Ranching in Panama[1]

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Highlight

Grass and cattle are an important part of Panama agriculture. Ninety percent of all grassland contains one or more introduced grasses. Brush control, fire control, and improvement in grass and livestock management are major problems. Cattle are grown and finished for market on grass. Low calf crops, disease and parasites, poor dry season feed conditions, and low-quality animals result in a generally low beef production per cow. Improved grazing practices and sound livestock management will result in higher calf crops and increased beef yields. Potential exists for a sound and economically profitable ranching enterprise.

La Ganaderia en Panama

Resumen

Los pastizales y el ganado son una parte muy importante de la agricultura de Panamá. El 90% de las tierras de pastoreo contienen una ó más especies de gramíneas introducidas. El combate de arbustivas, el control de las quemas, y el mejoramiento tanto de las plantas forrajeras como del ganado son de los problemas más importantes.

El ganado se cría y se engorda para el mercado en los potreros. Los bajos porcentajes de parición, las enfermedades y los parásitos, el bajo valor nutritivo de los forrajes durante las épocas de sequía, y los animales de calidad inferior traen como consecuencia, por lo general, una baja producción por vaca. Mayores porcentajes de parición y aumentos en el rendimiento de carne podrán lograrse mediante prácticas de pastoreo mejoradas y un manejo adecuado del ganado.

La ganadería en Panamá ofrece un buen potencial para establecer empresas remunerativas.

Panama is best known as the narrow strip of land which connects the two Americas, and as the location of the strategic Panama Canal which makes events in this area of worldwide importance. Panama is a small country some 400 miles long and 40 to 150 miles wide. It is bisected by a mountain chain only about 200 ft high at the lowest point, rising to 11,000 ft at the high point near the Costa Rica boundary. Temperatures are tropical except where elevations act to moderate the heat. Precipitation is from 1,000 to 5,000 mm annually, with a dry season of 100 to 130 days. Rainfall is adequate

[1] Information compiled by the author while employed by International Engineering Co., San Francisco, California, servicing the Agrarian Reform Project in Panama.

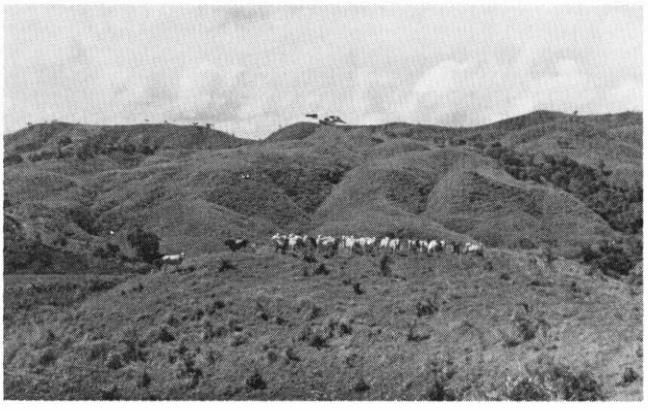

FIG. 1. Much of the grazing land in Panama is on steep slopes, where forage production is often high. Cattle graze readily on very steep lands.

to abundant in the wet season and drouth is frequently severe in the dry season. Precipitation is higher on the Atlantic slopes but this discussion is limited to the populated areas along the Pacific slopes and the vicinity of the Canal.

Cattle in Panama are grown and finished on grass with little or no supplemental feed. Grass is a major land use but a considerable percentage of it is derived from tropical savannah and from clearing tropical forest. Much of the land is not suited to crops and cultivation but is maintained in satisfactory condition in either forest or grass when supported by correct practices (Fig. 1).

Cattle and grassland not only provide a sound land use but also provide employment and subsistence for comparatively large numbers of people, as well as an important contribution to the national economy.

The Pacific coast has always been the principal area of habitation. The alternating wet and dry seasons offer a much more pleasant and healthful climate and well-adapted to production and harvesting of crops.

