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RIFT VALLEY FEVER ACTIVITY IN WEST AFRICA
(SENEGAL, BURKINA FASO, COTE D'IVOIRE,
TOGO & CAMEROUN)

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S U M M A R Y

A RVF VERO SURVEY WAS CARRIED OUT ON DOMESTIC RUMINANTS OF WEST AFRICA. THE PREVALENCE OF RVF ANTIBODIES APPEARED TO BE LINKED TO ANIMAL PARAMETERS (SPECIES, SEX AND AGE) AND ENVIRONMENTAL CONDITIONS (SAHELIAN, SOUDANIAN AND GUINEAN AREAS).

THE CONCLUSION WAS THAT THE RVF VIRUS ACTIVITY IS PRESENT BUT AT A LOW LEVEL.

KEY WORDS : RIFT VALLEY FEVER WEST AFRICA, DOMESTIC RUMINANTS, ANTIBODIES

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SLIDE 1: TITLE

RIFT VALLEY FEVER ACTIVITY IN WEST AFRICA (1989-1991)

SLIDE 2: AUTHORS

THIS WORK IS PART OF A COLLABORATIVE STUDY BETWEEN THE PASTEUR INSTITUTE, THE ORSTOM, THE SENEGALESE INSTITUTE FOR AGRICULTURE RESEARCH IN DAKAR, THE NATIONAL LABORATORIES FOR ANIMAL PRODUCTION AND PATHOLOGY IN BURKINA FASO AND COTE D'IVOIRE AND THE VETERINARY SCHOOL OF MEDICINE OF DAKAR.

SLIDE 3: MAP AFRICA

INTRODUCTION

IN 1912, THE DISEASE WAS DESCRIBED ON SHEEP AND THE VIRUS ISOLATED IN KENYA IN 1931. IN 1948, THE VIRUS ISOLATION FROM MOSQUITOES IN SEMLIKI FOREST, UGANDA PROVIDED THE EVIDENCE OF AN ARBOVIRUS.

RVF VIRUS IN EAST AFRICA PRODUCES EPIZOOTICS THAT PERSIST FOR 1 TO 3 YEARS, THEN DISAPPEARS FOR 5-15 YEARS INTERVALS. EPIZOOTICS ARE ASSOCIATED WITH SEASONAL RAINFALL PRODUCED BY THE INTERTROPICAL CONVERGENCE ZONE.

THE 1987-1988 EPIDEMIC RVF IN THE RECENT EPIZOOTIC PERIOD IN WESTERN AFRICA PRODUCED HUMAN INFECTION IN SOME SITES AS WELL AS EPIDEMIC RVF IN SOUTHERN MAURITANIA. IT FOCUSED ATTENTION ON THE DISEASE AS A POTENTIAL GLOBAL THREAT. THE EXTENSION OF RVF IN MAURITANIA RESULTED IN ABORTION AND DEATH OF MANY THOUSAND SHEEP AND CATTLE AND SEVERAL HUNDRED HUMAN FATALITIES.

SINCE THEN, WE HAVE BEEN MONITORING RVF TRANSMISSION BY STUDYING DOMESTIC UNGULATES FROM SENEGAL, BURKINA FASO, COTE D'IVOIRE, TOGO, AND CAMEROON. WHITE SPOTS ON THE SLIDE INDICATED THE LOCATIONS WHERE STUDIES WERE UNDERTAKEN.

METHODS

SLIDE 4: SENEGAL

1- SELECTED LOCATIONS IN THE LEFT BANK OF THE SENEGAL RIVER IN THE UPPER, MIDDLE AND LOWER BASINS WERE RANDOMLY CHOSEN. ANIMALS OF 2 OR MORE HERDS BY LOCATION WERE BLED WITHOUT INDIVIDUAL TAGGING. SPECIES, SEX AND AGE (ADULT TEETH) OF THE ANIMALS WERE REPORTED. ABORTIONS, STILLBIRTHS WERE RECORDED....

IN OTHER AREAS OF SENEGAL (FERLO, THIES AREA), TAGGED ANIMALS WERE MONITORED AT LEAST FOUR TIMES A YEAR.

2- SERA FROM OTHER COUNTRIES WERE COLLECTED BY VETERINARY SERVICES FOR NATIONAL SURVEILLANCE PROGRAMS FROM SELECTED AREAS IN CAMEROON, COTE D'IVOIRE, TOGO, AND BURKINA FASO.

