

Virus Name: Nyando	Abbreviation: NDOV	
Status <b>Probable Arbovirus</b>	Select Agent No	SALS Level 2
SALS Basis <b>Results of SALS surveys and information from the Catalogue.</b>		
Other Information		
Antigenic Group <b>Nyando</b>		

#### SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation <b>MP 401</b>	Accession Number	Original Date Submitted 2/3/1985
Family <b>Bunyaviridae</b>	Genus <b>Bunyavirus-like</b>	
Information From <b>M.C. Williams and J.P. Woodall</b>	Address <b>E. African Virus Res. Institute, P.O. Box 49, Entebbe, Uganda, E. Africa</b>	
Information Footnote <b>Reviewed by editor</b>		

#### Section II - Original Source

Isolated By (name) <b>Williams, et al. (1)</b>	Isolated at Institute <b>Entebbe</b>	
Host Genus <b>Anopheles funestus, pool of 110 mosquitoes</b>	Species	Host Age/Stage
Sex <b>Female</b>		
<u>Isolated From</u> <u>Isolation Details</u>		
Signs and Symptoms of Illness	Arthropod	
Time Held Alive before Inoculation		
Collection Method <b>Taken resting inside huts</b>	Collection Date <b>12/16/1959</b>	
Place Collected (Minimum of City, State, Country) <b>Ramulla, near Kisumu, Kenya</b>		
Latitude <b>0° 7' S</b>	Longitude <b>34° 58' E</b>	
Macrohabitat <b>Nyando river valley, flat lakeshore area near fields and swamp(2)</b>	Microhabitat <b>Inside mud huts (3)</b>	Method of Storage until Inoculated <b>Alive for 1-3 days, then at -20dC</b>
Footnotes		

### **Section III - Method of Isolation**

Inoculation Date  
**12/21/1959**

Animal (Details will be in Section 6)  
**nb mice**

Route Inoculated Reisolation  
ic, ip and sc No

**Other Reasons  
Unrelated to any virus in the laboratory**

## 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

## Stability of Infectivity (effects)

pH (infective range)

Lipid Solvent (ether - % used to test) After Treatment Titer Control Titer  
**1:1** **<2.8 dex** **5.0 dex**

Lipid Solvent (chloroform) After Treatment Titer Control Titer

Lipid Solvent (deoxycholate) After Treatment Titer Control Titer

Other (formalin, radiation)

## Virion Morphology

**Bunyavirus-like particles (10)**

Mean nm Range nm

**Measurement Method** Surface Projections/Envelope  
**Electron microscopy (10)**

### Nucleocapsid Dimensions, Symmetry

## Morphogenesis

Site of Constituent Formation in Cell	Site of Virion Assembly	Site of Virion Accumulation
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Inclusion Bodies

Other

## Hemagglutination

Hemagglutination	Antigen Source	Erythrocytes (species used)
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Yes

SMB ext. by fluorocarbon (Arcton 113) + prot.

Goose

pH Range	pH Optimum
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5.8-6.2

5.8-6.1

Temperature Range	Temperature Optimum
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Only RT and 4dC tested.

Remarks  
**Antigen is very labile. Sucrose-acetone extraction failed.**

Serologic Methods Recommended

CF, NT

Footnotes

**Antigen is very labile. Sucrose-acetone extraction failed.**

- HA:
- (a) No inhibition by antisera to Semliki Forest, chikungunya, Sindbis, WN, Ntaya, Bunyamwera or Pongola.
  - (b) MP 401 antiserum did not inhibit the following antigens: EEE, WEE, VEE, Mayaro, chikungunya, Semliki Forest, Sindbis, Middelburg, Aura, Getah, Bebaru; YF, Wesselsbron, Zika, Banzi, Spondweni, West Nile, dengue 2, MVE, Ntaya, RSSE, Powassan, SLE, JBE; Ilesha, Bunyamwera, Germiston, Marituba, Oriboca, Caraparu, Tahyna, California, Bwamba, Sathuperi, SF Sicily, SF Naples, Akabane, Witwatersrand, Delcairnie, Bakau, Ketapang, Manzanilla, Koongol, Bhanja, Ingwavuma. (The information in the subsection (b) above is from Dr. J. Casals, Rockefeller Foundation Virus Laboratories, New York.)

