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SCWDS BRIEFS

A Quarterly Newsletter from the
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CWD Surveillance in the Southeast

The discovery of chronic wasting disease (CWD) in wild deer remote from the historic endemic area in Colorado and Wyoming has fueled concerns among wildlife agencies over the distribution of the disease. Since 2000, CWD has been found in free-ranging deer or elk at new locations in Colorado, Illinois, Nebraska, New Mexico, Saskatchewan, South Dakota, Utah, Wisconsin, and Wyoming, indicating that CWD has become more widely distributed than originally believed.

The presence of CWD in a wild cervid population presents significant challenges to wildlife agencies because of the potential impacts of CWD on the population itself, as well as perceptions regarding public health implications. Currently there is no evidence that CWD is transmissible to humans; however, the Centers for Disease Control and Prevention (CDC) recommends that persons avoid exposure to the CWD agent while CDC continues to assess the risk, if any, of disease transmission to humans. Some state wildlife agencies are attempting to eradicate or manage CWD through severe reduction of wild cervid populations; however, opponents of such programs argue that this is inappropriate because "CWD is everywhere." Faced with these challenges, state wildlife management agencies are obligated to document the presence or absence of CWD and consequently have greatly expanded their CWD surveillance.

Extensive active CWD surveillance was conducted for the first time in the Southeast this past year. Samples from 19,103 wild deer and elk were collected for CWD testing by wildlife agencies from 16 states (AL, AR, FL, GA, KY, LA, MD, MO, MS, OK, NC, SC, TN, TX, VA, and WV). Evidence of CWD was not detected in any of the samples. The number of animals tested from individual states ranged from around 100 to more than 6,000, with most states testing from 500 to 1,000 animals. Of the animals tested, 331 fit the CWD target profile of animals most likely to have CWD. A target profile animal is any adult cervid that is emaciated and shows some combination of neurologic deficits.

During the past year, SCWDS tested 8,710 animals in active surveillance programs, as well as 229 samples from deer or elk submitted for diagnostic evaluation or examined in research or herd health evaluation projects. The SCWDS laboratory is part of the USDA's contract laboratory system for transmissible spongiform encephalopathies. This system was greatly expanded last year in response to the need to enhance nationwide CWD

surveillance. This network consists of 26 laboratories across the country.

Continued testing of CWD target profile animals in conjunction with an appropriate active surveillance program is essential for sound CWD monitoring. In order to continue to expand the growing database on CWD surveillance in the Southeast, testing for CWD will continue to be performed on every cervid submitted to the SCWDS laboratory when appropriate specimens are available. (Prepared by Rick Gerhold)

Monkeypox Introduced with Exotic Pets

During June and July 2003, 72 suspected human cases of monkeypox were reported in Illinois, Indiana, Kansas, Missouri, Ohio, and Wisconsin (37 confirmed). Numbers of cases of this foreign disease increased from May 15 through the first week of June and subsequently declined. Most persons became ill following contact with pet prairie dogs (*Cynomys* sp.) obtained from an Illinois animal distributor or from other distributors who purchased prairie dogs from this source. Prairie dogs at the Illinois facility apparently were infected through contact with Gambian giant rats (*Cricetomys* sp.) and dormice (*Graphiurus* sp.) that originated in Ghana. This highly publicized disease outbreak in humans and pet prairie dogs happened because of the growing trend of private exotic animal and captive wildlife ownership in this country, as well as by international transport of non-domesticated animals.

Epidemiologic and laboratory investigations have identified an April 9, 2003, shipment of approximately 800 African small mammals from Ghana to a Texas animal distributor as the source of monkeypox virus introduction into the United States. The shipment contained 762 rodents, including Gambian giant rats and dormice, as well as several other rodent species. Monkeypox virus infection in six African rodents from this shipment was confirmed by the Centers for Disease Control and Prevention (CDC).

