

1970

White-tailed Deer in Southeastern Minnesota: Winter Observations

Robert D. Dorn
University of Wyoming

Follow this and additional works at: <https://digitalcommons.morris.umn.edu/jmas>



Part of the [Zoology Commons](#)

Recommended Citation

Dorn, R. D. (1970). White-tailed Deer in Southeastern Minnesota: Winter Observations. *Journal of the Minnesota Academy of Science*, Vol. 37 No. 1, 16-18.

Retrieved from <https://digitalcommons.morris.umn.edu/jmas/vol37/iss1/5>

This Article is brought to you for free and open access by the Journals at University of Minnesota Morris Digital Well. It has been accepted for inclusion in Journal of the Minnesota Academy of Science by an authorized editor of University of Minnesota Morris Digital Well. For more information, please contact skulann@morris.umn.edu.

White-tailed Deer in Southeastern Minnesota: Winter Observations

ROBERT D. DORN*

ABSTRACT— Food habits, movements, vegetation type use, and bedding of white-tailed deer (*Odocoileus virginianus borealis*) were observed while snow-tracking in southeastern Minnesota. Waste corn (*Zea Mays*) was the most important food item. Three dogwoods (*Cornus racemosa*, *C. rugosa*, *C. alternifolia*), all non-commercial forest species, were the most important for browse. Acorns were unavailable due to crop failure. Six trails made in less than 24 hours covered more than 1 mile each, straight line distance. The longest was 3½ miles. Snow did not appear to affect movements. About two-thirds of the beds were on wooded uplands. Browsing areas appeared dependent on bedding locations which appeared dependent on upland field location.

The white-tailed deer was probably more abundant in southeastern Minnesota at the time of the study (1966-1967) than it has ever been. Much of the forested area where deer now exist was originally prairie; and before heavy settlement developed elk were the most common big game animal, with some bison, deer, and a few bear (Coues, 1895).

As the early settlers reduced what forest there was and turned the prairie into land for planting or grazing, large game animals were eliminated quickly. Then, as the need for firewood decreased in favor of other fuels while the demand for conservation practices increased, the forested area was enlarged by both natural and artificial reforestation and fire control (Munkel and Fremling, 1967). With forest and farm crops providing cover and food, plus protection afforded by law regulating hunting, the deer again moved in and began to increase. By the early 1940's, complaints of damage caused by deer became common in the southeastern part of the state, so a hunting season was authorized to reduce the deer population (Erickson, et al, 1961). The subsequent annual hunting seasons have been aimed at control of damage to crops and orchards in the area.

This paper reports winter observations of the northern white-tailed deer at irregular periods from October, 1966, to April, 1967, but mainly in December and March of those years.

13-square-mile study area

The study area comprised approximately 13 square miles about 5 miles south of Winona, Minnesota, at the head of the Garvin Brook watershed. It is characterized by a rolling upland plain dissected by narrow valleys lying from 300 to 500 feet below adjacent uplands

(Brown and Nygard, 1941). The uplands and wider valleys were cropped and the narrow valleys mostly pastured.

The hillsides were mostly wooded and often pastured. About 30 percent of the area was woodland. An Oak type (*Quercus alba*, *Q. velutina*, *Q. macrocarpa*, *Q. rubra*) comprised more than two-thirds of the woodland. Oak-Birch-Basswood (*Quercus* spp., *Betula papyrifera*, *Tilia americana*), Elm-Basswood-Maple (*Ulmus americana*, *Tilia americana*, *Acer saccharum*), and Aspen-Birch (*Populus tremuloides*, *Betula papyrifera*) types comprised most of the remaining woodland. A Prairie type (*Andropogon scoparius*, *A. Gerardi*, *Bouteloua curtipendula*) occurred on many southwest facing slopes. Plant nomenclature follows Fernald (1950). A more detailed description of the study area was given elsewhere (Dorn, 1967).

Snow cover in the observation period was 10 inches or more, continuously, from December 28, 1966, to March 9, 1967, with a maximum of 21 inches on the ground at some points around Winona in February, but the snow cover varied on different exposures. Snow-fall for the winter was 14.0 inches above normal (W. J. Cole, U.S. Weather Bureau observer).

