Surveillance of wild animal diseases in Europe

F.A. LEIGHTON *

Summary: A study of the methods and personnel involved in general surveillance of wild animal diseases in Europe was conducted by correspondence and personal interview in 1993-1994. Twenty-seven of the thirty-six countries contacted participated in the study. A great range was observed in the intensity of surveillance programmes and the details of their organisation. Programmes of comprehensive general surveillance were present in four countries, while eleven countries had general surveillance programmes which were limited to certain geographical regions and/or wild animal species. Twelve countries had no programmes of general wildlife disease surveillance, but had surveillance programmes for one or more specific diseases which included wild animals. Significant information on the occurrence of diseases in wild animals was available in each participating country. Factors found to be important in the structure and function of surveillance programmes were as follows:

- historical occurrences of rabies, hog cholera (classical swine fever), viral haemorrhagic disease of rabbits and the European brown hare syndrome
- approaches to wildlife management and relationships between wildlife-oriented field personnel and the surveillance programme
- whether or not fees were charged for diagnosis of diseases in wild animal specimens
- training and equipment of diagnostic personnel
- organisation of wild animal disease data.


INTRODUCTION

Surveillance of wild animal diseases can be divided into four separate activities:

a) detection of disease or disease-causing agents in wild animals

b) diagnosis (precise identification of the disease)

c) information management (collection and analysis of information gained from detection and diagnosis)

d) use of surveillance information in making decisions and formulating policies with respect to wildlife management, domestic animal health or public health (3).
This study was undertaken in 1993-1994 to assess the nature of wild animal disease surveillance in Europe in terms of these four activities, and to catalogue the organisations and individuals responsible for such surveillance. Surveillance of diseases in wild mammals and birds was the focus of the survey, but information on wild fish was also collected. The following is a synopsis of the results of this study. A full-length report, which includes country-by-country descriptions, is also available (see 'Acknowledgements').

METHODS

This survey was conducted by correspondence, telephone interview and personal interview from a base at the Laboratory for Studies of Rabies and Wildlife Diseases of the National Centre for Veterinary and Food Research (Centre national d'études vétérinaires et alimentaires: CNEVA) near the city of Nancy in eastern France. Initially, letters were sent to the Delegate to the Office International des Epizooties (OIE) of each European country, and further contacts were made with the widest possible range of other people, to obtain information on how and by whom surveillance is conducted in each country. Personal visits were made to key institutions in as many countries as possible. The countries with which contact was attempted during the survey are listed in Appendix I.

For each country, letters of general inquiry were followed by specific requests for information regarding detection, diagnosis, information management and use of information. Interviews were also held with the personnel of the OIE in Paris, the Directorate-General for Agriculture of the Commission of the European Communities (now European Union) in Brussels, the organisers of the European Section of the Wildlife Disease Association, and the Group for Studies of the Ecopathology of Mountain Wildlife (convened at Château d'Oex, Switzerland). The author participated as a non-member at the meeting of the OIE Ad hoc Group on Wildlife Diseases, in Paris, 2-4 February 1994. The survey included a total of approximately 350 written communications and 35 interviews. A written summary of information for each country was sent to the persons who had provided the information, with the request that they make corrections and comments.

RESULTS

Information on wild animal disease surveillance was received from 27 of the 36 countries from which data were sought (Appendix I). A great range in the intensity of surveillance programmes and the degree of their organisation was evident among the countries which participated in the survey. However, important information about the occurrence of wild animal diseases was available in every participating country.

