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WOLF MORTALITY IN NORTHEASTERN ITALY IN THE PERIOD 2018-2024: FORENSIC AND ONE HEALTH REFLECTIONS

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Introduction

The presence of the wolf in the Central-eastern Alpine regions of Italy, starting from the settlement of the first stable pack in Lessinia mountains (Verona and Trento provinces) in 2013, has progressively increased reaching in 2020/21 an estimated population of 266 individuals, with 33 reproductive units distributed in a territory doubled compared to that occupied in 2017/2018. With the increase in the number of wolfpacks, whose distribution is still concentrated in the Trentino-Veneto piedmont belt, signs of the presence of individuals in hilly and flat areas have also increased over time, as well as the finding of dead or injured/sick individuals throughout the territory. The aim of this work is to describe the monitoring activity from a forensic and health point of view carried out on wolves delivered to Istituto Zooprofilattico Sperimentale delle Venezie (IZSVE) diagnostic laboratories of Veneto, Friuli, Bolzano and Trento. This activity allowed us to obtain more information on the presence of the main circulating pathogens in the wolf population of the Central-eastern Alpine regions and on the most frequent causes of death, both intentional and accidental.

Material and Methods

In the period 2018-06/2024 years, 96 wolves underwent necropsy at the local laboratories of the IZSVE. In case of suspected poaching, the cadavers were subjected to radiographic examination to seek radiopaque material compatible with pellets/bullets. The autopsy was then performed according to the national guidelines for forensic autopsies in veterinary medicine in association with the diagnostic protocol defined by the IZSVE. This protocol includes the direct detection of rabies virus, distemper virus, influenza type A viruses, *Leptospira*, *Trichinella*, and cestodes. Antibodies against *Leptospira* were also investigated. Toxicological analyses were applied to determine carbamates, chlorinated and phosphorated pesticides, metaldehyde and strychnine in the gastric content and anticoagulant rodenticides in the liver. Finally, ticks were identified taxonomically and analyzed by PCR for *Anaplasma*, *Babesia*, *Theileria*, *Borrelia*, *Rickettsia* and Tick-Borne Encephalitis virus.

The analyses were performed in whole or in part depending on the state of decomposition of the animals, hence tissue availability, as well as the diagnostic suspicion formulated at the autopsy.

Results and Discussion

Out of 96 wolves examined, the majority died for anthropogenic causes, mainly from motor vehicle accidents (n= 71; 73.9%) but also from non-accidental causes as firearm injuries and pesticide poisoning (n=11; 11.4%). The prevalence of road accidents is evidently a direct consequence of the greater probability of finding carcasses on the roadside or in the immediate vicinity, compared to those in the natural environment where wolves usually live and, presumably, die from other causes. Non-anthropogenic causes were recorded in 11 cases (11.4%), 6 of which attributable to intraspecific competition, 2 to severe diffuse sarcoptic mange inanition, one to distemper, one to falling in a hydroelectric station channel and the latter, a postweaning puppy, to gastroenteric disease. In the remaining 3 cases it was not possible to confidently determine the cause of death.

As expected, based on the epidemiological situation, no wolf tested positive for the rabies virus. Also noteworthy is the fact that no positivity was observed for *Trichinella* spp.. Monitoring infectious diseases, particularly those of a zoonotic nature, becomes crucial in a context where an increasing interaction of the wolf with anthropogenic activities is expected.

Despite the results obtained do not represent the real distribution of the death occurrence in the wolf population, the application of standardized protocols among institutions allows a better representation of the information that is possible to collect, aiming at the improvement of environmental and health management of wild carnivores.

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