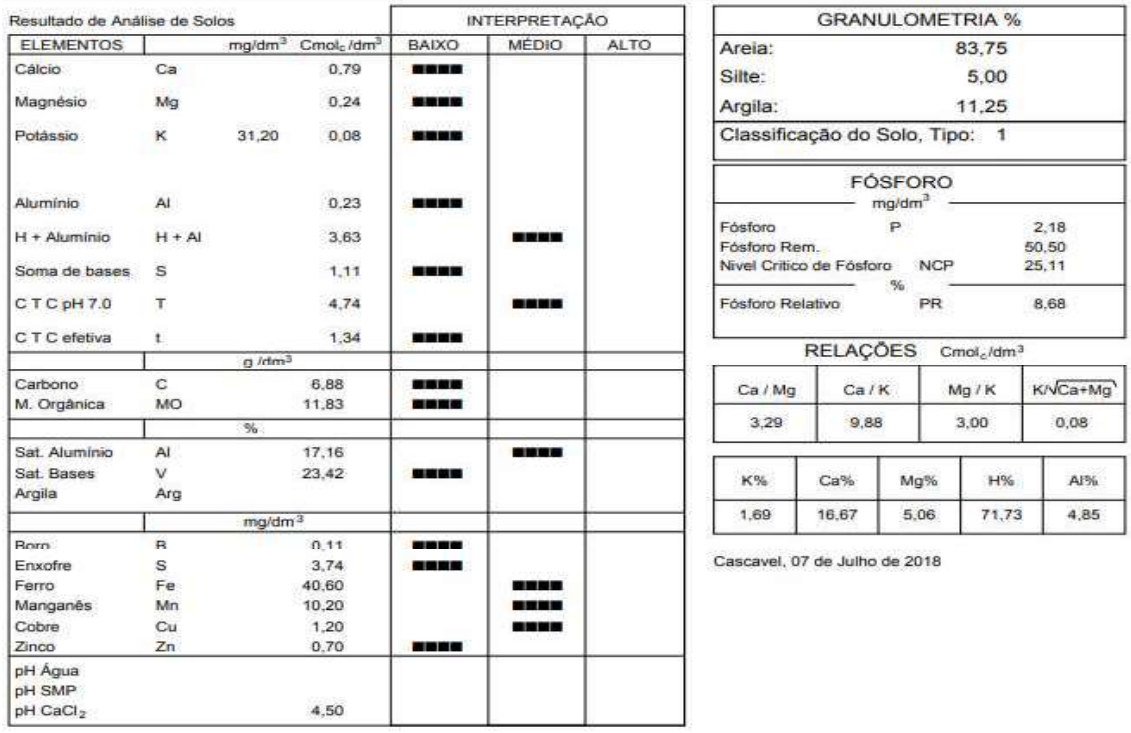
Figure 1- Physical-chemical analysis of the soil at the Mariani site, Sidrolândia-MS.



Resultado de Análise de Solos

ELEMENTOS		mg/dm³	Cmol$_c$/dm³	INTERPRETAÇÃO BAIXO	MÉDIO	ALTO
Cálcio	Ca		0,79	■■■■		
Magnésio	Mg		0,24	■■■■		
Potássio	K	31,20	0,08	■■■■		
Alumínio	Al		0,23	■■■■		
H + Alumínio	H + Al		3,63		■■■■	
Soma de bases	S		1,11	■■■■		
C T C pH 7.0	T		4,74		■■■■	
C T C efetiva	t		1,34	■■■■		
	g /dm³					
Carbono	C		6,88	■■■■		
M. Orgânica	MO		11,83	■■■■		
	%					
Sat. Alumínio	Al		17,16		■■■■	
Sat. Bases	V		23,42	■■■■		
Argila	Arg					
	mg/dm³					
Boro	B		0,11	■■■■		
Enxofre	S		3,74	■■■■		
Ferro	Fe		40,60		■■■■	
Manganês	Mn		10,20		■■■■	
Cobre	Cu		1,20		■■■■	
Zinco	Zn		0,70	■■■■		
pH Água						
pH SMP						
pH $CaCl_2$			4,50			

