

Detection of canine distemper virus Europe wildlife lineage from a Marsican brown bear (*Ursus arctos marsicanus*)

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During the year of 2021 four Marsican brown bears have been captured and monitored by the technical staff of the Abruzzo, Lazio and Molise National Park (ALMNP) within the territories of the Park and surrounding areas, as planned by the Conservation plan [1].



All bears were clinically healthy and blood samples, rectal, vaginal and nasal swabs were collected for diagnostic purposes.

Two alive and one dead red foxes (*Vulpes Vulpes*) showing clinical signs and gross lesions CDV infection related were recovered. Rectal and nasal swabs were collected.

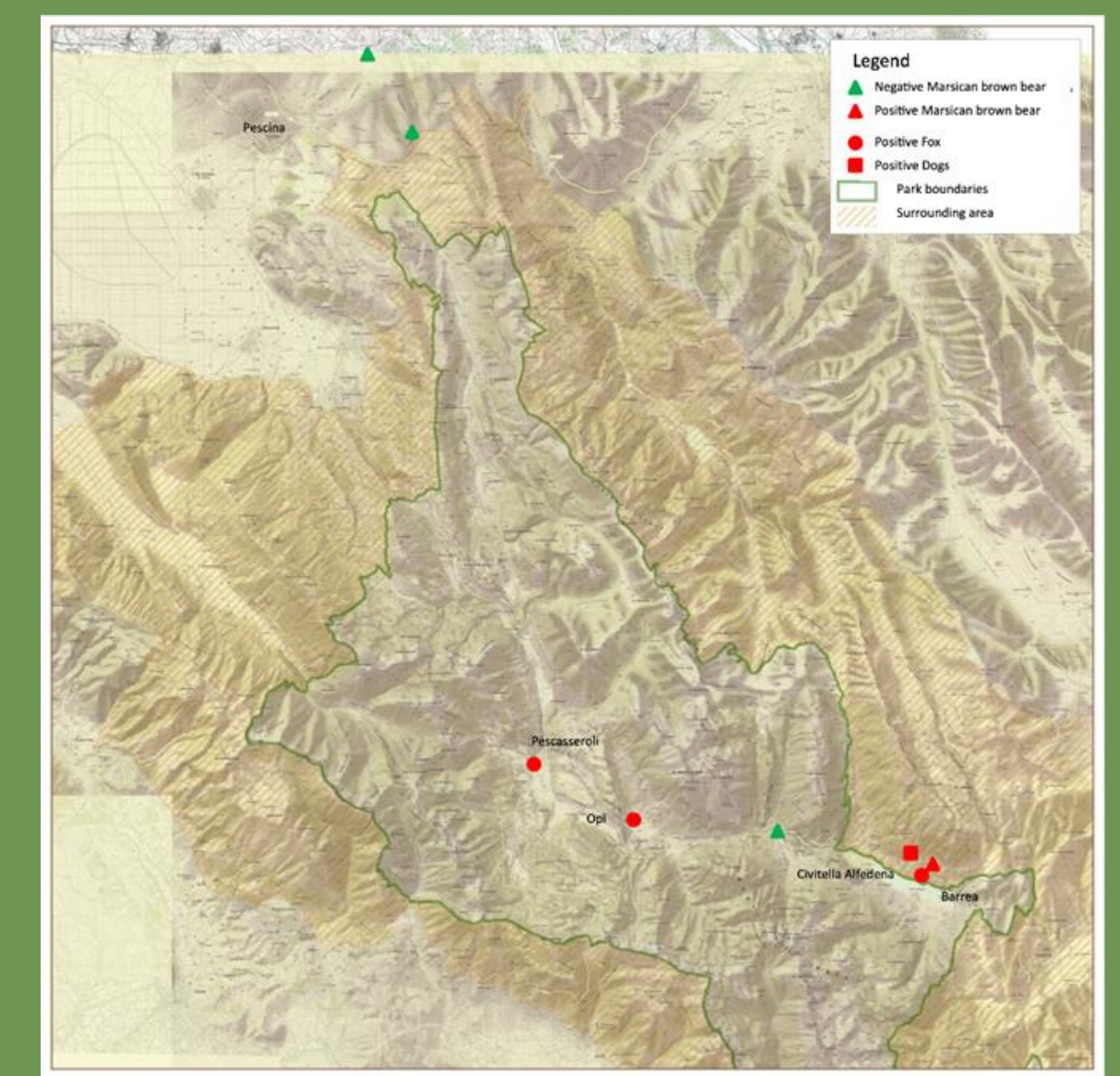


Similarly, two symptomatic and unvaccinated dogs were reported by the owner of a flock of sheep grazing in the same territories. Rectal and nasal swabs were collected.

