



CATTLE PENS used in this study at Yuma. In summer the animals spend most of their time under the shades. Feed alley is on left side of pens and thus not shown in this photo. Note stacked alfalfa hay in far background.

Gain, Feed Intake and Feed Requirement of Steer Calves on Hay and Haylage — Summary of Three Experiments

<i>Item</i>	<i>Hay</i>	<i>Haylage</i>
No. steers	56	56
Average days on feed	94	94
Average initial wt., lb.	444	440
Average daily gain, lb.	1.72	1.46
Average daily feed (hay basis) lb.	16.0	15.3
Feed required/100 lb. gain, lb.	955	1080

HAYLAGE STUDIES AT YUMA

By W. H. Hale

More than 250,000 tons of alfalfa hay is produced annually in Yuma County, Ariz. Some 42,000 acres were cut for hay in 1964. A portion of this is sold in California and some in other parts of Arizona. The remainder is fed locally.

The alfalfa hay in the Yuma area is of excellent quality and, of course, harvested without rain. Very few leaves are lost during proper harvesting. Generally, the hay averages over 16 percent protein on a 10 percent moisture basis, has a low crude fiber content, and contains approximately 55 to 60 percent total digestible nutrients. The usual total digestible nutrient value given for alfalfa grown in other areas of the United States is 50 percent.

A Natural For Feeders

Due to the large production of high quality alfalfa, cattle feeders in the Yuma area have been interested in its utilization in a program for growing steer calves, especially during the warm summer months when the performance of fattening steers is sometimes less than ideal.

With initial weight of approximately 400 pounds, a feeding period of 140 to 175 days is required to obtain the

200 to 250-pound gain per steer. The daily gain during this period will usually average 1.50 to 1.75 pounds with 1000 to 1100 pounds of hay required to produce 100 pounds of gain. The hay is usually fed as ground baled hay, but a few operators prefer dry field chopped hay. The feeders in the growing program would like a system of harvesting and/or feeding that would improve both performance and feed efficiency of the growing calves, and thereby increase the return per ton of hay — if such is possible.

Beginning in the summer of 1962, a series of growing trials was initiated at the Yuma Experiment Station to study methods of improving performance with growing steers fed ground baled alfalfa hay.

One of the areas investigated was the feeding value of alfalfa when stored in airtight glass-lined silos. Forage can be stored in this type of structure when the forage contains 40 to 50 percent moisture as compared to the usual 70 percent in other silos. A 14 x 40 ft. Harvestore silo was made available for this work.

Is Sweet and Palatable

Fermentation is restricted, and the product taken from the unit has a sweet odor and is apparently very palatable to cattle. With tests conducted in the Midwest, dry matter consumption was higher with low-moisture forage silage (haylage) than with conventional silage.

Due to the construction of the Harvestore, the unit does not have to be emptied in order to be refilled. The top portion of the unit can be filled while the feed in the bottom portion is accessible by means of a bottom unloader. This report contains the results of three trials conducted during the summers of 1963, 1964 and 1965 at the Yuma Branch Experiment Station.

Comparative Trials Begun

The hay and haylage were harvested from alternate borders in the same field. The alfalfa was approximately 40 percent bloom stage at the time of harvesting. The baled hay was stacked in the open with a Haro-bed bale stacker. The hay prior to feeding was ground through a Miller mill with a standard hay screen. The alfalfa used for haylage was wilted in the field until it contained approximately 50 percent moisture, chopped to 1/2-inch lengths with a Gehl forage chopper, then stored in the Harvestore for three weeks prior to feeding.

During the first two years the unit was filled with one cutting of forage and the feeding trial conducted until the unit was emptied. During the 1965 study the unit was refilled twice during the feeding period. As the results of the feeding trials between the three years were similar, they are presented as a three year summary.

The steer calves used for each
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year's study originated in Texas and were fed ground alfalfa hay on arrival at the Yuma Station until the initiation of the experiment. All calves were branded, neck chained, sprayed with CoRal, and in some cases castrated and dehorned.

Gains Less on Haylage

The results of the three year study are presented in the table at the left. Daily gain on the haylage was 15 percent less than on the ground baled alfalfa hay. Feed intake of the haylage on a hay basis was slightly less than on the hay, but the small difference in feed intake would appear not to account for the marked difference in gains observed between the two treatments. Feed requirement on the hay ration was 955 pounds as compared to 1080 on the haylage ration. Thirteen percent more feed was required on the haylage than on the hay to produce 100 pounds of gain.