SERA WERE TESTED BY ELISA TEST FOR IGG/IGM DETECTION.

RESULTS:

SLIDE 5: RIVER BASIN TABLE

IN THE SENEGAL RIVER BASIN, THE ANNUAL SURVEY WAS CONDUCTED IN SEPTEMBER BY THE END OF THE RAINY SEASON. 293 SERA FROM SMALL RUMINANTS WERE COLLECTED IN 1988 , 324 IN 1989, 592 IN 1990 AND 600 IN 1991. A SIGNIFICANT DECREASE OF RVFV IGG ANTIBODY PREVALENCE IN SMALL RUMINANTS IS OBSERVED IN THE THREE AREAS: 22,2% IN 1989, 9,3% IN 1990 AND 6,2% IN 1991.

SLIDE 7:

THIS GRAPH PRESENTS THE PERCENTAGE OF POSITIVE ANIMALS IN THE 3 BASIN AREAS WITH A DECREASE OF PREVALENCE FROM 1988 TO 1991. ALL POSITIVE ANIMALS IN 1991 WERE AT LEAST ONE YEAR-OLD.

SLIDE 6: SENEGAL IGM

4 IGM WERE RECORDED IN 1988, AND 2 IN 1989 IN THE SENEGAL RIVER BASIN. IN 1989, IN THE FERLO AREA (YONOFERE AND DAHRA) 5

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THE AVERAGE RAINFALL IN THE STUDIED AREAS SHOWED TWO RAINY SEASONS FROM MARCH TO JULY AND SEPTEMBER TO NOVEMBER. THE IGM ANTIBODIES WERE DETECTED IN NOVEMBER 88 AND JANUARY 89.

SLIDE 10: ABORTIONS

AMONG THESE SHEEP, 111 EWES ABORTED WITHIN 4 MONTHS. A SIGNIFICANT DIFFERENCE OF RVFV IGG ANTIBODY PREVALENCE WAS RECORDED: 14,40% (16) IN THESE EWES IN COMPARISON WITH THE OTHER GROUPS. IN ONE CASE, IGM ANTIBODIES WERE DETECTED..

SLIDE 11: TOGO

722 SERA FROM SHEEP AND CATTLE WERE COLLECTED IN OCTOBER 90 JANUARY 1991. THE RVFV IGG ANTIBODY PREVALENCE IN TOGO IS LOW. WITH A SIGNIFICANT DIFFERENCE OF RVF IGG ANTIBODY PREVALENCE BETWEEN SHEEP (2,1%) AND BOVINES (9,6%). NO SIGNIFICATIVE DIFFERENCES WERE OBSERVED BETWEEN THE THREE CLIMATIC AREAS. NO IGM ANTIBODIES WERE RECORDED.

SLIDE 12: CAMEROON(Adamaoua, North, Far-North)

FROM NORTH CAMEROON, 616 SERA COLLECTED IN SEPTEMBER-OCTOBER 1989 WERE OBTAINED FROM CATTLE AND SHEEP. A 11,20% RVFV IGG ANTIBODY PREVALENCE WAS RECORDED. NO IGM ANTIBODIES WERE DETECTED, AND NO SIGNIFICANT DIFFERENCES BETWEEN THE CLIMATIC AREAS WERE RECORDED.

CONCLUSION

SLIDE 13: MAP AFRICA

FEW NEW RVF VIRUS INFECTIONS WERE FOUND IN THE SAHELIAN, SUDANIAN AND GUINEAN HABITATS IN THE DIFFERENT MONITORED COUNTRIES. THIS RAPID DECLINE IN INCIDENCE FROM 1987-1988 SUGGESTS

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SEROCONVERSIONS WERE RECORDED DURING THE RAINY SEASON BUT NONE IN 1990-1991. THE RVF IGG PREVALENCE WAS LOWER IN THE THIES AREA (1 OUT OF 35 SHEEP MONITORED OR 2,9% IN 1989). SINCE 1989, NO ACTIVE VIRUS TRANSMISSION WAS OBSERVED.

SLIDE 7: BURKINA FASO

IN JANUARY 1991, 1395 SERA WERE COLLECTED FROM SHEEP AND GOATS IN THE NORTHERN SAHELIAN AREA (SOUM, YATENGA, SENO, OUDALAN) AND SOUTHERN SUDANIAN AREA (KOURRITENGA, BOULGOU). A LOW RVF IGG PREVALENCE 1,72% IS RECORDED WITH NO SIGNIFICANT DIFFERENCES BETWEEN THE TWO AREAS. NO IGM ANTIBODIES WERE DETECTED. HOWEVER THE POSITIVE ANIMALS WERE AT LEAST ONE YEAR-OLD. (Only the recent infections occurring by the end of the rainy season could be detected in January 1991. However the Optical densities for IgG antibodies were low, indication of no recent activity.)

