

Strategies interrelation used in the handle and use of pasture in farms located in Trujillo state, Venezuela.

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Abstract

A research was done to determine the handle strategies and the use of forage gramineae in farms of Trujillo state, Venezuela, and to analyze their interrelations and the origin of seeds used for their establishment. The research consisted on obtaining information through a survey done in 110 farms of 13 municipalities of Trujillo state, analyzed through a descriptive statistic scheme. The research provides information about the strategies used for the production of pasture and the interrelation among them. The results showed that 21.3% of farms make analysis of soils; 53.7% fertilize the paddocks; 99.1% rotates the paddocks; 14.8% irrigate the pastures; 98% makes mechanical control of weeds and 21.3% with chemical methods. Guinea pasture (*Panicum maximum*) is the most common specie (89% of farms) followed by star pastures (*Cynodon plectostachyus*) (56.0%) and barrier (*Urochloa decumbens*) (52.3%). The interrelations detected among the strategies mentioned and among the pasture species in paddock showed that farmers use their paddocks without giving them much importance to the soil. It is then concluded that a program of technical assistance is required that would guide the farmers about the handling strategies that allow improving the efficiency of the pasture's use, including the alternative that incorporate the forages leguminous as a food complement to improve the offer quality in the production units.

Key words: pasture handling, forage production, strategies for the pasture's use.

Introduction

Bovine cattle play an important role in the economic activity of Trujillo State because there are cattle farms in the state that offer jobs and

contribute with milk and meat for direct consuming and as raw material. In these farms, pastures are really important for feeding the herds,

because it works to low the costs of the production and helps with the profitability of the system. This is why they have basic strategies for the management of the pastures.

The development of this research allowed the authors to know about the strategies used for the management of the pastures, which when used appropriately, improve the quantity and quality of grass that should be the base of the bovine diet in a sustainable production system. Chacon (3) points out that the production with ruminants in the tropic should be based on the rational use of the fibrous resources, such as natural pasture and introduced pasture; therefore, it is important to lead an investigation orientated towards the information of production that allows increasing the animal production based on these resources. Muñoz (8) indicated that the forage gramineae is a valuable resource and can be easily found. Besides, it should be considered that the properties of tropical pastures have been discussed and its potential to nourish the animals has been well accepted (5). Ventura (12) also affirms the importance of pasture for the bovine's diet because it is an herbivore animal with a specialized digestive system to take advantage of the vegetal tissue.

Pointing out the management activities, Mancilla and Valbuena (6) state that managing the pasture is maintaining the good conditions of

climate, soil, plants and animals into the pasture ecosystem. In that case, it is important to study how the stock farmer manages it and from here, start to look for the relations of used strategies to know how important they are when creating a program of management of the grassland resource.

About the strategies of management, (6) under the approach of the sustainable forage agriculture, Mancilla and Valbuena highlight that the elements to considerate are the activities that the farmer carries out to improve the production and quality of the pasture biomass, such as the use of fertilizers, weeds' control and the associations of grass with leguminous pasture. Ventura (12) analyses these strategies and proposes an approach about the management of the pasture. He considers the following strategies: selection of species, pest control, management of soils, irrigation and drainage. All this, integrated to an appropriate zoo technique management that emphasizes the breaking periods of the paddock and how demanding pasture is.

The aim of this research is to determine the management strategies and how to profit the grassland in farms of Trujillo State and the relations among them. Also, to investigate the different forage species that exist in the farms and the type of seeds used.

Materials and methods

Agro-climatic characteristics.

The production units and near areas from where the information was taken, are related with ecosystems with an altitude that varies from 10msnm (La Ceiba Municipality) to 1000msnm (Boconó Municipality), these areas are known as Tropical Dry Woods, with a precipitation rank between 850 (Carache Municipality) until 1600 mm/every year (La Ceiba Municipality) (7), the temperature varies from 20°C (Boconó Municipality) to 26°C (La Ceiba Municipality) and the humidity varies between 72% (Carache Municipality) and 86% (La Ceiba Municipality) (7).

Research design.

The methodology was based on finding information about the used strategies for the management of pasture in farms. For this, tools or methods were used to become aware of the relations among these strategies, considering the activities the producers do in the grasslands. This research had 110 farms as samples, taken out from 2500 units of bovine production of Trujillo State. The information was collected in farms of 13 municipalities out of 23 of the State, emphasizing the ones where the cattle production is an evident economic activity. The selection of the farms was made at

random, based on the list supplied by the association of farmers with the production units indicated.

