



LABORATORY AND FIELD OBSERVATIONS
ON THE EFFECTIVENESS OF DDT FOR THE CONTROL
OF THE VECTOR SANDFLY, *PHLEBOTOMUS ARGENTIPES*
IN THE KALA AZAR ENDEMIC STATE OF BIHAR¹

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1. Paper presented and published as abstract in the Annual Conference of the Association of Indian Epidemiologists held at the National Institute of Communicable Diseases, Delhi, India, 7-8 February, 1995.
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ABSTRACT

In order to ascertain the susceptibility status of the vector sandfly, *Phlebotomus argentipes*, specimens collected from three villages of Patna and Madhubani districts of Bihar were exposed to a discriminating dosage of 4% DDT, and studies revealed that they continue to be susceptible to DDT.

To substantiate laboratory findings, field observations were also made to assess the impact of DDT spraying on vector sandfly density in a few selected villages of Patna, Samastipur and Vaishali districts (Bihar). The study revealed that the *P. argentipes* population disappeared completely from sprayed houses for a period of three months.

INTRODUCTION

Phlebotomus argentipes, the vector of Kala azar is known to be highly susceptible to DDT (Kaushal et al., 1978; Joshi et al., 1979, and Kaushal et al. 1993). It has been reported that this species is so susceptible that after spraying DDT @ 100 mg/ft² *P. argentipes* was completely eliminated from sprayed houses and reappeared only six months after spraying in Darbhanga district, Bihar (Mukhopadhyay et al., 1987), and after seven months in Tamil Nadu (Shanmugham, 1977).

Resistance of *P. argentipes* to DDT was recently reported from a village in Samastipur district, Bihar (Mukhopadhyay, 1992). Hence, a study was undertaken to determine the susceptibility status of the species to DDT and also to observe the impact of DDT spraying on the density of sandflies in some districts of Bihar under field conditions. The results of these studies are presented in this report

MATERIAL AND METHODS

Studies were undertaken from March to June 1993 and 1994 in the following manner:

- (i) Adult *P. argentipes* were collected from Bousoula Danapur village and Hulash chak in Patna, and Kalwali village in Madhubani district during the morning hours by torchlight through the suction tube method. Female *P. argentipes* of the same physiological age group were exposed to 4% DDT for one hour to determine their susceptibility status according to the WHO standard method.
- (ii) To carry out field observations on the impact of DDT spraying, adult sandflies were collected after the first round of spraying by the State Health Department @100 mg/ft² from randomly selected sprayed and unsprayed houses of different villages in Patna, Samastipur and Vaishali districts. Ten to fifteen minutes

were spent in each house for the collection of sandflies. The *P. argentipes* collected from unsprayed houses of sprayed villages were also exposed to 4% DDT for one hour. Collections were also made from Hulashchak village (PHC - Phulwai sharif), Patna district, where no DDT spraying was carried out and was selected as a control village.

RESULTS AND DISCUSSION

The susceptibility status of field collected *P. argentipes* from Patna and Madhubani districts is shown in Table I. Results showed 100% and 97.7 % mortality in *P. argentipes* from Patna and Madhubani districts respectively after one hour of exposure to 4% DDT, which suggests that this species is still susceptible to the insecticide.

Field observations made on the impact of DDT spraying on the density of *P. argentipes* in Patna, Samastipur and Vaishali districts revealed that the search for sandflies in 222 sprayed houses amounting to 40 hours in three districts after a gap of one week to three months of DDT spraying did not reveal a single specimen of *P. argentipes*. In some of the sprayed houses, mainly *Sergentomyia babu* and 27 specimens of *P. papatasi* were detected.

Simultaneous collection of sandflies from 79 unsprayed houses of the sprayed villages revealed 42 specimens of *P. argentipes*. This also shows the impact of DDT spraying on the overall density of this sandfly species. Exposure of *P. argentipes* collected from unsprayed houses exposed to 4% DDT for one hour results in 100% mortality.

The density of *P. argentipes* in Hulashschak, the control village in Patna district where no DDT was sprayed was 27.5 per man/hour during the study period.

Present observations in respect of *P. argentipes* showing 100% mortality as against exposure to 4% DDT for one hour, a total absence of the species in sprayed houses and the presence of a few specimens in unsprayed houses of sprayed villages suggests that *P. argentipes* is still susceptible to this product. Hence, DDT can be used effectively in Kala azar control programmes.

ACKNOWLEDGEMENT

The authors are thankful to the Director, National Institute of Communicable Diseases for his encouragement and for providing the facilities needed for the study. Thanks are also due to the technical staff of the Kala azar Unit for carrying out the technical work.

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TABLE I
Susceptibility status of Phlebotomus argentipes
against DDT in Bihar

	<u>DDT 4%</u>			<u>Control</u>			Remark
	No. exposed	No. Dead	% Mortality	No. Exposed	No. Dead	% Mortality	
village	45	45	100%	15	0	Nil	susceptible
	90	90	100%	15	0	Nil	"
hamlet	90	88	97.7%	15	0	Nil	"

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