

DEER VERSUS LIVESTOCK ON GULF COAST RANGE

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Is deer production limited on range used by livestock? This question, because of the steady upward trend in livestock use of forested land, poses a problem for all who are interested in deer management in the Gulf Coastal region.

The records of the Agricultural Marketing Service (formerly Production and Marketing Administration), United States Department of Agriculture, show that in 1947 there were 5,728,000 head of cattle in the four Gulf states of Alabama, Florida, Louisiana and Mississippi, while in 1954 there were 7,439,000, an increase of 1,711,000 head. On January 1, 1954 there were 2,480,000 hogs and 236,000 sheep, while in 1947, there were 3,597,000 hogs and 325,000 sheep, a decrease in the population of these animals. The number of livestock using the forest range is unknown, but it is certain that the forested areas received their share of the increase in cattle as well as a considerable number of hogs, sheep and goats. The impact of such a population of domestic livestock on wildlife must be great.

The problem is more pronounced on privately-owned range but its common practice to run livestock on public land, both federal and state. Public lands dedicated primarily to wildlife may or may not permit livestock use. Where it is practiced, the stocking rate varies greatly. In some cases all livestock have been removed on the thesis that they, regardless of kind and number, are harmful to game. There are ranchers who would like to see all game banished from their premises to get rid of hunters. These represent extreme views and actions and may prevent the best use of the land. However, knowingly or unknowingly, many landowners have gutted their lands by overstocking with livestock and game, especially deer. In the west large acreages have been seriously hurt by overuse by livestock and deer. For example, it is common knowledge that collective grazing and browsing by goats, sheep, cattle and deer have virtually ruined large areas in the Edward's Plateau of Texas.

In numerous localities throughout the Gulf Coast region, free-ranging hogs seriously compete with wildlife for mast. A study of acorn consumption in Louisiana on range occupied by hogs and on range where hogs were excluded revealed that acorn mast disappeared from the hog range 34 days before it did on the hog-free range. Cattle ranching is practiced in varying degree of stocking and husbandry. In many instances the stocking rate depends upon how many cattle the ranchman can procure. A few practice modern methods of herd and range improvements while others handle their herds and range in a slipshod manner.

Although it is recognized that the different kinds of livestock and their management of forest range may or may not be detrimental to wildlife, the purpose of this paper is to report specific competition between cattle and deer for browse. The entire question of livestock as it relates to game on the range is a needed and fertile field of investigation. To assume that livestock is always harmful to wildlife or vice versa should not be condoned. We need more facts.

Cattle are primarily grazers while deer obtain most of their forage by browsing on woody plants. However, cattle on forested range browse the woody plants in varying degree, depending upon the quality and quantity of grass. Both deer and cattle make use of certain forbs (weed and weed-like plants) in spring and late summer just prior to and during flower formation.

Campbell and Cassady (1954) in their study of cattle on longleaf pine range state that about 10 percent of the cattle diet is composed of shrubs and trees. Heaviest use is made of these plants in spring and winter which coincides with their use by deer. Investigating the feeding habits of cattle in the longleaf-slash pine forests of Georgia, Lemon (1949) found that their diet consisted of about 93 percent grass and grass-like plants, three percent forbs, and four percent shrubs and hardwood trees. Lemon's findings substantiate earlier conclusions of Biswell et al. (1943) and Biswell and Foster (1949), who have shown that woody browse plants and forbs are taken at all seasons, but more heavily from December through May. Goodrum's (1949) study of cattle feeding habits on the loblolly-shortleaf pine-hardwood type forest in Walker County, Texas, has shown that, with a stocking rate of one cow unit to 75 - 100 acres on a year-round basis, woody browse and forbs constituted 10 percent of the diet in spring and summer (March to September).