Ecology

Considerable variation occurs in rainfall and temperature and there is a corresponding variation in soil and vegetation. Space does not permit a complete treatment of the area ecology but it is evident that the natural or climax vegetation is determined by the length and severity of the dry season as well as by the amount of precipitation. Tropical forest is the most extensive plant formation with variations from a low but dense scrub, to a tall four-story rain forest, although the rain forest is outside the area of this discussion for the most part. There is no question that plant cover has been greatly influenced by man in the inhabited sections and many plants now found are indicators of man's treatment rather than an index of natural vegetation. Some species, of which a scrub tree, *Curatella americana*[2], is the best example, prefer open sun and are resistant to fire, grazing, and other acts of man. These are now apparent dominants in localities where such plants would not occur in the natural vegetation. Precipitation of about 2,500 mm produces tropical forest with a dry season of 100 to 120 days.

There appears to be adequate basis for accepting savannah as the natural vegetation on upland soils in the 1,000 to 2,500 mm zone of precipitation where the dry season is severe. The deep alluvial soils have a forest climax in the most arid climate found in Panama.

The savannah vegetation is typical tropical savannah. *Curatella americana* is probably the most common scrub tree, often called sandpaper tree because of the large rough leaves, but is called chumico locally. *Anacardium occidentale* or Cashew nut, *Brysonima crassfolia* or nance, and a number of other xerophytic species are common. Xerophytes are represented in grasses and sedges by one or more species of such genera as *Trachypogon, Muhlenbergia, Aristida, Andropogon, Paspalum, Scleria, Bulbostylis,* and many others.

Seeding of exotics, brush control, and other treatments are applied on grassland regardless of original plant cover, and most grassland has scrub brush in the cover. Consequently the boundary between true forest and savannah is essentially of academic interest except as a question of competition of land use arises. The land suitable for cultivation is limited, the relative competitive position of cropland and other uses is not to be explored here but obviously cultivation is a high priority use when soil and topography are suitable. An extensive area of savannah and scrub forest is more useful and productive in grass than in trees except under intensive treatment not found in current tree culture practice in Panama. Both forest and grassland use are suitable uses for resource conservation when supported by correct treatment.

Native Grazing Plants

Some of the native grasses are excellent forage but many of the dominants are coarse harsh bunchgrasses of low palatability. Representative dominants on good upland sites are *Andropogon bicornis, A. angustatus, Paspalum virgatum, Panicum grande, Manisuris aurita, Setaria tenax.* The dominants on shallow arid sites include *Trachypogon secundus, Andropogon leucostachys, Axonopus aureus, Muhlenbergis emersleyii, Paspalum humboldtianum, Aristida tincta.* Wet land dominants include *Paspalum virgatum* and numerous sedges

[2] Identification of grasses and forbs principally by Florida State University, with a limited number by the author after Swallen (1943). Tree identification by Forestry Division of Panama Dept. of Agriculture.

and rushes. The habitats of these grasses are intermixed and overlap into both wetter and drier sites. Some species of *Paspalum* are common intermediate grasses. *P. plicatulum* is the most important of these and grows on practically all sites but is seldom a dominant on a sizable area.

There is an important understory of shorter grasses that fill in the interstices even on arid sites. Density is normally very high on all sites and any openings in the grass cover are a sign of depletion. Understory grasses are often stoloniferous or rhizomatous or both. *Axonopus compressus* and *Homolepis aturensis* are the most common on all but the very wet and very dry sites. Other common grasses are *Paspalum notatum, P. multicaule, P. conjugatum, P. pilosum, P. microstachyum, Panicum polygonatum,* and *Erogrostis maypurensis. Bouteloua repens* and *Axonopus purpusii* are common on arid sites and often form a sod under misuse, providing good grazing but low in productivity.

Sedges occur frequently on all sites. *Dichromena cilatus* (ojo del gato) is the most frequent and grows in all grassland but has little grazing value. *Cyperus, Fimbristylis,* and *Rynchospora* are common genera. *Bulbostylis* and *Scleria* are usual on arid and sandy sites. *Eleocharis* and *Equisetum* are frequent on wet land sites.