CF: No reaction in cross testing with Bwamba, Pongola, Simbu, Ingwavuma, African horsesickness, Wad Medani, bluetongue, Chenuda, Lagos bat, Lumbo, Mossuril, Nairobi sheep disease, Nyamanini, Quaranfil, Thogoto, Witwatersrand. For homologous titres see Reference [1].

Sera	Antigen		
	MP 401	ERET 124	ERET 147
MP 401	40/512 **	ND	20/128
ERET 124	ND	40/128	40/128
ERET 147	20/256	80/256	80/256

\*\* Serum titre/antigen titre

ERET 124, 147: Strains isolated from Eretmapodites mosquitoes in Ethiopia by Dr. C. Serie.

NT: No protection by antisera to chikungunya, o'nyong-nyong, Semliki Forest, Sindbis, Middelburg, dengue 1 and 2, Entebbe bat, Spondweni, Wesselsbron, West Nile, Uganda S, YF, Ntaya, Zika, Apeu, Oriboca, Bunyamwera, Germiston, Ilesha, Simbu, Semunya, Nakiwogo, Rift Valley fever, Nairobi sheep disease, Witwatersrand, Bwamba, Pongola, EMC, Theiler's FA, or GD7.

In NT, Nyando virus was distinct in both directions from both of the Eretmapodites isolates.

## 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						Growth Without CPE +/- (g)	
		CPE			PLAQUES				
		Day (c)	Extent (d)	Titer TCD50/ml (e)	Day (c)	Size (f)	Titer PFU/ml (e)		
Jungle fowl embryo (PC)					5	Plaques	>1.3 (a)		
Duck embryo (PC)	P-8					No plaques(9)			
Vero (CL)	P-5				5	2 mm	6.6 (11)		
LLC-MK2 (CL)					6	2 mm	7.0 (11)		

(a) 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
Man	1 *		Central African Republic (4, 8)
Man		34/89 NT	Kenya (1)
Man		11/39 NT	Uganda (1)
Anopheles funestus	1/2,130		Kenya (1)
An funestus	1		Central African Republic (4)
Aedes dalzielii	3		Kedougou, Senegal (12)

\* Patient with biphasic fever, myalgia, vomiting

**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)	P-3	ic 0.01	Death	5	>3.5	
Mice (nb)	P-9	ip				
Mice (nb)		sc				
Mice (wn)		ic 0.03	Antibody			
Mice (wn)		ip 0.2	Antibody			
Mice (nb)		ic 0.01	Death	4	6.5	
Mice	P-1, P-21	ic, ip, sc 0.5	Only alopecia and runting, no deaths			

**Section IX - Experimental Arthropod Infection and Transmission**

Arthropod species & virus source(a)	Method of Infection log10/ml (b)		Incubation period (c)		Transmission by bite (d)		Assay of arthropod, log10/ml (e)		
	Feeding	Injected	Days	°C	Host	Ratio	Whole	Organ	System
Aedes aegypti		Virus multiplied to titer of 3.5 dex after parenteral inoculation, but attempts to transmit by bite were unsuccessful (7).							

## 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
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Subclinical	Overt Disease
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Clinical Manifestations

Number of Cases	Category (i.e. febrile illness, etc.)
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One

## Section XII - Geographic Distribution

Known (Virus detected)

**Kenya, Central African Republic, Senegal**

Suspected (Antibody only detected)

**Uganda**

## Section XIII - References

1. Williams, M.C., et al. 1965. Arch. ges. Virusforsch. 15:422-427.
2. Haddow, A.J. 1942. Bull. Ent. Res. 33:91.
3. Corbet, P.S., et al. 1961. Trans. R. Soc. Trop. Med. Hyg. 55:463-480.
4. Rapport Annuel de l'Institut Pasteur de Bangui. 1969. p. 37.
5. Stim, T.B. 1969. J. Gen. Virol. 5:329-338.
6. Ardoine, P.L.M. and Simpson, D.I.H. 1965. Bull. Soc. Path. Exot. 58:573-589.
7. E. Afr. Virus Res. Inst. Annual Rep. 1964. No. 14. p. 51.
8. Digoutte, J.P., et al. 1972. Bull. Soc. Path. Exot. 65:751-758.
9. Lazuick, J. Personal communication. 1979.
10. Harrison, A., et al. Personal communication. 1981.
11. Stim, T.B. 1969. J. Gen. Virol. 5:329-338.
12. Rapport Annuel de l'Institut de Dakar. 1975. p 11.

## Remarks