Beef Cattle Production and Range Practices in South Florida

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In 1521 Ponce de Leon brought cattle to Florida to supply his group of Spanish explorers with beef and milk. Since that time cattle have grazed the native range and, recently, the improved pastures in increasing numbers. A million head of beef cattle graze the 17.6-million-acre south Florida area alone (Fig. 1). This closely approaches the numbers of beef cattle that are found in Oregon, Wyoming or New Mexico.

The U. S. Forest Service recently has begun research on native range problems in south Florida in cooperation with other Federal agencies, the State of Florida and several private companies and ranchers. One first step has been the accumulation of information on beef cattle production and range practices, much of which is presented in this paper.

General Description of South Florida

South Florida is a flat to gently rolling country of sandy soils and abundant ponds and marshes. No point is more than 60 miles from salt water. The highest point is about 325 feet above sea level and most of the interior is from 25 to 100 feet in elevation. Much of the extreme southern part is known as the Everglades, an area of low, grassy swamplands inhabited by abundant wild life, and is of little agricultural value unless properly drained.

Only 12.8 percent of the land is publicly owned; the remaining 87.2 percent is privately-owned, often in large tracts. For example, almost two million acres of land are owned by five of the largest companies or individual land holders. Other ownerships from 25,000 to 50,000 acres are common. The principal endeavor on the large land holdings is beef cattle raising, with interest in forest management showing up on individual ownerships.

The climate is subtropical, although killing frosts may occur annually in the north half of the area, while killing frosts are likely to occur in half the years along the coasts and in the area south of Lake Okeechobee. Precipitation is highly seasonal with dry winters and wet summers. Annual precipitation for all U. S. Weather Bureau stations in the area aver-

