

Prickly Pear Cactus: A Texas Rangeland Enigma

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Rangeland is the primary natural resource used for a variety of enterprises. It is a renewable resource that can regenerate indefinitely under favorable conditions. Much of the success or failure of a ranching operation on rangelands depends upon the management decisions regarding this resource.

Range resources must be effectively produced, harvested, and converted to saleable products. A manager must decide on the proper enterprises to fit the mix of available resources of the land. Conversely, it may be feasible to manage the multiple resources to fit the goals of the land manager.

Cultural practices such as brush management and seeding have been practiced for many years to manipulate rangeland vegetation. One frequent goal has been to reduce competition from "noneconomic" plants while increasing "desirable" vegetation. If a species is too numerous, too dense, toxic, or otherwise a problem, the management decision may be to manipulate or reduce the population. If desirable species are limited, then practices may be initiated to encourage growth of those species. An undesirable species for one situation or use may be a desirable species in another context. It is the manager's responsibility and task to choose and implement the right practices at the right time based on the goals of the enterprise.

Some species have changed in status with changing goals. For example, four-wing saltbush is being used to revegetate saline oil well sites in West Texas. Kochia is now regarded as a good forage plant in arid and semiarid regions.

The increasing economic importance of wildlife and wildlife habitat to Texas ranchers has shifted many former undesirable plants into the desirable column. One example is the enigmatic prickly pear cactus. Alternately cursed and praised, this species provides an excellent example of a plant that offers opportunities for manipulation to meet management objectives and not be universally condemned.

Prickly Pear—Friend or Foe?

The prickly pears are a group of flat-stemmed cacti with jointed pads. There are many species but the three most common and widespread prickly pears in Texas are Engelman's (*Opuntia engelmannii*), Texas (*O. lindheimeri*), and Plains (*O. polyacantha*). Texas prickly pear is more common in southern Texas, whereas Engelman and Plains prickly pear are found in western and northwestern Texas. Prickly pears occupy between 25 and 35 million



Fig. 1. Pricklypear cactus is a controversial plant on Texas rangelands.

acres in varying densities in all parts of the state except Northeast Texas.

Prickly pears easily root from pads scattered by animals or machinery. Mechanical brush control efforts have inadvertently done much to spread and intensify cactus populations. In some places, dense stands compete with grasses and other desirable plant species for space, water, light, and nutrients. Grass herbage production has been shown to be two to three times greater in the absence of prickly pear on good sites. However, prickly pear will also grow on sites that will not support a high level of grass production (e.g., saline, shallow gravelly hills, etc.).

Many wildlife species, particularly in South Texas, depend upon prickly pear for food, water, and cover. Studies have shown that up to 21% of the annual diet of white-tailed deer is prickly pear cactus. Prickly pear pads also comprise the bulk of the diet of the javelina. Prickly pear is also rated as an important food and cover plant in South Texas for Northern bobwhite quail. The seeds are high in nutrition, productivity, and palatability as a quail food. However, the plant doesn't provide much shade and has only moderate value as a headquarters cover. Prickly pear patches are excellent for travel and escape cover from predators. Many other species of birds and mammals also use the prickly pear as food or cover.

Prickly pears are also food-producing cacti for humans. The tunas are large, sweet fruits that are eaten raw, prepared as jelly, or candied. The young, tender pads, called

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"nopalitos", are eaten in salads and omelets, or as a garnish. Domestic production, at the present, is relatively small and large amounts of nopalitos and tunas are imported into the U.S. annually.

Livestock throughout South Texas, Mexico, and Central and South America are often fed prickly pear either as a primary sustenance food or an emergency feedstuff. Feeding prickly pear, however, has several disadvantages. "Pear eaters" may result from feeding livestock singed pear, as the livestock may continue to eat prickly pear with spines after "burning" has stopped. This can result in external and internal injuries causing the animals to remain in poor condition throughout the year. Death losses were high from these injuries during screwworm outbreaks. Livestock may also tear off pads and scatter them over the pasture, spreading the plant.



Fig. 2. Singed prickly pear, with a good protein supplement, is a good emergency cattle feed in South Texas.

Sheep in the Edwards Plateau of Central Texas are particularly affected by eating pear. Sheep apparently relish "pear apples" and usually begin eating the ripe fruits in mid-summer and continue consuming them until they are gone. The small spines cause a swelling of the lips and tongue that is locally called "pear mouth". This has a debilitating effect on the animals but, more importantly, the seeds may become compacted in a compartment of the rumen. Blockage may become complete, eventually killing the animal.

Nutritional Value of Prickly Pear for Livestock

Eighty-five years of research still have not adequately defined the role of prickly pear in livestock diets. Prickly pear is still an important emergency feed resource for ranchers in South Texas for both beef cows and stockers.

However, the nutrient content of prickly pear is often less than that required by any animal other than a dry or early bred beef cow. Griffiths' (1905) review of management practices utilizing prickly pear in South Texas at the turn of the century is interesting but given today's levels of beef, dairy, swine, and horse production in the United States, it is doubtful that prickly pear has a significant place in modern feed rations. However, there is still a need for nutritional and feeding information which could be very useful in areas or countries with less intensive methods of livestock production.

