

Range and Livestock in Tropical Savannahs of British Guiana

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IT is common knowledge that the world's largest expanse of tropical forest occurs in the interior of South America. It is a less well-known fact that this great tropical interior also contains many millions of acres of grassland in Venezuela, Colombia, Brazil, and the Guianas. It is an area of monotonously hot weather near the equator at elevations of only a few hundred feet. Rainfall is seasonal in character with a wet season and a dry season, both of which are likely to be extreme.

This discussion is devoted to the savannahs of the Guianas, which differ from the other grasslands of the tropics only in detail. Guiana savannahs are in fact an extension of the savannahs of Brazil and the plains of the upper Orinoco in Venezuela.

The tropical grassland is generally stocked with cattle. Yields of beef are now very low due to a number of factors including poor quality animals, nutritional deficiencies, poor ranch facilities, and lack of transportation. However there is definite evidence here and there that a satisfactory beef production can be attained.

NATURE AND TYPE OF THE SAVANNAH

The Guiana savannahs lie principally between 300 and 600 feet elevation. Temperatures are uniformly hot throughout the year but not excessively so, rarely rising above 100°F. The wet season, or period of heavy precipitation, is from April to September. Rainfall varies from 60 to 70 inches annually of which 65 to

90 percent comes in the wet season. Extremes of rainfall are as important as the average and a range in annual precipitation has been recorded of 40 to 100 inches. Any comparison however of these figures with the rainfall of temperate zones is of doubtful value because of the difference in conditions. There are periods of six months in drouth years without effective rainfall. A much shorter time than this produces drouth conditions that may be severe in the savannah uplands. It is obvious then that the vegetation must be able to endure extremes of wet and dry cycles.

The savannah grasslands occasionally occur near the coast, intermingled with the forest or "Bush," as it is called in the tropics regardless of size of the trees. Savannahs increase in area toward the interior and are continuous except for stream courses and isolated mountain areas in the part of the interior known as the Rupununi savannahs in Guiana. The same savannah extends over a large area in Brazil on the Rio Branca, a tributary of the Amazon.

The origin and development of these grasslands present some interesting problems for speculation and study by ecologists. It seems most likely that they are carved out of the forests by a combination of drouth and fire. Fire was common before white settlement and has increased since that time.

The long dry season is not favorable to trees but does not prohibit their growth. However this is certainly a major factor in the dominance of the grassland. The

relatively infertile soil, which has a low water-holding capacity, is a contributing element that retards a return of forest.

The line of demarcation between forest and grassland is sharp and distinct. This would appear to be due to fire that does not invade the lush green tangle that makes up the Bush along streams and mountains but that makes short work of any isolated seedling from the Bush that attempts to invade the grassland. There is now a slight but definite trend toward encroachment of the savannah into the Bush, which is unquestionably due to fire. There is also evidence that this trend may be reversed under some circumstances.

The savannahs are, as the name implies, not entirely devoid of tree cover. The most common tree is a small scrubby plant called sandpaper tree (*Curatella americana*) from the rough surface of its large leaves. This tree rarely grows more than 15 to 25 feet tall and is well adapted to survive drouth. It is quite resistant to fire although the seedlings and young plants are often killed in burning the grass cover.

There are two principal variations in the savannah resulting from the undulating character of the terrain. One is the lowland subject to flooding in the wet season, and the other is the upland that is never subject to prolonged flooding. The nature and character of the plant cover of the two sites is radically different.

The lowlands or swamps are under water during most of the wet season. There is a gradual drying up with the onset of the dry season until all but the lowest parts are dry on the surface and there may even be drouth effects. Prior to introduction of cattle and horses, the swamps were soft and spongy and could not be crossed much of the time. The constant trampling has now resulted in compacting of the soil so that they can

generally be traversed by livestock even when covered with water. The vegetation is grass and sedges that can endure this situation. The grasses are *Andropogon*, *Paspalum*, and a few others, together with many sedges and rushes that grow tall enough to project above the water. They are coarse and harsh, and generally not grazed to any extent except when young shoots can be reached. Consequently fire has been common here as well as on the upland to make the young growth available to grazing livestock. When the water recedes, a number of other species appear. Some of these are annuals that come from seed. Some are perennials that come from either dormant rootstocks or have managed to survive by maintaining a few green leaves floating on top of the water. Most of this group root from the nodes of the stems and spread over the ground quickly forming a sward of fairly palatable grazing after the water recedes. *Paspalum*, *Panicum*, *Thrysa*, and *Axonopus* are the principal grasses of this group.

