Mulla 1977) and a new serotype, *B. thuringiensis* var. *israelensis* has been found with a very high degree of toxicity for both mosquito (Goldberg and Margalit 1977) and black fly (Undeen and Nagel 1978) larvae. It is not yet known if alkalinity is a common factor in this toxicity. If this alkalinity is unique among stream dwelling insects, it might also be a useful characteristic in the formation of microencapsulated insecticides increasing specificity as demonstrated in methoprene (Altosid®) lab and field tests (Thompson and Adams 1979).

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NOTES ON THE GEOGRAPHICAL DISTRIBUTION OF THREE SPECIES OF *CULISETA*

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At the Medical Entomology Project, U. S. National Museum of Natural History, Smithsonian Institution I recently examined specimens representing species of the genus *Culiseta.* As a result the following distribution records are reported:

Cs. (Culicella) morsitans dyari (Coquillett)
VERMONT: Laurel Lake near Jacksonville, VI-15-1952; 2 males collected and determined by H. D. Pratt. New state record.

Cs. (Cuc.) silvestris minnesotae Barr
ALASKA: Pt. Woronzof, Anchorage, June 10, 1964, stationary trap; 1 female collected by K. M. Sommerman. This specimen was labelled "*Culiseta morsitans dyari*?" by Dr. Sommerman. *Cs. s. minnesotae* has pale brownish bands both basally and apically on the abdominal terga; *Cs. m. dyari* has only basal bands, and the pale scales are distinctly white. New state record.

Cs. (Culiseta) alaskaensis (Ludlow)
NEVADA: Baker, Mt. Diablo Mer., 11–9–39, 1 male collected by T. O. Thatcher. New state record.
UTAH: Escalante, no date; CCC Survey; 2 females. I assume that this collection was made in the 1930's. New state record.

ANTIBODY LEVELS IN BLACKBIRDS TO ST. LOUIS ENCEPHALITIS VIRUS

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Each winter in central and southern Kentucky large numbers of blackbirds congregate. Roosts consist of grackles, red-winged blackbirds, and starlings with smaller numbers of other species also seen. During the summer these roosts break up with the birds scattering across the region. Many of the species found in these winter roosts live in intimate association with man in the summer months, especially in suburban areas. Sentinel birds and trapped wild birds have routinely been used to monitor antibody levels to St. Louis encephalitis (SLE) in the bird population. These levels can then be used to predict the possibility of SLE outbreaks and the need for mosquito control spraying (McLintock 1976, Wong 1976). It was of interest to us to determine the level of anti-

body to SLE in birds from these winter flocks. The immune status of these birds might be of value in determining the expected levels of virus activity the following summer.

A roost estimated to contain 6–8 million blackbirds was sprayed with the detergent Tergitol by the Kentucky Agriculture Department. Many of the birds succumbed to the freezing temperatures. We selected 23 birds, which could easily be captured, and exsanguinated them by cardiac puncture. The serum was extracted and stored at −4°C.

Work in our laboratory (Tesh and McCammon 1978) has shown that the complement fixation inhibition (CFI) test is a rapid, reliable technique for assaying bird sera for antiarbovirus antibodies. The microtiter adaption of the CFI technique was used as previously described (Olsen et al. 1973). Reference antigen was SLE-infected mouse brain (courtesy of CDC); complement fixation (CF) titer 1:32. Control antigen was normal mouse brain. Reference antiserum was a human serum with a CF antibody titer of 1:64 toward SLE. The microtiter test consisted of incubating twofold dilutions of heat-inactivated experimental serum with 2 CF units of reference antigen for 1 hr at 37°C. The above reactants were subsequently mixed with 2 CF units of heat-inactivated (56'C for min) reference antibody plus $5C°H_{50}$ units of guinea pig complement and incubated for an additional 16 hr at 4°C. Optimally sensitized sheep red blood cells (SRBC) (1.25%) were added to the test and incubated for an additional 30 min at 37°C. In the microtiter CFI test, experimental serum titers were reported as the reciprocal of the highest serum dilution that visually reduced the CF reaction between reference antibody and reference antigen by 50%, i.e., from a 4+ reaction to a 2+ reaction. A titer of 1:4 or greater was considered positive. The microtiter CFI test used 25 u liters each of experimental and reference sera, reference antigen, and SRBC, and 50 u liters of complement.

Determination of units of complement, reference antibody, reference antigen, and hemolytic amboceptor were all performed under conditions which simulated those of actual CFI test procedures.

Twenty-three bird sera were titrated for antibody by the CFI test. Results of these test showed that 70% of the sera tested were positive at least at the 1:2 level and that 57% exhibited titers of 1:4 or greater (Table 1). It may be significant that over 50% of the birds tested possessed low levels of antibody to SLE. These findings suggest the value of the winter roots as a source for determination of the susceptibility of these birds to infection. Further studies are warranted, examining larger number of birds and correlating with age. Such a study combined with a banding program could provide new information concerning the epidemiology of SLE.

Table 1. Antibody to St. Louis encephalitis virus in birds as measured by complement fixation inhibition.

Species	No. Tested	CFI titer <2	2	4	8	16
Grackle	15	4	1	4	2	4
Red-wing	4	2	1	1	—	—
Starling	3	—	1	1	1	—
Brewer's blackbird	1	1	—	—	—	—
Total	23	7	3	6	3	4

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COLONIZING *AEDES DORSALIS*

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The mosquito *Aedes dorsalis* (Meigen) is an important pest of man and domestic animals. Females are said to be "fierce" biters, and the attack rate may be sufficiently annoying near

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