Pricklypear...

Good or Bad?
Some species of pricklypear grows in every vegetational area of Texas. It is used as emergency livestock feed and is a good source of vitamin A during droughts. Many wildlife animals eat pricklypear. The young, tender, half-developed pads when processed are called “nopalitos,” a delicacy for Latin Americans during the Lenten season. The tunas, or fruits, can be made into tasty jelly, candy or syrup. Some species were used by Indians to dissolve and set cochineal dye. Dried cholla trunks can be made into beautiful, western type decorations.

Pricklypear increases on poor condition ranges, but decreases when ranges improve and produce abundant grass. Before range conditions can be improved, dense pricklypear stands must be controlled by either chemical or mechanical methods, or a combination of the two.

Since the value of pricklypear is controversial, “Pricklypear—Good or Bad” seems an appropriate title for this publication.
Pricklypear — Good or Bad?
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Pricklypear has been used as livestock feed for more than a century. It usually is considered an undesirable plant on Texas rangelands, but does have some economic value as supplemental forage for cattle and sheep during winter and drouth periods. Pricklypear has the unique ability of storing water in its flattened-fleshy stems. This water reserve enables the plant to withstand long drouth periods. During drouths and range overuse, pricklypear density increases as grass cover lessens. With improved grazing management and grass conditions, pricklypear density decreases because of competition from good grass cover. A grazing management system that allows desirable grasses to increase should control pricklypear once the original infestation is controlled.

Several species of the genus, *Opuntia*, are called pricklypear. One or more species exist in almost every vegetational area of the State, Figure 1. The most common and widespread pricklypears known to Texas ranchmen are engelmann, *Opuntia engelmannii*, nopal, *Opuntia lindheimeri*, and plains, *Opuntia polyacantha*. Included in the same group are several types of chollas of which *tasajillo*, *Opuntia leptocaulis*, and *cholla*, *Opuntia imbricata*, provide the greatest problems on Texas rangelands. Dog cactus, *Opuntia schottii*, is injurious to grazing animals, particularly sheep and goats.

*Engelmann pricklypear* is common in the Edwards Plateau, Trans-Pecos, Rolling Plains and High Plains areas. It is an erect plant that may grow as high as 6 feet, but normally is never tree-like. Engelmann pricklypear pads are large and circular, usually 8 to 12 inches across, with a yellowish-green color and spines. Its large flowers are bright yellow. The fruits, called tuna, are large, dark purple and can be made into a palatable and attractive colored syrup. Wildlife relish the ripe tunas. This species is easily confused with other pricklypears of similar growth habits and form. Figure 2 shows the typical growth habit of engelmann pricklypear.

*Nopal pricklypear* is extremely variable in growth form and habits. It may be low and wide-spreading or tree-like, up to 12 feet tall, with a definite cylindrical trunk. Nopal pricklypear is found in the South Texas Plains, Blackland Prairies, Edwards Plateau, Trans-Pecos, Rolling Plains, High Plains and, to a limited extent, on the Gulf Prairies. The flowers are beautifully colored, varying from yellow to red. Earlyday Indians used the young tender pads as food. The tunas can be made into a tasty jelly. Wildlife and even livestock like the ripe tunas. Typical growth characteristics and habits of nopal pricklypear are shown in Figure 3.

The *plains pricklypear* is limited primarily to the Rolling and High Plains. This pricklypear is low growing, usually two pads tall, and forms small clumps. Generally, plains pricklypear is overgrown with grass when range has been managed properly. Figure 4 shows a typical growth habit of plains pricklypear.

*Dog cactus*, also called clavellina, is limited to the South Texas Plains, Edwards Plateau and the Trans-Pecos areas. The plants are prostrate and form dense masses 10 to 50 feet square. These masses are impenetrable and a great pest to grazing animals. The joints, covered with long spines, are broken off easily and often cling to the animal's feet, mouth and other body parts, causing serious injury. A typical growth of dog cactus is shown in Figure 5.