For the purposes of data presentation, three categories of general wild animal disease surveillance were defined (Table I). These are broad categories, and there is great variation in the details of the surveillance programmes among the countries.
<table>
<thead>
<tr>
<th>Country</th>
<th>Comprehensive general surveillance (a)</th>
<th>Partial general surveillance (b)</th>
<th>No general surveillance (c)</th>
<th>Records covering 10 years or more (date of earliest record)</th>
<th>Computerised records (date computerisation was started)</th>
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<tbody>
<tr>
<td>Austria</td>
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<td>1978</td>
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<td>The Netherlands</td>
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<td>Russia</td>
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<td>Serbia and Montenegro</td>
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<td>1950 (g)</td>
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<td>1984 (h)</td>
<td>1984 (h)</td>
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<tr>
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<td></td>
<td></td>
<td>1975 (l)</td>
<td>1975 (l)</td>
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</tbody>
</table>

a) programmes which cover the entire country and are comprehensive with respect to species of mammals and birds examined and types of diseases assessed

b) wide range of programmes including detection, diagnosis and management of disease-related information, but restricted in various ways (e.g. to certain geographical regions or groups of species)

c) absence of a programme of general wild animal disease surveillance (in all cases, however, there is some degree of surveillance for a few specified diseases, e.g. rabies, bovine tuberculosis or classical swine fever [hog cholera], and wild animals are included in such surveillance to some degree)

d) programme of general wildlife disease surveillance existed prior to 1989

e) records of the Institute for Zoo Biology and Wildlife Research (see Appendix II)

f) wildlife disease surveillance in Russia is being re-organised, but considerable information on disease occurrence is available (three sources are listed in Appendix II)

g) Galli-Valerio Institute (see Appendix II)

h) University of Bern (see Appendix II)

i) Veterinary Investigation Diagnosis Analysis System (see Appendix II)
represented in each category. The categories refer only to general surveillance, i.e. surveillance which includes a broad range of species and a broad range of diseases. In all participating countries, programmes existed for the surveillance of specific diseases, which included wild animal species, and scientists were actively engaged in the study of certain wild animal diseases. Availability of data spanning ten years or more and computerisation of data are also noted in Table I.

Appendix II provides postal addresses for sources of information on wild animal disease surveillance in each participating country. The institutions listed were either directly involved in surveillance or were able to provide information on surveillance programmes in the country.

DISCUSSION

RECENT HISTORICAL BACKGROUND

The occurrence of certain diseases in wild animal species in the recent past has had a major influence on the existence and nature of wild animal disease surveillance programmes in many European countries. Of particular importance are rabies, hog cholera (classical swine fever), viral haemorrhagic disease of rabbits (VHD) and the European brown hare syndrome (EBHS).

Rabies and hog cholera

Rabies in the red fox (Vulpes vulpes) and other carnivores, such as raccoon dogs (Nyctereutes procyonoides) and wolves (Canis lupus), affects much of Europe. After the Second World War, the spread of rabies in the red fox radiated from a region in the general area of eastern Poland and adjacent parts of the former Soviet Union at a rate of approximately 30-60 km per year (1). The disease achieved its western-most extension in 1970, reaching eastern France. Surveillance programmes for rabies in both wild and domestic animals were developed, in many countries, in response to this epizootic. Oral vaccination of foxes with vaccine contained in baits was first attempted in 1977, in Switzerland. During the 1980s, growing numbers of countries adopted this strategy, and surveillance programmes began to include surveillance of a wide range of species; surveillance covered not only rabies but also chemicals included in the vaccine baits, in order to determine the efficiency of the vaccination programmes. While much of the surveillance for rabies involves examination for rabies only, the general effect of this epizootic and the response to it has been to heighten awareness and interest in wild animal diseases in Europe. Many of the wild animal disease surveillance programmes are closely associated with this specific concern about rabies.

Hog cholera has occurred in wild boar (Sus scrofa) in many parts of Europe. It is not clear whether this disease can be maintained in wild boar populations; but it passes from domestic pigs to wild boar, and infected wild boar populations therefore represent possible sources of disease for domestic swine (2). The importance of hog cholera for domestic pigs and international trade in pork products has caused many national veterinary organisations to include wild boar in their routine diagnostic services: like rabies, hog cholera has served to heighten awareness and activity with respect to surveillance for wild animal diseases.
Viral haemorrhagic disease of rabbits and the European brown hare syndrome

VHD and EBHS are apparently new diseases of wild and domestic rabbits (*Oryctolagus cuniculus*) and hares (*Lepus europaeus*), which first occurred in Europe during the 1980s. Both diseases are rapidly fatal and caused large-scale mortality in wild populations and on farms (4). These diseases received a great deal of public and official attention, due to their economic impact on rabbit and hare farms, and on wild populations of these important game species. Surveillance and research programmes were initiated in most affected countries and, in 1989, the OIE added VHD to its ‘List B’ of diseases for which occurrence information is required annually from each Member Country. Again, these two epizootic diseases resulted in increased activity in wild animal disease surveillance throughout much of Europe.

