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WAD MEDANI AND SOLDADO VIRUSES FROM TICKS
(IXODOIDEA) IN WEST AFRICA¹

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--- CANICAS (J.L.) ---

Abstract. A total of 2282 ticks representing at least 12 species was collected in Senegal and Mauritania during 1977 and tested for virus in suckling mice. Wad Medani virus was recovered from 8 lots of *Rhipicephalus guilhoni* and 1 lot of *R. e. evertsi* collected from domestic animals. Soldado virus was isolated from 14 lots of *Ornithodoros capensis* taken from debris in nests of Grey-headed Gulls (*Larus cirrhocephalus*).

A total of 2049 ticks representing at least 11 species was collected between 26 January and 21 February 1977 from 7 localities in northern Senegal and southern Mauritania (16°5' to 16°30'N, 15°30' to 16°25'W) (TABLE 1). Most of the specimens were taken from wild and domestic mammals, although 1 female *Haemaphysalis leachi* was removed from an Ant-Chat bird (*Myrmecocichla aethiops aethiops*). In addition, 233 *Ornithodoros capensis* were collected on 20 and 22 February 1977 at the Senegal National Park on Langue-de-Barbarie (15°50'N, 16°30'W). The *O. capensis* were found in debris from 1/3 of 30 nests of Grey-headed Gulls (*Larus cirrhocephalus*) examined.

Ticks were maintained alive in plaster-of-paris vials until they could be sorted by genera in a field laboratory in St. Louis, Senegal. They were then shipped in liquid nitrogen to the Pasteur Institute in Dakar to be identified to species and injected into suckling mice for virus isolation attempts.

Virus was recovered from 8 lots of *Rhipicephalus guilhoni*, 1 lot of *R. e. evertsi*, and 14 lots of *O. capensis* (TABLE 2). The *Rhipicephalus* isolates were all serologically similar to each other, as were the isolates from *O. capensis*. A selected strain (SenAr-339-77) from *R. guilhoni* was identified by complement-fixation and neutralization tests as Wad Medani virus (TABLE 3). The *O. capensis* isolates were identified as Soldado virus (TABLE 4, 5).

Wad Medani virus, a member of the Kemerovo serogroup of orbiviruses, was first reported from a pool of *R. sanguineus* (possibly *R. guilhoni*, see Morel, 1969, These de Doct. Sci. Nat., Fac. Sci. d'Orsay, Univ. Paris) from sheep in the Sudan and from *Hyalomma marginatum isaaci* in India (Taylor, Hoogstraal & Hurlbut, 1966, Am. J. Trop. Med. Hyg. 15: 75). Subsequently, the virus was recovered from *Amblyomma cajennense* in Jamaica (Casals, 1970, Misc. Publ. Entomol. Soc. Am. 6: 327-29), from a mixed pool of *Hyalomma a. anatolicum* and *Boophilus microplus* in West Pakistan (Begum, Wisseman & Casals, 1970, Am. J. Epidemiol. 92: 197-202) and from *H. a. asiaticum* and *H. a. anatolicum* in the USSR (L'vov, Kurbanov, Neronov, Gromashevsky, Skvortsova, Gofman, Klimenko, Berdiev & Kiseleva, 1976, Med. Parazitol. Parazit. Bolenzni 45: 452-55; Skvortsova, Kurbanov, Gromashevsky, L'vov, Aristova, Neronov & Berdiev, 1975, Mater. 9. Simp. Ekol. Virus, Dushanbe, p. 45-46; and Kostyukov, Bulychev, Daniyarov, Pak, Skvortsova, Gromashevsky & L'vov, 1975, Mater. 9. Simp. Ekol. Virus, Dushanbe, p. 33-34). Seletar, a closely related virus, was isolated from *B. microplus* in Singapore and Malaysia (Rudnick, Marchette & Garcia, 1967, Abstr. Pap. I. SE

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TABLE 1. Ticks collected between 26 January and 22 February 1977 in Senegal and Mauritania and tested in suckling mice for arboviral infections.