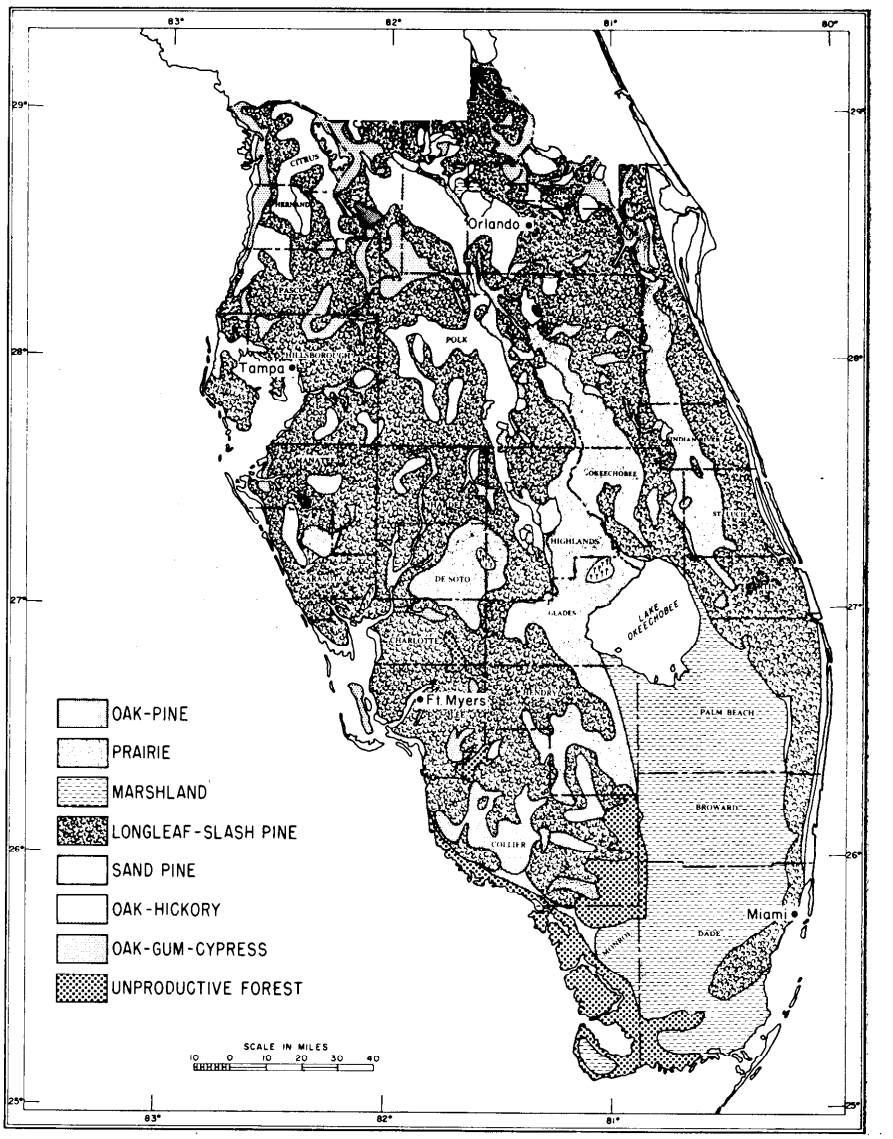

FIGURE 1. Generalized major vegetation types in the south Florida project area.

ages 52.86 inches. During the low-precipitation months beginning in late October and extending into May, many ponds and marshes dry up. However, with the onset of summer rains in June, these ponds and marshes fill, and by late summer many low-lying tracts of land are flooded.

In general, the soils supporting range vegetation are sands, low in organic matter, poorly-drained and moderately acidic. Soils of organic origin exist in the Everglades region and are used for truck crops, sugar cane, and improved pasture when properly drained.

The soils generally are deficient in nitrogen, phosphorus, potassium, calcium, and magnesium. In addition, certain soils also are deficient in copper, manganese, zinc and boron. Lime is frequently added to improved pasture soils to help correct soil acidity and as a source of calcium and magnesium.

The Range Resource

Approximately 11.2 million acres or 65 percent of south Florida's lands are grazed or grazeable. Of this amount, 10.2 million acres is native rangeland. The remaining one million acres has been improved by partial or total destruction of existing native vegetation followed by planting of a variety of pasture grasses.

A highly complex vegetation exists. During the summer of 1954, a total of 354 species of plants—all of which showed evidence of grazing use by cattle—were collected and identified. Among them were 147 species of grass and 77 grass-like plants. Forbs and shrubs are abundant but are less valuable for grazing than the grass and grass-like species.

Very little work has been done in classifying range vegetation into forage types, but Davis (1943) has provided excellent ecologic groupings, useful in delineating range types. In this paper, areas important for livestock grazing have been grouped into four plant associations, using material from Davis and information gathered by the U. S. Forest Service during 1954 and 1955. Vegetation on each of these associations is briefly discussed in the following sections.

FIGURE 2. Pine flatwoods ranges vary considerably. Some are fully stocked with trees, but most are cutover. Cattle obtain forage from forest ranges in all degrees of tree stocking.

Pine Flatwoods

Pine flatwoods cover about 5.7 million acres. They are spread over the north half of the area from the Gulf of Mexico to the Atlantic Ocean, and extend down each coast to the vicinity of Naples on the west and in a narrow band as far south as Homestead on the east. The timber overstory, though largely cut-over, varies from sparse to fully stocked (Fig. 2). Dominating the range aspect are saw-palmetto (*Serenoa repens*), grass species of the genera *Aristida, Andropogon, Panicum, Paspalum, Axonopus, Sorghastrum,* other grasses and grass-like plants, a number of weeds and a variety of shrubs such as gallberry (*Ilex glabra*), staggerbush (*Lyonia* spp.), huckleberry (*Vaccinium* spp.), paw paw (*Asimina* spp.) and runner oak (*Quercus* spp.).

Dry Prairies

"Dry" prairies or naturally treeless ranges cover approximately two million acres (Fig. 3). They are quite similar in plant composition to much of the cutover pine flatwoods with the exception that they do not support trees. They do have some cabbage palmetto (*Sabal palmetto*).

Wet Prairies

Wet prairies generally are found in the pine flatwoods on very poorly-drained and frequently flooded sites (Fig. 3). They are readily distinguished from the dry prairie and pine flatwoods types by scarcity or absence of saw-palmetto. A great variety of forage plants occurs within this forage type. In 1954, the Forest Service found in this type over 100 plant species which cattle had grazed. Among the common plants are longleaf threeawn (*Aristida affinis*), maidencane (*Panicum hemitomon*), lovegrass (*Eragrostis* spp.), beakrushes (*Rhynchospora* spp.), *Hypericum* spp., and corkwood stillingia (*Stillingia aquatica*). Grasses such as marsh hay cordgrass (*Spartina patens*) and hairawn muhly (*Muhlenbergia capillaris*) also occur.

