



Relationship of mule deer to livestock on summer range in the Pryor Mountains, Montana
by John Edgar Firebaugh

A thesis submitted to the Graduate Faculty in partial fulfillment of the requirements for the degree of
MASTER OF SCIENCE in Fish and Wildlife Management
Montana State University
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Abstract:

A study was conducted in the Pryor Mountains of south-central Montana during the summers of 1967 and 1968 to obtain quantitative data on distribution, food habits, and range relations of mule deer and cattle on the summer range. Physical condition and productivity of the deer were also studied. The previous history of livestock grazing on the area was reviewed. The physiography and vegetation of the study area were described. The vegetation was described as constituting three zones: the Fescue-Wheatgrass, Douglas-fir, and Spruce-Fir. Canopy coverages and frequencies of occurrence of various low-growing plant species were determined for most of the types and subtypes within each zone by quantitative measurements. Distribution of mule deer for both summers was determined by 1,152 observations during 129 observation trips. Eighty-one percent of the total deer observations were in the Douglas-fir Zone. The Fescue-Wheatgrass and Spruce-Fir Zones received light use by deer. Fifty-seven percent of the total cattle observations were on the Fescue-Wheatgrass Zone. The Douglas-fir Zone received the least amount of use by cattle. Deer food habits were determined by examination of 70 feeding sites during the summers of 1967 and 1968. Forbs composed 89 percent of the total summer diet while browse and grasses formed 10 and 1 percent, respectively. Use of forbs decreased from June to September while use of browse increased. Eighty-three percent of the mule deer feeding sites were located in the Douglas-fir Zone. Cattle food habits were evaluated by examination of 59 feeding sites. Grasses and grass-like plants constituted 71 percent of the diet. Forbs and browse composed 28 and 1 percent of the diet, respectively. Use on grasses and grass-like plants increased from 56 percent in July to 90 percent in September as forbs became desiccated. Utilization of forbs decreased from 42 to 9 percent during this same period. The majority of cattle feeding sites were located in the Fescue-Wheatgrass Zone. Forage utilization by cattle was determined by use of agronomy cages, exclosures, and grazed plant transects. Utilization was found to be heavy in several areas. Hog-dressed weights of hunter-killed mule deer were lower than those of certain other studies. Classification of 1,152 deer by age and sex revealed low fawn:doe ratios of 54 and 32 fawns per 100 does for the summers of 1967 and 1968, respectively. There was little overlap of range use and little direct competition for food between mule deer and cattle. *Taraxacum laevigatum* was the only plant species used substantially by both. Distribution and numbers of cattle appeared to limit the distribution of deer mainly to the Douglas-fir Zone.

This limitation of range use possibly accounted for the lower productivity of deer.

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by

JOHN EDGAR FIREBAUGH

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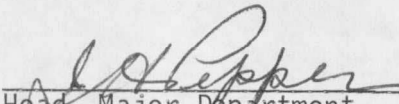
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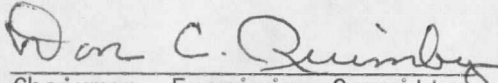
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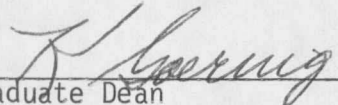
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ABSTRACT