Wildlife management in Europe

There is no single system of wildlife management in Europe. In some countries, the management system varies in different regions (e.g. among the cantons of Switzerland). In contrast to the general rule in North America, where wildlife management is the designated task of government wildlife agencies, wildlife management in much of Europe is largely conducted by hunters and fishermen (and their organisations), with varying degrees of government supervision and input. These management activities range from the relatively simple submission and approval of an annual hunting plan for a particular hunting area, to a complex set of biological observations, reports and surveys required of hunters as part of their permit to hunt. Decisions regarding the management of game species are often either made or greatly influenced by the hunters themselves. Hunting seasons are often quite long, with some hunting and fishing activity permitted over much of the year. In many countries, game meat and fish may be sold, and there is considerable commerce associated with hunting. In general, hunting and fishing rights belong to the landowner, and these may be sold or rented. In addition, the responsibility for damage to agricultural crops caused by game animals has traditionally been considered the responsibility of the owner of adjacent wild animal habitat lands, such as forests, and landowners (or the hunters who owned the hunting rights to the land) were required to pay for crop damage in adjacent fields. This appears to be changing now, but a cultural relationship remains between hunting and protection against crop damage, which can substantially influence wildlife management decisions.

One effect of this system of wildlife management is that many well-organised groups of hunters exist in Europe, who are often quite knowledgeable about wildlife biology (rigorous examinations are required in several countries) and are in the field throughout much of the year. These hunters expect to take responsibility for the management and welfare of the wildlife in their hunting or fishing areas, particularly the species which they themselves harvest. In many countries, these organised hunters finance wild animal disease surveillance programmes, either directly or through permit fees, and often also play a fundamental role in detection of diseases within these surveillance programmes. But this situation also tends to bias wildlife management programmes and wild animal disease surveillance strongly towards game species. Management appears to be conducted more on a species-by-species basis than through general habitat management for complex biological communities. Not all lands are managed in this way, however. In national parks and similar reserves, habitat management appears to be the more usual approach. There are important and diverse exceptions to all of the above generalisations.
Disease surveillance may be categorised as either passive or active. Passive surveillance (also called disease monitoring) implies the collection of data on diseases and affected species through routine procedures of detection and diagnosis; it does not involve specific, directed activities to define precisely the prevalence or incidence of one or more particular diseases or disease-causing agents. Active surveillance, however, implies directed pursuit of disease-specific data through systematic sampling of a population. Examples of active surveillance are serological surveys for antibodies to particular infectious agents and toxicological surveys for particular toxic substances, applied to statistically-valid samples from defined animal populations. The disease surveillance activities documented during this study were all passive in nature. Active surveillance, when undertaken, was most often conducted as part of a research project or study of a particular disease; this was not the approach taken for general wildlife disease surveillance.

Detection

Two factors seem particularly to influence the effectiveness of detection programmes. The first is the degree of communication between the personnel responsible for the overall surveillance programme and the people in the field who actually do the work of detection. Detection programmes appear to be most effective when hunters, fishermen, naturalists, wildlife officers, foresters or equivalent field personnel are well-informed about the potential importance of wild animal diseases, and regularly receive reports and other feedback after submitting specimens for diagnosis. The second factor is whether or not those people involved in detection must pay a fee for the diagnostic examination of the specimens which they submit. Clearly, a direct charge for such examination is a deterrent to detection activity. Detection appears to be largely ineffective wherever such fees are charged. Under these circumstances, surveillance ceases to be general and becomes, instead, partial and oriented toward the particular interests of those involved in detection.

