

INCREASED PREVALENCE OF *CULEX TARSALIS* IN OHIO AND ITS IMPLICATIONS¹

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ABSTRACT: Fifteen new county distribution reports for *Cx. tarsalis* were recorded for Ohio in 1977. *Cx. tarsalis* has now been reported from 28 of Ohio's 88 counties. This species was collected in significantly higher numbers in 1977 than in the previous 7 years.

Serologic evidence of hemagglutination inhibiting antibodies to WE in juvenile pigeons for 3 consecutive years and the increased prevalence of *Cx. tarsalis* indicate this species should be closely monitored for possible involvement with western encephalitis in Ohio.

INTRODUCTION

Culex tarsalis Coquillett was regarded as a rare mosquito in Ohio by Venard and Mead (1953). Parsons et al. (1972) reported this species as occurring in 10 Ohio counties based on extensive light trap collecting during the years 1965 to 1971. In 1977 an unusual increase in the abundance of *Cx. tarsalis* was noted and resulted in the establishment of 15 new county records, increasing the known distribution of this species to 28 of 88 Ohio counties. Detection of this increased population density and new distribution records is directly attributed to an ongoing statewide St. Louis encephalitis (SLE) surveillance program, directed by the Ohio Department of Health.

The surveillance program was instituted in 1976 as a result of an SLE epidemic which swept through the mid-section of the United States in 1975, leaving Ohio with 416 known human cases, including 29 fatalities. A network of surveillance sites in 24 counties was estab-

lished to monitor SLE virus activity in mosquitoes and birds. The goal of this surveillance program was to provide an early warning of significant SLE activity so that appropriate and effective mosquito control efforts could be mobilized.

METHODS

The Vector-borne Disease Unit (Ohio Department of Health, Communicable Disease Division) and cooperating local health departments made mosquito and bird blood sample collections on a bi-weekly basis at each surveillance site. Mosquito collection techniques described by Sudia and Chamberlain (1962, 1967) were adopted for the program. These techniques included use of CDC Miniature light traps supplemented with dry ice (Newhouse et al. 1966), shelter collections from daytime resting sites, evening collections in bird coops, and human biting collections. All collections were processed according to methods described by Sudia and Chamberlain (1967) and Sudia et al. (1970). Surveillance sites selected in 1976 were used again in 1977 with only minor changes.

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RESULTS

Cx. tarsalis was absent from all collections made in 1976. In 1977, 180 specimens of *Cx. tarsalis* were collected; 169 through SLE surveillance activities and 11 from pest mosquito investigations in non-surveillance counties. Only 3 of 24 counties (Mahoning, Muskingum and Washington) involved in the SLE surveillance program did not record this species in 1977 (Fig. 1). Although *Cx. tarsalis* accounted for less than 1% of all *Cx.* mos-

quitoes identified in 1977, the observed increase in frequency of collection is statistically significant when compared to collection data from 1976 and to data from the previous seven years (Table 1). Forty-three specimens representing the 15 new county records were deposited in the mosquito reference collection of the Vector-borne Disease Unit. The remaining 137 were tested for arboviruses on duck embryo and vero cell cultures; results were negative.