Vegetational Types of Minor Importance

Oak-cabbage palm hammocks and oak-scrub types commonly occur but they are not of high forage value. Principal value of the hammocks is for shade and protection from cold rains and wind.

FIGURE 3. *Left*: Dry prairies are important forage producing ranges in south Florida. *Right:* cattle frequently graze wet prairies in the winter and early spring.

Forestry

Approximately 53 percent of the area is classed as forest land and most of this is used for cattle grazing. The land previously supported good stands of pine timber, but heavy logging since the 1920's, combined with a high incidence of wildfires and other fires set to burn off the "rough" for grazing, has left the forests in a severely depleted condition. In 1949, 86 percent of all commercial forest land and 94 percent of all commercial *pine* forest land was understocked with trees (McCormack, 1949 and 1950).

Forage production beneath mature fully-stocked forest stands is very low compared to the forage produced on range supporting only a few trees.

Shifting Agriculture

Truck crops are commonly raised in a shifting type of agriculture in south Florida (Fig. 4). In this system, range and cutover forest lands are cleared, cultivated, and planted to vegetables or other crops. After one or two year's use, the land is abandoned because of excessive competition from Bermuda grass (*Cynodon dactylon*) or disease problems. "Farms" containing from 60 to 320 acres are common. The abandoned lands are used for cattle grazing either as they are or after they are planted to Pangola (*Digitaria decumbens*) or other pasture grasses.

Wildlife

Quail, turkey and deer, the most important game species, live principally on lands used for livestock raising. Deer populations are low, however, with only 12,570 head reported in latest censuses by the Florida Game and Fresh Water Fish Commission.

Range Management Systems and Practices

Many south Florida ranchers with fairly well-drained land run cattle on the same range yearround without any system of pasture deferment or rotation. Some ranchers believe that cattle do better if rotated between ranges twice a year. Of necessity, other ranchers move cattle to higher pine rangeland during the late summer period, when extensive low-lying areas may be covered with 2 to 6 inches or more of water.

During the dry season cattle often make good use of forage growing in large sloughs or freshwater marshes. Frequently, the sloughs are a part of large pastures which contain higher, forest rangeland. The entire pasture may be

FIGURE 4. In south Florida's shifting agriculture farms are carved out of forest and rangelands, one or two crops raised, and the land abandoned to grow up to miscellaneous grasses and weedy vegetation. The dike bordering this farm is used for two-way water control—irrigation in the dry season and drainage in the wet season.

available to cattle yearlong, but the marshes are less heavily grazed during high-water periods.

Range burning is the most widespread tool of management used by ranchers on south Florida's native range and perhaps 30 percent of the total range area is burned each year. Burning destroys accumulations of dry grass and provides accessible green foliage for grazing during the winter and early spring (Fig. 5). Cattle tend to congregate on newly burned range during the winter and apparently obtain little forage from the unburned areas.

Most burning is done from November through February, though some begins as early as September and occurs as late as May. Some rangelands may be burned over every year but the more common practice is to burn a unit of range every two or three years. One deterrent to yearly burning is the fact that not enough dead organic material accumulates in one year to carry a fire.

Some ranchers practice a scheme of progressive burning to lengthen the period during which the native range grasses are palatable for winter and spring grazing. They may set their first fires in November; about the first of January they set another series of fires to burn additional grass; still later, perhaps in the middle of February, they set another and last series of fires for the season.

Under the commonly employed methods of burning, tree reproduction is frequently injured or killed. Flames from range fires often jump into crowns of large trees in the flatwoods rangelands. There are many advocates and some antagonists to range burning as practiced in south Florida. Many ranchers who utilize native range for most of their forage say they could not stay in business without the use of fire. Those who are forestry conscious deplore what sometimes seems to them a harmful practice.