GRANULOMETRIA %

Areia:	83,75
Silte:	5,00
Argila:	11,25
Classificação do Solo, Tipo:	1

FÓSFORO mg/dm³

Fósforo	P	2,18
Fósforo Rem.		50,50
Nivel Critico de Fósforo	NCP	25,11
%		
Fósforo Relativo	PR	8,68

RELAÇÕES Cmol$_c$/dm³

Ca / Mg	Ca / K	Mg / K	K/√Ca+Mg
3,29	9,88	3,00	0,08

K%	Ca%	Mg%	H%	Al%
1,69	16,67	5,06	71,73	4,85

Cascavel, 07 de Julho de 2018

The property's soil has a sandy texture and low content of organic matter, these characteristics make it difficult for plants to take advantage of nutrients and hinder their development and productivity (SOUSA et al., 1987). Given these conditions, the application of 9 tons/hectare of composted chicken litter was recommended, as it is a low-cost product, it helps in the availability of nitrogen for plants, and increases the organic matter of the soil (SOUSA et al., 1987).

The cultivated area had a good plant stand (figure 2), with average productivity of 7.27 tons of dry matter/hectare.

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Figure 2- Stand of corn plants used for the production of silage.

The production achieved in the corn and sorghum crops (table 1) was sufficient to feed 15 lactating cows for a period of 120 days, from May to August, which are the months of greatest deficit of food for the animals in that region. . Combined with the volume of biomass produced, corn silage is characterized by its high nutritional value, capable of meeting part of the animals' nutritional requirements and increasing milk production (VAN SOEST, 1994).

Table 1- Chemical-bromatological composition of corn and sorghum silages produced at the Mariani site, Sidrolândia-MS

Item	Corn	Sorghum
Production (NM t/ha)	30	75
DM %	24,25	22,00
NDF %	56,95	41,51
ADF %	33,55	50,65
CP %	8,31	11.29
MM %	5,66	4.20

NM- Natural Matter, DM- Dry Matter, NDF- Neutral Detergent Fiber, ADF- Ácid detergent Fiber, CP- Crude Protein, MM- Mineral Matter.

The millet presented a good plant stand (figure 3) and good productivity, since the crop has a high straw production capacity in low fertility soils, being able to produce more than 6 tons/ha of straw (SILVA et al. 2015).

Figure 3- Millet culture in cultivated area.

In the 2019 harvest, due to the climatic difficulties faced, sorghum implantation was recommended (figure 4), for the production of silage and animal feed, this choice was made due to its greater tolerance to water deficit, reducing the risk of losses (MAY et al., 2013). The sorghum variety chosen was the "Bolivian giant sorghum" Agri 002E due to its high production potential. For soil fertilization, the use of 10 tons/ha of rock dust was recommended.

Figure 4- Fodder sorghum in early harvest

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Sorghum productivity reached 16.5 tons of dry matter, a value two and a half times the value achieved with corn in the previous harvest, in 2018, demonstrating that the choice of the species to be used has great importance on the productivity of the property.

The chemical composition of corn and sorghum silages showed good nutritional value for cattle feed (Table 1). According to Oliveira et al. (2017), the production and conservation of food are one of the main points to be observed in the production of cattle, since this food can comprise between 60 to 100% of the animals' food source, thus, an efficient production, both in volume for the whole dry period of the year and with good nutritional value, can determine the profit or loss of the activity.

The results achieved with the practices applied in the property demonstrated the importance of the application of technologies, through the rural extension, in the development of the small producers. According to Monção et al. (2019), the transfer of technologies to rural producers through extension and technical assistance helps the development of food production and development of the rural area.

FINAL CONSIDERATIONS

The extension actions, developed on the property, helped in the production of roughage for supplementation of animals in the dry period and, consequently, for milk production. From the results observed in the present work, it is possible to highlight the importance of extension

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in the management of family properties, ensuring production sustainably and economically, contributing to the preservation of resources and the fixation of man in the field.

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