

OPERATIONAL AND SCIENTIFIC NOTES

THE ERADICATION OF *Aedes albopictus* IN INDIANAPOLIS, INDIANA

BRIAN J. JARDINA

Marion County Health Department, Division of Vector Borne Disease Prevention, 4001 E. 21st Street, Indianapolis, IN 46218

ABSTRACT. From September 16, 1986, to September 15, 1987, the Vector Borne Disease Prevention Unit of Marion County utilized different monitoring techniques, immediate chemical control measures and an intensive source reduction program to successfully eradicate *Aedes albopictus* from Indianapolis, Indiana. Monitoring in 1988 and 1989 failed to show any signs of continuing infestation.

The discovery of an *Aedes albopictus* (Skuse) infestation in Harris County, Texas, in 1985 (Sprenger and Wuithiranyagool 1986), and subsequent infestations throughout the eastern half of the United States, provoked mosquito abatement programs to spend considerable time, manpower and money to conduct research and to control this Asian species. The ability of *Ae. albopictus* to reproduce rapidly and to colonize various microhabitats (Hawley 1988) has made it difficult to eradicate in the United States. On September 16, 1986, the Department of Vector Borne Disease Prevention in Marion County, in cooperation with Centers for Disease Control and Indiana State Board of Health personnel, discovered an infestation of *Ae. albopictus* at a tire retreading company located on the east side of Indianapolis, Indiana. Our surveillance program and chemical treatments together with a complete source reduction program proved very successful in eradicating *Ae. albopictus* in Indianapolis.

Surveillance was based on behavioral characteristics of *Ae. albopictus*, focusing on the aggressive adult biting, the gravid female and the ability of *Ae. albopictus* to disperse over several suitable habitats. Daily biting counts were performed to monitor changes in the population density and geographical distribution over a 1.5-km area. Biting counts provided us with the most reliable information about the increases in adult populations and enabled us to detect the dispersal of *Ae. albopictus* in new areas. High levels of biting *Ae. albopictus* females indicated a larval habitat in close proximity (within a 5-m radius). Gravid females were collected with a modified gravid trap (Reiter) using black bus pans, hay infusion attractant and a black lid with a small diameter opening. The discovery by Reiter and Darsie (1984) of an *Ae. albopictus* male in Memphis, TN, suggested that this technique might be of value in our monitoring effort.

Our third surveillance tool was the oviposition trap. Twenty black cups, half-filled with leaf litter attractant were set within a 3-km radius of the original infestation site. Red velour strips were secured with paper clips inside the cups to provide a suitable surface for gravid females to deposit their eggs. The velour strips were replaced, and the containers were serviced on a weekly basis. Eggs found to be deposited on the velour strips were sent to the Indiana State Board of Health for hatching and identification. This technique was time-consuming and only confirmed the presence of *Ae. albopictus* within new areas. Pesticide applications were based on the detection of biting adults, a technique which we found to be more sensitive than ovitrapping, in order to achieve immediate and effective control.

Based upon verbal reports of potential resistance of *Ae. albopictus* (M. Sinsko, personal communication) to organophosphate insecticides we used alternative chemicals for control. Malathion and granular Abate[®] were replaced with synergized resmethrin and granular *Bacillus thuringiensis* var. *israelensis* (*B.t.i.*). The original infestation site consisted of approximately 3,500 tires which were larvicided 6 times with *B.t.i.* in a 45-day period. The tire retreading company and surrounding roads were mapped and a truck mounted ULV unit fogged the entire area with synergized resmethrin at a rate of 130 ml/min. Adulticiding was performed 5 days per week at optimal spraying times of mid-morning and early evening hours. A portable (hand-held) ULV unit was used in inaccessible areas.

Source reduction was the most effective method used to control *Ae. albopictus*. The owner of the retreading company was issued orders on September 17, 1986, by the Vector Borne Disease Prevention Unit, to transport approximately 3,500 tires from his premises to acceptable tire recyclers in Indiana. Since the

owner refused to comply, the Marion County Environmental Court forced compliance with the order, and the tires were removed within a 2-month period. Complete records of tires transported to new destinations in northern Indiana were maintained. Upon receiving the shipment, the owners and operators at the destinations were informed about the potential infestation of *Ae. albopictus* within the tires. Inspections of the premises at these destinations by Indiana State Board of Health entomologists failed to show any signs of transfer of the infestation. The absence of infestations at these scrap tire processors suggested that the tires were sufficiently treated before transport.

Prior to the reemergence of *Ae. albopictus* on June 6, 1987, the Department of Housing and Neighborhood Health was asked by Vector Borne Disease Prevention (V.B.D.P.) to issue orders to property owners in an effort to remove all trash and rubbish from their yards. Isolated areas of debris and illegally dumped tires were removed by V.B.D.P. and sent to the landfill.

The last *Ae. albopictus* adult observed in Indianapolis was collected in a gravid trap on

September 15, 1987, two blocks north of the initial infestation site. *Aedes albopictus* was not detected in 1988 or 1989. Effective source reduction and pesticide application led to the eradication of *Ae. albopictus* from Indianapolis.

This paper is dedicated to Chuck Dulla, Administrator of Vector Borne Disease Prevention. Special appreciation goes to Mike Sinsko from the Indiana State Board of Health for his wisdom and moral support. I also thank Maggie Wood, Holly Grabe, and the rest of the V.B.D.P. personnel for their time and manpower to successfully eradicate *Ae. albopictus* from Marion County.

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