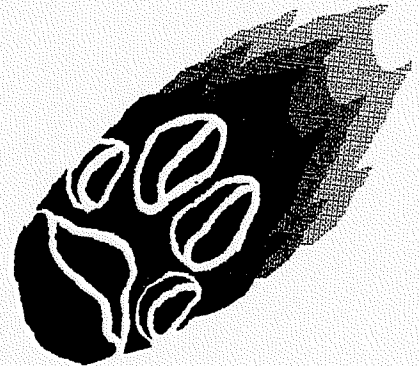
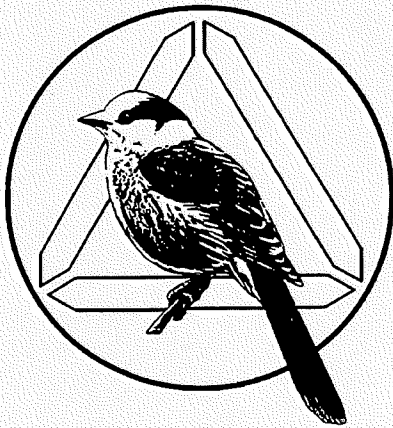


SURVEILLANCE OF WILD ANIMAL DISEASES IN EUROPE

A SURVEY OF SOURCES OF
INFORMATION ON WILDLIFE DISEASES

1993-94

Frederick A. Leighton



A COOPERATIVE PROJECT BETWEEN:

THE CANADIAN COOPERATIVE WILDLIFE HEALTH CENTRE

DEPARTMENT OF VETERINARY PATHOLOGY
WESTERN COLLEGE OF VETERINARY MEDICINE
UNIVERSITY OF SASKATCHEWAN
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INTRODUCTION

This survey was undertaken in order to inform the Canadian Cooperative Wildlife Health Centre (CCWHC) about the existing infrastructure and procedures for surveillance of wild animal diseases in Europe. In particular, its purpose is to provide the names and contact information for organizations and individuals who might be consulted if information about the occurrence of particular diseases, or diseases in particular species, in Europe is required. Such information is needed to permit the CCWHC to advise government and non-government agencies regarding health issues associated with importation or exportation of wild animal species into or out of Canada, and may also be needed should the CCWHC require advice about diseases new to Canada but well-known in Europe. A second purpose of this report is to facilitate exchange of information within Europe itself. This purpose evolved during the course of the survey when it became clear that many of the programs and persons active in wildlife disease surveillance in each country were not known to persons with similar interests in other countries.

This report consists primarily of brief descriptions of the status of wild animal disease surveillance in each country. The amount of information available differed among countries and each description represents only what the author was able to discover in the time available (September 1993-June 1994). Important omissions are likely to have occurred. In addition to these descriptions, there is information about European international organizations that may either influence wild animal disease surveillance through official channels or which may act as vehicles for the exchange of information about the occurrences of wild animal diseases in Europe.

Some Definitions For the purposes of this report, **wildlife** and **wild animal** mean free-ranging vertebrates which may be terrestrial, aquatic, or marine. They may be native or introduced species and may be naturally-reproducing or reared artificially (farmed) and released. They may be migratory or sedentary. A **Pathologist** is a specialist in the diagnosis of disease by methods that begin with autopsy and proceed to additional procedures such as histology, bacteriology, toxicology, etc. as judged to be necessary. **Pathology** is the work of pathologists. These words appear to be uniformly defined in this way in Europe except in France where "pathologie" and "pathologiste" are used to imply the study of disease in its very broadest sense such that any biomedical scientist would be considered a pathologist. Disease **surveillance** means a program of continuous monitoring of diseases in a particular region. **General** disease surveillance means the monitoring of diseases of all kinds in all vertebrate species.

The Nature of Wild Animal Disease Surveillance

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

1) Detection of disease or disease-causing agents in wild animals; 2) Diagnosis, or precise identification, of the diseases ; 3) Collection and analysis of the information gained from detection and diagnosis; and 4) Use of surveillance information in making decisions and policies with respect to wildlife management, in domestic animal health or public health ¹.

Detection: This requires an infrastructure for vigilance by personnel who are regularly in the field and who will make appropriate observations and ensure that adequate specimens are sent to a laboratory for diagnosis. Specific surveys of various kinds (serology, examination of shot samples of animals, etc.) can be useful adjunct activities but do not replace the essential vigilance of field personnel. An infrastructure of vigilant field staff is particularly important for detection of new diseases and for quantifying natural occurrences. Specific surveys are most useful for estimating population prevalence or assessing the presence of particular known pathogens. Field personnel may include government wildlife personnel and non-government personnel such as hunters, naturalists, farmers, foresters, non-government scientists and their staff, and others. For these people to function in surveillance, strong lines of communication must exist between them and those responsible for the surveillance system.

Diagnosis: For effective surveillance, diagnosis must be undertaken by trained personnel capable of detecting both well-known and new diseases. This implies a central role for well-trained veterinary pathologists or others with equivalent expertise (for example, there are non-veterinary specialists in fish and poultry pathology) These pathologists must work in laboratories with the full range of diagnostic capabilities readily available.

Information Management: Surveillance requires a system for recording information on disease occurrences so that the data can be reviewed or referred to at a future date. Raw data must be analyzed or summarized into some useable form. To be analyzed, data must be categorized and indexed in some way, preferably in a computer program that makes retrieval and analysis easy. The most useful recorded data relate to large geographic areas, or are national in scope, and cover many years.

Use of Surveillance Information: Surveillance serves a useful purpose and can be said truly to function only when the data are taken into consideration on a regular basis when decisions are made on issues to which the surveillance data are relevant. This requires a high level of awareness on the part of government and non-government administrators who make decisions on a wide range of wildlife- and health-related issues. It also requires good lines of communication between those

¹ Leighton, F.A. 1994. L'épidémiosurveillance des animaux sauvages au Canada. Annales de Médecine Vétérinaire. In Press.

responsible for wildlife disease surveillance and these decision-makers.

Where the information available from a country permitted, the surveillance program is described in terms of these four component parts.

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 (Laboratoire d'Études sur la Rage et la Pathologie des Animaux Sauvages - LERPAS) of the National Centre for Veterinary and Food Research (Centre National de Recherche Vétérinaire et Alimentaire - CNEVA) near the city of Nancy in eastern France. Letters were sent to the delegate to the Office International des Epizooties (see below) of each European country, but contacts also were made with as wide a range of other people as possible in order to learn how surveillance is conducted in each country and by whom. Letters were sent to persons and institutions suggested by an ever-enlarging group of colleagues. In particular, the secretary of the newly-created European Section of the Wildlife Disease Association (see below) was helpful in providing contacts. Personal visits were made to key institutions in as many countries as possible, emphasis being given to countries with well-developed programs of general wildlife disease surveillance and/or those close to eastern France and thus readily reachable within the travel budget available. The countries with which contact was attempted during the survey are listed in Table I.

Table I. Countries contacted during the survey. Names of countries visited in person are marked with an asterisk (*). Names of countries from which no information was received are followed by (-N)

Albania (-N)	Germany*	Norway*
Austria*	Greece	Poland
Belgium*	Hungary	Portugal
Byelorussia (-N)	Iceland (-N)	Romania (-N)
Bulgaria (-N)	Ireland*	Russia
Croatia	Italy*	Serbia-Montenegro
Czech Republic	Latvia	Slovak Republic (-N)
Denmark*	Lithuania	Slovenia
Estonia	Luxembourg*	Spain
Finland*	Macedonia (-N)	Sweden*
France*	Malta (-N)	Switzerland*
	Netherlands*	Ukraine (-N)

For each country, letters of general inquiry were followed by specific requests for information regarding detection, diagnosis, information management and use of information. In addition, some general information about wildlife management was sought. Interviews also were held with the personnel of the International Office of Epizootics (l'Office International des Épizooties - OIE) in Paris, the Directorate-General for Agriculture of the Commission of the European Communities (European Union) in Brussels, the organizers of the European Section of the Wildlife Disease Association and the Group for Studies of the Ecopathology of Mountain Wildlife (Groupe d'Études sur l'Écopathologie de la Faune Sauvage de Montagne - GEEFSM) convened at Château d'Oex, Switzerland. The author participated as a non-member at the 1994 meeting of the OIE *Ad Hoc* Group on Wildlife Diseases. In all, the survey included the sending of approximately 225 letters and 130 FAX transmissions, 34 personal interviews and one interview by telephone.

Descriptions of the status of wild animal disease surveillance were synthesized from the information available. These were then sent to the persons who had provided the information with the request that the description be reviewed and corrected as necessary. This review process was completed for most of the descriptions found later in this report.

The data gathered were entirely qualitative and no attempt at quantification was made in their analysis. It is not the purpose of this report directly to compare the programs in the various countries of Europe or to rank them in any way.

RESULTS

Information about wild animal disease surveillance was received from 27 of the 35 countries from which data were sought (Table 1). A great range in the intensity of surveillance programs and in the degree of their organization was evident among the countries that participated in the survey. Some countries have formal, organized and highly integrated programs with a central responsible agency and with full national coverage, while other countries have no program at all. However, useful information about the occurrence of wild animal diseases is available in every country that participated in the survey. Even in the absence of a formal surveillance program, studies of particular diseases or surveys of particular regions have been or are being carried out.

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 programs in many European countries. Of particular importance are rabies, hog cholera (classical swine fever), rabbit viral hemorrhagic disease and European brown hare syndrome.

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 World War II, rabies in the red fox spread centrifugally from a region in the general area of eastern Poland/adjacent Russia at a rate of about 30-60 km per year². It achieved its western-most extension, in eastern France, in 1970. Surveillance programs for rabies in both wild and domestic animals developed in many countries in response to this epizootic. Oral vaccination of foxes with vaccine contained in baits was first attempted in Switzerland in 1977. During the 1980's, more and more countries adopted this strategy and surveillance programs began to include surveillance of a wide range of species not only for rabies but also for chemicals included in the baits in order to determine the efficiency of the vaccination programs. While much of the surveillance for rabies involves examination for rabies only, the general effect of the 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 programs are closely associated with this specific concern about rabies.

Hog cholera (classical swine fever) has occurred in wild boar in many parts of Europe. It is not clear whether the disease can be maintained in wild boar populations, but it passes from domestic pigs to wild boar and infected wild boar populations represent possible sources of disease for domestic swine³. This disease, because of its importance for domestic pigs and international trade in pork products, has caused many national veterinary services to include wild boar in their routine diagnostic services and, like rabies, has served to heighten awareness and activity with respect to surveillance for wild animal diseases.

Rabbit Viral Hemorrhagic Disease (RVHD) and European Brown Hare Syndrome (EBHS): Two apparently new diseases of wild and domestic rabbits and hares occurred in Europe during the 1980's. Both diseases are rapidly fatal and

² Aubert, M. et al. 1993. Les acquis de la prophylaxie contra la rage vulpine en France. *Médecine et Maladies Infectieuses* 23 (spécial): 537 - 545. Note: regular quarterly reports on rabies in Europe are published in *Rabies Bulletin Europe*, available from the Federal Research Centre for Virus Diseases of Animals, Postfach 1149, D - 72001 Tübingen, Germany.

³ Aubert, M. 1994. La peste porcine classique du sanglier en Europe. *Annales de Médecine Vétérinaire*. In Press

caused large-scale mortality in wild populations and on farms⁴. These diseases received a great deal of public and official attention because of their economic impact on rabbit and hare farms and on wild populations of these most important game species. Surveillance and research programs were initiated in most affected countries, and, in 1989, the OIE added RVHD 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 over much of Europe.

Wildlife Management in Europe: There is no single system of wildlife management in Europe. In some countries, the management system differs in different regions as, for example, among the Cantons of Switzerland. However, in contrast to the general rule in North America, where wildlife management is the designated task of government wildlife agencies, wildlife management over much of Europe is largely carried out by hunters, fishermen and their organizations, with varying degrees of government supervision and input. This management activity ranges 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, surveys etc. required of hunters as part of their permit to hunt. Decisions regarding management of game species are often either made by, or are greatly influenced by, the hunters themselves. Hunting seasons often are 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 land owner and these too may be sold or rented. In addition, the responsibility for damage to agricultural crops caused by game animals has been considered the responsibility of the owner of adjacent wild animal habitat lands such as forests, and land-owners, 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 there remains a cultural relationship between hunting and protection against crop damage that can influence wildlife management decisions in a substantial way.

One effect of this system of wildlife management is that there are many well-organized groups of hunters 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. They expect to take responsibility for the management and welfare of the wildlife in their hunting or fishing areas, particularly of the species they themselves harvest. In many countries, these organized hunters finance the wild animal disease surveillance programs, either directly or through their permit fees, and they often also play a fundamental role in detection of diseases within

⁴ Morisse, J.-P. 1991. Hépatites d'origine virale des léporidés: introduction et hypothèses étiologiques. *Revue Scientifique et Technique de l'Office International des Epizooties* 10: 269-282.

those surveillance programs. However, this tends also to bias wildlife management programs and wild animal disease surveillance strongly toward game species. Management appears to be carried forward more on a species by species basis than through general habitat management for complex biological associations. Not all lands are managed in this way however. In national parks and similar reserves, habitat management appears to be the more usual approach. To all of the above generalizations there are important and diverse exceptions.

One senses a transition occurring in Europe with respect to wildlife management. Historically, wildlife management meant hunting and, particularly, protection of crops from damage by wild animals. Wildlife management was part of the general activities of ministries of agriculture. More and more, however, ministries of the environment are being created and wildlife management is being moved from agriculture to these new ministries. As a consequence, conservation and non-consumptive uses of nature are having an increasing influence on management decisions. This transition appears to have forged mutually supportive relationships among consumptive and non-consumptive naturalist groups in some countries and to have resulted in considerable conflict among them in others.

General Trends in Observed in Wildlife Disease Surveillance in Europe

Detection: Two factors seem particularly to influence the effectiveness of detection programs. The first is the degree of communication between the personnel responsible for the overall surveillance program and the people in the field who actually do the work of detection. 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 feed-back when they submit specimens for diagnosis, detection programs appear to be at their most effective. The second factor is whether or not the people involved in detection must pay a fee for the diagnostic examination of the specimens they submit. It is clear that a direct charge for the examination is a deterrent to detection activity. It appears that detection is 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. Thus, for example, where hunters or hunting organizations are required to pay for diagnostic examinations, surveillance is almost certainly limited to game species, often to major mortality incidents and also to conditions which the hunters do not think they recognize and can diagnose themselves.

Diagnosis: The reliability of the diagnoses made and the likelihood of recognizing new or unusual diseases are tied directly to the education of the diagnostic personnel and 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 that 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. There are a variety of educational scenarios that can prepare a person in this way, but the usual sequence is a veterinary medical degree followed by a formal training program at an educational institution or by apprenticeship with senior diagnostic specialists at a diagnostic laboratory. Autopsies performed by persons without such training risk 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 (preparation of histological slides, toxicology, virology, bacteriology, mycology, parasitology, hematology, biochemistry, radiology, electron microscopy) in order to proceed to a final diagnosis. In addition, specimens to be examined must arrive at the laboratory in a state that 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 rabies or hog cholera or RVHD can be rendered on the basis of single samples taken from particular organs. No general autopsy is required. This fact distinguishes most programs of surveillance for specific diseases from programs of general disease surveillance.

As will be obvious from the above, the most effect surveillance programs are those that involve diagnosis by specialist pathologists in well-equipped laboratories. Otherwise, the data from the surveillance program become suspect. Data for particular diseases with clear criteria for laboratory diagnosis on the basis of identifying the causative agent can be accepted in the absence of specialist pathologists. The diagnosis of many other diseases, particularly as causes of death, can not. In most countries with surveillance programs, specialist pathologists are relied upon for diagnosis, but there are some exceptions.

Information Management. For analysis, disease occurrence information must be gathered together in one place and reviewed systematically, the precise manner dependant on the purpose of the analysis. To know if a certain disease has occurred in a certain species or in a certain region, it is necessary to be able to search through the data from the past years or decades. Large amounts of data spanning several decades are often needed for meaningful epidemiological analysis, but even the records for one year can yield important information. The most useful information is, thus, extensive and well-indexed. Computerization of data is of major importance since retrievals and analyses are so greatly facilitated in this way. Useful indexing can be done without a computer but requires more time and is less flexible. Un-indexed records must be searched and sorted by hand for each analysis, which greatly limits the analyses that are carried out. Occasional summaries of data, such as annual

summaries, if complete, can serve as indices and certain analyses may be carried out on the basis of these summaries.

