

## SCIENTIFIC NOTE

### RECORD OF *Aedes albopictus* IN NEBRASKA WITH NOTES ON ITS BIOLOGY

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**ABSTRACT.** Adult *Aedes albopictus* were collected in Nebraska on August 10, 1992, at a scrap tire pile in Douglas County. Subsequent collections in 1992 revealed the presence of adult *Ae. albopictus* at a tire storage yard in West Point, NE. During 1995 and 1996, an ecological study of *Ae. albopictus* at the West Point site was conducted. *Aedes albopictus* populations were determined to be able to survive winter conditions in this region.

**KEY WORDS** Nebraska, Culicidae, mosquitoes, *Aedes albopictus*

*Aedes albopictus* (Skuse) has been introduced into the USA on several occasions (Pratt et al. 1946, Eads 1972, Reiter and Darsie 1984). These introduced populations were eliminated or failed to become established. The 1st established population of this mosquito in the USA was thought to be in Harris County, Texas, in 1985 (Sprenger and Wuitiranyagool 1986). Since 1985, permanent populations have been discovered in 26 states in the continental USA (Moore 1999).

Adult *Ae. albopictus* were 1st collected in Nebraska on August 10, 1992, in Douglas County (W. L. Kramer; Fig. 1). The site was an isolated scrap tire pile near the town of Valley. Shortly thereafter, this site was modified, including the removal of tires, and *Ae. albopictus* was no longer collected here. The landowner indicated that the tires on this site were from numerous unspecified southern cities. Tires from similar sources were determined to have been sent to a tire dealer in West Point, in Cuming County, NE. On August 24, 1992, an active adult *Ae. albopictus* population was observed within a used tire storage facility 1 mile south of West Point (41°50'N, 96°43'W; population 3,250). Approximately 200,000 tires were stacked in piles throughout the 50-acre storage yard. Adult *Ae. albopictus* were collected again at this site during 1993 and 1994. In 1995, a 2-year project through the Nebraska Health and Human Services System was initiated to determine the population size of *Ae. albopictus* within the tire storage yard, the extent of infestation beyond the tire storage yard, and whether the mosquitoes were able to survive winter conditions in Nebraska.

Omnidirectional traps (Jensen et al. 1994) were used to collect adult female *Ae. albopictus* at the tire yard. The omnidirectional traps were construct-

ed of 1-cm plywood and were painted black. The mosquitoes were funneled into a centrally located CO<sub>2</sub>-baited Centers for Disease Control light trap and into a mesh collection bag. The CO<sub>2</sub> source was from 1.2- to 1.4-kg dry-ice pieces placed in 3.8-liter insulated metal cans with lids. One dry-ice can per trap was suspended above the light trap and each can had five 5-mm holes in the bottom allowing release of CO<sub>2</sub>. The omnidirectional trap was hung on a tripod stand with the trap entrance 0.9 m above ground level. Traps were operated during daylight hours and were set at 0700 h and taken down at 1800 h. Two to 6 traps were operated each trap period. Traps were located at tree-shaded collection sites within and adjacent to the storage yard. Traps were operated from May to late August in 1995 and June to late August in 1996. Collected mosquitoes were frozen with dry ice and identified (Darsie 1986). Weather information for West Point was obtained from the National Oceanic and Atmospheric Administration (National Climatic Data Center, Asheville, NC).

In 1995, the 1st female *Ae. albopictus* were collected on June 21 (Fig. 2a). Most of the *Ae. albopictus* were collected from a trap located in a wooded area adjacent to the storage yard. In 1995 the summer month temperatures were higher and the precipitation lower than the 30-year normal (Fig. 2a).

In 1996, the 1st *Ae. albopictus* were collected on June 11 (Fig. 2b). Mosquito collections were low until July 24 and 26 when 5.0 and 5.5 were collected per trap, respectively. This peak may be attributed to a rainfall event of 1.85 in. occurring on July 17. A peak of 23.5 *Ae. albopictus* collected per trap occurred on August 15, possibly corresponding to a rainfall event of 5.74 in. on August 5. The greatest collections were in the more shaded areas of the tire storage yard. During 1996, the summer month temperatures were lower than normal and the precipitation higher than normal (Fig. 2b). Other adult mosquitoes collected were *Och-*