Shrubs and forbs do not make a significant part of the plant population in high condition grassland. *Mimosa albida* is a small creeping shrub that is nearly always present in grassland and may increase under misuse. It is sometimes grazed and is considered toxic. Species of *Heliconia* and *Sida* are shrubs 4 to 10 ft tall which readily invade grassland when there is any appreciable loss of the tall grass. When these shrub species gain a foothold they usually overtop the grass, and become dominant unless checked. These are nurse cover for trees and other shrubs and often eliminate grass. The land reverts to brush of doubtful value although good forest will reclaim favorable sites rapidly.

Introduced Grasses

Questionable value of many native dominants led to early efforts to improve the forage by introducing better grasses. Remarkable success has been achieved and much improvement in forage quality and yields has been obtained from exotics that have been established. Earliest introductions date back more than a half century in some localities. Some of the same species are major components of grasslands in neighboring Costa Rica and may be the source of the seed. The use of improved seedings is more recent in other sections of the country and has occurred in the past 25 years.

Melinis minutiflora (calingueiro or molasses grass), one of the first introductions, thrives in intermediate elevations and is a dominant on steep hills including areas too rough for grazing. It is fairly good forage but does not endure heavy trampling well.

FIG. 2. Faragua (*Hyparrhenia rufa*) is the most important grass in Panama. It is a tall grass readily attaining heights of 6 to 9 ft.

Panicum purpurascens (Para grass) is widely used on low, wet lands. It is six to ten ft tall and produces heavy yields. It is good forage and well suited for land too wet for most good forage plants.

Panicum maximum (Indiana or Guinea grass) is a tall coarse grass well adapted to deep soils and requires good moisture situations. It is reasonably good forage but the large coarse bunch presents a utilization problem.

Hyparrhenia rufa (called faragua in Panama or jaragua in most of Latin America) is a tall high-yielding grass adapted to shallow soil in all but the most arid situations in Panama (Fig. 2). It is the most widely used grass in the country and is the backbone of the grazing industry. It has problems in use but is reasonably good forage.

Pennisetum purpureum (elephant grass or Napier) is a good performer but requires abundant moisture to produce well and is not well adapted to the most arid lands in Panama.

Pennisetum clandestinum (Kikuyu) is the only sod grass of the exotics. It is adapted to elevations of 4,000 ft and higher and is the most common grass in the limited area of high elevation grazing land.

Digitaria decumbens (Pangola) is a recent introduction, but is very popular. It is palatable, yields well, and is high in protein. It is demanding in its requirements for moisture and fertile soil and must be regarded as restricted in its adaptation. It is essentially a cultivated grass.

A number of other grasses are now used in limited acreages and in a few localities. Still others are in process of trial and show promise. All those

in use have important limitations but also have decided advantages and may be expected to be in common use for the foreseeable future.

It is too early to evaluate exotics in relation to native grass. Some as faragua, calinguiero, and Kikuyu have demonstrated ability to invade adjacent native stands under a variety of conditions. This is of perhaps less importance than in many places because most grassland, whether from natural grassland, savannah, or developed by clearing forest, has been seeded. Seeding is not difficult and stands are normally fairly easy to establish. Census reports indicate 90% of the grazing land in use has been seeded to one or more exotic species. The same understory of short and intermediate grasses is present, or develops in a short time, on land seeded to exotics as is found on good condition native grassland. A dense stand of exotics is not susceptible to invasion by brush in any quantity and will remain dominant as long as it is given correct use. Brush will invade the more susceptible areas where there is even a brief period of overuse.

Brush and Fire

Natives hacked away at brush and forest and burned it to make fields for crops for centuries. A few years of crops followed by abandonment brought a return of the forest and a renewal of the soil resources. A much more frequent and intensive application of cut and burn brings grassland and this has occurred in parts of Panama. The process is aided by seeding but undesirable brush species are not destroyed by this process. Topgrowth may be killed but rootsprouting follows and brush maintains its foothold. Recutting is necessary at intervals, followed by fire to destroy the residues. Some brush may be reduced on the surface by fire without cutting but the two processes are applied together for satisfactory control. This is a laborious and expensive operation, but where brush is a problem; failure to apply control means that any brush present will overtop the grass and soon becomes dominant.