Collection of the information

The information was obtained from three principal groups of variables 1) farmer's management strategies for pasture and how they profit the grass with regards to the following indicators: a) soils analysis, b) fertilization, c) irrigation, d) weeds control and e) use of paddock. 2. - Forage species on paddock and 3) Seeds' origin of the established species. The third variable was included to know how this aspect modifies the strategies in the farms. The information was collected applying surveys and the instrument was a questionnaire of single or multiple answers. A positive climate favored the collection of the data

Data processing and analysis.

The information was organized, processed and analyzed with the SPSS (10) program by descriptive statistics, calculating the number of farms and percentages (%) for every individually variable, to describe the application of the strategies. The relation was achieved using contingency tables and chi-square tests to cross the variables, which made the comparison easier (10).

Results and discussion

In Trujillo State, it is common to find bovine production units with differences between them when talking about the use of equipment, how to

profit the resources and the application of technologies. Table 1 illustrates information about the strategies to profit the pasture in farms.

Soils' analysis was found in 23 farms, (21.3%) which is considered a low number because of the importance of it in the management of paddock. Muñoz (9) says that the analysis of soils allows evaluating its natural fertility in advanced or during the growth of grass. Arriojas states that these analyses show the behavior of soils as a mean of growth of any forage specie.

Another variable is fertilization; it was found that 58 farms (53.7%) fertilize the paddock (table 1). This shows the importance of fertilizing as a management strategy. Casanova (2) emphasizes that when using fertilizers the production of pasture is increased and as a consequence the farmer can enlarge the capacity of grasslands.

Also, table 1 reveals that the grazing and mechanical weeds control are the most used strategies by the object farms of the research. This may indicate in first place, that farmers accept the need of taking care of the pastures in their farms establishing breaking periods and activity periods. That leads to the improvement of pasture and to define the activity days, to better profit this resource.

In second place, just like Virgüez and González (13) say, producers recognize that weeds reduce the production of the different species of grass and as a consequence the animal production is diminished (milk and meat). This is why the strategies to eliminate weeds are very popular but the mechanical ones are the most used because they represent the lowest costs.

According to table 2, 22 farms (95.7%) out of 23 that analyze soils, fertilize, demonstrate that some producers are motivated to fertilize the paddock based on their knowledge on the soils analysis, helping themselves to profit this resource. Torres and Entrena (11) found similar results in farms of Trujillo State where it is needed to apply technical assistance programs to livestock producers, so they are motivated to use the appropriate strategies to profit paddock.

The relation between these two variables was verified, contrasting the hypothesis of independence with a chi-square test ($P < 0.01$), which showed dependence or association. This might mean that farmers that analyze soils

Table 1. Strategies to manage paddock of Trujillo State.

Strategy	Number of farms	Percentage (%)
Soils analysis	23	21.3
Fertilization	58	53.7
Rotating pasture	107	99.1
Irrigation	16	14.8
Mechanical control of weeds	106	98.0
Chemical control of weeds	23	21.3
Total of Farms	110	

Table 2. Frequency Matrix (number of farms) to compare used strategies to manage paddock in farms of Trujillo State.

Strategies	SA	CCW	MCW	I	R	Total of farms
Fertilization	22*	19	56	11	58	58
Soils Analysis		10	23	7	23	23
Chemical Control of weeds			22	7	23	23
Mechanical Control of weeds				16	105	106
Irrigation					16	16
Total of farms	23	23	106	16	107	110

*Dependence between variables ($P < 0.01$)

SA: Soils Analysis. CCW: Chemical Control of weeds. MCW: Mechanical Control of weeds

are convinced of the efficacy of fertilization, to improve the production of the pastures. As a result, using technical assistance programs, producers could agree about the convenience of using these strategies, however, it is important to consider how they manage and profit all the factors involved. About this, Senra (cited by Guevara *et al.*, (4)) brings out that animal production based on tropical pastures, depends, in a big measure, on the rational management of all the factors in the association soil-pasture-ruminant.

Regarding analysis of soils, weed control, rotation and irrigation, tables 1 and 2 show that out of the 106 farms, where mechanical weed control is used, only 23 farms (21.7%) carry out soil analysis.

From 107 farms, where pasture rotation is done, just 23 (21.5%) do the analysis of soils. According to Voisin (14) rotational pasture helps the fertility of soils. Making allusion to

irrigation of pastures, it is only used on 16 farms and only 7 analyze soils. It is important to state that the dependence between these variables was not significant with the chi-square test.

In the same order of ideas, on 56 farms out of 106, where weeds control is applied, the paddock are fertilized. table 2 demonstrates that there are 16 farms that irrigate the pasture and 11 do not use fertilizers.

