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GRADUATE TRAINING IN FISH AND WILDLIFE DISEASES

JOHN G. DEBBIE¹ and JOAN BUDD²

Training in fish and wildlife diseases generally requires specialization on the graduate level. Normally this involves the study of problems that cut across several of the basic sciences, especially microbiology, parasitology, pathology, and epizootiology.

A list of North American universities offering such training in wildlife diseases was originally published in this journal in 1971 (7:219). The following expanded list includes universities offering training in fish diseases. Even so, this is not a complete compilation. Prospective students are encouraged to investigate other universities and types of curricula which might meet their individual interests.

This list has been compiled and summarized from information kindly supplied by individuals at the institutions. We hope that other institutions will inform us of their programs for inclusion in future lists. Finally, although we had hoped to include a separate section on zoo medicine, it could not be done at this time. However, where universities have informed us of collaborative arrangements with zoos, that fact is mentioned.

TRAINING IN WILDLIFE DISEASES

UNIVERSITY OF CALIFORNIA, DAVIS

The university's comparative pathology program, leading to the M.S. and Ph.D. degrees, offers graduate studies for students with a special interest in wildlife. A cooperative program with Sacramento Zoo provides opportunity for zoo animal medicine training. Close coordination between various departments, including

Epidemiology and Preventive Medicine, Zoology, Animal Physiology and the Institute of Ecology, allow for broad training opportunities. For further information, contact Dr. M. E. Fowler, Department of Clinical Sciences, College of Veterinary Medicine (ZIP 95616).

COLORADO STATE UNIVERSITY, FORT COLLINS

The School of Veterinary Medicine and Biomedical Sciences has graduate programs for students interested in wildlife diseases. The Departments of Anatomy and Microbiology at the Veterinary College have wildlife courses, and cooperative arrangements exist with the Department of Fishery and Wildlife Biology. For further information, contact Dr. George Post, Department of Fishery and Wildlife Biology (ZIP 80521).

UNIVERSITY OF CONNECTICUT, STORRS

The Northeastern Research Center of Wildlife Diseases is situated at the College of Agriculture and Natural Resources. Academic programs offered lead to the M.S. or Ph.D. degree in comparative pathology for D.V.M.'s only; in pathogenic microbiology; in comparative virology; and in biochemistry of disease. Students may also take courses at the Department of Pathology of the university's medical school, the Section of Comparative Pathology of the Yale School of Medicine, and the Department of Pathology at Hartford Hospital. Interested individuals should contact Dr. S. W. Neilsen, Center Director, University of Connecticut, Storrs (ZIP 06268).

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UNIVERSITY OF GEORGIA, ATHENS

The Southeast Cooperative Wildlife Disease Unit, under the direction of Dr. Frank Hayes, is located at the university. Graduate training in all aspects of wildlife disease is offered with a stress on wildlife parasitology. (ZIP 30601).

UNIVERSITY OF GUELPH, ONTARIO, CANADA

The Department of Pathology, Ontario Veterinary College, offers wildlife disease programs at the graduate level. Those with emphasis on pathology, microbiology, and epizootiology are under the direction of Dr. Lars Karstad; those on diseases of marine fish and mammals are under Dr. Joe Geraci's supervision. For information on graduate programs in wildlife parasitology, contact Dr. Roy Anderson, Department of Zoology, College of Biological Science.

IOWA STATE UNIVERSITY, AMES

The Department of Veterinary Pathology, College of Veterinary Medicine is developing graduate training programs in wildlife diseases. Contact Dr. D. L. Graham for further information (ZIP 50010).

**MICHIGAN STATE UNIVERSITY,
EAST LANSING**

The Department of Pathology has special programs, leading to the M.S. and Ph.D. degrees, designed for students who already have professional degrees in a branch of medical science. Courses are also offered in the Department of Fisheries and Wildlife for students with an interest in wildlife disease. Candidates should contact Dr. C. C. Morrill, Department of Pathology (ZIP 48823).

UNIVERSITY OF MICHIGAN, ANN ARBOR

Students enrolled for M.S. or Ph.D. degrees in the fisheries, forestry and wildlife program of the School of Natural Resources can receive specialized training in other units of the university, primarily the Medical School and School of Public Health. The flexibility of the

program allows students to pursue a broad spectrum of interests. Those interested should contact Dr. A. B. Cowan for further information (ZIP 48105).

