THE ISOLATION OF A BABESIA IN WHITE-TAILED DEER 1

Author: EMERSON, H. R.

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The *Babesia spp.* are present in many countries of the world and produce widespread disease in wild and domestic animals. *Babesia bigemina* caused extensive economic losses in the southern United States in the nineteenth and twentieth centuries and was finally eliminated by the eradication of its vector, *Boophilus annulatus.*

Spindler (1958, J. Prot., 5(3):8) reported a Babesia-like organism in blood smears from a white-tailed deer (*Odocoileus virginianus*) in New Mexico. Attempts to isolate and propagate the organism were unsuccessful.

Isolation of a *Babesia spp.* from white-tailed deer in Tyler County, Texas indicated that Babesia infections were present in East Texas deer populations. A 10 ml. pooled blood sample from 3 deer collected in Tyler County was injected into a splenectomized, 18-month-old, male, white-tailed deer. On the fifth day post-inoculation, the deer was anorectic and had a rectal temperature of 104.5 F. The packed cell volume was 15.5 percent. Erythrocytes in Giemsa stained blood smears made 120 hours post-inoculation contained intracellular bodies similar to Babesia. The organism more closely resembled *Babesia divergens* morphologically than other recorded Babesia species. Forty percent of the erythrocytes were infected in the experimentally inoculated deer which died 8 days post-inoculation. At necropsy there was extreme icterus of all mucous membranes, lungs, brain, and serosa of the intestines and multiple petechial and ecchymotic hemorrhages in the subepicardium. The urinary bladder contained approximately 500 ml. of dark red urine. A diagnosis of babesiosis was made from the morphological appearance of the parasite.

Babesia divergens were described as paired, divergent, club-shaped organisms averaging 1.5 x 0.4 μ and located peripherally in the parasitized erythrocyte (Ricardson, 1963. Veterinary Protozoology. Oliver and Boyd, London, 157-161). The Texas Babesia isolate, which we have designated *Babesia cervi*, is a mononucleated hemoprotozoan that reproduces by binary fission or budding. Single organisms produce paired, divergent, club-shaped bodies averaging 1.9 x 0.75 μ, located peripherally in parasitized erythrocytes, which are characteristic of the infection (Figure 1).

Babesia divergens infection occurred primarily in adult cattle. Splenectomized calves under 1 year of age were highly susceptible to the infection. *Babesia divergens* caused an active infection in other mammals including red deer, fallow deer, roe deer, mouflon sheep, chimpanzees, and man (Levine, 1961. Protozoan Parasites of Domestic Animals and Man. Burgess Publ. Co., Minneapolis. p. 295; Enigk, 1962, L. Parasitenk, 21:238-256). *Babesia cervi* produced a fulminant, hemolytic disease in splenectomized deer and a chronic disease characterized by emaciation and anemia after 6 to 12 months in intact deer, which apparently were the primary hosts of the hemoprotozoan. We failed to transmit *Babesia cervi* to splenectomized calves, sheep, and goats by intravenous inoculation of infected blood. Differences between *Babesia divergens* and *Babesia cervi* in relation to size and primary host indicated that they should be considered distinct species.

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The examination of Giemsa-stained blood smears from deer suggests that this disease is enzootic in East Texas and may be an important cause of mortality of deer.

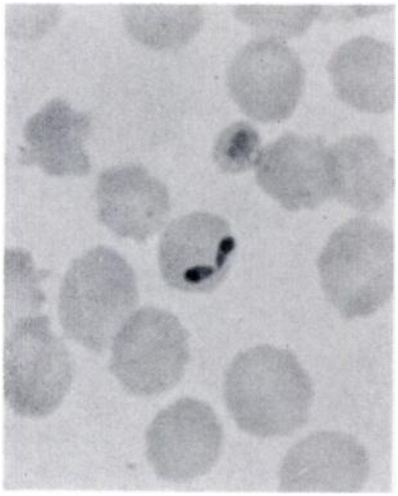

Figure 1. *Babesia cervi* (N. sp.) within an erythrocyte.

H. R. EMERSON,
Department of Veterinary Pathology
Texas A&M University
College Station, Texas
and W. T. WRIGHT,
Texas Parks and Wildlife Department
Silsbee, Texas
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PHENYLKETONURIA IN A MULE DEER (Odocoileus hemionus)[1]

Potential space fluids and urine samples were taken from several mule deer collected in Northeast New Mexico during the spring, 1968. A urine sample, collected by manual expression of the bladder of a three year old buck, was tested for phenylpyruvic acid using Phenistix Reagent Strips (Ames Company, Inc., Elkhart, Ind.) and gave a positive test of more than 100 mg/100 ml urine. Urine samples from three other deer were tested with negative results. To our knowledge, this is the first reported case of phenylketonuria in mule deer. The buck suffering from this inherited metabolic disorder showed no obvious behavioral features indicative of the mental retardation associated with phenylketonuria in humans, and it had survived a relatively long time under natural conditions. Its weight, 105 lbs., compares favorably with the 97 and 110 lb. weights of two other adult bucks collected in the same area, indicating that it had developed normally despite its supposed handicap. The generally low weights of these three deer are indicative of the poor browse available in the collection area.

E. H. STUDIER
Department of Biology,
New Mexico Highlands University
Las Vegas, New Mexico 87701

W. G. EWING
Department of Zoology,
Oregon State University
Corvallis, Oregon 97331
July 17, 1968

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