Cx. tarsalis was most often collected in

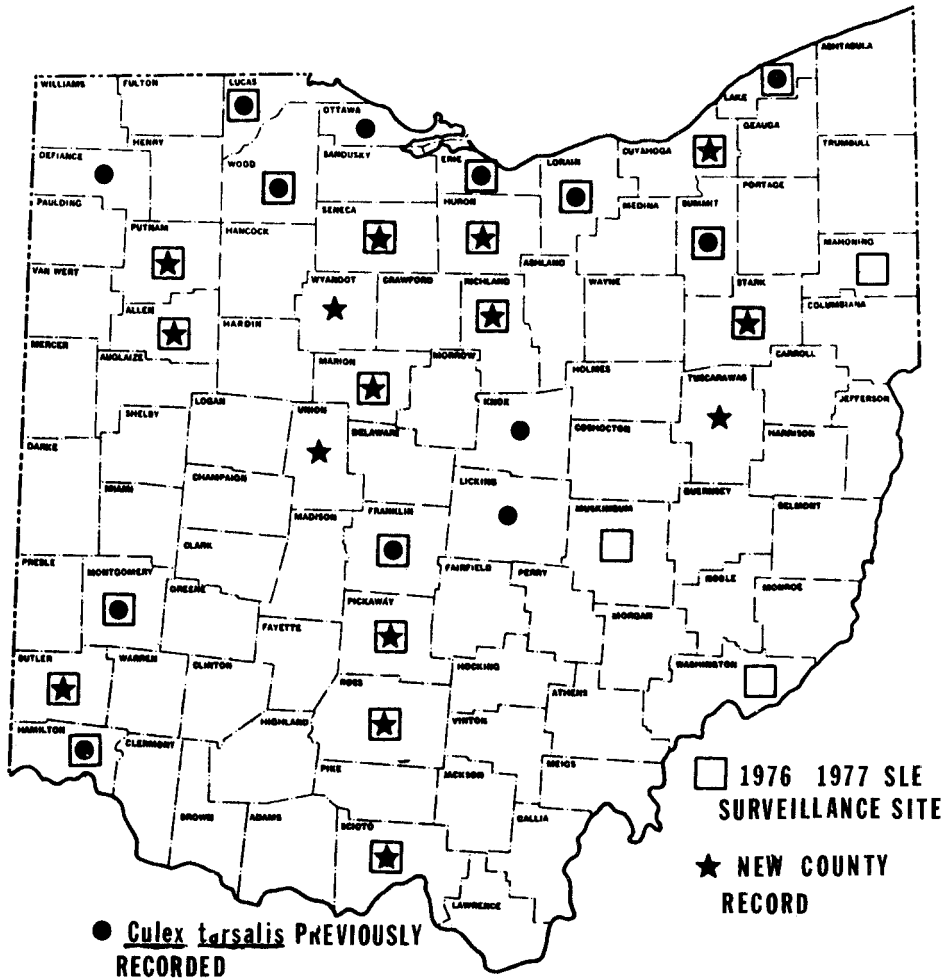


Fig. 1. Current distribution of *Culex tarsalis* in Ohio

Table 1. *Culex tarsalis* collected in Ohio, 1970–1977.

Year	Total other <i>Culex</i> species ¹	Total <i>Culex tarsalis</i>
1977 ²	49702	180 ³
1976 ²	40959	0
1975 ²	53496	5
1974	7353	0
1973	21361	0
1972	16794	1
1971	23299	1
1970	20050	7

¹ Includes *Cx. erraticus*, *pipiens pipiens*, *restuans*, *salinarius*, *territans*.

² SLE Surveillance Program.

³ Significant increase in abundance over years 1970–1976. $X^2(n=1) = 588.68$ $p < .01$.

CDC Miniature light traps (177 of 180). Three specimens were aspirated from shelters—2 from bird coops and one from a culvert. Figure 2 shows seasonal abundance of *Cx. tarsalis* in Ohio during 1977. The majority of specimens were collected in August (92) and September (46).

Cx. tarsalis was most abundant in the northwest quadrant of the state (130 of 180), with Lucas County recording the largest single light trap catch (14) and the greatest number collected over the course of the surveillance season (50).

DISCUSSION

Cx. tarsalis is a proven vector of western encephalitis (WE) and is involved in the rural cycle of SLE in the Western United States (Vector-borne Diseases Division 1975) and must be considered as a potential vector of both viruses in Ohio.

While no human cases of WE have been recorded in Ohio, serologic testing conducted in conjunction with the SLE surveillance program has yielded data which indicate that the virus is present in the state. In 1975, hemagglutination inhibiting antibodies to WE were detected in 14 juvenile pigeons (9 in Cuyahoga Co. and 5 in Franklin Co.). Juvenile pigeons were again found serologically positive to WE in 1976 (1 in Franklin Co.) and in 1977 (1 in Cuyahoga Co.). In addition, there were

two equine cases (1 each in Clinton and Ottawa Counties) in 1977.

Information gathered in SLE surveillance programs in neighboring states indicates that WE activity is becoming more prevalent in the eastern U.S. Clark reported isolation of WE virus in 1977 from a nestling house sparrow in Christian Co., Illinois (Dr. Gary Clark, Illinois Department of Public Health, personal communication). WE antibody titers were found in 3 juvenile pigeons and 1 juvenile house sparrow from Cook Co., Illinois in 1976 (Clark et al. 1977). WE virus has also been recently isolated from *Culiseta melanura* in Pennsylvania (Dr. William Wills, Pennsylvania State Health Department, personal communication) and New Jersey (New Jersey State Mosquito Control Commission 1977).

Evidence now indicates that WE is active in Ohio and neighboring states. *Culex tarsalis* will be closely monitored in 1978 for further indications of increasing

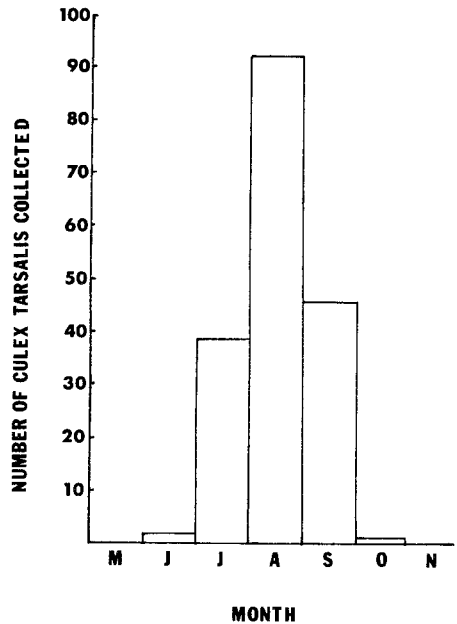


Fig. 2. Seasonal abundance of *Culex tarsalis* in Ohio—1977.

population levels. It is hoped that the 1978 SLE surveillance program will also provide additional information about WE in Ohio.

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