Improved pasture plantings of appreciable size were first made in the mid-1920's when common bahia (*Paspalum notatum*) and carpet grass seed were imported. Argentine and Pensacola bahia (*Paspalum notatum* var. *saurae*), bermuda grass, Pangola grass, and St. Augustine (*Stenotarphrum secundatum*) now are among the more common improved pasture grasses on the estimated one million acres improved. Costs of establishment are high, ranging from $20 to $50 or more per acre, but an additional 3 to 4 million acres probably could be planted.

FIGURE 5. Uncontrolled grazing following a severe winter burn has resulted in excessively heavy forage utilization on this south Florida rangeland.

Of the many ranchers who use both improved pastures and native range, some may have native range and improved pasture accessible to animals at all times, while other ranchers rotate cattle between improved pasture and native range. Young brood cows are kept by some ranchers on improved pastures until they have had one or two calves. They are then run entirely on the native range for the rest of their productive life. One large ranch runs its cattle on improved pasture from October to February. Cattle are on native range from February to July. Pregnant cows are on improved pasture from July to October, while the dry cows and steers are on native range.

Range Livestock Management

Compared with other range areas, south Florida's livestock management practices generally are poor. Many improved livestock management methods are available but they have not been put into widespread use by ranchers grazing native range. Some of the current practices are discussed in the following sections.

Breeds and Breeding

One of Florida's great forward steps has been the upbreeding of its range cattle from the cattle introduced by Ponce de Leon in 1521 and Hernando de Soto in 1539. It is estimated that approximately 70 percent of the commercial cattle in Florida now have about one-half native and one-half Brahman breeding; about 20 percent of the cattle have British blood, and approximately 10 percent have very little improved breeding.

Purebred Brahman bulls are commonly crossed with native cows for the first or second cross, then following with Angus, Shorthorn or Hereford bulls. Brahmans, Santa Gertrudis, Aberdeen-Angus, Shorthorn, Charolaise, Charbray, Herefords, Brangus, Brafords, Beefmasters and Afrikanders are included among south Florida cat-

tle. Many beef cattle also display some evidence of Devon, Dexter, Red Poll and Ayrshire or other dairy-type blood.

Brahman-English crosses do well in south Florida's hot and humid summer climate. Furthermore, the introduction of some English blood has resulted in beef carcasses which grade higher.

Even though many of the more progressive ranchers employ a breeding season of 4 to 5 months, and separate bulls from cows at the end of that time, many other ranchers still leave bulls with cows for a longer period — some even year-long. This, of course, means that calves are born throughout the year. According to a 1948 survey (Parvin, 1948), the average length of breeding season on ranches of less than 3,200 acres was 8.6 months, on ranches of 3,200 acres and over, 6.7 months. Cows frequently are bred to calve beginning in December or January. Danger from screwworms and other parasites is low during this period and calves can be weaned prior to the highwater season of late summer and fall.

Ranges containing 10,000 to 15,000 acres under one fence are not unusual. With this size acreage and with 500 to 1,000 or more brood cows in one range, effective service by bulls is difficult to obtain. Bulls commonly graze by themselves in groups of 3 to 5 or more and are not readily available when cows come into heat.

Some information is available on number of cows used per bull on Florida's native ranges. In Alachua County the average number was 32 cows per bull (Camp, 1932). A later survey showed somewhat similar data (Parvin, 1948). On ranches with less than 3,200 acres, 36 cows were run per bull, with variation from 15 to 75 cows. For ranches having 3,200 acres and over, twenty-nine cattlemen reported an average of 32 cows per bull, with variation from 15 to 50.

Parvin (1948) reported for ranches 3,200 acres and over that the average age of heifers at first calving was 33.4 months. For ranches of less than 3,200 acres, the average age of heifers at first calving was 30 months.

Calf Crops

Average calf crops in Florida are very low. For 1954, the average calf crop was reported as 50 percent (Fifield, 1954). A major cause of low calf crops in Florida reportedly is underfeeding—usually associated with feed deficient in protein, phosphorus, and perhaps certain trace elements (Hentges, 1954).

Low calf crops are not, of course, universal. One large ranch which makes some use of native range but bases its management program principally on improved pastures reports a calf crop of 75 percent. Another large range operator reports a calf crop of 65 to 70 percent.

