

## **SEROLOGIC SURVEY OF TWO DEER HERDS IN NEW YORK STATE**

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## BRIEF NOTES, SURVEYS AND COMMENTS

SEROLOGIC SURVEY OF TWO  
DEER HERDS IN NEW YORK STATE

A study was made of the serums from 261 blood samples collected from two white-tailed deer herds (*Odocoileus virginianus borealis*) in New York State. Samples were collected during special post-season hunts on two areas with dense winter deer populations, which at times exceed 100 deer per square mile. Sera were tested for evidence of exposure to the etiologic agents of leptospirosis, tularemia, rickettsiae, brucellosis, infectious bovine rhinotracheitis, bovine virus diarrhea, and arthropod-borne encephalitis.

The first problem area, Lordville, was located in the eastern part of the State and was a long-established winter deer yard of mountainous terrain. The food supply was limited and of poor quality. For many years, there has been chronic starvation, and winter mortality has reached 50 deer per square mile (Heselson and Jones, P. R. Report W-89-R-8, Job III-F, N.Y.S. Cons. Dept., 1963).

Ripley the second area, was a narrow flat agricultural belt of orchards and vineyards interspersed with farm woodlots and is located along the shore of Lake Erie. Deer moved into this area to escape the heavy snows and cold temperatures of the adjacent highlands. The food supply was plentiful and of good quality. No winter mortality studies were

made, but mortality was believed minimal.

## Tests

Tests for antibodies against the agents of leptospirosis, tularemia, and rickettsial diseases, and for encephalitis were made by Mrs. The'ma Muraschi and Miss Elinor Whitney, Division of Laboratories and Research, New York State Department of Health; for brucellosis, by Dr. Paul Nicoletti, U. S. Department of Agriculture, Animal Health Division and for infectious bovine rhinotracheitis and bovine diarrhea by Dr. Robert Kahrs, Veterinary Virus Research Institute, Cornell University.

<sup>1</sup> A contribution of Federal Aid in Fish and Wildlife Restoration - Project 35-R.

## Results

The results are summarized in Table 1.

**Leptospirosis** Three of 111 serum specimens from Lordville gave 3+ or 4+ reactions in the latex agglutination screening test for leptospirosis. In the tube agglutination test, one of these had a titer of 1:100 for *Leptospira pomona*; another a titer of 1:100 for *L. pomona*, *L. icterohemorrhagiae*, and *L. grippotyphosa*; the third had no significant titer. None of the 150 sera from the Ripley sampling reacted.

**Tularemia and Rickettsial Infections:** Two of the 150 Ripley specimens had a titer of 1:20 in the tube agglutination

Table 1. Serologic Tests of Specimens Collected From White-Tailed Deer

Infection	Lordville			Ripley		
	Number tested	Number of reactors	Per cent reactors	Number tested	Number of reactors	Per cent reactors
Leptospirosis	111	3 <sup>1</sup>	2.7	150	0	0
Tularemia	111	0	0	150	2	1.3
Rickettsial infection	111	6	5.4	150	3	2.0
Brucellosis	89	0	0	117	0	0
Infectious bovine rhinotracheitis	89	4	4.5	109	0	0
Bovine virus diarrhea	87	5	5.7	114	8	7.0
Arbovirus	30	1	3.3	24	9	37.5

<sup>1</sup> The reactors at 3 or 4 in latex agglutination screening test; when examined in tube agglutination tests, only two exhibited significant reactions.

test for *Pasteurella tularensis*. One specimen of 150 from Ripley had a titer of 1:40 for *Proteus vulgaris*, strain OX 19, which is indicative of current rickettsial infection. Two other specimens from Ripley and 6 of 111 from Lordville had OX 19 titers of 1:20, but the significance of these results is questionable.

**Brucellosis:** No reactions with *Brucella* antigen were found in 89 sera from Lordville and 117 sera from Ripley. A standard plate agglutination test, 1:25 dilution, was used.

**Infectious Bovine Rhinotracheitis and Bovine Virus Diarrhea:** In serum neutralization tests, 4 of 89 sera from Lordville showed evidence of antibodies for IBR in a 1:2 dilution; none of the 109 sera from Ripley showed neutralizing antibodies. Five of 87 sera from Lordville and 8 of 114 from Ripley had neutralizing antibodies, in a 1:2 dilution, for bovine virus diarrhea.

**Arbovirus Infection:** Sera were examined by hemagglutination-inhibition (HAI) techniques with five arbovirus antigens: eastern and western encephalitis, Powassan, St. Louis encephalitis, Bunyamwera group, Cache Valley. One of 30 sera from Lordville and 9 of 24 from Ripley inhibited hemagglutination of the Bunyamwera group. No reactions were obtained with the other viral antigens.