Computerization is just beginning for disease occurrence records in Europe. In some countries, the process began in the mid-1980's, earlier than this in a few. In others, it is just beginning or is planned in the foreseeable future. Requests for information about the occurrence of particular diseases in a given country will be readily or not so readily handled depending largely on the degree to which the data are indexed, summarized or computerized. It is clear that a manual search through hundreds or thousands of records takes considerable time and that the persons responsible for wild animal disease surveillance programs without indexed or computerized data may not be able to respond to requests for information.

Use of Information: The degree to which information from wild animal disease surveillance programs 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, where countries have a national surveillance program that is well organized, the persons responsible for the program are regularly consulted by senior civil servants and others regarding wildlife health issues. This is particularly true when the program is the responsibility of a government agency and when the government has a leading role in wildlife management. However, certain programs outside of government agencies appear to be regularly consulted and to be moderately influential with respect to policies set by both government and non-government wildlife management groups.

International Organizations

*L'Office International des Épizooties*⁵ The OIE is an intergovernmental organization of some 134 member countries with a mandate to receive and redistribute information on the occurrence of animal diseases of importance to domestic animal health or to human health around the world. It was established in 1924 in Paris. Since its founding, it has evolved a range of activities related to its central mandate. The OIE confines its activities to its member countries and to diseases on two lists, referred to as List A and List B. List A contains 15 diseases considered to be of major concern because of their rapidly contagious and highly-damaging nature. Occurrences of these diseases are reported to the OIE monthly, and new occurrences are reported within 24 hours. There are 93 diseases on List B, the status of which is reported to the OIE once each year. The lists include diseases of mammals, birds, fish and invertebrates.

⁵ L'Office International des Épizooties, 12 rue de Prony, F-75017 Paris. Tel.: (+33) 1 44 15 18 88; FAX: (+33) 1 42 67 09 87

In 1993, the OIE created an *Ad Hoc* Group on Wildlife Diseases which met in Paris in March. This group reviewed the results of a questionnaire that had been sent to 125 member countries to determine the occurrence and level of concern for diseases in wild animals. The Group identified 10 diseases from List A and 21 diseases from List B which affected wildlife and for which wild animals might play significant roles in their epizootiology. The Group also proposed a list of 30 additional diseases which are of importance to wild animal populations in a manner analogous to the importance of List A and B diseases to domestic livestock. It was their suggestion that the members of the OIE consider inclusion of these new diseases, as well as the occurrence of List A and B diseases in wildlife species, as part of their regular reporting program.

The OIE operates under the authority its International Committee composed of delegates from all member countries. The major concern of the delegates is agriculture and international trade, but some member countries have strong interests in wildlife-based tourism and in environmental conservation. List A and B diseases in domestic species are still the overwhelming concern of the majority of members and it is unlikely that these members will want to allocate time and money to the reporting of diseases in wildlife. However, international trade in wild animal species used on game farms and proposed new approaches to the justification of diseases as a trade barriers arising through the GATT process may lead to the inclusion of some new diseases in some wild animal species in the formal reporting activities of the OIE. The OIE has great influence with respect to the reporting of disease occurrences. Thus, should wild animal disease be incorporated into the reporting requirements of the OIE, surveillance programs for wild animal diseases by member countries would be necessary. This would change the degree of surveillance in some European countries and would be an important stimulus in general to wildlife disease surveillance.

The data reported to the OIE from member countries are collated and published. Once published, they are considered public information, and the OIE is able to respond to requests for information that has proceeded to publication. The data reported to the OIE are computerized with the objective of publication. The analytical capacity of the computerized database is somewhat limited.

*European Union - Directorate-General for Agriculture*⁶ The 12 countries of the European Union (EU - formerly called the European economic community - EEC or the "common market"), soon to be joined by four new members, have a central administrative structure in the form of the Commission of European Communities in Brussels. Within the legislation of the EU are programs and activities that have some

⁶ Directorate-General for Agriculture Division of Veterinary Legislation, Commission of European Communities, Rue de la Loi 200, B - 1049, Brussels, Belgium. Tel: (+32) 2 295 3143; FAX: (+32) 2 295 3144.

influence on wild animal disease surveillance now and may have more influence in the future. In the context of trade in wild game meat, for example, Council Directive 92/45/EEC (16 June 1992) states that "member states shall ensure that a survey of the health of wild game is performed in hunting areas on their territories at regular intervals." The EU is directly involved in a program to eradicate rabies in foxes from member countries and to control and eradicate hog cholera and african swine fever, both of which involve surveillance in populations of wild boar. Enabling legislation for regulations with respect to translocation of wild animal species was passed in 1992. In reality, however, the Division responsible for these programs that might influence wild animal disease surveillance is small and has a large mandate. The priorities of its mandate are first zoonotic diseases, then diseases of domestic livestock and finally diseases in wild animals, and its activities are confined to issues involving commercial trade. Thus, while in the long term the regulations of the EU may stimulate a degree of general surveillance of wild animal diseases, in the short term little pressure is likely to be exerted in this direction. In another area entirely, Council Directive 91/414/EEC, adopted in 1991 and implemented in 1993, requires that plant protection products such as herbicides and insecticides, registered for use within the EU, must not have an unacceptable impact on wildlife populations, a requirement that would seem to imply a system of surveillance to ensure that such is the case.

*Group for Studies of the Ecopathology of Mountain Wildlife*⁷ This is an international organization of scientists who study disease in the ecology of mountain wildlife. Meetings are held annually and many of the presentations are subsequently published in the Bulletin d'Information sur la Pathologie des Animaux Sauvages (BIPAS)⁸. The first meeting was held in 1983. The group is dominated by scientists from France, Italy, Spain, and Switzerland, including those responsible for general wildlife disease surveillance in these countries. The group is a highly-effective forum for exchange of information and, as a result, scientists working on the health and disease of mountain wildlife in these countries are generally well-informed regarding similar work and colleagues sharing their interests in the other countries.

*Nordic Section of the Wildlife Disease Association*⁹ The Wildlife Disease

⁷ GEEFSM, c/o Dr. Dominique Gauthier (secretary), Laboratoire Départemental d'Analyses Vétérinaires de la Savoie, 321 chemin des Moulins, B.P. 1113, F - 73011 Chambéry, France. Tel.: (+33) 79 33 19 27; FAX: (+33) 79 75 25 92

⁸ Published by CNEVA-Nancy, B.P. 9, F - 54220 Malzéville, France. Tel.: (+33) 83 29 26 08; FAX: (+33) 83 29 33 13. Editor: Dr. Marc Artois.

⁹ Nordic Section of the Wildlife Disease Association, Dr. Torsten Mörner, Chairman, Wildlife Section, The National Veterinary Institute, P.O. Box 7073, S - 750 07 Uppsala, Sweden. Tel.: (+46) 18 67 40 00; FAX: (+46) 18 30 91 62

Association¹⁰ is an international scientific association based in the United States. Until 1994, there were two regional sections outside of North America, an Australasian Section based in Australia and a Nordic Section based in Sweden. The nordic section consists of scientists from Denmark, Finland, Norway and Sweden. Meetings are held once a year and serve as a forum for exchange of information. As a result of this organization, there is excellent communication among scientists working with wild animal diseases in nordic countries.

*European Section of the Wildlife Disease Association*¹¹ This new Section of the Wildlife Disease Association (WDA) was approved in 1993 and will have its inaugural meeting in Paris on 22-24 November 1994. During this survey, considerable interest in this new Section was expressed by scientists from many countries. It is anticipated that this will become a very active Section of the WDA and will serve to bring together the majority of scientists who work on wild animal diseases in Europe. As such, it will be the only European association for the study of wild animal diseases and will do much to improve communications among individuals and institutions in the many countries of Europe.

National Surveillance Programs

The status of wild animal disease surveillance is described separately for each country. This is followed by information regarding who to contact for more detailed information. In telephone and FAX numbers, the country code, as of June 1994, is given in parentheses, preceded by a "+" - eg (+33) for France.

While no comparison is made here among the surveillance programs described, some information has been extracted and tabulated to act as a guide or index for particular kinds of information (Table 2). Note that exclusion from this table means either that a country does not fit in the various categories tabulated or that the data that might have included a country under one or more categories was not available to the author.

¹⁰ The Wildlife Disease Association, P.O. Box 1897, Lawrence, Kansas 66044-8897, U.S.A.

¹¹ Organizers of the inaugural meeting in November 1994 (Paris) are Drs. Torsten Mörner (The National Veterinary Institute, P.O. Box 7073, S-750 07 Uppsala, Sweden), Marc Artois (CNEVA-Nancy, B.P. 9, F-54220 Malzéville, France) and Thijs Kuiken (Department of Veterinary Pathology, University of Saskatchewan, Saskatoon, SK S7N 0W0 Canada)

Table 2. Guide to the availability of historical collections of tissues, long-term records and computerized records of wild animal diseases in Europe. These categorizations apply only to programs of general wildlife disease surveillance. Specific programs, such as for surveillance of rabies only, are not included. See description of each country (below) for details.

Historical Collections of animal tissues as frozen tissues (FR), Formalin-Fixed tissues (FF), wax blocks for histological slides (W) and frozen serum (S).	Data on wild animal disease occurrences covering more than 10 years. The date of the earliest records are given. Multiple dates indicate multiple collections	Availability of computerized data. The year during which computerization began is indicated.
<p>Denmark (W) France (S) Germany - IZW (FF)(W) Norway (FR)(S) Spain (S) Sweden (FR)(S) Switzerland- Galli-Valerio (W)</p>	<p>Austria (1978) Czech Rep. (1980) Denmark (1934) Finland (1930) Germany (1953) Hungary (1977) Norway (1960/1891) Serbia-Montenegro (1957) Slovenia (1953) Sweden (1945) Switzerland- Bern (1984) - Galli-Valerio (1950) United Kingdom (1975)</p>	<p>Finland (1990) France (1986) Germany - IZW (1994) Hungary (1984) Norway (1985) Sweden (1986/1978) Switzerland- Bern (1984) - Galli-Valerio (1994) United Kingdom (1975)</p>

ALBANIA

No information was received from Albania. The address listed for the Chief Veterinary Officer is as follows:

Director of Veterinary Services
Ministry of Agriculture and Food
Tirana

Attn. Dr. Anesti RAKO

AUSTRIASOURCES OF INFORMATION

Information was obtained by correspondence with Drs. T. STEINECK and F. TATARUCH of the Research Institute for Wildlife and Ecology, Vienna, and by a personal visit to this Institute on 24-25 March 1994.

SUMMARY

A program of general wildlife disease surveillance is operating in Austria and is coordinated by Dr. T. STEINECK of the Research Institute for Wildlife and Ecology (Forschungsinstitut für Wildtierkunde und Ökologie), a research institute of the Veterinary University of Vienna. Emphasis is given to game animal species and the program does not include fish. Because the Institute has departments of toxicology and wildlife ecology as well as pathology, its surveillance program is broadly based and is oriented toward application of data to wildlife management. There is a fish diagnostic laboratory at the Veterinary University of Vienna that can provide general information on fish diseases. In addition, there are special surveillance programs for rabies and for hog cholera, and these include wild animal species.

WILDLIFE DISEASE SURVEILLANCE: INFRASTRUCTURE AND FUNCTION

Detection - Discovery of sick or dead animals is primarily the work of hunters, but veterinarians and the general public participate on occasion. The Research Institute for Wildlife and Ecology has a contract with hunter associations in two provinces (bundeslandes) whereby individual hunters may submit specimens and the cost of the diagnostic examination is paid by the association. Otherwise, examinations at the Institute or at the other diagnostic laboratories around the country must be paid for by the person submitting the specimen or by some other arrangement such as with a local hunting organization (specimens submitted as part of the national surveys for rabies or hog cholera are accepted without charge to the submitter, but diagnosis is limited to the presence or absence of these specified diseases). Approximately 1000 wild animal specimens are submitted each year for general diagnosis: 300-400 are submitted to the Institute and 500-600 are submitted to other diagnostic laboratories (this excludes specimens collected for rabies and hog cholera surveillance programs).

Diagnosis - Diagnosis is done by veterinary pathologists trained either through post-veterinary programs of study or by apprenticeship. Of the nine provinces in Austria, state-owned veterinary diagnostic laboratories are located in six. In addition, the Institute for Pathology and Forensic Medicine, the Institute for Fish at the Veterinary University and the Research Institute for Wildlife and Ecology have full capabilities in post mortem diagnosis. Thus, there is ready access to diagnostic laboratories in nearly all of the country.

Information Management - The Research Institute for Wildlife and Ecology maintains a national file of wildlife disease information. Diagnostic data are received from all diagnostic laboratories, usually in the form of diagnostic reports of each examination. These are compiled by Dr. STEINECK. Records begin in 1978 and there are substantial numbers of examinations recorded from 1980 onward. Records are not now computerized but computerization is underway. Data in the files include standard diagnostic data, species and geographic location by hunting area or by district (areas of approximately 200 km²). Records on paper are indexed by species and major diagnoses. All records are in German. The computer system will use a coding system now in use at the Institute of Pathology and Forensic Medicine of the Veterinary University, modified for the requirements of wild animal disease records. An annual summary of diseases in wild animals (largely game animal species) is prepared each year by Dr. STEINECK.

Use of Information - Because the Research Institute for Wildlife and Ecology has a major mandate for research relevant to wildlife management, this is also the orientation of the wildlife disease surveillance program coordinated by the Institute. Wildlife management itself is decentralized in Austria; major decisions and policies are established in each region by hunters themselves together with a government wildlife officer. Information about wildlife diseases is made available to hunting groups through publications in hunting journals, presentations at meetings and through consultations as may be requested. There is also adequate communication between the Institute and government offices concerned with wildlife issues, including export and import permits.

COMMENTS

The wildlife disease surveillance program is national in scope and is based on cooperation among the Research Institute for Wildlife and Ecology, veterinary diagnostic laboratories, departments of the Veterinary University, federal disease control programs and hunting organizations. It is, thus, broadly based. It is a partial program only, in that many species are excluded from the program because of its focus on hunted species. The program is strengthened by its location in a research institute that undertakes studies of certain disease problems in depth, for example careful study of the dynamics of radionuclides in red deer and the pathogenesis of rape intoxication in wild ruminants. Epidemiological analysis of disease occurrence data has not been extensive, but may be advanced by computerization.

PRIMARY CONTACTS

Research Institute for Wildlife and Ecology (Forschungsinstitut für
Savoyenstrasse 1 Wildtierkunde und Ökologie)
A - 1160 Wien
Tel: (+43) 1 45 36 23; FAX: (+43) 1 45 36 23 59

- General Information: Attn. Dr. Theodora STEINECK
- Toxicology: Attn. Dr. Frieda TATARUCH
- Director of the Institute: Prof. Dr. K. ONDERSCHEKA

SECONDARY CONTACTS

- Fish Diseases:

Institut für Fischkunde
Veterinärmedizinische Universität Wien
Linke Bahngasse 11
A - 1030 Wien Tel: (+43) 1 7 11 55 551

Attn. Prof. GRÜNBERG

- Rabies:

Bundesanstalt für Tierseuchenbekämpfung
Robert Koch-Gasse 17
A - 2340 Mödling Tel: (+43) 2236 231030

- Hog Cholera:

Bundesanstalt für Virusseuchenbekämpfung bei Haustieren
Emil-Behring-Weg 3
A - 1231 Wien Tel: (+43) 1 804 35 38

- Veterinary University of Vienna:

Institute for Pathology and Forensic Medicine and Institute for Parasitology

Veterinärmedizinischen Universität Wien
Linke Bahngasse 11
A - 1030 Wien

Tel: (+43) 1 711 550

BELGIUMSOURCES OF INFORMATION

Information was received by correspondence with Dr. L. HALLET (Inspector General, Veterinary Services, Ministry of Agriculture) and by telephone from Dr. R. DUCATELLE (Faculty of Veterinary Medicine, University of Gent). I met with Dr. J. PEETERS (National Institute for Veterinary Research, Brussels) on 25 October 1993 and with Prof. P-P PASTORET, Dr. B. COLLIN and Dr. T. JAUNIAUX (Faculty of Veterinary Medicine, University of Liège) on 21 January 1994 and again on 15 April while attending the meeting of the Belgian Association for Epidemiology and Animal Health at Liège.

