

Goat Grazing
San Diego Project

Oct. 1976
Walt Jones

SPANISH GOATS AND BRUSHLAND MANAGEMENT

IN

SAN DIEGO COUNTY

The past one and one-half years have been very interesting and exciting for those of us working in brushland resource development in San Diego County. Brushlands, covering some 5,000,000 acres in southern California, have long been considered a liability due to its high fire hazard characteristic and we have labored for years in the fight against this fire hazard developed from brush build-up and the inevitable regrowth on our attempts at brush removal to develop range for cattle, wildlife, recreation and fire hazard reduction. The past four years have brought to the forefront our large dependence on nonrenewable energy sources and the weakness of this system. Only on infrequent occasions have we made attempts to find uses for brush due to its inaccessibility, the rugged terrain on which it grows, and the high cost of a finished product developed from its potential energy source.

If this brush's large renewable energy potential could be conveniently harvested and converted into a salable, economically competitive product, we would be making a giant step forward in our quest toward a working solution to our brushland fire hazard. We would also move closer to the realization of the multiple use concept that we so often aspire to in our wildlands use planning.

For some time resource development people have toyed with the idea of converting the brush's energy potential into a useable fuel but the logistics of harvesting, transportation, and conversion have been an uneconomical and insurmountable task. The idea of a foraging (browsing) animal, such as the Spanish or meat and hair goat, to harvest brush regrowth to produce red meat without competing with man for good agricultural land has long been an established tradition and technique in many and large parts of the world's marginal land area. Goats have long been used in Texas for brush regrowth removal to minimize range maintenance costs on multiple livestock and wildlife use and produce mohair and meat. Although our vegetation type would seem to be ideal for this type of animal husbandry this has never been practiced in southern California.

Often our brushland managers may elude to or list goat browsing as a biological control potential for managing brush regrowth, the political administrative and livestock industry "attitude" has never been predisposed to this concept; but thanks to the foresight and promotional hard work of the Cleveland National Forest personnel, San Diego County has been given the opportunity to experience first-hand the ability of the "Spanish" or meat goat to browse brush regrowth and maintain low fuel volume in brushland fuelbreaks. Beginning chronologically with the initial contact in April, 1975, between the personnel of the Cleveland National Forest and a private goat owner to discuss the possibilities of an eventual experiment on the use of the meat goat as a tool in brush fuel management, through various public and technical meetings organized by the Cleveland National Forest personnel on the feasibility of this operation, two environmental impact reports, to the eventual arrival of 500 "Spanish" meat-type goats

on the Descanso Ranger District of the Cleveland National Forest occurred in March of 1976. This was a relatively short period when one considers the many environmental, social and traditional, and bureaucratic ramifications that a project of this nature had to overcome. With the arrival on August 17, 1976, of 700 more "Spanish" goat does from western Texas, the meat goat population of the project increased by 140% to arrive at the present flock of 1200. The immense interest and the success that this experiment has had during the past six months has prompted other organizations, agencies and private ranchers to look more seriously at this brush management technique as an important and valid one to add to our list of brush modifications and reduction methods for our 1.6 million acres of Chaparral and brush areas of San Diego County.

Within the United States, Texas has long been the leader in the production of Mohair and meat from goat husbandry and has a well-developed goat production industry. Thus a great deal of experience and expertise has been developed by the Texas A&M Experiment Stations and Cooperative Extension Service working in cooperation with the goat production industry on goat management, health, marketing and breed improvement. This fact led me to solicit a fact-finding trip to attend the 1976 Texas A&M Sheep and Goat Conference and Field Day at San Angelo in order to improve my understanding of goat management and production and how we may adapt this information to our situation in San Diego County. The following comments summarizes my impressions, Texas Goat Research Development and Orientation and key contacts made with Texas Research, Cooperative Extension, and Goat Production Industry people.