A PREVIOUS STUDY IN 1987 ON 482 SMALL RUMINANTS FROM SAHELIAN AND SUDANIAN AREAS SHOWED A HIGHER PERCENTAGE OF POSITIVE RVF IGG ANIMALS (15,8%) ASSOCIATED WITH IGM (3.3%) .

SLIDE 8: COTE D'IVOIRE:

1058 SERA WERE COLLECTED FROM SHEEP IN SELECTED AREAS OVER A THREE YEAR PERIOD FROM 1988 TO 1990 IN SOUTH-EASTERN AND WESTERN REGIONS. THE ANNUAL RVF IGG ANTIBODY PREVALENCES ARE SIMILAR: 7,9% IN 1988, 6,6% IN 1989 AND 5% IN 1990. NO DIFFERENCES BETWEEN EASTERN AND WESTERN AREAS WERE OBSERVED. 2 IGM ANTIBODIES SERA WERE RECORDED IN 1988 AND 1 IN 1989.

SLIDE 9: RAINFALL

AN INTER-EPIZOOTIC PERIOD, AND RAISES QUESTIONS AS TO VIRUS MAINTENANCE.

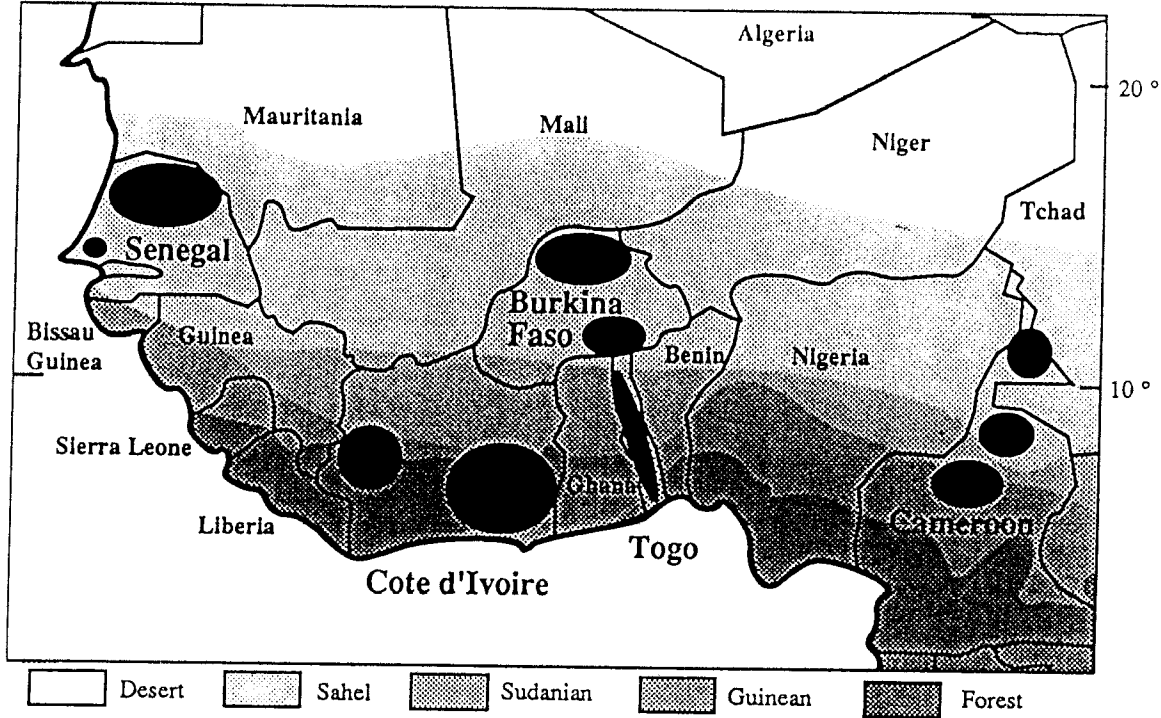
IN EAST AFRICA, THE MAINTENANCE CYCLE IS ESTABLISHED FOR 5-15 YEARS WITHOUT EXTENSIVE OR LIMITED OUTBREAK.