SUMMARY

There is currently no program for the general surveillance of wild animal diseases in Belgium. Some elements of a system exist and there appears to be increasing interest in wild animal diseases from the perspectives of risks to domestic animals, zoonoses and wildlife management. A program of surveillance of diseases in marine birds and mammals found dead on Belgian beaches has been organized to operate at least from 1992 to 1996.

There are nine state-owned veterinary diagnostic laboratories in Belgium, including the National Institute for Veterinary Research in Brussels which is also the central veterinary laboratory to which diseases of national or international importance are reported by the provincial laboratories. The provincial laboratory in Harloie (SE Belgium) is the national diagnostic laboratory for fish. Wildlife specimens are not commonly examined in these laboratories because all submitters, including wildlife officers, must pay fees for the autopsies. Exceptions are made when important outbreaks of diseases occur such as Rabbit Viral Hemorrhagic Disease and European Brown Hare Syndrome or when an important disease of domestic animals or humans occurs in wildlife, such as hog cholera in wild boar and rabies in foxes. There is no national database of diagnostic information from the veterinary diagnostic laboratories, although such a network is envisioned in the next few years. A surveillance and oral vaccination program for rabies in foxes is organized through Dr. P-P PASTORET at the University of Liège and specific surveys for hog cholera and brucellosis in wild boar have been conducted by the National Institute for Veterinary Research. The Service in Pathological Anatomy of the faculty of veterinary medicine, Liège, accepts wild animal specimens for diagnosis without cost to the submitter, but the number of specimens submitted is small. The diagnostic laboratories of the veterinary faculty at the University of Gent examine wild animal specimens on occasion also. A Centre for Game Animal Medicine is operated at the veterinary faculty of the University of Liège by Dr. B. COLLIN. This is largely an information centre that attempts to make existing

veterinary information available to hunters and wildlife authorities for their wildlife management activities.

COMMENTS

Despite the lack of routine surveillance for wild animal diseases in Belgium, a certain amount of information about wildlife diseases is available from the individual scientists who work in this or related fields.

Wildlife management in Belgium is largely in the hands of hunters and is administered separately in the Flemish- and French-speaking sections of the country. The major wildlife populations are located in the French-speaking section (Wallonie) and their management is administered by the Division of Nature and Forests office in Jambes (Ave. Prince de Liège 15, B - 5100 Jambes).

CONTACTS

Faculty of Veterinary Medicine
University of Liège
Sart Tilman
B - 4000 Liège

- General information and Rabies Program:

Attn. Prof. P-P PASTORET, Division of Immunology
Tel: (+32) 41 56 34 69;
FAX (+32) 41 56 35 80

- Surveillance of marine bird and mammal diseases:

Attn Prof. F. COIGNOUL (Head of Service) and Dr. T. JAUNIAUX (Assistant in charge of diagnosis), Service in Pathological Anatomy,
Tel: (+32) 41 56 40 75; FAX (+32) 41 56 40 65.

- Centre for Game Animal Medicine:

Attn. Dr. B. COLLIN, Department of Anatomy
Tel: (+32) 41 56 40 60; FAX (+32) 41 56 40 61

Faculty of Veterinary Medicine
University of Gent
Casinoplein 24
B - 9000 Gent

- General Information:

Attn. Dr. R. DUCATELLE, Department of Avian Pathology,
Tel: (+32) 92 23 37 65

National Veterinary Research Institute
Groeselenberg 99
B - 1180 Brussels (Ukkel)

- General Information:

Attn. Dr. J.E. PEETERS, Head, Parasitology and Small Livestock Pathology.
Tel: (+32) 2 375 4455; *FAX (+32) 2 375 0979*

- Brucellosis in wild boar and hares: Attn. Dr. J. GODFROID

BULGARIA

No information was received from Bulgaria. The address listed for the Chief Veterinary Officer is as follows:

Regional Commission of the O.I.E. for Europe
Bld. Wasil Lewski 110
1504 Sofia

Attn. Dr. N. T. BELEV, President

BYELORUSSIA

No information was received from or about Byelorussia. Possible contacts were provided by Dr. Eugeny KUZNETSOV of the All-Russian Research Institute for Nature Protection, Moscow, and by CNEVA - Nancy, France.

POSSIBLE CONTACTS

Byelorussian Research Institute of Experimental Veterinary Medicine
P/O Kuntsevtschina
Minski Region, Minskaya Oblast
223020 Byelorussia

Tel: (+7) 98 81 34; 98 81 31, or 98 81 32

Ministry of Agriculture and Food
Kirova 15
Minsk Tel: (+7) 172 202 564; *FAX: (+7) 172 274 388*

Attn. Dr. S. N. SHPILEVSKY

- Rabies Surveillance:

Institute for Epidemiology and Microbiology
Ministry of Health
ul. Nogina 3
Minsk Tel: (+7) 172 265 866; *FAX: (+7) 172 270 013*

Attn. Dr. P. RYTIK

SOURCES OF INFORMATION

Information was received through correspondence with Dr. Čedomir PAUKOVIĆ of the Croatian Veterinary Institute and with Dr. Marko TADIĆ, Director of the Veterinary Administration.

SUMMARY

There is no program for general wild animal disease surveillance in Croatia. However, 2 000 to 3 000 wild animals are examined each year by the system of state veterinary laboratories. Most of these samples are submitted specifically for surveillance of rabies, but complete autopsies are sometimes done as well. All data regarding diagnosis of wild animal diseases by the central or the four regional veterinary laboratories are on file in the central Veterinary Institute in Zagreb. All records are on paper and are not indexed by species or disease. However, data for each year are summarized in an annual analysis and report. Regional diagnostic laboratories are located in Križevci, Rijeka, Split and Vinkovci. Currently, detection of diseases in wildlife is limited because the cost of diagnostic examinations for diseases other than the major infectious diseases for which there are national surveillance programs must be paid by the submitter. In addition to diagnosis, the Veterinary Institute has carried out considerable research on various diseases of wild animals.

CONTACTS

Dr. Čedomir PAUKOVIĆ
Veterinary Institute
Savska cesta 143
41000 Zagreb

Tel: (+38) 41 535 011; FAX: (+38) 41 537 140

CZECH REPUBLIC**SOURCES OF INFORMATION**

All information was gathered through correspondence with Dr. Leoš ČELEDA, Deputy Director General, State Veterinary Administration, Prague and Dr. Oldřich MATOUCH, Director, State Veterinary Institute, Liberec.

SUMMARY

There is currently no organized program for general surveillance of wild animal diseases in the Czech Republic. There are surveillance programs for specific diseases that affect wild animals: rabies, hog cholera, brucellosis, tularemia, tuberculosis and trichinosis. Each is coordinated by one of the laboratories of the State Veterinary Institutes (Ministry of Agriculture), a network of 10 veterinary laboratories located throughout the country. Prior to 1989, a program of general wild mammal and bird disease surveillance was coordinated by the State Veterinary Institute at Liberec, the institute which currently coordinates the rabies surveillance and vaccination program. Diagnostic examinations of wild animal specimens were done at this and other veterinary laboratories without cost to the submitter, and all information regarding diagnoses of diseases in wild animals was centralized at Liberec. Records from this period begin in 1980 and consist of individual diagnostic reports which are not indexed but which were summarized in detail each year in an internal report. In 1989, the general surveillance program was terminated. The State Veterinary Institutes now must charge hunters and others who submit wild animal specimens for diagnosis unless the specimens are part of a surveillance program for one of the specific diseases noted above. Diagnostic examinations done within the context of these specific programs are paid for by the State. Data gathered in the rabies surveillance program is maintained in a computerized database and can be searched and analyzed by a variety of criteria. In 1991, 5082 wild animals were examined for rabies. Fish diseases are investigated at a specialized laboratory of the State Veterinary Institute in Budějovice.

PRIMARY CONTACT

Dr. Oldřich MATOUCH, Director
State Veterinary Institute
U sila 310

463 11 Liberec 30

Tel. (+42) 48 462 631; *FAX: (+42) 48 461 792*

- General information on Wild Animal Diseases; Rabies Program

DENMARK
(Including Greenland and the Faroe Islands)

SOURCES OF INFORMATION

All information was gathered through correspondence with Dr. Hans Henrik DIETZ of the National Veterinary Laboratory in Aarhus and during a visit to that laboratory 11-2 January 1994.

SUMMARY

A comprehensive national program of wild animal disease surveillance is based in the National Veterinary Laboratory, Ministry of Agriculture, in Aarhus. The program is coordinated by Drs. H.H. DIETZ and P. HENRIKSEN. There is no fee charged for examination of wild animal specimens and anyone may submit such specimens for diagnosis. Records of wild animal diseases extend back to 1934, when wildlife disease surveillance was begun at the National Veterinary Laboratory by Professor M. Christiansen. The Aarhus laboratory examines fish as well as birds and mammals, and their work also includes animals from zoos and fur and game farms. Wildlife management is now the responsibility of the Ministry of the Environment. There is close cooperation between the Ministries of Agriculture and of the Environment with respect to wildlife diseases. The Ministry of the Environment undertakes surveillance activities for environmental contaminants as well as specific research projects with respect to pollution and wildlife health. Dr. B. CLAUSEN of the National Environmental Research Institute, Ministry of the Environment, has particular expertise regarding wild animal health in Greenland.

WILDLIFE DISEASE SURVEILLANCE: INFRASTRUCTURE AND FUNCTION

Detection - Anyone in Denmark may submit wild animal specimens to the National Veterinary Laboratory in Aarhus and no fee is charged. Hunters remain important in detection of wild animal diseases, but naturalists and biologists also play important roles. The need for vigilance by these groups is regularly publicised by the National Veterinary Laboratory in popular articles and in meetings of various kinds. The number of wild animal specimens submitted for diagnosis has ranged from 350 to over 1,000 per year.

Diagnosis - All diagnoses are made at the National Veterinary Laboratory in Aarhus. Diagnosis of fish diseases is done in a special section of the laboratory; this section is also the O.I.E. Reference Laboratory for viral diseases of fish. Mammals and birds are examined by veterinary pathologists with formal post-veterinary education in veterinary pathology and specific interest and experience in the diagnosis of wildlife diseases. The laboratory is well-equipped and also has access to a variety

of specialized diagnostic laboratories of the National Veterinary Laboratory system in Copenhagen, including comprehensive toxicology. Wax blocks of tissues are retained.

Information Management - Records of diagnoses made by the laboratory have been kept on paper since 1934. All records are in Danish. Data recorded include history/anamnesis, standard diagnostic information, species, field data when available, and geographic location by postal code (nearest community). Diagnostic reports are filed by accession number and they are cross-indexed by species, date, location and submitter. Computerization is scheduled to begin in 1994; currently records are on paper only.

Use of Information - Each year, an annual summary of wildlife disease occurrences is published in the laboratory's annual report. Additional reports are made from time to time in scientific articles and in hunting journals. There is a high level of awareness of disease surveillance among government wildlife biologists, with whom meetings are held regularly. Thus, information about wildlife disease issues appears readily available to wildlife managers. Some epidemiological analyses were carried out on the surveillance data in a Doctoral dissertation by Dr. Erik RATTENBURG. Information on wild animal diseases in Denmark is exchanged once or twice each year at meetings of the Nordic section of the Wildlife Disease Association and other meetings of Scandinavian or nordic wildlife disease specialists.

Financial Base - The wildlife work of the National Veterinary Laboratory is funded entirely by the Department of Agriculture.

COMMENTS

Wildlife disease surveillance in Denmark appears comprehensive and well-organized. In parallel, there are long-term records of animals killed each year by hunters which serve as indices of animal abundance for comparative analysis¹. The major current weakness of the surveillance program is that disease occurrence data are not in a form that can easily be searched or analyzed. Computerization should change this situation. The surveillance program has always been based on the interests of veterinary pathologists in the National Veterinary Laboratory, rather than on an official mandate of that Laboratory. It is, thus, vulnerable to changes in staff and to changes in the willingness of the Department of Agriculture to underwrite the program.

¹ See: H. Strandgaard and T. Asferg (1980) The Danish bag record II. Danish Review of Game Biology 11:1-112.

CONTACTS

National Veterinary Laboratory
2, Hangøvej

DK - 8200 Aarhus N. Tel: (+45) 86 16 79 00; *FAX: (+45) 86 10 74 64*

- Diseases of Mammals and Birds:

Attn. Drs. Hans Henrik DIETZ and Per HENRIKSEN

- Diseases of Fish:

Attn. Dr. Niels Jorgen OLESEN

National Environmental Research Institute
Frederiksborgvej 399
P.O. Box 358

DK - 4000 Roskilde Tel: (+45) 46 30 12 00; *FAX (+45) 46 30 11 14*

Attn. Dr. Bjarne CLAUSEN

SOURCES OF INFORMATION

All information was received through correspondence with Dr. Matti NAUTRAS of the State Veterinary Department and Dr. Toivo JÄRVIS of the Estonian Agricultural University.

SUMMARY

There is no national program of general surveillance of wild animal diseases in Estonia. The State Veterinary Department is responsible for veterinary diagnostic laboratories in the country and has specific surveillance programs for rabies, particularly in red foxes and raccoon dogs, and trichinosis, particularly in wild boar and bears. These examinations of wild animals are done without cost to the submitter. The Estonian Sea Research Institute in Tallinn has undertaken diagnostic examinations of seals and marine fish. Personnel of the Faculty of Veterinary Medicine in Tartu have undertaken various studies of wild animal diseases, including surveys and diagnosis.

CONTACTS

- General Information, State Veterinary Laboratories, Rabies and other Zoonoses:

State Veterinary Department
Väike - Paala 3
EE - 0014 Tallinn Tel: (+372) 2 210 280; FAX:(+372) 2 215 548

Attn. Dr. Ago PÄRTEL

- General Information, Faculty of Veterinary Medicine, Parasitic Diseases:

Dr. Toivo JÄRVIS
Department of Parasitology
Faculty of Veterinary Medicine
Estonian Agricultural University
Kreutzwaldi 62 - B218
EE - 2400 Tartu

SOURCES OF INFORMATION

All information was gathered during a visit to the National Veterinary and Food Institute, Helsinki, 16-17 January 1994, particularly through interviews with Prof. Bengt WESTERLING.

SUMMARY

A comprehensive national program of wild animal disease surveillance is based in the Field Unit, National Veterinary and Food Institute, Helsinki, and is coordinated by Prof. Bengt WESTERLING. Diagnostic examinations of wildlife specimens are done without cost to the submitter. Anyone in Finland may submit specimens; the majority come from hunters and wildlife biologists. The Field Unit has one specialist each in wildlife, fish and fur-bearing animals. Records of diagnostic findings are kept in the files of the Department of Pathology of the Institute. Records on paper are available from the 1930's to the present and records are computerized from 1990 to the present. Reports of diagnoses made for wild animal specimens at the three regional veterinary diagnostic laboratories outside of Helsinki are included in the wildlife records of the Institute. There is also a specific survey and oral vaccination program for rabies in eastern Finland. An annual summary of wildlife disease occurrences is published in the annual report of the Institute (in Finnish, Swedish and English). Special reports and papers in scientific and hunting journals also are written from time to time. There is also a fish disease laboratory at the Turku (Åbo) Academy with at least ten years of accumulated records. Wildlife diseases and epidemiology also are studied at the Finnish Forest Research Institute (Vantaa) and there are cooperative working relationships among the National Veterinary and Food Institute, the Game and Fisheries Research Institute and Helsinki University with respect to wild animal diseases.

WILDLIFE DISEASE SURVEILLANCE: INFRASTRUCTURE AND FUNCTION

Detection - Any person in Finland may submit wild animal specimens for diagnostic examination and there is no cost to the submitter. Awareness of the wildlife disease surveillance program is still growing among wildlife management personnel and non-government groups such as hunters, but there is already significant participation by these groups in the detection of wildlife diseases. Approximately 500 wild mammals and birds are submitted yearly for general diagnosis and another 300-400 mammals are submitted for rabies surveillance.

Diagnosis - Most wild animal specimens are examined at the National Veterinary and Food Institute, Helsinki. However, three regional diagnostic laboratories (at Oulo, Kuopio and Seinäjoki) accept wild mammals and birds for diagnosis, and

there are fish disease specialists at the laboratories in Oulo and Kuopio. The Institute plans to have a fish disease laboratory at Turku (Åbo) in the future. The laboratory of Dr. G. BYLUND at the Turku (Åbo) Academy also examines fish for disease. The diagnostic facilities at the Institute are complete and examinations are conducted by veterinary pathologists with formal post-veterinary education. Pathologists from the Department of Pathology often assist Prof. WESTERLING of the Field Unit with the examinations of wildlife specimens.

