NOTES

Fla. Field Nat. 19(2): 49-51, 1991.

PIROPLASMS OF WHITE-TAILED DEER (*ODOCOILEUS VIRGINIANUS*) IN FLORIDA

SAM R. TELFORD, JR. AND DONALD J. FORRESTER
Department of Infectious Diseases, College of Veterinary Medicine, University of Florida, Gainesville, Florida 32610

The white-tailed deer (*Odocoileus virginianus*) is host to two species of piroplasms (Apicomplexa: Piroplasmorida) in various portions of its range: *Babesia odocoilei* Emerson and Wright 1970 (Babesiidae), and *Theileria cervi* Bettencourt, Franca and Borges 1907 (Theileriidae) (Kingston 1981). *Babesia odocoilei* is apparently uncommon, for it has been reported in white-tailed deer only in Texas (Emerson 1969; Emerson and Wright 1968; Waldrup et al. 1989a, b), Oklahoma (Waldrup et al. 1989a), and Virginia (Perry et al. 1985). Spindler et al. (1958) found a *Babesia* species in white-tailed deer in New Mexico, but did not provide a species designation. Although hemolytic disease has been documented in immunocompromised deer (Emerson and Wright 1968, Perry et al. 1985), the effects on wild populations have not been determined (Waldrup et al. 1989a). *Theileria cervi*, on the other hand, is more common and is known in white-tailed deer from Missouri, Oklahoma, Texas, Arkansas, Virginia, and Alabama (Kingston 1981), as well as from Florida, Georgia, South Carolina, and Maryland (Davidson et al. 1983). Marburger et al. (1965) suggested that *T. cervi* had been responsible for the massive die-off of white-tailed deer (some 30,000) in the Central Mineral Region of Texas within a two-week period in late summer, 1962. Experimental studies on the pathogenicity of *T. cervi* by Robinson et al. (1967) did not provide conclusive evidence that this piroplasm is pathogenic to deer under normal conditions, but the authors suggested that this parasite represents a potential threat when high deer density and poor nutrition coincide with the presence of other diseases and parasites.

Blood samples of 21 white-tailed deer were available from Duval, Alachua, Levy, and Citrus counties in northern Florida. Thin blood films were prepared, fixed in absolute methanol and stained by standard Giemsa technique. One deer, a 7-8 month old male collected in December 1989 in Citrus County, showed a moderate erythrocytic infection of a *Babesia* that did not differ in appearance from *B. odocoilei* (Fig. 1, Nos. 1-5). This is the first report of a *Babesia* infection in white-tailed deer from Florida, and apparently is only the second report from the southeastern United States. Perry et al. (1985) examined six white-tailed deer from the Great Dismal Swamp of southeastern Virginia, and found *B. odocoilei* infections in two yearlings. *Theileria cervi* (Fig. 1, Nos. 6-8) was found in all 16 white-tailed deer from Duval County (aged 6 months to 8 years, eight males and eight females, collected December 1978 to January 1979), and in two of two from Alachua County (a yearling male in December 1977, and another male, 3-5 years old, in October 1982). Two deer collected in Levy County were negative (a female, 6 months old, in December 1982; and a male >1 month of age, in May 1974). *Babesia* and *Theileria* were readily distinguished by size, shape, and the relative quantity of cytoplasm in the infections reported here. In the *Babesia* infection, the nuclei were 1.5 to 3 times the size of the *Theileria* nuclei, with proportionately greater amounts of cytoplasm (Fig. 1, Nos. 1-5), and the comma-shape characteristic of the genus was commonly seen (Fig. 1, No. 4). *Theileria* were elongate (Fig. 1, No. 6) or round (Fig. 1, Nos. 6-8). Even the largest rounded forms (Fig. 1, No. 8) showed a cytoplasm quantity less than half that of the nucleus. In cooperation with the Florida Game and Fresh Water Fish Commission and the U. S. National Park Service, our laboratory has examined white-tailed deer from Collier, Monroe, and Dade counties in

