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SOUTHEASTERN COOPERATIVE WILDLIFE DISEASE STUDY



PARASITOLOGY  
COLLEGE OF VETERINARY MEDICINE  
THE UNIVERSITY OF GEORGIA  
ATHENS, GEORGIA 30602

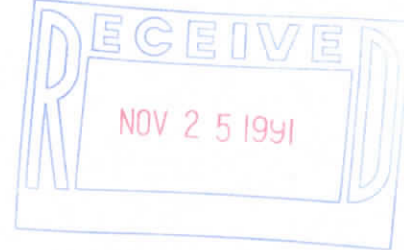
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November 12, 1991

COPY



Mr. John Taylor, Manager  
Tennessee National Wildlife Refuge  
P.O. Box 849  
Paris, Tennessee 38242

Dear Mr. Taylor:

Enclosed are our reports on the deer herd health checks conducted on the Big Sandy and Duck River Units of Tennessee National Wildlife Refuge, Henry and Humphrey Counties, Tennessee on August 21, 1991. The health checks involved examination of five adult deer from each Unit. The data for each area are arranged into a series of tables (parasitologic, serologic, and pathologic) and are accompanied by interpretive comments.

As is evident from our comments, the herd on Big Sandy Unit appears to be within nutritional carrying capacity and is not currently experiencing any overt decline in health status due to density dependent disease agents (parasitism and/or nutritional stress). We did encounter one animal that had experienced a nonfatal but debilitating infection by one of the hemorrhagic disease viruses (probably EHD virus). Although somewhat density dependent, hemorrhagic disease is not strictly related to deer density because of the influence of weather on the biting midge vectors and because the viruses can infect other ruminants in addition to deer. Maintaining deer herds at or below nutritional carrying capacity therefore is only partially effective in reducing losses to hemorrhagic disease. This herd can be maintained at its present level without undue risk of disease related losses.

The herd on the Duck River Unit appears to be closer to nutritional carrying capacity based on APC data and other health parameters. This herd also had evidence of prior activity by hemorrhagic disease viruses indicating a potential for losses to this disease. Although the health status of the Duck River Unit herd is not serious at this time, our data suggest that the herd is at a point where declines in herd health can be expected if current density is maintained. Based on these findings, we recommend that the herd not be allowed to expand beyond its present density and that consideration be given to initiating a slight herd reduction.

We trust that this information will be of value in management of these deer herds. Detailed information on the parasites and diseases covered in these reports can be obtained from the text Diseases and Parasites of White-tailed Deer. In particular, we would refer you to pages 413-423 for an

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explanation of the relationships between deer density, nutrition, and disease. The attached flier also has an elementary explanation of the basics of deer herd health. If you have any questions about these reports or if we can be of assistance on other matters, please do not hesitate to contact us.

Best regards,

Sincerely,



William R. Davidson, Ph.D.  
Associate Professor

WRD:gc

Enclosures

CC: Mr. Don Orr ✓  
Mr. Craig Bitler  
Mr. Gary T. Myers  
Mr. Larry C. Marcum  
Mr. W. Greg Wathen  
Mr. James W. Pulliam, Jr.  
Mr. Harold W. Benson  
Dr. E. Frank Bowers  
Mr. James Jones  
Mr. Cleophas R. Cooke, Jr.  
Mr. Jerry J. Presley  
Mr. Bud Bristow  
Mr. Joe L. Herring

Table 1. Arthropod, helminth, and protozoan parasites of five white-tailed deer (*Odocoileus virginianus*) collected from Big Sandy Unit, Tennessee National Wildlife Refuge, Henry County, Tennessee, on August 21, 1991.

						<u>ARTHROPODS</u>					
Animal Number	1	2	3	4	5	Animal Number	1	2	3	4	5
Age (years)	1	1	1	1	3	Lice	-	-	-	-	-
Sex	F	M	F	F	F	Louse Flies	-	-	-	-	-
Weight (pounds)	84	125	104	90	125	Ticks	Moder	Light	Light	Light	Light
Physical Condition	Fair	Good	Good	Fair	Good	Chiggers	-	-	-	-	-
Kidney Fat Index	56.8	27.3	23.4	19.1	51.3	Ear Mites	-	-	-	-	-
Packed Cell Volume	24	30	38	40	44	Nasal Bots	-	-	-	-	-
Hemoglobin	10	12	16	15	17.5						

<u>Location in Host</u>	<u>HELMINTHS</u>	Number of Parasites Per Deer					<u>Range</u>	<u>Prevalence</u>	<u>Average</u>
		1	2	3	4	5			
Brain	<i>Parelaphostrongylus tenuis</i>	-	-	-	1	2	0-2	40%	0.6
Circulatory									
Lungs	<i>Dictyocaulus viviparus</i>	2	-	1	2	-	0-2	60%	1.0
	Protostrongylid larvae	-	+	+	+	+	-	80%	-
Abdominal Cavity	<i>Setaria yehi</i>	5	2	2	-	1	0-5	80%	2.0
Thoracic Cavity									
Liver									
Esophagus	<i>Gongylonema pulchrum</i>	1	7	3	5	75	1-75	100%	18.2
Rumen									
Abomasum	<i>Mazamastrongylus odocoilei</i>	90	351	120	171	280	90-351	100%	202.4
APC = (328)	<i>Ostertagia mossi</i>	90	117	-	86	-	0-117	60%	58.6
	<i>Ostertagia dikmansi</i>	-	-	-	43	-	0-43	20%	18.6
	<i>Ostertagia ostertagi</i>	-	58	-	-	-	0-58	20%	11.6
	<i>Trichostrongylus axei</i>	-	234	-	-	-	0-234	20%	46.8
	<u>PROTOZOANS</u>								
Blood	<i>Trypanosoma cervi</i>	+	-	+	+	+	-	80%	-
	<i>Theileria cervi</i>	+	+	+	+	+	-	100%	-

Table 2. Results of serologic tests for selected diseases in five white-tailed deer from Big Sandy Unit, Tennessee National Wildlife Refuge, Henry County, Tennessee on August 21, 1991.

