Scientific Programme

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Abstracts

Report of wildlife disease investigations in Finland in 2011-2012
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The focus of wildlife disease surveillance is on zoonotic diseases transmitted by small carnivores: rabies, echinococcosis and trichinellosis. In 2011-2012, brain samples from 458 raccoon dogs, 290 foxes, 181 lynx, 43 pine martens, 39 wolves and 44 bats (of various species) were examined for rabies by FA method and found negative. *Echinococcus canadensis* was found in 8 wolves out of 41 examined, all from the eastern part of the country. For the first time, hydatid cysts of *E. canadensis* were found in the Finnish forest reindeer (*Rangifer tarandus fennicus*) in 2012. *Echinococcus multilocularis* was not found in the examined foxes or raccoon dogs. As usual for the last decade, *Trichinella* spp. were prevalent in wildlife also in 2011-2012: 51% of lynx, 32% of wolves, 34% of raccoon dogs and 19% of foxes were infected. Tularemia occurred mostly in brown hares (12 cases) and less frequently in mountain hares (5 cases). *Francisella tularensis* was also found in a beaver and a hedgehog. European brown hare syndrome (EBHS) seems to have become extremely rare as no cases were found in 2011-2012. In small passerine birds, avian chlamydiosis was more prevalent than usual in the winter of 2012 with five confirmed outbreaks in different parts of the country. Avian trichomoniasis caused notable mortality in yellowhammers in midwinter of 2012. Mysterious local moose deaths – two moose dead with same findings in almost exactly the same place in autumns of 2011 and 2012 – puzzled pathologists. A poisoning of some kind was the tentative diagnosis. Otherwise, new diseases or unusual large-scale mortality events were not detected.

Wildlife diseases in Sweden 2011-2012, a summary
Erik Ågren, National Veterinary Institute, Uppsala, Sweden

In Sweden, the main wildlife disease diagnostics and surveillance is done at the National Veterinary Institute. In 2011, a total of 4,883 wild animal bodies or parts of bodies were examined or sampled. Of these, 3,227 were red fox, with almost 3,000 collected and sampled within the *Echinococcus multilocularis* surveillance after the first finding of the parasite in February 2011, in the southwest of Sweden. The study showed four positive red fox in three different counties. To OIE, 102 cases of important wildlife diseases were reported in 2011, including trichinella in several large carnivores, tularemia, salmonella, toxoplasmosis, trichomoniasis, avian pox, a large outbreak of avian paramyxovirus in pigeons, pseudotuberculosis, and sarcoptic mange. In 2012, 1,472 wildlife cases were handled. About 560 large carnivores; wolf, brown bear, lynx, and wolverine, both samples from hunted animals and fallen wildlife were submitted to SVA in both 2011 and in 2012. Active disease surveillance and studies in 2011-2012 include studies such as mortalities in moose calves, adult moose in southern Sweden, eider duck mortalities, tularemia in hares, liver flukes in grey seals, lead levels in eagles, and ammunition lead contamination of game meat, as well as avian influenza surveillance.

Two emerging or otherwise novel wildlife parasites
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Two *Dirofilaria* species are known to exist in Europe; *D. immitis* and *D. repens*. They are mosquito vector–borne parasites of dogs, and also zoonotic. They, especially *D. repens*, are expanding their range in Europe from the Mediterranean countries northward. The bear parasite *Dirofilaria ursi* is also regarded as zoonotic. Its identified range includes North America, Japan and Siberia, but there appear to be no properly published records from Europe. However, these worms have been seen in hunted brown bears at least for three decades with a high prevalence in Finnish Karelia, with around 70-80 % of adult bears being infected. Mosquitoes are the vectors of *D. immitis* and *D. repens*, but blackflies are described as the vectors of *D. ursi*. Its in-vector developmental temperature requirements are apparently lower than those of *D. immitis* and *D. repens*. What climate change will do to the distribution of *D. ursi* is to be seen.

Macroscopic *Sarcocystis* cysts were detected in muscles of 28 mallards (*Anas platyrhynchos*), one wigeon (*Anas penelope*) and one teal (*Anas crecca*) hunted in Lithuania and Finland. According to several gene sequences the
cysts were identified as *Sarcocystis rileyi*. All isolates examined were identical to each other. The lack of intraspecific genetic diversity might be caused by the recent relocation of *S. rileyi* to a new continent. In America, the definitive host of *S. rileyi* is the skunk.

