

DEVELOPMENT OF FALCIPARUM MALARIA IN A PANAMANIAN SUBSPECIES OF HOWLER MONKEY*

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Abstract. After adaptation to Colombian and then Panamanian *Aotus trivirgatus*, the Panama II strain of *Plasmodium falciparum* was infective for *Alouatta villosa trabeata* Lawrence. Five serial trophozoite passages were demonstrated, with parasitemias reaching 35,000 per mm³; four animals experienced multiple recrudescences, terminating as long as 175 days after inoculation.

Previous attempts to induce infections of *Plasmodium falciparum* in howler (*Alouatta*) monkeys met with little success.¹⁻³ We now report infectivity of the *Aotus trivirgatus*-adapted Panama II strain⁴ to a coindigenous subspecies of *A. villosa*, yielding parasite growth at significant levels and establishment of serial passage in normal hosts.

MATERIALS AND METHODS

The Panama II strain was acquired in July 1972 through the kindness of Dr. W. E. Collins, USPHS, Chamblee, Georgia after the second transfer in Colombian *A. trivirgatus*. Since that time we have carried a line in intact or splenectomized night monkeys of local origin. The laboratory procedures have been published elsewhere.⁵

The species designation for the howler monkey, *Alouatta villosa* (= *A. palliata*), follows Hall and Kelson⁶ and other authors.^{7,8} All of these subjects originated from Barqueta, Chiriqui Province in southwestern Panama, and the subspecies was identified as *A. v. trabeata* Lawrence (Mendez, Gorgas Memorial Laboratory, pers. commun.) consistent with descriptions given for this group of middle American primates.⁹

RESULTS

At our 18th *A. trivirgatus* passage of the parasite, a combined intraperitoneal/intravenous

subinoculation was made to each of two *A. v. trabeata*. One, 8008, experienced an infection (Table 1), while the corecipient remained negative throughout 54 days of observation. Four subsequent serial passages were made intraperitoneally.

Monkey 8008 showed a 1-day prepatent period, having received 738×10^6 parasites. The onset of patency among the remaining subjects, requiring 5 to 20 days, did not relate to the inoculum size (0.8×10^6 to 70×10^6). Peak counts oc-

TABLE I
Infections of *Plasmodium falciparum* in *Alouatta villosa trabeata*

Host no.*	Prepat. and (submat.) pds. days	Patent pds. days	Maximum parasitemia per mm ³	Total period examined days
8008	1	5	<10	238
	(54)	16	10,680	
	(21)	45	6,420	
	(13)	20	7,220	
8009	5	18	14,910	166
	(31)	15	1,060	
	(37)	25	5,490	
8011	11	16	35,060	85
	(19)	21	14,180	
	(6)	12†	33,060	
8013	17	20	5,820	203
	(11)	47	4,600	
	(30)	3	120	
	(25)	21	3,370	
8014	19	22†	6,520	41

* Listed in sequence of serial passage.

† At death.

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