Weaning Weights

Weaning weights of range calves may vary from 225 to 400 pounds or more, depending upon age, breeding, time of calving, type of range and management program. Some ranchers try to wean calves at 6 to 8 months of age, but calves frequently are left on the cow until 10 months or more of age. One progressive rancher who practices excellent cattle management and who runs his cattle principally on improved pasture, but without supplemental feed, consistently weans calves in October at weights around 500 pounds.

Handling and Raising of Cattle

Throughout the range country, branding, dehorning, castration and inoculation are commonly done in the winter months when danger from screwworms and other parasites is lowest. Because of the year-round warm climate, barns or other shelters are a rarity on south Florida's rangelands. The only shelter provided is that offered by trees. During times of high winds or infrequent cold spells, cattle secure necessary protection in the forests or hammocks.

Mineral Supplementation

The need for proper mineral supplementation of range cattle has been recognized in Florida, although as late as 1931 only 15 percent of the range herds studied in Alachua County were supplied salt (Camp, 1932). By 1931 a nutritional anemia called "salt-sick" had been found to be the result of lack of iron or iron and copper in the forage (Becker, *et al.* 1931). In some areas cobalt was found to be deficient. Other minerals which may be deficient in Florida range forage are calcium, phosphorus, and sodium chloride. Iodine is not lacking in Florida and no evidence has been found of nutritional deficiency resulting from insufficiency of fluorine, potassium, magnesium, manganese, sulfur or zinc.

A mineral mixture developed by the Florida Agricultural Experiment Stations contains elements deficient in the forage, has good keeping qualities, and is palatable to cattle (Becker, *et al.* 1953).

Water for Cattle

Throughout south Florida an adequate supply of water is available much of the year. However, during the late winter and early spring when many ponds dry up, supplying adequate water can be a problem. Some ranchers use windmills to pump water from shallow wells into troughs or let the water run onto the ground. Other ranchers dig pits deeper than the expected low groundwater level and allow cattle to obtain water there. Abandoned artesian wells left by itinerant truck farmers furnish water for cattle on other ranges.

Winter Feeding

During the winter, range cattle commonly lose from 50 to 125 or 150 pounds. Seasonal variation in the amount and quality of forage on the range has been considered the most important factor responsible for weight changes of range cattle throughout the year (Kirk, *et al.*, 1945). Grasses on sandy

lands start becoming low in protein as early as July, August and September, depending on the area and the type of soil. Other factors which cause loss in weight are excessively wet pastures and cold, driving rains.

Feeding to improve cattle condition during the winter is not generally done but has recently begun to be practiced by more progressive ranchers. Dry roughages such as corn cob and husk mixtures, and hay are fed along with silage and concentrates such as snapped corn, and cottonseed meal or pellets.

Unfortunately, many ranchers do not have facilities for preparing and storing hay from their excess summer improved pasture grasses and must resort to costly commercial feeds when adverse weather hits.

Recent research by the Florida Agricultural Experiment Stations has shown the benefits of feeding citrus products (Kirk and Davis, 1954). Cows fed whole oranges and grapefruit were in better condition than those on native pastures alone. Cows on native range alone lost an average of 51 pounds per head, but those fed oranges lost 28 pounds. Cows getting grapefruit as a supplement lost only 10 pounds per head. Giving cattle free access to citrus molasses under range conditions, without adequate protein, has not proved satisfactory.

Enemies of Beef Cattle

Beef cattle are subject to many parasites on Florida's rangelands. Because of abundant moisture, favorable temperatures and frequent concentration of cattle, parasites have ample opportunity to increase in numbers.

Among the external parasites which cause damage are horn flies, houseflies, stable flies, mosquitoes, horseflies, deer flies, screwworms, lice and ticks. Oxwarbles (*Hypoderma lineata*) appear in the backs of cattle in November, December, and January, and the flies of the oxwarble grub frequently bother cattle in late winter. Spraying for oxwarbles and other parasites is done three or four times a year by the better operators. Screwworms, which have been present since 1933, are particularly damaging to newly born calves and to animals at dehorning time or when the skin tissue is broken (Swanson and Goen, 1952).