#### Discussion and Conclusions

**Leptospirosis:** Leptospirosis has been reported previously among wild deer populations (Wedman, E. E. and F. C. Driver, J. Amer. Vet. Med. Assn. 130: 513-514, 1957; Ferrie *et al.*, Proc. Communicable Disease Center Conf. for teachers of Vet. Pub. Health and Prev. Med. and Pub. Health Workers, June 12-18, 354-361 1958; and Goldstein *et al.*, Proc. 62nd Annual Meeting U. S. Livestock San. Assn. 104-108, 1958) and specifically *L. pomona* has been isolated from wild white-tailed deer in this State (Reilly *et al.*, Cornell Vet. (1): 94-98, 1961).

The two reactions which occurred in a 1:100 dilution may indicate nonspecific reactions, previous exposure, or initial onset of the disease, since a titer of at least 1:300 is considered significant for clinical diagnosis of current infection. The one specimen that gave a positive reaction in the latex agglutination test but not in the tube agglutination test may represent a nonspecific reaction in the former or a possible leptospirosis species not tested for in the latter.

**Tularemia:** Shaughnessy (In: Hull, T. G., *Diseases Transmitted from Animals to Man*, 5th ed., 588-604, 1963) reported that *Pasteurella tularensis* has been found in deer but makes no reference to the incidence, while Fay (Trans. 26th N. Amer. Wildl. and Natural Resources Conf., 203-210, 1961) cited Baily as having reported that only 1 deer of 2,294 examined had a high titer to this disease. The finding of only two low and questionable titers from 261 sera tested in this survey indicates a low incidence in the herds studied.

**Rickettsial Infection:** Only one of seven reactions with *P. vulgaris*, strain OX 19, was indicative of current infection. Since the test employed is a general screening test, the identity of the pathogen is not known.

**Brucellosis:** Fay (*Op. cit.*) summarized the testing of nearly 17,000 white-tailed and mule deer (*Odocoileus hemionus*) in 16 states and concluded that brucellosis is a comparatively rare disease in deer of the United States. The absence of reactions in our tests supports Fay's conclusion.

**Infectious Bovine Rhinotracheitis and Bovine Virus Diarrhea:** The serum neutralization titers of 1:2 against IBR and BVD viruses are only suggestive evidence that these diseases of cattle occur in deer. To our knowledge, these diseases have not previously been studied in wild white-tailed deer populations, and further study is warranted.

**Arbovirus Infection:** The observations that a high percentage of HAI titers to

the Bunyamwera group antigen in deer from the Ripley area and that no HAI titers to the other groups in deer from both areas were found warrant further investigation.

The findings of this survey offer leads for further study of infections of white-tailed deer, especially those caused by rickettsiae, and viruses of the Bunyamwera group, infectious bovine rhinotracheitis, and bovine virus diarrhea. Ecological factors such as variations in the fauna, population densities of the deer and the relationship of these densities to range condition should be considered.

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#### RABIES IN WILDLIFE AT FORT KNOX

A rabies survey was conducted in the wildlife population at Fort Knox, Kentucky, during the months, February to May, 1965. This program was initiated after a child had been bitten by a rabid skunk. Another person had been bitten by a skunk which was proven rabid the previous April.

The Post Game Warden and the Land Management Unit trapped the animals and submitted them to the Post Veterinarian. Trapping was distributed over most of the Post but was more intensive near housing, recreational and maneuver areas. The veterinarian selected fifty heads of the most likely species that were in good condition. These heads were shipped to Fort Meade under dry ice refrigeration because decomposition by autolysis and bacterial growth are both stopped at this temperature. The common objection that freezing always makes tissue unsatisfactory for histological studies is not valid. Rapid freezing at low temperatures does not cause swelling and rupture of the cells.

The brains were examined for Negri

bodies using Seller's stain and by the fluorescent rabies antibody technique. The positives were further confirmed by mouse inoculation. The following results were obtained:

Species	No.	Neg.	Pos.
Fox	19	19	--
Skunk	18	12	6*
Raccoon	8	8	--
Opossum	3	3	--
Mink	1	1	--
Cat	1	1	--
	50	44	6

\* Includes the February bite case.

Finding rabies in 6 of 18 skunks pinpoints an acute problem, particularly since many skunks seemed to be present in the area. The high rate of rabies among skunks and the absence of the disease in other species is significant. The degrees of avoidance and aggression exhibited by animals for each other are probably important factors in the transmission of rabies. No further cases of rabies have been found at Fort Knox since completion of this survey.

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#### ASPERGILLOSIS IN A COMMON

##### LOON (*Gavia immer*)

Chute *et al.* (Maine Agric. Exp. Station Misc. Publ., 655: 1-120, 1962) listed five references which reported the occurrence of aspergillosis among loons (*Gaviiformes*); most of these cases occurred among loons being held in zoological parks. Hartman (Auk, 63: 588-589, 1946) reported a case of aspergillosis in an immature common loon collected in the wild near Everglade City (sic), Florida. The loon was swimming at the time of collection and when dissected was found to have an extensive mycotic infection of the abdominal and thoracic air sacs. Hartman reported that the lungs were grossly free of the infection.

Since 1963 rather extensive losses