Although disposition of 178 (23%) of the 762 African rodents could not be investigated beyond the point of entry in Texas because of inadequate records, shipments of the African rodents were traced from Texas to distributors in six states. Some of the African rodents were purchased on April 21, 2003, by the Illinois distributor where approximately 200 prairie dogs may have been exposed. Monkeypox virus infection was confirmed by CDC in four prairie dogs from this facility. A total of 93 infected or potentially infected prairie dogs were traced from the Illinois distributor to six states (IL, IN, MI, MO, SC, and WI); however, an unknown number of prairie dogs, for which no records were available, died or were sold as pets at animal swap meets.

First identified in laboratory monkeys in 1958, monkeypox is a rare zoonotic disease that is endemic to the rain forests of central and western Africa. Human cases of monkeypox date to 1970. Rodents and lagomorphs also are susceptible to monkeypox virus infection. The causative agent belongs to the Orthopoxvirus family that includes variola (also known as smallpox), vaccinia (used in the smallpox vaccine), and cowpox viruses. Orthopoxviruses that occur in the United States include

ectromelia virus of mice, raccoonpox, skunkpox, and volepox.

Humans may be infected with monkeypox virus by bites from infected animals or through contact with blood or other fluids from the animal. The virus can spread person-to-person through respiratory droplets, bodily fluids of infected persons, or via contact with contaminated bedding or clothing. Person-to-person transmission has not been identified in the outbreak in the United States, although it has been documented in Africa. Symptoms in laboratory-confirmed cases in humans in the United States included fever, rash, coughing, and enlarged lymph nodes. The illness ran its course in 2 to 4 weeks and no fatalities occurred, although a human case fatality rate of 1-10% has been observed in Africa.

Few new human cases have been reported since June 11, 2003, when the Food and Drug Administration and CDC implemented a joint order banning the importation, transport, and release of the implicated animal species. Additional control strategies have included smallpox vaccination of persons potentially exposed to monkeypox virus and state-enacted restrictions on intrastate animal shipment and trade. In addition to the joint order, the CDC has recommended premises quarantine and euthanasia for all rodents from the April 9 shipment and for any prairie dogs that were exposed to the African rodents.

The emergence of monkeypox in the United States this summer highlights the public and animal health threat posed by importation of exotic animals for commercial purposes. Exotic animal importation and trade of indigenous wildlife captured for the pet trade have been associated with previous disease outbreaks, including human salmonellosis contracted from pet reptiles, as well as tularemia and plague epizootics in captive prairie dogs. Although many states prohibit private ownership of prairie dogs, thousands of these animals, many of which are captured from the wild, are distributed in the United States and shipped internationally for sale as pets. The results of recent human exposure to monkeypox virus via pet prairie dogs have been obvious. However, the potential exposure of other species and introduction of monkeypox virus into free-ranging wildlife via illegal release of implicated animals or by improper disposal of animal carcasses or litter remain unknown and of concern to public health and wildlife management agencies. Additional information on monkeypox is available from the CDC website: www.cdc.gov (Prepared by Nicole Nemeth and John Fischer)

SARS

In February 2003, a new coronaviral disease known as Severe Acute Respiratory Syndrome (SARS) gained international attention as it spread to 32 countries around the world. The virus first surfaced in the human population in November 2002 in the Guangdong Province of southern China. The emergence of SARS and its impact on international travel and business has created an urgent need to understand the natural history of the disease in order to prevent future epidemics.

Coronaviruses are large RNA viruses that cause respiratory and intestinal disease in humans and many species of domestic animals. Most human

coronaviruses cause mild upper respiratory disease resembling the common cold. However, coronavirus of cattle and transmissible gastroenteritis virus of swine cause severe disease in livestock. Little is known about coronavirus infection in wild animals, but feline infectious peritonitis virus has been documented as a cause of disease in large felids such as the cheetah. Coronaviruses are spread in respiratory secretions and feces, so lower density of wild animal populations could explain the lower prevalence of coronavirus infections in wildlife when compared with domestic animals. Also, coronaviruses are inactivated by heat, disinfectants, and ultraviolet light, so they do not survive long outside of their hosts. Coronaviruses typically have narrow host ranges, but they can mutate easily due to their unique method of replication and potentially could be infectious to other species. Sequencing of the genome of SARS virus demonstrated that the virus is distinct from all of the known coronaviruses for which information is available. It is proposed that the SARS virus be classified into a distinct fourth serogroup, separate from the three previously recognized coronavirus serogroups.

