

REPORT OF AN EPIDEMIC OUTBREAK OF TEGUMENTARY LEISHMANIASIS IN A COFFEE-GROWING AREA OF COLOMBIA

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Tegumentary leishmaniasis in Colombia is frequently due to subspecies of the *Leishmania braziliensis* complex. Between 1981 and 1986, 9,369 cases of cutaneous leishmaniasis were reported in Colombia, involving the population dedicated to agricultural activities (A. Corredor et al., 1986, *Bol. Epidemiol. Nac.*, 12: 9-26). At present, because of socio-political violence, other fractions of the population, militaries and guerrilla, should be considered within the groups at high risk of contracting the disease.

Epidemiological reports on endemic foci of tegumentary leishmaniasis are common in the literature, in contrast with epidemic outbreaks, which also constitute an important feature of this disease. In Colombia information on epidemic outbreaks is scarce. In the old settlement of Montebello, department of Antioquia, a fruit and coffee growing area, I. D. Velez (personal communication) studied on outbreak of tegumentary leishmaniasis. This region is ecologically characterized by the absence of primary forest and mammalian fauna traditionally recognized as potential reservoirs of the disease.

In 1985 an outbreak of similar characteristics was detected in the municipality of Dagua, Valle del Cauca. The present paper describes the parasitological and entomological findings of this outbreak and the possible factors responsible for its occurrence.

The outbreak involved principally the settlement of Villahermosa within the municipality of Dagua (3°30'30" North, 76°31'18" West), 40 km distant from Cali (Fig.). The estimated population is of 1,127 inhabitants, most of them mestizos. The economy in this mountainous region is based on coffee and plantain. The zone is classified as tropical dry forest (G. B. Holdridge, 1967, *Trop. Sci.*

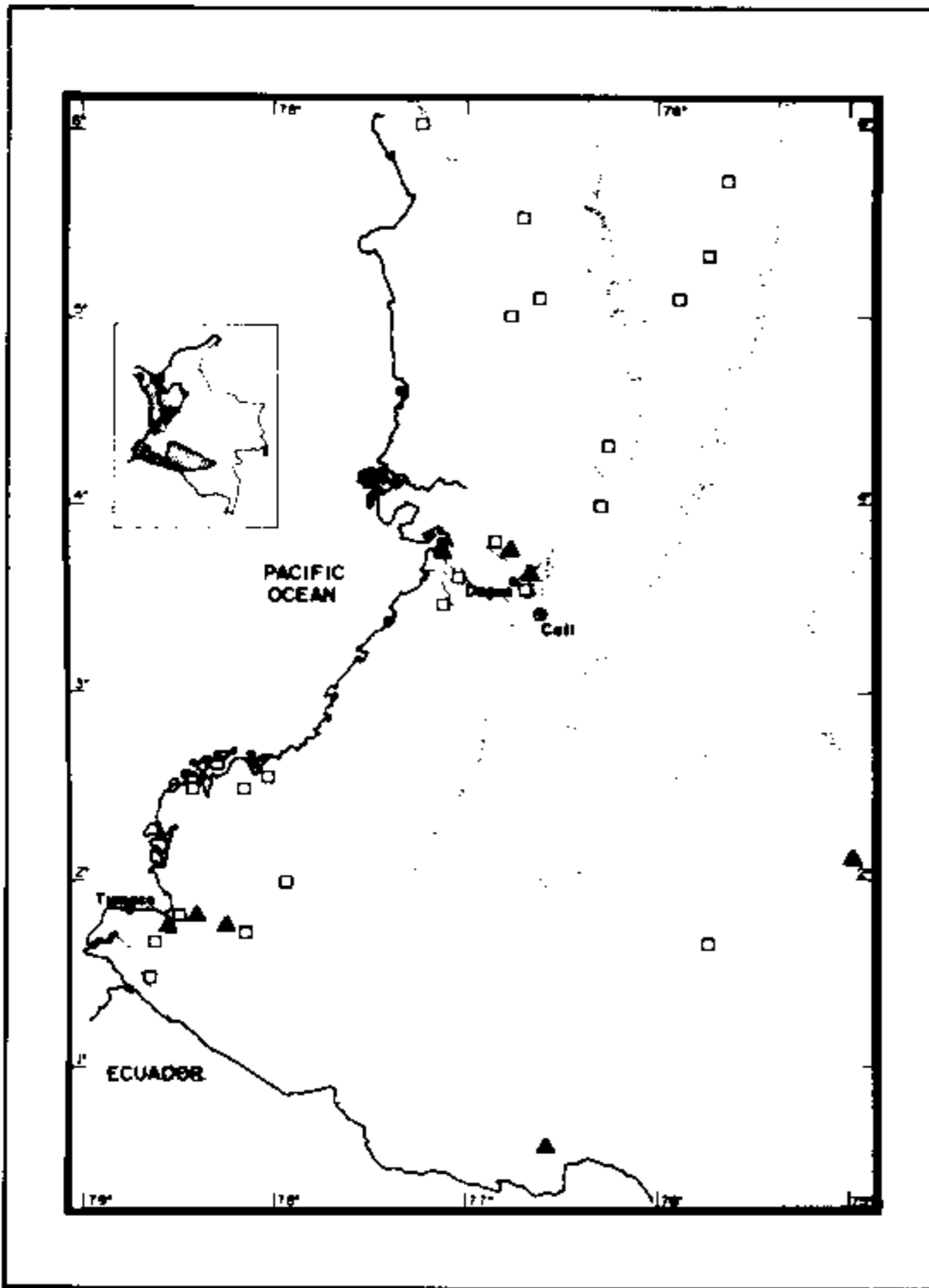
Center, Costa Rica. p. 206), with an average altitude of 1,135 m., mean temperature of 24°C, and 1,100 mm annual rainfall.