Liver fluke, lungworms and stomach worms are all important internal parasites. Liming soil during crop farming or for raising of improved pasture may foster liver fluke infestations by providing good breeding conditions for the snail, which acts as an intermediate host for liver flukes. Abandoned artesian wells also may serve to provide good habitats for the liver fluke snail and so encourage greater cattle infestations.

Accurate information on livestock losses from diseases is not available for Florida. However anaplasmosis probably is one of the diseases causing frequent losses (Simpson, 1954). Until eradication of the Texas fever tick, through a concentrated dipping program which began in 1924 and continued in some parts of the area until the early 1940's, Texas fever caused many deaths among range cattle. Hyperkeratosis or "X-Disease" has been found in Florida's beef cattle herds (Lee, 1954). "Swollen joints," for which one of the causal agents is the microorganism *Streptococcus pyogenes*, has occurred on Florida ranges for a number of years and can be responsible for loss of 5 to 10 percent of the calf crop on individual ranches (Emmel, 1950). Acute ergotism, resulting from grazing Dallis grass (*Paspalum dilatatum*), Argentine bahia grass and brownseed paspalum (*P. plicatulum*) infected with the fungus *Claviceps paspali*, has been observed (Simpson and West, 1952).

Livestock poisoning by plants has been severe in some instances. Loss from predators is negligible. Although bear and cougar inhabit the Everglades and adjacent ranges and bobcats are fairly common, they do not kill many cattle. Occasional losses from snake bite and alligators occur.

Marketing

Florida's beef cattle industry is essentially a "cow and calf" business and is built around production of canner, cutter, and utility beef animals. Most cattle are marketed directly off grass and very little steer feeding is currently done, although interest in feeding is increasing rapidly (Fig. 6).

Although Florida currently produces only 60 percent of its total beef and veal needs, cattlemen probably produce more low quality beef than is being consumed in the State. To meet the demand for top grades of meat, large volumes of good, choice, and prime beef and beef animals produced in the midwest are shipped to plants serving Florida markets. A possible 75 percent of the steers fed out in Florida to good, choice, and prime grades are produced in Georgia, Alabama, Tennessee, and other states and shipped into Florida as feeders because of the scarcity of high quality feeders produced in Florida (Rhodes, 1955).

In 1953 only 10.1 percent of the slaughter cattle sold in seven Florida auction markets graded commercial, good, and choice (McPherson, 1954). Less than 20 percent of the slaughter calves graded commercial, good and choice, and only 6 percent of the stockers and feeders sold in these auctions graded medium or above. These figures emphasize the low quality of Florida's cattle but they do not entirely show the true quality, for many of the better grades of animals are marketed by private treaty or direct sale. About one-half are sold privately or direct to packers, dealers, or other farmers (Scruggs and Scarborough, 1954).

The comparative quality of Florida's cattle is reflected by the average value of $62.00 per head in 1954, compared to $92.40 for the entire United States (Scruggs and Scarborough, 1954). In 1953, the average live weight of cattle (excluding calves) slaughtered in