Diagnosis

The reliability of the diagnoses made and the likelihood of recognising new or unusual diseases are directly tied to the education of the diagnostic personnel and the nature of the facilities in which they work. Two other factors of importance are the infrastructure for transport of specimens to the laboratories and the actual disease which is diagnosed. The single most critical step in diagnosis for general wild animal disease surveillance is the autopsy. A reliable autopsy can only be conducted by a pathologist with a complete biomedical education and additional intensive specialist training in pathology (including histopathology), probably for a minimum of two years. If autopsies are performed by persons without such training, there is a risk of important errors in recognition and interpretation of lesions, and inappropriate subsequent analyses. Equally, such diagnostic specialists must have access to service laboratories in all medical diagnostic disciplines, in order to proceed to a correct final diagnosis. In addition, specimens to be examined must arrive at the laboratory in a state which makes examination at autopsy still feasible.

It is also true, however, that specific tests for specific diseases can be conducted with perfection in the absence of a veterinary pathologist. A diagnosis of rabies, hog cholera, or VHD can be rendered on the basis of single samples taken from particular organs. No general autopsy is required. This is the method of surveillance often used for specific
diseases, and distinguishes such disease-specific programmes from programmes of general disease surveillance.

Information management

For analysis, disease occurrence information must be collated and reviewed systematically, the precise manner being dependent on the purpose of the analysis. To know if a specific disease has occurred in a particular species or region, one must be able to search through the data from previous years or decades. Large amounts of data spanning several decades are often needed for adequate epidemiological analysis, but even the records for one year can yield important information. The most useful information is thus extensive and well-indexed. Computerisation of data is of major importance, as this greatly facilitates retrievals and analyses: useful indexing can be performed without a computer, but this requires more time and is less flexible; un-indexed records must be searched and sorted by hand for each analysis, greatly limiting the analyses. Occasional (e.g. annual) summaries of data, if complete, can serve as indices; and certain analyses may be performed on the basis of such summaries.

Computerisation of disease occurrence records is just beginning in Europe. In some countries, this began in the mid-1980s or earlier, while in others the process is just beginning or is planned to commence in the near future. Requests for information on the occurrence of particular diseases in a given country will be more or less readily handled, largely depending on the extent to which the data are indexed, summarised or computerised. A manual search through hundreds or thousands of records takes considerable time, and if those responsible for wild animal disease surveillance programmes lack indexed or computerised data, they may be unable to respond to requests for information.

Use of information

The degree to which information from wild animal disease surveillance programmes is used in making decisions or establishing policies in wildlife management, or in veterinary or public health, could not readily be assessed by the methods of this survey. In general, in countries with well-organised national surveillance programmes, those responsible for implementing the programme are regularly consulted on wildlife health issues by senior civil servants and others. This is particularly true where the programme is the responsibility of a government agency and the government has a leading role in wildlife management. Certain programmes outside government agencies appear to be regularly consulted, however, and to be moderately influential with respect to policies set by both government and non-government wildlife management groups.

ACKNOWLEDGEMENTS

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the expression of any opinion whatsoever by the governments of Canada or of France, of any of the contributing or sponsoring organisations or individuals, or of the author, concerning the legal status of any country or territory mentioned, or its authorities, or concerning the delineation of its frontiers or boundaries.

Persons wishing to obtain the full-length report of the results of this study should direct their requests as follows: requests from European countries should be made to the Director, CNEVA-Nancy, B.P. 9, F-54220 Malzéville, France. Requests from all other countries should be directed to the author at the Canadian Cooperative Wildlife Health Centre (see title page), together with CN$10.00 for countries in North America or CN$15.00 for other countries to cover printing and mailing costs.