Summary of Fact-Finding Trip, September 1, to September 3, 1976 to the Texas A&M Sheep and Goat Conference and Field Day held at San Angelo, Texas:

Sheep and Goat Industry Situation:

The Texas sheep and goat industry is a well established part of the state's agriculture economy having a gross annual revenue value in excess of \$80,000,000 with the Angorra and "Spanish" goat part comprising \$20,000,000 of this value. The sheep industry was well established in the early 1900's with the estimated head count of 1909 being 44.7 million. This number has fluctuated considerably over the years and is presently estimated at 14.3 million. The product emphasis has changed considerably from one of producing primarily wool in the early 1900's to that of producing lamb today. The Angorra goat industry for Mohair production was well established by the 1920's but both the Angorra and "Spanish" goat were introduced and used in the early 1800's. The Angorra goat numbers have fluctuated over the years with a high point in 1966 of 4.0 million to the present day level of less than one million head. The "Spanish" goat has been kept and used for many years as a biological brush control agent and the meat production was usually channeled through ethnic groups of usually Mexican-American origin with no real attempt to process the animals through meat packing houses and chain food stores. No real census attempts have been made to access the "Spanish" goat population but it has probably fluctuated around the 200,000 in the 1960's to a possible 500,000 head presently. Increased interest in "Spanish" goat production probably came about due to the crash in wool and Mohair prices during the late 1960's and the rising demand for a less expensive red meat than the rapidly rising beef, lamb, and pork meats. The present day center of the Texas sheep and goat

industry is the Edwards Plateau Region of Southwestern Texas with two-thirds of the sheep and goat production centered here. Important centers for sheep and goat marketing and trade are the cities of San Angelo, San Antonio, Uvalde, Lampasas, Golphwaite and Junction.

Present Texas Recommendations and Practices for Range Management, Health, Breeding, Marketing, Economics and Predator Control in "Spanish" Goat Production Range Management:

"Spanish" goats are very hardy animals and are generally able to withstand the rigors of Texas rangelands. The "Spanish" goat has a much wider range of adaptability than the Angora goat and thus may be successfully produced in all regions of Texas. Since the Spanish goat has been used primarily in the past for controlling sprouts of certain species of brush (oaks, juniper, mesquite) in cut-over and bulldozed (chained) areas and is known to feed upon more than 25 species of browse plants, this goat is usually grazed in varying combinations with other livestock (cattle and sheep). Stocking rates necessary for sprouts control is estimated at one goat or more per two acres at the Sonora Research Station. Research has indicated that combinations of goats, cattle and sheep or cattle and goats produce higher gross production per acre and range is maintained in its best condition than when either of the animal species is grazed alone. Seven feet is considered the maximum height for effective browsing.

Management is extensive with fencing done to break up large tracks of land to allow some flexibility in rotational grazing for better range improvement and to help control internal parasites. Goats are usually figured at the rate of six does per animal unit and moderate mixed stocking grazing is recommended in order to maintain range and animals in good condition.

Supplemental feeding is usually not practiced but the few ranchers that do supplement report higher kid crops and flocks that are easier to handle.

A typical supplemental feed could be one-fourth to one-half pounds of cottonseed cake or one-third to three-fourth pounds of yellow corn per head daily through the poor feed periods or preceding breeding. A popular self-feeding mixture in large, rough or brushy range is three parts of ground milo, one part cottonseed meal and one part salt for an inhibitor. Feeders should be located one-half to one mile for water.

Supplemental grazing, such as stubble fields, small grains, Sudan and irrigated pasture is recommended to supplement native pasture when available.

Tight fencing is very important for adequate flock management. Woven wire fence (40" to 48") with two or three barbed wires above spaced 6' apart is preferred. Barbed wire fencing can also be used. Working pens of sheep type are adequate for goats.

Billy kids are usually not castrated young under range conditions, but in special situations they may be castrated up to yearling age during round-up time.

Health: Both internal and external parasites do occur to different degrees in range flocks. Both lice and ticks are common external parasites that attack "Spanish" goats. Spraying or dipping twice a year is recommended. Excellent initial control is usually possible by a second treatment 12 to 18 days following the first spraying. Explicit recommendations are found in the Texas A&M Extension Publication MP-691, "Suggestions for Controlling External Parasites of Livestock and Poultry".