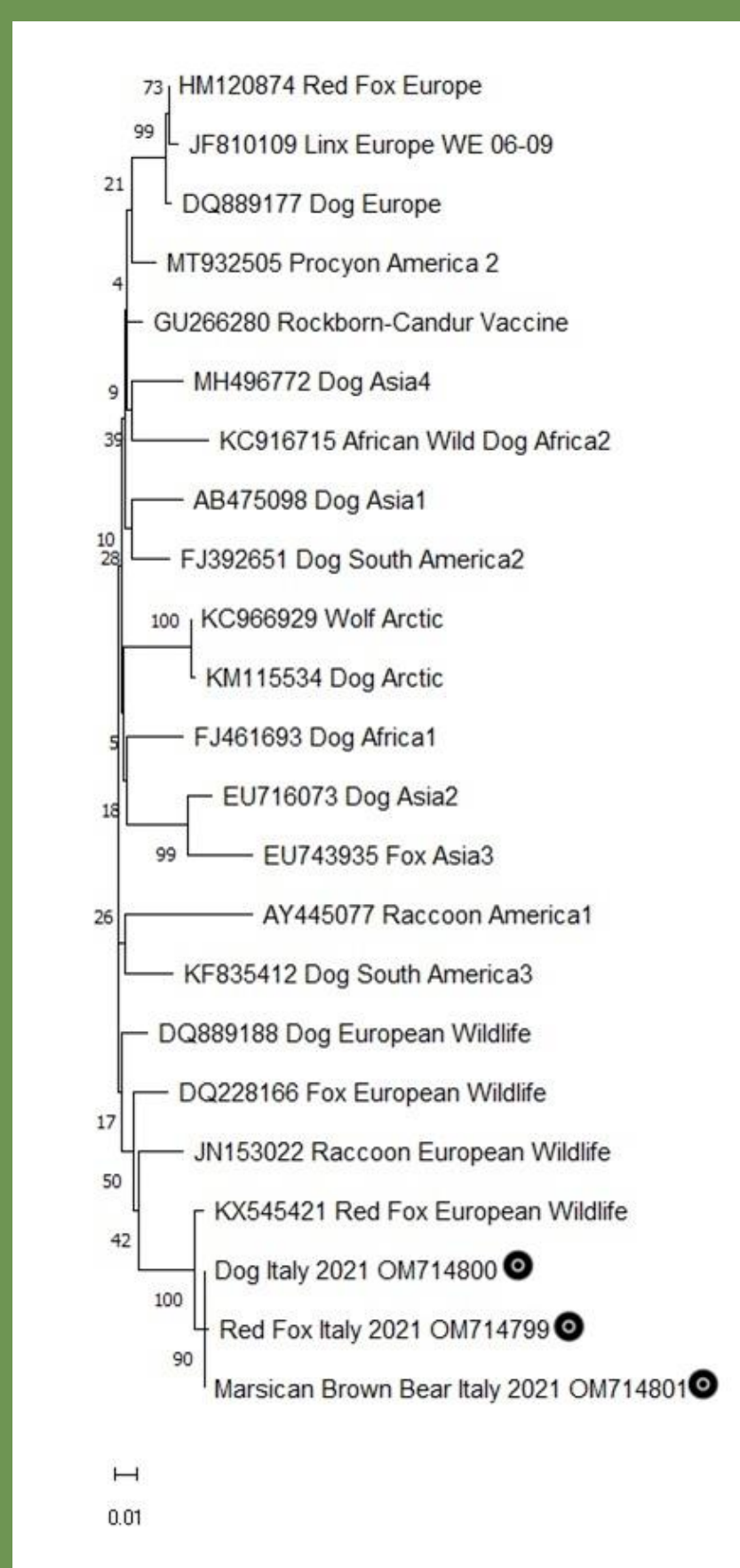


Diagnostic hemi-nested RT-PCR for detection of CDV RNA was performed starting from all mucosal swabs. Blood samples were analyzed by virus neutralization test for anti-CDV antibodies titration [2,3].

Seven samples coming from foxes, dogs and one Marsican brown bear resulted positive for CDV N gene.