Our field studies on cattle use of woody browse were conducted on the DeSota National Forest, Leaf, Mississippi, and in Louisiana on the Kisatchie National Forest, all lying within the longleaf pine belt. Deer browsing studies have been underway in these areas since 1947, and have revealed the fact that the following browse plants are the most important ones for deer:

Greenbrier (*Smilax spp.*), whitebay (*Magnolia virginiana*), titi (*Cyrilla racemiflora* and *Cliftonia monophylla*), large gallberry (*Ilex coriacea*), virginia willow (*Itea virginica*), fringe tree (*Chionanthus virginica*), yaupon (*Ilex vomitoria*), French mulberry (*Callicarpa americana*), redbay (*Persea Borbonia*), horsesugar (*Symplocos tinctoria*), swamp dogwood (*Cornus alternifolia*), poison sumac (*Toxicodendron vernix*), chokeberry (*Aronia arbutifolia*), blackgum (*Nyssa sylvatica*), and blackberry (*Rubus spp.*).

A field survey in Mississippi of cattle browsing on range free of deer and including most of these species was made in February, 1948 (Table 1).

A survey showed that both cattle and deer prefer the same species of browse. Our cattle pasture in this study was stocked at the rate of one cow to 63 acres or a total of 150 head on 9,450 acres throughout the year, except March when it was reduced to 100. Our deer study in an ecologically similar area has shown that the same degree of browsing was done by deer at a stocking rate of one deer to 15 acres.

The degree of use on browse is best expressed by an "index of browsing" figure (Martin and Krefting 1953) as shown in the last column of Table 1. When the index exceeds 100, browsing is considered too heavy. The other columns in Table 1 expressing "Percent of Food Available" and "Percent of Food Eaten" were arrived at according to a deer browse survey method, but with modification, described by Aldous (1944).

On the Kisatchie National Forest in Louisiana, where cattle and deer occupy the same range, cattle have been seen to browse on 16 species of trees and

Table 1. Cattle browsing on range free of deer. DeSota National Forest, Mississippi — 1948. (From a sample of 200 plots 1/100-acre in size).

Species	No. of plots (%)	Average density	Average browsing	Util. factor	Percent food eaten	Percent available	Total browsing values	I.B.
<i>Acer drummondii</i>	20 (10)	0.60	0.5	0.3	0.1	3.4	10	1+
<i>Aronia arbutifolia</i>	12 (6)	0.35				2.2		
<i>Azalea</i> spp.	20 (10)	0.75	3.0	2.3	0.7	4.7	60	8
<i>Callicarpa americana</i>	20 (10)	0.65	22.5	14.6	4.7	4.1	450	75
<i>Cornus florida</i>	50 (25)	2.15	17.6	37.8	12.2	13.6	880	44
<i>Cyrilla racemiflora</i>	12 (6)	1.00	45.0	45.0	14.5	6.3	540	112
<i>Ilex coriacea</i>	32 (16)	1.90	6.6	12.5	4.0	12.0	210	16
<i>Itea virginica</i>	12 (6)	0.40				2.5		
<i>Kalmia latifolia</i>	4 (2)	0.30				1.9		
<i>Magnolia virginiana</i>	20 (10)	0.65	52.0	33.8	10.9	4.1	1,040	130
<i>Nyssa sylvatica</i>	10 (5)	0.25	14.0	3.5	1.1	1.6	140	35
<i>Persea Borbonia</i>	12 (6)	0.30	34.2	10.3	3.3	1.9	410	85
<i>Rubus</i> spp.	28 (14)	1.45	10.7	15.5	5.0	9.2	300	18
<i>Smilax</i> spp.	28 (14)	1.25	54.6	68.3	22.0	7.9	1,530	109
<i>Symplocos tinctoria</i>	32 (16)	1.75	24.7	43.2	13.9	11.1	790	49
<i>Toxicodendron vernix</i>	6 (3)	0.20	1.7	0.3	0.1	1.3	10	6
<i>Vaccinium elliotii</i>	26 (13)	1.55	14.6	22.6	7.3	9.8	380	36
<i>Viburnum</i> spp.	10 (5)	0.30				1.9		
Totals		15.80		310.0	99.8	99.5		

shrubs, six of which were first choice deer browse. On many other areas throughout the Gulf Coastal region where only cattle were present they have been observed to browse more heavily those plants most palatable to deer. Among the plants consumed by both deer and cattle are whitebay, greenbrier, yaupon, blackberry, wateroak (*Quercus nigra*), blackgum, and French mulberry. The number of plants browsed and the degree of use by cattle is dependent on the stocking rate, condition of the range, and supplemental feeding. A few plants, such as sweetgum (*Liquidambar styraciflua*), preferred by cattle, are taken by deer only when the browse they prefer is depleted.