The natural reservoir of SARS virus and the origin of the new virus are still unknown. In May 2003, researchers from the University of Hong Kong isolated a virus very similar to SARS virus from four masked palm civets (*Paguma larvata*) and one raccoon dog (*Nyctereutes procyonoides*) in a live-animal market in Shenzhen in the Province of Guangdong. Civets are cat-like carnivores related to the mongoose. They are solitary animals that may form small family groups in the woodlands, rainforests, and savannas of Africa, southwestern Europe, India, the Arabian Peninsula, southeastern Asia, and the Philippines. In southern China, the meat of the masked palm civet is a delicacy, and live animals are sold in markets for human consumption. The raccoon dog is closely related to the gray fox and the bat-eared fox and is native to the forests of eastern Asia. It also was artificially introduced into eastern Europe to be hunted for fur. These civets and raccoon dogs may be the source of SARS virus, or they may be incidental hosts infected by another animal before they arrived at the market. Close confinement of these animals in a market creates a good environment for disease transmission.

In the market where the SARS-like coronavirus was isolated from masked palm civets, 5 out of 10 (50%) civet handlers tested positive for antibodies to SARS virus, which indicated that the handlers had overcome infection in the past. Elsewhere in the Guangdong Province, 508 civet handlers were tested, and 66 (13%) tested positive for SARS virus antibodies. This percentage is much higher than the prevalence of SARS virus antibodies in the general population, so animal handlers in the live markets of southern China apparently come in contact with the virus more frequently.

The coronaviruses isolated from the palm civets and the raccoon dog in Guangdong were very similar to the SARS virus but had an extra stretch of genetic material not present in the human SARS virus. Since coronaviruses are known to mutate and lose sequences of genetic material during replication, researchers believe that the SARS agent may have

originated in other animals before it gained the ability to infect humans. Research currently is underway to identify the natural life cycle of the SARS virus and to determine the role of animals in the origin and transmission of the SARS coronavirus and their status as reservoirs of the disease. Additional information on SARS is available from the Centers for Disease Control and Prevention website: www.cdc.gov (Prepared by Emily Watry)

Florida Passes Feral Cat Policy

On May 30, 2003, the Florida Fish and Wildlife Conservation Commission (FWC) passed a policy regarding feral and free-roaming cats. The policy states that in being entrusted by the public with the responsibility of safeguarding wildlife resources, FWC is obligated "to protect native wildlife from predation, disease, and other impacts presented by feral and free-ranging cats." The primary focus of the policy is to provide technical advice, policy support, and partnerships with land-management agencies to lessen the impacts of cats where they pose a significant threat to local wildlife populations on public conservation lands.

During the months preceding the vote, the draft policy sparked mobilization of feral cat advocacy groups and significant press coverage. An earlier draft of the policy called for opposing "trap-neuter-release" (TNR) programs wherever they potentially impact local wildlife populations; however, this reference was removed from the final policy. Regarding TNR, the FWC stated that while it does not endorse this approach to feral cat management, the primary focus for the new policy is to lessen specific adverse impacts of feral and free-ranging cats on rare wildlife species inhabiting lands owned or managed by the Commission.

Trap-neuter-release programs are being conducted with private and public funding in cities, suburbs, military bases, college campuses, parks, farms, and natural areas around the United States. Colonies of stray and feral cats form around artificial feeding sources, such as garbage dumps or places where people deliberately provide food for them. Trap-neuter-release programs involve humane trapping of feral cats, surgical sterilization, and release at the site of capture. However, not all agree that TNR is the best approach to management of feral cats.