Information Management - The records of the Pathology Department of the Institute extend back in time to the 1930's and these include records of diseases in wildlife. These records are not indexed and must be searched manually. Diagnostic data have been recorded in a computerized database since 1990. Wildlife records continue to be kept in the records of the Department of Pathology rather than in a separate file in the Field Unit. The original computer filing system is now being modified to make use of the data coding system developed in Norway at the Central Veterinary Laboratory, Oslo. Implementation of this new system is scheduled for 1995. The computer file is indexed and searchable by a variety of criteria. Data kept on file include History/anamnesis, standard diagnostic information, species and geographic location by postal code (nearest community). Diagnostic information is written and retained in either Finnish or Swedish, depending on the language of the submitter of the specimen (Finland is officially a bilingual country with a population that is approximately 6% Swedish-speaking, 94% Finnish-speaking). Some 10 years of diagnostic records are available for diseases of fish at the Turku (Åbo) Academy.

Use of Information - Information about the occurrence of diseases in Finnish wildlife is disseminated through the annual report of the institute, publications in hunting magazines (eg *The Hunter* with editions in Finnish and Swedish) and papers in scientific journals such as the *Finnish Fish and Game Journal* (in English) and the *Finnish Veterinary Journal* (in Finnish). Cooperation between the Field Unit and wildlife biologists and managers has been steadily growing since 1982 and mutual consultation and exchanges of information are now occurring regularly. The Field Unit is consulted on regulatory matters pertaining to wildlife. Some teaching about wildlife diseases is provided to the Veterinary Faculty, which is in an adjacent building. Information on wild animal diseases in Finland is exchanged once or twice each year at meetings of the Nordic section of the Wildlife Disease Association and other meetings of Scandinavian or nordic wildlife disease specialists.

Financial Base - The wildlife work of the Field Unit and the Department of Pathology of the National Veterinary and Food Institute is funded entirely by the Ministry of Agriculture.

COMMENTS

The wildlife surveillance program appears to be comprehensive and effective. In the past, a schism between veterinary and biological wildlife interests resulted in a low level of detection, but this problem seems largely resolved. Wildlife management is split between two federal departments in Finland: game animal management is the responsibility of the Ministry of Agriculture while non-game species are managed by the Ministry of the Environment. This complicates communication and exchanges of information, but the necessary lines of communication are now becoming established. Improvements in the computer program and the entry of data from past years will make epidemiological analyses of wildlife disease data more feasible. The total coordination of the surveillance program and most of the diagnostic pathology is done by the single wildlife specialist of the Field Unit of the Institute. Additional personnel may be required if the surveillance program is to realize its full potential.

PRIMARY CONTACT

Field Unit
National Veterinary and Food Institute

Postal Address:

P.O. Box 368
00101 Helsinki

Street Address:

Hämeentie 57
00580 Helsinki

Tel: (+358) 0 393 101; *FAX: (+358) 0 393 1811*

Attn. Prof. Bengt WESTERLING

SECONDARY CONTACTS:

- Fish Disease Laboratory at the Turku (Åbo) Academy:

Åbo Akademi
Porthansg 3
20500 Åbo 50 Attn. Dr. G. BYLUND

- Rodent epizootiology, Hanta virus data:

Finnish Forest Research Institute
P.O. Box 18
01301 Vantaa Tel: (+358) 0 857 054 77; *FAX:(+358) 0 857 2575*

Attn. Dr. Heikki HENTTONEN

FRANCE

SOURCES OF INFORMATION

Information was gathered through interviews with Drs. Jacques BARRAT and Cécile EICHENLAUB of the Laboratoire d'études sur la rage et la pathologie des animaux sauvages, CNEVA - Nancy and Dr. François MOUTOU of CNEVA - Maisons Alfort (Paris) in October 1993, with Dr. J-P MORISSE of CNEVA - Ploufragan (St Briec) in November 1993 and with Mr. François BIADI of the Office National de la Chasse, St. Benoist (near Paris) in December 1993. Further information was obtained through informal discussions with Dr. Jacques BARRAT throughout the 1993-94 year.

SUMMARY

A national system of surveillance of wild animal diseases was organized in France in 1986 as a cooperative venture among the Office National de la Chasse - l'ONC (national game department), the Centre National d'Etudes Vétérinaires et Alimentaires (CNEVA: national centre for veterinary and food research) laboratory at Malzéville (Nancy), the toxicology laboratory of the Institut National de Recherche Agronomique and the Ecole Nationale Vétérinaire (national veterinary school) at Lyon, the veterinary diagnostic laboratories in each department (county) and the national and departmental federations of hunters. This system of surveillance is named "SAGIR" (loosely derived from "Surveillance Sanitaire Nationale de la Faune Sauvage"). The national database of wildlife disease occurrence information is maintained by Dr. Jacques BARRAT of CNEVA - Nancy. Diseased wild animals are detected primarily by hunters and wildlife officers, and specimens are sent to some 60 of the 89 departmental veterinary laboratories for diagnosis. Toxicological analyses are made at the toxicology laboratory in Lyon. Hunted species are the main focus of the program, but other species are not necessarily excluded. Results of diagnoses are sent to the submitter, the departmental hunter association and to CNEVA-Nancy where they are entered into a computerized database. Quarterly reports are sent to the ONC which redistributes them to departmental hunter associations. Summaries are published every 6 or 12 months in the *Bulletin d'Informations sur la Pathologie des Animaux Sauvages en France - BIPAS* (bulletin of wildlife diseases in France), published by CNEVA -Nancy, and an annual summary is published in the *Bulletin Mensuel de l'Office National de la Chasse* (Monthly Bulletin of the National Game Department) published by the ONC (Paris). This program of wildlife disease surveillance was initiated and is funded by the ONC in order to provide disease information that can be used in wildlife management programs and policies. Current difficulties with the program are at the level of detection and diagnosis. Wildlife management in France is decentralized and largely privatized such that the ONC has only indirect influence on many management decisions. Nonetheless, SAGIR functions effectively within these limits and represents a major source of wildlife disease

information. In addition to SAGIR, there are specific surveillance programs in France for rabies and hog cholera in wild animals. A bank of serum samples from a range of wildlife species is maintained at CNEVA-Nancy. Diagnoses of fish diseases are made at CNEVA - Maisons-Alfort (freshwater) and CNEVA-Brest (marine), although most of this work is confined to aquaculture.

WILDLIFE DISEASE SURVEILLANCE: INFRASTRUCTURE AND FUNCTION

Detection - Hunters and their organizations are the primary group relied upon to detect diseased wildlife. All licensed hunters in France are members of departmental hunter federations which are the groups through which SAGIR seeks the cooperation of hunters. The Office National de la Chasse also employs some 1300 game wardens (gardes de chasse) who are paid by the state but are assigned their work by the departmental hunting federations. The game wardens often serve as the intermediaries between the hunters and the actual submission of specimens to departmental veterinary laboratories. The degree of participation in wildlife disease detection varies greatly among departments. A small number of departments are the source of more than half of the specimens submitted within the SAGIR program while others provide very few or none. In general, the hunter or the hunter federation of the department pays all or part of the fee for diagnostic examinations of the specimens they submit. For this reason, hunters tend to be selective in what specimens they submit. For example, in 1992, only 153 rabbits were submitted (approximately 4,600,000 are killed by french hunters each year) of which only 15 had myxomatosis, a disease that is present at high prevalence throughout France. Hunters feel they can make this diagnosis themselves and do not submit rabbits they suspect have the disease. As a consequence, the magnitude of myxomatosis as a disease of rabbits is not apparent in the SAGIR data. Hunters are also more likely to submit and pay for specimens of hunted species than of non-game or nuisance species. To be included in the SAGIR database, a one-page form must be completed by the submitter at the time of submission of the specimen. A significant number of wild animal specimens are submitted without this form and these are thus lost to the SAGIR system. In 1992, 1485 specimens of small game were submitted in 57 of 95 departments and 753 specimens of ungulates were submitted in 58 of 95 departments. Small game submissions were of hares (74%), rabbits (10%) and 22 species of birds (16%). Ungulates were of five species, of which 55% were Roe Deer and 43 % wild boar. More than 80% of the wild boar were collected in a surveillance program for hog cholera (classical swine fever) in eastern France.

Diagnosis - There are 89 departmental veterinary diagnostic laboratories in France and these are the laboratories where primary diagnostic assessment of wild animals is made in the SAGIR program. Toxicological analyses are made at the toxicology laboratory in Lyon. Results of diagnostic tests are sent to Dr. BARRAT at CNEVA - Nancy. Many of the departmental laboratories have responsibilities for food and environmental hygiene as well as for veterinary diagnosis. Some employ experienced

veterinary diagnosticians but in many, autopsy and diagnostic procedures are carried out by technical staff with or without veterinary supervision. The range of diagnostic procedures available is often quite limited. Final diagnostic interpretation is usually the responsibility of the veterinary practitioner who submitted the samples to the laboratory. These laboratories are funded by the government of the department and not by the federal treasury. Most require a fee for diagnostic examination of wildlife. The fee is sometimes paid by the departmental federation of hunters and may also be partially, or sometimes completely, subsidized by the laboratory. Wild animal disease surveillance benefits from the large number of laboratories, which encourages submission of specimens by minimizing the distance specimens must be transported by the submitter. It suffers from the partial participation and from the diagnostic limitations of these laboratories, particularly with respect to diseases not shared with domestic animals.

Information Management - Currently, all data are retained in coded form in a computerized database at the Laboratoire d'études sur la rage et la pathologie des animaux sauvages (CNEVA - Nancy). The database uses the Paradox® relational database program. The data are extensively cross-indexed and can be searched by all criteria. Data entered include history/anamnesis, environmental data (when available), standard diagnostic information, species and geographic location by commune (readily converted to map coordinates). Diagnostic data are coded using a system of nomenclature developed for domestic animals by CNEVA-Lyon. This system has been found unsatisfactory and conversion to a more satisfactory system is in progress. Data are also retained on paper but are indexed only by accession number. Environmental data are coded according to a classification system for biotopes developed by the Office National de la Chasse. Until 1992, data for small game were retained in a separate database at CNEVA-Maisons Alfort (Paris). Unfortunately, errors in these data were created in the process of storage on magnetic tape and retrieval for transfer to CNEVA - Nancy in 1992. This has resulted in the virtually complete loss of data for small game from 1986-1992. These data must be re-entered and currently exist only on paper. As of 1 June 1994, there were 3627 entries for large game (ungulate) species on the SAGIR database.

Use of Information - Summaries of wildlife disease occurrences are published every 6 or 12 months in the *Bulletin d'Informations sur la Pathologie des Animaux Sauvages en France - BIPAS* (bulletin of wildlife diseases in France), published by CNEVA - Nancy, and an annual summary is published in the *Bulletin Mensuel de l'Office National de la Chasse* (Monthly Bulletin of the National Game Department) published by the ONC (Paris). SAGIR was initiated and is funded by the ONC, in order to provide disease information that can be used in wildlife management programs and policies. Wildlife management in France is decentralized and largely is the work of non-government federations of hunters who work with the prefecture of the department to set hunting regulations. The ONC thus has only indirect influence on many management decisions. However, the influence of the ONC is significant and, through SAGIR, the ONC has made a major effort to inform itself regarding wildlife disease issues in France and

to incorporate this information into its policy deliberations. Information specifically about rabies in France is published monthly by CNEVA - Nancy (*Bulletin Epidémiologique Mensuel de la Rage en France*).

COMMENTS

SAGIR is well organized at the level of management and use of information. In some departments, detection and diagnosis operate very effectively. However, weaknesses in both detection and diagnosis in many departments result in a national surveillance program that is incomplete and data that are not always reliable. It is probably not necessary to have full participation by all departments in SAGIR in order to have comprehensive national surveillance. Intensive programs of detection and diagnosis in representative areas of all major biological and geographic regions would be sufficient, and this is probably a feasible goal for SAGIR.

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GERMANY**SOURCES OF INFORMATION**

Information was gathered by interviews with a large number of research scientists at the Institute of Zoo Biology and Wildlife Research, Berlin 7-9 February 1994 and with Drs. W. LUTZ and M. KRAMER in Bonn 18-19 March 1994.

GENERAL SUMMARY

There is no national program for general surveillance and monitoring of wild animal diseases in Germany. Data on the occurrence of most diseases of wildlife are not available for the country as a whole. The Federal Research Centre for Virus Diseases of Animals maintains a surveillance and control program for rabies in wild foxes and for hog cholera (classical swine fever) in wild boar. The Institute of Epidemiology within this Federal Research Centre is working toward a computer-based national reporting system for disease occurrences and may include occurrences in wild animal species in this new system. The Centre restricts its work to epidemic diseases of major economic and/or zoonotic importance.

In the State (Lande) of Nordrhein-Westfalia (northwestern Germany), the Research Institute for Game Animals and Prevention of Game Damage operates a program of general game animal disease surveillance, but for that State and those species only. No similar programs exist in the other 15 states. Research on wild animal diseases is carried out at a large number of institutions around the country. A national survey for the occurrence of avian botulism has been carried out from Hamburg for some years. The Institute for Zoo Biology and Wildlife Research houses an extensive archive of zoo and wildlife disease information extending back to 1953 and including records for wild animal diseases, particularly in Germany and adjacent eastern European countries. While these records do not arise from surveillance activities, they nonetheless include important information on historical and current occurrences.

WILDLIFE DISEASE SURVEILLANCE: INFRASTRUCTURE AND FUNCTION**A. Research Institute for Game Animals (Nordrhein-Westfalia):**

The Institute's program of wild animal disease surveillance is directed by Dr. Walburga LUTZ.

Detection - Hunters are responsible for detection of sick or dead animals. Hunters are highly organized and are required, as part of their permit to hunt, to make a variety of biological observations, including the occurrence of disease. Hunters may bring specimens to any one of four State-operated veterinary diagnostic laboratories for diagnosis (locations at Krefeld, Münster, Arnsberg and Detmold). Only game animal species - ungulates, upland game birds and mallard ducks, hares, rabbits, carnivores and

raptorial birds (recognized in law as "game" but also protected) - are examined in this program. Persons who submit non-game species must pay for the diagnosis personally, and this is seldom done. Between 200 and 600 game animals are submitted for examination annually.

Diagnosis - Laboratories are generally well-equipped. German veterinary pathologists are accredited by rigorous criteria including five years of experience as a practicing pathologist, an examination and two scientific publications. To aid their interpretations, the pathologists have access to advice from the director of this surveillance program, Dr. Walburga Lutz, with respect to game animal biology and diseases peculiar to wildlife.

Information Management - Copies of all diagnostic reports for examinations of game animal species are sent to Dr. Lutz at the Institute by the veterinary laboratories. Information collected by the Institute for each specimen includes standard diagnostic information, species (by German common name) and geographic location by designated hunting area (often these are the same as the "commune" or township). Anamnesis/history and field data are not included, although these may be received and retained by the veterinary laboratory. The data are not computerized but are retained in files on paper and are summarized annually. Records are available from 1953 to the present. The records themselves are not indexed. Extracting information that is not available in the annual summaries requires a record-by-record manual search. Publications of the Institute itself include an annual summary of disease occurrence information published in long form and in summary form for use in popular publications such as hunting journals. Special reports on disease problems are published from time to time when warranted. All publications are in German. The usual journal for scientific publications is *Zeitschrift für Jagdwissenschaft*

Use of Information - This aspect was not fully explored. The Institute plays an important role in advising government on game management policies.

Financial Base - This Institute is a State institute. It's budget is a fixed percentage of the hunting permit fees paid by hunters in the State.

B. Institute of Epidemiology (Wusterhausen) (of the Federal Research Centre for Virus Diseases of Animals). At this Institute, Dr. Matthias KRAMER has taken a particular interest in wild animal disease data.

Detection - Data are gathered for specific diseases in specific regions of Germany as needed. Currently there are surveys for hog cholera in wild boar in Lower Saxony and Pomerania, for example. A variety of groups, particularly hunters, are recruited into detection work for these epidemic-driven surveys. These surveys are always for one or a few pre-identified diseases and may involve samples of dead or killed animals or sera.

Surveys of roe deer and wild boar for bacterial, viral and toxicological diseases are being undertaken in cooperation with the State of Brandenburg from 1991-1996. The national rabies program is also the work of the Federal Research Centre for Virus Diseases of Animals, but is based at the Centre's headquarters in Tübingen. Rabies is the subject of the only national surveillance program for a wild animal disease.

