PLANTING & CULTIVATING NATIVE CACTUS FOR CATTLE FEED AND WILDLIFE UTILIZATION IN SOUTH TEXAS

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Abstract

1. Brief history of how and why I became interested in prickly pear.
2. 14 desirable plant characteristics of prickly pear, and
3. Planting methods, maintenance and utilization of prickly pear.

History - Why Prickly Pear?

1951 was the beginning of one of the longest and most severe droughts in south Texas history, lasting from 1951 thru 1957. I drew three conclusions from this drought. One - there had to be a better way to ranch if you were to survive these dry years. Two - It wasn't the good years, the 18 to 35 inch rainfall years that hurt the cattlemen in south Texas. The good years take care of themselves. It was the 8 to 14 inch rainfall years that kill the cowman, ruin his quail crop and decimate his deer herd. Three - I needed more grass.

By the early 1960's I had begun to experiment with the root plow, introduced grasses and brush control. Over the following ten years I worked with some 250 species, selections of species or ecotypes of grasses and woody plants, including the genus Atriplex or the salt bushes. Much of this material came from the Soil Conservation Service, Forest Service and the Plant Material Center at Knox City, Texas.

By the 1960's revenue from deer and quail leases had become an important source of revenue to the south Texas rancher. Their environment and needs was becoming more important also.

One problem you create when you start controlling your brush and disturbing the soil is that you destroy ar at least upset some native species that provide both cover and food for wildlife. A perennial bunch grass will not satisfy the needs of the wildlife community because, in the first place, a perennial is dormant in the winter as well as in a long drought and second, deer, quail, javelinas and the balance of your wildlife community don't eat much grass. This not withstanding, it is amazing the increase in tonnage of grass you can establish using a rotation system and introduced grasses.

We couldn't ranch in south Texas without our perennial grasses. They are a mainstay and backbone of any year round ranching operation. They do have two inherent shortcomings. One of these shortcomings is that grasses are not the diet of the wildlife community and two during a long dry spell these grasses lose their protein content, moisture content and palatability.

In south Texas the prolonged drought occurs only occasionally, and is a long term period of stress, whereas the January - March period of the year is a short term period of

stress and is with us almost every year. This January - March period is typically dry, cold and most of your native plants lose their leaves. Quail die during this period, deer have just finished their mating season and are thin and emaciated, cows are calving and have the additional burden of raising a baby calf. Very little is green during this period. I felt there was a pressing need for an evergreen browse plant that could be used by livestock and the wildlife community during this January - March period as well as during long drought periods. The genus Atriplex and other woody plants I had worked with had not satisfied this need.

By the year 1983, and the beginning of the 1983-84 drought, I had established several thousand acres of introduced perennial grasses. I was stocked moderately and had a rotation system in operation. I thought I was ready for anything. Before this drought was over I was just about out of everything. I saw an unusually cold winter destroy twenty year old stands of buffel grass in Dimmit county and go all the way to the Rio Grande Valley and destroy much of the citrus there.

As the drought got more severe I had about one hundred cows, mostly older cows that were not responding to supplemental feeding and what little dry grass was left in the pasture. These cows were gathered and grouped in two pastures that had native stands of prickly pear. I began burning pear for these cows as well as giving them a protein supplement, primarily salt and meal at the rate of 3 to 4 kilograms (6 to 8 pounds) per day. Within a few weeks there was a marked improvement in the overall appearance of these animals. They began to lick themselves, their stomachs filled up, their milk flow increased, their overall appearance and demeanor improved dramatically. It was then that I realized it was time to take another look at prickly pear.

14 Reasons for Planting Prickly Pear

(One of my critics commented I should re-title this section "Eulogy to the Prickly Pear").

Let me first explain that the plant I will be talking about is south Texas's native, dominant Opuntia, this being Opuntia lindheimeri and the area I will be talking about is south Texas in general, Dimmit County, Texas in particular.