Active search for skin lesions and vector collections were started in June, 1985. Individuals with tegumentary lesions were skin tested with Montenegro antigen. The etiological diagnosis and parasite characterization in patients with active lesions were carried out using the protocols described by K. A. Weigle et al. (1986, *Am. J. Trop. Med. Hyg.*, 36: 489-496; 1987, *Am. J. Trop. Med. Hyg.*, 35: 722-731).

Twenty-seven cases of active cutaneous leishmaniasis were detected among the 1,127 persons surveyed; in all of them the parasite was isolated and identified. Isoenzyme studies revealed that 25 of 27 isolates (92.5%) were variants of *L. b. braziliensis*, whereas only 2 (7.5%) were identified as *L. b. panamensis*. Two isoenzyme groups (1.1 and 1.5) for each *L. braziliensis* subspecies were detected in patients of this focus (Fig.).

Almost 30% of the active lesions were detected in the population under 15 years of age, and half of them corresponded to the 0-4 year group. On the other hand, no sex differences were observed.

Disease rate (presence of active lesion) was 22.2/ 1000 inhabitants, and the age group at highest risk was the 20-24 year old, in which a clear difference in sex was evident. Montenegro skin test was positive in 76.9% (20/26) of patients, while clinically significant antibody titers (IFAT > 1:16) were detected in 56% (14/25) of them. No mucosal involvement was found upon clinical examination. The mean time of lesion evolution was 1.7 months, ranging from 0.5 to 6 months.



Geographic location of Dagua and distribution of isoenzymatic groups 1.1 (□) and 1.5 (▲) in Colombia.

Sand flies were collected in the intradomicile (ID) and in the surrounding coffee plantations, using the protected human bait technique (HB) and CDC light traps installed 1 m above the floor. Resting sand flies were collected with buccal aspirators on the wall of houses, as well as tree trunks and leaves. All specimens captured with human bait and light trap (88,2%) were brought alive to the laboratory and individually dissected searching for flagellates in the intestinal tract. Alternately, the other sandflies were preserved in 70% alcohol, cleared according to the method of G. B. Fairchild & M. Hertig (1984, *Science*, 108: 20-21) and mounted in Canada balsam.

Among the 187 sand flies collected, 4 different species were taxonomically confirmed: *Lutzomyia columbiana*; *L. lichyi*; *L. shannoni*; *L. scorzai* (Table). *L. columbiana* and *L. lichyi* showed the highest anthropophilia and most pronounced attraction to light. *L. lichyi* was the only species collected inside houses, either attracted to light or biting humans. No flagellate infection was found in the sample of wild phlebotomines examined.

The leishmaniasis outbreak detected in Dagua is very similar to that in Montebello, Antioquia (I. D. Velez, personal communication). Intra and peridomiciliary transmission involving family groups was common to both foci. Disease prevalence in the 0-4 year old group was similar to other age groups suggesting a high level of intradomiciliary exposure.

