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### **Increasing Food Security through Evaluation of Prospects Cattle Stallions of the Breed Simmental and Simbrah**

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#### **Introduction**

Mexico is a country that is concerned to increase the quality and quantity of food production, and relying less on imports that generate high prices and with this decrease of accessibility of consumption for its population, especially in low-income communities economic, where the consumption of protein may be very important for public health and sustainable development. It is a country Genetic Simbraha and Simmental breeds and production of Simmental and Simbrah registered pure Fleckvieh (from registry) races, are highly efficient in activity milk without losing the genetic capacity of calves efficiently produce meat in grazing without additives, special for commercial breeding a true dual-purpose breed, (Mexican Association Simmental Simbrah, 2010).

The country must prepare for the global problems that lie ahead in the next 30 years, as are the lack of food, shortages of water and energy and environmental pollution, so all that research right now in that direction is of strategic importance, not only for the country, but also for the world. For Mexico, agricultural and forestry production units is the main land use in the country, covering an area of 112.3 million hectares, which represents the 57.3% of the national territory, according to information from the eighth census agricultural, livestock and forest (Inegi, 2007, Manzanares et al., 2014).

In other side, according to the data of the service of information and statistics agric-food and fisheries of the (Sagarpa, 2002) Mexico has a great diversity of livestock genetic resources, with a total of 45 breeds of cattle, of which 26 are European, 7 Zebu and synthetic 12, product of crosses between European breeds and Zebu.

The State of Nuevo Leon, Mexico, has a livestock area amounting to little more than 5.5 million hectares, 86% of the State area, of which 90% are rangeland, and the remaining 10% of prairies. The livestock inventory in the State of Nuevo Leon amounts to 386,474 cattle (Manzanares et al., 2014).

Today, Nuevo León takes place 20 national beef production. Different breeds of cattle can be adapted to the climatic conditions of Nuevo León, as the Beefmaster, Charoláis, Simmental Simbrah, red Brangus, Santa Gertrudis, Italian (Chianina and Romagnola), Long Horn, Limousin, Braunvieh, Charbray, Braford, among others. The State of Nuevo

León has been internationally recognized for the quality of the meat of bovine animals. Additionally, in Nuevo Leon consumption per capita, said meat, is 37 kg a year, according to the Corporation for the Agricultural Development of Nuevo Leon (2008), is the state the highest in the country, which also compares favorably with the national average of 21 kg (Manzanares, et al., 2014).

According to the Corporation for the Agricultural Development of Nuevo Leon, Mexico (2008), the predominant production system is extensive rangeland. In terms of induced grassland, there are approximately 540, 000 has induced meadows of temporary, dominated the buffel grass (*Cenchrus ciliaris*). There are close to 20,000 ha Prairie with irrigation systems, with grazing african star and bermuda crosses, in addition to about 150,000 ha of fodder such as sorghum, corn, oats, grass, alfalfa crops, among others with little proportion (Manzanares, et al., 2014).

In currently used several practices for genetic improvement, which include the evaluation of prospects to stallions, which have the advantage of assessing and identifying the best stallions at an early age, allowing the improvement of future generations for growth and carcass characteristics. This can be accomplished through selection for characteristics that can be measured in vivo using ultrasound technique, and which are good indicators of the quality of the channel (AOC), intramuscular fat rib eye area (index of marbling) and thickness of back fat (EGD). These tests are of the utmost importance since meat products, especially of cattle currently facing great challenges and opportunities, highlighting the urgent need to increase competitiveness against global competition facing our country (Manzanares, et al., 2014).

Advances in the technology of ultrasound to predict the composition and quality of the channel in vivo, this technology makes an important tool for the evaluation and improvement of the merit of the breeding beef carcass, without resorting to direct measurements in the channel of related animals, which is costly and takes time for the genetic evaluation of animals.