Collection of data

Data on food habits were collected by the author while snow-tracking, using a modification of the method described by Hosley and Ziebarth (1935). Trails were followed, and the number of fresh bites on twigs or stems of each plant species, the number of animals or animal groups utilizing each species, and the number of feeding sites for each species were recorded. A feeding site was defined as a location of feeding on a species separated by at least 2 paces from adjacent sites where that species was used. About 10 kernels of corn were considered one bite. Feeding data were arbitrarily classed in five utilization categories (high, medium, low, rare, none), considering total bites, total feeding sites, and animals or animal groups utilizing each species. The abundance of available species along the trails was estimated visually

* ROBERT D. DORN received his B.S. degree in Wildlife Management from the University of Minnesota and the M.S. in Fish and Wildlife Management from the State University of Montana. He is presently a member of the Zoology and Physiology Department at the University of Wyoming, Laramie, Wyo. He is a native of Winona, in southeastern Minnesota near the area in which this study was conducted.

and classed as high, medium, low or rare. This does not represent abundance on the area as a whole.

Data on movement, bedding, and vegetation type use also were obtained while snow-tracking. Most trails were first followed in one direction until lost and then followed in the other direction until lost. If the animal was disturbed, trailing was terminated in the forward direction at least for that day. Trails were plotted, accurate to about 1/8 mile, on topographic maps. In almost all cases the animals did not appear to be aware of being followed.

Selection and utilization of forage

Nine plant species accounted for most of the forage (Tables 1 and 2). Most use was on waste crops and non-commercial forest species. Corn and three species of dogwood were most utilized. Recorded animal groups using corn were few because many trails were lost before reaching the fields. Use of hazel (*Corylus* spp.) catkins was believed much more than the data indicate, allowing for difficulty of detection. Failure of the acorn crop during the autumn of the study may have resulted in food habits that could be "abnormal" for the area. Christisen (1953), Korschgen (1954), and G. R. Meyer (personal communication) have observed a heavy dependence of deer on acorns and, when acorn crops failed, heavy dependence on agricultural crops. The corn utilized was that missed by mechanical pickers and could be dug out of the snow readily by the animals. Although use of grass, soybeans (*Glycine Max*), and dry forbs occurred, the extent could not be determined but was be-

lieved relatively unimportant. Use of open water was not observed, but snow licking was frequent.

In northern Minnesota, deer usually congregate and spend the winter on small areas. This yarding practice does not occur on the study area, but small, mobile herds, usually 6-8 animals, are formed in winter. Individual animals enter or leave the group continuously.

About 51 3/8 deer miles were recorded, including 30 1/4 miles in December and 19 7/8 miles in March. A deer mile is 1 mile of trail for one deer (Hosley and Ziebarth, 1935). Distances are straight-line distances. It was not possible to observe a full 24 hours' travel of any animal due to changing snow conditions and occasional mixing with other trails. Six trails were more than one mile long. The longest, (by three animals), was 3 1/8 miles, including 2 1/4 miles of undisturbed travel during darkness. There was 13 inches of fresh snow cover at the time. These movements were much more extensive than is generally reported for white-tailed deer (Severinghaus and Cheatum, 1956). Five of the above six animal groups contained an adult male. Males ordinarily travel longer distances than females, especially during fall and winter (Fashingbauer, et. al., 1965); this may account for the extensive movements, but failure to observe a full 24 hours' travel of any one animal suggests that daily movements were even more extensive than noted. These extensive movements probably were due in part to the low population density, estimated at less than two deer per square mile. Generally, average size of home range decreases as population density increases (Sanderson, 1966).

Food, water, and cover were well interspersed in the area and were accessible without such extensive movements. There was no hesitancy among the deer to go through deep snow, even if bounding was necessary. Most of the hill climbing was straight up the steepest hillsides, even with deep snow present, and unlike the movement up and down valley bottoms and draws reported by Gladfelter (1966) in Idaho.

The Aspen-Birch type browse was used much more than would be expected from its relative occurrence, probably because this type occurred mostly as a narrow band between the most extensive wooded types and the upland fields. The deer lingered in this band before moving into the fields. The Prairie type was used in lesser proportion than its occurrence, probably from lack of desirable food species and cover.

