

**The Geographical
Distribution of Animal
Viral Diseases**

STEWART ODEND'HAL

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The Geographical Distribution of Animal Viral Diseases

EXPERIMENTAL VIROLOGY

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Preface

There is an urgent need to establish accurately the current geographical distribution of the major viral diseases, because of today's great mobility of humans and animals by air and massive movements of populations on account of various political disruptions and natural catastrophes. With this objective in mind, the world literature was screened for 110 different viruses, and maps were prepared. These maps delineate the global distribution of pathogenic viruses based on authenticated reports from a variety of reliable sources.

Dr. Herbert Nsanze, Chairman of the Department of Microbiology at the School of Medicine, Nairobi University, Kenya, was the key figure who unlocked and opened the door of opportunity which led to the development of this book. He informed me of the Second International Conference on the Impact of Viral Diseases on the Development of Africa and Middle-East Countries, which took place in Nairobi in December 1980. Dr. Edouard Kurstak, the organizer and coordinator, was kind enough to accept my paper, "Veterinary Geography: The Neglected Essential First Step in Disease Control." As a result of this conference, Dr. Frederick Brown invited me to write a monograph on the geographical distribution of animal viruses.

Investigators most knowledgeable about these viruses have assisted by reviewing and supplying their expertise to provide the most up-to-date information. Opposite each map is a synopsis of the pertinent information about that particular virus. This information includes classification of the virus and description of the disease, hosts and vectors, areas free of the virus, key developments, historical movements, diagnostic techniques, diagnostic reagents, map credits, key references, and the names and addresses of the reviewers and consultants who may be contacted for more specific information.

Awareness of where a virus exists is important, but knowledge of where it does not exist may be of greater significance. These are regions where vulnerable populations are susceptible to the devastating effects of either epidemics or epizootics. This book will hopefully stimulate support of research to extend our current insufficient knowledge in this vital area.

Many of the viruses are zoonoses, and physicians as well as veterinarians and public health officials may find access to these maps useful. Students of human and veterinary medicine will find the synopses to be a convenient resource for rapid and concise reviews of the salient features of the various viruses.

Whether it concerns an intercontinental shipment of highly productive dairy cows to be used for genetic improvement, or a planeload of Boy Scouts attending a jamboree, it is hoped that this book will enable the conscientious practitioner to be knowledgeable about which viruses constitute risks to both the imported and native populations. Without this knowledge the appropriate prophylactic and precautionary measures cannot be prescribed.

Stewart Odend'hal

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My wife has provided many invaluable suggestions and constructive criticism that proved to be useful. In addition, she was wonderfully tolerant of the time required to work on this book. Paul Gibbs of the University of Florida shared his experience in the fledgling field of veterinary geography and provided moral support.

The Dean of my college, David P. Anderson, and the Chairman of our department, Robert E. Lewis, were open-minded, supportive, and helpful. John Bowen, Dave Dreesen, and Harold Snyder were very considerate in loaning me (with intellectual, but not financial, interest) the services of students to help verify citations, look up references, and prepare some of the final maps. Reggie Ridenhour, who spent many long laborious hours in the library, deserves a special thanks. Dena Ray also helped briefly.

Librarians also played an invaluable role. Lucy Campbell designed and implemented the initial computer data on-line retrieval of the world literature. Her assistance and suggestions throughout the project were particularly appreciated. Also very helpful were Dennis Trombatore, William Loughner, Nell Evans, Steven Brown, Virginia Benjamin, and Doris Rusgrove.

Dr. J. Blajan in Paris was very kind in sending me valuable pertinent material from the Office of International Epizootics (OIE). Hu Hsiang-Pih of the Chinese Academy of Agricultural Science in Beijing also provided important information. Harry Dewey at the National Agricultural Library in Beltsville, Maryland, brought the Current Awareness Literature Service (CALS) to my attention and arranged for my enrollment. Ed Pilchard of the Emergency Program of the Animal and Plant Health Inspection Service (APHIS) of the United States Department of Agriculture (USDA) was extremely helpful in allowing me access to their information retrieval system.

I consider myself very fortunate to work with two exceptionally fine colleagues, Fred Smith and Jack Munnell. At various times they unselfishly volunteered their assistance so that I could concentrate on this book. They have my deep appreciation, admiration, and respect. I am also fortunate to work with

Craig Player, who consistently provided his competent, efficient assistance in many ways. Our departmental secretaries displayed patience, perseverance, and tolerance: I thank Debra Townsend, Pat Martin, and Brenda Fohey for their help. Harsh Jain, the graphic artist, drew the base maps and was helpful throughout the project. Dr. Louis B. Carrick was responsible for several literary improvements in the text after he kindly reviewed the manuscript.

