Virus Name: Virgin River	Abbreviation: VRV

Status
Possible Arbovirus

Select Agent
No

SALS Level
2

SALS Basis
Placed at this biosafety level based on close antigenic or genetic relationship to other viruses in a group of 3 or more viruses, all of which are classified at this level.

Other Information

Antigenic Group
Anopheles A

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation
743-366

Accession Number

Original Date Submitted
8/31/1984

Family
Bunyaviridae

Genus
Bunyavirus

Information From
C.H. Calisher

Address
Vector-Borne Diseases Division, CDC, Fort Collins, CO 80522

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)
G. Crane and R. Elbel

Isolated at Institute
Dugway, Utah

Host Genus
Anopheles freeborni

Species

Host Age/Stage
40 Adults

Sex
Female

Isolated From

Isolation Details

Signs and Symptoms of Illness

Arthropod
Depleted

Time Held Alive before Inoculation

Collection Method
CDC light trap

Collection Date
9/12/1974

Place Collected (Minimum of City, State, Country)
Beaver Dam Wash, at Virgin River, Arizona

Latitude
36° 54' N

Longitude
113° 56' W

Macrohabitat
571.5 meters elevation. Lower Sonoran Life Zone

Microhabitat
Tamarix pentandra, Salix gooddingi, Typha latifolia, Prosopis juliflora, Populus fremonti, Salsola k

Method of Storage until Inoculated
Mechanical freezer at -60dC

Footnotes

Section III - Method of Isolation

Inoculation Date
10/15/1974

Animal (Details will be in Section 6)
nb mice

Route Inoculated
Intracerebral

Reisolation
Yes

Other Reasons
No other related virus in this laboratory at time of isolation or reisolation.

Homologous Antibody Formation by Source Animal

Test(s) Used

Footnotes

Section IV - Virus Properties

Physicochemical

Pieces (number of genome segments)	Infectivity	Sedimentation Coefficients(s) (S)
Percentage wt, of Virion Protein	Lipid	Carbohydrate
Virion Polypeptides: Number	Details	
Non-virion Polypeptides: Number	Details	
Virion Density	Sedimentation Coefficients(s) (S)	
Nucleocapsid Density	Sedimentation Coefficients(s) (S)	

Stability of Infectivity (effects)

pH (infective range)

Lipid Solvent (ether - % used to test)	After Treatment Titer	Control Titer
Lipid Solvent (chloroform)	After Treatment Titer	Control Titer
Lipid Solvent (deoxycholate) **1:1000**	After Treatment Titer **<2.0 dex**	Control Titer **5.4 dex**

Other (formalin, radiation)
Loss of 1.2 dex and 0.4 dex when held at 37C, 1 hr and 4C, 22 hr respectively

Virion Morphology

Shape	Dimensions	
Mean nm	Range nm	
Measurement Method	Surface Projections/Envelope	Nucleocapsid Dimensions, Symmetry

Morphogenesis

Site of Constituent Formation in Cell	Site of Virion Assembly	Site of Virion Accumulation
Inclusion Bodies	Other	

Hemagglutination

Hemaggiutination	Antigen Source	Erythrocytes (species used)
No	**SMB ext. by sucrose-acetone**	**Goose**
pH Range **5.75-7.0**	pH Optimum	
Temperature Range **4dC - 37dC**	Temperature Optimum	

Remarks

Serologic Methods Recommended
CF, NT

Footnotes

Section V - Antigenic Relationship and Lack of Relationship to Other Viruses

743-366 antigen (titer = 256) was tested by complement-fixation with grouping immune ascitic fluids including: NIH Polyvalent grouping fluids 1 through 10 and 12, QRF, BWA, VSV, CAL, CON, SAK, SIM, TCR, GMA, BUN, B, PAL, PAT, PHL, CAP, KEM, Rabies, and Polyvalent Anopheles A as well as immune preparations to Anopheles A (original), Lukuni (TRVL 10076), Tacaiuma (BeAn 73), Anopheles B (original), Boraceia (SPAr 395) and Turlock (847-32) viruses. Reactivity was noted only with Polyvalent Anopheles A and Tacaiuma.
743-366 antibody (titer = 256) was tested by complement-fixation with Anopheles A (original), Lukuni (TRVL 10076), Tacaiuma (BeAn 73), Anopheles B (original), Boraceia (SPAr395) and Turlock (847-32). Reactivity was noted only with Tacaiuma antigen.
Results of cross-testing strain 743-366 with eight Anopheles A serogroup viruses by neutralization tests in Vero cells [2] .

