



Identification and characterization of an asymptomatic reservoir of *Plasmodium* infection in an endemic region of Honduras, Central America

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INTRODUCTION AND PURPOSE

Asymptomatic afebrile malaria due to *Plasmodium vivax* and *P. falciparum* has been described in Latin America (Brazil, Colombia, Honduras, Perú, Venezuela). It has been shown that the magnitude of the reservoir is much larger than identified by microscopy alone and that identification requires very sensitive laboratory techniques such as polymerase chain reaction (PCR). It has also shown that transmission can be significantly reduced by identifying and treating this reservoir. The purpose of this study is to identify the asymptomatic human reservoir of *Plasmodium* infection in the region of La Mosquitia, Honduras, Central America.

METHODS

Geographic location. La Mosquitia, at the northeastern of Honduras, is located in the Department of Gracias a Dios and it is part of the largest wildlife region of the country, Biosphere of Río Plátano (**Fig. No.1**). The region has two seasons, dry season from January to May and rainy season from June to December, with an average annual temperature of 28°C.

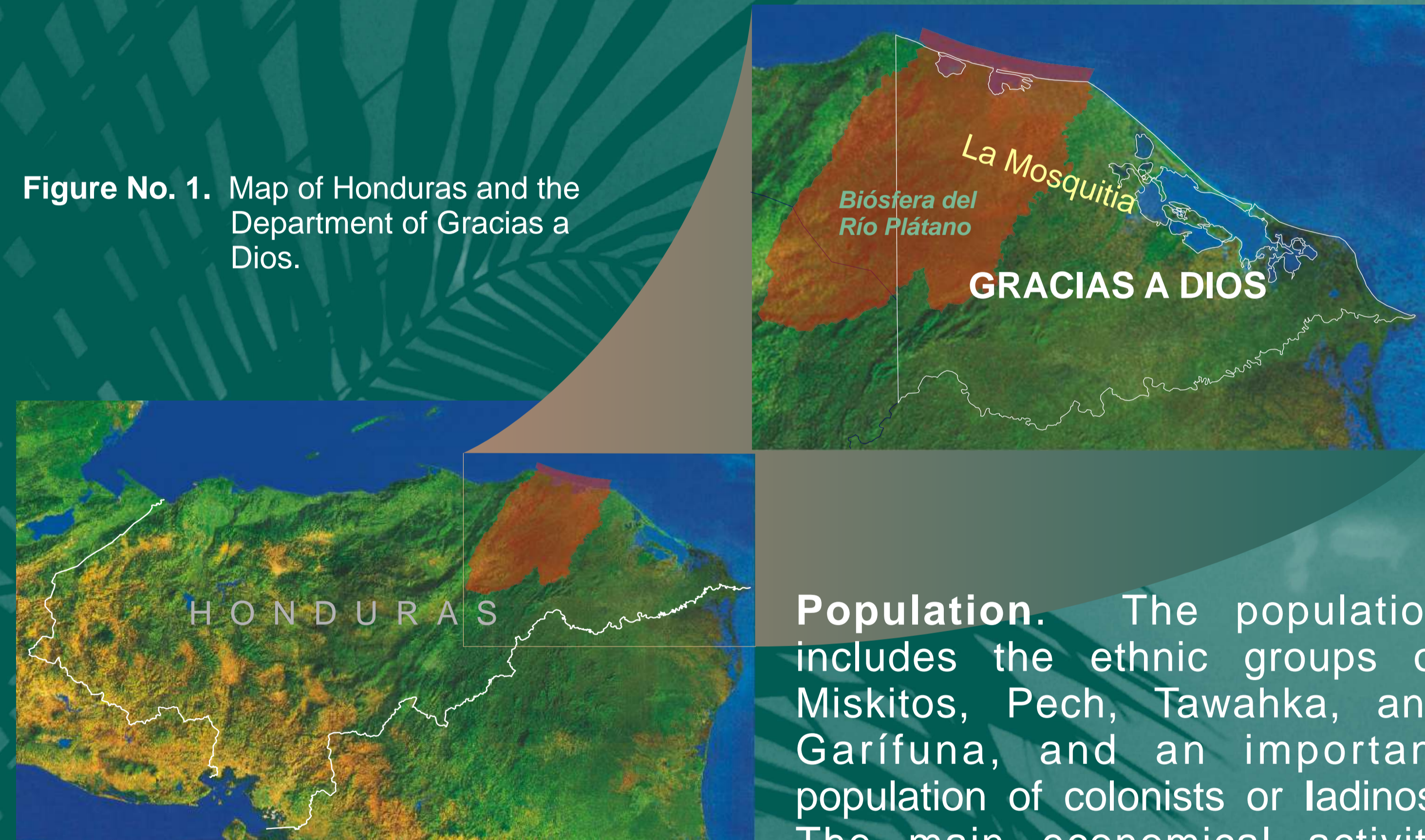


Figure No. 1. Map of Honduras and the Department of Gracias a Dios.

Population. The population includes the ethnic groups of Miskitos, Pech, Tawahka, and Garífuna, and an important population of colonists or ladinos. The main economical activity includes fishery, agricultural and commerce.

