

Phylogenetic Systematics: Project Data
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Morphological Data -

Characteristics Table:

	Tan-Yellow	Orange	White	Stripes	Spots
Lion	1	0	0	0	0
Tiger	0	1	0	1	0
Jaguar	0	1	0	0	1
Leopard	0	1	0	0	1
Snow Leopard	0	0	1	0	1
Clouded leopard	0	0	0	1	1

Jaroš, Filip. *The Ecological and Ethological Significance of Felid Coat Patterns (Felidae)*. 2012. Charles University in Prague, PhD dissertation. Supervised by Prof. RNDr. Stanislav Komárek, Dr. - [Link](#)

This dissertation has a plethora of information surrounding Felidae fur pattern and color that discusses their function, development, physiology, and adaptive significance. This will be a tremendous resource for morphologically mapping my phylogenetic tree.

Nagel, Doris, et al. "Functional Morphology and Fur Patterns in Recent and Fossil Panthera Species." *Scripta Geologica*, vol. 126, 2003, pp. 227-240. - [Link](#)

This paper discusses the morphology and fur patterns in Panthera species and uses fossil evidence with cave drawings to infer the morphology of extinct Panthera species. This paper could lend valuable insights into the evolutionary changes present in Panthera fur and color pattern as well as provide time calibration spots.

Time Data -

Tiger remains dated to 1648–1812 AD - [Discovery of a tiger \(Panthera tigris \(L.\)\) skeleton from the Little Ice Age buried on the shore of Qinghai Lake, northeast Tibet Plateau](#)

Panthera onca fossils in caves of Bahia, Brazil dated to late Pleistocene (29 ka and 36 ka) - [Panthera onca \(Linnaeus, 1758\) from the late Pleistocene of Brazilian Intertropical Region: taxonomy, habitat, isotopic diet composition, and isotopic niche overlap with extinct faunivores](#)

The first occurrence of leopards in Europe is dated to the Early Pleistocene, till about 1 Ma ago - [Villafranchian large mammals from the Iberian Peninsula: paleobiogeography, paleoecology and dispersal events](#)

Leopard population in northwestern Italy during the pre-Last Glacial Maximum Late Pleistocene.
- [The remarkable *Panthera pardus* \(Felidae, Mammalia\) record from Equi \(Massa, Italy\): taphonomy, morphology, and paleoecology](#)

My phylogeny will be constructed using Data from the study, Supermatrix, and species tree methods to resolve phylogenetic relationships within the big cats, *Panthera* (Carnivora: Felidae). This study provided the GenBank accession numbers for the mitochondrial genome sequences they used.

	Mitochondrial genome
Lion	OP930842
Leopard	EF551002
Tiger	EF551003
Jaguar	OR863197
Snow leopard	EF551004
Clouded leopard	DQ257669

My research found several genes responsible for *Panthera* fur color and pattern. The ASIP (Agouti Signaling Protein) gene affects the distribution of pigments in the fur and can influence patterns such as the agouti patterning. The TYR (Tyrosinase) gene is essential for melanin production and can affect overall color intensity. The genes KIT, SOX10, and MITF affect the movement and survival of melanocytes which are cells that produce pigment.