SEASONAL OCCURRENCE AND ABUNDANCE OF Aedes triseriatus and other mosquitoes in a La Crosse virus-endemic area in western North Carolina

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ABSTRACT: The species composition and population abundance of mosquitoes were investigated from May to November in 1989 and 1990 on the Cherokee Indian Reservation, an area of western North Carolina endemic for transmission of La Crosse (LAC) virus. Mosquitoes representing 6 genera and 13 species were collected. Aedes triseriatus was the most abundant species collected, comprising over 98% of mosquitoes collected by ovitrapping and CO₂-baited suction trapping, and 88% of resting adults collected by vacuuming vegetation and leaf litter. Culex restuans and Anopheles punctipennis were common but much less frequently collected. Host-seeking and resting Ae. triseriatus were most abundant in early to midsummer, whereas gravid Ae. triseriatus was most active in the fall. The previous occurrence of cases of LAC encephalitis was concordant with the seasonal activity of gravid but not host-seeking or resting Ae. triseriatus.

INTRODUCTION

Aedes triseriatus (Say) is the primary vector and overwintering host for La Crosse (LAC) virus in the midwestern USA (Grimstad 1988). LAC virus, a California serogroup virus, causes an encephalitis in children. In North Carolina, cases of LAC encephalitis generally are reported each year (Szumlas et al. 1996a). North Carolina ranks 8th in the nation with 1.6% of over 1,700 reported cases of encephalitis resulting from California serogroup viruses (Le Duc 1987). All cases have been reported in the Blue Ridge Mountain area of western North Carolina, most prominently from the Cherokee Indian Reservation area of Jackson and Swain counties. Transmission of California serogroup viruses has occurred in the area since at least 1964, when the first encephalitis cases were verified by Kelsey and Smith (1978). Documentation of LAC encephalitis cases on the Cherokee Indian Reservation was provided by Kappus et al. (1983). In this same investigation, LAC virus antibody was found in blood serum samples taken from 2nd grade children on the reservation in 1968 (2%) and 1978 (4.5%), and from high school students in 1979 (11.3%). Kappus and coworkers also made 2 LAC virus isolations from Ae. triseriatus mosquitoes that were reared from larvae collected on the reservation near the homes of children previously hospitalized for LAC encephalitis.

On the reservation, exposure of Native Americans to mosquitoes appears to be high. Recently, Szumlas et al. (1996a) reported finding LAC virus antibody prevalence rates of 20.6% in serum samples from the reservation, whereas only 4.7% of samples collected off-reservation were positive for antibody. In backyard container surveys, conducted in 5 of 6 of the principal communities, 11 species of mosquitoes were collected, but 80.9% of all mosquitoes reared from containers were Ae. triseriatus (Szumlas et al. 1996b). All communities averaged >6 containers per residence, suggesting that the potential for mosquito production on home grounds was high, and that exposure to virus-infected Ae. triseriatus likely occurred on home grounds.

On the Cherokee Indian Reservation, we investigated the population ecology of Ae. triseriatus in relation to the occurrence of LAC encephalitis cases. Herein, we report the seasonal occurrence and abundance of host-seeking, resting, and gravid Ae. triseriatus.

MATERIALS AND METHODS

Study area: The Cherokee Indian Reservation is located in western North Carolina in the Blue Ridge Mountains. The reservation, which occupies ca. 22,600 ha, is located in Swain and Jackson counties at the junction of U.S. highways 19 and 441 (Fig. 1). More than 6,000 Native Americans live in approximately 2,300 residences (Welch 1990). Elevations range from 572 to over 1,667 m, but most residences are situated at elevations ranging from approximately 600 to 900 m. The flora and fauna have been described previously (Szumlas et al. 1996a).

Six sites were established on the Cherokee Indian Reservation in 1989 and 1990 (Fig. 1) for routine sampling. Four sites were established at residences of children who had had LAC en-
cephalitis. An additional 2 sites were located at trash dumps where numerous artificial containers provided potential habitats for container-breeding mosquitoes.

