

## **Hybridization between the grey wolf and domestic dog and its ecological consequences**

The word „hybrid” raises an anxiety in most people. Our imagination creates a vision of ugly, bloodthirsty beasts threatening our safety. Genetic studies indicate however, that hybridization between wild species is a positive and quite common phenomenon in Nature. It can cause speciation, resulting in new species better adapted to changing environmental conditions. A key example is the modern bison, which has turned out to be a crossbreed between a steppe bison and an aurochs, and is one of the few species that survived the megafaunal extinction of the last glaciation. The issue is different when crossbreeding occurs between a wild species and a domesticated form, especially when their offspring are fertile. In this case, hybridization may be detrimental to the wild population of the species.

Genetic studies of wolf populations in different parts of their range have shown that hybridizations between wolves and dogs, their closest relatives, have occurred both recently and in the past. This kind of "misalliance" most often arises when a female wolf mates with a male dog. The introgression of dog genes into the wolf gene pool can reduce or even eliminate a number of adaptations that result from millions of years of evolution, threatening the functioning and survival of this species in nature.

The problem of hybridization can particularly affect populations of wolves that are re-colonising new areas. A very limited supply of unrelated mates, due to low population density, may prompt a female wolf to mate with a dog. Similar threats occur in areas where wolves are subjected to intense poaching and breeding male wolves are killed just before, or during heat. Hybrids reared in forests can continue to breed with wolves (i.e. backcrossing) and live in the environment for years, polluting the wolf gene pool and degrading the conservation status of the population. Hybridisation is highly possible in Poland because of the presence about 12 million of dogs, of which ca. 650,000 are regular wanderers in woods.

In this project by integrating molecular and field biology methods we will capture hybrids “red-handed”. Through tracking animals and analysing video-footage from camera traps installed in forests we want to discover wolf groups in which individuals with unusual appearance and behaviour exist: this will indicate possible crossbreeding with dogs. By parallel examination of DNA from collected samples (faeces, hair, urine, etc.), we attempt to confirm or exclude hybridization. We will also model environmental factors affecting hybrid occurrence, and study food habits of hybrids to discover whenever its diet differ from diet of wolves. Thanks to this approach, we will assess not only the frequency of this phenomenon, the distribution and environmental factors that support this process, but also the impact of crossbreeding on the gene pool and survival of the wolf population. An additional outcome of the project will be a tool set of the most efficient methods for the detection of hybridization in our native wolf populations, to be used worldwide.