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**Causes of mortality in Swedish moose (Alces alces), fall and winter 2012-2013**
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In response to reports of dead and emaciated moose (*Alces alces*) and media speculations of a new disease entity in Blekinge, eastern Skåne and Södermanland counties, in the summer and early autumn of 2012, efforts were made to bring in as many reported dead or euthanized moribund moose for necropsy as possible. In the period June 2012 to February 2013 52 moose, 30 females and 22 males, age distribution 10 less than 1 yr, 31 between 1 and 10 yrs and 11 more than 10 yrs, from the southern half of the country, were examined. The majority of the animals were in poor body condition, 48% were emaciated. Grouped results of the examinations revealed a spectrum of bacterial and viral infections as the main underlying cause of death (23%), followed by endoparasitism (21%) and trauma (19%). Eight percent of the animals had succumbed due to advanced age (cataract, dental wear). In 6% of the cases death had resulted from emaciation of undetermined origin. Results were comparable to historical data from Swedish wildlife disease surveillance with a notable increase in the number of moose with parasitic abomasitis (ostertagiosis) and parasitic enteritis (trichuriasis). The present findings do not support the presence of a new disease entity in Swedish moose but the number of moose with parasitic abomasitis and enteritis warrant further studies.

**Swedish wildlife disease surveillance of wild boars – what do we get and what do we see?**
Axel Sannö, National Veterinary Institute, Uppsala, Sweden

Wild boars (*Sus scrofa*) were reintroduced in Sweden in the 1970s through escapes from hunting enclosures. They were then accepted as part of the national fauna in the mid 1980s and have since increased rapidly. The calculated annual cull today is approaching 100 000. Within the Swedish wildlife disease surveillance program, wildlife found dead or hunted wildlife with visible abnormalities can be sent to the National Veterinary Institute for examination. Records from wild boars submitted through this program from 2002 – 2012 were studied. A total of 34 whole carcasses and 60 samples from wild boars were received. The most common findings were normal tissues from animals without signs of disease that had been sent in because the submitter had observed something unfamiliar or unusual. Examples include a liver with a normal gallbladder and hemal lymph nodes. The most common pathological findings were signs of parasitic infection with sarcoptic mange (n=11) and/or lung worms *Metastrongylus* spp. (n=13). Some cases of cachexia (n=8) and trauma (n=5) were also recorded. These findings indicate that, like other game species, the wild boar population appears to be healthy, suffering primarily from parasitic infections possibly due to high local population densities.

**Mycobacterium avium in a wild boar (Sus scrofa) in Sweden**
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The wild boar (*Sus scrofa*) is considered a potentially important reservoir host for tuberculosis in continental Europe. In Sweden no previous cases of tuberculosis have been described in the wild boar. A young male wild boar in average body condition shot during hunting was presented for necropsy due to multiple lesions in the inner organs. The following macroscopic changes were recorded. The spleen was markedly enlarged with multifocal abscesses of varying size 5 – 30 mm in diameter. The liver was enlarged and firm in consistency with a pale coloration. The lungs were heavy, had a mottled appearance and complete consolidation in some areas. A moderate amount of lungworms (*Metastrongylus sp.*) were present in the caudal
parts of the lung. The mesenteric, mediastinal, bronchial, submandibular and retropharyngeal lymph nodes were markedly enlarged and contained yellowish necrotic debris. Histopathologic examination of the spleen, lung, liver and lymph nodes showed a varying degree of chronic granulomatous inflammation with Langhan's giant cells. A Ziehl-Neelsen stain showed only a few positive rods in a lesion in the spleen. Mycobacterium Avium Complex (MAC) was isolated from the liver and submandibular lymph node. Further typing and sequencing classified the MAC as Mycobacterium avium sp. avium. This is the first recorded finding of Mycobacterium sp in a Swedish wild boar.

The biliary trematode *Pseudamphistomum truncatum*: an emerging parasite in Swedish wildlife?