Internal parasites (stomach worms, hair worms, thread-necked strongyle, Nodular worms, hookworms, lungworms, and tapeworms) are always present and are more of a problem in wet years than dry years. Proper grazing management and properly timed supplemental feeding are the only fully effective control measures. Stocking ranges at a moderate level, maintaining animals in reasonable physical condition and rotation of pastures are good practices. Observation of animals regularly for signs of developing parasite problems and isolation of effected animals for intensive treatment is also a must. Drug treatment for internal parasites can be effective only when used in conjunction with these practices. Both the drenching and bolus technique is used and changing drugs occasionally is recommended so that the parasites do not build up a resistance to any specific drug. Tramisol³ is a newer drug and is claimed to be effective against many of the worm types. Other common drugs are Thiobenzole and Phenothiazine.

Where animals are kept in confinement and wet areas, coccidiosis can be a problem. Proper management can be an effective control of this organism and drugs are also available for treatment.

Breeding Practices: Few attempts have been made to improve the animals through selective breeding. Some cross breeding with Angorras has been done and the dairy breed stocks have been introduced to increase size and milk production of the "Spanish" does.

"Spanish" goats will breed at any season of the year and it is common practice to leave the bucks with the does the year around. Some does may breed twice a year and twinning is common but a 150% yearly kid crop is considered a good to excellent production level. A recommended mating system would be to seasonally run the bucks with the does during two months in the spring and fall. This would allow for better eagle predation control and better management of the doe kids. This allows doe kids to reach a desirable size and age (about one year) before being bred for the first time. Three to four bucks per 100 does is recommended and some buck conditioning about two to three weeks before turning them in with the does is good practice. Doe flushing with supplemental feed or frost rested pasture is also good practice. Removing the kids from the doe some two to three months preceding breeding is necessary for the doe to regain good physical condition.

A good selective breeding program would be to divide the breeding herd into three groups and mate the best bucks to the best does, second best bucks to the second best does and the poorest bucks to the poorest does. You would save replacements from the top two groups. A 15% culling rate is considered average and early born kids should be given preference over late born ones for replacement. Bucks should be changed every two years to prevent inbreeding and a loss of vigor

in the flock. Points to be considered in a selective breeding program are large size, multiple births, good conformation (muscling), twice a year kidding, rapid growth, straight legs with good bone, and early breeding.

Some research work has been done to look at the effects of cross-breeding with Angorras and milk goat bucks to introduce hybrid vigor and improve carcass yield. Carcass yields are usually low, varying from 30 to 45%. The use of milk goat bucks has usually been discouraging in improving carcass yield. Crossbreeding with Angorra bucks or selective upbreeding within the "Spanish" goat has given more encouraging results.

The does are usually not given any special attention during kidding time. The best policy is to leave them alone and stay out of the pastures as much as possible. Fresh, rested grass type pastures are good for kidding since they provide excellent feed for milk production.

Keeping records of kid crop production and weight of kids at market time is highly recommended since this will help develop a prolific flock of fast growing animals through selective culling and breeding practices.

Marketing: Kids are usually marketed at four to five months of age or before weaning. The marketable kids will usually weigh between 30 to 40 pounds alive. Some buyers pick up kids at the ranch and most of the meat goes to local markets where it is highly prized among various ethnic groups. The Mexican population is an important outlet and important numbers are sold to buyers from Mexico. It is estimated that 25,000 to 35,000 kids are sold yearly to buyers in California and demands for kids are high throughout the United States and Canada during Easter time.

Packers in San Antonio process goat meat for canning and shipment to foreign countries. Since goat meat deboning is an expensive process it was hoped that the development of the mechanical deboner would pave the way for the introduction of goat meat into processed meats thus providing an added market potential for this type of meat. Presently this mechanical meat processing technique has not been cleared for commercial use in human food processing.

Other markets which have auctions that specialize in goats are San Angelo, Uvalde, Lampasas, Golthwaite, and Junction. Weekly receipts and prices on goats marketed in San Antonio and San Angelo can be obtained from the Texas Livestock Marketing Statistical Service.

Economics: The most recent cost analysis of "Spanish" goat production was made during the Spanish Goat Conference held at the Texas A&M Research and Extension Center, San Angelo in September, 1975. It was estimated that under range conditions, based on a culling rate of 12% and a yearly kidding rate of 100%, a doe unit would gross \$14.65 yearly but variable yearly costs of \$6.20 plus fixed costs of \$13.75 add up to a yearly loss of \$5.30 per doe. Under improved management and yearly kidding rate of 150% the situation was somewhat reversed with a net yearly return per doe of \$1.30.

