Lehmann Lovegrass and Simple Time Control Grazing

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Editor's Note: Readers may wish to read the article "Lehmann Lovegrass—Central South Africa and Arizona, USA" by Jerry R. Cox, G.B. Ruyle, Jan H. Fourie, and Charlie Donaldson which appeared in Rangelands 10(2):53-55, Apr. 1988.

The use of Lehmann lovegrass for revegetation is controversial. Some ranchers object to the grass because of its lower palatability and some range ecologists express concern about the potential invasive replacement of native perennial grasses by the South African species. Another controversial subject is time control grazing. This paper addresses these concerns by describing how a formerly unproductive area of a southern Arizona ranch was rehabilitated through soil ripping, mesquite control and seeding with Lehmann lovegrass. It was then grazed under a simple time control system that resulted in major benefits to the ranch operation.

Description of Ranch

The ranch is located west of the Santa Cruz River in southeastern Arizona. The Cumming family began running cattle on the open range in this area in the 1890's. Today, some 200 to 250 head of mature cattle are run year-long on an allotment (approximately 9,000 acres) of the Coronado National Forest, and on adjoining base land. The ranch has been managed for nearly a half century by Douglas Cumming, who is also an owner.

The ranch includes the eastern slopes of the Tumacacori Mountains and the rocky ridges and foothills of these mountains which merge into a bajada on the southeast. The bajada consists of coarse unconsolidated outwash material which was leveled and then dissected in Quaternary times. The rocks of both the mountains and the bajada are generally andesite in composition. A level area of the bajada consisting of several hundred acres is locally called "the Mesa." Soils of the Mesa consist of a deep rocky clay or clay loam that grades into the coarser bajada formation underneath.

Most of the ranch lies between 3,500 and 4,600 feet in elevation. The Mesa area averages about 3,800 feet. Ranch rainfall ranges from about 14 to 18 inches depending on topography and elevation. Over 60% of the rainfall comes in July, August, and September.

The two major vegetative types of the ranch are oak woodland and desert grassland. The Mesa area is entirely in the latter type. Principal native grasses are sideoats grama, slender grama, sprucetop grama, curly mesquite, cane beardless, tanglehead, and plains lovegrass. The most valuable browse is guajilla or false mesquite. Mesquite invasion has long been a problem on the bajada.

Grazing History

Father Kino introduced cattle to nearby Pima Indian Villages on the Santa Cruz River near the end of the 17th Century. Spanish, and later, Mexican cattle may have grazed areas of the present Cumming ranch periodically from the latter part of the 18th century into the fourth decade of the 19th century when Apache depredations disrupted the cattle industry until after the U.S. Civil War. During this period of disruption there was probably some use by wild cattle. A period of heavy open range grazing by the cattle of several ranches occurred from the 1870's until the Baca Float land grant boundary and the first Forest Service allotments were fenced in the early 1920's.

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This paper is dedicated to the memory of Gilbert Sykes, Nogales District Ranger and Charles (Chuck) Ames, Coronado National Forest Range Staff Officer. These men contributed a great deal to the success of the Mesa range improvement projects and they epitomized excellence in Federal Service.
Even though the boundaries of Forest Service allotments were fenced and stocking limits set, it was, initially, difficult to control distribution within the units. The first significant control of cattle distribution on the Cumming ranch occurred in the early 1950’s when a fence was constructed to separate the Mesa area from the remainder of the ranch. This fencing was followed by several pasture fences. The pastures made a rest-rotation grazing system possible and allowed better distribution of cattle. Small pastures on the mountain slopes were especially valuable in this regard. Distribution was also enhanced by the construction of additional stockwaters, salting, drifting of cattle, and by running young Barzona and Brangus cattle. Most range improvements were constructed under rancher-Forest Service cooperative agreements where both parties contributed to the projects.

**Rehabilitation of the Mesa Area**

The area of the bajada known as “The Mesa” was subject to heavy grazing in open range times because it was level and lay between natural permanent livestock waters. By the time the ranch perimeter was fenced, the area had lost most of its perennial grass stand, mesquite was invading, burroweed was spreading and soil permeability was reduced. Even though the stocking was controlled on the allotment, cattle continued to concentrate on the Mesa area until separate pastures were constructed.

