

THE ECONOMIC FEASIBILITY OF CULTIVATING PRICKLY PEAR AS A CROP FOR FEEDING CATTLE IN SOUTH TEXAS

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Can prickly pear be used economically to feed cattle in south Texas? I think that it can, and that it will save more money for ranchers than buying a pre-mixed feed. If my hypothesis proves true, it will be significantly valuable information for ranchers to know in order to save them money.

LITERATURE REVIEW

Jack Maltberger, the father of South Texas rancher Bill Maltberger, once said, "If you have pear and water, you can stay, don't ever run from a drought" (Maltberger, 1989). Likewise, Dr. H. Q. Sibley, whose family survived the seven-year drought of the 1950's by using prickly pear, says, "I think it is THE most economical way to survive a South Texas drought with the least amount of expense and involved land alteration" (Sibley, 1989). The prickly pear cactus (*Opuntia* spp.) saves money when used in place of feed during droughts and during the winter months (Hanselka, 1989). It can also be used to prevent or get rid of hollow belly (Maltberger, 1989). The prickly pear is great for adding bulk and forage. It is mostly fiber and water (Sibley, 1989). In research on cattle being fed different levels of prickly pear in their diets, it was found that the more prickly pear included in the cows' feed, the less water they drank. In a feeding trial in the fall of 1915, three groups of cows were fed different levels of prickly pear. Those fed large amounts of prickly pear drank only 5 pounds of water daily (8.3 lbs/gallon). Those fed medium levels drank 30 pounds, but those which were fed sorghum hay needed 95 pounds. The cows which were fed only prickly pear did not drink any water. When the same experiment was done in May and June, the same four rations (heavy and medium levels of prickly pear, sorghum hay, and prickly pear alone) caused the cows to drink 0, 44.3, 95 and 0 pounds of water (Paschal, 1989). Normally, a cow would drink from 10 to 20 gallons of water a day, depending on conditions such as weight, physiological status, and temperature (Nutrient Requirements of Cattle, 1984). Although prickly pear is high in energy and ash (mineral) when fed "as is," it has very little protein. It also appears to be high in vitamin A, although it is not known what effect burning the spines might have on the vitamin A content. Vitamin A is often in short supply in rangelands prone to drought. Prickly pear is important as a south Texas feed because it can meet the following requirements of a drought resistant fodder crop: 1) it can survive long droughts, 2) it can produce large quantities of fodder during favorable rainfall periods, 3) it has a high carrying capacity, 4) it is able to supply succulent fodder to animals, 5) it has no adverse effect on animal health, 6) it can withstand severe utilization, 7) it has easy establishment and economical maintenance, and 8) it is adaptable to poor soil and climate conditions (Gregory, 1988).

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To prepare the prickly pear for consumption by the cattle, either burn the spines and let the cattle eat it where it is, or cut it, burn off the spines, chop it, and put it in feed troughs (Hanselka, 1989). To find the cost of preparing the prickly pear, you only need to add the cost of fuel to the cost of workers who prepare it. At least 90% of the time, it will come out to be less than buying feed (Howell, 1989)

METHODS AND RESULTS

In this paper the value of the prickly pear was estimated for a 5 year old plantation on the W.H. "Bill" Maltsberger ranch at Cotulla, Texas. The soil type was 87 BC Rolling Hardland Range type. The row spacing in this plantation was 16 ft 3 inches. A typical 10 ft section of one of these rows was harvested and found to weigh 358 lbs. Using the inter row spacing of 16 ft 3 inches this corresponds to 96,000 lb of fresh cactus/acre.

Maltsberger (personal communication) has determined that 4 gallons of propane at \$0.69/gallon are required for 14 cows/day and that 8 man-hours at \$3.65/hr are required to prepare prickly pear feed for 200 cattle/day. Therefore the propane and labor costs were \$0.197/cow-day and \$0.146/cow-day respectively. Maltsberger (1989) has previously found that a daily ration consisting of 3 lb of cottonseed meal, 0.2 lb of salt/meat/bone meal and 110 lb of prickly pear cactus satisfied the nutrient requirements of a cow nursing a calf. Since 110 lb of prickly pear were required per cow per day, the labor plus propane costs were \$0.00312/lb for the prickly pear.