However there is evidence of the breed selection since the 17th century (1600-1630). It was until the year of 1862 that defined the beginning of breeding in purity of race, since starting the registration of animals in the genealogical book of the race by order of the Government of Switzerland.

Genetic Simbraha and Simmental breeds and production of Simmental and Simbrah registered pure Fleckvieh (from registry) races, are highly efficient in activity milk without losing the genetic capacity of calves efficiently produce meat in grazing without additives, special for commercial breeding a true dual-purpose breed, (Mexican Association Simmental Simbrah, 2010). The origin of the simmental breed is in the Simme Valley located in the Berner Oberland, Switzerland. Simmental name derives from its original location. In the German language the word "Thal" or "Tal" means "Valley". Simmental literally means Valley of the Simme. This Valley is located where the river Simme flows in the middle and West of Switzerland where the climate is cold and there is Alpine and sub-alpine vegetation that offers excellent Prairie (Manzanares, et al., 2014).

Main objective criticality of this study was generate knowledge to increase food security in the production of meat through the assessment of cattle that are leaflets to be stallions of the Simmental and Simbrah breeds. The evaluation of the different productive characteristics with economic importance of simmental and simbrah, under an appropriate and uniform

environment breeds, which makes that the differences that manifested due to the genetic quality of each individual.

## **Material and Methods**

For the realization of the present research were used the tests to assess prospects to stallions, that they have proven to be one more tool to select sires, whose production characteristics are superior to the of his contemporaries. The Simmental-Simbrah Mexican Breeders Association invited all partners to participate by sending their cattle to the "test of evaluation of prospects to stallions" that took place in the facilities of the Center of Research and Agricultural Production at the Universidad Autonoma of Nuevo Leon, located on national road Linares - Ciudad Victoria kilometer 145 in the municipality of Linares, Nuevo Leon, Mexico.

Description of the process of carrying out the research (Manzanares, et al., 2014):

- Reception of the stallions.

There were received on the premises of the Centre of Research and Production of the January 4th until January 13th 2010.

Upon arrival was a visual, individual and group exam. It weighed for distribution in uniform batches by live weight. Conducted the health management of gastro-enteric worming and against ectoparasites, and vaccinated against IBR, BRSV, PI3, DVB and Clostridial. The same applied vitamin A, D and E. It used a period of adaptation of 19 days (from 4 to 22 January 2010). Food was provided to 16% PC, and they forage grass.

The start date of the assessment took place at 8:00 of January 23th of 2010, taking the initial individual weight of each young bull. Weighing the stallions was diet of food and water for 12 hours prior to the weigh-in, he was also held at hip height and scrotal circumference measurement. According to the results of the weights, adjusted the amount of food that was provided to each placed, adjusting the amount to 3% of the live weight present.

Upon arrival was a visual, individual and group exam. The weighing was performed every 28 days, being on the following dates:

1st weighing: January 23th 2010 2nd weighing: February 20th, 2010 3rd heavy: March 20th 2010 4a weighing: April 17th 2010 Weighing final 2010: May 14th 2010

Characteristics or variables that were measured to evaluate the prospects to stallions were:

1. Daily gain for the period (GDP) the formula used was as follows:  $GDP = (\text{final weight} - \text{initial weight}) / \text{the days of the Test}$ . 2. Daily gain by age (GDE) the formula used was as follows:  $GDE = \text{final weight} \div \text{age update}$ . 3. Weight adjusted to 365 weaning weight adjusted to age. It is a useful measure, since it combines weaning weight adjusted to weaning with the animal post-weaning growth. Growth post-weaning is mainly determined by the potential of the individual.  $\text{Weight Adjusted to 365 days} = (\text{year weight} - \text{weight at weaning}) \div (365 \text{ Days} - \text{Days at weaning}) \times (160 + \text{adjusted weight} \times 205 \text{ days})$ . 4. The beef tenderloin area. The measurement loin eye Area carried out with ultrasound equipment brand Aloka 500v, with a linear transducer of 17 cm of 3.5 and a software. 5. Percentage of fat intramuscular.