Diagnosis - A variety of general and specialist federal or state veterinary laboratories are used as needed.

Information Management - Epidemiological analysis is the fundamental expertise of the Institute, which includes eight epidemiologists. Mapping and forecasting of epidemics and analysis with respect to demographic and socio-economic data are its major focus.

Use of Information - The work of the Institute is always associated with government policies of prevention and control of animal diseases.

Financial Base - This is a Federal Institute. Some projects are funded jointly by Federal and State funds.

C. Institute for Zoo Biology and Wildlife Research (Berlin)

This is a research institute. It does not do systematic regional surveillance of wild animal diseases. However, it contains a large pathology department and complete capabilities in post mortem diagnosis that are often used for wild animal specimens. No fees are charged for this diagnostic work. In fact, the Institute pays for many of the specimens it receives since these are specifically requested and are received as research material. In addition, the Institute houses an impressive archive of reports and specimens of diseases in zoo and wild animals. The wild animal component is largely from the Berlin region but specimens from many different areas of Europe are included. The collection was begun in 1953 and now contains in excess of 40,000 accessions. These include diagnostic reports, histological slides and tissues blocks. There are, in addition, tissues in formalin for the most recent ten years and 10,000 kodachrome slides. The material is cross-indexed by species, disease, pathology and a number of other criteria. The current system of punch-card indexing is being converted to a computerized index. This collection is unmatched in Europe as an historical archive of disease occurrence information and specimens, and is the work, above all, of Dr. Rudolf Ippen, former Director of the Institute and Head of Pathology..

The Institute conducts research on both wild and zoo animal diseases, with departments of Pathology, Parasitology, Microbiology (viruses and *Salmonella*) Comparative Reproduction, and Anatomy.

Financial Base - Half of the budget is provided by the Federal government and half by the State of Berlin.

COMMENTS

Veterinary diagnostic services in Germany are organized independently and differently in each of the 16 States. States have both State-operated laboratories and large private diagnostic laboratories owned and operated by farming organizations. Federal activity in this regard is limited to veterinary services relevant to international trade and relations or problems of national scope, such as major epidemics. There are 5 veterinary colleges, 5 wildlife research institutes, and at least 40 veterinary diagnostic laboratories where wild animal specimens might be examined. In only four laboratories in one State are examinations of wild animals done routinely and are paid for by public funds; elsewhere the submitter must pay, which greatly limits the submission of specimens.

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SOURCES OF INFORMATION

Information was obtained by correspondence with Dr. Elias TSAGLAS, Animal Health Directorate, Athens.

SUMMARY

A program of wild animal disease surveillance was established in Greece in 1983, particularly along the northeastern border adjacent to areas outside of Greece where rabies, foot and mouth disease and rinderpest are endemic. The program is oriented toward detection of these important epizootic diseases as well as echinococcosis. Samples from wild animals killed by hunters or found dead are examined in regional state veterinary diagnostic laboratories for these specific diseases. The program involves collaboration among hunters, the Forestry Services and the Veterinary Services (both services are within the Ministry of Agriculture). Data are collated by the Zoonosis Section of the Animal Health Directorate in Athens. Over the past ten years, 580 wolves, 1260 foxes, 954 jackals, 127 wild boar and 26 deer have been examined in this surveillance program (and were found negative for the above-mentioned diseases). The Veterinary Faculty of the University of Thessaloniki carries out some diagnostic examinations of wild animals also. There is a special laboratory for the diagnosis of fish diseases in the Central Veterinary Institute in Athens.

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SOURCES OF INFORMATION

All information was received through correspondence with Drs. V. SZTOJKOV (Department of Game Pathology) and Erzsébet SÁGHY (Department of Virology) of the Central Veterinary Institute, Budapest, with Dr. László SUGÁR of Pannon Agricultural University and with Dr. Imre ÁKOSHEGYI of the Wildlife Biology Station, Gödöllő.

SUMMARY

Surveillance for diseases in wild animals, including fish, has been coordinated since 1977 by the Central Veterinary Institute (Ministry of Agriculture) in Budapest. Detection of diseased wildlife currently is done primarily by hunters, anglers, and land owners who must pay for most diagnostic examinations of the specimens they submit. The majority of diagnostic examinations are made at the Central Veterinary Institute by the Department of Game Pathology or the Department of Fish and Bee Diseases. Special surveillance programs for important infectious diseases such as rabies, hog cholera, viral hemorrhagic diseases of rabbits and hares, blue tongue, duck plague, etc. also are coordinated by the Central Veterinary Institute, and these often involve wild animal species. No fee is charged for diagnostic examinations of wildlife specimens considered to be part of these special surveys. The Central Veterinary Institute has specialized laboratories for diagnosis of diseases of all kinds, infectious and non-infectious. Records are kept of all diagnoses and have been computerized since 1984.. An annual summary was prepared each year from 1977 to 1984.

WILDLIFE DISEASE SURVEILLANCE: INFRASTRUCTURE AND FUNCTION

Detection - Detection of diseased wildlife currently is done primarily by hunters and land owners who must pay for most of diagnostic examinations of the specimens they submit. Prior to 1989, there was no fee for such examinations. From 1989 to 1993, the average number specimens submitted and examined each year was 4200 birds, 1100 foxes (rabies surveillance), 174 wild boar and 720 other mammals. Since 1993, blood samples from wild boar have been examined intensively: about 2000 per year. Examinations of fish kills are paid for by the Ministry of Agriculture. Otherwise examinations of fish are paid for by local water authorities, angler clubs or fishery corporations. About 200-300 wild fish are examined each year.

Diagnosis - The majority of diagnostic examinations are made at the Central Veterinary Institute by the Department of Game Pathology. However, there are five regional veterinary diagnostic laboratories at Szombathely, Kaposvár, Békéscsaba,

Debrecen, and Miskolc that also accept wild animal specimens. These regional institutes collaborate closely with the Central Veterinary Institute in this wildlife work. When mortality incidents are detected that involve large numbers of animals, the Department of Game Pathology undertakes field investigations. Special surveillance programs for important infectious diseases such as rabies, hog cholera, viral hemorrhagic diseases of rabbits and hares, blue tongue, duck plague, etc. also are coordinated by the Central Veterinary Institute, and these often involve wild animal species. No fee is charged for diagnostic examinations of wildlife specimens considered to be part of these special surveys. The Central Veterinary Institute has specialized laboratories for diagnosis of diseases of all kinds, infectious and non-infectious. Diagnostic examinations of wild fish are carried out by the Department of Fish and Bee Diseases of the Central Veterinary Institute.

Information Management - Records are kept of all diagnoses. A complete annual summary was prepared each year from 1977 to 1984. Records were computerized in 1984. Computerized data can be searched by disease, host species, submitter and geographic location. A new computer system is being developed and will be implemented in 1995. All records and reports are in Hungarian.

COMMENTS

The Central Veterinary Institute was founded in 1928 and was directed from that date to 1943 by Professor Rezö MANNINGER. The Institute became particularly active in wild animal disease surveillance in 1977 with the establishment of the Department of Game Pathology. Prior to this, a wildlife disease laboratory had been established in Budapest in the 1960's and was expanded into the Game Biology Research Station at the end of 1971. The majority of diagnostic examinations of wildlife were done at this Research Station in the 1970's. This activity ceased at the end of that decade when the Station was moved to the University of Agricultural Sciences at Gödöllő, although some wild animal disease research (lead poisoning in birds, parasites of wild boar) continues to be conducted at this institute now called the Wildlife Biology Station. The Central Veterinary Institute has been the coordinating institution for wild animal disease surveillance for the past 15 years.

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ICELAND

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**IRELAND
(EIRE)**SOURCES OF INFORMATION

Information was gathered during interviews with Dr. Michael SHERIDAN and Margaret GOOD, Department of Agriculture, Food and Forestry, Dublin, on 9 March 1994, and through correspondence with Dr. E. WEAVERS (Veterinary Research Laboratory, Dublin), Prof. Brian SHEAHAN (Dept. of Veterinary Pathology, University College Dublin), Mr. John McARDLE and Dr. Francis SCULLION (Fisheries Research Centre, Dublin), and Prof. Máire MULCAHY and Dr. Paddy SLEEMAN (Dept. of Zoology, University College Cork).

SUMMARY

There is no national or regional program of general wildlife disease surveillance in Ireland. A suitable infrastructure for such a system exists, and some relevant data are generated each year. However, there is no organized program for detection of diseases in wildlife and there is no system of information management or analysis for the data currently available. There is a well-coordinated program for surveillance of bovine tuberculosis in both wild and domestic animals, focussed particularly on the badger. A national registry of pathology of aquatic animals in Ireland has been proposed but is not, as yet, organized.

WILDLIFE DISEASE SURVEILLANCE: INFRASTRUCTURE AND FUNCTION

Detection - Anyone in Ireland may submit wild animal specimens for diagnosis and in most cases these diagnostic examinations will be done without charge to the submitter. However, there does not appear to be any organized program for the detection of diseased wildlife. On the other hand, there is concerted action to find and submit badgers for diagnostic examination, coordinated between the veterinary service of the Department of Agriculture, Food and Forestry and the wildlife service of the Department of the Environment. From time to time, specific investigations have been undertaken due to public or official concern over wildlife mortality. At present, the six state-run veterinary diagnostic laboratories examine annually 100-500 wild animal specimens for general diagnosis and an additional 2,000 badgers for tuberculosis as well as for other diseases.

Diagnosis - There are five regional state-run diagnostic laboratories located at Athlone, Cork, Kilkenny, Limerick, and Sligo, and a central diagnostic laboratory (the Veterinary Research Laboratory) in Dublin. The Department of Veterinary Pathology, University College Dublin also has a diagnostic laboratory. These all accept wild animal specimens for examination. Veterinary pathologists at the state-owned laboratories generally have received their post-veterinary education in diagnostic pathology through apprenticeship. The Department of the Marine operates a Fisheries Research Centre in

Dublin which includes veterinary diagnostic laboratories for marine fish and invertebrates, including wild species. Additional diagnostic examinations and disease research in wild fish, marine invertebrates, farmed fish and shellfish, and on marine mammals is carried out at the Department of Zoology, University College Cork. BioResearch Ireland provides a fish disease diagnostic service at University College Galway.

Information Management - The diagnostic records of the various diagnostic laboratories are maintained entirely independently of each other. There is no uniformity in method of filing of information nor in the format of computerization where computerization exists. Only very general summaries of diagnostic findings in wildlife are exchanged among laboratories or published in the combined annual reports of the Veterinary Laboratory Service. There is no national database of general wildlife disease information. The computerized records of the Fisheries Research Centre represent a significant, though partial, national database of diseases in wild fish. All data on bovine tuberculosis in wild animals are assembled in a central computerized database in the Department of Agriculture, Food and Forestry in Dublin as part of a major program of surveillance and research aimed at eventual eradication of the disease (a joint project with Tuberculosis Investigation Unit, University College Dublin). The database includes some 10,000 records.

Use of Information - With the exception of the data on tuberculosis, data on wild animal diseases generally are not available for use in framing wildlife management or other policies.

COMMENTS

A program of general wild animal disease surveillance could readily be built on the existing infrastructure in Ireland. Organization and publicity to enhance detection and a national database of wildlife disease occurrence information are the principle elements to be added to the existing system. The surveillance program regarding tuberculosis in badgers and other wild species has forged the necessary relationships between the veterinary and wildlife services upon which a program of general wildlife disease surveillance would depend.

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SOURCES OF INFORMATION

Initial contact was made via letter to Dr A. LAVAZZA (Brescia). I visited Drs. ROSSI and BALBO at the veterinary faculty in Turin (16-18 February 1994) and also was taken to meet the personnel of a regional park (Parco Naturale Argentera) and of a regional veterinary laboratory (Drs. PISTONE and GENNERO, Istituto Zooprofilattico Sperimentale del Piemonte Liguria e Valle d'Aosta, Turin)

GENERAL SUMMARY

Surveillance of wild animal diseases is not organized on a national scale nor undertaken systematically except for specific diseases, such as rabies, for which there is a coordinated national program. However, there is considerable interest in wild animal diseases in academic and government institutions and a great deal of information is both created and applied in wildlife management. A veterinary epidemiologist is employed in the National Wildlife Institute (Istituto Nazionale della Fauna Selvatica); Gran Paradiso National Park has a veterinarian on staff and positions for four veterinarians were recently created by the Ministry of Agriculture to work within other national preserves. Approximately 160 veterinarians and wildlife management personnel are organized as the Italian Society for Wildlife Ecopathology ("Società Italiana di Ecopatologia della Fauna"; 'ecopathology' , as used here, is the study of wildlife diseases in the context of epidemiology and population biology) which holds scientific meetings, offers short courses on wildlife disease topics and will soon publish a newsletter. The aggregate of on-going research by these people and the degree of communication among them constitute a certain level of wildlife disease surveillance. There is also an extensive system of veterinary diagnostic laboratories in Italy. There are ten regional veterinary laboratories, each of which serves as a centre of reference and special diagnostic services for the smaller provincial diagnostic laboratories in the local region. All these laboratories accept wild animal specimens, including fish, and there is no cost to the submitter for these examinations. In the main, however, wild animals are examined for rabies or one or two other specific diseases, and additional diagnostic tests often are not done. There is no national reporting system for the diagnostic findings of these laboratories except for diseases for which national statistics are required by international agreements. Computerization of the records of these laboratories is only just beginning (1991). Italy has two international reference laboratories for wild animal diseases: Istituto Superiore Sanità in Rome is the WHO reference centre for *Trichinella* and trichinosis; Istituto Zooprofilattico Sperimentale in Brescia is the OIE reference laboratory for Rabbit Viral Hemorrhagic Disease and European Brown Hare Syndrome (hemorrhagic diseases of lagomorphs).

WILDLIFE DISEASE SURVEILLANCE: INFRASTRUCTURE AND FUNCTION

Detection - Anyone may submit wildlife specimens to Italian veterinary laboratories without cost to themselves. However, hunters and wildlife management personnel are the principle participants in the detection of sick or dead animals. Hunters are expected to submit animals found dead both for pathological study and to show that they were not killed illegally. I did not determine whether there are specific programs or campaigns to urge hunters to make such submissions for purposes of general disease surveillance. Such programs do exist in areas where rabies occurs (north and east) and hunters and wildlife officers are active participants in both detection and vaccination (foxes) for rabies. There are many veterinary laboratories, so that nearness to a laboratory is not a problem for submission of specimens. The regional veterinary laboratory in Turin receives 700-800 wildlife specimens each year.

Diagnosis - The provincial and regional veterinary diagnostic laboratories are oriented toward diagnosis of recognized diseases in domestic farm animals. Tests and diagnostic expertise for these diseases are well-developed; however, general *post mortem* diagnosis is less so. Veterinary diagnosticians generally learn their skills on the job rather than through specialist training programs. Apprenticeship, by working with experienced senior colleagues is sometimes possible, but for many, diagnostic skills are self-taught. Histopathology generally is not done by the diagnostic laboratories but is referred to pathologists at some of the 13 veterinary colleges if it is thought to be necessary. Wild animal specimens are examined primarily for rabies. Hares are examined for European Brown Hare Syndrome. Further examinations may be carried out but many wild animal specimens are examined for these specific diseases only. Most wild animal specimens received by provincial laboratories are re-submitted to the regional laboratory for examination, but some are examined at the level of the provincial laboratory.

Information Management - Diagnostic information is reviewed and summarized by each regional diagnostic laboratory. These summaries include data from the provincial laboratories within the region. Diagnostic data prior to 1991 exist only on paper. Computerization is underway but is not uniform or coordinated among laboratories. There is no national system for gathering or analyzing data on the occurrence of wild animal diseases. Annual reports that summarize diagnostic findings for the year are prepared by each regional laboratory in February and are exchanged among regional laboratories as well as being sent to the chief veterinary officer in Rome.

Use of Information - Since there is no general surveillance program, there are no surveillance data *per se* to be made use of. On the other hand, people with specific expertise in wild animal diseases are strategically placed in the National Wildlife Institute, in parks and preserves, in diagnostic laboratories and in veterinary faculties such that the incorporation of wildlife disease issues and concerns in the evolution of wildlife management policies seems quite likely. The activities of the Italian Society for Wildlife Ecopathology serves, to some extent, to inform decision makers regarding wildlife health

issues. There are a number of cooperative projects in wildlife research and management between disease specialists and wildlife biologists.