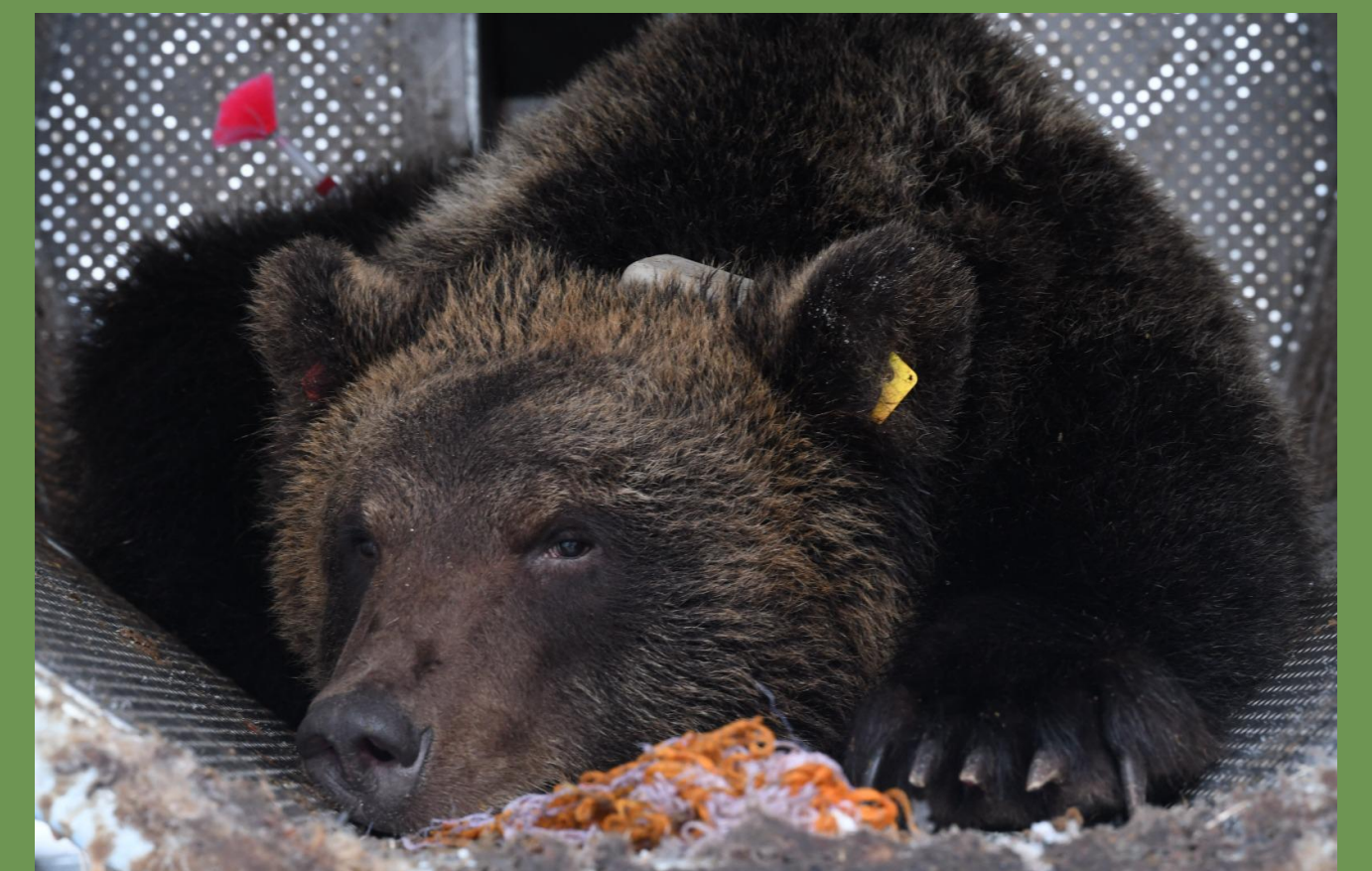
Geographical distribution of CDV-positive animals in the ALMNP



Positive samples were submitted to sequencing of CDV H gene for genetic characterization of viral strain [4,5].

The sequences analysis revealed a 99-100% the specificity among them with the isolate CDV599/2016 (GenBank Access number KX545421), recovered from a fox found dead in 2016 in the area of L'Aquila province, Abruzzi region [6]. The phylogenetic tree placed the H gene sequences under study in the European wildlife lineage (Europe-2) group along with similar sequences from domestic and wild hosts.

Neighbor-Joining tree of H gene sequences from red fox, Marsican brown bear and dogs under study (highlighted with a dark circle).



This is the first report of direct identification of a CDV strain in Marsican brown bear. The positive bear appeared to be clinically healthy when it was examined by the veterinary staff, suggesting a poor or null effect of the virus. The genetic phylogeny supports the idea that all investigated animals were exposed to a unique viral strain, already described in the same area of study in a red fox [6].

The presence of CDV-infected dogs inhabiting with Marsican brown bears once again confirms the necessity to implementing the vaccination programs in dog populations, with particular emphasis on those living in protected areas of Central Italy.

References

[1] Anonymous. Piano d'azione nazionale per la tutela dell'Orso bruno marsicano. Quaderni Conservazione della Natura 2011, 37. Roma: Ministero dell'Ambiente-ISPRA. [2] Di Francesco *et al.* Detection by hemi-nested reverse transcription polymerase chain reaction and genetic characterization of wild type strains of Canine distemper virus in suspected infected dogs. J Vet Diagn Invest. 2012, 24(1), 107-15. [3] Di Francesco *et al.* Serologic evidence for selected infectious diseases in Marsican brown bears (*Ursus arctos marsicanus*) in Italy (2004-09). J Wildl Dis. 2015, 51(1), 209-13. [4] Martella *et al.* Genotyping canine distemper virus (CDV) by a hemi-nested multiplex PCR provides a rapid approach for investigation of CDV outbreaks. Vet Microbiol. 2007, 122(1-2), 32-42. [5] Sekulin *et al.* Emergence of canine distemper in Bavarian wildlife associated with a specific amino acid exchange in the haemagglutinin protein. Vet J. 2011, 187(3), 399-401. [6] Di Sabatino *et al.* Lethal distemper in badgers (*Meles meles*) following epidemic in dogs and wolves. Infect Genet Evol. 2016, 46, 130-137.