CO.53
POPULATION STRUCTURE OF TWO RABIES HOSTS IN ALASKA

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Rabies, is widespread in arctic and red foxes in Northern and Western Alaska, but not endemic in Interior Alaska. Areas with endemic rabies overlap with the habitat of the Arctic fox while regions solely inhabited by the red fox are considered free of endemic rabies. It is therefore not known if red foxes serve as competent long-term reservoirs for rabies or support only spill over infections. Three strains of rabies virus are present in Alaska with distinct geographic distribution. Furthermore climate change is expected to alter the distribution of these two species in Alaska, expanding the range of the red fox into the historic habitat of the arctic fox. We assessed the population structure of the two major hosts in Alaska, red and arctic foxes in the context of rabies strain distribution in Alaska. In contrast to previous studies on population structure of Arctic foxes in North America, we found significant structure in the population of arctic foxes, which correlates with the phylo-geographic distribution of rabies strains in Alaska. Red foxes also showed evidence of only limited gene flow between regions of Alaska.

CO.54
THE GERMAN RACCOON (PROCYON LOTOR) POPULATION AS POTENTIAL RABIES RESERVOIR SPECIES

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Until recently, the red fox (*Vulpes vulpes*) was considered the only reservoir species for terrestrial wildlife rabies in Europe. However, since the late 1980s another host species has emerged in North- and East Europe; the raccoon dog (*Nyctereutes procyonoides*). Interestingly, several other potential rabies reservoir species occur in Europe but without evidence that these animals play any role in the spread of the disease; golden jackals (*Canis aereus*) in Southeast Europe, the small Indian mongoose (*Herpestes auropunctatus*) inhabiting parts of the Adriatic coastal region, and the raccoon (*Procyon lotor*) in most parts of Europe. Especially in (semi-) urban areas in Germany, extreme high raccoon population densities have been observed (approx. 100 animals/km²). To investigate the possibility that raccoons in Germany could become a reservoir species in case of re-emergence of rabies in Germany the susceptibility of the ´local' raccoon population was investigated. Wild caught animals were inoculated with the most likely lyssavirus variants to infect the German raccoon population. It was shown that the German raccoons were fully susceptible for a dog and raccoon rabies virus (RABV) variant. Five of 6 raccoons inoculated with a fox RABV isolate showed subsequently clinical signs. In contrast to foxes, none of the infected raccoons succumbed to rabies after infection with European Bat Lyssavirus Type 1 (EBLV-1); although all these raccoons seroconverted. The most likely event that a German raccoon will come in contact with a lyssavirus is through contact with an infected bat. It can therefore be a reassuring thought that based on the results of this study raccoons are highly refractory to EBLV-1 virus infection. The highest risk that the raccoon population will become infected with rabies is by re-emergence of this disease by accidental importation of dog rabies. Although the immediate risk may not seem high it must be stressed that no experience and no tools are readily available to control a rabies outbreak among raccoons in Germany. The study was conducted as part of the Lyssavirus Research Network and sponsored by the German Federal Ministry of Education and Research (grant nr. 01KI1016A).

CO.55
RABIES CONTROL PROGRAMMES IN THE BALKAN REGION: ACHIEVEMENTS AND PERSPECTIVES IN MACEDONIA

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Through the Instrument and Pre-Accession Assistance, European Union provides funding to support the control and eradication of classical swine fever and rabies in seven candidate or potential candidate countries of the Western Balkans, where the main reservoir and vector of rabies is the red fox (*Vulpes vulpes*). Most of those countries have reinforced measures aiming to control the disease and have initiated oral vaccination programmes against rabies which started in Kosovo in spring 2010. The project was initiated in Macedonia in August 2010 and the first objective was to improve passive surveillance and reporting through enhancing public awareness about the risks of the disease and training for stakeholders. Macedonia is a 25,713 km2 country bordered by four infected countries. In Macedonia, there had been no cases reported since 2000. The first oral vaccination campaigns were implemented in spring and autumn 2011 in the whole country using SADB19 vaccines and aerial distribution. The first case of rabies was detected in July 2011 on a fox in the centre of the country. Eight other cases have been reported in the centre, in the east and in the south parts of Macedonia. Several cases have been isolated at close proximity with Bulgaria and Greece, requiring the implementation of addequate measures in those countries. The last case was recorded in a cat in March 2012. The number of samples and of species analysed in 2011 was significantly increased compared to that of 2009 and 2010. This reflects a higher level of awareness of rabies among hunters, general public and professionals involved in rabies control activities as well as increased quality of the rabies surveillance and monitoring. The efficacy of the campaigns was assessed through monitoring healthy foxes (with active participation of hunters) in all vaccinated areas and revealed a very high percentage of bait uptake (estimated at 91%) and an rabies antibody response of foxes at 59%. The genetic characterization of eight strains isolated in Macedonia has been undertaken to identify rabies variants circulating in the country. The tested isolates were resolved in the East European group with a high nucleotide identity of the nucleoprotein gene found for all isolates, suggesting wildlife movements of rabies in the region. The multi annual rabies control programme will be shortly described (rabies surveillance network, planning, organisation, implementation and evaluation of the campaigns, laboratory investigations) as well as achievements done in the Balkan region. Perspectives for strengthening collaboration with the neighbouring countries for the next years will also be discussed.

CO.56
RESULTS OF THE FIRST ONRAB® SAFETY AND IMMUNOGENICITY FIELD TRIAL IN RACCOONS IN THE U.S.

