Virus Name: Bhanja		Abbreviation: BHAV
Status **Probable Arbovirus**	Select Agent **No**	SALS Level **3**

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

Other Information

Antigenic Group
Bhanja

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation	Accession Number	Original Date Submitted
IG 690		10/24/1984

Family	Genus
Bunyaviridae	**Bunyavirus like**

Information From	Address
Virus Research Centre (VRC)	**20A Wellesley Road, P.O. Box No. 11, Poona 1, India**

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)	Isolated at Institute	
VRC (1)	**Poona**	
Host Genus **Haemaphysalis intermedia (formerly called parva)**	Species	Host Age/Stage **Adults)**

Sex
Not Answered

Isolated From	Isolation Details
Signs and Symptoms of Illness	Arthropod

Time Held Alive before Inoculation
7 days

Collection Method	Collection Date
Ectoparasites off paralyzed goat	**12/18/1954**

Place Collected (Minimum of City, State, Country)
Bhanjanagar, Ganjam District, Orissa, India

Latitude	Longitude	
Macrohabitat	Microhabitat	Method of Storage until Inoculated **Kept alive until processed**

Footnotes

Section III - Method of Isolation

Inoculation Date
12/25/1954

Animal (Details will be in Section 6)
nb mice

Route Inoculated
Intracerebral

Reisolation
No

Other Reasons
The strain does not resemble any other virus strain handled at VRC at that time

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 **2.8 dex**	Control Titer **7.7 dex**

Other (formalin, radiation)

Virion Morphology

Shape	Dimensions **<220 nm**	
Mean nm	Range nm	
Measurement Method **Seitz EK; Millipore filtration (3)**	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 + sonication**	**Goose**
pH Range	pH Optimum	
5.8-6.4	**6.0**	
Temperature Range	Temperature Optimum	
	27dC	

Remarks

Serologic Methods Recommended
CF, HI, NT

Footnotes

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

Indistinguishable from IbAr 2709. By CF, IG 690 serum (homol. = 512) did not react with Farallon, Chenuda, Colorado tick, Hughes, Dugbe, Ganjam, Wanowrie, Kaisodi, Kemerovo, Johnston Atoll, Lanjan, Nyamanini, Manawa, Quaranfil, Silverwater, Soldado, Thogoto, Lipovnik, Uukuniemi, Wad Medani, NDV.
BY CF, IG 690 antigen did not react with (homol. titer in parenthesis) Farallon (256), Chenuda (256), Colorado tick fever (64), Hughes (512), Ganjam (>512), Wanowrie (>512), Kaisodi (512), Lanjan (256), Nyamanini (512), Quaranfil (512), Silverwater (512), Soldado (256), Thogoto (128), Uukuniemi (256), Wad Medani (128), group A serum (32-128), Group B serum (32-128), EMC (64), Eretmopodites 147 (64), GD I (32), Guaroa (256), reovirus 3 (256), Ilesha (64), Kairi (256), NDV (128), Manzanilla (128), Oropouche (256), Simbu (32), Tacaiuma (128), Tacaribe (256), Batai (256), Turlock (128), Congo (64), Wyeomyia (32).
By HI, IG 690 serum (homol. CF = 512, HI = 1280) did not inhibit Lanjan, Uukuniemi, 11 group A viruses, 13 group B viruses, Marituba, Oriboca, Caraparu, Bunyamwera, Germiston, Ilesha, Tahyna, California, Bwamba, Sathuperi, Ketapang, Bakau, Manzanilla, Witwatersrand, Naples, Sicilian, Koongol, Akabane, Ingwavuma, Tacaiuma, Umbre.
By HI, Bhanja (strain IBAr 2709) antigen was not inhibited by hyperimmune sera of Chenuda, Colorado tick fever, Hughes, Ganjam, Wanowrie, Kaisodi, Lanjan, Nyamanini, Quaranfil, Silverwater, Thogoto, Wad Medani, EEE, Klamath, NDV, Nyando, Nakiwogo. (This information from the WHO International Reference Centre.)
Antigenically related by the HI test to Kisemayo virus isolated in 1974 from Rhipicephalus pulchellus ticks collected in Somalia. No cross-reactions between these agents were demonstrable by CF, agar gel diffusion or NT [20] .

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
Blood (M)

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)						Plaques (5)			
BS-C-1 (CL)			CPE, replication (6)						

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
Haemaphysalis intermedia	1/6		Bhanjanagar, Orissa State, India
Amblyomma variegatum	1/557 pools		Central African Republic (14)
Amblyomma variegatum	1		Senegal (23)
Haemaphysalis punctata (unfed ticks)	9		Italy (2)
Haemaphysalis punctata	2		Brac, Yugoslavia (16)
Dermacentor marginatus	1		Armenian SSR, USSR (15)
Boophilus decoloratus	119		Nigeria (4)
Boophilus decoloratus pools	36/864		Nigeria (7)
Amblyomma variegatum	13		Nigeria (4)
Amblyomma variegatum pools	7/850		Nigeria (7)

Hyalomma truncatum	6;1		Nigeria(4); Senegal(23)
Hyalomma truncatum pools	4/663		Nigeria (7)
Man (blood)	1 *		USA (11)
Man		10/185 NT	S.Moravia, E.Slovakia, Czech. (21)
Ticks	1		Cameroon (8), Senegal (10)
Cattle (blood)	13		Nigeria (12)
Sheep (blood)	2		
Sheep		58/58 NT	Southeast Bulgaria(17)
Atelerix albiventris	1		Nigeria (13)
Xerus erythropus	1		
Haemaphysalis ticks	1		Southeast Bulgaria(17)
Hyalomma rufipes	1		Somalia (18, 19)
Goats		44/61	Italy (2)

* Laboratory infection

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)	SMB 5	ic 0.02	Death		9.2-9.7
Mice (nb)		ip 0.03	Death		8.5-9.5
Mice (nb)		sc			
Mice (wn)		ic 0.03	Death		7.5-8.5
Mice (wn)		ip 0.3	None		

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 **Reported**	
Clinical Manifestations		
Number of Cases **1 (11)**	Category (i.e. febrile illness, etc.) **Febrile illness**	

Section XII - Geographic Distribution

Known (Virus detected)
India, Italy, Nigeria, Cameroon, Senegal, Yugoslavia (11, 16), Central African Republic (14), USSR (15), Bulgaria (17), Somalia (18,19)

Suspected (Antibody only detected)
Sicily (9), Czechoslovakia (21), Sri-Lanka (22)

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Remarks

The virus was isolated from ticks collected off a paralyzed goat (lumbar paralysis). No virus could be isolated from brain and spinal cord specimens of sick goats. Nor was it possible to obtain any serological evidence of an association of the virus with the lumbar paralysis. HI and NT antibodiescould be demonstrated in survey sera from goats.