Site 1 was located at a residence in the community of Big Cove at 890 m. Numerous food containers (>100) and some tire casings (5–10) were present at this site, all of which were located 10–20 m from the house. The residence was inhabited in 1989, but it was vacant during 1990. Site 2 was a trash dump site located on Yellow Hill in the community of Cherokee at about 730 m. This site was approximately 100 m from the nearest residence. Numerous discarded containers and a few automobile tire casings were found. Site 3 was located at a residence in Birdtown at 585 m. Site 4 was located at a trash dump site, also in Birdtown, at 610 m. Hundreds of discarded trash containers and >1,000 tire casings were present at this site in 1989. In 1990, over half of all the tires and much of the surrounding vegetation were destroyed by fire. The nearest residence to this site was about 25 m away. Site 5 was located at a residence on Blue Wing Creek Road in the community of Soco at about 710 m. Man-made containers were not abundant at this site. The nearest neighbor was at a distance of ca. 25 m. Site 6 was at a residence in the Big Y area on Wright's Creek at 790 m. Discarded containers were not abundant.

Sampling larvae: A survey was conducted during the week of July 18, 1990, to characterize conditions at each site and to collect mosquitoes. With the exception of site 4, artificial containers were sampled at all sites. Containers at site 4 were too numerous to sample. All larvae and pupae in flooded containers were removed and placed in Whirl-Pak® bags (Fisher Scientific), placed in an ice chest, and transported to an insectary at North Carolina State University.

Sampling adults: The seasonal activity of females was monitored using oviposition and suction traps (baited with CO₂), and resting males and females were collected by vacuuming vegetation and leaf litter.

Ovitrapping: Oviposition activity of container-breeding mosquitoes was monitored with
traps at all 6 sites daily for 23 wk in 1989 from
May 31 to November 7, and for 26 wk in 1990,
from May 2 to November 8. During both sea-
sons, ovitraps were placed in the same locations.
Ovitraps consisted of no. 10 tin cans (ca. 4 liters
volume) painted glossy black inside and out
with Rustoleum®. Holes were drilled 2.5 cm
down to the soil, and tap water was added to fill
the container for an additional week and then
the strip was reflooded. This procedure was repeated
until they were processed. Within each site, the
samples from containers were segregated by
year, site, sample, species, and sex, and enumerated. When aspiration samples were
sorted, females were classified as unfed, blood-
fed, or gravid.

Weather data: Records of daily precipitation and high and low temperature, collected at the
Oconaluftee weather station on the Cherokee In-
dian Reservation, were acquired from the State
Climatological Office in the Department of Ma-
rine, Earth and Atmospheric Sciences, North
Carolina State University, Raleigh, NC.

Statistical analyses: Weekly rainfall totals were examined by analysis of variance (ANO-
VA) (Sokal and Rohlf 1994). Differences in the
mean weekly number of mosquitoes collected
between years, sites, and within sampling meth-
ods were tested for significance using ANOVA.
Prior to these analyses, the numbers of mosqui-
toes collected were subjected to square root
transformations to normalize variances. Fisher's
least-significant-difference (LSD) test was used
to segregate significantly different means. Type
III mean squares for the year × site × sample
interaction were used as error terms in F and
LSD tests.

RESULTS

Weather patterns: Air temperature peaked in
June, July, and August of both years, and de-
clined rapidly after August (Fig. 2). The aver-
ages of maximum and minimum temperatures
from May 1 to October 31 were 18.2°C and
18.6°C in 1989 and 1990, respectively. Seasonal
patterns of precipitation from February to Oc-
tober for 1989 and 1990 appeared to be mark-
edly different (Fig. 2); however, weekly rainfall
totals from May 1 to October 31 were only marginally different between years ($F = 3.69; df = 1; P = 0.06$). For this period, rainfall totaled 101.6 and 66.9 cm for 1989 and 1990, respectively.

Container surveys: The number of containers found at each study site ranged from 15 at site 5 to >1,000 at site 4 (Table 1). Containers at site 4 consisted mainly of discarded automobile tire casings. Over 90% of the containers were flooded at the time of the survey except for site 6, where only 67% of containers were flooded. Prevalence of flooded containers infested with *Ae. triseriatus* larvae ranged from 15 to 41%. Mean standing crop of larvae in containers was lowest at site 2 (4.3 immatures/container) and highest at site 5 (71.5 immatures/container).