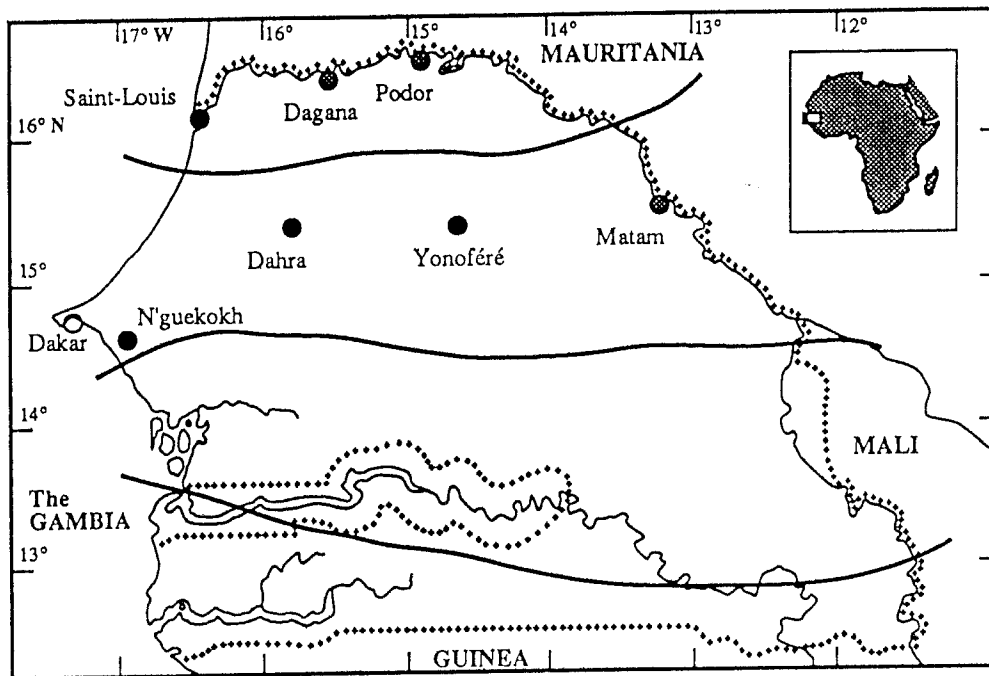
IN EGYPT, FOLLOWING THE 1977-1978 EPIDEMICS, THE VIRUS WAS LAST ISOLATED IN 1981, AND SEROLOGICAL EVIDENCE OF VIRAL TRANSMISSION AMONG ANIMALS WAS STILL DEMONSTRATED IN THE NORTHEAST NILE DELTA IN 1983.

IN NORTHERN SENEGAL, FOLLOWING THE 1987-1988 OUTBREAKS, IGM SEROLOGICAL EVIDENCE OF VIRAL TRANSMISSION LAST OCCURED IN 1989 BUT THE PRESENCE OF RVF IGG IN 1 TO 2 YEARS OLD SHEEP IN 1991 IS AN EVIDENCE OF A ACTIVE RECENT TRANSMISSION OF THE VIRUS. LARGER SAMPLES OF DOMESTIC UNGULATES COULD BE NEED TO BE MONITORED. HOWEVER RVF IGG ANTIBODIES IN 1 YEAR-OLD UNTAGGED ANIMALS ARE A GOOD MARKER OF ANY VIRAL TRANSMISSION WITHIN A YEAR INDEPENDENTLY OF THE SEASON FOR SERA COLLECTION.

THE ISOLATION OF RVF VIRUS FROM A WIDE RANGE OF VECTORS AND HOSTS (MOSQUITOES, CULICOIDES, SIMULIUM, WILD AND DOMESTIC ANIMALS, OR BATS IN GUINEA) SUGGESTS AN COMPLEX ENZOOTIC AND EPIZOOTIC TRANSMISSION CYCLE. AND RAISES THE QUESTION OF VIRUS MAINTENANCE.