By virtue of their profession, veterinarians have been drawn into the middle of the TNR controversy. Advocates of TNR believe that leaving sterilized cats in an established colony is the best deterrent to population growth, as members will defend the territory, limiting the addition of new, sexually intact cats to the group. The ultimate goal of the TNR program or "managed colony," as stated by the American Veterinary Medical Association (AVMA), is colony size reduction by alteration and adoption and eventual elimination by attrition. In 1996, the AVMA drew up an extensive list of minimum requirements for "managed colonies" in the interest of the health and welfare of the cats and the public. Notably, these requirements include "restriction of the colony to a well-defined area, *not on lands managed for wildlife or other natural resources*."

Opponents of TNR programs regard feral cats living in "managed colonies" as non-native, invasive, subsidized predators. They observe that feral cats lead short, brutal lives and believe that those who participate in TNR programs prolong the suffering of feral cats still facing a multitude of hazards and diseases. Furthermore, opponents note that veterinarians and others who treat and release feral cats may be violating animal abandonment laws in some localities. Also at issue is the fact that feral cat colonies pose numerous public health risks, not all of which can be mitigated by vaccination and deworming. These concerns already have prompted professional organizations such as the National Association of Public Health Veterinarians, American Association of Wildlife Veterinarians, and American Association of Avian Veterinarians to pass resolutions opposing TNR.

The debate among veterinarians supporting and opposing TNR programs was evident at the annual meeting of the AVMA in Nashville, Tennessee, in July 2002. Dr. Julie Levy, assistant professor at the University of Florida's College of Veterinary Medicine and cofounder of "Operation Catnip," a TNR program that began on the university campus, presented seminars in the session "Free-Roaming and Feral Cats and the Public." Dr. David Jessup, senior veterinarian with the California Department of Fish and Game, presented seminars in the counterpoint session "Feral and Free-Roaming Cats; the Flip Side of the Coin." Another seminar on management of abandoned and feral cats is scheduled for the 2003 AVMA Animal Welfare Forum to be held in Chicago in November.

How many homeless domestic cats are there in the United States? Estimates range from 30-60 million stray (abandoned or lost) and feral (unsocialized offspring of strays) cats. In addition, only an estimated 35% of the more than 73 million owned pet cats are kept exclusively indoors, leaving 47 million free to roam outdoors. These highly efficient predators may be particularly devastating to wild birds, small mammals, reptiles, and amphibians that are small or restricted in their distribution. Certainly, more scientific studies are needed to fully document the impacts of roaming cats on native wildlife, but as evidence mounts, wildlife professionals feel compelled to act.

Resolution of this complex problem requires a cooperative, multi-disciplinary approach, and the solution depends in part on wildlife health professionals contributing scientific information to the discussion. As Dr. Tonie Rocke, past president of the Wildlife Disease Association, commented, "We would all agree that efforts to reduce feral cat populations and the numbers of animals killed in animal shelters are laudable goals." Despite their differences, advocates and opponents of TNR are united in sharing a common goal (to make abandonment of unwanted pet cats a thing of the past), a common understanding (that the feral cat problem is, at root, a people problem), and a common strategy (education). Indeed, a key component of the FWC policy specifies that the agency will develop a public-awareness campaign focusing on responsible cat ownership and the impact on native wildlife posed by feral and free-roaming cats. (Prepared by Cynthia Tate)

White Paper on Feeding and Baiting

Several significant health problems in free-ranging wildlife are strongly associated with artificial supplemental feeding. Prominent examples include bovine tuberculosis in white-tailed deer in Michigan, bovine brucellosis in elk in the Greater Yellowstone Area, and mycoplasmal conjunctivitis of finches. This practice causes unnatural congregation of wildlife and increases the opportunities for the transmission of infectious disease agents. The Canadian Cooperative Wildlife Health Center (CCWHC) recently made available *A Comprehensive Review of the Ecological and Human Social Effects of Artificial Feeding and Baiting of Wildlife*. The Executive Summary of this excellent review follows. The entire 68-page document, which includes an annotated bibliography, may be found at the CCWHC website (http://wildlife.usask.ca/).