Aspiration sampling: In 1989 and 1990, 11 mosquito species and a total of 6,046 adults were collected in aspiration samples. Aspiration sampling detected more mosquito species than the other 2 survey methods. Almost twice as many adults of all species were collected in 1989 ($n = 4,024$) relative to 1990 ($n = 2,022$),
Table 1. Container and site characteristics for 6 mosquito sampling sites on the Cherokee Indian Reservation, including 4 residences of previous La Crosse encephalitis patients.

<table>
<thead>
<tr>
<th>Site</th>
<th>Distance (m) to nearest residence</th>
<th>Containers examined</th>
<th>Immature Aedes triseriatus collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&gt;100</td>
<td>Total no.</td>
<td>Total no. per container</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flooded</td>
<td>Mean no. per container</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>105</td>
<td>96</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>27</td>
<td>18</td>
</tr>
</tbody>
</table>

1 Containers surveyed for mosquito immatures on July 18, 1990.
2 Containers were not sampled.

with means of 8.4 and 3.6 adults collected per 15-min aspiration sample, respectively. Although 11 species were sampled, males and females of only 5 species were collected regularly. *Aedes triseriatus* was the most abundant species (X = 4.8 adults collected per sample), comprising 88.4% of all specimens collected. Other less common species (overall means of <0.4 adults per sample) collected included *Culex restuans* Theobald (6.5%), *Aedes vexans* (Meigen) (2.1%), *Culex territans* Walker (1.6%), and *Culex pipiens* Linn. (1.2%). In 1989 and 1990, 84.1 and 68.4%, respectively, of the total number of mosquitoes were collected from site 4.

**CO₂-baited suction trapping:** Eight species and 5,438 females were collected (Table 2), but only *Ae. triseriatus* and *Anopheles punctipennis* (Say) were well represented throughout the season. *Aedes triseriatus* was the most abundant species, constituting 98% of all specimens collected, with means of 61.5 and 15.3 females per suction trap sample in 1989 and 1990, respectively. *Anopheles punctipennis* averaged 0.7 and 0.3 females per 24-h trap sample in 1989 and 1990, respectively. For 6 other species, 27 specimens were collected, and each species accounted for <0.3% of the total collected during both years.

**Ovitrapping:** Five species were detected with ovitraps but more than 98% of the eggs collected were deposited by *Ae. triseriatus*. Mean density of eggs deposited by *Ae. triseriatus* in ovitraps was 83.3 eggs per trap-week. In contrast, mean numbers of *Cx. restuans*, *Aedes hendersoni* Cockerell, *Aedes albopictus* (Skuse), and *Cx. pipiens* varied from <0.1 to 0.2 eggs per trap-week.

**Seasonal abundance and distribution of Aedes triseriatus:** Resting adults exhibited peaks of abundance in June and late July–early August in 1989; and peak numbers of adults were collected in early June, July, and August, and in mid-September in 1990 (Fig. 3). Phenology of males closely paralleled that of females, but males de-

Table 2. Mosquitoes collected in CO₂-suction traps at 3 sites on the Cherokee Indian Reservation in 1989 and 1990.

<table>
<thead>
<tr>
<th>Species</th>
<th>Total no. adults collected</th>
<th>Percent of total</th>
<th>Mean no. adults collected per 24-h suction trap</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n = 66)</td>
<td></td>
<td>1989 (n = 66)</td>
</tr>
<tr>
<td><em>Aedes triseriatus</em></td>
<td>5,343</td>
<td>98.30</td>
<td>61.50</td>
</tr>
<tr>
<td><em>Aedes atlanticus</em></td>
<td>1</td>
<td>0.02</td>
<td>0.01</td>
</tr>
<tr>
<td><em>Aedes trivittatus</em></td>
<td>1</td>
<td>0.02</td>
<td>0.00</td>
</tr>
<tr>
<td><em>Aedes vexans</em></td>
<td>3</td>
<td>0.06</td>
<td>0.02</td>
</tr>
<tr>
<td><em>Anopheles punctipennis</em></td>
<td>68</td>
<td>1.30</td>
<td>0.70</td>
</tr>
<tr>
<td><em>Culex pipiens</em></td>
<td>14</td>
<td>0.25</td>
<td>0.00</td>
</tr>
<tr>
<td><em>Culex restuans</em></td>
<td>5</td>
<td>0.09</td>
<td>0.03</td>
</tr>
<tr>
<td><em>Coquilletidia perturbans</em></td>
<td>3</td>
<td>0.06</td>
<td>0.03</td>
</tr>
</tbody>
</table>
increased precipitously before females at the end of summer. In 1989, females were more abundant, but in 1990, males were generally collected in greater numbers than females up until early August (Fig. 3). Bloodfed and gravid *Ae. triseriatus* were collected throughout the season but only in low numbers (<5) per sample even when populations were at peak numbers. Small peaks in the numbers of bloodfed females collected per sample occurred in late June and July, and early August, and again in mid-September. Gravid females increased in number in our collections from July 4 to September 19, reaching peak numbers on August 29.