Most bedding on wooded uplands

Almost two-thirds of the 101 beds observed were on wooded uplands, usually within 50 yards of an upland field. Nearly half of the remaining one-third of the beds were made on lower, wooded slopes during snowstorms. The preference for upland woods apparently was not for visibility or cover but for proximity to upland fields which were much used for feeding and escape.

There was a slight preference for cutover areas for both bedding and feeding. These areas contained much brushy re-growth which provided food and cover. There was no preference for specific exposures, in contrast to the preference for south facing exposures found by Cook

TABLE 1. Plants most utilized by deer on the study area (twigs and buds unless otherwise indicated).

PLANT SPECIES	UTILIZATION ¹	ABUNDANCE ¹	PERCENTAGE OF TOTAL		
			Bites	Feeding Sites	Deer Groups
<i>Zea Mays</i>					
corn (grain)	H	H	18	11	30
<i>Cornus racemosa</i>					
gray dogwood	H	H	16	12	55
<i>Cornus rugosa</i>					
round-leaved dogwood	H	H	15	12	40
<i>Cornus alternifolia</i>					
alternate-leaved dogwood	H	H	11	9	55
<i>Tilia americana</i>					
basswood	H	H	8	10	40
<i>Populus tremuloides</i>					
trembling aspen	H	M	6	8	65
<i>Corylus americana</i>					
American hazelnut (catkins)	H	H	2	8	30
<i>Prunus virginiana</i>					
chokecherry	M	H	5	6	65
<i>Corylus americana</i>					
American hazelnut	M	H	4	6	40
<i>Prunus serotina</i>					
black cherry	M	M	5	5	35
Percentage Total			90	87	..
Numerical Total (all species used)			4,981	850	20

¹ H = high, M = medium.

TABLE 2. Plants with low (L), rare (R), or no (N) utilization by deer on the study area (twigs and buds unless otherwise indicated).

PLANT SPECIES		UTILI-	ABUN-
Scientific Name	Common Name	ZATION	DANCE ¹
<i>Ulmus rubra</i>	slippery elm	L	M
<i>Quercus</i> spp.	black oak group	L	M
<i>Crataegus</i> spp.	hawthorn	L	M
<i>Amelanchier</i> spp.	Juneberry	L	M
<i>Viburnum Lentago</i>	nannyberry	L	M
<i>Ostrya virginiana</i>	ironwood	L	H
<i>Rhus glabra</i>	smooth sumac	R	M
<i>Sambucus canadensis</i>	common elder	R	M
<i>Salix humilis</i>	prairie willow	R	R
<i>Vitis riparia</i>	frost grape	R	M
<i>Diervilla Lonicera</i>	bush honeysuckle	R	L
<i>Prunus americana</i>	American plum	R	R
<i>Quercus macrocarpa</i>	bur oak	R	L
<i>Quercus</i> spp.	unidentified oaks	R	L
<i>Betula papyrifera</i>	paper birch	R	L
<i>Carpinus caroliniana</i>	hornbeam	R	M
<i>Acer Negundo</i>	box elder	R	M
<i>Rubus idaeus</i>	raspberry	R	R
<i>Rubus</i> sp.	black raspberry	R	M
<i>Ribes</i> sp.	gooseberry	R	M
<i>Quercus alba</i>	white oak	R	L
<i>Acer saccharum</i>	sugar maple	R	L
<i>Viburnum Rafinesquianum</i>	arrowwood	R	L
<i>Cornus stolonifera</i>	red-osier dogwood	R	R
<i>Sambucus pubens</i>	red-berried elder	R	R
<i>Equisetum hymale</i> (strobilus and stem)	horsetail	R	R
<i>Rhus radicans</i>	poison ivy	R	R
<i>Rhus glabra</i> (fruit)	smooth sumac	R	R
<i>Corylus cornuta</i>	beaked hazelnut	R	R
<i>Staphylea trifolia</i>	bladdernut	R	R
<i>Carya cordiformis</i>	bitternut hickory	R	R
<i>Celastrus scandens</i>	bittersweet	R	R
<i>Pyrus malus</i>	common apple	R	R
<i>Xanthoxylum americanum</i>	prickly ash	N	H
<i>Pyrus</i> sp.	crabapple	N	L
<i>Fraxinus</i> sp.	ash	N	L
<i>Juglans cinerea</i>	butternut	N	L
<i>Salix nigra</i>	black willow	N	L
<i>Salix interior</i>	sandbar willow	N	L
<i>Ceanothus americanus</i>	Jersey tea	N	R
<i>Juniperus virginiana</i>	eastern red cedar	N	R
<i>Juniperus communis</i>	dwarf juniper	N	R
<i>Rhus typhina</i>	staghorn sumac	N	R