Disease	Deer Number				
	1	2	3	4	5
Leptospirosis					
(serotype <u>pomona</u> )	Neg	Neg	Neg	Neg	Neg
(serotype <u>hardjo</u> )	Neg	Neg	Neg	Neg	Neg
(serotype <u>grippotyphosa</u> )	Neg	Neg	Neg	Neg	Neg
(serotype <u>icterohemorrhagiae</u> )	Neg	Neg	Neg	Neg	Neg
(serotype <u>canicola</u> )	Neg	Neg	Neg	Neg	Neg
(serotype <u>bratislava</u> )	Neg	Neg	Neg	Neg	Neg
Brucellosis	Neg	Neg	Neg	Neg	Neg
Anaplasmosis	Neg	Neg	Neg	Neg	Neg
Infectious bovine rhinotracheitis (IBR)	Neg	Neg	Neg	Neg	Neg
Bovine virus diarrhea (BVD)	Neg	Neg	Neg	Neg	Neg
Parainfluenza <sub>3</sub> (PI <sub>3</sub> )	Neg	Neg	Neg	Neg	Neg
Epizootic hemorrhagic disease (EHD)	Pos	Neg	Neg	Pos	Neg
Bluetongue (BT)	Sus	Neg	Neg	Sus	Neg
Vesicular stomatitis virus (VSV-NJ)	Neg	Neg	Neg	Neg	Neg
Vesicular stomatitis virus (VSV-Ind)	Neg	Neg	Neg	Neg	Neg

Table 3. Lesions and pathologic conditions in five white-tailed deer collected from Big Sandy Unit, Tennessee National Wildlife Refuge, Henry County, Tennessee, on August 21, 1991.

Lesion/Condition	Deer Number				
	1	2	3	4	5
Granulomatous meningitis	-	-	-	1	1
Peribronchitis	1	-	-	1	1
Fibrinous Pleuritis	1	1	1	1	1
Pulmonary adhesions	-	-	-	1	1
Verminous pneumonitis	-	1	2	1	1
Fibrinous peritonitis	1	1	1	-	-
Multifocal granulomatous lymphadenitis	-	-	2	-	-
Chronic ruminitis/Atrophy rumenal papillae	3	-	-	-	-

\*Key: - = lesion or condition not present; 1 = minor tissue damage or mild pathologic change; 2 = moderate tissue damage or moderate pathologic change; 3 = extensive tissue damage or marked pathologic change.

INTERPRETIVE COMMENTS: Meningeal worms (Parelaphostrongylus tenuis) present in low numbers in two deer and associated with mild central nervous system lesions (meningitis) in both animals. Large lungworms (Dictyocaulus viviparus) present in low numbers in four deer. Large lungworms and protostrongylid larvae (from meningeal worms and possibly muscleworms, P. andersoni) associated with mild to moderate lung damage (peribronchitis, pleuritis, pneumonitis, pulmonary adhesions) in all deer. Abomasal parasites (Mazamastrongylus odocoilei, Ostertagia mossi, O. dikmansii, O. ostertagi, and Trichostrongylus axei) at a low level (APC = 328) indicating a high probability that the herd is below nutritional carrying capacity. Abdominal worms (Setaria yehi) and gullet worms (Gongylonema pulchrum) present at low to moderate levels but not considered pathogenic at these intensities. Abdominal worms associated with mild inflammation of the abdominal surfaces (peritonitis) in three deer. Blood protozoans (Trypanosoma cervi and/or Theileria cervi) present in all deer with the latter considered a stressor only in malnourished, heavily parasitized hosts. Arthropod parasites at levels less than those commonly found on white-tailed deer in southeastern United States.

Physical condition ratings, kidney fat indices, body weights, and hematologic values not remarkable. In addition to lesions attributable to parasitism (noted above), pathologic studies disclosed inflammation of the lymphnodes and lymphatic vessels (lymphadenitis) of undetermined cause (cultures and special stains of tissues were negative) in one deer. One deer had extensive damage to rumen mucosa (ruminitis/ atrophy of rumenal papillae). The rumen lesions were severe and was consistent with prior infection by one of the hemorrhagic disease viruses. Serologic tests for antibodies to selected infectious diseases disclosed antibodies to EHD and/or bluetongue viruses in two deer, including the one with rumen lesions. The occurrence of antibodies and/or lesions in these deer indicates previous activity by this virus within the herd. Both EHD and bluetongue viruses are the etiologic agents of hemorrhagic disease which is the most significant infectious disease of white-tailed deer in the Southeast. The remaining serologic tests were uniformly negative indicating minimal (if any) activity by these infectious agents.

An overview is as follows: 1) based on APC data the herd is below the nutritional carrying capacity; 2) the levels of important pathogenic parasites (lungworms, ticks, blood protozoans) were not at levels considered sufficient to produce mortality; 3) pathologic evidence of a parasitism/malnutrition syndrome was not detected; 4) there has been activity by hemorrhagic disease viruses which are the most important infectious disease agents of deer; and 5) the overall health status of the population is such that mortality to malnutrition/parasitism should not be expected to occur in the near future; however, the future activity of hemorrhagic disease viruses within the herd is unpredictable. Based on these findings, this herd can be maintained near its present density without undue risk of losses to density dependent disease factors (parasitism and nutritional stress).