It is impossible to go through all of the files and recognize all of the people from around the world that have made a useful contribution to this book. I worked most intensely with the reviewers and consultants, not all of whom desired formal recognition. It is to these people that I direct my most enthusiastic expression of appreciation. Their involvement has imparted an atmosphere of authenticity to the book, and in essence this is their book not mine.

List of Abbreviations

AAAP	American Association of Avian Pathologists
ADO	<i>Animal Disease Occurrence</i>
AGID	Agar Gel Immuno-Diffusion
AGRICOLA	Agricultural On-Line Access
AHS	African Horse Sickness
AHY	<i>Animal Health Yearbook</i>
APHIS	Animal and Plant Health Inspection Service
ASF	African Swine Fever
BHK	Baby Hamster Kidney
BLV	Bovine Leukosis Virus
BVD	Bovine Virus Diarrhea
CAB	Commonwealth Agriculture Bureaux
CALS	Current Awareness Literature Service
CAM	Chorio-Allantoic Membrane
CAT	Capillary Agglutination Test
CAV	Canine Adenovirus
CDC	Centers for Disease Control
CDV	Canine Distemper Virus
CE	California Encephalitis (Virus)
CEC	Commission of the European Communities
CEC	Chick Embryo Culture
CELO	Chick Embryo Lethal Orphan
CF	Complement Fixation
CFI	Complement Fixation Inhibition
CIE	Counter Immuno Electrophoresis
CIOP	Counter Immuno Osmo-Phoresis
COCAL	Complement Fixation for Cat Leukemia

COFAL	Complement Fixation for Avian Leukosis
CPV	Canine Parvovirus
CRIS	Current Research Information System
CSIRO	Commonwealth Scientific and Industrial Research Organization
EAdV	Equine Adenovirus
EEE	Eastern Equine Encephalomyelitis
EHV	Equine Herpesvirus
EIA	Equine Infectious Anemia
ELA	Enzyme-Labeled Antibody
ELISA	Enzyme-Linked Immuno-Sorbent Assay
EM	Electron Microscopy
EPA	Environmental Protection Agency
ERhV	Equine Rhinovirus
FA	Fluorescent Antibody
FAO	Food and Agriculture Organization
FAV	Fowl Adenovirus
FIP	Feline Infectious Peritonitis
FMD	Foot and Mouth Disease
FOCMA	Feline Oncovirus-Associated Cell Membrane Antigen
GI	Gastro Intestinal
HA	Hemagglutination
HCMV	Human Cyto-Megalo Virus
HEV	(Porcine) Hemagglutinating Encephalomyelitis Virus
HI	Hemagglutination Inhibition
IBAR	Inter-African Bureau for Animal Resources
IBR	Infectious Bovine Rhinotracheitis
IEOP	Immuno-Electro-Osmo-Phoresis
IFA	Indirect Fluorescent Antibody
IgM	Immunoglobulin M
IHA	Indirect Hemagglutination
INK	Inkoo (Virus)
IP	Immuno-Peroxidase
IPV	Infectious Pustular Vulvovaginitis

JC	Jamestown Canyon (Virus)
JS	Jerry Slough (Virus)
KEY	Keystone (Virus)
KFD	Kyasanur Forest Disease
LAC	La Crosse (Virus)
LSD	Lumpy Skin Disease
LUM	Lumbo (Virus)
MCF	Malignant Catarrhal Fever
MEL	Melao (Virus)
MLV	Modified Live Virus
NAL	National Agricultural Library
NSD	Nairobi Sheep Disease
OIE	Office of International Epizootics
PAHO	Pan American Health Organization
PHA	Passive Hemagglutination
PM	Phenotype Mixing
PSCID	Primary Severe Combined Immuno-Deficiency
RIA	Radio Immuno Assay
RIF	Resistance-Inducing Factor
RPHA	Reversed Passive Hemagglutination
RPHI	Reversed Passive Hemagglutination Inhibition
RRID	Reverse Radial Immuno-Diffusion
RSRI	Reverse Single Radial Immuno-Diffusion
SA	San Angelo (Virus)
SAT	Southern African Territories
SN	Serum Neutralization
SN	Serra do Navio (Virus)
SR	South River (Virus)
SSH	Snowshoe Hare (Virus)
SSIE	Smithsonian Scientific Information Exchange
TAH	Tahyna (Virus)
TC	Tissue Culture

TGE	Transmissible Gastro Enteritis
TVT	Trivittatus (Virus)
UK	United Kingdom
US	United States
USA	United States of America
USDA	United States Department of Agriculture
USSR	Union of Soviet Socialist Republics
VESV	Vesicular Exanthema of Swine Virus
VIA	Virus Infection Associated (Antigen)
VN	Virus Neutralization
WHO	World Health Organization

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