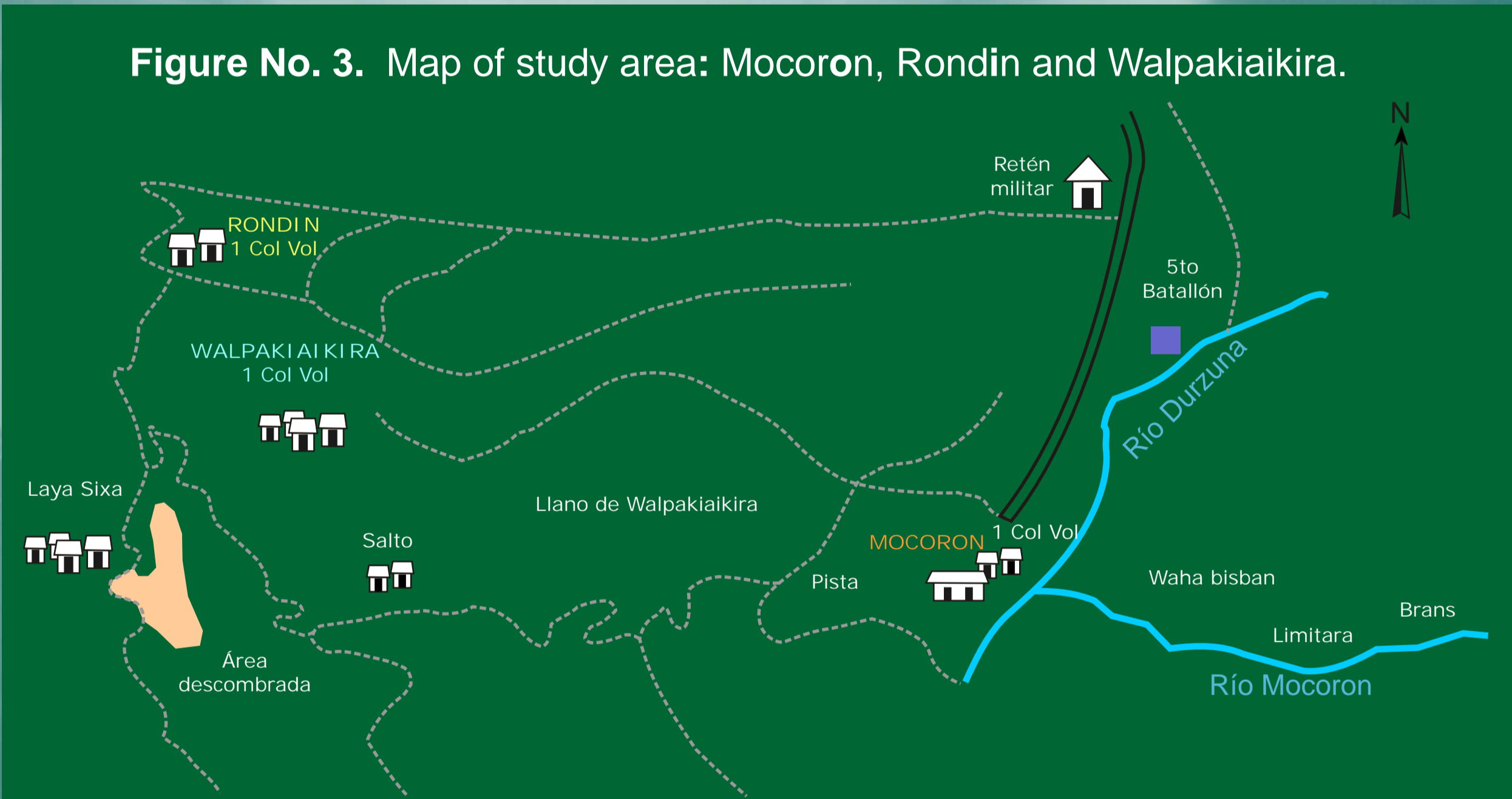
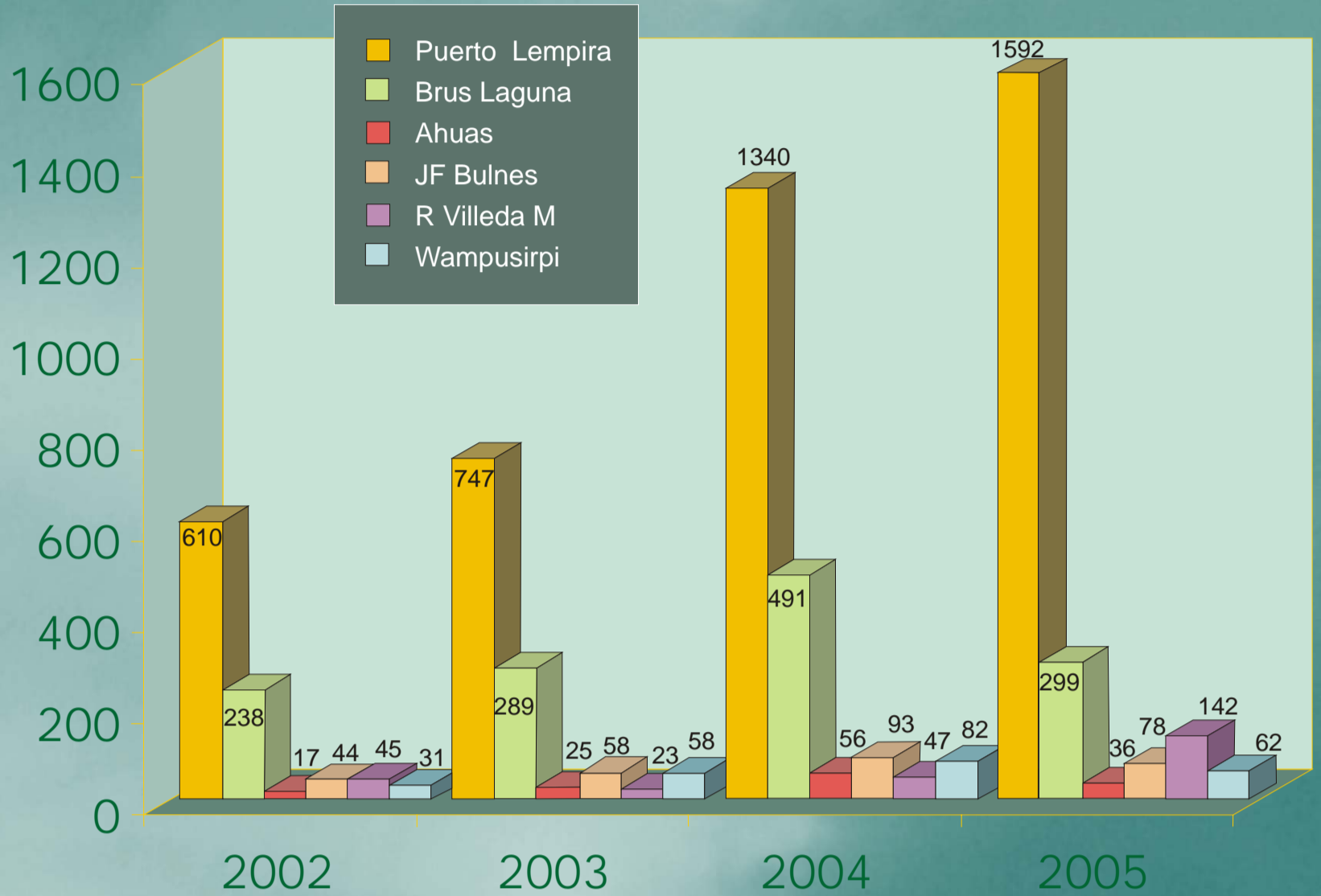
Sampling and follow-up. Through examination of malaria data from Departmental Health Region and Departmental Hospital in Puerto Lempira, we identified the geographical and species distribution of malaria in the district of Puerto Lempira. Communities representative of stable native population were identified, one of them selected as the study site and the others as control (July 2006). The communities (intervention and controls) will be examined by cross-sectional surveys and *Plasmodium* infections will be compared clinically (signs and symptoms), parasitologically (parasite species and parasitemia), epidemiologically (age, sex, malaria history) and genetically (PCR markers) (Year 2007). After this first study, an intervention is planned for one community by treating all individuals with *Plasmodium* infection (symptomatic or asymptomatic), while the other two communities (no intervention) will be used as control areas. There will be passive and active surveillance to follow the evolution of individuals in the reservoir, including the evolution after treatment and the acquisition of new *Plasmodium* infections, compared to untreated control communities (2007-2008).

