

Final Report

MAR-8

A STUDY OF THE BEHAVIOR AND ECOLOGY OF THE
SIKA DEER, AND WHITE-TAILED DEER WITHIN
THE ASSATEAGUE ISLAND NATIONAL SEASHORE

Submitted by:

Ronald R. Keiper
Department of Biology
Mont Alto Campus
The Pennsylvania State University
University Park, PA 16802

Walter M. Tzilkowski
School of Forest Resources
The Pennsylvania State University
University Park, PA 16802

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INTRODUCTION

Assateague Island is a 59.2 km long barrier island located off the Atlantic coast of Maryland and Virginia. The Virginia portion of the island consists of approximately 3,680 ha administered by the U.S. Fish and Wildlife Service as the Chincoteague National Wildlife Refuge. The Maryland portion of Assateague Island is 3,415 ha primarily administered by the National Park Service. The National Park Service lands are designated the Assateague Island National Seashore (AINS).

The major vegetation types on AINS include: American beach grass (Ammophila breviligulata) on sand dunes along the ocean, American three-square (Scirpus americanus) and various sedges in the inner-dune zone in the middle of the island, and saltmarsh cordgrass (Spartina spp.) in the marshes along the bay on the western edge of the island. A shrub zone composed of bayberry (Myrica pensylvanica) and marsh elder (Iva frutescens), and a narrow band of loblolly pine (Pinus taeda) are also present on the higher regions of the island.

Assateague Island supports populations of three large mammalian herbivores: the feral pony (Equus caballus), white-tailed deer (Odocoileus virginianus), and Sika deer (Cervus nippon). The Sika deer, like the pony, is an exotic species on the island. A wire fence along the Maryland/Virginia boundary of the island greatly restricts, but does not totally prevent, emmigration of the NPS wild and free-roaming ponies to the Virginia portion of the island. The fence probably provides little deterrent to deer movements.

Little is known about the size, sex and age structure, habitat utilization, and feeding habits of either deer population on the Maryland portion of the island. Using the pellet-group count method, the total deer population on AINS was estimated at approximately 500 to 700 deer (Keiper and

Hunter, 1982), but because the pellets of white-tailed deer could not be distinguished from those of Sika deer, the number of deer of each species was not determined.

Keiper and Hunter (1982) examined the late spring-summer of 1981 food habits of the deer by collecting pellets in the field and sending them to the Composition Analysis Laboratory at Colorado State University. Plant fragments in the samples were identified by comparing them with a reference collection. Because Rhus and Myrica were both recorded from over 80% of the samples, Keiper and Hunter (1982) concluded that competition may exist between the Sika and white-tailed deer during this season.

Keiper and Hunter (1982) gathered information on the sex and age structure of the deer harvest at a deer check station operated during the 1981 hunting season. Of 63 deer examined at the station, 82% were Sika deer. Only 11 deer shot by hunters were white-tailed deer. For both deer species, male deer comprised only 1/3 of the deer harvested. With respect to age, 61% and 45% of the Sika deer and white-tailed deer, respectively, examined were fawns or yearlings (Keiper and Hunter, 1982).

This research was designed to gather more information on the Sika and white-tailed deer populations and to learn more about the year-round food habits of both deer species. Specifically the objectives were to:

1. Determine the size, sex and age structure of the Sika and white-tailed deer populations harvested during the 1982 season.
2. Determine the food habits of the deer by collecting pellets from known animals during the late summer and late fall and by having the plant fragments in these samples identified by comparison with known plant fragments in the reference collection at Colorado State University.
3. Determine habitat-partitioning by deer by means of radio-telemetry.

METHODS

Deer Sex, Age, and Weight

Deer sex, age, and weight data were gathered from hunter-killed Sika and white-tailed deer from November 27 - December 1, 1982. A check station,

located at the island's sole land vehicle access point, was manned during the period. Deer were sexed, aged by tooth replacement and wear, and weighed (dressed weight).