It is interesting to note that the yearly gross return per doe (150% yearly kid crop) increased from \$10.27 to \$21.25 during the period from 1973 to 1975 while the yearly variable costs only increased from \$4.00 to \$6.20 per doe. The present gross yearly return per doe is estimated at \$22.50.

The recent devaluation of the Mexican peso has caused a considerable drop in the Texas market value of the "Spanish" goat trade indicating the strong influence of the Mexican trade on the market. It is anticipated that this situation will normalize and the market value will again increase.

Predator Control Situation: The Edwards Plateau in western Texas has long been the center of the sheep and goat industry. The fact that this area had since the turn of the century been almost free of the coyote was an asset in the establishment of this livestock industry. Since the coyote is an important predator on both sheep and goat it is thus an important deterrent to the running of sheep and goats. However, the coyote is reinvading this area and causing considerable losses in both the sheep and goat industry. The 1972 annual losses to coyotes is estimated at \$1.8 million to the sheep industry, and to all predators (eagles, foxes, bobcats, dogs and coyotes), the total loss was estimated at \$3.0 million. The value of goats killed by all predators was estimated at \$1 million in 1972 with coyotes doing \$427,000 of damage. However, the direct loss through animals killed by predators is less important than the loss associated with the inability to run goats in area of significant coyote or other predator density. These goats cannot be completely replaced by equal animal units of cattle and any beneficial effect they had in controlling brush invasion has been lost.

The present state predator control program is administered through the Predatory Animal and Rodent Control Service of the United States Bureau of Sports Fisheries and Wildlife. Money is provided through funding of the Federal Government, the State of Texas, and counties and individual producers. Present legal predator control activities of this agency consists of trapping shooting and denning. Shooting is done both from the ground and aircraft. Where a significant number of coyotes are present these methods are time consuming, expensive and at times ineffective. The presidential order of 1972 which restricted the use of chemical toxicants on Federal lands as well as the use of them by Federal employees took away the use of poisons (such as cyanide and 1080) in baits and traps from the above predator control agency. The present use of the M-44 (cyanide gun) is legal to be used by private individuals on private lands. Fencing and confinement rearing is being suggested as possible options but the present economics of these husbandry methods are not encouraging.

The use of chemical repellents to reduce coyote predation is at the research stage. A wide range of repellants have been tested under field conditions but the results, in general, have been discouraging.

Research Activities and Orientation of the Texas Agriculture Experiment Station San Angelo Center (Related to Goat Productivity Management and Health):

Facilities for conduction research include main building, laboratories and livestock facilities on 50 acres owned by the Experiment Station, 1,564 acres

of subleased land next to the station, 3,623 acre ranch that joins the Sonora Station and a recently acquired 8,414 acre ranch near Brady. The staff consists of six researchers and four technical support people. The following is a list and brief of the currently approved projects relating to goats:

Improvement of Reproductive Performance of Sheep and Goats - Dr. Maurice Shelton

The number of kids reared per year from a flock of goats is the major factor determining gross income to goat producers. The relatively low kidding percentages reported by Texas flocks and the inherent high potential for multiple births offers a real potential for making major improvements. With 1.2 million does in Texas, increasing kidding percentage by 5% would result in 60,000 more lambs worth some 1.2 million dollars. Past research efforts have provided much data concerning the effects of various hormone treatments and environmental and management variables on fertility. The basic objective of the current research with sheep, Angora and Spanish goats is to continue evaluating potential methods for improving reproductive efficiency. Areas of effort include: 1.) Accelerated lambing or kidding, 2.) Endocrine stimulation, 3.) Genetic selection between or within breeds, 4.) Alteration of management practices and 5.) Evaluation of disease problems as a cause of loss in reproductive efficiency.

Improvement of Carcass Merit in Sheep and Goats - Dr. Maurice Shelton

Efforts on this project have been directed toward developing a feasible method for accurately estimating carcass merit in live sheep in order to allow effective selection for this trait. Rams performance tested on the Sonora Station are being used with the ultimate goal of incorporation of a measure for carcass desirability into the selection index. Ultrasonic estimates of body fat and muscling have been made, and several Rambouillet and Suffolk rams have been performance and progeny tested to obtain carcass merit of their offspring. Another important effort under this project is to work with Spanish or "meat type" goats, which have been largely neglected by researchers as a meat producing animal. Efforts have been carried on primarily on the Sonora Station, but the Winters Ranch now provides an opportunity to run enough goats to much enhance this effort. The objective is to investigate the potential and implement programs for improving carcass merit of this animal.