In these preliminary results we describe the characteristics of the selected study sites.

RESULTS

In the last years, the department of Gracias a Dios is included among the five departments that produce over 80% of total malaria and falciparum malaria cases at national level. It also has the highest annual parasite index (API= 28.4, 2005). Among the six districts of the department, Puerto Lempira is the one that contributes to most of the local cases (**Fig. No. 2**).

Figure No. 2. Malaria cases per district, years 2002-2005. Vector Borne Disease Program, Health Region of Gracias a Dios.



Mocoron has an approximate population of 1,700 inhabitants (257 houses) living mostly on subsistence farming. It is three hours by car from Puerto Lempira, the capital city of the Department of Gracias a Dios, and has a very stable population. It includes three larger villages: Mocoron (intervention area), Rondin and Walpakiakira (control areas) (**Fig. No. 3**). Although the population older than 50 years old, in Mocoron as well as in the whole Puerto Lempira district, is approximately 8%, the Health Region data shows a positivity rate of only 3% in this age group.

In a recent active malaria surveillance in the towns of Mocoron, Sirsirtara and Yahurabila (Global Fund Project, 2006), out of 280 individuals examined (72% afebrile) there were 14% of positive cases. In Mocoron, there were 19 positive cases, 63% asymptomatic (**Table No. 1**).

Table No. 1. Active case detection, Mocoron, Global Fund Project, 2006.

Community	Condition of the examined patients		P. v.	P. f.	Mixed infection
	Febril	Afebril			
Mocoron, n= 117	29	88	6	11	2
Sirsirtara, n= 104	50	54	6	8	0
Yahurabila, n= 59	0	59	1	4	1

P.v.= *Plasmodium vivax*, P.f.= *P. falciparum*

CONCLUSIONS

1. We have identified a suitable site for studying the effects of eradicating the malaria reservoir. This site has a stable population with minimal migration and is composed of three separate villages which allow for controlled studies.
2. As typical of areas of premunition lower percentage of the malaria was found in the elderly (3%), although they constituted a larger percentage of the population (8%).
3. Prospective monitoring after the treatment intervention should allow evaluating the eradication effect (magnitude and duration) comparing to control areas.