In 1947 Coronado National Forest officials and Douglas Cumming concluded that physical range improvements would be necessary to eventually recover the Mesa area. Between 1949 and 1978 a number of small range improvement projects were implemented on the Mesa. These projects included contour ripping some 210 acres of low permeability soils, removal of mesquite by hula dozer and conventional dozer blade and the spraying of an additional area of mesquite with 2-4-5T. Following completion of each project the area was broadcast seeded to Lehmann lovegrass. The first seeding was completed in 1949. The seeded areas were fenced for grazing control after seeding. By the mid 1970’s the Mesa had been divided into three pastures totaling about 440 acres, of which about 340 acres were occupied primarily by Lehmann lovegrass, some of which had spread naturally from seeded areas. The remaining pasture areas located primarily on slopes supported mostly native grasses. It was estimated in 1982 that the average production of Lehmann lovegrass in the Mesa pastures was 1,000 lbs. per acre while that of the native perennial grasses on the slopes was about 500 lbs. per acre.

During the 1970’s and early 1980’s Lehmann lovegrass

![Fig. 2. The above two photographs contrast the condition of the Mesa before and after treatment. The upper photograph was taken in 1951 and the lower one in September 1984. The predominant grass in the lower photo is Lehmann lovegrass. The photos do not show the same exact site but each is typical of Mesa conditions at the time taken.]
had spread and became established on areas outside the Mesa pastures including areas where the soil had a high clay content. Cox and Ruyle (1986) reported that long term persistence and spread of Lehmann lovegrass in southeastern Arizona is limited to sandy loam and loamy sand soils. Finding Lehmann lovegrass on clay soils may be due to other local site factors. It appears that Lehmann lovegrass does not spread to certain sites such as rocky slopes and north exposures where micro-climate may be a control. This agrees with research data that indicates that temperature may be a factor in the spread and establishment of Lehmann lovegrass (Cox et al. 1988). Another factor apparently affecting the spread of the grass is range condition. Lehmann lovegrass appears to spread more slowly and not become the dominant species where the native perennial grasses are dense and vigorous.

Problems in Use of Lehmann Lovegrass

The Lehmann lovegrass pastures presented certain management problems. The major one resulted from selective grazing by livestock during the growing season. Cattle would often use the palatable native perennial grasses in preference to the Lehmann lovegrass. They would also use the previously grazed Lehmann lovegrass plants in preference to the larger and coarser ungrazed plants. This latter use problem also occurred when Lehmann lovegrass was green in the spring and fall. The selective grazing resulted in a pattern of large ungrazed clumps interspersed with heavily grazed smaller plants.

In 1981 Douglas Cumming and Duane Thwaits, Coronado National Forest Range Conservationist, concluded that the most appropriate way to graze the Lehmann lovegrass would be by concentrating large numbers of cattle for short periods on the pastures during the summer growing season and moving the cattle on a time control schedule to prevent adverse effects on the vegetation. It was also believed that such a grazing system could also significantly increase the ranch calf crop. This was a decisive factor in implementation of the grazing system.

The Mesa Pastures and Calf Crops

As typical of much of the Southwest, more forage growth on the ranch occurs during the summer rainy season. Little growth occurs in the late spring and early summer. The months of May and June (and sometimes early July) are especially dry, and during this time cattle subsist primarily on dry perennial grass of the previous summer. Even Lehmann lovegrass is usually dry at this time. Because of this pattern, cows may not be in optimum breeding condition during the dry period. Also, the high temperatures of early summer may affect bull fertility. These factors result in some cows still being open by mid July.

It would be expected that practically all open cows would be bred in late July and August after new growth resulting from the summer rain had restored their condition. In reality, a significant number of cows have remained open after the summer rains. It is believed that this occurred because the summer rains put temporary water in every canyon and rocky draw and as a result, cattle no longer watered at central points. This abandonment of water along with the cool rainy weather caused cattle to scatter over the ridges and canyons of and, as a consequence, a bull might not be near a cow during the average of 16 to 24 hours when she is in estrus even though there is at least one bull for 15 cows and the bulls used are mostly young.
aggressive Barzonas adapted to the rough rocky terrain.