"In recent years, events within Canada and the United States have drawn attention to potential negative consequences of feeding and baiting wild animals, especially enhanced transmission of infectious diseases such as bovine tuberculosis and chronic wasting disease. This report was prepared to gather available science-based information on the ecological and human social effects of artificial feeding and baiting of wildlife into one readily accessible document. The contracting agencies, Parks Canada and Saskatchewan Environment, recognize that an objective review of existing literature may help to answer questions and concerns within and outside the agencies, and help to guide subsequent decision-making concerning management and research pertaining to feeding and baiting. "Although the objectives for artificial feeding and baiting with feed often differ, the effects of these practices are considered together. In essence, both provide natural or artificial food for wildlife at specific locations in the environment.

"Significant ecological effects of providing feed to wildlife have been documented through observation and experimentation at the individual, population, and community levels. In Saskatchewan and Manitoba, the increased potential for disease transmission and outbreak is perhaps of greatest and immediate concern. Nevertheless, even if spread of disease is prevented, other significant ecological concerns exist. Disruption of animal movement patterns and spatial distribution, alteration of community structure with reduced diversity and abundance, the introduction and invasion of exotic plant species, and general degradation of habitat are all major negative effects that have been documented at different locations throughout North America. Although information gaps exist, current information appears sufficient to conclude that the potential for negative ecological effects as a result of providing food to wildlife through artificial feeding or baiting is high. Nevertheless, our current understanding of the specific mechanisms operating between cause (feeding or baiting) and effect is often too crude to allow accurate prediction of the nature or magnitude of effect.

"The human social effects of providing food to wildlife concern numerous issues (economics, human safety, wildlife ownership, etc.), and

perceptions regarding specific issues can be quite disparate. The science-based information is limited in part because philosophical differences lie at the root of many of the issues and science is not the appropriate tool for resolution, e.g., science cannot determine whether hunting over bait is ethical or not." (Prepared by John Fischer)

More SCWDS Graduate Student Accolades

SCWDS graduate student Michael Yabsley was highly honored recently as the recipient of the Norval-Young Award, given by the Society for Tropical Veterinary Medicine at its biennial conference. The Norval-Young Award was established in 1997 to honor the memory of Drs. Andy Norval and Alan Young, two distinguished researchers and teachers who made enormous contributions to the present understanding of tick_borne diseases in the tropics. Both of these scientists were dedicated to student participation, encouragement, and support. Veterinary students or graduate students with a special interest in tropical veterinary medicine compete for the award worldwide. Applicants must have completed a research project in tropical veterinary medicine and must be recommended by faculty or professional members of the institution that supported the research or clinical project. Michael was recommended for the award by his major professor, Dr. Randy Davidson, and by Dr. Susan Little. The winner receives expenses to attend the meeting, including round-trip air fare, registration fees, housing, and meals. This year's meeting was held in Iguassu Falls, Brazil, June 21-July 2, 2003.

Michael also recently won a Doctoral Research Assistantship from the University of Georgia. Designated as a Dissertation Completion Award, it is given only to highly qualified graduate students during their final year of study. The award consists of a $15,000 stipend over a 10-month period and is provided to assure that the student is free from other departmental responsibilities so that maximum time can be spent on research and writing. Our heartiest congratulations to Michael.

Two other graduate students affiliated with SCWDS also are receiving recognition for outstanding accomplishments. Drs. Cynthia Tate and Andrea Varela were chosen to receive awards during the upcoming 52nd Annual Conference of the Wildlife Disease Association (WDA), to be held August 11-14, 2003, in Saskatoon, Saskatchewan. Cynthia and Andrea are both conducting research on ehrlichiosis. Cynthia's major professor is Dr. Randy Davidson, and Andrea is studying under the guidance of Dr. Susan Little.

