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INFORMATICS

Chronic Wasting Disease Data Clearinghouse and the Wildlife Disease Information Node: In December, 2004, the National Biological Information Infrastructure (NBII) assigned Dr. Bob Worrest, Chief Scientist at NBII in Reston, VA, as the Wildlife Disease Information Node (WDIN) manager. In addition, at the same time, because the NWHC now has the skills and capabilities for managing the WDIN website content and infrastucture in-house, NBII agreed that Information Management and Technology for the WDIN will now be served and provided from the NWHC in Madison. The prototype Chronic Wasting Disease Data Clearinghouse, developed by NBII working collaboratively with the NWHC, was demonstrated and tested during the 2004 International Association of Fish and Wildlife Agencies (IAFWA) meeting. Comments collected from those sessions were analyzed for potential modifications to the database. Based on this information, the Wildlife Disease Information Node staff is now embarking on the development of an operational system that will have the capability to hold not only data on CWD, but other wildlife diseases, as well. It is projected that this new system will become available for testing in early summer 2005, and be fully operational for the 2005 hunting season.

The National Wildlife Health Center urges IAFWA states, which monitor CWD to begin using the CWDDC for data entry. The system is easy to use, safe and secure. All data is entered voluntarily and each state can control the information it does and does not want displayed; reporting can be set for summary information or for detailed information, depending on states needs and comfort levels. A Memorandum of Understanding between the users and NBII itself detailing these arrangements will be made. Ecological and demographic data for each set of animal tissues tested and laboratory results can be entered online. This will save time, money, effort and duplicative data entry needs.

We are asking the IAFWA Fish and Wildlife Health Committee to "endorse" the CWDDC concept and encourage all states tracking CWD, whether the disease is present or not in their states, to contribute to the system. For general information on the Chronic Wasting Disease Data Clearinghouse go to http://wildlifedisease.nbii.gov/CWD/cwd.html For the CWD data clearinghouse itself, go to http://wildlifedisease.nbii.gov/cwddc .

WEST NILE VIRUS STUDIES

West Nile Virus – Hawaii Concerns: The USGS's National Wildlife Health Center Field Station in Honolulu, HI (NWHC) and the Pacific Islands Ecological Science Center on the Big Island of Hawaii (PIESC) recently completed an initial study evaluating the

susceptibility of native Hawaiian forest birds to West Nile virus. The study, using the non-endangered songbird, the Amakihi, demonstrated that these birds are indeed susceptible to both experimental challenge, as well as through bite-exposure by infected *Culex quinquefasciatus* mosquitoes, the dominant bird-feeding mosquito in Hawaii. Studies have also begun to determine the susceptibility and reservoir potential of birds that have been introduced to Hawaii, primarily those that inhabit the coastal lowlands and airport areas where West Nile virus may be most likely introduced. To date, Java sparrows have been studied, and have been shown to be potentially significant reservoirs that could maintain or amplify West Nile virus if it arrives at the Hawaiian Islands. Concurrently, NWHC surveillance for flavivirus exposure in birds in Hawaii is continuing at ports and airfields in Hawaii. To date, all sera are negative for WNV and other flaviviruses.

West Nile Virus and Other Diseases in Sage Grouse: The NWHC began studies of West Nile virus and other diseases of sage grouse in summer, 2004. Collaborative studies with the Nevada Division of Wildlife, Oregon Department of Fish and Wildlife, USGS's Western Ecological Research Center (WERC), and the U.S.Fish and Wildlife Service are examining causes of death in sage grouse recovered from population studies, West Nile virus exposure, and other potential pathogens in trapped and hunter-killed sage grouse, and other sage ecosystem species for their potential roles in West Nile virus maintenance and transmission. To date, two of nine sage grouse carcasses recovered have been positive for West Nile virus by polymerase chain reaction (PCR), but it is not clear whether West Nile virus contributed to the birds' deaths. Additionally, *Leucocytozoon* sp., a blood parasite, has been found in a high percentage of sage grouse sampled; the significance of this finding is not known. Our field studies, currently in Nevada, Oregon, and California, are in different parts of sage grouse range than other sage grouse disease studies being conducted by investigators in the Powder River Basin.

