Virus Name: Ibaraki	Abbreviation: IBAV

Status
Possible 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
Epizootic Hemorrhagic Fever

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation
Ibaraki-2

Accession Number

Original Date Submitted
8/21/1984

Family
Reoviridae

Genus
Orbivirus

Information From
T. Omori

Address
National Institute of Animal Health, Kodaira, Tokyo, Japan

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)
National Institute of Animal Health

Isolated at Institute
Ibaraki Prefecture, Japan

Host Genus
Cattle

Species

Host Age/Stage
10 years

Sex
Female

Isolated From	Isolation Details
Whole Blood	

Signs and Symptoms of Illness
Fever, anorexia, lacrimation, deglutitive difficulty, ulceration of oral nasal muscosa

Arthropod

Time Held Alive before Inoculation

Collection Method
UNKNOWN

Collection Date
9/20/1959

Place Collected (Minimum of City, State, Country)
Ibaraki Prefecture, Central parts of Japan

Latitude
37° N

Longitude
140° E

Macrohabitat
Open rice field

Microhabitat

Method of Storage until Inoculated

Footnotes

Section III - Method of Isolation

Inoculation Date
9/20/1959

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

Route Inoculated

Reisolation
Yes

Other Reasons

Homologous Antibody Formation by Source Animal
Yes

Test(s) Used
CF, NT

Footnotes

Section IV - Virus Properties

Physicochemical
RNA, Double Strand

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; stable at pH 6.4

Lipid Solvent (ether - % used to test) **20%**	After Treatment Titer **4.8 dex**	Control Titer **5.5 dex**
Lipid Solvent (chloroform) **5%**	After Treatment Titer **5.8 dex**	Control Titer **5.5 dex**
Lipid Solvent (deoxycholate) **0.1%**	After Treatment Titer **6.2 dex**	Control Titer **5.8 dex**

Other (formalin, radiation)
Sens. to trypsin, resistant to repeated freeze-thaw (4,6)

Virion Morphology

Shape **Spherical**	Dimensions **55 nm (9)**	
Mean **55 (9) nm**nm	Range **range 50-60 nm**nm	
Measurement Method **Negative contrast**	Surface Projections/Envelope **Pseudo-envelope (9)**	Nucleocapsid Dimensions, Symmetry

Cubic T=3 (9); Capsomere=32 (9)

Morphogenesis

Site of Constituent Formation in Cell	Site of Virion Assembly	Site of Virion Accumulation
Cytoplasm (9)	**Budding from cell membrane, intracytoplasmic viral matrices (9)**	**Cytoplasm, extra-cellular space (9)**
Inclusion Bodies	Other	
	Tubular structures in cytoplasm (9)	

Hemagglutination

Hemaggiutination	Antigen Source	Erythrocytes (species used)
No	**Inf. bovine kidney cell cult. fl. Acetone-ether ext. SMB**	**Many***
pH Range	pH Optimum	
7.2		
Temperature Range	Temperature Optimum	
37dC, 22dC, 4dC		

Remarks
*** Cattle, horse, sheep, goat, guinea pig, mouse and chicken erythrocytes tested**

Serologic Methods Recommended
NT, CF

Footnotes
*** Cattle, horse, sheep, goat, guinea pig, mouse and chicken erythrocytes tested**

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

No evidence of a serological relationship between Ibaraki virus and bluetongue virus was recognized. Cross neutralization was not observed and cross complement-fixation was not shown between Ibaraki and bluetongue, type 10 [4] , [6] . By CF, sheep antisera to bluetongue, types 1-16 which reacted with bluetongue, type 10 antigen, were negative with Ibaraki antigen [4] . Studies conducted elsewhere, employing neutralization tests in mice, BHK-21 and other cell culture systems, complement-fixation, and ferritin tagged antibody, also confirmed a lack of antigenic relationship between Ibaraki and bluetongue viruses [10] . Two-way cross relationships between Ibaraki virus and EHD virus, serotypes 1 and 2, demonstrated by agar gel precipitin and indirect fluorescent antibody tests [12] . By neutralization tests, Ibaraki virus was more closely related to EHD virus, serotype 2 ("Alberta strain"). Antigenic relationship not observed between Ibaraki virus and four serotypes of bluetongue found in USA.

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)

Lab Methods of Virus Recovery (ALL ISOLATIONS)
Newborn mice, bovine embryo kidney-BEK, calf kidney, calf passage to BEK (3,4)

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)	
Bovine embryo	1	21-50	3+ (3)						
kidney (BEK) (PC)	10	5	3+	5.8**					
Sheep kidney (PC)	1	5	3+	5.5					
Hamster kidney (PC)	1	5	3+	5.8					
BHK-21 (CL)	1	5	3+	5.8					
Chick embryo (PC)	1	4	2+	5.5					

** 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
Cattle (blood)	5/15	764/1,312 NT	Ibaraki Prefecture, Japan (4)

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)	Ibaraki-2,10th	ic	Death	3-4.5	7.5
Mice (nb)		ip			
Mice (nb)		sc			
Mice (wn)		ic	Survival		
Mice (wn)		ip			
calves (1-2 yr)	Ibaraki-5,1st	iv, ocular instillation, mucous membrane scarification.	Virus serially passaged 7-8 times in calves by iv inoc. of blood. Fever, leukopenia consistently observed. In other instances additional signs of the disease were observed (2, 4).		
	Kyushu-1	iv			
eggs (4-5 day)	Ibaraki-2, 1st	ys	Death (4, 8)		
rabbits (yg ad)		iv, ic	Survival, no antibody (4, 8)		
guinea pigs (wn)		ic, ip, in	Survival, no antibody (4, 8)		
sheep		iv	No pathogenicity, low infectivity (4, 8)		

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)
Degeneration of mucous membranes of the digestive tract and striated muscles of naturally infected cattle (2,4). Lesions: hyperemia, edema, hemorrhage, and degeneration of musculature and epithelium (4,11). Ulceration may develop in skin of the muzzle and coronets (4).

Inclusion Bodies — Intranuclear

Organs/Tissues Affected
Esophagus, larynx, pharynx, tongue, abomasum (2,4)

Category of tropism
Striated muscle

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)
Japan (4), Bali (Indonesia), Taiwan (4)

Suspected (Antibody only detected)

Section XIII - References

1. Omori, T. 1961. Bull. Office Int. Epizoot. 55:1109-1117.
2. Omori, T., et al. 1969. Jap. J. Microbiol. 13:139-157.
3. Omori, T., et al. 1969. Jap. J. Microbiol. 13:159-168.
4. Omori, T. 1970. Nat. Inst. Anim. Health Quart. 10:Suppl. 45-55
5. Inaba, Y., et al. 1966. Bull. Ofice Int. Epizoot. 66:329-340.
6. Inaba, Y., et al. 1970. Jap. J. Microbiol. 14:351-360.
7. Inaba, Y. 1975. Aust. Vet. J. 51:178.
8. Matumoto, M., et al. 1970. Jap. J. Microbiol. 14:99-109.
9. Ito, Y., et al. 1973. Arch. Ges. Virusforsch. 40:29-46.
10. Campbell, C.H., et al. 1975. Canad. J. Microbiol. 21:2098-2102.
11. Ishitani, R. 1967. J. Jap. Vet. Med. Assoc. 20:219-228.
12. Campbell, D.H., et al. 1978. Vet. Microbiol. 3:15-22.

Remarks

Bluetongue-like virus disease (1,5), but little pathogenicity for sheep (8). Synonym: Kaeishi strain (4).