Deer Food Habits

To determine deer food habits, 50 pellet samples from known deer were collected from deer processed at the deer check station and from deer immobilized during tagging. Pellets were packed with table salt to dry the pellets and prevent decomposition. The samples were sent to the Composition Analysis Laboratory at Colorado State University for analysis. Twenty microscope slides from each pellet sample were prepared and then the plant materials on the slides were compared to known plant reference slides.

Habitat-Partitioning

During the periods, 12-19 July 1982 and 2-6 August 1982, attempts were made to capture white-tailed deer and Sika deer. The typical capture procedure was to drive the access roads at night with 2 volunteers, each equipped with a 3.2×10^6 lumen/m² spotlight, positioned on a vehicle's roof. The primary search area was delimited by "Dune Crossing 1" and the "Fox Levels." After a deer was sighted, an attempt was made to immobilize the deer. A Palmer[®] capture gun propelled a syringe containing a solution of zylazine (1.1 mg/kg) and ketamine hydrochloride (6.6 mg/kg). Each deer that was captured was collared with an activity transmitter (164 mHz).

RESULTS AND DISCUSSION

Deer Harvest

During the 1982 hunting season 57 deer, 47 Sika and 10 white-tailed deer, were collected from AINS (Table 1). Sika deer made up over 82% of the harvest, the same as in the 1981 season and higher than the 1978-1981 average of 75.3% (Table 1).

Of the 47 Sika deer harvested during 1982, 21 (44.7%) were male, 22 (46.8%) were female and 4 (8.5%) were fawns whose sex could not be determined. Of the 10 harvested white-tailed deer, 7 (70%) were male while 3 (30%) were female. The percentage of male white-tailed deer harvested in 1982 was higher than in 1981, when males comprised only 36.4% of the kill (Keiper and Hunter, 1982). The percentage of male and female Sika harvested in 1981, when the kill was 40% male and 37.8% female (Keiper and Hunter 1982) was not different from 1982.

Dressed weight was recorded for 46 of the Sika deer harvested during 1982. For 4 fawns, the mean weight was 10.8 kg. In the case of adult Sika deer, 21 male deer averaged 28.4 kg, while 21 female Sika deer averaged only 18.4 kg. The mean weight for male Sika was higher than that in 1981, when 18 male deer averaged 22.2 kg, but the mean weights for females, who averaged 19.3 kg in 1981 ($n = 17$) and fawns, with an average weight of 10.9 kg ($n = 10$) (Keiper and Hunter, 1982) was not different.

For white-tailed deer, the one female weighed 33.1 kg. Seven male white-tailed deer averaged 28.5 kg. This mean weight was less than that for 3 male white-tailed deer killed in 1981, where the average was 39.1 kg, but these differences may result from the small samples.

Table 1. Species composition of deer harvested on Assateague Island National Seashore, 1978-1982.

Year	<u>Sika Deer</u>		<u>White-tailed Deer</u>		<u>Total Deer</u>
	n	(%)	n	(%)	
1978	26	73.0	10	27.0	36
1979	38	74.5	13	25.4	51
1980	37	69.8	16	30.1	53
1981	52	82.5	11	17.4	63
1982	47	82.4	10	17.5	57
Total	200	76.9	60	23.0	260

Deer Food Habits

Microscopic analysis was conducted on 50 fecal samples obtained from 18 deer (5 white-tailed and 13 Sika deer). Three of the Sika samples were

obtained in July or August, while the remaining samples were extracted from deer checked during the 1982 fall hunting season.

Although there are at least 441 different species of plants on AINS (Higgins et al, 1971) only 35 different plants were identified in the Sika deer fecal samples obtained during late fall (Table 2). Samples from white-tailed deer for late fall showed only 23 different plant fragments with only 3 plants, Hudsonia, (beach heath), Quercus (oak), and Magnolia, not also being represented in the Sika deer pellets. In late fall, white-tailed deer and Sika deer appear to have the same general diet.

