A SURVEY OF THE FEEDING PRACTICES, COSTS AND PRODUCTION OF DAIRY AND BEEF CATTLE IN NORTHERN MEXICO

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INTRODUCTION

Prickly pear is a sweet succulent plant resistant to arid land conditions (1) and because of these attributes it has been used as an emergency livestock feed, especially during the winter and spring seasons.

In North-Central Mexico, Marroquin (6) has classified three prickly pear producing areas as follows:

1) Potosina-Zacatecana area. Includes the states of Aguascalientes, part of Coahuila and Durango and Jalisco.
2) Northeast area. Includes north of Tamaulipas state and west of Nuevo Leon state.
3) Difuse area. Includes the states of Coahuila, Chihuahua, Durango, Nuevo Leon, San Luis Potosi and Zacatecas.

There are about ten prickly pear species that are considered (9) to have forage potential, because of their chemical composition (Table 1) and their availability during critical periods of the year, which are: *Opuntia cantabrigiensis, Opuntia lindheimeri, Opuntia robusta, Opuntia engelmanii, Opuntia rastrera, Opuntia macrocentra, Opuntia microdasys, Opuntia phaeacantha, Opunita ficus-indica, Opuntia megacantha.*

Table 1. Chemical composition of different prickly pear species.

		%						
Specie	Reference	DM	OM	CP	EE	CF	ASH	NFE
O. rastrera	4	14.4	59.9	2.8	0.8	16.2	40.1	40.2
O. robusta	4	10.4	81.4	4.4	1.7	17.6	18.6	57.6
O. engelmanii	4	15.1	68.4	3.3	1.2	3.6	31.6	60.3
O. lindheimeri	4	11.6	74.5	4.1	1.0	3.0	25.5	66.3
O. ficus-indica	4	11.3	89.9	3.8	1.4	7.6	13.1	77.1
Opuntia Spp.	3	17.0	----	5.1	1.9	13.2	20.5	59.2

DM = Dry Matter OM = Organic Matter CP = Crude Protein
EE = Ether Extract CF = Crude Fiber NFE = Nitrogen Free Extract

Based on the estimated production of 100-300 tons of prickly pear/ha., about one to five cows/year can be maintained in one hectare (2,5).

The purpose of this study was to present aspects related to the feedings of prickly pear to dairy and beef cattle.

METHODS

This survey was conducted in seven livestock units located in three municipalities (Saltillo, General Cepeda and Parras) of the State of Coahuila in Northern Mexico. The information obtained in this survey included:

Location of the livestock unit.
Number of animals (dairy and beef) in the livestock unit.
Amount of prickly pear offered per day.
Form of feeding (cut, burned, or chopped)
Other feeds offered.
Season (month) of feeding.
Production level (dairy and beef).

The only consideration in cost of production, was the prickly pear market price. The requirements of a 600 Kg. dairy cow producing 15.4 Kg of milk with 3.0% fat were estimated from the NRC (7) tables. Then, the amount and percentage of these requirements supplied by prickly pear were estimated. The same procedure was followed for the beef animals (8). However, the requirements considered were those estimated for a 400 Kg steer with an average daily gain of .34 Kg. These requirements for both, dairy and beef, were selected based on the average estimated weights and production levels observed.

RESULTS

The results of the survey of the feeding practices and production of dairy cattle is presented in Table 2. It shows that the seven production units had 447 cows with a mean prickly pear consumption of 25.7 Kg/day, and a mean daily milk production of 15.4 Kg. All of the production units offered the prickly pear in the burned-chopped form supplemented with corn stover. However, three of the production units also offered milo, and the other three offered also range and/or alfalfa as supplement. In this group one production unit also supplied agave as part of the supplement. It was found that prickly pear was commonly fed from January to May.

The feedings practices and production levels of beef cattle fed prickly pear are shown in Table 3. From the 715 beef animals found in the seven production units, 130 animals were not fed prickly pear. In those units that were using prickly pear the mean consumption of this forage was 15.0 Kg/day, with an average daily gain of .34 Kg. All of

the production units supplying prickly pear offered it in burned-chopped form. All of the production units kept the animals under range conditions during the day. Two of the production units also offered concentrate. Another supplemented with a combination of corn stover, molasses and urea, and another one of the production units supplemented only corn stover. Most of the production units fed prickly pear during the months of January to May.

Table 2. Results of the survey of the feeding practices and production of dairy cattle in northern Mexico.

Location	Number of Animals	Prickly Pear consumed per day (Kg)	Milk Production per day (Kg)	Form of Feeding	Supplement	Season of Feeding
R. Nuevo	20	30	18	Burned	Corn Stover + Alfalfa	Jan-May
Dos Abril 1	120	30	16	Burned	Corn Stover + Milo	Jan-May
Dos Abril 2	42	20	14	Burned	Corn Stover + Range + Alf.	Jan-May
Agua Nueva	70	30	15	Burned	Corn Stover + Milo	Jan-May
G. Cepeda	100	20	15	Burned	Corn Stover + Milo	Jan-June
Derramadero	60	20	14	Burned	Corn Stover + Range + Alf.	Jan-June
La Trinidad	35	30	16	Burned	Corn Stover + Range + Alf. + Agave	Jan-May
	447	X = 25.7	X = 15.4			

Table 3. Results of the survey of the feeding practices and production of beef cattle in northern Mexico.