There are a few species, such as wild rice (*Oryza perenne*), that have almost completely disappeared. This is a large coarse grass that is palatable and that can endure extremes of flooding. It was probably never the principal grass but was formerly more common than at present. Other grasses that have decreased in the swamps are *Pennisetum*, *Manisuris*, and *Sorghastrum*.

The uplands are an entirely different situation (Fig. 1). The dominant grasses are coarse and harsh, although much smaller than the swampgrass dominants. The principal species is *Trachepogon plumosus*, which is quite a remarkable grass. It may be found in flower at all seasons but produces its principal seed crop in November and December. It has a sharp twisted awn that is quite unpleasant for travelers because of its

ability to work its way through clothing. It is grazed fairly well when young but soon develops a harsh leaf and stem and is not then grazed readily. In the more sandy areas it may grow in a nearly pure stand, but is usually associated with other grasses. A species of *Andropogon* is the dominant on localized areas, which is

Sedges also are common on the upland. There are comparatively few weeds and shrubs although there are several species present, especially during the wet season. Some of these are evidently grazed fairly readily. They are more susceptible to fire than grasses and fade out rapidly after the end of the wet season.



FIGURE 1. Typical savannah upland. Building is ranch outstation or line camp. Bunchgrass is *Trachepogon*.

also not highly palatable. These two make up 90 percent of the grasses in much of the upland and are rarely less than 75 percent of the total weight. There is an undercover of smaller grasses of *Paspalum*, *Axoponus*, *Panicum*, *Mesotetum*, and related grasses, which are often different species of the same grasses that are found in the swamps. These make more palatable forage and consequently have probably been influenced by grazing. However fire is by far the dominant influence in the upland plant cover. There may once have occurred species that no longer appear at all.

LIVESTOCK AND GRAZING

The upland soils vary from a grey sand to brown sandy loam and are subject to excessive leaching during the high rainfall of the wet season. The deficiency of calcium and phosphorus is severe enough that it has not been possible to successfully raise cattle on upland alone. Failure to recognize these limitations has led to proposals to greatly increase the stocking of the savannahs, which are not at all warranted until this problem has been solved. The lowland and swampy areas hold the water for some considerable period and contain more silt, are

not as much subject to leaching, and have accumulated more of the precious mineral elements. The limited number of analyses made indicate a deficiency even on these lowlands but it is less severe than on the uplands.

Original introduction of cattle in the tropical grasslands was made by early explorers. The first cattle in the Guianas came from these herds well over a century ago, but grazing on the interior savannahs has been an industry of consequence for only 40 to 50 years.

tial numbers of cattle alone would have no meaning.

Original herds were little better than wild cattle and even now are under inadequate restraint or control. Inbreeding is common and has not helped the quality of the animals (Fig. 2). Ranching practice is crude, without fences to control and regulate activities of the cattle. Losses are heavy from a variety of sources including predators, calf crops are low, and animals mature slowly. At present the average steer at five years of age

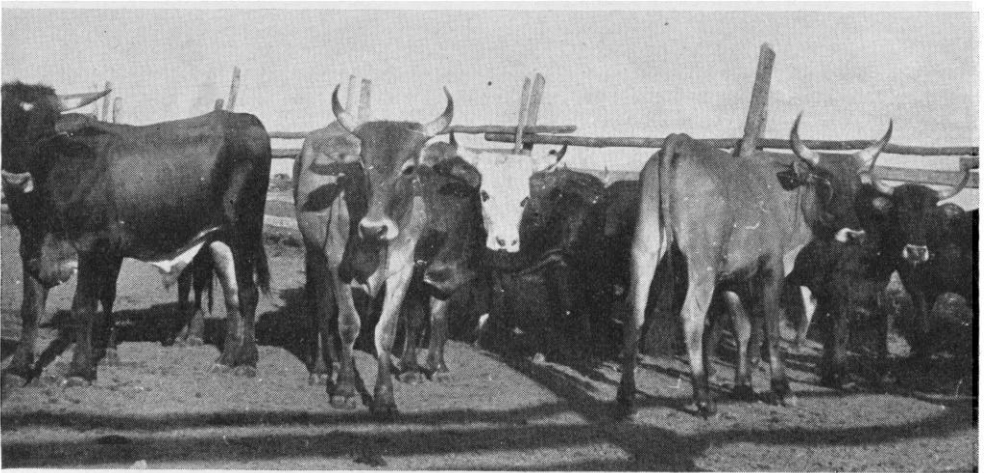


FIGURE 2. Typical savannah steers. Cattle are of light frame and rangy, but are clean boned and of smooth conformation.