Cutting well below the soil surface probably will eradicate the brush but rocky terrain and lack of suitable equipment prevent widespread application of this method. Chemicals offer the most promising results but require much more trial work to be effective.

Grassland is burned frequently in much of the country. Whether it is grazed appears to make little difference and custom must be considered as the basic reason for much burning. Fire is helpful in disposing of the residues which accumulate and some believe it helpful to grass. Organic residues in burned materials are released and are readily used by new growth; they are as readily carried away by erosion which always take toll after a fire.

A few more advanced and successful ranchers do not practice burning. The Department of Agriculture has started to work on the problem and has issued regulations which represent progress, although these are not nearly adequate for the needs. There is need for appraisals of values, detriments, alternatives, and a program of research and mass education to deal with the problem of fire.

Grazing Management

Correct use of grass is a problem here as in other areas of the world where range and pasture grazing is applied. Overgrazing is common and sometimes severe, although there is much grassland that is not subjected to heavy grazing. There is a surprisingly good understanding of correct use by the local users including many of the small operators.

Tall grass is very susceptible to depletion by any type of misuse. Continuous grazing will require maintenance of a height of 20 inches of ungrazed residue. This is conducive to spot use and is difficult to maintain when needs for dry season reserves and variation in growth rates are considered. Rotation grazing is a practical solution and the only one that has been developed to date. Many ranchers prefer to permit a height growth of about four ft, followed by grazing the stubble as short as practical depending on the species. With this system natural seeding will usually be adequate and the plant vigor is maintained.

A short grass cover is not only much less productive but is difficult to maintain because when there is adequate light near the ground, invasion of undesirable plants is serious.

Grazing lands are productive and carrying capacity is high. The national census shows an animal unit population of a grazing animal on a little less than a hectare (2.48 acres). A cow per hectare is a widely quoted rule of thumb. Normal upland tall grass with 80 inches rainfall will support a cow/ha with proper grazing use; 1.25 ha may be needed on the lowest rainfall and on poor soils. A sizable acreage of mountain grassland is of no significant value for grazing because of rugged terrain and low quality forage. Wetland in Para grass, fertilized Pangola, and grasses on high rainfall mountain land or irrigated land may support three to four animals/ha.

Ranch improvements are usually modest. Fences are nearly always adequate to carry out a rotation grazing plan and to permit good livestock management, although not always located to take advantage of terrain for good distribution of grazing. Cropland is not always fenced and poses a problem in control. The ephemeral nature of cropping practices in areas of slash and burn and abandonment in a few years increases the difficulty of protecting cropland.

Many do not have title to the land occupied and

FIG. 3. Steers fattening on Pangola grass on alluvial land in the dry season. Moisture is adequate here for good growth of this very palatable grass.

occasionally conflicts arise. Ownership is a major problem in many localities where people have occupied the land for generations without title. Efforts are now being made to correct this situation to transfer title to legitimate users.

Livestock water is not a problem in the wet season but is a major deficiency in many localities in the dry season, often resulting in moving animals considerable distances to find water. Grazing land is at a premium along permanent streams and over-grazing is a frequent result of scarce water supplies. In much of the area the solution is in wells or surface ponds which would be entirely adequate for the relatively short period of inadequate stock water.

There is little or no difficulty in distribution of grazing on the steep slopes common in Panama. Cattle seem to like the steep hills because of better air drainage resulting in lower temperatures and less insect pest activity. Soils on steep slopes are younger and may have a more favorable mineral content and there may be other factors.

Livestock Operations

The first Spanish settlers introduced cattle in the savannahs and added grazing acreage by clearing forests, making use of negro slaves and native slaves as labor. Ranching quickly became the principal agricultural activity. However, ranching was virtually static for centuries and livestock production at the turn of the century was low and quality of feed and animals was poor. Numbers of cattle have increased steadily from about 60,000 in 1903 to approximately 1,000,000 in 1965. Important factors in growth of cattle raising are increase in market demand, introduction of better forage grasses, improvement in breeding animals, and developments in disease and parasite control.

Cattle are grown and finished on grass (Fig. 3). The normal age of marketing is 30 to 36 months at 900 to 1,100 lb. Prices are controlled by the Federal Government and premature slaughter of lightweight unfinished cattle is discouraged by penalty prices.