Fig. 2. *Engelmann pricklypear.*

Fig. 3. *Nopal pricklypear.*
Tasajillo, also called fingerpear, slender stem cactus and turkeypear is common on the South Texas Plains, Edwards Plateau, Trans-Pecos, Prairies and Rolling Plains areas. Tasajillo has small round cylindric stems or joints covered with short spines. Generally, it has many branches and grows about $3\frac{1}{2}$ feet tall but can attain a height of 6 feet. The short brittle joints, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, scatter over the soil when disturbed, causing a heavy infestation of new plants. This characteristic limits control methods. Tasajillo has inconspicuous flowers that bloom in the summer. The ripe fruits are scarlet red and relished by wildlife, especially turkeys. Tasajillo usually grows under trees and fences, since seeds are deposited by birds. Figure 6 shows a typical form and habit of tasajillo.

Cholla, also called walkingstick cactus, tree cactus or cane cactus, is common on the Edwards Plateau, Trans-Pecos, Rolling Plains and High Plains, Figure 7. Cholla is tree-like and grows from 3 to 8 feet tall. Terminal joints usually are 3 inches long and 1 inch in diameter and generally set at an acute angle to the main stem. The spines are more than 1 inch long. The flowers are bright purple, maturing into a yellow fruit that drops to the ground when ripe, producing new plants. The fruit is not eaten by man or beast, since it contains a high content of acid, making it unpalatable. In early days, the fruit was chopped, boiled, filtered and the extract used to dissolve and set cochineal dye.

Forage Value

Ranchmen frequently burn pricklypear during winter for supplemental cattle roughage, as shown in Figure 8. Burning consists of singeing the pricklypear spines with a hot flame from butane or oil pear burners. Pear burners are constructed and operate much like a blowtorch. Burn the spines enough so that they cannot be felt when the pad is touched. Livestock refuse to eat pricklypear that is burned excessively. Pricklypear also is burned and fed to livestock during drouth periods. During the 1950-57 drouth, year-long burning of pricklypear supplied much of the required forage necessary for preservation of foundation stock.
Figure 9 shows South Texas Plains area where pricklypear predominated after good range grasses were depleted by drouth and over-utilization. Sometimes, cattle are concentrated on such dense stands. The pricklypear area is then progressively burned and different kinds and amounts of supplements may be provided. Under such management, cattle in good condition normally lose weight if supplied pricklypear only, but if in poor condition, they may improve for a short time. Generally, the amount of gain and the thrift of the cattle depend on the rate of supplemental feeding. Ranges normally should be stocked to provide a feed reserve of grass without the utilization of pricklypear.

### Table 1. Percentage Chemical Analyses of Green Pricklypear

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude protein</td>
<td>1.4 - 4.4%</td>
</tr>
<tr>
<td>Digestible protein</td>
<td>0.5%</td>
</tr>
<tr>
<td>Fat</td>
<td>1.55%</td>
</tr>
<tr>
<td>Potash</td>
<td>3.04%</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>0.33%</td>
</tr>
<tr>
<td>Magnesium</td>
<td>1.6%</td>
</tr>
<tr>
<td>Crude fiber</td>
<td>8.63%</td>
</tr>
<tr>
<td>Calcium</td>
<td>2.84 - 13.85%</td>
</tr>
<tr>
<td>Nitrogen free extract</td>
<td>57.85%</td>
</tr>
<tr>
<td>Water</td>
<td>Up to 85%</td>
</tr>
</tbody>
</table>

Pricklypear is classed as poor to fair roughage, but pricklypear alone is not considered a livestock maintenance feed. At the Texas Agricultural Experiment Station at Sonora, a daily feeding of 11.49 pounds of burned and chopped pricklypear, 0.35 pounds of cottonseed meal and 0.34 pounds of alfalfa proved a satisfactory emergency ration for ewes. Pricklypear, as an emergency feed, can be used most efficiently to supply the bulk of roughage supplemented with a protein concentrate and alfalfa hay. Pricklypear has a fairly good supply of Vitamin A.

**Beneficial or Detrimental?**

Pricklypear offers several advantages as a range plant:

1. Hay expenditures are reduced during winter and drouth periods on overused ranges.
2. Hay transportation costs are reduced, since livestock utilize burned or railed plants where they grow.

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Fig. 8. Burning pricklypear for winter roughage (Photo courtesy of San Angelo Standard Times).
Fig. 9. Pricklypear predominates desirable range grasses because of drouth and range overuse.
Fig. 10. Hand grubbing and piling.
Fig. 11. Railing of heavy pricklypear infestation.
year. They tear off pricklypear pads and scatter them over the pasture, helping spread pricklypear infestation.