Mycoplasma of Sheep and Goats - Dr. Charles W. Livingston

Major disease research efforts are directed at determining the involvement of mycoplasma organisms in livestock. This group of organisms is receiving much increased research interest throughout the world in humans, livestock and plants. For example, eight years ago, only three species of mycoplasma were known in sheep and goats; today 16 have been identified. Dr. Livingston made the initial isolation of ureaplasmas from sheep, that has been reported in world literature, and also made the first isolates made in the U.S. from cattle and goats. These organisms have been widely found in local livestock and have been associated with respiratory and reproductive problems, as well as pink eye in sheep and goats. Research will continue to determine the

the exact significance of these organisms. In addition to this project, Dr. Livingston autopsies most all the animals that die on the Station, to ascertain the cause of death. Therefore, he contributes much to other research efforts of Station staff here and at College Station.

Evaluating Management of Predators in Relation to Domestic Animals -
Dr. Maurice Shelton

This project has been funded primarily by the U.S.D.A., Agricultural Research Service grant funds and contributes to a regional effort of several western states. Work in Texas has consisted of evaluating the predator problem, determining fencing requirements to exclude coyotes, and the evaluation of potential aversive agents to reduce predation. Much of this work has been conducted at the Texas A&M University Research Center at McGregor and on cooperating ranches located in areas having high coyote populations. Results with aversive agents are not especially encouraging, but efforts are continuing in this area of research.

Factors Affecting the Quality of Diets of Ruminants in the Edwards Plateau -
Dr. Ed Huston

This research is devoted to determining animal diets and diet quality and how these are affected by such variables as season of the year, grazing system employed and species of animal. Over the past three years, approximately 1,000 samples have been obtained from grass, forbs and browse plants on the Sonora Station and are being analyzed for protein, digestible energy and phosphorus. Information obtained will provide a basis for decisions of what and when to supplementally feed in order to meet animal requirements.

Investigation of Methods to Improve Labor Efficiency of Sheep, Goats, Wool and Mohair Production - Dr. Maurice Shelton

The purpose and objectives are to investigate methods for reducing quantity and quality of labor required for high labor demanding practices associated with sheep and goat production. Specific high labor demanding activities to be given attention include shearing, wool and mohair handling, feeding supplemental feeds, treating for internal and external parasites and gathering. Significant assistance is expected to be provided by V.H. Aldred of the Department of Agricultural Engineering.

Use of Protected Proteins and Amino Acids to Improve Efficiency of Meat, Wool and Mohair Production - Dr. Millard Calhoun

Basic research indicates that quality and quantity of protein available for post-ruminal absorption may be limiting performance of ruminants under certain conditions. Also, recent laboratory work shows that an amino acid, ϵ -cysteine, provides some protection against bitterweed toxicity. Research objectives are to evaluate methods for protecting proteins and amino acids from microbial breakdown in the rumen, develop supplementation procedures to increase blood ϵ -cysteine levels and define conditions for using protected proteins and amino acids to improve rate and efficiency of lamb, wool and mohair production.

Winters Ranch - Range Studies

The 2,414 acre H.D. Winters Ranch, near Brady, that was leased September 1, 1975, has greatly expanded the research opportunities in this area of the state. Ted Fairchild is the Ranch Manager. This ranch provides a carrying capacity of some 650 animal units. With combination of livestock species, this will allow flocks and herds of around 300 cattle, 1,100 sheep and 800 goats. These livestock number and the number of available pastures will allow for meaningful breeding, management, nutrition and range and pasture improvement research. Unique opportunities on the ranch include a large acreage of marginal cultivated land and pasture land that has been revegetated with native species, as well as around 800 acres of rough, shinnery oak. Research to make maximum use of both these type areas should be of considerable value. Research projects to capitalize on these opportunities are being planned.