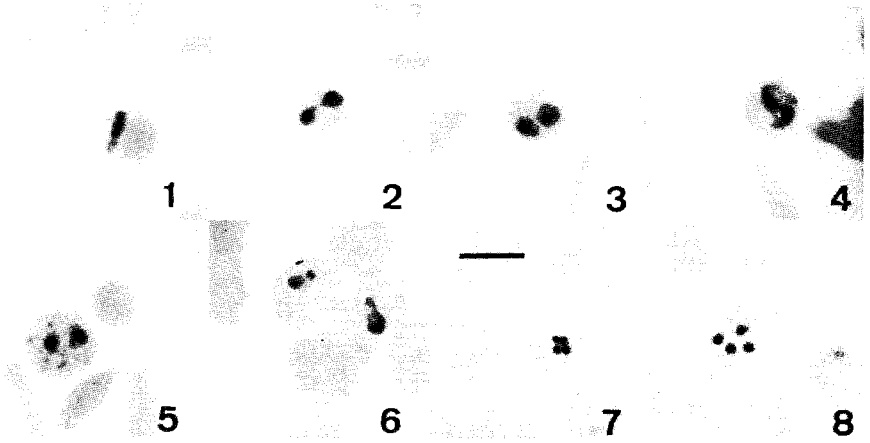

Figure 1. Piroplasms found in white-tailed deer. Nos. 1-5 show *Babesia odocoilei* in erythrocytes of *Odocoileus virginianus*, Citrus County, Florida. Nos. 6-8 show *Theileria cervi* in erythrocytes of *Odocoileus virginianus*, Duval County, Florida. Horizontal bar = 4 μm; slides stained by standard Giemsa technique.

southern Florida between 1984 and 1990. Blood samples from 278 of these were examined for haemoparasites, and only *Trypanosoma cervi* was found (Telford et al. 1991; Telford and Forrester, unpublished data). It was detected by blood culture specific for trypanosomes and examination of standard thick and thin blood films. The use of blood films to diagnose piroplasm infections only provides evidence that the parasites are present in the community; negative results do not necessarily indicate that they are absent. Because deer chronically infected with piroplasms may not show patent infections (Kingston 1981), prevalence can only be established by serological, subinoculation, or specialized culture techniques.

The natural vectors of *T. cervi* and *B. odocoilei* in Flordia have not been determined, but evidence suggests that the ticks *Amblyomma americanum* and *Ixodes scapularis* might be involved (Kingston 1981, Davidson et al. 1983, Waldrup et al. 1990). Both ticks have been found on white-tailed deer in Florida (Forrester in press).

Representative blood films have been deposited in the U. S. National Parasite Collection, Beltsville, Maryland (Accession Nos. 81275-81276). We wish to thank W. O. Sermons and J. W. McCown of the Florida Game and Fresh Water Fish Commission for their help in obtaining the white-tailed deer. M. D. Young, E. C. Greiner, C. H. Courtney, and M. G. Spalding reviewed the manuscript, and we thank them. This research was supported by contracts from the U. S. National Park Service and the Florida Game and Fresh Water Fish Commission, and is a contribution of Federal Aid to Wildlife Restoration, Florida Pittman-Robertson Project W-41. Florida Agricultural Experiment Stations Journal Series No. R-00928.

Literature Cited

Davidson, W. R., C. B. Crow, J. M. Crum, and R. R. Gerrish. 1983. Observations on *Theileria cervi* and *Trypanosoma cervi* in white-tailed deer (*Odocoileus virginianus*) from the southeastern United States. Proc. Helminthol. Soc. Wash. 50: 165-169.

EMERSON, H. R. 1969. A comparison of parasitic infestations of white-tailed deer (*Odocoileus virginianus*) from central and east Texas. Bull. Wildl. Dis. Assoc. 5: 137-139.