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**ÉPIDÉMIOSURVEILLANCE DES ANIMAUX SAUVAGES EN EUROPE. - F.A. Leighton.**

**Résumé :** Une étude portant sur les méthodes et le personnel impliqués dans les programmes de surveillance générale de la faune sauvage en Europe a été réalisée par correspondance et entretiens privés en 1993-1994. Sur 36 pays sollicités, 27 ont pris part à l'étude. L'intensité de la surveillance et les détails de son organisation sont très variables. Les programmes généraux d'épidémiosurveillance présentaient un caractère exhaustif dans quatre pays et étaient limités à certaines régions et/ou espèces d'animaux sauvages dans onze autres. Sans être dotés de programmes généraux d'épidémiosurveillance pour la faune sauvage, douze pays avaient mis en place des programmes de surveillance pour une ou plusieurs maladies spécifiques englobant des animaux sauvages. Des informations précieuses sur la fréquence des maladies chez les animaux sauvages étaient disponibles dans chacun des pays qui ont participé à l'étude. Les facteurs jugés importants pour la structure comme pour la mission des programmes d'épidémiosurveillance sont les suivants :

- l'histoire des cas de rage, de peste porcine classique, de maladie hémorragique virale du lapin et de syndrome du lièvre brun européen ;
- les méthodes de gestion de la faune sauvage et les relations entre le personnel de terrain spécialisé dans les animaux sauvages et le programme de surveillance ;
- le caractère payant ou gratuit du diagnostic de maladies à partir de prélèvements sur des animaux sauvages ;
- la formation et le matériel mis à disposition du personnel effectuant le diagnostic ;
- l'organisation des données sur les maladies des animaux sauvages.

**MOTS-CLÉS :** Epidémiologie – Europe – Maladies de la faune sauvage – Surveillance.

Resumen: El autor describe un estudio sobre los métodos y el personal implicados en las áreas de vigilancia general de las enfermedades de la fauna salvaje en Europa, llevado a cabo en 1993-1994 tanto por correspondencia como a través de entrevistas personales. Participaron a la encuesta 27 de los 36 países que fueron invitados a hacerlo. Pudo observarse una gran variación en cuanto a la intensidad de los programas de vigilancia y a los pormenores de su organización. Cuatro países disponían de programas exhaustivos de vigilancia general, mientras que en otros once se aplicaban programas de vigilancia general limitados a ciertas regiones geográficas y/o a ciertas especies de animales salvajes. En doce de los países no existían programas de vigilancia general centrados en las enfermedades de la fauna salvaje, aunque sí programas para una o más enfermedades específicas que afectaban también a animales salvajes. En todos los países participantes se disponía de información significativa sobre la aparición de enfermedades entre la fauna salvaje. Fueron identificarse los siguientes elementos importantes en cuanto a la estructura y función de los programas de vigilancia:

– Incidencia histórica de la rabia, la peste porcina clásica, la enfermedad hemorrágica viral del conejo y el síndrome de la liebre parda europea.

– Tipo de enfoque adoptado en el manejo de la fauna salvaje y relación existente entre el personal de campo dedicado a aquélla y el propio programa de vigilancia.

– Percepción o no de honorarios por el diagnóstico de enfermedades en especímenes salvajes.

– Formación y equipamiento del personal encargado del diagnóstico.

– Organización de los datos relativos a las enfermedades de la fauna salvaje.


Appendix I

Countries contacted during the survey

Albania (N)
Austria *
Belgium *
Bielorussia (N)
Bulgaria (N)
Croatia
Czech Republic
Denmark *
Estonia
Finland *
of Macedonia (N)
France *
Germany *
Greece
Hungary
Iceland (N)
Ireland *
Italy *
Latvia
Lithuania
Luxemburg *
Malta (N)
The Netherlands *
Norway *
Poland
Portugal
Romania (N)
Russia
Serbia and Montenegro
Slovak Republic (N)
Slovenia
Spain
Sweden *
Switzerland *
Ukraine (N)
United Kingdom *

(N): no information received

* countries visited in person

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* *
Appendix II

Primary sources of information about wild animal disease surveillance in European countries