The current activities on the ranch are being carried on under the existing projects. Activities include:

Cattle - 200 cows and their calves have been or are being used in the following studies: 1.) Evaluation of Ralgro implants, 2.) Evaluation of prostaglandin for synchronizing estrus for artificial breeding and 3.) Value of Rumensin for growing stocker calves.

Sheep - 1.) 200 ewes are being bred for fall and spring lambing to polled and horned Rambouillet, Dorset, Finn and Suffolk x Hampshire rams. 2.) The 1975 Rambouillet mutton lambs were used to evaluate various management procedures for producing slaughter lambs weighing 110 pounds or more. The 1976 mutton lambs will be used on a similar study.

Goats - 1.) 600 Spanish nannies have been identified individually and are being bred to 10 to 20 different males to obtain kids of known sires to provide data useful in assessing the difference in performance potential present in Spanish goats and to develop heritability estimates and selection indexes. 2.) A group of Spanish goats was used to evaluate the value of the practice of castration and different methods of castration on performance and carcass traits. 3.) A group of aged Angora muttons is being used by Jim Bassett to evaluate the value of red oil on reducing vegetable defect in Mohair.

The Future of the Texas Goat Industry

The potential looks good for the goat industry since a large possibility still exists for increasing production, the fact that these animals produce a usable product without directly competing with man for food, they provide a means of efficiently harvesting range forage in this area of the state, and they provide a biological control of range brush with little chance for environmental pollution. The number one obstacle to the future of the

goat industry in the Edwards Plateau of Texas depends on the effective control of predators, namely coyotes. Failure to find workable and economically feasible answers to predator control will result in serious loss to the important animal industries of this region, adjacent regions of the state and to the state's economy because of the reduction in income generated by these industries. It will not be simply a matter of economic losses resulting from predator kill, but the ultimate loss resulting from many producers "selling out" or pulling out of goat and sheep production, thus threatening the future existence of the total goat and sheep industry in Texas. Research has clearly shown that equal animal units of sheep and goats cannot be replaced by cattle on rangelands in the Edwards Plateau.

Research, Cooperative Extension, and Industry Contacts

Dr. Carl Menzies, Resident Director of Research, Texas Agricultural Experiment Station and Extension Center, San Angelo, Texas;
Dr. Maurice Shelton, Breeding and Reproductive Physiologist, Texas Agricultural Experiment Station, San Angelo, Texas;
Dr. J.E. Huston, Range Nutrition, Texas Agricultural Experiment Station, San Angelo, Texas;
Dr. Charles Livingston, Veterinarian Microbiologist, Texas Agricultural Experiment Station, San Angelo, Texas;
Mr. Philip V. Thompson, Research Associate, Texas Agricultural Experiment Station, San Angelo, Texas;
Donald W. Spiller, Research Associate, Texas Agricultural Experiment Station, Sonora, Texas;
Charles Taylor, Research Associate, Texas Agricultural Experiment Station, Sonora, Texas;
Dr. George A. Ahlschwede, Area Sheep and Goat Specialist, Texas Agricultural Extension Service, San Angelo, Texas;
Mr. Jack L. Groff, Area Sheep and Goat Specialist, Texas Agricultural Extension Service; Kerrville, Texas
Dr. Delmar I. Davis, Area Livestock Specialist, Texas Agricultural Extension Service, San Angelo, Texas;
Robert H. Kensing, Area Economist-Management, Texas Agricultural Extension Service, San Angelo, Texas;
Melton Caroline, Director Predatory Animals and Rodent Control Services of U.S. Bureau of Sport Fisheries and Wildlife, San Antonio, Texas;
Mr. Bill Brown, Rancher, Menard, Texas;
Mr. Jim Willingham, Rancher, Uvalde, Texas;
Mr. Ed Young, Rancher, Uvalde, Texas.