1. Ease of Establishment: In order to cultivate and propagate a species you have to be able to increase its numbers rapidly and economically, otherwise you are wasting your time.

Few plants in a a semi-arid environment like south Texas establish as easily and readily as the prickly pear. In fact it has two ways of propagating, one by seed and one by direct contact with soil. This last means is absolutely beautiful - just break off a pad at its joint, place it on the ground and bang!!! you start a new plant. What could be easier? This ability to reproduce directly from pad to new plant makes the prickly pear very easy to work with and makes its multiplication process very rapid.

2. Built in Survival Mechanism: In order to survive in any environment a plant must be able to defend itself. The prickly pear pad is a virtual arsenal of sharp spines of

all sizes, large and small. This arsenal of spines is part of its survival mechanism, keeping most animals from knocking down the plant and eating the plant. This plant couldn't survive without its spines. These spines enable the prickly pear to remain unmolested and unused except during periods of stress when animals brave its spines to survive on its moisture, energy and fiber. These spines not only control when this plant is utilized but also how much of the plant is utilized. By controlling these spines man can also control when and how much livestock utilize the plant.

The second part of the Prickly pears survival mechanism is the plant's ability to absorb large quantities of moisture during rainy periods and store and retain this moisture in its pads and root system for long periods of time.

3. An Evergreen: The prickly pear is an evergreen. This makes this plant almost unique in south texas. Practically all our south Texas plants go dormant in the January - March period as well as in a prolonged drought. Our winters are typically dry. There frequently isn't enough moisture in the winter months to support plant growth. Frequently we have a freeze in late December or early January further reducing the chances of plant growth. Yet the prickly pear remains green during this period as well as in a prolonged drought. This is amazing, only one of the many amazing characteristics of this plant.

4. A Palatable Plant: In my opinion the prickly pear is far more palatable to both livestock and wildlife than it is given credit for. Despite its spines and in the presence of ample other green and growing plants I see utilization of prickly pear, both pads and fruit each year by a wide variety of animal life including birds, deer, javelinas, rats, quail, coons, turkey, turtles, as well as livestock. The palatability of the prickly pear naturally increases during the January - March period and during periods of prolonged stress and drought. The high moisture content of its pads are irresistible during these periods.

5. A Dual Purpose Plant: The prickly pear benefits both livestock and wildlife. Inevitable when a cow herd suffers from a drought the balance of the animal community suffers also, some species more than others. While being utilized occasionally as a supplemental ration for livestock during periods of drought, the prickly pear remains available year round to wildlife for food, shade and shelter.

Many of the prickly pears uses are indirect, as nature feeds on itself. Take the case of the coyote that eats the rabbit that eats the prickly pear. Or take the case of the blue indigo snake that eats the rat that eats the prickly pear. This sequence of events is repeated in nature many fold, maintaining a balance and perpetuating a wide variety of plant and animal life.

6. A Long Lived Plant: The genus Opuntia is typically long lived, providing a continuing, dependable supply of food and moisture for a variety of animal life. This longevity of a species is important when you consider the health of an animal community over a long period of time and think in terms of 5 - 10 and 20 year time spans.

Drought occurs in south Texas infrequently, but their reoccurrence is certain. To have a plant like prickly pear available in time of stress is as comforting as having a gallon of water with you when you are stranded in the desert!

7. A Producer of a Large Biomass: Prickly pear is capable of producing a staggering volume of forage. One hectare of prickly pear planted with rows four meters apart, a plant every two meters down the rows give you 1250 plants per hectare. Further assuming after five years of growth you have fifty pads per plant, each pad weighing approximately one-half kilogram, this give you a total of 31,250 kilograms per hectare or 27,834 pounds per acre. This is a tremendous volume to grow dry land, on an arid piece of south Texas real estate.