The early cattle were Spanish origin, light framed, and slow maturing. However so long as numbers of cattle were low, they thrived and were free of plagues disease problems. As soon as herds increased beyond the capacity of the lowlands, the quality and health of the cattle degenerated. The present rate of stocking is 15 to 20 cattle per square mile. This is little more than the lowlands will support. The ultimate potential grazing is so interrelated to the correction of deficiencies and with improved management facilities and practices that an estimate of poten-

weighs 800 pounds although a few in more favored locations as to soil mineral content reach considerably greater weights.

Cattle raising in the wet areas of the tropics has a handicap of disease and parasites although this is not nearly so formidable as has sometimes been thought. Animals develop a remarkable tolerance to the local ailments. Modern science is developing treatments and preventive measures although the work done on specific tropical problems is much less than in the temperate zones, and hence the difficulties are not as well

solved. As a matter of fact the herds in the savannahs were pretty well free of any serious disease problems until comparatively recent times. Ticks are common but not particularly severe. Tick fever is endemic but causes little mortality, although losses in general health and weight of cattle are probably of consequence. Foot and mouth disease has not gained a foothold generally. Many of the diseases of the temperate zone have not occurred at all. Screw worms are a problem and unquestionably do occasion some loss though not generally regarded as severe. Flies of several kinds and mosquitoes are a source of considerable annoyance especially in the wet season.

RANCHING AND ECONOMIC PROBLEMS

The ranching industry has experienced a great deal of difficulty in its development. The area is generally isolated and difficult to reach. Transportation is a serious problem. Waterfalls interfere with river transport. Highways and railways are non-existent, and cost of construction through the forests and swamps is well nigh prohibitive. In the early ranching period there was no way to reach the Guiana coast with cattle and no market at all except in Brazil where demand was uncertain and values low.

The market to the Guiana coast was opened with the development of a cattle trail through the forest just at the end of World War I. The trail was very difficult to traverse, particularly in its early years because of the swamps and long distances without feed in the tropical jungles. Losses were extremely heavy and profits small if there were any. This trail is now somewhat improved and death losses are not great but weight loss is severe and only the strongest and most rugged cattle can hope to make the trek. During the depression years of the thir-

ties, cattle scarcely paid the cost of driving them to the market. Ranching has been a moderately profitable undertaking since the more favorable markets during and since World War II.

Since the close of World War II the country has been opened to air traffic. With some aid from the Colonial Government, landing fields have been developed and regular traffic by the Guiana Airways Company established. Beef is now flown out to coastal markets in some quantity. However the cost of this airlift is very high. While present beef values are not high, the airlift is succeeding because the present production costs are very low. It has, however, only partially replaced the difficult and costly trail.

Cattle ranching is carried on with a low capital outlay, but the returns are also low. There are many problems in the transition from the current operation to highly efficient beef producing units.

The problems to solve are only partly contained within the industry. There is a lack of understanding of the industry and its problems by the government. The ranching industry represents only a very small fraction of the population and is not well enough united to be effective in making its needs felt. Ranch operating and marketing facilities are inadequate. Finances are not now available to make needed adjustments. Land tenure is a major problem. The British savannahs are Crown lands operated by the ranchers under a lease. The leases now cost very little but give no satisfactory guarantee of tenure. The ranchers do not feel justified in constructing ranch improvements without more assurance that they will not be dispossessed in favor of native Indians or new settlers.

As in other parts of the Americas, there are a few outstanding characters who figure most prominently in the develop-

ment of the savannahs. The grazing industry was developed and the first markets to the coast established largely by the foresight and courage of a Scotch trader who was able to visualize the commercial potential. The ranch established by this trader has passed into the hands of a corporation. This corporation has been very influential in the promotion of ranching and marketing, chiefly through the interest and activity of its manager, who has pursued his task with great energy. A limited amount of improvement in ranching methods and breeding has been carried on by this concern in spite of tremendous physical and financial handicaps. The local air line is a factor in the economy of the area. Although regular air traffic is recent, the influence on the area is great. Its manager has applied himself to aiding in the problems of the savannah for many years before the task of establishing regular air service was accomplished.