AGRICULTURAL EXTENSION LABORATORY
REPORT OF PLANT TISSUE ANALYSIS
FEED QUALITY

AGRICULTURAL EXTENSION
 UNIVERSITY OF CALIFORNIA

County: San Diego
 Submitted by: Walter Graves

Number: F-121/3-R
 Date sampled: 7/13/77
 Date submitted: 9/20/77
 Date reported: 1/6/78

Identification: Goat browsing in San Diego - Lisle Green

Sample No.	Description	Code			DM	MCF	ADF	Prot.	Ash	Fat	Fiber	NFE	Ca	P	Mo	Cu
		Cut	Age	I.D.												
					%	%	%	%	%	%	%	%	%	ppm	ppm	
1	Qudu #1 (2 sacks)							10.7	5.0	2.4	27.0	54.9	0.82	0.14	0.34	9.7
2	Qudu #2 (2 sacks)							10.0	7.5	2.3	28.5	51.7	0.75	0.12	1.9	9.0
3	Cegr #2 (1 sack)							8.3	5.1	5.2	18.6	62.8	0.86	0.10	2.4	3.9

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 Isfendar Ramadan
 Staff Research Assoc.

cc: W. Bushnell
 J. Clawson

AGRICULTURAL EXTENSION LABORATORY
REPORT OF PLANT TISSUE ANALYSIS
FEED QUALITY

AGRICULTURAL EXTENSION
 UNIVERSITY OF CALIFORNIA

County: San Diego
 Submitted by: Walter Graves

Number: F-122/6-R
 Date sampled: 7/13/77
 Date submitted: 9/20/77
 Date reported: 3/1/78

Identification: Goat Browsing in San Diego - Lisle Green

Sample No.	Description	Code			DM	MCF	ADF	Prot.	Ash	Fat	Fiber	NFE	Ca	P	Mo	Cu		
		Cut	Age	I.D.														
					%	%	%	%	%	%	%	%	%	%	ppm	ppm		
1	Adfa #1 (1 sack)							6.0	23.6	6.2	15.3	48.9	0.43	0.10	4.8	7.0		
2	Adfa #2 (2 sack)							5.4	3.7	10.8	19.5	60.6	0.56	0.10	2.6	6.7		
3	Adfa #3 (2 sack)							6.0	4.0	11.0	16.1	62.9	0.61	0.11	2.1	5.3		
4	Cegr #3 (2 sack)							9.8	5.1	5.3	21.5	58.3	0.80	0.14	1.9	8.0		
5	Arg1 #2 (1 sack)							8.2	5.2	6.8	19.2	60.6	0.59	0.12	1.8	9.5		
6	Arg1 #3 (2 sack)							7.7	4.8	6.9	22.9	57.7	0.55	0.13	2.6	5.3		

Ramadan
 Isfendiar Ramadan
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 cc: W. Bushnell
 J. Clawson

AGRICULTURAL EXTENSION LABORATORY
REPORT OF PLANT TISSUE ANALYSIS
FEED QUALITY

AGRICULTURAL EXTENSION
 UNIVERSITY OF CALIFORNIA

County: San Diego
 Submitted by: Walter Graves
 Identification: Marfin #2

Number: F-123/5-R
 Date sampled: 9/30 & 10/7/77
 Date submitted: 10/21/77
 Date reported: 2/14/78

Sample No.	Description	Code			DM	MCF	ADF	Prot.	Ash	Fat	Fiber	NFE	Ca	P	Mo	Cu
		Cut	Age	I.D.												
					%	%	%	%	%	%	%	%	%	ppm	ppm	
1	Chamise (adenostema fasciculatum)						9.9	4.2	7.9	15.3		0.51	0.17	2.1	6.0	
2	Ceanothus Gregii						13.9	8.3	4.6	17.3		0.53	0.20	2.4	5.7	
3	Quercus Dumosa						12.3	4.3	3.4	23.9		0.40	0.21	1.7	8.0	
4	Arctostaphylos Glandulosa						7.7	3.7	11.3	19.5		0.26	0.14	2.6	4.5	
5	Ceanothus Palmeri						17.6	6.0	3.5	11.7		0.74	0.22	2.5	6.3	

Isfendiar Ramadan
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AGRICULTURAL EXTENSION LABORATORY
REPORT OF PLANT TISSUE ANALYSIS
FEED QUALITY

AGRICULTURAL EXTENSION
 UNIVERSITY OF CALIFORNIA

County: San Diego
 Submitted by: Walter Graves

Number: F-122/6-R
 Date sampled: 7/13/77
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Identification: Goat Browsing in San Diego - Lisle Green