Cynthia is receiving the WDA's Graduate Research Recognition award, given to the student judged to have the best research project in the field of wildlife disease, based on written communication and scientific achievement. The winner receives a plaque and up to $1,000 to cover travel, housing, registration, and meals related to the annual conference. Cynthia will be the featured presenter during the Student Presentation Session at the Conference.

Andrea was the winner of the WDA's Scholarship Award, which acknowledges outstanding academic

and research accomplishment, commitment, and potential in pursuit of new knowledge in wildlife disease or health. The award has a value of $2,000 and is given annually to an outstanding student who is pursuing a master's or doctoral degree specializing in research on wildlife disease.

These are the two highest honors given to student-members of the Wildlife Disease Association, and Cynthia and Andrea are to be highly commended and congratulated. (Prepared by Gary Doster)

Recent SCWDS Publications Available

Below are some recent publications authored or co-authored by SCWDS staff. If you would like to have a copy of any of these papers, fill out the request form and return it to us.

_____Augspurger, T., J.R. Fischer, N.J. Thomas, L. Sileo, R.E. Brannan, K.J.G. Miller, and T.E. Rocke. 2003. Vacuolar myelinopathy in waterfowl from a North Carolina impoundment. Journal of Wildlife Diseases 39(2): 412-417.

_____Fischer, J.R., L.A. Lewis, and C.M. Tate. 2003. Experimental vacuolar myelinopathy in red-tailed hawks. Journal of Wildlife Diseases 39(2): 400-406.

_____Gaydos, J.K., D.E. Stallknecht, W.R. Davidson, E.W. Howerth, M.D. Murphy, and F. Elvinger. 2002. Cross-protection between epizootic hemorrhagic disease virus serotypes 1 and 2 in white-tailed deer. Journal of Wildlife Diseases 38(4): 720-728.

_____Gaydos, J.K., D.E. Stallknecht, W.R. Davidson, F. Elvinger, D.G. Mead, and E.W. Howerth. 2002. Innate resistance to epizootic hemorrhagic disease in white-tailed deer. Journal of Wildlife Diseases 38(4): 713-719.

_____Howerth, E.W., D.G. Mead, and D.E. Stallknecht. 2002. Immunolocalization of vesicular stomatitis virus in black flies (Simulium vittatum). New York Academy of Sciences 969: 340-345.

_____Keel, M.K., W.R. Davidson, G.L. Doster, and L.A. Lewis. 2002. Lead shot in an upland habitat: implications to northern bobwhite. Archives of Environmental Contamination and Toxicology 43: 318-322.

_____Nettles, V.F., C.F. Quist, R.R. Lopez, T.J. Wilmers, P. Frank, W. Roberts, S. Chitwood, and W.R. Davidson. 2002. Morbidity and mortality factors in Key deer (Odocoileus virginianus clavium). Journal of Wildlife Diseases: 38(4): 685-692.

_____Quist, C.F., Nettles, V.F., E.J.B. Manning, D.G. Hall, J.K. Gaydos, T.J. Wilmers, and R.R. Lopez. 2002. Paratuberculosis in Key deer (Odocoileus virginianus clavium). Journal of Wildlife Diseases 38(4): 729-737.

_____Yabsley, M.J., N.L. Gottdenker, and J.R. Fischer. 2002. Description of a new Eimeria sp. and associated lesions in the kidneys of double-crested cormorants (Phalacrocorax auritus). Journal of Parasitology 88(6): 1230-1233.

_____Yabsley, M.J. and G.P. Noblet. 2002. Biological and molecular characterization of a raccoon isolate of Trypanosoma cruzi from South Carolina. Journal of Parasitology 88(6): 1273-1276.

_____Yabsley, M.J., A.S. Varela, C.M. Tate, V.G. Dugan, D.E. Stallknecht, S.E. Little, and W.R. Davidson. 2002. Ehrlichia ewingii infection in white-tailed deer (Odocoileus virginianus). Emerging Infectious Diseases 8: 668-671.

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