¹ H = high, M = medium, L = low, R = rare.

and Hamilton (1942). Much of the browsing was near the beds. It appeared that the browsing area was dependent on the bedding location, which in turn appeared dependent on upland field location.

The future status of deer in this part of Minnesota will be dependent on land-use policies as they affect deer habitat. As the forests mature, the supply of natural food will decrease, and deer will become more dependent on agricultural crops. Sound forestry practices for harvesting the mature timber can alleviate pressure on crops by providing more natural food. Cooperation between foresters, sportsmen, farmers, and game biologists and the related public agencies will be necessary for the benefit of all concerned.

Acknowledgments

Appreciation is extended to Dr. R. J. Mackie, University of Minnesota, for his guidance during the study and to others who provided assistance and offered suggestions.

References

- BROWN, M. H. and I. J. NYGARD. 1941. Erosion and related land use conditions in Winona County, Minnesota. U.S. Dept. Agr., Soil Conserv. Ser. Erosion Survey No. 17.
- CHRISTISEN, D. M. 1953. Acorns — the staff of wildlife. *Missouri Conservationist* 14(10):10-11.
- COOK, D. B. and W. J. HAMILTON, JR. 1942. Winter habits of white-tailed deer in central New York. *J. Wildl. Mgmt.* 6(4):287-291.
- COUES, E. 1895. The expeditions of Zebulon Montgomery Pike, to headwaters of the Mississippi River, through Louisiana Territory, and in New Spain, during the years 1805-6-7. Volume I. New York, Francis P. Harper.
- DORN, R. D. 1967. Observations on winter range use of white-tailed deer in southeastern Minnesota. *Dept. Entomol., Fisheries, and Wildl., Univ. Minn.* Type-written.
- ERICKSON, A. B., V. E. GUNVALSON, M. H. STENLUND, D. W. BURCALOW, and L. H. BLANKENSHIP. 1961. The white-tailed deer of Minnesota. *Minn. Dept. of Conserv. Tech. Bull.* No. 5.
- FASHINGBAUER, B. A., J. M. IDSTROM, C. KINSEY, W. H. PETRABORG, D. W. BURCALOW, and F. B. LEE. 1965. Big game in Minnesota. *Minn. Dept. of Conserv. Tech. Bull.* No. 9.
- FERNALD, M. L. 1950. *Gray's manual of botany*. 8th ed. New York, American Book Co.
- GLADFELTER, H. L. 1966. Nocturnal behavior of white-tailed deer in the Hatter Creek enclosure. *M. S. Thesis. Univ. Idaho, Moscow.*
- HOSLEY, N. W. and R. K. ZIEBARTH. 1935. Some winter relations of the white-tailed deer to the forests in north central Massachusetts. *Ecology* 16(4):535-553.
- KORSCHGEN, L. J. 1954. A study of the food habits of Missouri deer. *Missouri Conserv. Comm.*
- MUNKEL, R. E. and C. R. FREMLING. 1967. A review of the bounty system as a method of controlling undesirable animal populations in Houston County, Minnesota (1883-1965). *J. Minn. Acad. Sci.* 34(2):117-121.
- SANDERSON, G. C. 1966. The study of mammal movements — a review. *J. Wildl. Mgmt.* 30(1):215-235.
- SEVERINGHAUS, C. W. and E. L. CHEATUM. 1956. Life and times of the white-tailed deer. *In* Taylor, W. P., Editor. *The deer of North America*. Harrisburg, Pa., The Stackpole Co. and Washington, The Wildlife Management Institute, pp. 57-186.