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MOSQUITO TRANSMISSION OF WILD TURKEY MALARIA, *Plasmodium hermani*¹

MARTIN D. YOUNG,² JAI K. NAYAR³ and DONALD J. FORRESTER²

Abstract: *Culex nigripalpus* experimentally transmitted *Plasmodium hermani*, a plasmodium of wild turkeys (*Meleagris gallopavo*) in Florida. The mosquitoes were infected by feeding upon blood induced parasitemias in domestic turkey poults. The resulting sporozoites, transmitted by either mosquito bites or injection, produced malaria infections in domestic poults.

INTRODUCTION

Recently wild turkeys (*Meleagris gallopavo*) in Florida were found infected with a new species of malaria.² This parasite was discovered by subinoculating blood from wild turkeys into domestic turkey poults according to the method of Herman *et al.*³ The parasite was described from peripheral blood smears of the resulting parasitemias and named *Plasmodium hermani*.⁴ No vectors of this *Plasmodium* are known. The purpose of this study was to investigate the susceptibility of certain Florida mosquitoes to this parasite and to attempt transmission into domestic turkey poults (Broad-breasted white, Nicholas strain).

MATERIALS AND METHODS

Three- to five-day-old females of ten different species of colonized or F₁ generation of Florida mosquitoes were tested for vector potential, viz., *Anopheles quadrimaculatus* Say, *Anopheles crucians crucians* Wiedemann, *Anopheles albimanus* Wiedemann, *Aedes taeniorhynchus* (Wiedemann), *Aedes aegypti* (L.), *Aedes triseriatus* Say, *Culex nigripalpus* Theobald, *Culex pipiens quinquefasciatus* Say, *Psorophora columbiae* (D. & K.) *Wyeomyia medioalbipes* Lutz. These mosquitoes, which inhabit the

same geographical area (south central Florida) as the wild turkeys, were reared and maintained as described by Nayar and Sauerman⁴ and Nayar and Pierce.⁵

Two domestic turkey poults with induced *P. hermani*⁴ infections were used as hosts. Gametocytes were present in the peripheral blood smears. Beginning on the third day of parasitemia, groups of approximately 200 female mosquitoes of each species were blood-fed to repletion on 9 of the next 17 days. Each lot of mosquitoes was allowed only one infective blood meal. Thereafter they were maintained at 27 C and a relative humidity of 75% and were fed a 10% sucrose solution.

RESULTS AND DISCUSSION

Of the 10 species tested, complete development of the sporogonic cycle occurred only in *C. nigripalpus*. Those feeding on days 4, 7, and 8 of parasitemia patency became infected.

Oocysts were detected on the mosquito midguts by the 6th day after the blood-meal. Sporozoites were observed in the salivary glands on the 13th day. The infection rates of the individual lots of mosquitoes ranged from 95 to 100%, mainly the latter.

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⁴ Strain P-27.

Seven individual uninfected domestic turkey poults, ranging in age from 3 to 43 days, were exposed to the bites of from 6 to 25 infected mosquitoes on days 13 (1), 14 (1), 15 (1), 16 (2) and 25 (2) after the mosquitoes had acquired the original infective meal. With one exception, all of the poults developed parasitemias following prepatent periods of 11 to 14 days. The one exception was a 30 day prepatent period in the poult bitten on day 13, the first day that the sporozoites were in the salivary glands.

Each of two additional turkey poults were injected intraperitoneally with sporozoites from the salivary glands of 14

mosquitoes suspended in 0.9% NaCl solution. Parasitemias appeared 11 and 12 days later, respectively. Thus, sporozoite transmission was accomplished in all of the 9 attempts.

This study has demonstrated that *C. nigripalpus* is a competent experimental vector of *P. hermani* in turkeys. It is most probable that this mosquito is a natural vector of the parasite because it and the wild turkey share the same geographical area in Florida where the malaria is prevalent. Also, *C. nigripalpus* is an extremely opportunistic mosquito which feeds mainly on galliform, ciconiiform and passerine birds, rabbits and cattle.¹

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