The Mesa Lehmann lovegrass pastures offered a means to concentrate bulls and cows in a small area and thus increase the number of open cows bred during the optimum breeding period in August. The described grazing system addresses both the problem of Lehmann lovegrass utilization and that of open cows after the summer breeding season.

Each year in August, approximately 150 to 200 cows are placed in one of the Mesa pastures with about 14 bulls. Yearling heifers, cows with very young calves, and obviously pregnant cows are excluded. The herd is then grazed in each of the three pastures for between five and ten days depending on the size of pasture, rate of growth of grass, observed utilization, and plant response. The cattle are held in the Mesa pastures for at least 22 days to allow every cow to come into estrus at least once while the cattle are concentrated. The cattle are removed not later than the 25th day to allow ungrazed growth in the latter part of the growing season. Each year the order of placement in pastures is alternated on a rotation basis. If forage production is subnormal, fewer cattle will be run or if rains are late the placement of cattle in the pastures may be delayed.

This simple time control system has been implemented using existing pastures with the only additional expense being 10 man days of extra riding. The system is coordinated with the rest-rotation system in use on the remainder of the ranch.

Results of Grazing System

The time control use of the three Lehmann’s lovegrass pastures on the Mesa has resulted in the following benefits:

1. Lehmann lovegrass plants are grazed more evenly under the heavy grazing for a short period. The number of large coarse clumps are reduced and the number of individual plants increases. These plants are fine stemmed and more palatable. The increased number of smaller plants may also be due to the trampling of seeds into the ground.

2. The time control and non-use at the beginning and end of the grazing season allows both the native species and the Lehmann lovegrass sufficient rest from grazing to replenish root reserves and maintain vigor. In spite of heavier selective grazing, the density and vigor of desirable native perennial grass species have not diminished in Lehmann lovegrass pastures where they had occurred prior to Lehmann reseeding. The percentage of sideoats grama has actually increased.

3. Placing cattle on the Mesa pastures at the height of the grazing season facilitates the rest rotation system on the remainder of the ranch by reducing the summer use in the rotation schedule. This has contributed to the upward trends in range condition on most of the ranch.

4. The concentration of bulls and cows in the Mesa pastures for at least one estrus cycle has increased calf crops by at least ten percent.

Conclusions

1. Measures such as soil ripping, mesquite control and seeding are expensive and might not be practical for large areas. However, the Cumming ranch programs have shown that treatment of selected small areas (five percent on the Cumming ranch) and the implementation of appropriate grazing systems can have major implications for the entire ranch for both range management and profits.

2. Simple time control grazing systems can be implemented cheaply using existing pastures and these systems can be coordinated with rest rotation systems. Time control seems to be especially effective for the Lehmann lovegrass.

3. Because of the range management programs, supplemental feeding is unnecessary in most years and none was provided between 1980 and 1988. Calf weights have approximated those of ranches which practice supplemental feeding. In 1986 and 1987 the weights of seven- and eight-month-old steer calves sold in December averaged about 500 lbs.

Supplemental feeding in May and June would probably improve calf crops but it would also interfere with distribution of cattle in rough pastures and would add additional expense. It is felt that the concentration of cattle under the time control system increases calf crop enough to compensate for lack of feed supplement to cows. Supply of minerals, including dicalcium phosphate, during the entire summer is probably desirable.

4. Lehmann lovegrass, if used properly, can be an asset to a ranch. It provides a high volume of forage and often remains green in the fall and spring when native species are dormant. Some spread of the grass has occurred on the Cumming ranch but such spread seems limited to certain sites and it does not appear to displace vigorous stands of native grass.

Future Directions

1. The range condition of the Mesa lovegrass pastures will be carefully monitored and the spread of Lehmann lovegrass observed.

2. Grazing systems may be altered as necessary. One modification already planned is occasional summer growing season rest and spring or fall time control use of the Lehmann lovegrass pastures.

3. Periodic burning of the Mesa lovegrass stands should probably be done in the future. Burning should kill mesquite seedlings and undesirable half shrubs such as burroweed and snakeweed. It would also reduce ungrazed material in the older clumps that reduces palatability. Since burning eliminates much of the litter, it should not be done more often than five year intervals.

4. At some point in the future additional soil ripping may be desirable if the increased soil permeability from past ripping should diminish.

Literature Cited