Mean number of *Ae. triseriatus* adults collected in aspiration samples in 1989 (6.4 adults per sample) was greater ($F = 18.08; df = 1; P = 0.001$) than in 1990 (3.1 adults per sample). A larger number of females ($F = 37.89; df = 1; P = 0.0001$) was collected in 1989 ($\bar{x} = 4.0$ mosquitoes per sample) relative to 1990 ($\bar{x} = 2.4$ mosquitoes per sample). In contrast, the number of males collected in 1989 ($\bar{x} = 1.3$ mosquitoes per sample) and 1990 ($\bar{x} = 1.8$ mosquitoes per sample) was not different ($F = 2.45; df = 1; P = 0.14$). Adult collections varied significantly among the 5 sites sampled ($F = 108.7; df = 4; P = 0.0001$), with nearly 87% of all *Ae. triseriatus* collected in both years taken at site 4 (Table 3). The number of adults collected at this site in 1989 ($\bar{x} = 29.5$ adults per sample) was greater ($P < 0.05$) than the number collected in 1990 ($\bar{x} = 12.0$ adults per sample). The abundance of *Ae. triseriatus* was much lower at other
Table 3. Resting *Aedes triseriatus* adults collected from vegetation with backpack aspirators at 5
sites on the Cherokee Indian Reservation in 1989 and 1990.

<table>
<thead>
<tr>
<th>No. adults collected per 15-min aspiration sample</th>
<th>1989</th>
<th>1990</th>
<th>Total</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site</td>
<td>x</td>
<td>SE</td>
<td>x</td>
<td>SE</td>
</tr>
<tr>
<td>4</td>
<td>29.48a</td>
<td>6.57</td>
<td>11.97a</td>
<td>2.77</td>
</tr>
<tr>
<td>3</td>
<td>0.83b</td>
<td>0.21</td>
<td>1.13b</td>
<td>0.27</td>
</tr>
<tr>
<td>6</td>
<td>0.75b</td>
<td>0.21</td>
<td>1.01b</td>
<td>0.25</td>
</tr>
<tr>
<td>5</td>
<td>0.54b</td>
<td>0.13</td>
<td>0.84b</td>
<td>0.21</td>
</tr>
<tr>
<td>1</td>
<td>0.38b</td>
<td>0.10</td>
<td>0.77b</td>
<td>0.32</td>
</tr>
<tr>
<td>Overall</td>
<td>6.40</td>
<td>1.62</td>
<td>3.14</td>
<td>0.67</td>
</tr>
</tbody>
</table>

Means with the same letter within each column are not significantly different (P > 0.05) by an LSD test.

After being collected in highest numbers in suction traps in June and July, *Ae. triseriatus* females declined from August to October (Fig. 4). In 1989, high numbers of females were taken in the first collection in June, indicating that *Ae. triseriatus* was not sampled at the beginning of its breeding season. Females seemed to be more abundant in 1989 than in 1990, but high variation among sites made differences between means of each year insignificant (F = 1.00; df = 2; P = 0.50). Each year, more than 94% of all *Ae. triseriatus* collected were from site 4, with means of 178.9 and 49.4 females collected per 24-h suction trap sample in 1989 and 1990, respectively (Table 4).

*Fig. 4. Mean number of host-seeking *Aedes triseriatus* collected per 24 h in CO₂-baited suction traps at 3 sites on the Cherokee Indian Reservation.*
Table 4. Host-seeking Aedes triseriatus collected with CO₂-suction traps at 3 sites on the Cherokee Indian Reservation in 1989 and 1990.