COMMENTS

Many of the elements of an effective system of wild animal disease surveillance are in place in Italy: a cadre of field personnel who deliver specimens to diagnostic laboratories, a sufficient number of diagnostic laboratories, veterinarians as part of the wildlife management personnel in several parks, reserves and in the key national wildlife institute, and an organization of scientists and wildlife management personnel interested in wildlife diseases that is very active. Weaknesses are evident at the level of diagnosis and information management. While the veterinary diagnostic laboratories accept wild animal specimens in considerable numbers, wildlife is not their principle mandate and many specimens are examined only for rabies or a small number of other diseases. Thus, many diseases are not diagnosed even though the specimens are available. The absence of rigorously trained veterinary pathologists in many of these laboratories limits the probability that new or unusual diseases will be identified. Surveillance and knowledge of certain specified diseases is considerable, however: for example the diseases monitored by the diagnostic laboratories such as rabies and EBHS, and the diseases subjected to specific surveys and studies by the parks, reserves and veterinary faculties.

PRIMARY CONTACTS

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Dr. Lucca ROSSI*
Associate Professor

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* Veterinary parasitologists, particularly of mountain ungulates; well connected with wild animal disease work carried out in Italy.

Dr. Vittorio GUBERTI*
Istituto Nazionale della Fauna Selvatica
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40064 Ozzano Emilia (BO)

*Veterinary epidemiologist in the National Wildlife Institute

SECONDARY CONTACTS

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* Veterinary pathologist in central
Italy working with wild animal
diseases

Instituto Superiore de Sanità Tel: (+39) 06 4990; FAX (+39) 06 444 0077
Laboratorio di Medicina Veterinaria
Viale Regina Elena, 299
00161 Roma

Attn. Dr. Umberto AGRIMI - Rabies Program

Attn. Dr. Edoardo POZIO - WHO reference centre for Trichinosis

SOURCES OF INFORMATION

Information was received by correspondence with Dr. V. GRAPMANIS of the State Veterinary Department.

SUMMARY

While there is no formal program of general wild animal disease surveillance, the State Veterinary Department regularly examines wild animal species, particularly carnivores for rabies and wild boar for trichinosis. The forested regions of Latvia (41% or 26,570 Km²) have quite dense populations of wild animals; estimates include 12 wild boar, 39 roe deer, 11 red deer, 12 hare and 8 beaver per 10 km², for example. From 1987 to 1993, 1,118 wild animals were examined in the context of surveillance for rabies. Approximately 12,000-14,000 wild boar are killed by hunters each year, of which 10-70% are examined for trichinosis. Hog cholera was identified in wild boar in 1992.

CONTACT

State Veterinary Department

Republikas laukums 2

LV - 1981 Riga

Tel: (+371) 2 325 446; FAX: (+371) 9 340 630

Attn. Dr. Victor GRAPMANIS, Deputy Director

SOURCES OF INFORMATION

All information was received by correspondence with Dr. K. LUKAUSKAS, Director of the State Veterinary Service.

SUMMARY

There is no program of general surveillance of wild animal diseases in Lithuania. However, wild animals are examined by the State Veterinary Service, particularly for rabies but also for other diseases. Data on the occurrence of rabies is summarized three times a year by the State Veterinary Service.

CONTACTS

State Veterinary Service
Gedimino pr. 19
2025 Vilnius Tel.: (+370) 2 623 513; *FAX: (+370) 2 620 750*

Attn. Dr. K. LUKAUSKAS - Director

- Diagnostic Laboratory

State Veterinary Laboratory
Moleton Plantas 36
2901 Vilnius

LUXEMBOURGSOURCES OF INFORMATION

Information was gathered during interviews with Drs. Serge LOSCH et Joseph SCHON of the Veterinary Medical Laboratory, Luxembourg, on 9 February 1994, and through them, also, information was received from Dr. George THEVES.

SUMMARY

There is no formal program of general surveillance for wild animal diseases but the State Veterinary Medical Laboratory undertakes diagnostic examination of any wild animal specimens presented to it. There is no charge to the submitter for such examinations unless toxicological or specific virological (e.g. foot and mouth disease) analyses are required; these must be paid for. There is a regular surveillance program for rabies in red foxes and other species in association with campaigns of oral vaccination of foxes which recently have occurred twice each year until 1994 when a single campaign in the fall is planned. Subsequent campaigns will be planned as needed. Foxes are examined for rabies and vaccine marker and, up to 1994, they were also examined for trichinosis and echinococcosis. About 100 foxes are examined during each campaign. No historical records of diagnoses are kept by the laboratory or elsewhere in the State veterinary services. Diagnostic reports are retained for one year and are then discarded. Computerization of diagnostic information is possible in the future; currently, all records are on paper. Records include standard diagnostic information, species, and geographic location by numbered hunting area or nearest town. Records are in French (the administrative language of Luxembourg) as are all annual reports and summaries. Hunting occurs only during a few short periods of the year. Detection of diseased wild animals is most often done by wildlife management personnel or the general public.

CONTACTS

State Veterinary Medical Laboratory
B. P. 2081
L - 1020 Luxembourg
(54, Avenue Gaston Diderich, L-1420 Luxembourg)

Tel: (+352) 478 2544, FAX: (+352) 25 05 32

Attn. Dr. Joseph SCHON or Dr. Serge LOSCH or Dr. George THEVES

MACEDONIA / MALTA

MACEDONIA (EX YUGOSLAVIA)

No information was received from Macedonia - ex Yugoslavia. The address listed for the Chief Veterinary Officer is the following:

Director of Veterinary Services
Ministry of Agriculture, Forests and Waters
Skopje

Attn: Dr. Mazhar ZILJA

MALTA

No information was received from Malta. The address listed for the Chief Veterinary Officer is the following:

Principle Veterinary Surgeon
Veterinary Service
Department of Agriculture and Fisheries
Barriera Wharf, Marsa

Attn: Dr. C. L. VELLA

THE NETHERLANDSSOURCES OF INFORMATION

Considerable information was received through correspondence with Dr. P. ZWART (Formerly of the Department of Exotic Animal Pathology, University of Utrecht), Dr. T. KUIKEN (experience at several veterinary institutions), Dr. C.C.J.M. VAN DER MEIJS (Director of Veterinary Services, Ministry of Agriculture, Nature Management and Fisheries) and Dr. E.A. TER LAAK (Institute for Animal Science and Health, formerly the Central Veterinary Institute, Lelystad). I visited and interviewed Dr. J.T. LUMEIJ (Division of Avian and Exotic Animal Medicine, University of Utrecht) in Utrecht, 26 October 1993 and Dr. P ZWART in Bunnik on 27 October 1993.

SUMMARY

There is no current program for the surveillance of wild animal diseases in the Netherlands. Neither private, state nor university laboratories receive wildlife specimens on a regular basis for the purposes of general surveillance. There is no organized system for detection or diagnosis, and no system whatever for information management.

Between 1975 and 1992, there was a well-organized and highly effective program for surveillance of diseases in wild birds, a project of the Central Veterinary Institute, which is the state veterinary laboratory for the Netherlands (now re-organized as part of the new Institute for Animal Science and Health) together with four other institutes and with a large contribution from private individuals. As of September 1988, 15,236 wild birds had been examined for cause of death by this program, and the results had lead to revised regulations on pesticide use and a national perspective on important diseases such as avian botulism and avian cholera¹. From 1960 to about 1975, there was a division of wildlife diseases at the Institute for Forestry and Nature Research in Arnhem. Many specimens from this Institute were examined at the veterinary faculty by Dr. ZWART together with Dr. VAN HAAFTEN from the Institute. In principle, the records from this work and those from the wild bird mortality survey of the Central Veterinary Institute (the latter having been computerized using the Oracle® program) are still available for review. The Netherlands has no system of government-operated veterinary diagnostic laboratories. The Institute for Animal Science and Health provides special diagnostic services such as for rabies and also for fish of economic importance, whether farmed or wild. Routine veterinary diagnostic services are provided by four laboratories owned and operated by a private organization of agribusiness groups and coordinated through a

central office in The Hague. (This organization is changing. State subsidies of 50% are declining and the system may soon be contracted to three laboratories with the central office located in one of them.) There is no coordinated system of computerized records among these laboratories. Each may occasionally examine wild animal specimens but this information is lost to any national perspective. There is some interest in centralizing wild animal diagnosis in the veterinary faculty in Utrecht, but the funds necessary for such a project may be difficult to obtain. There is movement toward privatization of many veterinary services in the Netherlands, and wildlife management itself is largely privatized through allocation of responsibility for much routine wildlife management to hunters.

¹ See: Wild Bird Mortality in the Netherlands, 1975-1989. This is a compilation of papers by the Working Group on Wild Bird Mortality and the Netherlands Society for the Protection of Birds. ISBN 90-71473-02-3. It was published in 1990 by the former Central Veterinary Institute, now the Institute for Animal Science and Health, P.O. Box 65, NL-8200 Lelystad, The Netherlands

COMMENTS

While general surveillance of wild animal diseases does not currently exist in the Netherlands, there is nonetheless considerable scientific interest and expertise in wild animal disease research. The loose network of these scientists constitutes the best source of information regarding wild animal diseases in the Netherlands.

CONTACTS

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- General Information: Attn. Dr. H.J. OVER or Dr. Ed A. TER LAAK
- Avian Botulism: Attn. Dr. J. HAAGSMA
- Wild Animal Toxicology: Attn: Mr. P.E.F. ZOUN
- Rabies: Attn. Prof. Dr. J. VAN OIRSCHOT
- Fish Diseases (wild and aquaculture): Attn. Dr. O.L.M. HAENEN

Faculty of Veterinary Medicine
 University of Utrecht
 P.O. Box 80.154
 NL - 3508 TD Utrecht
 The Netherlands

- General information about wildlife diseases and related studies in the Netherlands:

Attn: Dr. J.T. LUMEIJ, Head, Division of Avian and Exotic Animal Medicine
 Tel: (+31) 30 531 800 FAX: (+31) 30 518 126

- Current and historical data on wildlife diagnoses made at the veterinary faculty:

Attn: Prof. J. E. VAN DIJK, Head, Department of Exotic Animal Pathology
 Tel: (+31) 30 534 364 FAX: (+31) 30 516 853

Prof. P. ZWART (Dr. Zwart was head of the Dept. of Exotic Animal
 Burg. v.d. Weijerstraat 16 Pathology, Veterinary Faculty, University of Utrecht,
 NL - 3981 EK Bunnik until his retirement and remains active in zoo and wildlife
 The Netherlands disease work)

Tel: (+31) 34 05 61644; FAX: (+31) 34 67262

Foundation for Animal Health Care (Central office for the organization of
 Prinsenvinkenpark 24 privately-owned veterinary diagnostic
 NL-2585 HL The Hague laboratories : "*Stichting Gezondheidszorg
 voor Dieren*")

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**NORWAY
(Including Svalbard)****SOURCES OF INFORMATION**

All information was gathered during a visit to the Central Veterinary Laboratory, Oslo, on 11-12 January 1994, particularly through interviews with Dr. Gudbrand STUVE.

SUMMARY

A comprehensive national program of wild animal disease surveillance is coordinated by the Section for Wildlife Diseases of the Central Veterinary Laboratory (Department of Agriculture) in Oslo. This Section was established and directed by Dr. G. HOLT until his retirement in 1991. Dr. Gudbrand STUVE is currently head of this Section and is the coordinator of the program. Specimens of wildlife are examined without charge at the Central Veterinary Laboratory or at any of four regional veterinary laboratories. Submission of specimens is facilitated by a network of wildlife management offices and personnel (Department of the Environment) at county and community levels. Records of disease occurrences are maintained on paper from 1960 to the present, and, since 1985, also are maintained on a computer. Records of some 30,000 diagnostic examinations are on file. The Toxicology Section of the Central Veterinary Laboratory has an archive of frozen organs (liver, kidney) from wildlife, mostly from raptorial birds, that dates from 1975 and contains approximately 10,000 specimens. An archive of serum samples is currently being organized between the Central Veterinary Laboratory, the Norwegian Institute for Nature Research (Trondheim) and the Tromsø Centre of Veterinary Medicine (a research institute focussed on aquaculture, reindeer and wildlife). There is close communication between the Wildlife Disease Section and wildlife management personnel. A separate Section for diseases of fish in the Central Veterinary Laboratory accepts specimens of wild fish for diagnosis.

WILDLIFE DISEASE SURVEILLANCE: INFRASTRUCTURE AND FUNCTION

Detection - Many people contribute to the work of detecting disease in wildlife and submitting specimens for diagnosis. Wildlife Management Boards exist at the level of counties and municipalities. In cooperation with conservationists, hunters, nature enthusiasts and local veterinarians, they encourage submission of specimens for diagnostic investigation. There is no fee for examination of wild animal specimens which might deter specimen submission. Between 500 and 1000 specimens of wild mammals and birds are submitted each year. Animals from zoos and game farms (very few in Norway) are also examined by the Central Veterinary Laboratory. In addition, there is close cooperation and communication with other institutes working on aspects of wildlife diseases. This includes the Norwegian Institute for Nature Research, which has projects on wildlife toxicology and pollution. There is also cooperation with public health authorities regarding zoonotic diseases.

Diagnosis - Autopsies are carried out in well-equipped laboratories by personnel with formal post-veterinary education in diagnostic veterinary pathology. Most diagnostic examinations (95%) are done in the Wildlife Disease Section of the Central Veterinary Laboratory by Dr. STUVE. Wild fish are examined in the Fish Disease Section. A variety of special diagnostic laboratories are available within the Central Veterinary Laboratory, with particular strengths in toxicology, microbiology and immunohistochemistry. Regional laboratories at Sandnes, Bergen, Trondheim and Harstad also carry out diagnostic examinations of wildlife and use the Central Veterinary Laboratory as a reference laboratory. The regional laboratories and the Central Veterinary Laboratory together constitute the State Veterinary Laboratories which function under a single director (currently Dr. B. NÆSS). The Toxicology Section of the Central Veterinary Laboratory has an archive of frozen organs (liver, kidney) from wildlife, mostly from raptorial birds, that dates from 1975 and contains approximately 10,000 specimens. An archive of serum samples is currently being organized between the Central Veterinary Laboratory, the Norwegian Institute for Nature Research (Trondheim) and the Tromsø Centre of Veterinary Medicine. Thus, retrospective diagnostic analyses in toxicology and serology are possible.

Information Management - The Wildlife Disease Section maintains records of all diagnoses of diseases in wildlife, including those made at regional laboratories. All records are in Norwegian. Records on paper begin in 1960, when the Section for Wildlife Diseases was created, while records maintained on a computer begin in 1985. Records of some 30,000 diagnostic examinations are on file. Some records of wild animal diseases prior to 1960 also are present in the general diagnostic records of the Central Veterinary Laboratory which date back to its establishment in 1891. Data retained in the records include history/anamnesis (paper records only), standard diagnostic information, species, and geographic location by postal code (nearest community). Records on paper are indexed by accession number but are not cross indexed by other criteria such as species or disease. The data filed on computer are coded using a system of codes developed by the Central Veterinary Laboratory for domestic animals. Data can be searched by species and disease. The State Veterinary Laboratories are currently working to upgrade the computer system used for recording data for both domestic animals and wildlife.

Use of Information - Occurrences of wild animal diseases are summarized each year in the annual report of the Central Veterinary Laboratory. Items are also written for two newsletters published by the Institute: *4 V* - published four times each year and aimed at the general public, and *V V News* - a monthly veterinary newsletter (VESO, Postboks 8109 dep, N - 0032 Oslo). Articles also are written for hunting journals and presentations are made to a variety of nature-oriented groups. There are formal and informal exchanges of information with wildlife management personnel, and the Wildlife Disease Section is consulted on management issues relating to diseases. Information on wild animal diseases in Norway is exchanged once or twice each year at meetings of the Nordic section of the Wildlife Disease Association and other meetings of Scandinavian

or nordic wildlife disease specialists. Some teaching about wildlife diseases is provided to the Veterinary Faculty, which is in an adjacent building.

Financial Base - The wildlife disease surveillance work of the Central Veterinary Laboratory is funded entirely by the Department of Agriculture

COMMENTS

The wildlife disease surveillance program in Norway is comprehensive and well-organized. It has a considerable historical database which includes both written information and tissue samples suited to retrospective analyses. Computerization of more of the database will be required before significant epidemiological analyses can readily be undertaken. The program rests too heavily on the work of the single veterinary pathologist who heads the Wildlife Disease Section and requires additional personnel to realize its full potential.