Control Measures

GRUBBING

One of the earliest means of controlling prickly-pear was grubbing with heavy hoes. Pricklypear is easy to control by cutting the main root 2 to 4 inches below the soil surface and removing the detached plants from the area. Little regrowth occurs except from young pricklypear seedlings which may be overlooked. Pricklypear grubbed and piled decays rapidly, Figure 10. However, the outermost plants of a pile, if in contact with the soil, may take root and begin new growth. Regrub and pile any live plants to prevent reinfestation. Wildlife consuming pricklypear fruits scatter the seeds, and reinfestation may occur when vegetative cover is reduced.

Many ranchmen burn pricklypear plants during winter, allow cattle to consume as much as possible and then grub the remaining fibrous trunks. This method usually reduces labor costs. Grubbing and piling of pricklypear is practical in many Texas areas. Usually, this is done on a contract basis for a cost of $3 and up per acre. Pricklypear grubbed and piled with economical labor during the slack work season usually costs about half that of the chemical treatment. Areas treated with herbicides may not require maintenance as rapidly as grubbed areas. Tasajillo and cholla are not controlled easily by hand grubbing because of the growth form and reinfestation from broken plant parts.

Mechanical grubbing can be done by using a fork lift mounted on the front of a farm tractor. This operation does a good job of uprooting small clumps of scattered pricklypear. In dense stands, this method does not obliterate the soil considerably. Reseed following such a disturbance.

RAILING

Dense stands of pricklypear in smooth areas can be removed economically with a maintainer blade, a bulldozer blade attachment, a farm tractor with a front end fork lift or railroad irons used as a drag. Rail during a dry period so the broken-off and disturbed pads have time to dry to prevent resprouting. The pricklypear can be railed two ways to uproot as many plants as possible and rub off many of the spines, Figure 11. Concentrating cattle on the railed area, shown in Figure 12, forcing them to consume large amounts of pricklypear, reduces greatly the chance for reinfestation. Rail ing two ways can be done for about $5 or $6 per acre. Many small brush plants also may be controlled by the heavy rails.
Defer the railed area during good growth conditions to allow native grass to re-establish. If a sufficient seed source is not available, reseed the area with adapted native grasses. The bare soil allows annual weeds to establish readily. Spray herbicides on the young weedy growth to reduce competition with grass seedlings. A herbicide to control annual weeds can be applied for less than $3 per acre and is much less expensive than an additional reseeding.

The mechanical methods usually are inferior to hand grubbing and piling, as many joints and pads are scattered, causing heavy reinfestation. Generally, on extremely dense stands, hand grubbing and piling or ground application of herbicides are too expensive and a cheaper method is necessary to reduce the heavy pricklypear stand.

Chemical

Suggestions for use of herbicides are based on effective agronomic practices. Follow directions on the USDA approved labels on the containers. If this precaution is observed there should be no danger from chemical residues.

Low volatile esters of 2,4,5-T are recommended for general use. Ester 2,4,5-T is a selective hormone-type herbicide, nonpoisonous to man and livestock. Avoid drift to foliage of nearby susceptible crops. Do not spray when wind velocity is high. Do not use the same equipment to apply insecticides on crop plants, flowers or vegetables.

Recommended Spray Solutions

Spray solutions recommended for control of pricklypear, tasajillo and cholla cactus should contain 8 pounds acid equivalent of 2,4,5-T low volatile ester in 100 gallons of spray mixture.

Most commercial stocks of 2,4,5-T low volatile esters contain 4 pounds of 2,4,5-T acid equivalent per gallon. To make 100 gallons of the recommended solution, add 2 gallons of 2,4,5-T stock solution containing a total of 8 pounds of 2,4,5-T to 98 gallons of diesel oil or kerosene. For small quantities, mix 1/3 measuring cup of 2,4,5-T ester with 1 gallon of oil.

Prepare emulsion sprays in the proportion of 1 part oil and chemical to 4 parts water. Thus, 100 gallons of spray mixture may be prepared with 2 gallons of 2,4,5-T ester stock solution, 18 gallons of oil and 80 gallons of water. Agitate the mixture continuously during application.

Other chemicals effective in pricklypear control include silvex or 2(2,4,5-TP) and dinitro compounds. Use silvex at the same rates as 2,4,5-T ester, preferably in oil sprays. Dinitro compounds may be used in oil sprays containing 2.5 - 3.0 percent dinitro.