Cattle are predominantly Brahman breeding but the crossbred Santa Gertrudis and Brangus are fairly common. There are a number of good purebred herds and the quality is improving rapidly in the commercial herds. There is room for a great deal of further herd improvement but quality is adequate for much better production than is now achieved.

Dairy production is locally important in some sections. Brown Swiss, Red Sindi, and Holstein breeding is usual for the dairy cattle. There are some well-managed dairies and many beef producers milk cows to supplement income and to provide employment for the labor force. Milk trucks have routes along most of the all-weather roads to collect milk. The surplus is processed as evaporated milk.

Herd improvement, higher calf crops, disease and parasite control, rigid culling of old and inferior animals, and correction of forage and nutritional deficiencies are some of the needs to achieve higher production per breeding cow and effect a needed improvement in the profit margins.

Calf crops are usually 50% or less with a few exceptions. Actual death loss varies but is relatively high. Loss from effects of parasites is greater than is usually recognized.

Breeding cows suffer from poor nutrition in the dry season and do not breed regularly as a result. An adequate supply of grass is important but does not solve this problem, because the dry grass is deficient in nutritive qualities. It can be solved by stored feed as hay or by green forage on irrigated or wet land. Many ranches have no wet lands of consequence for reserves and hay making is not practiced although it has definite possibilities. A controlled breeding season to drop calves at the end of the dry season or beginning of the wet season and weaning calves early in the dry season to enable cows to be carried through the dry season with the lowest demands on them will do much to correct the problem.

Mineral deficiencies are severe in much of the country. Phosphorous or calcium or both are lacking in most areas with the possible exception of some of the mountain grazing lands. Mineral feeding is a high-cost cash outlay many hesitate to incur but is showing excellent results on a few ranches which supply the needed minerals. Summing up, adequate grass of the best quality possible with reserves for the dry season, controlled breeding seasons, and weaning calves on schedule will result in more regular breeding cows and increased calf crops.

Protein deficiencies occur but do not prevent

high production. Imported protein feeds are too expensive to be feasible for general use. Legumes have not been developed to supply the need and native legumes are generally unpalatable.

Disease and parasites are virtually always serious problems where there are moist conditions in the tropics and the severity of the problem is not always recognized. Death loss is not severe except for outbreaks that occasionally occur. Loss in condition and in animal health and well being is less evident but is probably equally serious. The development in use of antibiotics and control measures for both disease and parasites makes it possible and feasible to correct problems in animal health. A few progressive ranchers have demonstrated the advantages of improved sanitation.

The application of improved husbandry practices together with rigid culling and a program of herd improvement will undoubtedly increase calf crops, reduce losses, and result in a much more vigorous and faster gaining herd and better performance by animals. The market yields of beef and milk can be increased tremendously. A program of mechanical and chemical brush control will greatly reduce the cost of treatment and lead to a reasonably permanent control.

Technical aid and sometimes financial help is a particular deficiency for small ranchers. Too often aid that has been available has been concentrated on large operators who are sometimes better able to respond but who also have less need for assistance. Progress is too often measured by mechanized operations and criteria suitable for a much more advanced agriculture than the present farms of Panama can be expected to handle. Native ranchers have acquired a surprising knowledge of the principles of grazing management and are eager to learn, although handicapped by local fears and prejudices. Specialists in grazing management are one important need that has been overlooked thus far. Both the land and its people have a potential for a much higher level of production if given correct direction.

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Two New Journal Features

Did you notice our new Journal feature in the May issue, p. 185–187? It is called "Viewpoints," a section for the statement of individual views on subjects of interest to range men—statements more complete than a simple letter to the Editor, but without the formal status of an Editorial. Editorial Board member "Hoop" Hooper suggested the idea. Your reactions are solicited.

The ASRM Board of Directors approved inclusion of a "Resumen en Espanol" for selected Journal papers, starting with this July issue; see p. 242 and 255. Initial translations prepared by Dr. Martin H. Gonzalez, of the Mexico Section in Chihuahua.

—*R. S. Campbell,* Editor