Virus Name: Rio Grande		Abbreviation: RGV
Status **Probable Arbovirus**	Select Agent **No**	SALS Level **2**

SALS Basis
Results of SALS surveys and information from the Catalogue.

Other Information

Antigenic Group
Phlebotomus Fever

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation	Accession Number	Original Date Submitted
TBM3-24) (1		8/9/1984

Family	Genus
Bunyaviridae	**Phlebovirus**

Information From	Address
Arbovirus Reference Branch, DVBVD, CDC	**P.O. Box 2087, Fort Collins, Colorado, 80522, USA**

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)	Isolated at Institute
J.S. Lazuick	**Fort Collins, Colorado**

Host Genus	Species	Host Age/Stage
Neotoma micropus (pack rat)		**Adult**

Sex
Male

Isolated From	Isolation Details
Whole Blood	

Signs and Symptoms of Illness	Arthropod
None	

Time Held Alive before Inoculation

Collection Method	Collection Date
Live trapped	**12/5/1973**

Place Collected (Minimum of City, State, Country)
Reed Ranch, Cameron County, Texas, USA

Latitude	Longitude
26° 1' N	**97° 17' W**

Macrohabitat	Microhabitat	Method of Storage until Inoculated
Semi-arid, mesquite-acacia savannah	**Thickets of mesquite, ebony, spartina grasses, low shrubs; salt grass in salt flats**	**Dry ice and then electric deep freezer at -60dC**

Footnotes

Section III - Method of Isolation

Inoculation Date
1/15/1974

Animal (Details will be in Section 6)
nb mice, Vero cells

Route Inoculated
Intracerebral

Reisolation
Yes

Other Reasons
Also, two other strains (TBM3-204, TBM4-719) from N. micropus and antibody in N. micropus

Homologous Antibody Formation by Source Animal
Yes

Test(s) Used
NT

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)
Labile at pH 3.0

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 **<1.0 dex**	Control Titer **4.0 dex**

Other (formalin, radiation)
Temperature stability: 56C <15 min; 37C 24 hrs, 20C >1, <7 days; 4/>7 days.

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)
Yes	**SMB ext. by sucrose-acetone**	**Goose**
pH Range **5.8-6.2**	pH Optimum	
Temperature Range **4dC - 37dC**	Temperature Optimum **25dC**	

Remarks

Serologic Methods Recommended
HI, CF, NT (NT preferred for serology)

Footnotes

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

CF antigen failed to fix complement in the presence of the following immune reagents: SLE, FLA, rabies, groups VSV, TCR, SIM, KEM, GMA, CAP, CAL, C, ANA, ANB, TUR, B, BWA, CON, PAL, PAT, QRF, numerous NIH grouping HIAF's. Strain TBM3-24 was shown to be closely related or identical to strains TBM3-204 and TBM4-719 [1] . HIAF to strain TBM3-204 reacted by CF with PHL group members CHG and BUJ at YARU [2] . HI tests with strain TBM4-719 and 31 grouping fluids showed inhibition of HA activity only with PHL group HIAF [2] .

Antigen or Antibody	Rio Grande Antigen/Virus		Rio Grande Antibody	
	CF	NT	CF	NT
TBM3-204	>128/>128 [a]	512/512	>128	512
Chagres	0/>128	<16/1024	32/>128	<16/512
Bujaru	0/16	<16/<16	4/>128	<16/512
Candiru	0/64	<16/512	0/>128	
Naples	0/>128	<16/256	0/>128	
Sicilian	0/32	<16/>1024	0/>128	
Anhanga		<16/128	0/>128	
Arumowot		<16/2048	0/>128	
Karimabad		<16/256	0/>128	
Itaporanga		<16/4096	0/>128	

Icoaraci		<16/32,000	0/>128
Punta Toro		<16/8192	0/>128
Salehabad		<16/32	0/>128
Urucuri		<16/128	0/>128
Gabek Forest		<16/64	0/>128
Pacui		<16/4096	
Frijoles		<16/2048	
Gordil		<16/256	
Caimito		<16/256	
Nique		<16/128	
Aguacate		<16/512	
Chilbre		<16/1024	
Cacao		<16/512	
Buenaventura		<16/128	

[a] Ht titer/Ho titer; 0 = <8

CF Tests

Antigens	Antibody to: TBM4-719	TBM3-204	TBM3-24
TBM4-719	128/64 [b]	256/256	128/128
TBM3-204	256/64	256/128-256	128/32
TBM3-24	256/64	256/128-256	128/64

[b] Antigen titer/antibody titer

Neutralization tests for the identification of Rio Grande virus were performed by Dr. R.B. Tesh.

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
Blood (LV)

Lab Methods of Virus Recovery (ALL ISOLATIONS)
Vero, 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)	0				8	3-4 nm			
Vero (CL)	3				4-5	3-4 nm	6.8 (c)		
Duck embryo (PC)	0					Negative			

(c) 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
Neotoma micropus (pack rat; blood)	3/241	151/241 NT	South Texas (1971, 1973-74)
Didelphis marsupialis (opossum)	0/75	15/75 NT	
Gopherus berlandieri (Texas tortoise)	0/217	20/217 NT	
Equus caballus (horse)	0/>2000	4/45 NT	
Reithrodontomys fulvescens (American harvest mouse)	0/19	1/19 NT	
Peromyscus leucopus (deer mouse)	0/113	5/113 NT	
Ovis sp. (sheep)	0/>50	1/27 NT	
Birds (8 orders, 20 families)	0/>1000	5/252 NT	
Man	0/>500	0/278 NT	
Bos sp., cattle	0/>100	0/50 NT	
Misc. small mammals	0/>200	0/163 NT	
Phrynosoma cornutum (horned toad)	0/1	1/1 NT	
Misc. reptiles	0/>25	0/6 NT	

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 3 (TBM3-24)	ic 0.02	Death	4	7.5
Mice (nb)		ip 0.03	Antibody		
Mice (nb)		sc			
Mice (wn)		ic 0.03	Death	6	5.7
Mice (wn)		ip 0.03	Antibody		
N. micropus	SM2 (TBM4-719)	sc 5,000	Viremia (4/6), antibody,		
		PFU	death (4/6) [a] (2)	6-11	4.3
—		sc 50,000	Viremia (5/8), antibody,		
		PFU	death (1/8) [b] (2)		4.2

[a] 2/4 with viremia died 2/2 without viremia died

[b] 1/5 with viremia died 0/3 without viremia

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
Rio Grande virus replicates and is transovarially transmitted in Lutzomyia anthophora (3).									

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)
South Texas, USA

Suspected (Antibody only detected)

Section XIII - References

1. Calisher, C.H., et al. 1977. Am. J. Trop. Med. Hyg. 26:997-1002.
2. McLean, R.G., et al. 1982. Am. J. Trop. Med. Hyg. 31:569-573.
3. Endris, R., et al. 1983. Am. J. Trop. Med. Hyg. 32:862-864.

Remarks