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A safety and immunogenicity field trial to evaluate a live recombinant human adenovirus (serotype 5)-rabies glycoprotein vaccine (ONRAB®) in raccoons and skunks was conducted in the U.S. in 2011. Approximately 80,000 Ultralite baits (Artemis Technologies, Guelph, ON, CAN) were distributed at 75 baits/km2 along 750m flight lines in 4, 127 km2 study areas in southeastern West Virginia, U.S. The bait was composed of a small blister pack that contained the ONRAB® vaccine with a waxy coating matrix of attractants impregnated with tetracycline biomarker, and camouflaged by a green dye. No phone calls from human or pet bait contacts were reported through a toll-free phone number provided on each bait. Low human population density may largely account for no reported bait contacts. No tissue abnormalities were observed in captive cottontail rabbits, opossums, fox squirrels, eastern wild turkeys, and woodrats at a 10x ONRAB® dose, and field histopathology results should be available in December 2012. Rabies virus neutralizing antibody (RVNA) was higher among raccoons ($P<0.05$) in post-ONRAB® samples (49.4%, $n=296$) than in naïve pre-ORV samples (9.6%, $n=395$). Biomarker was higher ($P<0.05$), among post-ONRAB® raccoons sampled, an indication of vaccine-induced RVNA's. The 49.4% RVNA population level in raccoons is the highest observed in the U.S. for a first time oral rabies vaccine distribution event. Skunk sample size was inadequate to assess ONRAB® effects. Field trial results warranted replication and expansion in 2012 to assess raccoon population immunity from a second ONRAB® trial in four more states, including Ohio urbansuburban habitats. These collaborative trials, which will continue to bring together multiple disciplines from county, state, federal and international jurisdictions in the spirit of One Health, should provide a basis to determine if ONRAB® is suited to achieve raccoon rabies management goals.

CO.57
PREFERENCES OF SELECT ATTRACTANTS IN THE COATING OF ONRAB VACCINE BAITS BY RABIES RESERVOIR SPECIES

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Rabies control managers and researchers in the United States are assessing how the Canadian vaccine ONRAB® may perform if integrated into the United States oral rabies vaccination (ORV) program. A measurement of success of any ORV program is bait uptake by target species. The attractant used in the bait matrix surrounding a vaccine influences bait uptake and vaccination rate. Our objective is to determine which flavor of attractant in the ONRAB® coating is the most preferred by rabies reservoir species in the field. In Texas (TX) we are evaluating four attractants (sweet, fish, egg, and cheese) in areas inhabited by raccoons (*Procyon lotor)*, skunks (*Mepthis mephitis*), foxes (*Urocyon cinereoargenteus)*, and coyotes (*Canis latrans*). In Puerto Rico (PR), we are comparing the preference of mongoose (*Herpestes auropuctatus)* for cheese, coconut, and fish attractants. We monitored bait stations with animal-activated cameras and regular checks of bait status (untouched, disturbed, and removed). In TX, we offered 540 baits of which 102 were removed, with cheese and fish most often removed (both 25%) followed by egg (21%) and then sweet (15%) and unflavored controls (14%). Image scoring from camera data is underway. In PR, mongoose removed baits on 38 of 343 occasions. Though all data are not yet fully analyzed, it appears mongoose prefer cheese, followed closely by fish. Findings in both TX and PR are suggesting that sweet flavors are least attractive to rabies reservoir species. To confidently state which attractants will likely perform the best, we need to complete the analyses of these data and do more extensive trials, especially in raccoon habitat in the eastern United States.

CO.58
EVALUATION OF NON-TARGET ANIMAL EXPOSURE TO HUMAN ADENOVIRUS RECOMBINANT ORAL RABIES VACCINE- OHIO 2012

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Oral Rabies Vaccination (ORV) is the primary management practice for controlling wildlife rabies in the United States, particularly among raccoons and foxes. Two ORV bait designs are primarily utilized for the distribution of vaccinia rabies glycoprotein (VRG) vaccine: a fish meal polymer block and a coated sachet. A primary public health concern related to ORV bait distribution is non-target contact between the ORV and humans and domestic pets. The VRG virus strain used in ORV is attenuated in mice, but human percutaneous exposure to ruptured sachets has resulted in localized vaccinia virus infection in very rare cases. Recently, a new recombinant human adenovirus ORV (AdRG) has been developed. This vaccine is incorporated in ultralight bait which has not previously been used in the United States. Surveillance for human contact is important, particularly among young children that may have contact with the bait, due to their lower prevalence of prior exposure and immunity to human adenoviruses. To evaluate potential differences in contact rates between the VRG and AdRG bait types CDC, the Ohio Department of Health, and USDA/WS will conduct an investigation during ORV baiting in Northeastern Ohio in August 2012. The focus of this investigation will be to ensure that public health programs are in place to capture events of human and domestic animal bait contact, ensure appropriate protocols are in place in case of a severe adverse event from a bait contact, and evaluate whether the AdRG vaccine bait matrix is associated with a different human detection rate compared to bait types used for distributing VRG. Updated guidelines related to appropriate management of potential contacts with AdRG baits during ORV activities may be developed based on findings from this investigation.

CO.59
MULTIDISCIPLINARY APPROACH TO EPIZOOTIOLOGY AND PATHOGENESIS OF BAT RABIES VIRUSES IN THE UNITED STATES

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Zoonotic disease surveillance is typically initiated after an animal pathogen has caused disease in humans. Early detection of potentially high-risk pathogens within animal hosts may facilitate medical interventions to cope with an emerging disease. To effectively spillover to a novel host, a pathogen may undergo genetic changes resulting in varying transmission potential in the new host and potentially to humans. *Rabies virus* (RABV) is one model pathogen to consider for studying the dynamics of emerging infectious diseases under both laboratory and field conditions. The evolutionary history of RABV is characterized by regularly documented spillover infections and a series of notable host-shifts. Within this context, enhanced field surveillance to improve detection of spillover infections will require validated techniques to non-invasively differentiate infected from non-infected individuals. In this