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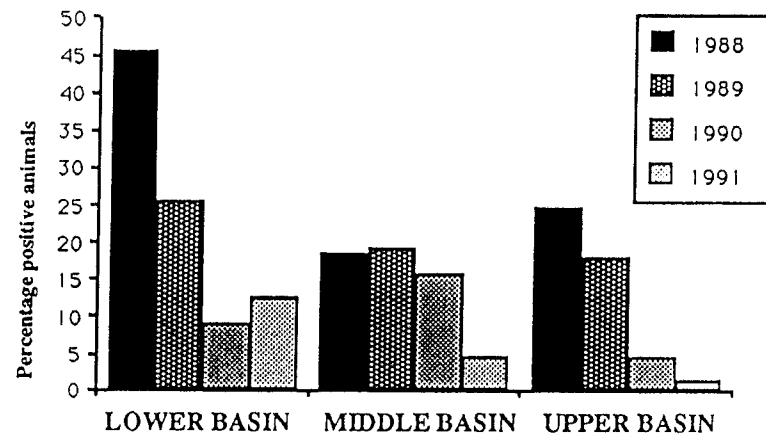




RIFT VALLEY FEVER VIRUS IgG PREVALENCE IN SMALL RUMINANTS
IN THE SENEGAL RIVER BASIN (1988 - 1991)

LOCATION	YEAR	1988	1989	1990	1991
LOWER BASIN	tested	35	160	104	190
	RVF IgG +	16	41	9	24
	%	47,5	25,6	8,7	12,6
MIDDLE BASIN	tested	170	109	257	210
	RVF IgG +	32	21	34	10
	%	18,8	19,3	13,2	4,8
UPPER BASIN	tested	88	55	231	200
	RVF IgG +	22	10	12	3
	%	25,0	18,1	5,2	1,5
TOTAL	tested	293	324	592	600
	RVF IgG +	70	72	55	37
	%	23,9	22,2	9,3	6,2

RIFT VALLEY FEVER VIRUS ANTIBODY PREVALENCE IN SMALL RUMINANTS IN THE SENEGAL RIVER BASIN (1988-1991)



RIFT VALLEY FEVER IgM ANTIBODIES PREVALENCE IN SMALL RUMINANTS
IN SENEGAL (1988-1991)

LOCATION	YEAR	1988	1989	1990	1991
Senegal River basin	tested	293	324	592	600
	IgM	4	2	0	0
Yonoféré (Ferlo)	tested	62	141	109	156
	IgM	0	1	0	0
Dahra	tested	254	258	87	-
	IgM	0	4	0	-
N'Guekokh	tested	-	35	17	24
	IgM	-	0	0	0
TOTAL	tested	863	758	805	780
	IgM	4	7	0	0
	(IgM%)	0,46	0,92		

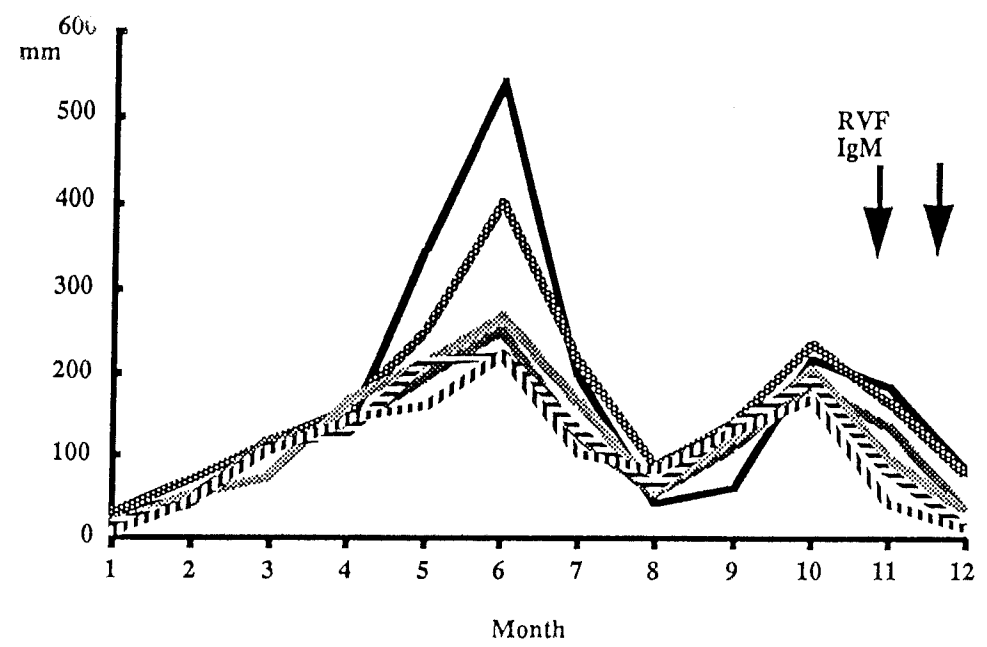
RIFT VALLEY FEVER IgG ANTIBODY PREVALENCE IN
SMALL RUMINANTS IN BURKINA FASO (JANUARY 1991)