Methods of Chemical Application

Hand application of 2,4,5-T solutions with knapsack, compression tank-type and power sprayers are most effective for pricklypear control. Use nozzle pressures of 25 to 35 pounds for hand sprayers and 40 pounds for power sprayers. Large-sized droplets are more desirable for covering pricklypear plants than small-sized or fog-like droplets. Wet thoroughly both sides of the pads, all joints and fibrous trunks to the point of slight runoff to obtain effective kill and control. Total application cost varies upward from $2.50 per acre, depending upon intensity and size of the pricklypear and the operator's technique. In the High and Rolling Plains area, the total cost of treating plains pricklypear with 2,4,5-T mixed in diesel oil and applied with a power sprayer ranges from 3 to 4 cents per plant. Figure 13 shows an infestation of pricklypear where ground spray equipment method is feasible.

Use diesel oil or kerosene with hand or power sprayers, and oil-water emulsions in power sprayers equipped with agitators. Emulsion sprays are as effective as oil sprays if kept agitated, but more volume of solution is required for treating individual plants. Spray applications using straight water and 2,4,5-T mixtures have not given consistent or satisfactory results over a wide area. In certain areas during ideal weather conditions, and heavy addition of a wetting agent, this treatment has given satisfactory results, but it is not recom
Pricklypear treatment with 2,4,5-T diesel oil spray (left) and six months after treatment (right).

Recommended as an effective method for pricklypear control. Using emulsion reduces the cost of treating pricklypear on large areas. In dense stands, power sprayers have these advantages over hand sprayers: (1) they can be pulled or carried by a truck; (2) refilling the sprayer is not required as often; (3) several operators can work from one tank by attaching additional lead hoses and nozzles. Power sprayers, as shown in Figure 14, work well if the infested pricklypear area is relatively smooth and not brushy. Hand-type sprayers can be used in any terrain or brushy area, Figure 16.

**Time of Application**

Apply oil sprays containing 2,4,5-T any time during the year when the pricklypear is growing vigorously and weather conditions are relatively hot with temperatures about 60 degrees F. Cactus plants take longer to die when sprayed with the temperature below 60 degrees, when under heavy drought stress or when new small pads are abundant. When spraying under adverse weather or growth conditions, allow two growing seasons for obtaining final results and before respraying.

Engelmann and plains pricklypear appear more difficult to control than nopal. Generally, a re-treatment to completely control plains pricklypear is required because of its low growth. Native grasses growing around the pricklypear plants make it extremely difficult to completely cover pads and trunks with the spray solution, Figure 4. Sometimes retreatments are needed on engelmann if growth and weather conditions are not ideal.

Treat tasajillo and cholla with the same methods and growth conditions as indicated for pricklypear.

Limit oil-water emulsion sprays to treatment during summer months. The emulsion sprays generally react slower on pricklypear and other cactus plants, especially during the cool months.

Pricklypear react rapidly to herbicide sprays during the hot summer months, and most effective results are obtained during this time.

**What Management Follows Control?**

Follow pricklypear control measures with good range management. Removing pricklypear without giving the better range grasses a chance to re-establish may destroy the existing seed stock of desirable grasses that grow under the protection of pricklypear plants. Under most conditions, pricklypear control gives best results when the treated area is deferred for one or more growing seasons to allow maximum improvement of grass production. The cured grass can be grazed properly during the winter without much damage. Figure 15 shows a pasture where control measures were used and deferred for one growing season. Usually pricklypear cannot compete successfully with a dense stand of grass.

Several range management practices may be needed for re-establishment of a depleted range after pricklypear is controlled. These practices include: (1) reseeding with adapted native range grasses; (2) deferred grazing during the growing season; (3) rotation grazing; (4) fencing—permanent or temporary; (5) brush control; (6) water, salt and feeding places distributed over the pasture for proper utilization of range plants; (7) construction of terraces or dams; (8) spraying, or chiseling; (9) a permanent deferred-rotation grazing management system or (10) a continuous grazing system with proper use. Earthen and net wire structures reduce active erosion and increase water penetration, but grass does the job much better if given a chance.

Follow good range management and maintenance practices to keep pricklypear under control and prevent reinfestation. Balancing the stocking rate with forage production prolongs the effectiveness of control measures, if this is the only practice that can be followed.