CONTACTS

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Tel: (+47) 2 296 4500;

Street address:

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N - 0033 Oslo (Oslo 4)
FAX: (+47) 2 246 0034

- General Information on Wild Animal Diseases, and for additional contacts:

Attn. Dr. Gudbrand STUVE

- Information on Fish Diseases

Attn. Dr. Tore HÅSTEIN

SOURCES OF INFORMATION

Information was received by correspondence with Prof. J. DRÓZDŹ of the W. Stekański Institute of Parasitology of the Polish Academy of Sciences, Warsaw.

SUMMARY

There is no program of general wildlife disease surveillance in Poland. General national surveillance of diseases of veterinary importance includes surveillance for rabies and hog cholera (classical swine fever) in wild animals. There is a veterinary diagnostic laboratory in each of the 49 departments of Poland and these carry out general diagnostic examinations which may include wild animal species. The scientific direction of these laboratories resides in the Veterinary Institute of Puławy while overall direction for national veterinary disease surveillance and centralization of data reside in the Veterinary Department, Ministry of Agriculture and Food Economy, Warsaw. There are four faculties of veterinary medicine in Poland, at Warsaw, Lublin, Olsztyn, and Wrocław. The one most active in wild animal disease studies is in Warsaw.

CONTACTS

- National Veterinary Disease Surveillance Programs:

Veterinary Department
Ministry of Agriculture and Food Economy
ul. Wspólna 30
00 - 930 Warszawa Tel: (+48) 22 628 8511; FAX: (+48) 22 623 2750

- System of Departmental Veterinary Diagnostic Laboratories

Veterinary Institute of Puławy
ul. Partyzantów 57
24 - 100 Puławy

PORTUGAL**SOURCES OF INFORMATION**

All information was received through correspondence with Dr. Jaqueline Mendes R. TELO, director of the Centre for Protection and Control of Animal Health, and Dr. A. C. LOUZÃ of the Veterinary Faculty, Lisbon.

SUMMARY

There is no program of general wild animal disease surveillance in Portugal. There is a surveillance program specifically for African Swine Fever in wild boar in which field personnel are actively urged to submit animals found dead and samples are taken during regular hunting. Portugal has been free of rabies in wild and domestic animals since 1960. Fresh water fish are sampled periodically for diseases of importance to hatcheries and aquaculture. There are 12 veterinary diagnostic laboratories in Portugal, but the majority of wild animal disease diagnosis is conducted at the National Veterinary Laboratory in Lisbon. Outside of national surveillance programs, persons who want a diagnosis for a wild animal must pay a fee to the laboratory doing the examination. The results of such examinations of wildlife specimens are not analyzed or summarized on a national basis. From time to time, personnel of the veterinary laboratories and of the Veterinary Faculty have conducted studies of wild animal diseases. Specific studies of *Lynx pardina*, otter and wild horses are currently underway.

CONTACTS

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*Federal organization responsible for veterinary epidemiology, including wild animal diseases.

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National Veterinary Laboratory*
Estrada de Benifca, 701
1500 Lisboa

* Most diagnoses of wildlife diseases are made by this laboratory.

ROMANIASOURCES OF INFORMATION

No information was received directly from Romania. A small publication was consulted and contacts were furnished by the Secretary, European Section of the Wildlife Disease Association and the Office International des Epizooties.

SUMMARY

There does not appear to be a program of general wild animal disease surveillance in Romania. Surveillance for rabies in wild mammals is carried out. *

POSSIBLE CONTACTS

- General Information:

Central Laboratory for Veterinary Diagnosis
63 Staicovici Str.
Sect. 5, Code 76206
Bucuresti *FAX: (+40) 1 157 875*

Attn. Dr. Eugen OLARU or Dr. Stefan NICOLAE

- Chief Veterinary Officer:

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Director General
Veterinary Sanitary Division
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Bucuresti

Tel: (+40) 1 15 78 75; FAX: (+40) 1 12 49 67

* Andreescu, N. and Nicolae, S. 1993. Rabies surveillance and preventional measures in Romania, 1983-1992. Rabies Bulletin Europe 17: 9-10. (Published on behalf of the World Health Organization by the Federal Research Centre for Virus Diseases of Animals, PF 1149, D-72001 Tübingen, Germany)

SOURCES OF INFORMATION

Information was received by correspondence with Dr. Eugeny KUZNETSOV of the All-Russian Research Institute for Nature Protection (Moscow) and Professor A. A. GUSEV of the All-Russian Research Institute for Animal Health (Vladimir). A personal interview was held in Paris on 5 February 1994 with Professor Viatcheslav BEREZIN of the Institute of Evolutionary Animal Morphology and Ecology (Moscow).

SUMMARY

There is currently no national or regional program of general wild animal surveillance in Russia. Nonetheless, there is a great wealth of historical information regarding diseases in Russian wildlife and new initiatives are being taken that may result in a program of general wild animal disease surveillance in the future. In the former Soviet Union, there was a large network of veterinary diagnostic laboratories and zoonosis laboratories in all regions and districts, and research institutes that studied wild animal diseases. Most of these institutions still exist but their organization, mandates and financing are being re-defined. Currently, the function of each is partial and lines of communication among each other or to coordinating units are largely non-existent. Formerly, there was a registry of diseases in wild animals at the Department of Reserves within the Ministry of Agriculture of the USSR, but this is no longer maintained. The All-Russian Research Institute for Animal Health (Ministry of Agriculture), formerly the All-Union Foot-and-Mouth Disease Research Institute, in Vladimir (180 Km from Moscow), plans to develop a Russian national registry of wildlife disease occurrences as part of its mandate within the federal program "Ecological Security of Russia" and its role in surveillance of major infectious diseases of domestic animals. The Wildlife Health Centre of the ALL-Russian Research Institute for Nature Protection (Ministry for Environmental Protection and Natural Resources) has a mandate to coordinate wildlife health programs within the Ministry that is responsible for wildlife management in Russia. There is also a Centre of Wild Animal Ecology, Pathology and Epizootiology within the Institute of Evolutionary Animal Morphology and Ecology (Russian Academy of Sciences) which organizes research projects on wild animal diseases on a contractual basis. The roles and inter-relationships of these organizations in national surveillance of wild animal diseases have yet to be defined.

CONTACTS

All-Russian Research Institute for Animal Health
600900 Jur'evets
Vladimir Tel: (+7) 09222 60614; FAX: (+7) 09222 61544

Attn. Prof. A.A. GUSEV - Director

Wildlife Health Centre
All-Russian Research Institute for Nature Protection
Znamenskoye - Sadki M-628
113628 Moscow Tel: (+7) 95 423 0322; FAX: (+7) 95 423 2322

Attn. Dr. Eugeny KUZNETSOV

Centre for Wild Animal Ecology, Pathology and Epizootiology
Institute of Evolutionary Animal Morphology and Ecology
Leninski pr. 33
Moscow Tel: (+7) 95 124 7932; FAX: (+7) 95 124 7932

Attn. Prof. V. V. BEREZIN

SERBIA AND MONTENEGRO
(Ex - Yugoslavia)

SOURCES OF INFORMATION

Information was obtained by correspondence with Professor Milijan JOVANOVIĆ, Veterinary Faculty, Belgrade, and Professor Dušan JAKOVLJEVIĆ, Deputy Minister, Ministry of Agriculture.

SUMMARY

There is no program of general wild animal disease surveillance in Serbia and Montenegro. There are surveillance programs for specific diseases such as rabies and hog cholera. Wild animal specimens are examined as part of these special programs or as requested by hunters, landowners or others, at 10 regional veterinary diagnostic laboratories (in Serbia at Belgrade, Novi Sad, Niš, Zaječar, Jagodina, Požarevac, Kraljevo, Zrenjanin and Sombor and, in Montenegro, at Podgorica) and also at the Department of Pathology, Veterinary Faculty, Belgrade. Detection of diseases in wildlife is mainly done by hunters and wildlife officials (gamekeepers). Diagnostic examinations for rabies and other specified diseases are paid for by the State but the submitter must pay the cost of any other diagnostic examinations, for example approximately 50 DM (~CDN\$40) for a wild boar and 80 DM (~CDN\$65) for a red deer. Several members of the Department of Pathology, Veterinary Faculty, Belgrade, specialize in wild animal diseases. At this Department, records (on paper) of wild animal disease diagnoses go back to 1957 and are indexed by species. Currently, this Department examines about 20 wild boar, 20 hares, 20 deer and 120 pheasants each year. The Ministry of Agriculture, Veterinary Department, receives information on all diagnoses made in all state laboratories for rabies, Newcastle disease and hog cholera. These records are on paper and begin about 1951. Examinations of wild fish are made at the Department of Fish Diseases, Veterinary Faculty, Belgrade, and at the Veterinary Institute in Belgrade. An overview of major infectious diseases of wild mammals and birds as of 1988 is available in English*.

* Jankovlejić, D. et al. 1988. The situation regarding wildlife in Yugoslavia. *Revue Scientifique et Technique de l'Office International des Epizooties* 7:(4) 857 - 860.

CONTACTS

- General Information; Veterinary Faculty :

Department of Pathology
Veterinary Faculty
Bul. JNA 18
11000 Belgrade Tel.: (+381) 11 684 262; *FAX: (+381) 11 685 936*

Attn. Prof. dr. Milijan JOVANOVIĆ

- National Records on rabies, Newcastle disease, hog cholera

Veterinary Department
Ministry of Agriculture
22 Nemanjina Str.
Belgrade

- Fish Diseases

Department of Fish Diseases
Veterinary Faculty
Bul. JNA 18
11000 Belgrade

Veterinary Institute
14 Vojvode Toze Str.
Belgrade

Attn. Dr. Maja MARKOVIĆ

Attn. Svetlana JEREMIĆ

- General Information; State Veterinary Laboratories; Rabies

Federal Ministry of Agriculture
Blvd. Avnoj-a 104
11070 Belgrade

Attn. Prof. dr. Dušan D. JAKOVLJEVIĆ - Deputy Minister

SLOVAK REPUBLIC**SOURCES OF INFORMATION**

Information was received by correspondence with Dr. O. MATOUCH, State Veterinary Institute, Liberec (Czech Republic).

SUMMARY

Prior to separation into two countries, veterinary services in Slovakia were administered separately from those of the Czech portion of the former Czechoslovakia. Records of wildlife diseases in the Slovak Republic may be available through the Slovak Veterinary Administration. An elaborate computerized system of veterinary information management was in place in Slovakia prior to 1988*. This may have included wildlife disease data which may still be available.

CONTACTS**- General Information:**

Slovak Veterinary Administration
Hábř. L. Svobody 23
842 13 Bratislava Tel: (+42) 7 721 252; FAX: (+42) 7 722 128

Attn: Dr. I. CENKER

- Chief Veterinary Officer

Státna Veterinárna Správa
Botanická 17
842 13 Bratislava

Attn. Dr. J. Sokol, Director General

* Haladej, S. and Hurcik, V. 1988. Computerized management system of the veterinary service in the Slovak Socialist Republic. *Revue Scientifique et Technique de l'Office International des Epizooties* 7 (3): 517 - 541.

SOURCES OF INFORMATION

Information was received by correspondence with Dr. Andrej BIDOVEC of the Faculty of Veterinary Medicine, Ljubljana.

SUMMARY

A program of general wild animal disease surveillance in Slovenia is coordinated by the Institute for Pathology of Wild Animals of the Faculty of Veterinary Medicine, Ljubljana. Detection of diseased wildlife is carried out by hunters and by regional veterinary organizations. The cost of diagnostic examinations is paid by the Hunting Association of Slovenia by an annual contract with the Institute. Thus, there is no direct charge to the person submitting the specimen. Surveillance is confined largely to official game animal species, but these include both protected and hunted species. General diagnostic examinations and examinations for specific diseases such as rabies are done at the Institute for the whole of Slovenia. The program of oral vaccination of foxes against rabies also is coordinated through the Institute and is carried out in conjunction with government veterinary and wildlife services. The Institute was established in 1953 and records of diseases recognized in wild animals exist from 1953 to the present in the form of reports on paper. The number of specimens (mammals and birds) examined each year varies from about 300 to 1500. Field examinations are also carried out during hunting seasons. Wild fish are examined at the Department of Pathology of Fish and Bees, also within the Institute.

The estimated size populations of major game species in Slovenia are red deer - 7,000; roe deer - 170,00 to 200,000; chamois - 11,000 to 12,000. Approximately 3,500 to 4,500 red foxes are shot each year, of which 250-300 are rabid, and 40,000 pheasants are released annually for hunting.

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SOURCES OF INFORMATION

All information was received through correspondence with Drs Mauro HERNÁNDEZ (ICONA - Madrid), Santiago LAVÍN and Ignacio MARCO (Veterinary Faculty - Barcelona), Celia SÁNCHEZ (DOÑANA National Park) and Luis LEÓN-VIZCAÍNO (Veterinary Faculty - Murcia)

SUMMARY

There is no national program of wild animal disease surveillance in Spain. There are, however, at least four regional programs of wildlife disease surveillance. Doñana National Park has its own veterinary staff and has maintained surveillance of diseases through autopsy of selected species (particularly ungulates) for the past seven years. The park also has a bank of frozen serum samples. Clinical examination and sampling is also done for a number of species of special concern to the park (Imperial Eagle, Iberian Lynx) and in the context of wildlife rehabilitation. In the autonomous region of Catalonia, the government supports a program of wildlife disease surveillance through a contract with the Faculty of Veterinary Medicine in Barcelona. This program was begun in 1991 and is currently focussed on wild ungulates. The Veterinary Faculty at Córdoba maintains a surveillance program in its autonomous region. The Veterinary Faculty in Murcia maintains a surveillance program in its autonomous region and also, by contract, in the Natural Parks of Cazorla (autonomous region of Jean), Grazalema-los Alcornocales (autonomous region of Cadiz) and Cabo de Gata (autonomous region of Almería). Thus, there is some degree of wildlife disease surveillance in 7 of the 17 autonomous regions. These surveillance programs are supported by regional or federal departments of the environment. There is also a system of veterinary diagnostic laboratories in Spain. These are organized independently by each autonomous region and there are no national records of diagnostic information beyond those gathered for diseases of national or international importance. Examinations of wild animal specimens at these laboratories must usually be paid for by the submitter. These laboratories do not examine wild animal specimens regularly. Specific programs of wildlife surveillance are mounted by these laboratories under special circumstances, such as the occurrence of African swine fever in wild boar. The Iberian Peninsula has no endemic rabies in wild or domestic animals, thus there is no active surveillance program for rabies in wildlife.

COMMENTS

Spain is divided into 17 autonomous regions with independent governments (Gobierno Autónomo) and both wildlife and veterinary management are, for the most part, administered independently in each region. There is thus no administrative structure that might link the regions together with respect to wildlife disease surveillance. The nine

national parks are administered by an institute within the federal Ministry of agriculture, fisheries and food: ICONA - Instituto Nacional para Conservacion de la Naturaleza or "National Institute for the Conservation of Nature". There is a veterinarian on the staff of the central office of ICONA in Madrid (Dr. HERNÁNDEZ) and another in Doñana National Park (Dr. SÁNCHEZ).

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SOURCES OF INFORMATION

All information was gathered during visits to the National Veterinary Institute and to the Faculty of Veterinary Medicine (Swedish University of Agricultural Sciences) in Uppsala on 13-14 January 1994. Additional informal discussions were held with Dr. Torsten MÖRNER on 2-4 February (Paris) and 21-22 March (Brussels).

SUMMARY

A comprehensive national program of surveillance of diseases in wild mammals and birds is based in the Division of Wildlife, National Veterinary Institute, Uppsala and is coordinated by Dr. Torsten MÖRNER. Wild animal specimens of all species are sent to the Institute by a well-organized network including personnel of the Swedish Hunters Association and the National Environmental Protection Agency. Anyone in Sweden may submit wild animal specimens for diagnosis, and no fee is charged to the submitter. There are three veterinary pathologists in the Division of Wildlife who do the diagnostic examinations. Records on paper of wild animal disease diagnoses extend back to 1945, when the Institute began its wild animal disease work under the direction of Dr. Borg, and to 1986 in a cross-indexed computer file. Archives of frozen organs and of serum are maintained for possible retrospective analyses. There is extensive consultation between the Division of Wildlife of the Institute and both veterinary and wildlife regulatory authorities in Sweden. A separate section of the Institute is responsible for diagnosis of diseases in fish. This section has no specific mandate to work with wild fish but does make such examinations from time to time. Animals from game farms also are examined at the Institute. Most diagnostic examinations of seals in Sweden are made by Dr. Anders BERGMAN of the Department of Pathology, Faculty of Veterinary Medicine. Specific surveys for environmental contaminants are undertaken by the Contaminant Monitoring Group of the Swedish Museum of Natural History.

