Virus Name: Llano Seco	Abbreviation: LLSV

Status
Probable Arbovirus

Select Agent
No

SALS Level
3

SALS Basis
Isufficient experience with virus; i.e., experience factor from SALS surveys was less than 500 in laboratory facilities with low biocontainment.

Other Information

Antigenic Group
*

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation
BFN 3112

Accession Number

Original Date Submitted
10/11/1984

Family
Reoviridae

Genus
Orbivirus

Information From
Robert P. Scrivani

Address
Arbovirus Res. Lab., Schl. of Public Health, Univ. of California, Berkeley, CA

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)
Dr. W.C. Reeves

Isolated at Institute
Arbovirus Lab, Berkeley, CA

Host Genus
Culex tarsalis, pool of 50

Species

Host Age/Stage
Adult

Sex
Female

Isolated From

Isolation Details

Signs and Symptoms of Illness

Arthropod
Gravid

Time Held Alive before Inoculation

Collection Method
Aspiration from shelter

Collection Date
7/23/1971

Place Collected (Minimum of City, State, Country)
Llano Seco Ranchero, Butte Co., CA

Latitude
39° N

Longitude
122° W

Macrohabitat
Riparian area with livestock pens

Microhabitat
Tule swamp

Method of Storage until Inoculated
Revco storage at -70dC

Footnotes

Section III - Method of Isolation

Inoculation Date
8/12/1971

Animal (Details will be in Section 6)
(Tissue Culture)

Route Inoculated

Reisolation
Yes

Other Reasons
No virus like thisone in laboratory

Homologous Antibody Formation by Source Animal

Test(s) Used

Footnotes

Section IV - Virus Properties

Physicochemical
RNA

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) **1:2**	After Treatment Titer **3.0 dex**	Control Titer **>5.0 dex**
Lipid Solvent (chloroform)	After Treatment Titer	Control Titer
Lipid Solvent (deoxycholate) **1:1000**	After Treatment Titer **2.0 dex**	Control Titer **5.0 dex**

Other (formalin, radiation)

Virion Morphology

Shape	Dimensions	
Mean nm	Range **50-60 nm**nm	
Measurement Method **Electron microscopy (ultrathin section)**	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	**Duck embryo cell culture; SMB ext. by sucrose-acetone**	**Goose**
pH Range **5.8-7.0**	pH Optimum	
Temperature Range	Temperature Optimum	

Remarks
*** Although it has been demonstrated that Llano Seco virus is antigenically related to Umatilla virus, its antigenic relationship to other established orbivirus serogroups is uncertain. Further serological studies are needed to clarify i**

Serologic Methods Recommended
CF, NT, IFA (broadly reacting)

Footnotes
*** Although it has been demonstrated that Llano Seco virus is antigenically related to Umatilla virus, its antigenic relationship to other established orbivirus serogroups is uncertain. Further serological studies are needed to clarify i**

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

Hemagglutination by WEE, SLE, POW, MOD, RB, CE, LOK, BUT, MD, TUR, and VEE antigens was not inhibited by BFN 3112 hyperimmune mouse serum (HIMS). There was no neutralization of BFN 3112 virus by plaque-reduction neutralization test using 1:5 dilutions of polyvalent grouping ascitic fluids for Group C, Group Guama, Group Simbu, Group VSV, Group Bunyamwera, Group California, Group Tacaribe, Group Phlebotomus, Group A, Polyvalent Quaranfil, Poly. Anopheles A, Poly. Bwamba, Poly. Patois, Group Capim, Group B, Poly. Palyam, Group Kemerovo, Poly. Congo, Polyvalents 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, and rabies. The homologous PRNT titer with BFN 3112 virus and HIMS was >80. BFN 3112 virus is related to Umatilla virus by cross-indirect fluorescent antibody test (IFA). By CF test, BFN 3112 antigen (homologous serum titer 32) reacted with Umatilla HIMS at 1:4 and 1:8 serum dilutions, but Umatilla antigen was nonreactive even homologously. BFN 3112 antigen did not react by CF with grouping ascitic fluids for Group Kemerovo and Polyvalent 8, but showed a questionable reaction with a 1:4 dilution of Polyvalent Palyam ascitic fluid. Also, see editor's remarks in footnote, page 1. Llano Seco antigenically related to Umatilla and a new unregistered orbivirus, Netivot [2] . They now comprise the Umatilla serogroup.
Complement-fixation and plaque-reduction neutralization test results with Llano Seco virus and antibody to some orbiviruses.

Antibody [a]	Complement- fixation	Plaque-reduction neutralization test
Llano Seco	32 [b]	> 160 [b]
Umatilla	8	<5
Bluetongue 8	<4	<5
CV 73 [c]	32	<5
V5-4387 [d]	<4	<5
Polyvalent 8 [e]	<4	<5
Polyvalent Palyam [e]	4	<5
Kemerovo Group [e]	<4	<5

[a] Hyperimmune mouse sera or ascitic fluid except Bluetongue 8 which is guinea pig serum obtained from Lederle Laboratories.

[b] Reciprocal of antibody dilution giving 3+ to 4+ fixation or 80% reduction of a viral challenge of 60-70 PFU.

[c] Immune mouse ascitic fluid obtained from Dr. H.M.S. Watkins, Naval Biosciences Laboratory, Oakland, CA prepared against an unidentified agent isolated by Dr. Watkins.

[d] Hyperimmune mouse serum obtained from Dr. R. Emmons, Calif. State Department of Public Health, prepared against unidentified agent recovered in his laboratory.

[e] Reference grouping orbiviral reagents obtained from N.I.A.I.D.

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)	
Duck embryo (CL)	SM6	3	4+	7.5 (f)	3	1-2 mm	6.6 (f)		
Vero (CL)						No plaques			
PS-Y-15 (CL)					3	1-2 mm	5.6		
Culex tarsalis (CL)			No CPE					+	

(f) 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
Culex tarsalis	12/thousands		Sacramento Valley, CA, USA

None from thousands of samples of other mosquito species, wild avian and mammalian bloods collected in the Central Valley of California.

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 6	ic 0.01	Sickness and death	3	
Mice (nb)		ip			
Mice (nb)		sc			
Mice (wn)		ic 0.03	None*		
Mice (wn)		ip 0.10	None*		
		4.0 dex PFU			
rabbits		sc 0.10	None**		
hamsters		sc 0.10	None**		
guinea pig		sc 0.10	None**		
1-week old chick		sc 0.10	None**		

* Antibody present 7 days after the second ic injection and 7 days after the fourth ip injection given at 7 day intervals.

** Tested for viremia at 1-7 days after inoculation and for PRNT antibody at 21 of 35 days after inoculation.

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
Culex tarsalis, SM6		6.2	10	26C			7.8		Duck embryo
			7		Drop of blood(1)	10/14			
		6.0	14	26C		13/22			Duck embryo
			21			14/25			
	6.6		13	26C			3.3		Duck embryo
Aedes dorsalis, SM6		5.0	12	26C			>3.0		Duck embryo

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)
Sacramento Valley, CA, USA

Suspected (Antibody only detected)

Section XIII - References

1. Gubler, D.J. and Rosen, L. 1976. Am. J. Trop. Med. Hyg. 25:146-150.
2. Tesh, R.B., et al. 1986. Am. J. Trop. Med. Hyg. 35:418-428.

Remarks