Antimicrobial-resistant faecal Escherichia coli in wild mammals in central Europe: multiresistant Escherichia coli producing extended-spectrum β-lactamases in wild boars - DTU Orbit (22/12/2018)

Aims: To determine the presence of antibiotic-resistant faecal Escherichia coli in populations of wild mammals in the Czech Republic and Slovakia. Methods and Results: Rectal swabs or faeces collected during 2006-2008 from wild mammals were spread on MacConkey agar and MacConkey agar containing 2 mg l-1 of ceftaxime. From plates with positive growth, one isolate was recovered and identified as E. coli. Susceptibility to 12 antibiotics was tested using the disk diffusion method. Resistance genes, class 1 and 2 integrons and gene cassettes were detected in resistant isolates by polymerase chain reaction (PCR). Extended-spectrum beta-lactamases (ESBL) were further characterized by DNA sequencing, macrorestriction profiling and determination of plasmid sizes. Plasmid DNA was subjected to EcoRV digestion, transferability by conjugation and incompatibility grouping by multiplex PCR. The prevalence of resistant isolates was 2% in small terrestrial mammals (rodents and insectivores, n(E. coli) = 242), 12% in wild ruminants and foxes (n(E. coli) = 42), while no resistant isolates were detected in brown bears (n(E. coli) = 16). In wild boars (Sus scrofa) (n(E. coli) = 290), the prevalence of resistant isolates was 6%. Class 1 and 2 integrons with various gene cassettes were recorded in resistant isolates. From wild boars, five (2%, n(rectal smears) = 293) multiresistant isolates producing ESBL were recovered: one isolate with bla(CTX-M-1) + bla(TEM-1), three with bla(CTX-M-1) and one with bla(TEM-52b). The bla(CTX-M-1) genes were carried on approx. 90 kb IncI1 conjugative plasmids. Conclusions: Antibiotic-resistant E. coli occurred in populations of wild mammals in various prevalences. Significance and Impact of the Study: Wild mammals are reservoirs of antibiotic-resistant E. coli including ESBL-producing strains which were found in wild boars.