RANCH IMPROVEMENT PROBLEMS

A better quality of livestock is a primary need. A few Hereford bulls were brought in after overcoming great difficulty in transportation shortly after World War I. Zebus or Brahmas were also imported. The crossing of these breeds appears promising. Economic considerations prevented this improvement from being maintained through the depression of the 1930's. The results, while remarkable considering the difficulties and problems involved, have not greatly influenced the cattle breeding. Importations of breeding stock are again being made and breeding of better animals is underway as a modest beginning. A combination of European and Brahman is usually accepted as the most desirable breeding for improving the native cattle.

The savannah grasses are quite deficient in minerals, particularly calcium and

phosphorus. These deficiencies must be corrected in some measure before it is possible to accomplish much in livestock improvement. However minerals must be transported inland at great expense, and this makes their use subject to very close scrutiny. Cattle have not been fed common salt up to this time. While addition of salt and mineral supplements can be expected to materially increase meat output, a herd could easily consume more of these products than the present value of the beef produced. A five year old steer will buy less than 500 pounds of salt and mineral. The steer could consume a major part of this amount himself in reaching that age if fed free choice. Ranchers cannot be blamed for being cautious and hesitant to initiate wholesale feeding of the supplements although there is a growing recognition that a program of feeding these supplements on some basis must be worked out.

The question of seeding the savannah to more palatable and nutritious grasses inevitably arises. "There ought to be a grass to plant" is a common remark by visitors. The answer to that question is not a simple one. There are grasses adapted to the tropics which would be a great improvement on the native grasses. Some, as Guinea grass and Para grass, are widespread in the native cover in some sections of South America. Ranchers have made seedings of these and others in small trials. The results indicate success only when fertilized or in a few selected sites. Seeding of small selected areas for special purposes is probably a practical procedure.

Draining and seeding of swamps should improve the forage materially. However drainage possibilities are limited chiefly because there is no practical way to dispose of the excess water for a high percent of the swamps.

Introduced grasses would partially solve the problem of palatability. Some are more productive than most of the native species, but native production is high enough to be reasonably satisfactory. The major problem of mineral deficiencies would not be corrected by new species but only by application of fertilizers. Present indications are that grasses that would make any appreciable improvement require fertilizers. The high cost of application and low value of cattle makes this prohibitive at present.

It is quite possible that tame pasture and hay grasses will eventually become a major phase of ranching. This can come only with cheaper transportation and development of management facilities for the more intensive type of ranching which will be required to handle this type of operation.

The high percentage of relatively unpalatable grasses in the plant cover, the need to protect the more palatable species, the tendency to graze only young, immature plants which requires occasional relief from grazing to permit recovery of grazed plants, all suggest rotation and deferred grazing as an essential measure in the solution to satisfactory use of range.

This means fencing. Fencing is also essential to effecting satisfactory herd control for an improved livestock management program. Fencing is also needed to control breeding animals to make most effective progress in improving the quality of livestock with limited importations of breeding stock. It may be practical to feed minerals on a restricted basis, which will require fencing to control their use and consumption. The average four or five year old steer can be exchanged for about 200 pounds of wire when transportation costs are included. Thus fencing is costly and will likely be installed slowly,

but this will to a considerable extent measure progress in improvement.

An additional factor in improvement of range requires checking of the unrestricted burning of the vegetation. Occasional burning may have merit in simplifying grazing use, but the present practice of firing simply because grass will burn can only be wasteful. This is a difficult correction to make because the practice is deeply rooted in the life of the native Indians, who resent any objections the ranchers may raise to their setting grass fires.

The various problems to increased beef output must be met pretty much simultaneously. Livestock quality needs to be improved but cannot be accomplished satisfactorily except as the mineral deficiencies are corrected. To make either of the above profitable, it is essential to have better control and management facilities to help reduce the heavy death losses and generally give the livestock better care. Financing is required from either government or private sources. Improved market facilities are necessary.

The one factor that could be expected to produce rapid enough change to be revolutionary is in transportation. If a rail or truck road could be developed, the cost of shipping livestock out and materials needed into the area would become only a fraction of the present expense, and would be of tremendous significance in changing the area economy. This possibility appears remote at present because of the excessive cost. The indications are that a moderate rate of development is all that can be anticipated. The possibilities of improving the range and of increasing the actual meat output are great, given an orderly development of the needed improvements and ranching practices.