This volume or biomass is expressed in gross weight of the plant or as I like to call it "wet weight" values as opposed to "dry weight" values. I do this for the following reasons:

1. Wet weight values are more impressive than dry weight values.

2. In my opinion it is this moisture in the pear pads that makes them palatable and desirable. In the depths of a drought the animal community is starving to death, hungry for anything that is moist, juicy, succulent and has any mass to it. You take all the moisture out of a pear pad and offer just the completely dried fiber to any animal, and I don't believe you are going to find very many takers, except possibly the rat. One of the main reasons prickly pear is so valued during periods of stress is this high moisture content.

3. When you purchase coastal hay or alfalfa it is normally sold on a wet weight basis so when we compare costs of alfalfa to prickly pear both are expressed in wet weight terms. I am not talking about protein, there is no question alfalfa has a much higher protein content than prickly pear.

8. A Drought and Cold Tolerant Plant: Prickly pear is a native of south Texas. It has been able to survive the extremes in moisture and temperature for hundreds of years. If a plant can't survive the extremes of an environment it won't live too long in that environment. These extremes have a way of repeating themselves. Actually prickly pear is one of the last native plants to collapse after a hard freeze and one of the last native plants to wilt under the hottest sun.

9. Adaptable to a Wide Variety of Soils: Prickly pear is adapted to and will grow on a wide variety of soils including deep sand, caliche, shallow ridge, clay loam and heavy bottom land. Like most plants the richer the soil, the more robust the plant. If a plant is soil type specific and will only grow on one type of soil you are very limited on where you can go with this plant. Fortunately this is not a problem with prickly pear in south Texas.

10. A Disease Resistant Plant: Certain diseases and insects have had some impact on the prickly pear, especially along the coast. For the most part, particularly in

the more arid regions of south Texas, prickly pear has not suffered any large degree of die off, not any more than most of your other native plants, not in Dimmit County anyway. You always have some mortality in any species, usually the older plants die, but they are replaced by younger plants.

11. A Low Cost Plant to Establish: Prickly pear is a very cheap plant to establish. My direct planting cost in a open field or savannah area are around $100 per hectare or $40 per acre. The planting process is very simple and crude, doesn't require much in the way of expertise or equipment. I will have more on this planting aspect in my next topic - Planting, Maintenance and Utilization of Prickly Pear.

Getting back to the cost, if it cost $100 per hectare to establish a stand that, when five years old, has a gross biomass of 31,250 kilograms per hectare, this figures out to about .31 cents per kilogram or .16 cents per pound or six pounds for one penny. This does not include harvesting costs, only direct planting cost, exclusive of interest, ad valorem taxes, etc. I don't know of any other type of crop of permanently available feed you can grow and store under the hot sun at that price. The volume of forage you can produce for so few dollars is phenomenal.

12. A Non Competitive Plant: Due to its very shallow root system and contrary to a popular misconception, prickly pear is a non-competitive plant and will tolerate other plants in its midst and around it circumference. This allow other plants and deep rooted perennial grasses to grow in close association with the prickly pear.

13. A Low Cost Plant to Maintain: After the initial planting and investment, and deferment period, very little further expense is incurred in maintaining a stand of prickly pear. The plant just continues to multiply until some balance is reached between old pant die off and new plant replacement.

14. Instant Availability: There is nothing like having something when you need it. A cultivar of prickly pear represents an instantly available source of stored energy, fiber and water at the disposal of the cowman whenever he feels that need for its utilization. This source of survival ration is stored <u>in situ</u>, in the pastures where it is needed and indestructible by sun, rain, wind, time and all the other elements that would rapidly destroy any other storehouse of drought survival material such as alfalfa, hay, and cubes stored under similar conditions.

This same storehouse of energy, fiber and water is also available year round to the wildlife community whenever their needs are such that they brave the spines of the cactus to tap this storehouse. This is almost as good a situation as having your cake and eating it too.