Four plants represented over 90% of the relative density of the plant fragments in the Sika pellets. These plants were Solidago (goldenrod), which was present in all Sika deer pellet samples and made up 34.04% of the relative density, Myrica (wax myrtle and bayberry), found in 96.6% of the samples and comprising 27.12% of the relative density, Spartina (marsh cordgrass), identified in 72.4% of the Sika deer pellets and contributing 17.17% to the relative density, and Rhus (dwarf sumac and poison ivy), found in all of the Sika samples and making up 13.19% of the relative density.

Table 2. Plants consumed by deer on Assateague Island National Seashore during late fall, 1982. Based on pellet samples microscopically examined at the Composition Analysis Laboratory, Colorado State University.

PLANT	White-tailed Deer		Sika Deer	
	Fecal Samples (n = 18)		Fecal Samples (n = 29)	
	% Frequency	Relative Density ^a	% Frequency	Relative Density
Ammophila	0.0	0.00	3.4	0.01
Bromus	5.6	0.02	3.4	0.01
Carex	0.0	0.00	24.1	0.38
Distichlis	0.0	0.00	34.5	1.42
Eleocharis	0.0	0.00	10.3	0.15
Eragrostis	0.0	0.00	6.9	0.18
Grass Glume	0.0	0.00	3.4	0.02
Juncus	0.0	0.00	6.9	0.08
Panicum	0.0	0.00	13.8	0.15
Phragmites	0.0	0.00	6.9	0.03
Setaria type	0.0	0.00	3.4	0.10
Spartina	5.6	0.14	72.4	17.17
Unknown grass	5.6	0.14	6.9	0.07
Amelanchier type	0.0	0.00	6.9	0.06
Composite I	11.1	0.87	3.4	0.10
Fern	22.2	0.76	34.5	1.08
Hibiscus	0.0	0.00	3.4	0.25
Hudsonia	5.6	0.49	0.0	0.00
Ilex	0.0	0.00	6.9	0.10

Table 2, continued.

PLANT	White-tailed Deer		Sika Deer	
	Fecal Samples		Fecal Samples	
	(n = 18)		(n = 29)	
	% Frequency	Relative Density ^a	% Frequency	Relative Density
Juniperus	22.2	0.77	13.8	0.46
Lechea	100.0	34.73	44.8	1.25
Liliaceae	0.0	0.00	3.4	0.01
Magnolia	5.6	0.15	0.0	0.00
Myrica	72.2	17.79	96.6	27.12
Persea	0.0	0.00	3.4	0.03
Pinus	27.8	0.46	24.1	0.46
Populus	11.1	0.22	10.3	0.12
Quercus	5.6	0.03	0.0	0.00
Rhus	94.4	16.42	100.0	13.19
Rosaceae type	27.8	2.00	13.8	0.51
Rosa	44.4	1.31	13.8	0.20
Seed	5.6	0.15	20.7	0.42
Smilax	61.1	2.35	13.8	0.35
Solidago type	88.9	14.80	100.0	34.04
Unknown Forb A	5.6	0.20	6.9	0.15
Unknown Forb I	5.6	0.02	6.9	0.11
Unknown Forb	5.6	0.06	3.4	0.01
Vitis	66.7	5.92	10.3	0.18

^a Relative Density = $\left(\frac{\text{Density of fragments for a species}}{\text{Sum of densities of fragments of all species}} \right) \times 100$

164.102 MHz. Live weights were 22, 23, and 32 kg. Two deer were estimated to be one-year old and 1 deer was estimated to be two-years old. Subsequent to capture, marking, and release each deer was known to be alive either from visual or electronic verification.

No useful data were gathered from the telemetered deer due to temporary-personnel problems, and the loss of 2 of the deer to hunters during the 1982 season.