A study was conducted in the Pryor Mountains of south-central Montana during the summers of 1967 and 1968 to obtain quantitative data on distribution, food habits, and range relations of mule deer and cattle on the summer range. Physical condition and productivity of the deer were also studied. The previous history of livestock grazing on the area was reviewed. The physiography and vegetation of the study area were described. The vegetation was described as constituting three zones: the Fescue-Wheatgrass, Douglas-fir, and Spruce-Fir. Canopy coverages and frequencies of occurrence of various low-growing plant species were determined for most of the types and subtypes within each zone by quantitative measurements. Distribution of mule deer for both summers was determined by 1,152 observations during 129 observation trips. Eighty-one percent of the total deer observations were in the Douglas-fir Zone. The Fescue-Wheatgrass and Spruce-Fir Zones received light use by deer. Fifty-seven percent of the total cattle observations were on the Fescue-Wheatgrass Zone. The Douglas-fir Zone received the least amount of use by cattle. Deer food habits were determined by examination of 70 feeding sites during the summers of 1967 and 1968. Forbs composed 89 percent of the total summer diet while browse and grasses formed 10 and 1 percent, respectively. Use of forbs decreased from June to September while use of browse increased. Eighty-three percent of the mule deer feeding sites were located in the Douglas-fir Zone. Cattle food habits were evaluated by examination of 59 feeding sites. Grasses and grass-like plants constituted 71 percent of the diet. Forbs and browse composed 28 and 1 percent of the diet, respectively. Use on grasses and grass-like plants increased from 56 percent in July to 90 percent in September as forbs became desiccated. Utilization of forbs decreased from 42 to 9 percent during this same period. The majority of cattle feeding sites were located in the Fescue-Wheatgrass Zone. Forage utilization by cattle was determined by use of agronomy cages, exclosures, and grazed plant transects. Utilization was found to be heavy in several areas. Hog-dressed weights of hunter-killed mule deer were lower than those of certain other studies. Classification of 1,152 deer by age and sex revealed low fawn:doe ratios of 54 and 32 fawns per 100 does for the summers of 1967 and 1968, respectively. There was little overlap of range use and little direct competition for food between mule deer and cattle. *Taraxacum laevigatum* was the only plant species used substantially by both. Distribution and numbers of cattle appeared to limit the distribution of deer mainly to the Douglas-fir Zone. This limitation of range use possibly accounted for the lower productivity of deer.

INTRODUCTION

Observations of mule deer (*Odocoileus hemionus*) and of summer ranges in the Pryor Mountains of south-central Montana by members of the Montana Fish and Game Department prior to 1967 suggested that both the deer population and the range were in below average condition. Low observed fawn: doe ratios suggested poor reproductive performance. Weights obtained at hunter checking stations and field observations indicated below normal weights. Certain personnel of the Fish and Game Department believed that these unfavorable conditions were partially a result of competition from livestock which heavily grazed the summer range.

Heavy grazing by sheep and cattle in the past resulted in loss of topsoil in certain areas and deterioration of this summer range. The magnitude of this deterioration is attested by recent range renovation practices such as contour furrowing by the U. S. Forest Service. Forest Service records show that the study area and adjacent lands were heavily grazed by numerous bands of sheep in the early 1900's. The Forest Service has controlled grazing in the Crooked Creek Allotment since 1926 when grazing permits were first issued. The other Federal agency involved in the administration of these lands is the Bureau of Land Management. Their records indicate that from 1936-1945, between 400 and 1,400 sheep grazed on the Mystic Allotment for 2 to 6 months of the year (Bibles 1968). The sheep were replaced by cattle in 1946. Cattle numbers have since varied from 100 to 200 for 3 to 5 months during the year.

This study was conducted in the Pryor Mountains during the summers of 1967 and 1968. Part time work was carried out in the fall of 1968. The objectives were to obtain quantitative data on distribution, food habits, and range relations of deer and livestock on the summer range. Mule deer reproduction and body condition were also studied.

DESCRIPTION OF THE STUDY AREA

The Pryor Mountain Range, located about 40 miles south of Billings, extends generally in an east-west direction. The range is approximately 21 miles long and 10 to 18 miles wide. The southern and western slopes gradually rise in elevation from the 4,500-5,000-foot surrounding plains to the highest point in the range, 8,786 feet on Big Pryor Mountain. The more abrupt northern and eastern slopes rise from 1,000-3,000 feet above the plains. Many deep, timbered canyons have been cut by drainages through the soft, underlying limestone formations.

The study area (Figure 1) comprises approximately 36 square miles of the eastern one-third of the Pryor Mountains. It is characterized by ridges which are open on top and timbered on the sides, large expanses of open grassland, and steep, timbered canyons. The heads of Sage Creek, Dry Head Creek, and the Dry Head Overlook Cliffs bounded the study area on the north while the east was bounded by the sheer cliffs which slope down to the Big Horn River canyon. The southern border was an indefinite line about 2 miles north of the Custer National Forest boundary, and the Big Pryor Mountain ridgeline bordered the area on the west.

Climatological data were taken at the Sage Creek Ranger Station located 7 miles west of the study area at an elevation of 5,675 feet. The mean monthly temperature and precipitation for June through September of 1967 and 1968 were 60.1°F. and 2.68 inches, respectively (USDA, Forest Service, 1967-1968). The month of June received the heaviest amount of moisture with an average of 6.27 inches for the two summers.