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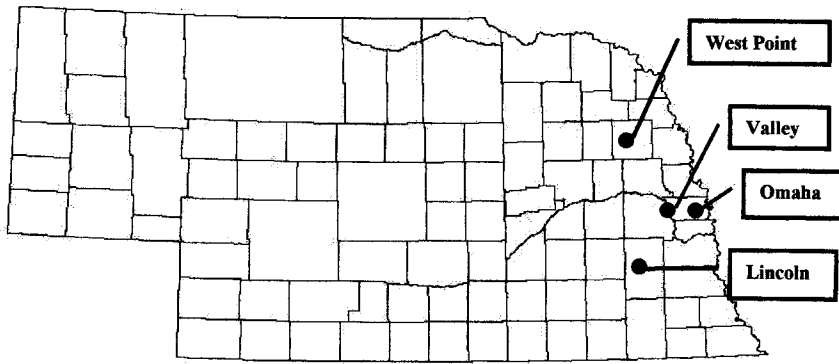


Fig. 1. Adult *Aedes albopictus* were collected in Valley and West Point, NE, during 1992. Omaha and Lincoln, NE, are placed as reference points.

*erotatus atropalpus* (Coquillett) (unpublished data), *Ochlerotatus dorsalis* (Meigen), *Ochlerotatus triseriatus* (Say), *Ochlerotatus trivittatus* (Coquillett), and *Aedes vexans* (Meigen).

No tires, and, therefore, no new infestations of *Ae. albopictus* associated with tires coming from endemic areas were introduced into the West Point, NE, tire storage yard between the 1995 and 1996 seasons. The winter months between the 1995 and 1996 collecting seasons seemed to be normal for this region, with only December 1995 and February 1996 temperatures being slightly warmer than the 30-year normal and only January and March 1996 being slightly cooler. Thus, *Ae. albopictus* seems to have survived winter conditions in Nebraska.

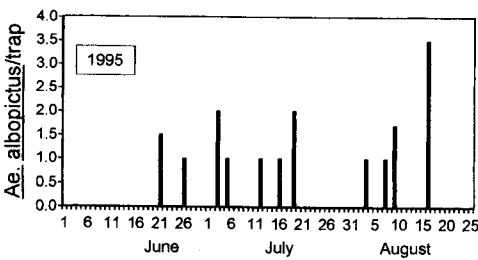
In both years, *Ae. albopictus* populations started at low numbers in early summer and then peaked in late summer. The importance of cool, wet weather in maintaining this species in Nebraska remains to be determined. However, greater numbers were collected in 1996 when a cool and wet summer occurred.

No populations of *Ae. albopictus* were observed in nearby West Point. However, *Ae. albopictus* apparently may be spreading to other regions of Nebraska. Recently, J. Moore (2001) collected *Ae. albopictus* larvae from tires near Lincoln, NE, in 2000.

This paper records the collection of *Ae. albopictus* in Nebraska and the ability of this species to survive winter conditions in the region. These sites in Nebraska may be the most northwestern collection points for *Ae. albopictus* in the USA. The northernmost collection of *Ae. albopictus* in the USA is Chicago, IL (41°55'N; Rightor et al. 1987). The spread of *Ae. albopictus* in this region may be limited by climatologic factors such as cold and dry conditions but may be positively affected by urbanization and human influence (Moore 1999).

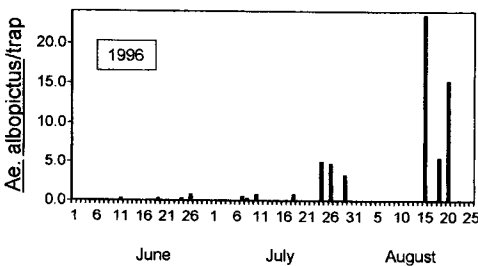
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a)



Avg. Temp. Max.	26.5 (28.1)	31.7 (30.8)	30.6 (29.1)
Avg. Temp. Min.	15.3 (14.8)	17.6 (17.8)	19.2 (15.9)
Precipitation	5.36 (11.61)	2.11 (7.47)	10.01 (8.33)

b)



Avg. Temp. Max.	27.6 (28.1)	27.4 (30.8)	27.0 (29.1)
Avg. Temp. Min.	16.0 (14.8)	16.0 (17.8)	16.6 (15.9)
Precipitation	16.33 (11.61)	8.89 (7.47)	19.28 (8.33)

Fig. 2. *Aedes albopictus* collections from West Point, NE, during (a) 1995 and (b) 1996. Values listed below each month represent the average monthly temperatures in West Point (°C) and total precipitation for that month in centimeters of rain. Values in parentheses are the 30-year normal values (National Climatic Data Center) for that month in West Point.

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