<table>
<thead>
<tr>
<th>Site</th>
<th>1989</th>
<th>1990</th>
<th>Total</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>SE</td>
<td>No.</td>
<td>SE</td>
</tr>
<tr>
<td>4</td>
<td>178.9</td>
<td>44.4</td>
<td>49.4</td>
<td>12.9</td>
</tr>
<tr>
<td>5</td>
<td>3.3</td>
<td>1.0</td>
<td>4.6</td>
<td>1.0</td>
</tr>
<tr>
<td>1</td>
<td>2.4</td>
<td>0.6</td>
<td>3.9</td>
<td>0.8</td>
</tr>
<tr>
<td>Total</td>
<td>61.5</td>
<td>17.8</td>
<td>19.3</td>
<td>5.0</td>
</tr>
</tbody>
</table>

¹ Means are not significantly different (P = 0.05) by an LSD test.

DISCUSSION

Seasonal occurrence and abundance of mosquito species: Aedes triseriatus was the most abundant mosquito on the Cherokee Indian Reservation in aspiration, CO₂-suction trap, and ovitraps samples. The seasonal profiles of resting males and females collected in aspiration samples (Fig. 3) and host-seeking females sampled with suction traps (Fig. 4) were similar. However, gravid females exhibited a different seasonal activity pattern (Fig. 5). Egg densities were much greater in 1990, and peak numbers were collected from mid-August to mid-September. Resting and host-seeking adults were more abundant in 1989 and generally reached peak numbers in July.

The contrasting phenologies most likely resulted from differences in the seasonal patterns of rainfall for these years. Ovitraps compete for eggs with natural and other man-made oviposition sites (Craig 1983, Hanson et al. 1988). High levels of rainfall would fill containers, diverting gravid females from using ovitraps. Consequently, if there are few natural or artificial containers present in areas where ovitraps are placed, a disproportionately larger number of eggs would be deposited in ovitraps compared to locales where numerous alternative oviposition sites are available. On the reservation, the seasonal occurrence of rainfall had a greater impact on oviposition activity than did the total amount of rainfall in 1989 and 1990. Weekly mean densities of eggs in ovitraps were greater in 1990, but total rainfall was lower than in 1989. In 1989 and 1990, precipitation in April and May would have flooded containers, stimulating production of Aedes triseriatus adults. However, in June and early July, 1990, gravid females from these cohorts would have been recruited to ovitraps in relatively high numbers because the decline in rainfall during this period of this year would have

Fig. 5. Mean number of Aedes triseriatus eggs collected per trap-week in ovitraps at 6 sites on the Cherokee Indian Reservation.
Table 5. Mean numbers of *Aedes triseriatus* eggs collected from ovitraps on the Cherokee Indian Reservation in 1989 and 1990.

<table>
<thead>
<tr>
<th>Site</th>
<th>Mean no. eggs collected per ovitrap-week</th>
<th>1989</th>
<th>1990</th>
<th>Total</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(\bar{x})</td>
<td>SE</td>
<td>(\bar{x})</td>
<td>SE</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>40.6a</td>
<td>5.3</td>
<td>134.9a</td>
<td>19.4</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>54.0a</td>
<td>6.3</td>
<td>96.1b</td>
<td>13.8</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>38.9a</td>
<td>5.2</td>
<td>87.4bc</td>
<td>17.6</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>45.5a</td>
<td>5.6</td>
<td>81.0bc</td>
<td>15.7</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>15.9b</td>
<td>2.8</td>
<td>72.0bc</td>
<td>9.9</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>22.8b</td>
<td>3.0</td>
<td>62.1c</td>
<td>10.0</td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td>36.6</td>
<td>2.0</td>
<td>88.9</td>
<td>6.1</td>
</tr>
</tbody>
</table>

\(^1\) Means with the same letter within each column are not significantly different (\(P = 0.05\)) by an LSD test.

Reduced the number of alternative oviposition sites. In contrast, comparatively higher levels of rainfall occurred during June and July, 1989, which would have filled containers diverting some females from ovipositing in ovitraps.