UNIVERSITY OF MINNESOTA, ST. PAUL

The College of Veterinary Medicine offers graduate veterinarians the opportunity to pursue a graduate degree in a department such as Veterinary Pathology and Parasitology, or Veterinary Microbiology and Public Health, and to do their thesis work on wildlife problems. Several formal courses, such as "Diseases of Wildlife" and "Parasites of Wildlife," are offered for students majoring in wildlife management or ecology. Other courses deal with furbearing animals, zoo animals, and epizootiology. Further information may be obtained from Dr. J. C. Schlotthauer, Department of Veterinary Pathology and Parasitology (ZIP 55101).

OREGON STATE UNIVERSITY, CORVALLIS

The Department of Veterinary Medicine provides training in wildlife disease through its master's program in veterinary medicine. Graduate courses are also offered in the Department of Fisheries and Wildlife. The university also has a sea grant program. Individuals are welcome to contact Dr. E. E. Wedman, Department of Veterinary Medicine (ZIP 97331).

**UNIVERSITY OF SASKATCHEWAN,
SASKATOON, CANADA**

The Department of Pathology at the Western College of Veterinary Medicine offers opportunities for wildlife disease training in the field of pathology. Dr. N. O. Nielsen should be contacted for further information.

**TEXAS A & M UNIVERSITY,
COLLEGE STATION**

The Department of Pathology, School of Veterinary Medicine, offers graduate training in wildlife diseases. Numerous research programs are being carried out under Dr. R. M. Robinson. (ZIP 77840).

WASHINGTON STATE UNIVERSITY, PULLMAN

The Department of Veterinary Pathology offers courses in all areas of wildlife disease, including fish, mammals, and birds. Training opportunities include all graduate degrees (M.S., D.V.M., Ph.D.). For further information, contact the Department of Veterinary Pathology, College of Veterinary Medicine (ZIP 99163).

UNIVERSITY OF WISCONSIN, MADISON

The Department of Veterinary Science offers graduate training at the M.S. and Ph.D. levels to veterinarians and nonveterinarians in the disciplines of microbiology, parasitology, pathology, and physiology, with joint majors or minors in such areas as wildlife ecology, biochemistry, and zoology. Special interests include infectious diseases of wild birds and mammals. Interested individuals should contact Dr. Thomas Yuill (ZIP 53706).

UNIVERSITY OF WISCONSIN, STEVENS POINT

A graduate program in wildlife disease training is offered in the College of Natural Resources. This is similar to the course at Madison, except that only the M.S. is offered. The emphasis of the program is on microbiological and parasitological diseases of wild populations. Contact Dr. Daniel Trainer, dean of the College of Natural Resources (ZIP 54481), for further information.

TRAINING IN FISH DISEASES**AUBURN UNIVERSITY, ALABAMA**

The Southeastern Cooperative Fish Parasite and Disease Project, within the Department of Fisheries and Allied Aquacultures, offers M.S. and Ph.D. degrees in fisheries with a specialization in fish parasites and diseases. The Departments of Botany, Microbiology, and Poultry Science and the School of Veterinary Medicine offer related courses.

Research on a specific disease problem is required. For further information, contact Dr. W. A. Rogers, project leader, or Dr. H. S. Swingle, department head (ZIP 36830).

BRIGHAM YOUNG UNIVERSITY, PROVO, UTAH

The Department of Zoology offers M.S. and Ph.D. degrees in virology and bacteriology of fish diseases. A cooperative course in fish diseases is offered by the Federal Fish Disease Diagnostic Laboratory at Springville, Utah. Those interested may contact Dr. Richard A. Heckmann (ZIP 84601).

UNIVERSITY OF CONNECTICUT, STORRS

The Northeastern Research Center for Wildlife Diseases, under the direction of Dr. S. W. Nielsen, offers training in comparative pathology which includes fish (see listing above).

UNIVERSITY OF GEORGIA, ATHENS

The College of Veterinary Medicine has graduate programs in the Departments of Veterinary Anatomy (M.S.), Dr. Robert E. Lewis, head; Veterinary Pathology (M.S., Ph.D.), Dr. David E. Tyler, head; and Medical Microbiology, Dr. John B. Gratzek, head. None of these programs is concerned exclusively with fish diseases, but courses are available which allow the student to emphasize this interest. (ZIP 30601).

UNIVERSITY OF GUELPH, ONTARIO, CANADA

M.S. and Ph.D. programs with an emphasis on fish diseases are offered in various disciplines. For the College of Biological Sciences, contact Dr. Mary Beverley-Burton (Parasitology) or Prof. L. A. McDermott (Microbiology). For the Ontario Veterinary College, contact Dr. M. Savan (Virology) or Dr. Joan Budd (Pathology).