Our survey figures indicate that it takes about five times as much forage, 10 percent of which is shrubs, trees, and forbs, to support one cow than it does one deer. According to Cassady (1949), it takes about 20 pounds of air-dry forage for a cow each day. On this basis for a deer, it would take about four pounds, most of which would be shrubs, trees and forbs. About 10 percent, or two pounds, of a cow's daily diet would consist of those things most eaten by deer. On our study area the cattle were obliged to depend largely on forage from an unimproved forest range, but received some supplemental feeding of hay only in late winter. On this basis alone, two cows would equal one deer on the range. This suggests that this type of range could carry 50 percent more deer when no cattle are present, insofar as forage is concerned.

It can be seen that in a cattle-deer management program it becomes necessary to recognize the forage needs of both animals. Under a heavy stocking program for cattle, this means that fewer deer can be carried on the range. However, under range improvement for both deer and cattle, more of each can be carried with less conflict between them. Studies by Campbell and Rhodes (1944), Cassady (1949), Brasington (1948), Campbell (1946), Wahlenberg et al. (1939), Biswell et al. (1943), and Biswell and Foster (1942) have indicated how more and better cattle can be produced on pine forest ranges. Some of the measures they recommend would also help deer but some would not. In general, they recommend getting rid of shrubs and hardwoods, some of which are top-choice deer forage.

Deer management involves herd control and habitat improvement. To keep a deer herd at its highest reproductive level, it must never be allowed to go beyond its peak build-up for after reaching its peak, the population has but one way to go and this is down, although the population may fluctuate in numbers from year to year. Our investigations to date (unpublished manuscript) show that deer are dependent upon a relatively few top-choice browse plants if fawn production is to be kept on a high level. For example, five deer corralled in a 160-acre area in Alabama had an annual increment of 75 percent the first year, 43 percent the second year and 10 percent each for the next two years. The drop in fawn production occurred in the third year after depletion of about five choice species of browse plants with good to fair distribution and abundance. Our work in Mississippi showed similar results.

Simple arithmetic will show that buck hunting alone, other factors being equal, will not prevent a well-established deer herd from increasing until it reaches its peak. This is not a theoretical consideration for many workers over the nation have tested it under field conditions. The evidence is clear: Good deer management must include the hunting of all sexes and ages during the initial herd build-up and perhaps later; that is, after the peak when the herd is decreasing in number.

Habitat improvement can produce more food and cover but eventually the herd must be reduced before the peak is reached. Experience has shown that a habitat can be made to produce more quality forage by prescribed burning at proper intervals. In the longleaf pine belt, with proper planning and application, this can be done without damage to pine. Our studies in Mississippi showed a four-fold increase in sprout growth on four good forage plants. The proper application of fire also increases many times over the late summer and early fall forbs which are a source of succulent foods during a time of year when succulent foods are needed.

SUMMARY AND CONCLUSIONS

A study of the browsing habits of cattle and deer in the Gulf Coastal region on forest range has shown that the two animals prefer the same woody browse plants. This lowers carrying capacity for deer, but has little influence on cattle because 90 to 93 percent of their diet is grass and grass-like plants. The remaining seven to 10 percent of the cattle diet consists of woody browse and forbs which are the main foods for deer.

The competition is increased on those ranges where range improvement, supplemental cattle feeding, and deer herd control are not practiced.

Herds of deer, as well as cattle, must be kept within the carrying capacity of the range. A high reproductive level in deer can only be maintained when an adequate supply of top-choice browse plants are available. After the best browse plants are depleted, fawn production drops sharply. In our study we found that the annual increment dropped from 75 percent when good browse was adequate to 10 percent when it was inadequate.

Apparently deer herds must be reduced in size before the peak is reached if fawn production and good hunting is to be maintained. A well established deer herd cannot be reduced, other factors being equal, by hunting only bucks. The alternative is to permit the taking of deer of any sex and age.

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