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STUDIES WITH DICHLORVOS RESIDUAL FUMIGANT AS A MALARIA  
ERADICATION TECHNIQUE IN HAITI

II. PARASITOLOGICAL STUDIES

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The original plan for parasitological evaluation was to obtain a 30% blood film sample from the populations of the DDT- and dichlorvos-treated zones, each sample to be of a randomized type. The annual surveys were planned in such a way as to take less than 1 week to be carried out. In every village of the area, blood samples were taken at random by trained personnel from people

recommendations.<sup>1</sup> A method of checking parasite counts against white blood cell counts in order to have a rough measurement of parasite density was established in July 1963. All positive and 10% of the negative slides were checked by the control laboratory of the National Malaria Eradication Program (SNEM) (central unit of very well trained personnel similarly checking the

TABLE 1  
Parasitological results for the experimental area of Arcahaie

Date taken	Dichlorvos-treated zone (10,000 inhabitants)									DDT-treated zone (12,000 inhabitants)										
	Blood sample (by age)									More than 1000 per cmm†	Blood sample (by age)									
	0 to 12 months				Over 1 year						Plasmodium*	0 to 12 months				Over 1 year				
	Exam./Pos.	C <sub>1</sub> +	Exam./Pos.	C <sub>1</sub> +	F	M	V	Mi	Exam./Pos.			C <sub>1</sub> +	Exam./Pos.	C <sub>1</sub> +	F	M	V	Mi		
1962 June	198/13	6.5	2,489/254	10.	241	14	12	0	--	250/11	4.3	2,974/156	5.2	156	6	4	1	--		
1963 June	100/7	7.0	2,772/136	4.4	120	20	0	3	20	119/1	0.6	3,300/69	2.1	54	14	1	1	9		
1964 June	182/4	2.2	2,612/67	2.5	70	0	1	0	21	188/0	0	3,301/23	0.7	21	2	0	0	4		

\* F = *falciparum*; M = *malariae*; V = *vivax*; Mi = more than one species

† The number of parasites per cmm of blood is estimated by counting the number of parasites and white blood cells over the same 10 consecutive microscopic fields chosen at random during the routine examination. Seven thousand WBC per cmm is the base of calculation.

gathered on the central square, at a crossroad or other convenient location. The proportion of the normal age-group distribution in the Haitian population (1950 census) was followed; mention was made whether the individuals had a history of fever.

To maintain good cooperation from the population and to avoid biasing the results by anti-malarial drug distribution, aspirin only was given for every blood sample taken.

The thick blood films were taken and processed according to Walker's technique and recom-

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diagnosis of the "Zone" microscopists of the Haitian program).

The results of the examination of the blood samples taken in June surveys in 1962, 1963 and 1964 are shown in Table 1. The three June surveys are comparable; each represented 30% of the population of the various localities sampled by the same procedure.

The results of the three June surveys, plotted on semilogarithmic paper (Fig. 1) to show Macdonald's line of regression,<sup>2</sup> indicate quite evidently that the interruption of transmission was not achieved in either the dichlorvos or the DDT treated zone.

The dichlorvos zone results show, furthermore, evidence of continuing transmission if one follows Macdonald's criteria: a) The infant parasite

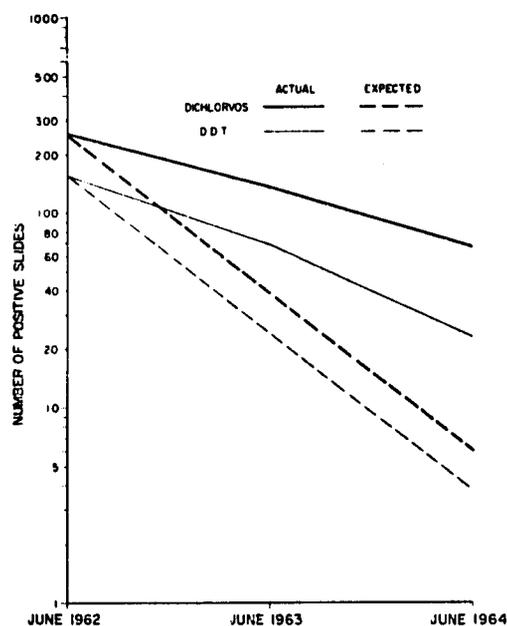


FIGURE 1. MacDonal's regression line based on the results of June 1962, 1963 and 1964 in the experimental area of Arcahaie, Haiti.

rate, more precisely the slide positivity rate among the infant population sampled is still 2.2%. b) There are 21 slides out of 71 positive slides (30%) showing more than 1,000 parasites per cmm of blood; Macdonald's highest permissible level is 7%.

It is not our purpose here to discuss the results for the DDT zone against those of the dichlorvos zone. However, the data obtained in both areas indicate (to a lesser degree in the dichlorvos zone) a suppressive influence on the slide positivity rate

of the blood samples taken at random from a fair-sized sample of the population.

Due to the fact that there could not be any reasonable doubt about the continuation of transmission in the dichlorvos area, no further case investigation was deemed necessary in order to confirm their autochthonous origin.

A study of the results, locality by locality, confirmed the parasitological findings, *i.e.*, transmission was continuing in areas where there were high mosquito densities.

#### SUMMARY

Blood film samples were taken of 30 percent of the population in the Commune of Arcahaie, Haiti, to determine the effect on malaria transmission produced by the periodic treatment of homes with the dichlorvos residual fumigant. Prior to insecticidal treatment, infants 0-12 months showed a positivity index of 6.5 percent in 2,489 smears. At 1 and at 2 years after treatment, samples in the same age group had positivity indices of 7.0 and 2.2 percent, respectively. *Plasmodium falciparum* was the principal parasite but infections of *P. vivax* and *P. malariae* also occurred. Despite reduction in infection levels in infants and in children over 1 year of age interruption of malaria transmission was not apparent.

#### REFERENCES

1. World Health Organization, 1961. Manual for processing and examination of blood slides in malaria eradication programs. MHO/PA/262.61.
2. World Health Organization, 1964. Expert Committee on Malaria. Tenth Report.