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CSIC researchers detect great variation in inbreeding within the Iberian wolf population

- **The study suggests that Iberian wolf population in the Peninsula is fragmented and points out the need of favour connectivity to guarantee gene flow**

- **The researchers found the highest inbreeding levels in one individual sampled south of Duero River, an area recently recolonized.**

Ejemplar de lobo ibérico. / Isabel Salado

Scientists from the Spanish National Research Council (CSIC) lead an international study where they found that Iberian wolf population, despite its apparent continuous distribution in the northwest of the Iberian Peninsula, show highly variable inbreeding values. The research group, led by the Doñana Biological Station and with the collaboration of the University of Postdam, has analyzed the complete genome of contemporary wolves and ancient specimens conserved in the Scientific Collections of the Doñana Biological Station. The research work, publish in the journal *Journal of Heredity*, indicates that a greater connectivity in the population could protect Iberian wolves from the local increasing of inbreeding, which makes them more susceptible to suffer genetic problems.

Wolf population in the Iberian Peninsula is isolated from other European wolf populations. Its distribution area was severely reduced during the last two centuries due to direct human population and habitat fragmentation. This caused that Iberian wolf reached its historical population minimum around 1970. Since then, wolf has recolonized northwestern and central areas in the Iberian Peninsula and has disappeared in the south. However, this apparent continuous distribution in the northwestern peninsula hides fragmentation and high local inbreeding values.

Inbreeding occurs when two related individuals have offspring. The more closely related the parents are, the higher the inbreeding level of the offspring. Inbreeding reduces genetic diversity in individuals and makes them more susceptible to suffer genetic problems. In a large, well-preserved population, inbreeding is expected to be low and, normally, without major differences between individuals. However, researchers observed in this study some very high inbreeding values in Iberian wolf population. “We found a wide range of inbreeding values, from not inbred individuals to individuals with so high inbreeding values that they parents could be siblings”, explains Isabel Salado, a researcher at the Doñana Biological Station and first author of the study.

When the researchers genetically compared contemporary and historical specimens from nearby localities, they observed that the first ones were more similar to the ones that lived in the same region some decades ago, which could explain the reason of the high inbreeding. “This is a surprising finding for a population of a species for which high dispersal ability is assumed. This indicates that there is little gene flow between individuals from different areas of distribution, that means that the population is fragmented into small subpopulations”, says Carles Vilà, a scientist at the Doñana Biological Station. This contrasts with the situation observed for other European wolf populations, where many long-distance dispersal movements have been detected.

The highest inbreeding levels were found in an individual in the south of the Duero river, a recently recolonized area. “This region was probably recolonized for individuals coming from the north of the river. If few individuals are able to arrive and settle south of the river, inbreeding could continue to increase in this part of the population”, says Jennifer A. Leonard, a researcher at the Doñana Biological Station. “To reduce fragmentation and thus avoid increasing local inbreeding, management strategies must favour connectivity within population, facilitating the natural dispersal of the species, especially in peripheral areas of the distribution”, adds Salado.

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Isabel Salado, Michaela Preick, Natividad Lupiáñez-Corpas, Alberto Fernández-Gil, Carles Vilà, Michael Hofreiter, Jennifer A Leonard. **Large variance in inbreeding within the Iberian wolf population**. *Journal of Heredity*. DOI: 10.1093/jhered/esad071

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