The finding of specimens of the *verrucarum* group both in Montebello and Dagua, which are characterized for their high anthropophilia, broad geographical and altitudinal distribution, and known participation in leishmaniasis transmission in Colombia, Perú and Venezuela (D. G. Young & P. G. Lawyer, 1987. *New World Vectors of Leishmaniasis*. p. 29-71. In K. F. Harris, *Current Topics in Vector Research*, Vol. 4, Springer-Verlag, New York) suggests that at least one of its members could be associated with disease transmission in these foci. *L. columbiana* was incriminated as vector of bartonellosis in the department of Nariño (Colombia) 4 decades ago (L. E. Rozeboom, 1947. *Ann. Ent. Soc. Am.*, 40: 705-714). This species is very common in Dagua, together with another antropophilic member of the *verrucarum* group, probably *L. townsendi*. Both species are very active in the secondary forest, and most important in coffee plantations, however no intradomiciliary biting has been observed.

None of the other sand fly species collected in Dagua have been associated elsewhere with *Leishmania* transmission. However, the presence of infected children under 4 years of age and the capture of *L. lichyi* in the houses suggests that it may be implicated in the intradomiciliary transmission of *Leishmania*. Sand flies captured in Villahermosa were infected experimentally with a *Leishmania* strain isolated from a patient of the area. A typically peripylarian infection was observed on day 5 post-infection. Percentages of infectivity were 81.3 (n = 16), 69.0 (n = 29) and 80 (n = 10) in *L. columbiana*, *L. lichyi* and *L. townsendi*, respectively. Also, infective forms located in the head were observed in 15.3% of the *L. columbiana* specimens, and in 5.0% of *L. lichyi* (data not shown). This data suggests that *L. columbiana* could have served as the vector in the coffee fields, while *L. lichyi* was involved in the intradomiciliary transmission. However, further studies are necessary to fully incriminate these species in the transmission of leishmaniasis in this area.

TABLE

Female phlebotomines collected in Villahermosa and Centella, Dagua using different capture methods

Species	Human Bait		Light Trap		Resting Site		Total	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
<i>L. columbiana</i>	48	(39)	20	(53)	7	(88)	75	(45)
<i>L. lichyi</i>	31	(25)	12 ^a	(32)			43	(26)
<i>L. shannoni</i>	15	(12)					15	(8)
<i>L. scorzai</i>	3	(2)	2	(5)			5	(3)
<i>Verrucarum</i> group	9	(7)	1	(3)	1	(12)	11	(6)
<i>Vexator</i> group	19	(15)	3 ^a	(7)			22	(12)
Total	125	(100)	38	(100)	8	(100)	171	(100)

^a Half of *L. lichyi* and 1 of the *vexator* group specimens were collected in the domicile.

The circumstances leading to the initiation and subsequent interruption of the Dagua outbreak are not clear. Active transmission was not occurring by the time the study visits were accomplished. This was suggested by the absence of new cases after all of the patients were treated with Glucantime.

It is speculated that leishmaniasis could have been brought either by guerrillas or militarys who at that time were fighting in the area. It is well known that both groups spend most of their time in forested regions where leishmaniasis transmission is common, and active lesions in them are frequent.

While *L. b. braziliensis* isoenzyme group 1.1 is a common variant found from Chocó to Nariño, group 1.5 is geographically more restricted (Fig.). The latter group is present only in certain regions of the Southwest and in the oriental plain-amazonian regions as well. The absence of a geographical continuity of this group suggests that the parasite was directly "imported" to Dagua, probably by people infected in the above mentioned areas.

It seems feasible that the arrival of these infected hosts to a region where potential

vectors exist, resulted in the initiation of the disease without establishing the infection in the local mammals. The latter assumption is based on the cessation of new leishmaniasis cases after the infected humans were treated, and the fact that the disease had never been detected before. The possibility of man and domestic animals being sources of cutaneous leishmaniasis has been reported by A. Falqueto et al. (1986, *Mem. Inst. Oswaldo Cruz*, 81: 155-63), J. A. Vexenant et al. (1986, *Mem. Inst. Oswaldo Cruz*, 81: 237-8) and other investigators, in Brazil.

More information is needed with regard to the actual role humans and domestic animals play in certain endemic regions, and their importance in establishing new foci when settling in leishmaniasis free areas with efficient arthropod hosts.

In the particular case of Dagua it is virtually impossible to determine with certainty the biological components that gave origin to the outbreak, although future experimental infections of local sand flies may prove useful in assessing their vector potential and probable implication in the cycle.