Sample No.	Description	Code			DM	MCF	ADF	Prot.	Ash	Fat	Fiber	NFE	Ca	P	Mo	Cu
		Cut	Age	I.D.												
					%	%	%	%	%	%	%	%	%	ppm	ppm	
1	Adfa #1 (1 sack)						6.0	23.6					0.43	0.10	4.8	7.0
2	Adfa #2 (2 sack)						5.4	3.7					0.56	0.10	2.6	6.7
3	Adfa #3 (2 sack)						6.0	4.0					0.61	0.11	2.1	5.3
4	Cegr #3 (2 sack)						9.8	5.1					0.80	0.14	1.9	8.0
5	Arg1 #2 (1 sack)						8.2	5.2					0.59	0.12	1.8	9.5
6	Arg1 #3 (2 sack)						7.7	4.8					0.55	0.13	2.6	5.3
	Note: Fiber and Fat values will follow															
	 Isfendiar Ramadan Staff Research Assoc. cc: W. Bushnell J. Clawson															


AGRICULTURAL EXTENSION LABORATORY
REPORT OF PLANT TISSUE ANALYSIS
FEED QUALITY

AGRICULTURAL EXTENSION
 UNIVERSITY OF CALIFORNIA

County: San Diego
 Submitted by: Walter Graves

Number: F-123/5-R
 Date sampled: 9/30 & 10/7/77
 Date submitted: 10/21/77
 Date reported: 1/6/78

Identification: Experimental Goats grazing Mt. Laguna, San Diego County

Sample No.	Description	Code			DM	MCF	ADF	Prot.	Ash	Fat	Fiber	NFE	Ca	P	Mo	Cu
		Cut	Age	I.D.												
					%	%	%	%	%	%	%	%	%	ppm	ppm	
1	leaves and new twig growth						9.9	4.2					0.51	0.17	2.1	6.0
2	new twig growth & seedlings (<18 cm)						13.9	8.3					0.53	0.20	2.4	5.7
3	Leaves and new twig growth						12.3	4.3					0.40	0.21	1.7	8.0
4	leaves from resprouted plants						7.7	3.7					0.26	0.14	2.6	4.5
5	new twig growth, resprouts and leaves						17.6	6.0					0.74	0.22	2.5	6.3
	Note: Fiber and fat values will follow.															
	 Isfendiar Ramadan Staff Research Assoc. cc: W. Bushnell J. Clawson															

(40)

LABORATORY WORK REQUEST

County SAN DIEGO Submitted by WALT GRAVES
 Date sampled OCTOBER 7 & SEPTEMBER 30, 1977 Send report copies to BOB BUSHNELL, JIM CLAWSON
 Identification EXPERIMENTAL GOATS, GRAZING MT. LAGUNA, SAN DIEGO COUNTY
 Sampling location MARFIN #2, MT. LAGUNA, ~5500 FT.
 Where possible give 1/4 of 1/4 of Sec. T R (Required for Water)
 Crop Soil type Drainage
 Irrigation method Water source
 No. of samples 5 Soil, water plant, (feed) misc. (circle one only)
 Plant part sampled: Petiole, blade, mid-rib, grain, (whole tops) mid-stem:
 Analyses requested FIBER, CALCIUM, PHOSPHORUS, COPPER, MOLYBDENUM, PROTEIN, ASH, FAT
 Project No. or problem description

Sample No. Description (for plants, include age, stage of growth, or cutting)

1. CHAMISE (ADENOSTEMA FASCICULATUM) - LEAVES AND NEW TWIG GROWTH
2. CEANOTHUS GREGGII - NEW TWIG GROWTH AND SEEDLINGS (<18 CM.)
3. QUERCUS DUMOSA - LEAVES AND NEW TWIG GROWTH
4. ARCTOSTAPHYLOS GLANDULOSA - LEAVES FROM RESPROUTED PLANTS
5. CEANOTHUS PALMERI - NEW TWIG GROWTH, RESPROUTS AND LEAVES

NOTE: ALL SAMPLES FROM AREA DISCED ABOUT 14 MOS AGO (EXCEPT FOR SOME MATURE PLANTS OF C. PALMERI WHICH ESCAPED DISCING). THESE SAMPLES REPRESENT THE BROWSING PATTERN FOR THESE PLANTS BY GOATS DURING THIS PERIOD (AS OBSERVED AND MEASURED ON EXPERIMENTAL PLOTS).

(Use another blank sheet, if needed.)