Feed intake data suggest that the haylage was highly palatable, and visual appraisal indicated a very desirable product. An interesting observation was the brown color of the fecal material from the steers receiving haylage which resulted in the surface of the pen having a distinct off-brown color. The brown color of the manure may have been due to a reaction between the alfalfa protein and/or nonprotein nitrogen with the soluble carbohydrates and/or crude fiber. This reaction is known to occur in the presence of moisture at temperatures above 122° F. (50°C.).

Daytime temperatures at Yuma during the period of the two studies were well over 100° F. and the material taken from the Harvestore was very warm. No doubt an enormous amount of heat was absorbed daily by the structure and the haylage. Temperature measurements in the haylage during the summer of 1964-

LIVESTOCK RESEARCH at Yuma is aided by this complete feed mill, with facilities for grinding, mixing and storage. Note the big dark blue Harvestore silo in background.

65 showed maximum temperatures of 150° F. (60° C.). These temperatures are sufficiently high to cause the browning effect seen in the feces. The reaction which caused the browning of the feces may have reduced the digestibility of the haylage components involved.

Indicates Lessened Digestibility

Digestion trials have been conducted to determine what chemical changes occurred in the haylage during storage. The unthrifty appearance of the steers suggested decreased digestibility of the haylage protein.

One of the treatments included during the 1965 growing trial but not discussed was the addition of 1½ pounds of cottonseed meal daily per steer to the haylage ration. The daily gain of the haylage plus cottonseed meal was 1.38 pounds as compared to 1.20 on straight haylage. These results suggest protein damage to the haylage during storage. Corresponding feed requirements on the two treatments on a hay basis were 1098 pounds, (including cottonseed meal) as compared to 1240 pounds, respectively. The cottonseed meal also improved feed efficiency.

It is hoped that the digestion trial will supply at least some of the questions concerning the apparent poor utilization of the haylage in the experiments conducted at the Yuma Experiment Station.

In 1963, Oakie feeder calves returned \$41.62 per ton of hay when feeder gains were valued at \$22.50 per 100 pounds. In 1964, the return per ton of hay was \$52.26 when feeder gains were valued at \$19.50 per 100 pounds. In 1963, the alfalfa hay had a market value of \$30 per ton and in 1964 the value was \$22.

Cytogeneticist Ramage Gets Well-Earned Praise

A major seed house, Northrup King, salutes a University of Arizona and USDA agronomist in a page advertisement in a recent issue of "Crops and Soils." The advertisement, with a half page picture of Dr. R. T. Ramage, salutes a "Chromosome Engineer (who) Sows Seeds of Plenty."

It quotes Tom's belief that "The key to greater crop production for a growing population is now in the hands of chromosome engineers."

The UA-USDA geneticist is a recognized "chromosome engineer" in his own right, with his accomplishments in pushing toward a hybrid barley through genetic restructuring. Tom's stocks of translocations and tertiary trisomics are now being made available to plant breeders throughout the country.

Dr. Ramage believes that the big increases in grain production — up 30 percent or more over current yields — will come about through hybrids, with their improved quality, greater yielding ability, better resistance to hazards.

Those of us who know and work with Tom Ramage, knowing him as a friend and companion as well as co-worker, look at this well-earned publicity proudly, unable to say anything more original than "It couldn't happen to a nicer guy!"

Interesting Mystery Picture "Saguaro Shoe"

The mystery picture on Page 10 is the "Saguaro shoe," taken from a dying Saguaro cactus. As you look about the desert, you'll see the holes in Saguaro trunks, made by the Gila Woodpecker. Soon other birds find these handy hiding places, and some nest in them, notably the little Elf Owl.

The Saguaro, like many plants and animals, has the ability to manufacture scar tissue to cover an injury, and soon this hole is sealed up to prevent further invasion of the plant tissue.

The scar tissue is very strong, so that the entire sealed area, the color and size of a football although irregular in size and opening, can be removed when the plant is dead.

In the photo, the black portion at right is the opening — the only part one would see if looking at the Saguaro itself.