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## The Colonization of an Ozark Mountain City by the Asian Tiger Mosquito (*Aedes albopictus*)

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On 10 August 1993 three adult *Aedes albopictus* (Skuse) were collected within the city limits of Batesville, (Independence County) in northeastern Arkansas (Jamieson and Olson, 1995). This was the first known report of this species from the Ozark Mountains physiographic region of the state. At that time *A. albopictus*, commonly called the Asian tiger mosquito, had been reported from only three Arkansas counties: Grant County (Moore et al., 1988), Craighead County (Jamieson et al., 1994), and Jefferson County (Savage et al., 1994). However, based on information from neighboring states, it is likely that *A. albopictus* occurs statewide in Arkansas. This species has received considerable attention since its arrival in the United States due to its potential threat as a disease vector. Although not yet implicated in any disease epidemic in the U.S., its ability to become locally abundant and thereby restrict human outdoor activity greatly concerns mosquito control professionals.

After its discovery in Batesville in 1993, an investigation to locate production sites in the city ensued. Three major breeding sites were found, two of which were tire dealerships on the north and south margins of the city limits, while the third was a dump in the west-central part of town. *Aedes albopictus* is a container-inhabiting species that rarely oviposits outside of artificial containers, with automobile tires being the primary larval-production site. However, Jamieson and Olson (1995) reported collecting *A. albopictus* larvae from a variety of containers including flower pots, bird baths, barbecue grills, Christmas tree stands, and house gutters. In this study we follow up that work with a biting survey to determine how well distributed this species is in the city of Batesville and to provide data as to relative abundance. We are concerned about the impact this Asian immigrant will have on Arkansas cities that historically have not had mosquito problems.

Three study sites were established within the city limits of Batesville. Site #1 was in the west-central part of the city near the intersection of College and 8th Streets, approxi-

mately 1 km west of state highway 167. Site #2 was on the campus of Lyon College in the northeastern part of town, approximately 2 km east of highway 167. Site #3 was in Fitzhugh Park, located in the south-central region of the city at the intersection of Briar and 20th Streets. Each site was sampled twice monthly from April to October, the first sample was always taken during the first week of the month while the second sample was taken around the 15th. Each sample consisted of all adult female mosquitoes that could be captured during a 30 minute period with an aspirator or wide-mouthed vial as they attempted to take a blood meal from the sampler. The sampling always occurred within the 2 hour period before dusk with the intent of maximizing the chances of capturing diurnal, crepuscular, and nocturnal species. Adult female *A. albopictus* were distinguished from other native species using characters described by Darsie (1986). Once *A. albopictus* populations peaked at these three sites (July and August), samples were taken from 13 neighborhoods city-wide in order to determine how widely distributed the species has become in the city.

A total of four mosquito species was collected at site #1 during the study. *Aedes triseriatus* (Say) was the most abundant species in April with a total of 5 being collected. It was not encountered during the remainder of the study period. An individual *Culex salinarius* (Coq.) was collected in April and likewise was absent from all subsequent samples. Three *Aedes vexans* (Meigen) were collected at site #1, one in May and two in the early June sample. From the 15th of June to the end of the study period, *A. albopictus* was the only mosquito collected at site #1. Its population peaked in July when 33 individuals were collected (15 during the early collection, July 3rd and 18 during the middle of the month, July 15th) (Table 1).

*Aedes albopictus* was the only species collected at sites #2 and #3 during the study. Populations at these sites were substantially lower than at site #1. The explanation may be related to the number of oviposition sites available in these areas or their proximity to major production sites such as

The Colonization of an Ozark Mountain City by the Asian Tiger Mosquito (*Aedes albopictus*)Table 1. Biting collections of adult female *Aedes albopictus* (Skuse) at three sites in Batesville, Arkansas in 1997.

Site	April	May	June	July	Aug.	Sept.	Oct.
1	0	5	10	33	18	5	0
2	0	0	0	1	5	1	0
3	0	0	1	5	3	1	0

tire dealerships. It could also be related to the relative amount of vegetation at the site. According to Hawley (1988), *A. albopictus* is primarily a forest dwelling species that is rarely encountered in areas devoid of vegetation. Site #1 is located in the residential area where Jamieson and Olson (1995) first collected the species in Batesville. There is an abundance of oviposition sites and cover, and it is < 1 km from the previously mentioned dump in the west-central part of town. Sites #2 and #3 are in public areas where one would expect to encounter fewer artificial containers for oviposition and the forest cover at these sites is less dense than at site #1. However, sites #2 and #3 are bordered on at least one side by a residential area.

When populations peaked in July and August, we expanded our collecting efforts in order to determine how well distributed the species is in the city. We collected biting adult female *A. albopictus* from 11 of the 13 neighborhoods sampled. The two that were negative were the most rural of the 13 sampled. This species has become widespread in the city of Batesville.

The main conclusion arrived at in this study is that *A. albopictus* can easily become locally abundant, and thus pestiferous, in communities in the Ozark Mountains physiographic region of Arkansas. Its true impact is more difficult to ascertain because of a lack of baseline data concerning mosquito abundance in areas of that region. While native mosquitoes such as *A. triseriatus* and *A. vexans* will readily take human blood, their current numbers appear too low to restrict any human outdoor activity. It is unclear what impact the arrival of *A. albopictus* has had on the distribution and abundance of native mosquito species, particularly those that are close ecological associates. *A. triseriatus*, commonly referred to as the treehole mosquito will readily utilize both treeholes and artificial containers as oviposition sites. However, because *A. albopictus* is a superior competitor in the artificial container habitat (Livdahl and Willey, 1991), *A. triseriatus* populations may have once been higher in the Ozarks prior to the *A. albopictus* invasion. Most life-long residents of the region agree that historically the area

has not had a significant problem with pestiferous mosquitoes prior to the arrival of this Asian immigrant.

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