6. Dorsal fat. 7. Genetic markers (softness of the meat and marbling). 8. Body size The formula used to calculate the body height for males was as follows:  $Ht = \text{height in inch}$

hips. Frame Score =  $- 11.548 + 0.4878 (\text{Ht}) - 0.0289 (\text{age in days}) + 0.00001947 (\text{age in days})^2 + 0.0000334 (\text{Ht}) (\text{age in days})$ . 9. Scrotal circumference (SC) The measurement was taken with a tape measure in the wide part of the scrotal pouch, the formula adjustment at 365 days is:  $\text{Adjusted } 365 - \text{diameter SC} = \text{current SC} [(365 - \text{age in days}) \times \text{Adjusted Factor age}]$ . It is noteworthy that scrotal circumference is an indicator of the fertility of the bull and will have a positive effect on the reproductive behavior of the daughters, such as early puberty. This is also considerable evidence that the measurement of the scrotal circumference in a bull between 1 and 2 years old has a heritability of moderate to high, (Mexican Association Simmental Simbrah, 2010).

- Nutrition of the cattle while the study was carried out.

The food ration was provided on the basis of a balanced diet containing 60 to 70% of available nutrients in general terms total (2.2 to 2.6 Mcal/Kg DM) and 16% crude protein. The ingredients for this ration were: sorghum grain, soybeans, ground bale of forage, molasses and pre flour blend of vitamins and minerals.

- Climate conditions present while the investigation was carried out.

In the municipality of Linares, Nuevo Leon, Mexico, it has a semi-hot climate sub-humid, registering an average annual temperature 21.4 °C, presenting extreme temperatures of 42 °C in summer and -2 °C in winter. The increased storm rainfall is typically recorded in the month of September, which oscillates between 170 and 180 mm, and the minimum in the months of January and December, between 15 and 20 mm. It is worth mentioning that the leaflets to stallions were evaluated under weather conditions that are presented in Table 1, by which, should be taken into account in the subsequent performance of the prospect.

**Table 1: Rainfall and temperature presented during the research, from January to May 2010.**

Month	Rainfall		Accumulated rainfall		Temperature (°C)		
	(mm)	(inch)	(mm)	(inch)	maximum	minimum	average
January	30.2	1.19	30.2	1.18	25	2	13.5
February	35.5	1.4	65.7	2.59	28	2	15.0
March	4	0.16	69.7	2.75	34	5	19.5
April	190.5	7.5	260.2	10.25	35	10	22.5
May	7.5	0.3	267.7	10.54	36	14.5	25.3

Source: Wether Stations of Centro de Investigación y Producción Agropecuaria, UANL y Facultad de Ciencias Forestales, UANL.

## Results and Discussion

The statistical analysis showed a high statistical difference between the total profits made by each of the two tested races and also showed highly significant statistical differences in the values of average daily gain for the two races ( $p=0.007$ ). Not found statistical differences with regard to the average profit of the two races.

The duration time of a test to get accurate data regarding the consumption of food in this study was 70 days. The differences between the races in the response of the components of variance to increase the duration of the tests are less. It can a slight trend occur in the Simmental bulls that they require durability tests than other races because some traits, but these differences are not consistent.

The foregoing is supported with the found by Archer and Bergh (2000); Kemp (1990) and Brown et al., (1991), who recommend duration for testing measurement of the rate of

growth in the literature includes 112 days, 84 days and 70 days. The studies that 112 days recommended usually based its conclusions on the basis of phenotypic correlations with evidence of 140 days and they do not consider problems with auto correlation data, while those that recommend shorter tests (84-70 days) were based on a variation of components. The rise in the increase in final weight for the Simmental Simbrah race about race, ( $p=0.006$ ), by which it can be said that the Simmental breed presents a better value of gain at the end of the test, even and when handling costs were the same for the two races in the conditions in which the test was performed (Manzanares, et al., 2015).