Prickly pear is very high in moisture content (but consequently low in dry matter). As a result, it often takes very large amounts of prickly pear (100–200 lbs per A.U. daily) to satisfy minimal nutrient requirements. This high level of water in the diet increases the rate of passage through the digestive system and leads to the scouring often seen in cattle fed singed prickly pear. This increased rate of passage also reduces nutrient absorption. It is always advisable to feed some hay or have a dry pasture that the cattle can utilize to increase the level of dry matter intake. This will reduce the incidence of pear fiber balls in the rumen caused by high levels of crude fiber. Cattle may appear to bloat on prickly pear but a more likely cause is the distension of the rumen from the large amounts consumed.

Crude and digestible protein levels are generally low in prickly pear, especially when fed on the plant "as is" or after singeing. Prickly pear is generally too low in crude protein to adequately maintain a dry pregnant cow except during early spring growth. As a result, it is always recommended that a good protein supplement be added to the diet of cattle fed prickly pear. Additional supplemental protein also reduces the incidence of pear or fiber balls in the rumen by increasing fiber digestibility. A non-protein nitrogen source might be utilized in a prickly pear ration. Further studies are needed in this area as well.

Fortunately, prickly pear is moderately high in energy. Energy levels vary, depending again on source of material. Since energy is often the first limiting nutrient on rangeland, is needed in the greatest amount, and has a significant effect on reproduction, prickly pear should be considered as a "good feed", albeit a slightly unbalanced one.

Prickly pear is generally very high in fiber and ash, both of which are responsible for digestive upsets. As stated, the large amount of indigestible fiber often causes "fiber" or "pear balls". The high ash content most likely aggravates the scours as a laxative effect. This appears to be as a result of the high levels of magnesium, potassium, and sodium salts in prickly pear. The problem of scours can be reduced by increasing dry matter intake with lower quality feedstuffs such as cottonseed hulls, hay, and brush pasture.

Prickly pear is low in phosphorus and will meet a dry pregnant cow's requirement only in the spring. Prickly pear is very high in calcium, further aggravating the calcium: phosphorus ratio imbalance seen on South Texas

rangelands. A 12% calcium:12% phosphorus mineral mix should be used as a supplement for cattle fed prickly pear. Prickly pear is extremely variable in mineral content, with some minerals exceeding requirements. These levels sometimes border on toxic levels, and may create other mineral imbalances of both macro and micro elements. Prickly pear also may be very high in vitamin A, often found in limited quantities on drought-prone rangelands.

The cost of supplementing with prickly pear was approximately \$.60 per head per day in 1983 and 1984. This compared very favorably with the cost of feeding hay (\$1.58/head/day in 1983 and \$1.84/head/day in 1984). A Texas Agricultural Extension Service survey of South Texas ranchers in 1989 indicates that almost one fifth of the ranchers burn and feed prickly pear as an emergency feed for their cattle at an average cost of \$.22/head/day.

Landowner Attitudes

Land manager attitudes toward prickly pear have varied, but generally prickly pear has been viewed as a mixed blessing (Lundgren et al. 1981). South Texas producers generally believe prickly pear to have positive values for livestock and wildlife but other regions rate it somewhat lower. Prickly pear is not perceived to cause a serious livestock health problem except on the Edwards Plateau. In approximately 20% of the counties of central Texas, prickly pear causes a serious livestock health problem; and an additional 25% have a moderate problem.

Only 16% of individual landowners in Texas practice any control measures for prickly pear. The main reasons for noncontrol were relatively light stands of pear and the high cost of treatment. Texas land managers generally feel that a 50%–75% reduction in prickly pear would have no effect on range livestock production but would have a negative influence on wildlife habitat. Since each ranch is different, each rancher must inventory his range resource and manage it to meet his own objectives. If some prickly pear control is necessary, the rancher must determine how much, where, in what configuration, and what control methods are most appropriate to their management plans.

In areas where prickly pear is viewed as a problem, an array of tools have been used to control it. These have ranged from grubbing with a heavy hoe, early attempts at using 2,4-D and 2,4,5-T, various mechanical treatments, and combinations of mechanical and chemical treatments. Dr. Darrell Ueckert (Ueckert et al. 1989) has developed a systems approach that combines sequential applications of prescribed fire and picloram sprays that are very effective.

A land manager may want to increase prickly pear in his pastures for an emergency feed. Mechanical methods

such as rilling or discing will scatter pads and encourage establishment. Some producers are planting prickly pear in rows in small pastures to facilitate singeing the spines and for control of the amount fed to livestock. Some are experimenting with fertilizer regimes to encourage optimum production. Recent research has indicated that total biomass production can be increased five-fold and nutrient quality boosted significantly with the addition of fertilizer (Gonzalez 1989).

Summary

Prickly pear is a good "hollow belly" cure. As an emergency feed ration it is an excellent natural resource to use in supplementing beef cattle. Prickly pear is highly variable in nutrient content, depending on species and variety, age class, season, and plant part. Most research indicates that it is low in protein and phosphorus content but high in energy, water, vitamin A, fiber, and ash. Most prickly pear rations require additional supplementation of protein and phosphorus.

Prickly pear advantages include reduction of costs of emergency feeding during droughts and winter; lessening of soil erosion on poor condition ranges; protection of grasses on overstocked and poor condition ranges; and various wildlife food and habitat benefits. Disadvantages include the fact that prickly pear itself is not a high quality livestock feed; singeing pear today is an expensive process; "pear-eaters" often result from feeding the plant; total forage production is lessened on pear ranges; and animal health problems can occur.

There is a lack of current research evaluating prickly pear in South Texas specifically as it relates to the ranch industry as a supplemental emergency feed in terms of ration formulation, feed methods, and the economics of feeding.

Each individual manager must decide on how to respond to this enigmatic rangeland plant.

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