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*Pseudamphistomum truncatum* is an opportunistic biliary trematode in a wide range of fish-eating mammals, including humans. Historically reported from Russia and Eastern Europe, this parasite has recently emerged in wild mustelids in the United Kingdom and Denmark. In a retrospective examination of wildlife pathology records from 1948 onwards from the National Veterinary Institute (SVA) in Sweden, *P. truncatum* was reported in 26 red foxes (*Vulpes vulpes*) from as early as 1954. However, only four of these cases occurred within the last two decades. Single cases also were reported from a grey seal (*Halichoerus grypus*) in 1973 and a ringed seal (*Pusa hispida*) in 1974. In contrast, infection in wild mustelids was not reported until 2006 in an otter (*Lutra lutra*). Since then, seven out of the 249 otters (2.8%) routinely investigated at SVA were infected with *P. truncatum*, and four of these cases occurred within the last year (2012). In three of these most recent cases, parasitism likely resulted in death of the host. A similar and more dramatic trend is evident in grey seals. Each year, 100-150 Baltic grey seals are examined at the Swedish Museum of Natural History. Prior to 2002, reports of *P. truncatum* were rare. Since then, prevalence has reached 20% and the geographic range has expanded to represent seals from the entire Swedish Baltic coast. Although primarily an incidental finding, this parasite has caused severe debilitation or death in three grey seals. Further investigation into the parasitic life cycle, reasons for this emergence and significance for potential final hosts, including humans, is warranted.

Distemper Epidemic in Red Foxes and Farmed Mink in Denmark 2012-13

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During 2012/2013 there has been a major epidemic of distemper in farmed mink (*Neovison vison*) and red foxes (*Vulpes vulpes*) in Denmark, an epidemic of such extent affecting both wild and domestic animals has not been recorded in Denmark in recent years. Distemper is caused by a *Morbillivirus*. The classical symptoms are depression, fever, nasal and ocular exudates, dyspnoea, diarrhoea, and neurologic signs and/or hyperkeratosis of the foot pads, however this depends on species affected. The relatively long incubation period of one to several weeks and long term shedding of virus from subclinically infected animals, make it difficult to control the disease in wildlife. The National Veterinary Institute diagnoses distemper by detection of virus in lung tissue by immunofluorescence or PCR. Distemper, which in Denmark is a notifiable disease of fur-bearing animals, affects a broad variety of carnivores and several species have been tested for distemper during the outbreak: 346 farmed mink (143 farms), 48 red foxes, 4 stone martens (*Martes foina*), 3 otters (*Lutra lutra*), 2 badgers (*Meles meles*), 2 pet dogs (*Canis lupus familiaris*), 1 grey wolf (*Canis lupus*), 1 raccoon dog (*Nyctereutes procyonoides*), 1 polecat (*Mustela putorius*) and 1 harbour seal (*Phoca vitulina*). Positive reaction has been detected in 28 red foxes, 1 stone marten and on 68 mink farms – all cases coming from Jutland. In regard to the outbreak of distemper among the farmed mink it is believed that wild foxes have introduced the disease into the farms and they might also be involved in spreading of the disease. This assumption is based upon the finding of a positive fox in March 2012, four months before distemper was diagnosed in the first mink farm. Several mink farmers also noted diseased foxes in their farms prior to the outbreak of distemper in the mink
and many of these farmers submitted diseased or dead wild foxes to be tested for distemper – which turned out positive. Furthermore, an on-going study at the National Veterinary Institute has shown that the genome of the distemper viruses identified in mink and foxes are identical. The outbreak of distemper has had a major negative impact on the Danish fox population in some areas of Jutland. So far the infection has been confined to Jutland, but the end of the epidemic has not yet been noted.

Echinococcus multilocularis surveillance in Sweden 2011-2013
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_Echinococcus multilocularis_ (EM) was detected in Sweden for the first time in 2011 after 10 years of screening around 300 hunted red fox (_Vulpes vulpes_) annually. An intensified national surveillance screening using segmental sedimentation and counting technique of intestines from almost 3,000 foxes followed, detecting a total of four EM-positive foxes from three different counties. To test a more cost efficient method of surveillance, an intensive collection of fox scats was done in one of the three positive areas in 2011. Almost 800 fox scats were collected from 267 of the 535 given 4 km² grid reference areas. Samples were analyzed with a new National Veterinary Institute (SVA)-developed real time PCR assay. Six samples (0.8%) were positive for EM. Fox scat collection and PCR analysis is presently being used for the second national large scale surveillance of EM in Sweden, initiated in 2012. A network of hunters from all 290 municipalities in Sweden has been established to ensure nationwide systematic collection of 4,000 fox scats. Surveillance results are published on SVA’s website and are updated weekly in tables and a map. Furthermore, all wolves and raccoon dogs examined at SVA are screened for EM, as were 112 fecal samples from local dogs in the Uddevalla region in 2011, and livers from 222 local small rodents. A follow-up study in the three infected areas is ongoing in 2013, with 30 foxes from fox hunting sampled per area. The infection has been confirmed to persist in the Uddevalla region in 2012 and 2013, both by fox intestinal examination and in fecal sample collection.