With regard to the daily gain for each race, the same behavior to be greater in the Simmental breed, even when it is assumed that the race Simmbrah, was created from the first round with the objective to better tolerate extreme environmental conditions that are presented in the northeast of Mexico, where the study was conducted, the genetic contribution of the race Cebu, does not become even as, less greater than the Simmental breed in terms of increased daily weight (Manzanares, et al., 2015).

What has been said above you can compare with what was found by Charolais and Limousin, (Renand et al., 1998), with cattle estimated genetic correlation that exists in the evaluations of stallions of the central station, using bulls that were subsequently tested, and studied its progeny, finding that the select by growth and residual feed rate (NFI), resulted in a significant increase in the ability of the muscle growth in the offspring in response to the selection of the Charolais breed (Manzanares, et al., 2015).

With regard to the daily gain has to be in the state of Sonora, Mexico was conducted an assessment of prospects to stallions in confinement in poultry, with a duration 140 days, by providing them with a complete diet, the races were Charolais, Indobrasil and Simmental taking a daily gain of 1.488, 1.183 and 1.457 g, respectively (López, 1981 and Manzanares, et al., 2015), whereas in the present study, the Simmental breed presented a daily gain superior of the order of 1.680 g.

Hernández et al., (1995), they mentioned that in the selection of bullocks for stallions should be considered important characteristics such as: the weight, the daily gain and the scrotal circumference, as well as other phenotypic characteristics, in order to achieve the selection to be efficient and obtain a higher genetic progress. Therefore, among the most important are: the daily gain of weight, height, scrotal circumference, characteristics of body composition measures with ultrasound and the fertility test, mainly (Rodríguez-Almeida, 1997, Manzanares et al., 2015).

Johnson et al., (1995) mentioned in a study, that the bulls of pure races as Hereford and Simmental ( $n = 120$ ), were evaluated their reproductive parameters. Four diets were used, all the same in composition with the exception of the dietary fiber, were given during the test of growth behavior, the diet had no direct effect (FQO. 10) in any of the reproductive variables examined. Of the 117 bulls to be had for the evaluation of their good play status, 75% were classified as satisfactory potential players, the 24% as "questionable" potential player and 1% as unsatisfactory potential players. In the present study, no statistically significant differences were found between the two races with a level of  $p>0.05$  in the following variables like to Manzanares, et al., (2015): Weight adjusted to 365 days, Area of the loin eye, Percentage of intramuscular fat, Fat, Genetic markers (softness and meat type marbled with fat "marmoleo"), Body size and scrotal circumference. The foregoing tells us that these characteristics under the conditions in which the study was conducted, are features that both breeds have alike.

In this case, Like as what Manzanares, et al., (2015) has found, if it looking for a higher increase in weight or final journal, then it should consider to the Simmental breed as the most appropriate for the northeast of México. The foregoing indicates that at least, with regard to these characteristics, continues to play the race Simbrah, both as the Simmental, what not discredited the formation of the race Simbrah, at least with respect to these variables and in the favorable conditions under which the present study was carried out.

### **Conclusions and Outlook**

The knowledge, that it been generated through this research to increase food security in the production of meat through the assessment of cattle that are leaflets to be stallions of the Simmental and Simbrah breeds, it was the following:

The Simmental breed behaved than the Simbrah, respect to the variables: Increase in daily weight and increase in final weight. If it looking for a higher increase in weight or final journal, then it should consider to the Simmental breed as the most appropriate for the northeast of México. And likewise, it was noted that there were no statistically significant differences between the two races ( $p>0.05$ ) with respect to the variables weight adjusted to 365 days, Area of the loin eye, percentage of intramuscular fat, fat, genetic markers (softness and meat type marbled with fat “marmoleo”), body size and scrotal circumference.

Based on what has been found in this study, it is planned to continue working in the food consumption residual (RFI) as an indicator of Selection of the cattle Simmental and Simbrah.

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