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SEROLOGIC EVIDENCE OF *Anaplasma marginale* INFECTION IN WHITE-TAILED DEER *(Odocoileus virginianus)* IN MISSOURI[1]

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Abstract: Sera obtained from 616 (1.16%) of the 53,310 white-tailed deer *(Odocoileus virginianus)* harvested in Missouri in the fall of 1979 were analyzed by the modified rapid card agglutination (MRCA) test for antibodies against *Anaplasma marginale.* The results indicated a low prevalence (1.14%) of MRCA reactors in the white-tailed deer population sampled.

INTRODUCTION

Columbian black-tailed deer *(Odocoileus hemionus columbianus)* are recognized carriers of *Anaplasma marginale.*[1,2,3] Blood from infected black-tailed deer,[4,11] mule deer[13] and elk[9,14] has been shown to be infective for cattle. In California and other areas of the Pacific Northwest, deer are considered to be important reservoirs of anaplasmosis. *Anaplasma marginale* is readily transmissible from deer to cattle in the Coast Range grazing areas of California.[5] White-tailed deer *(Odocoileus virginianus)* have been experimentally infected with *A. marginale.*[7,16,17]

The modified rapid card agglutination (MRCA) test for antibodies against *A. marginale* has been used in several species of wild ruminants: Columbian black-tailed deer,[6] elk,[9,14] mule deer[13] and axis and fallow deer.[15] The MRCA test was found to have a high degree of specificity and sensitivity in these studies.

The importance of white-tailed deer as reservoirs of anaplasmosis in Missouri has not been documented; therefore, the purpose of this study was to measure serological evidence of anaplasmosis in the free-ranging deer population. The MRCA test was used to examine the serum from hunter-killed white-tailed deer for antibodies to *A. marginale.*

MATERIALS AND METHODS

This survey was conducted in conjunction with the Missouri Department of Conservation's special deer hunts of 1979 and the statewide conventional firearm deer season of 1979.

Collection of Serum Samples

Special Hunts. All hunters were given a whirl-pack bag with attached instruction sheet. They were instructed to collect approximately 60 ml of blood from the external jugular vein of freshly killed deer or to collect blood clots from the heart. Successful hunters returned the blood sample to the official check station where data on sex, age, weight and other physical parameters were recorded. Blood samples were kept at 4 C until the serum was separated. Sodium azide (0.1M) was added to each serum sample to prevent microbial growth. The sera were processed according to the

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methods of Howarth, *et al.*[6] and Magonigle and Eckblad.[9]

Regular Season Hunt. Blood samples were obtained through the cooperation of wildlife biologists at the Department of Conservation deer check stations. Samples were stored at 4 C until arrival at the laboratory.

Analysis of Serum

Sera were tested for agglutinating antibodies against *A. marginale* by the modified rapid card agglutination (MRCA) test.[6,9] All sera were held at room temperature (20 C) for 72 h prior to the testing. The MRCA test was conducted in accordance with the manufacturer's directions.[a]

RESULTS

A total of 616 serum samples suitable for testing was obtained from the special hunts and regular season surveys and 7 of the 616 (1.14%) samples were positive by the MRCA test. The combined deer kill during these hunts was 53,310 animals. (Porath, W. 1979. Pers. commun.) The 616 sera represent a sampling rate of approximately 1.16% of the harvested deer. The minimum estimate of the white-tailed deer population of Missouri is 350,000. (Porath, W. and N. Giessman. 1979. Pers. commun.) The 616 samples thus represent a sampling rate of approximately 0.18% of the entire deer population.

DISCUSSION

The results of this study indicate that the prevalence (1.14%) of anaplasmosis MRCA reactors in the white-tailed deer population sampled was low. Thus, the free-ranging deer population cannot be considered a significant reservoir of anaplasmosis in Missouri. The prevalence of anaplasmosis in cattle in Missouri has been established to be approximately 13%.[10] Probably the MRCA positive samples represent transmission of *A. marginale* from domestic cattle populations to free-ranging deer populations in Missouri.

White-tailed deer can be infected with *A. marginale;*[16,17] however, the disease is subclinical unless the animal previously has been splenectomized. Since the present study did not examine MRCA reactions of experimentally infected white-tailed deer, the MRCA positive reactions could be false positives.

The home range of white-tailed deer in Missouri is relatively small, usually 5 km^2 or less,[18] often limited to a few favored bedding and feeding sites. This would tend to limit contact between domestic cattle populations and wild deer poulations to a fraction of the potential and may partially explain the low prevalence of MRCA reactors in the present study.

Horseflies are thought to be the primary vectors of anaplasmosis in the midwest. Highly efficient tick vectors, such as *Dermacentor occidentalis* and *Dermacentor andersoni,* are not found in Missouri. Horseflies are not considered to be as efficient as these ticks and this may offer another possible explanation for the low prevalence seen in Missouri deer.

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