Number of Species Affected By WNV in North America: As of November, 2004, 288 species of birds, 23 species of mammals and one reptile species have been affected by the WNV epizootic in North America, testing positive for the virus, viral RNA or viral antigen (e.g., these positive results are not simply antibody exposure studies, but actual virus presence).

PLAGUE

Sylvatic Plague Studies: NWHC studies on the development and deployment of plague vaccines for prairie dogs and black-footed ferrets are continuing. Vaccine trials in prairie dogs that consumed oral baits laden with a recombinant plague vaccine (RCN-F1) showed that the vaccine was effective in protecting about 50% of the animals against challenge with virulent plague. Consumption of vaccine-laden baits at least twice was necessary to provide protection; one bait was less effective. Laboratory work is still ongoing to add an additional antigen (V antigen) to improve the efficacy of this oral vaccine. In black-footed ferrets, an injectable plague vaccine using the F1-V protein was shown to be protective against challenge with virulent plague by consumption of plague-infected mice under experimental conditions. Ingestion of infected prey appears to be the

most likely route of plague transmission in ferrets in the field. This year, a field study was initiated with the USFWS in which vaccinated and unvaccinated captive-raised ferrets (50% each) were released in 3 sites in Montana, Colorado, and Arizona to determine efficacy of the vaccine and differential survival between vaccinated and unvaccinated animals. Similar field trials with radio-collared Canada lynx in Colorado are underway in collaboration with the Colorado Division of Wildlife.

AVIAN DISEASE STUDIES

***Avian Vacuolar Myelinopathy (AVM)*:** Recent evidence suggests that the causative agent of AVM is a toxin produced by algae that is associated with aquatic vegetation, such as *Hydrilla* or *Elodea*. Presumably, coots and other waterfowl consume the toxic algae along with aquatic vegetation and eagles acquire the disease by ingesting prey species that contain the toxic material in their guts. NWHC conducted laboratory experiments in coots to determine if a known algal neurotoxin, Anatoxin-A, was involved in the disease. In collaboration with investigators from Clemson University, we also fed another algae suspected to be involved to coots. Neither agent produced classic signs of AVM toxicity or the characteristic brain lesions associated with the disease. Other studies to identify the elusive agent are being planned.

Unusual Mortality of Common and Arctic Tern Fledglings: The NWHC has coordinated contact and discussions among approximately eight offices of six agencies and NGOs to investigate the possibility of obtaining support for a pilot study on the cause of the deaths of at least 1,700 common and arctic terns at two National Wildlife Refuges and a National Seashore in Massachusetts and Maine.

TECHNOLOGICAL ADVANCES

FTA Card Viral Diagnostic System: Progress continues on the FTA technology suitability analysis. Researchers in the Disease Investigation's virology laboratory have demonstrated that the FTA cards will retain sufficient iridovirus DNA for detection after three months when stored at room temperature. Further, WNV RNA can persist at detection levels for up to two weeks at room temperature. Further testing of this technology is planned. It is expected that once the efficacy evaluations are completed, the FTA cards will become a primary method for collecting and holding virus samples.

Avian Cholera: The NWHC continues to develop molecular methods to distinguish between serotype 1 *Pasteurella multocida* strains within the Center collection of isolates collected from wild birds. A Masters student (Keynttisha Jefferson), is focusing on developing a rep-PCR technique to genetically fingerprint strains. Through optimization of primer sequences, she has generated more complex and reproducible fingerprint patterns. Thus far, results from this work suggest that there is a striking homology between strains isolated from wild birds sampled from around the nation over the last 25 years.

Avian Botulism: The NWHC has undertaken a considerable effort to improve the ability to detect botulinum toxin. The assay we are working with is not based on using live mice and its methodology greatly shortens the time and expense of the test, as well as eliminates issues with sick mice. To move this development along, the NWHC has entered into a collaboration with researchers at the University of Wisconsin who have developed a novel biosensor. As a part of the research conducted by the UW investigators, they have been communicating with laboratories across the nation that isolate and identify botulinum toxin. They determined that the NWHC has one of the largest testing programs for botulinum in the country. The University is anxious to work with the Center to develop this technology in return for which the Center will have access to the technology. Initial trials of the technology indicate that typical blood samples (usually autolysed) that are submitted to the NWHC do not contain impurities that would confound the test (resulting in false positives). These initial trials used known botulinum negative samples.