Location	Number of Animals	Prickly Pear consumed per day (Kg)	Live weight gain per day (Kg)	Form of Feeding	Supplement	Season of Feeding
R. Nuevo	60	10	.1	Burned	Corn Stover + Range	Jan-May
Dos Abril 1	140	20	.6	Burned	Concentrate + Range	Jan-May
Dos Abril 2	60	--	--	------	Range	-------
Agua Nueva	85	10	.1	Burned	Range	Jan-May
G. Cepeda	180	20	.6	Burned	Concentrate + Range	Jan-June
Derramadero	120	15	.3	Burned	Corn Stover + M + U + Range	Jan-June
La Trinidad	70	--	--	------	Range	-------
	715	X = 15	X = .34			

M = Molasses U = Urea

The cost of dairy production using prickly pear as feed is shown in Table 4. The requirements of a 600 Kg dairy cow producing 15.4 Kg of milk with 3.0% fat, and the amount and percentage from these requirements supplied by prickly pear are also presented. Considering the observed mean prickly pear consumption of 25.7 Kg per cow at a cost of $.013/Kg the prickly pear cost/day was $.34. Considering a mean milk production of 15.4 Kg/cow/day and a total feed cost per kilogram of milk of $.22, the total cost of feeding was $3.34/cow/day. Thus, prickly pear is contributing about 10% of the total cost of feeding and is supplying 4.5% net energy for location, 12.2% protein, 46.0% fiber, over 100% Ca, and 15% P of the requirements listed by the NRC (7).

The cost of beef production using prickly pear as feed is shown in Table 5. The requirements of a 400 Kg steer with an average daily gain of .34 Kg and the amount and percentage from these requirements supplied by prickly pear are also presented. Considering the observed mean prickly pear consumption was 15.0 Kg per cow with a cost of $.013/Kg the pricly pear cost per day was $.20. Considering an average daily gain of .34 Kg per steer/day and a total feed cost per kilogram of gain of $1.17, then the total cost of feeding was $.40 per steer/day. Thus, prickly pear is contributing about 50% of the total cost of feeding and is supplying 7.8% net energy for maintenance, 20.6% net energy for gain, 16.2% protein, over 100% Ca, and 50.0% P of the requirements listed by the NRC (8). From this data, it can be observed that the cost of feeding prickly pear is high, and it is related to the low daily gain.

Table 4. Cost of Dairy Production.

Req 600 Kg Cow 15.4 Kg Milk, 3.0% Fat			Supplied by Prickly Pear	% of Req. Prickly Pear
NE1 (Mcal)	= 20.2		.92	4.5
Protein (Kg)	= 1.8		.22	12.3
Fiber (Kg)	= 1.3		.60	46.0
Ca (Kg)	= .06		.38	>100.0
P (Kg)	= .04		.01	25.0
Prickly Pear Consumption		25.7 Kg		
Cost of Prickly Pear		$ .013 Kg		
		$ .34		
Milk Production		15.4 Kg		
Feed Cost/Kg Milk		$ .22		
Total Feed Cost		$ 3.34		

NE1 = Net Energy for Lactation Ca = Calcium P = Phosphorus

Table 5. Cost of Beef Production.

Req 400 Kg Steer ADG 0.34 Kg			Supplied by Prickly Pear	% of Req. Prickly Pear
NEm (Mcal)	= 6.9		.54	7.8
NEg (Mcal)	= 1.5		.31	20.6
Protein (Kg)	= .8		.13	16.2
Ca (Kg)	= .02		.22	>100.0
P (Kg)	= .02		.01	50.0
Prickly Pear Consumption		15.0 Kg		
Cost of Prickly Pear		$ .013/Kg		
		$ .20		
Average Daily Gain		.34 Kg		
Feed Cost/Kg Gain		$ 1.17		
Total Feed Cost		$ .40		

ADG = Average Daily Gain NEm = Net Energy for Maintenance NEg = Net Energy for Gain
Ca = Calcium P = Phosphorous

CONCLUSIONS

Feeding burned-chopped prickly pear is a common practice in most of the production units surveyed during the critical months of the year (January to May), which in this area is the dry season. It is important to note that not all of the beef production units were supplying prickly pear, and that prickly pear is fed in greater amounts for dairy than for beef cattle.

Dairy cattle had a better productive performance than the beef cattle, which probably reflects better supplementation and management practices. In relation to beef cattle productive performance, it was observed that those steers receiving a good supplement, such as concentrate, had much better results in production.

Feeding costs associated with the utilization of prickly pear for dairy cattle composed about 10% of the total, while those associated with beef cattle composed about 50%.

It must be pointed out that the production units surveyed were ejidos (communal land) where economic resources are limited. Given the limited financial resources the observed production levels are not as low as they appear.

The utilization of prickly pear in the feeding of dairy and beef cattle will continue, because of its availability during the critical months of the year, and its low cost. However, if higher production levels are expected, then adequate supplementation and management practices should be emphasized.