WILDLIFE DISEASE SURVEILLANCE: INFRASTRUCTURE AND FUNCTION

Detection - The Swedish Hunters Association is the most important group with respect to detection of diseased wild animals. This organization consists of both hunters and government employees and is largely responsible for wildlife management in Sweden. This organization is well-informed about the wildlife disease surveillance program through journal articles, short courses and presentations by personnel from the National Veterinary Institute. From time to time, the Institute will request specimens of particular species to pursue special studies. In addition, anyone in Sweden may submit specimens of wild animals for diagnosis. No fee is charged for these examinations. Approximately 1,500 specimens of wild animals are submitted for diagnosis each year.

Diagnosis - Almost all examinations of wild animal specimens are done by personnel of the Division of Wildlife of the National Veterinary Institute (There are some 10 regional/municipal veterinary diagnostic laboratories in Sweden but these do virtually no examinations of wild animals). Diagnoses are made by veterinary pathologists with formal post-veterinary education in veterinary diagnostic pathology. The diagnostic facilities of the National Veterinary Institute are of the highest quality and special laboratories are available for all routine and exceptional diagnostic tests. The Division of Wildlife itself has particular expertise in the diagnosis of tularemia. Since 1986, organs (liver, kidney, muscle) and aqueous extract of lung (which can be used for antibody titres) have been frozen and retained from each autopsy except when contraindicated for reasons such as infection with a zoonotic agent. A similar archive of frozen serum was begun in 1990.

Information Management - Records on paper of diagnoses made on wild animal specimens are available from 1945 to the present. From 1945 to 1986, records for wild animals were included with the records of diagnoses made on all species in the Institute; since 1986, records for wildlife have been kept in a separate file. These records are not indexed or cross-referenced and must be searched manually. Records were computerized starting in 1978. From 1978 to 1988, the computer system was largely for administrative purposes and records contain a minimum of data coded by broad categories. In 1988, the Division of Wildlife established its own computerized database of wildlife disease diagnoses. Data have been entered retrospectively back to 1986 and prospectively to the present. This database uses the DBase® program. Data are not coded. For each examination, recorded data include history/anamnesis and field data (when available), standard diagnostic data (Swedish common names of diseases and technical medical terminology are both used), species and geographic location by postal code (nearest community). This database is extensively cross-indexed and can be searched by all criteria entered. All data are in Swedish.

Use of Information - Wildlife disease data are summarized quarterly, by county, and these summaries are distributed to the county organization of the Swedish Hunters Association. An annual report is also prepared by the Division of Wildlife and is published both separately and as a part of the annual report of the Institute. Articles are published in hunting journals both to inform those involved in the detection of diseases and to encourage interest and participation in the surveillance program. Articles also are published in the national veterinary magazine (*SVA Vet*) and in regular scientific journals. There are extensive formal and informal exchanges of information with biologists and other wildlife management personnel on a regular basis. Formal reviews of legislation and regulation regarding wildlife are routinely requested by the Board of Agriculture and the National Environmental Protection Agency. Information on wild animal diseases in Sweden is exchanged once or twice each year at meetings of the Nordic section of the Wildlife Disease Association and other meetings of Scandinavian or nordic wildlife disease specialists. Some teaching about wildlife diseases is provided to the Veterinary Faculty, which is in an adjacent building.

Financial Base - The Division of Wildlife of the National Veterinary Institute receives approximately 60% of its budget from an allocation of hunting license fees and 40% from the budget of the Institute and other sources.

COMMENTS

The program for wild animal disease surveillance in Sweden is comprehensive and highly effective for mammals and birds. Marine mammals appear to fall outside this program. Hunting is a major activity in Sweden; for example, approximately 100,000 moose - 35% of the national moose population - is harvested annually, and game meat accounts for about 6% of national meat consumption. The close cooperation among hunters, wildlife biologists and the Division of Wildlife of the National Veterinary Institute is a major reason for the success of the surveillance program.

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SWITZERLAND**SOURCES OF INFORMATION**

An initial exchange of letters with Drs. C. RIGGENBACH (Federal Veterinary Office), P. BOUJON (Galli-Valerio Institute) and M. GIACOMETTI (formerly of the veterinary faculty in Zurich, now in Vienna) was followed by visits and interviews with wildlife disease scientists in Bern [14-15 February 1994; Drs. M. SCHMITT, W. MEIER, M. SUTER - Institute of Veterinary Pathology, E. PETERHANS, U. BREITENMOSE, S. CAPT and R. ZANONI - Virology Institute/Rabies Centre, P. BOUJON - Galli-Valerio Institute] and in Vienna (21-22 April; M. GIACOMETTI).

GENERAL SUMMARY

While there is no centralized national program for wild animal disease surveillance in Switzerland, near-national surveillance is provided by two veterinary institutions: The Institute of Veterinary Pathology (Institut für Tierpathologie) at the veterinary faculty in Bern and the Galli-Valerio Institut (Institut Galli-Valerio) in Lausanne. Each provides diagnostic services for wild animal species. The Institute of Veterinary Pathology/Bern accepts specimens from anywhere in the country. The Galli-Valerio Institute serves primarily the Canton of Vaud but also accepts specimens from elsewhere. The Swiss Rabies Centre, the first to undertake oral vaccination of foxes as a means to control the disease, is located in the same building as the Institute of Veterinary Pathology and there is close cooperation among the personnel of these two groups. Research on wild animal diseases is not restricted to these two institutions but they are the only two institutions engaged in general routine surveillance for wildlife diseases. Diagnostic records, histological slides and blocks of tissue dating to the 1950's and 60's are maintained at the Galli-Valerio Institute and constitute a significant historical archive.

WILDLIFE DISEASE SURVEILLANCE: INFRASTRUCTURE AND FUNCTION

Detection - Wildlife management personnel (Gardes de chasse or game wardens and equivalent fish officers, in particular) and the general public, including hunters and fishermen, are the field personnel primarily involved in detection. Because the Swiss program of oral vaccination of foxes against rabies involves bait placement and surveillance for rabid animals by these same people, there is a high level of awareness about wild animal diseases and the importance of submission of specimens for diagnosis. Not including foxes submitted for rabies examination, the Institute of Veterinary Pathology/Bern receives approximately 120 mammals/birds and 200-400 wild fish each year; an additional 300 or so wild mammals are examined as part of specific research projects. The Galli-Valerio Institute receives approximately 1000 wild animal specimens yearly, of which 300-600 are foxes specifically submitted as part of the rabies program. A very small number of wild fish are examined in Lausanne. There is no cost to the

submitter for wild mammals or birds and the government pays for examinations of wild fish submitted through a government agent. The Galli-Valerio Institute maintains seven cold-rooms distributed around the Canton of Vaud where specimens may be delivered and from which they are picked up once each week. Transportation of specimens to the Institute of Veterinary Pathology/Bern is the responsibility of the submitter.

Diagnosis - Both institutions have well-equipped diagnostic laboratories and pathologists with formal post-veterinary education in veterinary diagnostic pathology. The Institute of Veterinary Pathology/Bern has a faculty position dedicated to wild animal diagnosis and research and the Galli-Valerio Institute has a long tradition of interest and activity in wild animal disease diagnosis in addition to its mandate as a diagnostic laboratory for domestic animals.

Information Management - Institute of Veterinary Pathology: Diagnostic data are now organized on a DBase® computer program. Standard diagnostic information, species and geographic location (by commune and canton) are coded and retained. Paper copies of the diagnostic reports are kept for 10 years. The history/anamnesis is not typed onto the final report but the documents that accompanied the specimen to the laboratory are kept with the final report in the files of the Institute. Reports are now available for the previous 10 years for fish and the previous 5 years for other wildlife. Data are summarized in an annual report each year. A summary of wild fish diseases for 1982-92 is available. Data and reports are written/recorded in German with translation into French as necessary. **Galli-Valerio Institute**: Computerization was only begun in 1994 but records on paper have been retained for the past 30 years. Histological slides and blocks have been retained for 30 to 40 years. Data and reports are in French. The historical file of reports is organized by species and by year and can be searched in this way. The number and species of wild animal specimens received is noted in the Institute's Annual Report, but diagnoses are not summarized. Wildlife diagnoses have been summarized periodically in the past, the last being in 1985. A new joint summary document for wildlife diagnoses at both Institutions is planned.

Use of Information - Annual reports from the Institute of Veterinary Pathology/Bern are sent to federal wildlife and veterinary offices, and summaries of fish disease occurrences are distributed to all Cantons. There appears to be a good rapport and exchange of information between wildlife and veterinary authorities and both institutions (see, for example, Riggerbach, C. 1988: " Situation de la faune sauvage en Suisse", Rev. sci. tech. Off. int. Epiz. 7: 843-846). Diagnostic reports for wild animal specimens are sent to appropriate wildlife management personnel as well as to the submitter of the specimen. Thus, information about wildlife diseases is available to wildlife managers.

Financial Base - The Institute of Veterinary Pathology is a part of the veterinary faculty of the University of Bern. As such, it is supported by a combination of cantonal and federal funds. The Galli-Valerio Institute is the veterinary diagnostic laboratory for the

Canton of Vaud and is supported by the canton, with an additional small endowment from the original sponsor of the laboratory, the well-known parasitologist Professor Galli-Valerio.

COMMENTS

The activities of these two institutes together with that of the Swiss Rabies Centre constitute quite a complete system of wildlife disease surveillance. The major current weakness is the absence of a national database upon which national epidemiological analyses could be based. It seems likely that this will develop through the existing close cooperation among the two primary surveillance institutions and the relative ease of information exchange computerization makes possible.

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SOURCES OF INFORMATION

Information was gathered through correspondence with Mark FLETCHER (Wildlife Incident Unit, Central Science Laboratory, Berkshire), Dr Seamus KENNEDY (Veterinary Services Division, Belfast), Dr. James K. KIRKWOOD (Institute of Zoology, London), Dr. Steven McORIST (Royal (Dick) School of Veterinary Studies, Edinburgh), Dr. Ranald MUNRO (Lasswade Veterinary Laboratory, Midlothian), Dr. Tony SAINSBURY (Institute of Zoology, London), and Dr. Francis SCULLION (Fisheries Research Centre, Dublin, Ireland). Interviews were held with Dr. Seamus KENNEDY in Belfast on 7 March 1994, and, by telephone, with Dr. Marion WOOLDRIDGE (Central Veterinary Laboratory, Weybridge) on 6 April 1994. A 1990 report entitled *Wildlife Disease Investigation Review: Final Report* written by D. Osborn et al. for the Department of the Environment was made available to me by Dr. McORIST.

SUMMARY

There is no program for general surveillance of wild animal diseases in the United Kingdom. There are some specific surveillance programs for marine mammals, for bovine tuberculosis in all species including wildlife, and for wild animal mortality due to pesticides. Detection of diseased animals appears haphazard, with the exception of specific programs such as for marine mammals and beached birds. A network of government veterinary diagnostic laboratories is present throughout the UK but these have no specific mandate to work with wild animal species and often must charge the submitter a fee for diagnostic examinations of specimens submitted. There is no central national archive for wildlife disease occurrence information, although the Veterinary Investigation Diagnosis Analysis (VIDA) system of the Central Veterinary Laboratory - Weybridge serves this function to a limited degree. Results of research projects on specific diseases have been incorporated into wildlife management programs, but there is no system or program to manage and make use of the diverse sources of disease occurrence information available. There is nonetheless considerable interest and research activity regarding wild animal diseases in the UK. A very large number of diseased wild animals are seen by non-government veterinarians, particularly in the context of rehabilitation efforts. These veterinarians are represented by two major organizations: The British Veterinary Zoological Society and the British Wildlife Rehabilitation Society. In addition, the British Wildlife Health Association was established in 1987 and has served to improve the flow of information among those interested in wild animal diseases. Over the past few decades, there have been several rounds of debate regarding the desirability or otherwise of coordinating wildlife disease surveillance and research in the UK; the latest having taken place during the past 3-4 years. No definitive decision or action has been taken by government in this regard.

WILDLIFE DISEASE SURVEILLANCE: INFRASTRUCTURE AND FUNCTION

The principle organizations active in the area of wild animal disease surveillance are mentioned briefly in this section.

Government Veterinary Diagnostic Laboratories - Regional diagnostic laboratories exist throughout the UK but are organized and administered separately in England and Wales (organized together as one unit), Northern Ireland, and Scotland. Most examine wild animal species from time to time, but none have a firm mandate to do so. The professional staff consists of veterinary pathologists, many of whom possess post-graduate qualifications in appropriate disciplines. All laboratories except the two in Northern Ireland are linked to a central computerized database of diagnostic findings called the Veterinary Investigation Diagnosis Analysis System (VIDA) organized within the Central Veterinary Laboratory - Weybridge. In principle, all diagnoses made on all specimens submitted to all laboratories are entered into this database; 267,000 diagnoses were entered in 1991, and records extend backward in time to 1975. A total of 2,366 submissions of wild animal specimens were registered on the VIDA system in 1993 and 2565 were registered in 1989. Wild animal data directed to two other databases within the same Ministry, the Wildlife Incident Investigation Scheme for pesticides and the bovine tuberculosis surveillance program, may or may not end up also in the VIDA database. The program and coding system for data in the VIDA system are designed for analysis of major diseases of economic importance to the livestock industry. The coding system is limited such that only major diseases are recorded by name and many wild animal species are either grouped together in one general taxonomic category or grouped together with related domestic animals. Retrieval and analysis of wild animal data are, thus, difficult. A minimum charge of £50 is made for reports generated from the VIDA system.

In Northern Ireland, the Veterinary Sciences Division of the Department of Agriculture, Belfast, receives 50-300 wild animal submissions each year. There is no charge to the submitter for diagnostic examinations of wildlife. Records on paper of diagnostic findings are kept for seven years but are not indexed. Computerized records begin with 1987 and consist of the text of the written report. These are not cross-indexed by species or disease. Northern Ireland does not contribute data to VIDA but does to the Wildlife Incident Investigation Scheme.

The Wildlife Incident Investigation Scheme was established in the 1960's, and now monitors animal mortality due to the use and abuse of pesticides. It is currently financed by the agrochemical industry and by government departments, and is coordinated by the Central Science Laboratory of the Ministry of Agriculture, Fisheries and Food (Berkshire, England). The Scheme operates in England, Northern Ireland, Scotland and Wales. For detection, the scheme relies on members of the public to report mortality incidents to one of the regional centres of the program. If the biologist of the regional centre considers pesticide poisoning a possibility, samples are forwarded to the nearest veterinary

diagnostic laboratory for autopsy. If autopsy findings do not reveal an alternative cause of death, tissue samples for chemical analysis are sent to an analytical laboratory. Data from all pesticide analyses are maintained on a computerized database by the Wildlife Investigation Unit of the Central Science Laboratory. The number of wildlife incidents investigated annually recently has been in the range of 300-400.

A tuberculosis database is maintained by the Ministry of Agriculture, Fisheries and Food at Tolworth, Surrey. In principle, all diagnoses of tuberculosis in any animal species made by any of the regional diagnostic laboratories in England, Wales and Scotland will be entered into this computerized database.

Institute of Zoology of the Zoological Society of London - The Institute participates in a number of research programs that provide wildlife disease surveillance data. Mortality and disease in marine mammals in the UK is investigated jointly with the Scottish Agricultural College's Veterinary Investigation Centre in Inverness, in collaboration with a number of organizations and individuals, for example the Natural History Museum and Sea Mammal Research Unit. The program is supported by the Department of the Environment. Data are maintained on a computerized database at the Institute. Similarly, data on avian botulism and disease and mortality in frogs are collected and archived.

COMMENTS

The basic infrastructure for a wild animal disease surveillance program appears in place in the UK, but it is not organized or funded to function in this manner. There does not appear to be an organized infrastructure for the detection of diseased wildlife. The VIDA system could function as a central database of wildlife disease information, but its computer program would require significant restructuring to make possible useful epidemiological analyses of wildlife data, and better links would be required with the other sources of wildlife disease information noted above. The current climate of privatization and cost-recovery in the veterinary services of the UK may represent a further difficulty in the organization of a wild animal disease surveillance program.

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