EMERSON, H. R., AND W. T. WRIGHT. 1968. The isolation of a *Babesia* in white-tailed deer. Bull. Wildl. Dis. Assoc. 4: 142-143.

FORRESTER, D. J. In press. Parasites and Diseases of Wild Mammals in Florida. University of Florida Press, Gainesville.

KINGSTON, N. 1981. Protozoan parasites. Pp. 193-236 *in* Diseases and parasites of white-tailed deer (W. R. Davidson et al. Eds.). Tall Timbers Research Station, Tallahassee, Florida. Miscellaneous Publication Number 7.

MARBURGER, R. G., R. M. ROBINSON, J. W. THOMAS, AND K. A. CLARK. 1965. Management implications of disease of big game animals in Texas. Proc. Southeast. Assoc. Game Fish Comm. 24: 46-50.

PERRY, B. D., D. K. NICHOLS, AND E. S. CULLOM. 1985. *Babesia odocoilei* Emerson and Wright, 1970 in white-tailed deer, *Odocoileus virginianus* (Zimmermann), in Virginia. Jour. Wildl. Dis. 21: 149-152.

ROBINSON, R. M., K. L. KUTTLER, J. W. THOMAS, AND R. G. MARBURGER. 1967. Theileriasis in Texas white-tailed deer. Jour. Wildl. Manage. 31: 455-457.

SPINDLER, L. A., R. W. ALLEN, L. S. DIAMOND, AND J. C. LOTZE. 1958. *Babesia* in a white-tailed deer. Jour. Protozool. 5 (suppl.): 8.

TELFORD, S. R., JR., D. J. FORRESTER, S. D. WRIGHT, M. E. ROELKE, S. A. FERENC, AND J. W. MCCOWN. 1991. The identity and prevalence of trypanosomes in white-tailed deer (*Odocoileus virginianus*) from southern Florida. Jour. Helminthol. Soc. Wash. 58: 19-23.

WALDRUP, K. A., A. A. KOCAN, T. QURESHI, D. S. DAVIS, D. BAGGETT, AND G. G. WAGNER. 1989a. Serological prevalence and isolation of *Babesia odocoilei* among white-tailed deer (*Odocoileus virginianus*) in Texas and Oklahoma. Jour. Wildl. Dis. 25: 194-201.

WALDRUP, K. A., E. COLLISSON, S. E. BENTSEN, C. K. WINKLER, AND G. G. WAGNER. 1989b. Prevalence of erythrocytic protozoa and serologic reactivity to selected pathogens in deer in Texas. Prev. Vet. Med. 7: 49-58.

WALDRUP, K. A., A. A. KOCAN, R. W. BARKER, AND G. G. WAGNER. 1990. Transmission of *Babesia odocoilei* in white-tailed deer (*Odocoileus virginianus*) by *Ixodes scapularis* (Acari: Ixodidae). Jour. Wildl. Dis. 26: 390-391.

Fla. Field Nat. 19(2): 51-53, 1991.

SUCCESSFUL NESTING BY REDDISH EGRETS AT OSLO ISLAND, INDIAN RIVER COUNTY, FLORIDA

BRIAN TOLAND

Florida Game and Fresh Water Fish Commission, Office of Environmental Services 110 43rd Avenue, S. W., Vero Beach, Florida 32968

The Florida population of the Reddish Egret (*Egretta rufescens*) has been slow to recover from the impact of plume-hunting, which caused the near extirpation of the species by 1890 (Robertson 1978). Still a rather rare species throughout its range (Robertson 1978, Hancock and Kushlan 1984), the Reddish Egret has only recently begun to expand its Florida nesting range from Everglades National Park and the Lower Florida Keys west to Marco Island and north to Tampa Bay (Bancroft 1971, Paul et al. 1975, Paul et al. 1979, Paul 1982, Hancock and Kushlan 1984). The gradual recolonization of its former breeding