Planting, Maintenance and Utilization of Prickly Pear

Planting a row of prickly pear is somewhat simpler than planting a row of corn or watermelons. Basically I plow or disc an area, run a drag over it, then make a shallow furrow, drop pear pads joint end down in the furrow, then close the furrow with 7 to 10 centimeters (3 to 4 inches) of soil, thereby covering the lower portion of the pad with

soil. It helps if you have a moist soil to work with or light rain right after plantings to set the plants. Soil bed preparation does not have to be as thorough, deep or as smooth as for a vegetable crop because you are planting a "chunk" of pear as opposed to a small vegetable seed.

My preferred period to plant prickly pear is from December to April, during the cool period of the year and before spring rains.

The rule of soil richness still applies - the richer the soil the more robust the plants will be. Plant density will be higher and likewise biomass will be greater in the richer soils.

When you take a plant as desirable and palatable as a prickly pear pad that is growing on a mother plant, say one meter above ground level and well above the reach of rabbits, rats and other small animals and drop it down to and below ground level you subject this pad to much more predator damage.

The spines soon begin to soften and decay on that part of the pad that is below ground level and the rats and rabbits soon figure this out and begin to dig under the freshly planted pear rooting them up and destroying them.

For this reason I like to plant my prickly pear as a monoculture and leave the balance of the field as barren and devoid of plant life as possible to discourage the presence of predators. By predator I mean anything that threatens the establishment and survival of my Opuntia community.

There are several ways of discouraging these predators, such as planting prickly pear as a monoculture, burning any brush piles in the field area that may provide a home for rats and rabbits and by keeping livestock out of the planted area as they will inevitably trip over these new plants and uproot some of them.

It is extremely helpful to have a wet spring following planting for two reasons:

1. The presence of moisture nourishes the young pear plants, and

2. When you have moisture present you will have many other small green plants available for the rats and rabbits to feed on, consequently they won't put as much pressure on the young prickly pear community.

Following initial planting, if you can keep a young plant alive and multiplying through the first summer and winter it will usually mature and sustain itself thereafter.

I have noticed a wide variety and range of plant size and vigor from one plant to another in these new prickly pear cultivars and haven't been able to fully explain it.

Once a freshly planted area becomes established, say beyond one to one and one half years, very little maintenance is required. The area may be grazed by livestock without much damage to the young cacti. Wildlife will make use of the fruits and some

terminal growth and not hurt the mother plant, provided the plant is well enough established as not to break off at ground level.

My utilization of prickly pear by livestock has been strictly limited to "burning pear" during long drought periods. I can recall only three such periods in Dimmit County in the recent past. These periods were from 1951 to 1957, from 1961 to 1962 and from 1983 thru 1984. During these three periods prickly pear furnished an additional source of energy, fiber and moisture to many a cow herd.

The utilization method used was the removal of a majority of the spines from the surface of the pear pad by the application of heat from a flame thrower called a "pear burner" using compressed propane as a fuel. The flame needs to be hot and left on a pad surface only long enough to turn the larger spines red then moved to another surface. You must of course toast both sides of each pad. If you don't remove enough of the spines the old cow will pass that pad up for one that is properly prepared. In an attempt to remove 100% of their spines you can overcook pear. Over cooked pear has a tan color and the cows will still eat it. However the over cooked pear is quite laxative and does not agree with a cow's digestive system.

Prickly pear is only one of several survival foodstuffs available to the rancher during a drought and is usually the last one to be utilized.

Prickly pear is low in protein therefore a protein supplement is usually fed with the pear. Being mostly water and fiber, prickly pear is quite laxative in nature. In order to moderate this laxative effect it is desirable to have a supply of dry grass available. This grass may be old and coarse and practically useless by itself, but when available in addition to prickly pear and a protein supplement it will be utilized by a cow herd to good advantage.

I close this presentation with one final comment, in my opinion, the prickly pear is a "macho plant" that has stood the test of time. A "survivor" that has stood up to and challenged the desert and its elements, man and beast included, for hundreds of years, and this survivor is still here today - alive, robust and strong - ready and willing to be utilized by man. The extent and scope of this utilization being limited only by man's imagination.