A least cost ration analyses (MIXITTM-2 Agricultural Software Consultants, Inc, Kingsville, TX) found the cost of the most inexpensive alternative to prickly pear was \$1.23/day for a ration containing cottonseed meal, salt/meat/bone meal, cottonseed hulls, milo, and ground limestone (Table 1).

The costs of the supplements (cottonseed meal, and salt/meat/bone meal) for the prickly pear ration was \$0.39 per cow per day. The difference of \$0.84/day, between the cost of the complete alternative ration (\$1.23/day), and the supplements for the prickly pear ration (\$0.39/day) (Table 1) was assigned to the 110 lb of prickly pear (\$0.00764/lb). After subtracting the propane and labor costs of \$0.00312 to produce the prickly pear, the net value of the cactus is \$0.00452/lb.

The estimate of the prickly pear/acre was 96,000 lb which at a net value of \$0.00452/lb would yield \$434/acre. Obviously there is a fair amount of variation in these numbers but nevertheless it appears as if the prickly pear would be worth about \$400/acre. This is remarkable given the fact that this growth occurred in 5 years, 2 of which experienced considerable drought.

Table 1

Comparison of rations with and without prickly pear:

| INGREDIENTS--AS FED | PRICES (\$/100lb) | WITH PRICKLY PEAR (lb) | WITHOUT PRICKLY PEAR (lb) |
|-------------------------------------|----------------------|---------------------------------|------------------------------------|
| COTTONSEED MEAL 41% | 12.10 | 3.00 | 0.76 |
| SALT/MEAT/BONE MEAL | 13.71 | 0.20 | 0.20 |
| CACTUS, PRICKLYPEAR | 0.00 | 110.00 | ---- |
| COTTONSEED HULLS | 5.00 | ---- | 4.51 |
| MILO | 5.15 | ---- | 17.09 |
| LIMESTONE, GROUND | 3.00 | ---- | 0.07 |
| TOTALS | | 113.20 | 22.64 |
| COSTS | | 0.39 | 1.23 |
| NUTRIENTS ¹ - DRY MATTER | | | |
| DRY MATTER | % | 19.54 | 97.74 |
| DE | MCAL/KG | 2.77 | 0.42 |
| ME | MCAL/KG | 2.29 | 0.33 |
| NEm | MCAL/KG | 1.38 | 0.22 |
| NEg | MCAL/KG | 0.74 | 0.04 |
| NE(LACT) | MCAL/KG | 1.44 | 1.64 |
| TDN | % | 62.83 | 72.96 |
| PROTIEN | % | 10.79 | 11.60 |
| BYPASS PRO | % | 2.19 | 0.88 |
| FIBER | % | 11.51 | 11.15 |
| FORAGE | % | 86.52 | 18.36 |
| ACID FIBER | % | 2.52 | 15.99 |
| CALCIUM | % | 8.61 | 0.40 |
| CHLORINE | % | 0.37 | 0.19 |
| COBALT | PPM | 0.02 | 0.23 |
| COPPER | PPM | 2.77 | 19.13 |
| IRON | PPM | 34.78 | 437.43 |
| MAGNESIUM | % | 1.12 | 0.24 |
| MANGANESE | PPM | 3.18 | 16.81 |
| PHOSPHORUS | % | 0.34 | 0.50 |
| POTASSIUM | % | 2.00 | 1.34 |
| SODIUM | % | 0.39 | 0.20 |
| SULFUR | % | 0.25 | 0.20 |
| ZINC | PPM | 1.87 | 18.24 |
| VIT. A | KIU/KG | 0.00 | 0.00 |
| VIT. E | PPM | 4.42 | 1.12 |
| NPN | % | 0.00 | 0.00 |
| SELENIUM | PPM | 0.00 | 0.00 |
| NEg (1978) | MCAL/KG | 0.16 | 0.07 |
| NEm (1978) | MCAL/KG | 0.24 | 0.18 |
| NDF FIBER | % | 3.78 | 17.30 |
| LIGNIN | % | 0.76 | 4.41 |
| CELL WALL | % | 3.53 | 17.42 |

¹ Values for nutrient contents obtained from National Research Council, 1976.

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