SPECIES	LARVAE	NYMPHS	ADULT ♂	ADULT ♀	TOTAL TESTED	POSITIVE POOLS	MINIMUM FIELD INFECTION RATE
<i>Ornithodoros capensis</i>	3	102	61	67	223	14	1:17
<i>Hyalomma impellatus</i>	0	0	170	193	363	0	—
<i>H. truncatum</i>	0	0	102	51	153	0	—
<i>H. marginatum rufipes</i>	0	0	0	1	1	0	—
<i>Hyalomma</i> spp.	0	8	0	0	8	0	—
<i>Amblyomma variegatum</i>	0	1	0	0	1	0	—
<i>Haemaphysalis leachi</i>	0	0	0	1	1	0	—
<i>Boophilus decoloratus</i>	0	0	0	3	3	0	—
<i>Rhipicephalus cuspidatus</i>	0	0	18	3	21	0	—
<i>R. guilhoni</i>	0	0	332	159	491	8	1:61
<i>R. muhsamae</i>	0	0	663	198	861	0	—
<i>R. sulcatus</i>	0	0	19	39	58	0	—
<i>R. evertsi evertsi</i>	0	0	49	23	72	1	—
<i>Rhipicephalus</i> spp.	10	6	0	0	16	0	—
Total	13	117	1414	738	2282	24	—

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TABLE 2. Virus isolations from ticks collected in Senegal during February 1977.

STRAIN	TICK	POOL SIZE	AREA	DATE	HOST
Wad Medani virus					
SenAr-286-77	<i>R. guilhoni</i>	10 ♂	Rong	12.II.1977	domestic animals
SenAr-288-77	<i>R. guilhoni</i>	5 ♂	Rong	12.II.1977	domestic animals
SenAr-339-77	<i>R. guilhoni</i>	10 ♀	Kassak Nord	15.II.1977	domestic animals
SenAr-340-77	<i>R. guilhoni</i>	9 ♀	Kassak Nord	15.II.1977	domestic animals
SenAr-341-77	<i>R. e. evertsi</i>	3 ♀	Kassak Nord	15.II.1977	domestic animals
SenAr-343-77	<i>R. guilhoni</i>	10 ♂	Kassak Nord	15.II.1977	domestic animals
SenAr-345-77	<i>R. guilhoni</i>	8 ♂	Kassak Nord	15.II.1977	domestic animals
Sen-Ar-346-77	<i>R. guilhoni</i>	10 ♂	Kassak Nord	15.II.1977	domestic animals
Sen-Ar-355-77	<i>R. guilhoni</i>	10 ♂	Kassak Nord	15.II.1977	domestic animals
Soldado virus					
SenAr-365-77	<i>O. capensis</i>	5 N,* 4 ♂,	Langue-de-Barbarie	20.II.1977	Gull nests, debris
SenAr-367-77	<i>O. capensis</i>	5 N, 2 ♂, 2 ♀	Langue-de-Barbarie	20.II.1977	Gull nests, debris
SenAr-369-77	<i>O. capensis</i>	2 N, 4 ♂, 1 ♀	Langue-de-Barbarie	20.II.1977	Gull nests, debris
SenAr-373-77	<i>O. capensis</i>	5 N, 5 ♂	Langue-de-Barbarie	20.II.1977	Gull nests, debris
SenAr-377-77	<i>O. capensis</i>	3 N, 4 ♂, 3 ♀	Langue-de-Barbarie	22.II.1977	Gull nests, debris
SenAr-378-77	<i>O. capensis</i>	1 N, 5 ♂, 4 ♀	Langue-de-Barbarie	22.II.1977	Gull nests, debris
SenAr-379-77	<i>O. capensis</i>	4 N, 2 ♂, 4 ♀	Langue-de-Barbarie	22.II.1977	Gull nests, debris
SenAr-380-77	<i>O. capensis</i>	5 N, 3 ♂, 2 ♀	Langue-de-Barbarie	22.II.1977	Gull nests, debris
SenAr-381-77	<i>O. capensis</i>	7 N, 1 ♂, 1 ♀	Langue-de-Barbarie	22.II.1977	Gull nests, debris
SenAr-382-77	<i>O. capensis</i>	4 N, 2 ♂, 1 ♀	Langue-de-Barbarie	22.II.1977	Gull nests, debris
SenAr-386-77	<i>O. capensis</i>	10 ♀	Langue-de-Barbarie	22.II.1977	Gull nests, debris
SenAr-387-77	<i>O. capensis</i>	10 ♀	Langue-de-Barbarie	22.II.1977	Gull nests, debris
SenAr-388-77	<i>O. capensis</i>	10 ♀	Langue-de-Barbarie	22.II.1977	Gull nests, debris
SenAr-389-77	<i>O. capensis</i>	10 ♀	Langue-de-Barbarie	22.II.1977	Gull nests, debris

* N = nymphs.

Asian Reg. Semin. Trop. Med., Bangkok, p. 40-41.). These isolates and ours were all from ticks collected from domestic animals. Very little is known about the ecology of this virus.