	ANTIBODY TITER TO:								
Virus or Strain	**743-366**	**SPAr 2317**	**H-32580**	**TCM**	**CoAr 1071**	**CoAr 3624**	**LUK**	**ColAn 57389**	**ANA**
743-366	40960	1280	80	2560	-	80	80	10	20
SPAr 2317	1280	1280	20480						
H-32580 *	10240	10240	20480	81920	80	10	320	10	80
Tacaiuma	5120		80	40960					
CoAr 1071	80		80		80				
CoAr 3624	-		-			160			
Lukuni	-		-				640		
ColAn 57389	-		-					2560	
Anopheles A	80		-						320

Antibody titer: reciprocal of highest dilution producing >90% plaque reduction

- indicates <10; blank indicates not tested

* See XIV. (1) Remarks, bottom of page 4

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)

Lab Methods of Virus Recovery (ALL ISOLATIONS)
Newborn mice

Cell system (a)	Virus passage history (b)	Evidence of Infection							
		CPE			PLAQUES			Growth Without CPE	
		Day (c)	Extent (d)	Titer TCD50/ml (e)	Day (c)	Size (f)	Titer PFU/ml (e)	+/- (g)	
Vero (CL)	SM4				12	3 mm	5.0 **		
PS (CL)					6	2 mm	5.8		
PK-15 (CL)					6	3 mm	4.7		
L-929 (CL)						No plaques	<3.0		
Duck embryo (PC)						No plaques	<3.0		

** Expressed in dex

Section VII - Natural Host Range (Additional text can be added below table)

Vertebrate (species and organ) and arthropod	No. isolations/No. tested	No. with antibody/No. tested Test used	Country and region
Anopheles freeborni	1/2041		Beaver Dam Wash, Arizona (1)
Anopheles franciscanus	0/1862		
Culex tarsalis	0/849		
Culex thriambus	0/552		
Culiseta inornata	0/279		
Other (including Cx erythrothorax, Cs incidens, Aedes vexans, Ae dorsalis, Culicoides hieroglyphiens, Culicoides sp.)			

Section VIII - Susceptibility to Experimental Infection (include viremia)

Experimental host and age	Passage history and strain	Inoculation Route-Dose	Evidence of infection	AST (days)	Titer log10/ml
Mice (nb)	SM 0	ic	Death	9-10	
Mice (nb)		ip			
Mice (nb)		sc			
Mice (wn)		ic			
Mice (wn)	SM 4	ip	Death	8	6.4
Mice (nb)		ic	Death	6	6.1

Section IX - Experimental Arthropod Infection and Transmission

Arthropod species & virus source(a)	Method of Infection log10/ml (b)		Incubation period (c)		Transmision by bite (d)		Assay of arthropod, log10/ml (e)		
	Feeding	Injected	Days	°C	Host	Ratio	Whole	Organ	System

Section X - Histopathology

Character of lesions (specify host)

Inclusion Bodies — Intranuclear

Organs/Tissues Affected

Category of tropism

Section XI - Human Disease

In Nature	Residual	Death
Subclinical	Overt Disease	
Clinical Manifestations		
Number of Cases	Category (i.e. febrile illness, etc.)	

Section XII - Geographic Distribution

Known (Virus detected)
Arizona, USA

Suspected (Antibody only detected)

Section XIII - References

1. Elbel, R.E., et al. 1977. Mosquito News. 37:497-507.
2. Calisher, C.H., et al. 1980. Bull. PAHO 14:386-391.

Remarks

Virgin River virus is distinct from Brazilian isolate H-32580 which is a variant of both Tacaiuma virus and of its subtype, SPAr 2317 virus.