AREA	No. tested	RVF IgG +	RVF + %
Sahelian	1 1 7 5	2 4	1 , 9 6
Sudanian	2 2 0	1	0 , 4 5
TOTAL	1 3 9 5	2 4	1 , 7 2

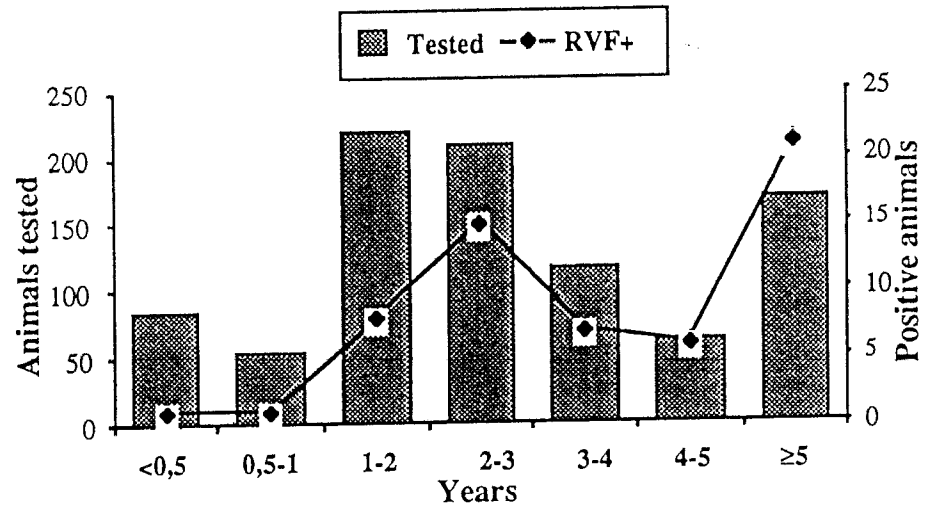
RIFT VALLEY FEVER VIRUS IgG/IgM ANTIBODY PREVALENCE
IN SHEEP: COTE D'IVOIRE (1988 - 1990)

YEAR	1988	1989	1990
Tested	530	228	300
RVF IgG	42	15	15
% RVF IgG	7,92	6,58	5,00
RVF IgM	2	1	0
% RVF IgM	0,38	0,44	0,00

AVERAGE RAINFALLS IN COTE D'IVOIRE



AGE DISTRIBUTION OF POSITIVE RVFV IgG SHEEP IN COTE D'IVOIRE (1988-1990)



RIFT VALLEY FEVER ANTIBODY PREVALENCE IN SHEEP

COTE D'IVOIRE (1988-1990)

Pathology	No. tested	RVF IgG+		RVF IgM+	
		No.	%	No.	%
Abortions	111	16	14,40	1	0,90
≤ 4 months			± 6,53		± 1,76
Controls	957	56	5,85	2	0,21
			± 1,49		± 0,29

RIFT VALLEY FEVER ANTIBODY PREVALENCE IN BOVINE AND
SMALL RUMINANTS IN TOGO (OCTOBER 1990-JANUARY 1991)

AREA	Species	No. tested	RVF IgG +	RVF + %
Sudanian	Bovine	2 2 2	1 3	5, 8 6
	Sheep	1 2 2	1	0, 8 2
Sudano-Guinean	Bovine	1 2 4	1 6	1 2, 9 0
	Sheep	1 3 3	6	4, 5 1
Guinean	Bovine	4 9	8	1 6, 3 0
	Sheep	7 2	0	0, 0 0
TOTAL	Bovine	3 9 5	3 7	9, 3 7
	Sheep	3 2 7	7	2, 1 4

RIFT VALLEY FEVER ANTIBODY PREVALENCE IN BOVINE AND SMALL
RUMINANTS IN NORTH CAMEROON (SEPTEMBER-OCTOBER 1989)

AREA	Species	No. tested	RVF IgG +	RVF + %
Sahelian	Bovine	-	-	-
	Sheep	63	12	20,33
Sudanian	Bovine	156	16	10,25
	Sheep	280	26	9,29
Sudano-Guinean	Bovine	47	3	6,38
	Sheep	70	12	17,14
TOTAL	Bovine	203	19	9,25
	Sheep	413	50	12,11