UNIVERSITY OF MARYLAND, COLLEGE PARK

The Department of Microbiology offers a Ph.D. program with a specialty in marine microbiology, estuarine microbiology or pathogens of marine animals. Contact Dr. R. R. Colwell for further information (ZIP 20740).

OKLAHOMA STATE UNIVERSITY, STILLWATER

The Oklahoma Cooperative Fishery Unit, under the direction of Dr. Robert C. Summerfelt, has graduate programs leading to M.S. and Ph.D. degrees in zoology, with specialties in fisheries biology, aquatic biology, and fish pathobiology. (ZIP 74074).

OREGON STATE UNIVERSITY, CORVALLIS

The Department of Microbiology, School of Science, offers M.S. and Ph.D. degrees in microbiology. Students may elect to study some aspect of infectious diseases of fish as a thesis problem. Areas include bacterial, viral, protozoan and fungal infections in salmonid fish and other marine species. In recent years there has been particular emphasis on studies of immune response in fish and the development of oral vaccines for control of infectious diseases in fish. Cooperating units include the Marine Science Center at Newport, Oregon, the Oregon State University Fish Disease Laboratory, and the Fish Commission of Oregon. For further information, write to Dr. J. L. Fryer (ZIP 97331).

UNIVERSITY OF RHODE ISLAND, KINGSTON

The Department of Animal Pathology, under the direction of Dr. R. E. Wolke, plans a graduate program leading to M.S. and Ph.D. degrees in marine pathology and virology. All the facilities for such a program are available, including the Graduate School of Oceanography and the Maine Experiment Station. One can now study fish diseases through the disciplines of bacteriology, virology and parasitology, while acquiring good basic training in related aquatic subjects.

**UNIVERSITY OF SASKATCHEWAN,
SASKATOON, CANADA**

The Western College of Veterinary Medicine, Department of Pathology, offers a Postgraduate Diploma in diagnostic pathology. The purpose is to provide basic disciplinary training in pathology with emphasis on fish disease, including diagnostic situations involving certification and disease status of existing fish stocks.

The M.Sc. and Ph.D. degrees are earned through a program of research in pathology, which provides training in applying the discipline of pathology to research problems in fish diseases. Trainees and students are encouraged to prepare also for the Board Examination of the American College of Veterinary Pathology. For further information, write to Dr. N. O. Nielsen or Dr. G. A. Wobeser.

UNIVERSITY OF WISCONSIN, MADISON

The Department of Veterinary Science offers M.S. and Ph.D. degrees in Veterinary Science and in conventional fields (bacteriology, pathology, etc.) However, training may be tailored to fit a student's interest. Study of fish as a step toward a more general interest, such as pathology, toxicology, or microbiology is encouraged. Fish pathology is included in a number of courses available. Interested students should contact Dr. William E. Ribelin (ZIP 53706).

**U.S. BUREAU OF SPORTS FISHERIES
AND WILDLIFE**

The Eastern Fish Disease Laboratory, Leetown, West Virginia (ZIP 25430) offers a course in alternate years from September to January, with 245 hours of lecture and 277 hours of laboratory instruction. It will next be offered in 1975-76. There are seven instructors. The subjects include review of physiology and anatomy, parasitology, bacteriology, immunology, virology, histopathology and studies of the environmental and nutritional requirements of fish. No degree is offered, but ten hours of graduate credit

may be obtained from the student's home university or Fordham University by special arrangement. Contact Dr. Glenn L. Hoffman, Training Officer.

EUROPEAN PROGRAMS

UNIVERSITY COLLEGE, CORK, IRELAND

The Department of Zoology awards the M.Sc. or Ph.D. degree following the presentation of a thesis based on original research on macroparasitic diseases of fish (with less emphasis on microbial diseases). Interested students may obtain further information by contacting Dr. M. Mulcahy.

**UNIVERSITY OF MUNICHEN,
FEDERAL REPUBLIC OF GERMANY**

Graduate courses in fish diseases are offered by Dr. H. Reichenbach-Klinke. For information, contact the Zoologisch-Parasitologisches Institut der Tierärztlichen Fakultät, D8 München 22, Kaulbachstrasse 37.

UNIVERSITY OF STIRLING, SCOTLAND

The Aquatic Pathobiology Unit under the direction of Dr. R. J. Roberts offers the M.Sc. in aquatic veterinary studies, a course for graduate veterinarians, and an M.Sc. by research for etiologists or zoologists. The research project is designed in specialized areas, i.e. bacteriology, parasitology, or virology. A Ph.D. by research is available with a prerequisite being the course in aquatic veterinary studies.