Austria  Research Institute for Wildlife and Ecology, Savoyenstrasse 1, A-1160 Vienna
Belgium  Director, Division of Immunology, Faculty of Veterinary Medicine, University of Liège, Sart Tilman, B-4000 Liège
Croatia  Veterinary Institute, Savska cesta 143, 41000 Zagreb
Czech Republic  State Veterinary Institute, U sila 201, 46311 Liberec 30
Denmark  National Veterinary Laboratory, 2, Hangøvej, DK-8200 Aarhus N
Estonia  State Veterinary Department, Väike-Paala 3, EE-0014 Tallin
Finland  Field Unit, National Veterinary and Food Institute, P.O. Box 368, 00101 Helsinki
France  SAGIR, CNEVA-Nancy, B.P. 9, 54220 Malzéville
Germany  Research Institute for Game Animals, Forsthhaus Hardt, D-53229 Bonn;
Institute for Epidemiology, Seestrasse 55, D-16868 Wusterhausen/Dosse;
Institute for Zoo Biology and Wildlife Research, P.F. 1003, D-10252 Berlin
Greece  Zoonosis Section, Directorate General of Veterinary Services, 2 Acharnon St., 101 76 Athens
Hungary  Department of Game Pathology, Central Veterinary Institute, Országos Állategészségügyi Intézet, H-1149 Budapest, Tabornok U.2
Ireland  Department of Agriculture, Food and Forestry, Agriculture House, Dublin 2
Italy  President, Italian Society for Wildlife Ecopathology, Department of Animal Production, Epidemiology and Ecology, Faculty of Veterinary Medicine, Via Nizza 52, 10126 Turin
Latvia  State Veterinary Department, Republikas laukums 2, LV-1981 Riga
Lithuania  State Veterinary Service, Gedimino pr. 19, 2025 Vilnius
Luxemburg  State Veterinary Medical Laboratory, B.P 2081, L-1020 Luxembourg
The Netherlands  Institute for Animal Science and Health, P.O. Box 65, NL-8200 Lelystad
Norway  Central Veterinary Laboratory, Box 8156, Dep., N-0033 Oslo
Poland  Veterinary Department, Ministry of Agriculture and Food Economy, ul. Wspólna 30, 00-930 Warsaw
Portugal  Centre for Protection and Control of Animal Health, Largo da Academia Nacional de Belas Artes 2, 1200 Lisbon

Russia  Wildlife Health Centre, All-Russian Research Institute for Nature Protection, Znamenskoye-Sadki, M-628, 113628 Moscow; All-Russian Research Institute for Animal Health, 600900 Jur’evets, Vladimir;

Centre for Wild Animal Ecology, Pathology and Epidemiology, Institute of Evolutionary Animal Morphology and Ecology, Leninski, pr. 33, Moscow

Serbia and Montenegro  Department of Pathology, Veterinary Faculty, Bul. JNA 18, 11000 Belgrade

Slovenia  Institute for Pathology of Wild Animals, Veterinarska Fakulteta, p.o. Gerbičeva GO, 61115 Ljubljana – p.p. 25

Spain  Wildlife Service, ICONA, Gran Vía de San Francisco 4, 28005 Madrid;

Division of Infectious Diseases, Veterinary Faculty, University of Murcia, 30071 Murcia;

Division of General and Medical Pathology, Veterinary Faculty, Autonomous University of Barcelona, Building V, 08193 Bellaterra (Barcelona)

Sweden  Division of Wildlife, National Veterinary Institute, P.O. Box 7073, S-75007 Uppsala

Switzerland  Diagnostic Laboratory for Wild Animal Diseases, Institute of Animal Pathology, University of Bern, Länggass-Strasse 122, CH-3012 Bern;

Galli-Valerio Institute, Rue César-Roux 37, CH-1014 Lausanne

United Kingdom  Veterinary Investigation Diagnosis Analysis System, Epidemiology Department, Central Veterinary Laboratory (Weybridge), New Haw, Addlestone, Surrey, KT15 3NB;

Wildlife Incident Unit, Central Science Laboratory, London Road, Slough, Berkshire, SL3 7HJ;

Veterinary Sciences Division, Stoney Road, Stormont, Belfast, BT4 3SD.

REFERENCES

