JAMESTOWN CANYON VIRUS IN CONNECTICUT [1]

HENRY E. SPRANCE[2], ANDREW J. MAIN, JR. AND ROBERT C. WALLIS
Medical Entomology Section, Dept. of Epidemiology and Public Health, Yale University School of Medicine, 60 College Street, New Haven, Ct. 06510

JULIUS ELSTON
Mosquito Control Section, Connecticut State Dept. of Health, Madison, Ct.

ABSTRACT. Five isolations of California (CAL) group viruses were made from 3 pools of *Aedes abserratus*, 1 pool of *Ae. vexans* and one pool of *Ae. cantator* in Connecticut during the period 1966 through 1975. All five isolates were identified as the Jamestown Canyon (JC) serotype. This represents a substantial increase in the known distribution of JC virus into the northeast.

INTRODUCTION

Since the initial isolation of a California (CAL) group virus in 1943 (Hammon et al. 1952), the group has grown in size and importance. The members of the group are widely distributed and have been isolated in Europe, Africa, South America, and North America. Some of these viruses have been found to be important as a cause of human encephalitis and in the past 15 years have been the subject of intense research.

Knowledge of CAL group virus activity in Connecticut has been limited. Whitman et al. (1968) made the first isolation of a CAL group virus (Con-L-36708) in Connecticut from a pool of 20 *Aedes abserratus* (Felt and Young) collected in Simsbury. A second isolation (Sp-73660) was made in 1973 from a pool of *Ae. cantator* collected in Guilford (Anderson, 1976 personal communication). At the time of these isolations neither was subtyped.

To further explore the activity of CAL group viruses in Connecticut several light trap stations were operated in coastal areas during the 1975 summer season.

MATERIALS AND METHODS

Seven light trap stations were established. These stations were located in the communities of Clinton, Guilford, Killingworth, Madison, North Madison, and Westbrook. The Killingworth site was a part of an area of continuing study of arbovirus ecology being conducted by Yale University. The other sites were associated with the State Health Department's arbovirus surveillance program. All traps were of the New Jersey type, operated by battery or household current from dusk to mid-morning and were

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[2] Present address: Dept. of Entomology, University of Maryland, College Park, Md. 20742

supplemented with dry ice as an additional attractant. The mosquitoes were collected in CDC type mesh bags. These bags were collected daily and replaced with fresh ones. The mosquitoes were then transported alive to the laboratory.

Mosquitoes were identified, pooled into groups of 50 or less, and stored frozen at −60°C until processed. The pools were processed by the method of Sudia and Chamberlain (1967), modified to use 2 ml of 0.75% bovine plasma albumin (BPA) with penicillin and streptomycin per pool. Mouse brain antigens were prepared after the method of Clarke and Casals (1958). Isolates were identified in complement-fixation (CF) tests (Casals 1967) using single inoculation hamster immune sera (Sprance and Shope 1977).

RESULTS

A total of 19,294 adult female mosquitoes was collected from all sites between June and October, 1975. Of the pools tested 3 yielded CAL group virus isolates, a pool of 25 *Ae. vexans* (USA-Ar-78-75), and 2 pools of *Ae. abserratus* (USA-Ar-83-75 and USA-Ar-74-75) respectively. Table I lists all CAL group isolates from female mosquitoes in Connecticut from 1966 through 1975.

The 1975 isolates, USA-Ar-78-75, USA-Ar-83-75, and USA-Ar-74-75, as well as the two previous isolates, Con-L-36708, and Sp-73660, were tested in micro-CF tests (Casals 1967) using single inoculation hamster immune sera (Sprance and Shope 1977) to determine their specific subtypes. The CF test results are given in Table 2. The results indicate that all 5 Connecticut isolates are very closely related if not identical to Jamestown Canyon (JC) virus.

DISCUSSION

These isolations of CAL group virus indicate that at least 1 subtype is actively circulating in Connecticut. More significant, however, is the identification of these isolates as JC virus. Sudia et al. (1971) hypothesized a distribution of JC virus limited to the western parts of the United States and Canada. The recent report of JC virus from the Del Mar Va peninsula in the Eastern U.S. (LeDuc et al. 1975), and the identification of the Connecticut isolates indicate a considerable extension of the known range of JC virus. These data may very well indicate a distribution encompassing much of the U.S. and Canada.

Table 1. California group virus isolations from mosquitoes (adult females only) in Connecticut, 1966 through 1976.

	1966	1967	1968	1969	1970	1971
Aedes abserratus	1/184*	0/187	0/114	0/0	0/91	0/153
Aedes cantator	0/0	0/85	0/44	0/3	0/0	0/0
Aedes vexans	0/96	0/905	0/1137	0/3900	0/784	0/2313
Other *Aedes* spp.	0/315	0/1932	0/2205	0/1591	0/2674	0/1026
Other genera	0/189	0/6173	0/7204	0/10245	0/4954	0/3718
Total	1/784	0/9282	0/10704	0/15739	0/8503	0/7210

	1972	1973	1974	1975	Total	MIR
Aedes abserratus	0/2	0/1	0/27	2/212	3/971	1:324
Aedes cantator	0/4	1/1606	0/456	0/1255	1/3453	1:3453
Aedes vexans	0/196	0/3824	0/1008	1/5522	1/19685	1:19685
Other *Aedes* spp.	0/289	0/375	0/1862	0/4823	0/17092	1:17092
Other genera	0/3577	0/3557	0/4488	0/7482	0/51587	1:51587
Total	0/4068	1/9363	0/7841	3/19294	5/92788	1:18558

* Number of positive pools/number of individual mosquitoes tested.

Table 2

Sera / Antigens	Jamestown	Keystone	Snowshoe Hare	Trivittatus	San Angelo	California	LaCrosse
USA-Ar-74-74	256[1]	16	0	8	0	0	0
USA-Ar-78-75	256	16	8	0	0	0	0
Con-L-36708	256	32	32	16	0	0	0
USA-Ar-83-75	128[2]	8	0	0	0	0	0
sp-73660	256	16	0	0	0	4	4
Jamestown	256						
Keystone		64					
Snowshoe Hare			128				
Trivittatus				512			
San Angelo					64		
California						32	
LaCrosse							16

[1] Reciprocal of maximum antibody titer in grid tibrations: initial dilution of serum 1:8 of antigen 1:4.

[2] Results obtained in a separate test, using South River serum for Jamestown Canyon. South River has been shown to be indistinguishable from JC in CF tests (Srance and Shope, 1977).

Three of the 5 isolations were made from *Ae. abserratus*. This information may be important when attempting to define the natural cycle of JC virus in Connecticut. No isolations were made from *Ae. triseriatus*, the primary vector of LaCrosse (LAC) virus. Sudia et al. (1971) suggested that LAC virus, as well as snowshoe hare (SSH), and trivittatus (TVT) viruses occur in Southern New England. Snowshoe hare has been isolated in Massachusetts from *Aedes* mosquitoes (Sudia et al. 1971), but as yet none of the 3 has been isolated in Connecticut.

The question of human involvement with the CAL viruses in Connecticut has not been adequately investigated. Hemagglutination-inhibiting (HI) antibody to CAL group viruses has been found in man in Connecticut; however, no investigation into the etiological agent has been made (Anderson, 1976, personal communication). Jamestown Canyon virus has been implicated in human disease in Alaska (Feltz et al. 1972) and Wisconsin (Sudia et al. 1971). Further studies may elucidate the importance of JC virus in human disease in Connecticut. Such studies may also indicate the presence of 1 or more of the other subtypes of CAL group virus.

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