The effects of container abundance on use of ovitraps by *Ae. triseriatus* is evident at site 4. Densities of eggs in ovitraps at this trash dump site generally were lower than at other sites. Containers were predominantly discarded automobile tires, which are highly suitable breeding sites for *Ae. triseriatus* (Haramis 1984). The abundance of host-seeking and resting adults was highest at this site. A decrease in numbers of host-seeking and resting mosquitoes collected at site 4, observed in 1990 relative to 1989, was undoubtedly due to the partial destruction of tires and resting sites by fire. At other sites, similar changes in habitat did not occur, and the numbers of adults collected were not markedly different between years.

At site 1, the other trash dump site, aspiration and suction trap sampling yielded the lowest number of *Ae. triseriatus* adults, which was unexpected. At this site, 105 containers were examined, and more than 40% of flooded containers were positive for larvae, with a mean of 7 larvae per positive container. The low abundance of adults suggests that few adults emerged from these containers. The majority of containers consisted of rusted food cans. In Florida, O'Meara et al. (1992) reported finding few *Ae. albopictus* larvae in bronze cemetery vases that leach copper ions into the water. Metal ions may have similarly limited the survival of *Ae. triseriatus* larvae in rusted containers at site 1.

The abundance of *Ae. triseriatus, Cx. restuans, Ae. albopictus,* and *Ae. vexans* decreased in aspiration samples in 1990 relative to 1989. Amounts of rainfall in May are comparable for both years, but mosquitoes were unexplainably less abundant in June and throughout much of the breeding season in 1990. Only one *Ae. albopictus* larva was recovered during the backyard container surveys in 1990. *Aedes albopictus* was unexplainably not sampled in ovitraps made in 1990. Collection of *Ae. albopictus* in 1989 may have resulted from an introduction of this species in tires or other translocated man-made containers the same year. Its decline in 1990 could have been due to its inability to overwinter. Hawley et al. (1989) found that the overwinter-survival of several strains of diapauing and nondiapauing *Ae. albopictus* was lower than that of *Ae. triseriatus* in northern Indiana.

**Seasonality of Ae. triseriatus and the occurrence of LAC encephalitis:** The majority of reported LAC encephalitis cases (48 of 54) in North Carolina from 1964 to 1992 have been reported in August and September (Szumlas et al. 1996a). Seasonal abundance patterns of *Ae. triseriatus* estimated by both aspiration and suction trapping in 1989 and 1990 do not correspond with the seasonal incidence of previously reported LAC encephalitis cases. Population levels of *Ae. triseriatus* declined during August and September, at times when most LAC encephalitis cases in NC have been reported. In contrast to our results, Clark et al. (1985a) reported *Ae. triseriatus* biting rates in a LAC virus-endemic area of northern Illinois, to be highest in August and September when LAC encephalitis cases were most frequently reported (Clark et al. 1983, 1985b). On the reservation, however, seasonal oviposition activity did appear to coincide with the reported occurrence of LAC encephalitis cases. In 1989 and 1990, peaks in oviposition activity were observed in August and September. It is possible that the high abundance of host-seeking females in June and July results in
virus amplification and higher infection rates of mosquitoes in the latter half of the season. Some mosquitoes, collected from containers and with ovitraps in late summer and early fall of 1990 and 1992, were tested for virus. A total of 16,227 adults and 581 pools of mosquitoes representing 12 species were processed. *Aedes triseriatus* was the predominant mosquito processed, accounting for 93.8 and 78.7% of the total number of mosquitoes and mosquito pools processed, respectively. La Crosse virus was isolated from 2 pools of 56 female and 36 male *Ae. triseriatus* that were reared from eggs collected in ovitraps placed from August 7 to 21, 1990. The minimum field infection rate was estimated to be 0.26 infected adults per 1,000 *Ae. triseriatus* adults (Szumlas et al. 1996b).

The connection between oviposition activity and LAC virus transmission becomes more apparent when considering the availability of breeding sites near residences on the reservation. After *Ae. triseriatus* females become infected by transovarial (Watts et al. 1973) or venereal transmission (Thompson and Beaty 1977), they acquire a blood meal, develop eggs, and seek oviposition sites. Because tree holes are rare on the reservation, and artificial containers are abundant near residences, gravid females would be attracted to peridomestic containers. After ovipositing, these females would seek another blood meal. La Crosse virus would be transmitted to residents through the biting activity of these infected mosquitoes during subsequent gonotrophic cycles.

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