According to the results on tables 1 and 2, it can be inferred that the farmers accept that fertilization and the analysis of soil are important strategies to manage paddocks; however, they do not carry them out. This behavior can be explained considering that the producer should make an economical investment to optimize the production, but it is necessary to know that cattle is a business, therefore, the farmer will try to reduce the operating expenses using less expensive strategies.

Nevertheless, if technical assistance was offered and also information about the benefits of maintaining a basic plan of grasslands management, following a program of strategies with a flexible structure and institutional support, producers would be more receptive to implement these recommendations.

Table 3 summarizes information about the main pasture species established in farms of Trujillo State. The most used is guinea pasture (*Panicum maximum*) found in 97 farms (89%). In second position is star grass (*Cynodon plectostachyus*) found in 61 farms (56%) and barrera grass (*Urochloa decumbens*) found in 57 farms (52.3%). It is necessary to quote that these grass species are used in farms along with other species, but on individual paddocks.

Any producer mentioned the leguminous pasture on the paddock, this means that the farmers do not know how good they are to

complement the ruminants' diet. Hernández *et al* (5) affirms that generalizing the use of leguminous pasture may be an alimentary strategy, because it is proved that when used in association with the regular grass, the animal production can be equal or may exceed the ones obtained with fertilized grass.

Table 4 reveals the relation between the strategies used by the producers and the forage species. Out of 97 farms (89%) with guinea pasture, 52 (53.69%) fertilize the grasslands. These 52 with guinea pasture and fertilizers represent the 42.27% of the whole. There are 17 farms with Taiwan pasture (*Pennisetum purpureum*), and 12 out of these 17, (70.6%) fertilize. This comparison shows the relation between fertilizing and the preference towards particular forage specie. This preference is up to the producer because according to him, this is an important resource and may help him

Table 3. Main grass species established in paddock in farms of Trujillo State.

Specie	N° of farms	Percentage (%)
Guinea (<i>Panicum maximum</i>)	97	89.0
Star (<i>Cynodon plectostachyus</i>)	61	56.0
Barrera (<i>Urochloa decumbens</i>)	57	52.3
Needle (<i>Urochloa humidicola</i>)	25	22.9
Taiwan (<i>Pennisetum purpureum</i>)	17	15.6
Sebosa (<i>Melinis minutiflora</i>)	9	8.3
Brizantha (<i>Urochloa brizantha</i>)	8	7.3
Páez (<i>Brachiaria mutica</i>)	8	7.3
King pasture (<i>Pennisetum purpureum x Pennisetum typhoides</i>)	7	6.4
Tanner (<i>Brachiaria arrecta</i>)	7	6.4

Table 4. Number of farms that apply strategies and the relation with common pasture species in grasslands

Specie	Strategies				Total of farms by specie
	Fertilization	Soils analysis	Chemical control of weeds	Mechanical control of weeds	
Guinea	52	23	23	93	97
Star	32	17	18	58	61
Barrera	27	9	8	55	57
Taiwan	12	8	5	17	17

solve the food supply for the cattle. This agrees with the following statement by Muñoz (8): forage grass represents a worthy resource and it is easy to get for the ruminants' diet.

Table 5 summarizes the relation between strategies to manage seeds and their origins. In 94 farms national and international seeds were used, which made difficult to relate the origin of seeds and the used strategies, the other 16 farms (14,5%) did not provide any information because of their lack of knowledge.

This shows the producers' ignorance about the origin of seeds. The relation among producers using national and international seeds was similar. This means that the origin of seeds is not a determinant variable to carry out strategies to manage paddock.

The results reveal the relation between some field activities that are used as strategies by the farmers to improve the grasslands, besides; they contribute to highlight the need to offer orientation to producers, so they can profit efficiently this resource.

Table 5. Relation between faros that apply strategies and the origin of most used seeds in grasslands

Origin	Strategies				Total origin
	Fertilization	Soils analysis	Chemical control of weeds	Mechanical control of weeds	
National	9	4	6	14	15
Imported	15	8	4	25	25
Both	27	11	13	52	54
Total of farms	51	23	23	91	94
No information about seeds	7			15	16

Conclusions

The results allow us to know that farmers in Trujillo State carry out strategies to manage and profit the paddock, even though; they do not perform some strategies that may be really important to profit the use of the resource. The relations between the strategies, worked to identify the strengths and the weakness on pastures management. Among the strengths it can be mentioned that the producers recognize the need to control weeds, the need to have breaking periods and activity periods to help

the recover of pastures. Inside the weakness, it can be emphasized that the analysis of soils is not common and fertilization is carry out without any technical recommendation from a previous study. Also, producers do not have any interest in introducing leguminous grass on pastures. It is important to organize a technical assistance program to offer orientation about the use of pastures, accentuating the management of the pasture ecosystem, making emphasis on soils.

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