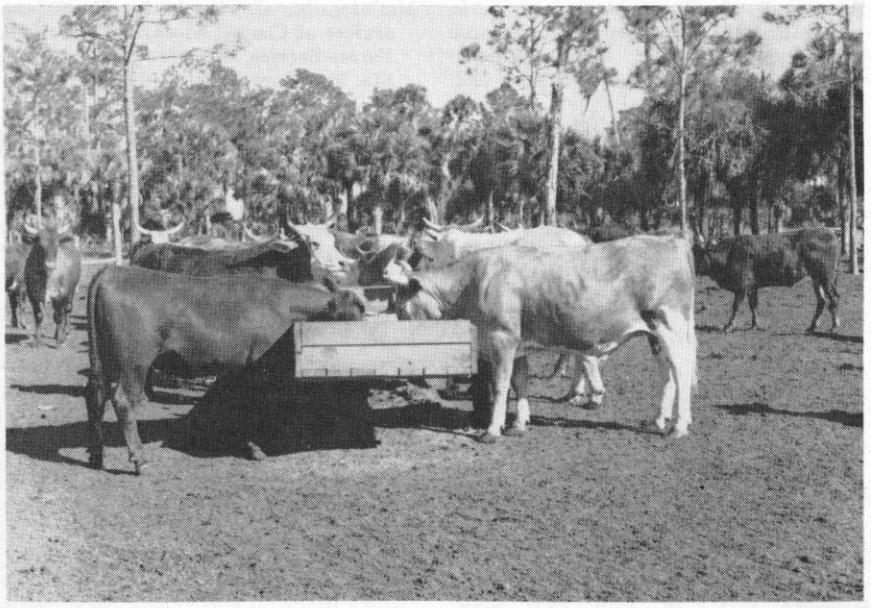

FIGURE 6. Feeding trials by the Collier Company proved successful in raising market grades of steers in 1955.

Florida was 723 pounds, compared to a national average of 937 pounds (Pace, 1954).

Discussion

South Florida has a good potential for increased production from its grazing lands. Although approximately 1,000,000 acres of improved pastures have been planted on cutover forest land, native prairie and reclaimed marshlands, full productivity from all improved pastures has not been realized. Recommended agronomic practices are diligently followed by some ranchers with resultant high production, while other ranchers employ poor practices.

Management of the 10.2 million acres of native range has received little attention until recently. Little factual information exists on the forage species making up the range and their reactions to different grazing treatments. Good livestock management principles have been developed for Florida but they have not been widely applied. Breeding practices frequently are poor; improvement of herds through rigid culling of undesirable animals is not always done; supplemental feeding of cattle needs extension; calves often are not weaned until 10 months old. Range problems are complicated because of poor livestock management.

One very prominent Florida rancher has stated that Florida is now pioneering as the West was in the 1880's. Challenges exist which, if met, can result in greatly increased productivity from the range.

One of the principal range problems is overstocking. Since estimates on grazing capacity of the native range vary from 5 to 30 and more acres per animal per year, and but little experimental work has been done towards determination of proper stocking rates, the degree of overstocking can only be estimated. Fifield (1954) has estimated that 90 percent of Florida's ranches are overstocked. Calculations made during the Forest Service analysis of range management problems suggest that native ranges are currently stocked at 150 percent of their present carrying capacities.

Public agencies thus have a heavy obligation to provide range management systems which can increase productivity from the native range. Part of this obligation possibly can be satisfied by development of management systems which will result in increased forage production. The remainder of the obligation must be satisfied by more efficient use of forage through improved means of livestock management.

Development of better management systems for the native range may well serve to relieve grazing pressure on the improved pastures. Complementary use of the large amount of cheap native herbage with the lesser acreages of improved pasturage needs further study.

Use of rangeland for tree growing will have some effect, though small, on grazing capacity. By 1964, an estimated 125,000 acres of native forest rangeland may be planted and managed principally for tree production. Range forage productivity in south Florida can be expected to decrease on tree-planted range areas somewhat in line with other parts of the South. Grazing demands on unplanted forest rangelands will be somewhat intensified through this change in land use.

The highly complex vegetation contains many species of little known characteristics. Furthermore, the long growing season results in an almost year-round progression of plant developing stages. Many forage species complete their growth cycles during the summer period while others continue growth into the fall and winter. Regrowth also occurs during the winter by some species, following burning, and quite possibly, also, following removal of herbage by grazing at that time. Generally accepted experimental techniques for obtaining reliable data on herbage production, utilization and even range condition and trend were not evolved for such conditions and do not appear entirely suitable for use in south Florida. Development of reliable sampling techniques is highly important.

Study of the ecological aspect of range burning is urgently needed. Fire has been the most commonly used range management tool for

many years, but its effects on south Florida's vegetation and soils are little known. Extension of prescribed burning techniques evolved elsewhere in the South can be of immediate value but these techniques must be adjusted to the subtropical south Florida environment.

Another important range problem is the occurrence of dense patches of saw-palmetto, a shrubby plant of low forage value. Little is known about the autecology of saw-palmetto and economically practical methods for its control on low value range lands. Feasibility of its control through management needs to be explored.

At the present time deer populations are low in south Florida and generally no real competition exists between cattle and deer for forage. However, sportsmen's desires for increased numbers of shootable deer could conceivably favor large increases in deer numbers. Should this happen, problems in dual range use may arise.

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