

Status: Probable Arbovirus

SALS Level: 3

Antigenic Group: Bhanja

Taxonomic status: *Bunyavirus like*

Other Information: None.

Select Agent:

SALS Basis: S

HEPA Filtration:

**Section I - Full Virus Name and Prototype Number****Full Virus Name:** Prototype Number:

Bhanja IG 690

**Information from:** Virus Research Centre (VRC) **Date:**

\* 10/24/1984

**Address:** 20A Wellesley Road, P.O. Box No. 11, Poona 1, India

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Reviewed by editor

**Section II - Original Source****Isolated by:** VRC (1) **at:** Poona**Genus and species:** Haemaphysalis intermedia (formerly called parva) **Sentinel:** X**Age/Stage:** Adults **Sex:**

Isolated From	Isolation detail
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**Signs and symptoms of illness:**

Arthropod engorged depleted gravid

**Time held alive before inoculation:** 7 days**Collection date:** 12/18/1954 **Method:** Ectoparasites off paralyzed goat**Place collected:** Bhanjanagar, Ganjam District, Orissa, India**Latitude:** ° ' " **Longitude:** ° ' "**Macrohabitat:****Microhabitat:****Method of storage until inoculated:** Kept alive until processed**Footnotes:****Section III - Method of Isolation and Validity****Inoculation Date:** 12/25/1954**Animal:** nb mice **Embryonated egg:** Tissue Culture:

(Details in Section VI - Biologic Char.)

**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 (See Section II):****Test used:** HI CF NT**Other:****Footnotes:**

## Section IV - Virus Properties

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### Physicochemical:

RNA:      DNA:      Single Strand:      Double Strand:  
Pieces:      Infectivity:      Sedimentation coefficient(s): /strong>  
Percentage wt. of virion protein , lipid      carbohydrate  
Virion polypeptides:  
Number:      Details:  
Non-virion polypeptides:  
Number:      Details:  
Virion density:  
Nucleocapsid density      Sedimentation coefficient:  
Nucleocapsid density      Sedimentation coefficient:

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### Stability of infectivity (effects) pH

Lipid solvent:  
(ether)      After treatment titer      Control titer  
(chloroform)      After treatment titer      Control titer  
Detergent:  
(deoxycholate) 1:1000After treatment titer 2.8 dex      Control titer 7.7 dex  
Other (formalin, radiation):

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### Virion morphology:

Shape      Dimensions <220 nm  
Mean (nm)      range (nm)      how measured Seitz EK; Millipore filtration (3)  
Surface projections, envelope  
Nucleocapsid dimensions, symmetry

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### Morphogenesis:

Site of constituent formation in cell  
Site of virion assembly  
Inclusion bodies  
Other

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### Hemagglutination:

Hemagglutination Yes      Antigen source SMB ext. by sucrose-acetone + sonication  
Erthrocytes Goose      pH range 5.8-6.4      pH optimum 6.0  
Temperature optimum 27dC      range  
Remarks  
Serologic methods recommended CF, HI, NT  
Footnotes:

## Section V - Antigenic Relationship And Lack of Relationship To Other Viruses

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Indistinguishable from IbAr 2709. By CF, IgG 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, IgG 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, IgG 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

Susceptibility of Cell Culture Systems:

Cell system (a)	Virus passage history (b)	Evidence of Infection						Growth Without CPE		
		CPE		PLAQUES		+/- (g)				
		Day (c)	Extent (d)	Titer TCD50/ml (e)	Day (c)	Size (f)	Titer PFU/ml (e)			
Vero (CL)						Plaques (5)				
BS-C-1 (CL)			CPE, replication (6)							

## Section VII - Natural Host Range

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 (Record 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) Days	Transmision by bite (d)		Assay of arthropod, log10/ml (e)		
	Feeding	Injected		°C	Host	Ratio	Whole	Organ

## Section X - Histopathology

Character of lesions:

Inclusion bodies:

Cytoplasmic:(M) (LV) Intranuclear: (M) (LV)

Organs-tissues affected:

Category of tropism:

## Section XI - Human Disease

Human disease:	In nature:	(S) (R)
	Death:	(S) (R)
	Residua:	(S) (R)
Laboratory infections:	Subclinical:	(S) (R)
	Overt Disease:	(S) (R) X
Clinical manifestations:		
Category: Febrile illness	No. of cases: 1 (11)	

## Section XII - Geographic Distribution

Known (virus):

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

Suspected (antibody):

Sicily (9), Czechoslovakia (21), Sri-Lanka (22)

## Section XIII - References

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## Section XIV - 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 antibodies could be demonstrated in survey sera from goats.