Soldado, a Hughes group virus, was originally reported from nymphal *O. capensis* and/or *O. denmarki* from a Noddy Tern (*Anous stolidus*) on Soldado Rock, Trinidad in the Caribbean (Jonkers, Casals, Aitken & Spence, 1973, J. Med. Entomol. 10: 517-19). Since this time, Soldado or "Soldado-like" viruses have been reported from *O. capensis* group ticks associated with seabirds in various parts of the world. Isolates were recovered from *O. capensis* in the Seychelles in the Indian Ocean (Converse, Hoogstraal, Moussa, Feare & Kaiser, 1975, Am. J. Trop. Med. Hyg. 24: 1010-18), Lake Shalla in Ethiopia (Hoogstraal, Clifford, Keirans, Kaiser & Evans, 1976, J. Parasitol. 62: 799-810), and an island near Aransas National Wildlife Refuge, Texas, USA (King, Blankinship, Paul & Rice, 1977, Wilson Bull. 89: 157-58) and from *O. maritimus* from Puffin Island, Wales (Converse, Hoogstraal, Moussa & Evans, 1976, Acta Virol. 20: 243-46), Great Saltee Island, Ireland (Keirans, Yunker, Clifford, Thomas, Walton & Kelly, 1976, Experientia 32: 453-54), and Cape Frehel, France (Chastel, Launay, Rogues & Beaucournu, 1979, C. R. Acad. Sci. Ser. D: 288: 559-61) in the North Atlantic. Our isolates of Soldado virus are the first reported from West Africa.

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throughout various phases of this study.—**Andrew J. Main, Kirby O. Kloter** (present address: Department of Tropical Medicine, Tulane University, 1430 Tulane Avenue, New Orleans, La. 70112, USA), Yale Arbovirus Research Unit, 60 College Street, New Haven, Ct. 06510, USA; **Jean-Louis Camicas, Yves Robin** (present address: Institute Pasteur, Cayenne, French Guiana), Institut Pasteur, B.P. 220, Dakar, Senegal; and **Mamadou Sarr**, Service de Luthe Antipaludique, Thies, Senegal.

TABLE 3. Serologic identification of a selected isolate (SenAr-339-77) of Wad Medani virus from Senegal by complement-fixation and neutralization tests.

ANTIGEN	ASCITIC FLUID	
	SenAr-339-77	Wad Medani
Complement-fixation:		
SenAr-339-77	64/8*	128/8
Wad Medani	64/8	128/8
Neutralization:		
SenAr-339-77	0.8**	0.7
Wad Medani	1.0	1.1

* Reciprocal of serum titer/reciprocal of antigen titer.

** Log of neutralization of index (LD₅₀ in suckling mice).

TABLE 4. Complement-fixation test comparing a selected Senegal isolate (SenAr-386-77) with other members of the Hughes serogroup.

ANTIGENS	ASCITIC FLUIDS								
	SenAr-386-77	Soldado	Hughes	Farallon	Zirqa	Punta Salinas	Sapphire II	Hughes group	Normal
SenAr-386-77	256/64*	512/64	0	0	0	0	0	16/64	0
Soldado	256/128	≥512/128	16/8	0	0	0	0	32/128	0
Hughes	0	0	≥512/256	0	8/64	64/256	0	128/512	0
Farallon	0	0	64/128	32/128	32/128	64/128	0	32/256	0
Zirqa	0	0	16/64	0	512/256	16/64	0	8/64	0
Punta Salinas	0	0	128/64	4/32	16/64	≥512/256	0	128/128	0
Sapphire II	0	0	0	0	0	0	512/512	0	0
Normal	0	0	0	0	0	0	0	0	0

* Reciprocal of serum titer/reciprocal of antigen titer (0 = less than 1:4).

TABLE 5. Sérologic identification of Soldado isolates from Senegal by complement-fixation and neutralization tests.

	ASCITIC FLUIDS					
	COMPLEMENT-FIXATION			NEUTRALIZATION		
	Homologous	Ar-377-77	Soldado (TRVL 52214)	Homologous	Ar-377-77	Soldado (TRVL 52214)
SenAr-365-77	256*	128	128	1.8**	1.8	1.3
SenAr-367-77	128	128	128	2.2	2.0	1.7
SenAr-369-77	64	256	128	≥2.5	2.4	1.5
SenAr-373-77	256	128	128	1.8	1.6	1.6
SenAr-377-77	128	128	256	2.2	2.2	2.0
SenAr-378-77	512	128	256	2.8	2.6	2.1
SenAr-379-77	64	64	128	≥1.6	≥1.6	≥1.6
SenAr-380-77	256	128	128	≥2.2	≥2.2	1.6
SenAr-381-77	256	256	128	2.7	2.5	1.9
SenAr-382-77	64	64	128	1.5	2.4	1.6

* Reciprocal of serum titer.

** Log of neutralization index (LD₅₀ in suckling mice).