

S2. Summary of the 85 studies used in the analysis of population genetic indicators H_o , H_e or F_{is} .				
Species	Type of sampling	Type of genetic marker	Quality control	Reference
<i>Sus crofa</i>	Hair follicles and tissue (mixed)	STR	DNA quality and purity by spectrophotometry. PCR standardization. Statistical validation (Hardy Weinberg and Bonferroni).	Mihalik et al., 2020.
<i>Axis porcinus</i>	Hair, antlers and feces (non-invasive).	SSR	Multi-tube method. Effective number of alleles and allele frequencies. Hardy Weinberg equilibrium. Linkage disequilibrium.	Angom et al., 2020.
<i>Mustela putorius</i>	Fresh tissue and museum specimens (mixed).	SSR	Detection of null alleles and repeats. Hardy Weinberg equilibrium. Ligand imbalance.	Ciofi et al., 2012.
<i>Ursus thibetanus</i>	Blood (invasive)	SSR	Statistical validation (Hardy Weinberg and Bonferroni). Ligament imbalance.	Wu et al., 2009.
<i>Elaphurus davidianus</i>	Blood (invasive)	SSR	Standardization of PCR conditions. Selection of primers with consistent amplification. Automated sequencing and allele measurement. Statistical validation (Hardy-Weinberg and linkage disequilibrium).	Jiao et al, 2008.
<i>Ursa auropunctata</i>	Tissue (invasive)	SSR	Sequence quality assessment (FastQC) Noise and adapter removal (fastp) Standardized PCR conditions (Multiplex PCR kit) Detection of null alleles and repeats. Statistical validation (Hardy-Weinberg and linkage disequilibrium).	Sato et al., 2021.
<i>Tayassu pecari</i>	Blood (invasive)	SSR	Correction for multiple comparisons (Benjamini-Yekutieli) Null allele detection and estimation Error frequency evaluation (null alleles detected) Statistical validation (Hardy-Weinberg and linkage disequilibrium)	Vecchia et al., 2011.
<i>Rhinolophus affinis</i>	Blood (Invasive)	SSR	Null allele detection and estimation	Mao et al., 2009.

			Statistical validation (Hardy Weinberg and Bonferroni).	
<i>Lemmus sp.</i>	Tissue (invasive)	mtDNA	Comparison with theoretical expectations (Ewens) Evaluation of mutation-drift balance Neutrality-type test and population deviation	Ehrich et al., 2005.
<i>Cervus elaphus</i>	Blood (invasive)	SSR	Genotype replication and error rate estimation. Statistical validation (Hardy-Weinberg, linkage disequilibrium and Bonferroni correction).	Conard et al., 2010.
<i>Prionailurus bengalensis</i>	Muscle, blood and epithelial cells (mixed).	SSR	Detection of genotyping errors and null alleles.	Ko et al., 2018.
<i>Rangifer tarandus platyrhynchus</i>	Blood, bone, antler, teeth and hair (mixed).	SSR	Exclusion of low-quality samples. Gel electrophoresis	Peeters et al., 2019.
<i>Mus musculus domesticus</i>	Blood and hair (mixed)	SSR	Exclusion of low-quality samples. Use of standardized multiplex PCR.	Förster et al., 2013.
<i>Vulpes macrotis mutica</i>	Tissue and blood (mixed)	SSR	Statistical validation (Hardy-Weinberg, linkage disequilibrium and Bonferroni correction). Comparison of number of alleles vs sample size. Repeated analysis for all loci	Schwartz et al., 2005
<i>Roman Talpa</i>	Feces, hair and tissue (mixed)	mtDNA cytochrome b	Standardized PCR conditions Manual electropherogram review (visual quality control) Statistical validation (Hardy-Weinberg, linkage disequilibrium) Genotype replication and error rate estimation.	Canestrelli et al., 2010.
<i>Neotoma Micropus</i>	Tissue (Invasive)	SSR	Null allele detection and estimation Statistical validation (Hardy-Weinberg, linkage disequilibrium and Bonferroni correction).	Mendez-Harclerode et al., 2007.
<i>Ursus arctos</i>	Hair (Non-invasive)	SSR	Exclusion of low quality samples. Detection of genotyping errors and null alleles.	Barrueto et al., 2023.

			Statistical validation (Hardy-Weinberg, linkage disequilibrium and Bonferroni correction).	
<i>Sorex araneus</i>	Tissue (Invasive)	SSR	Statistical validation (Hardy-Weinberg and linkage disequilibrium).	White et al., 2007.
<i>Canis sp</i>	Blood and tissue (Invasive)	SSR	Detection of genotyping errors and null alleles. Statistical validation (Hardy-Weinberg, linkage disequilibrium and Bonferroni correction).	Vonholdt et al., 2008.
<i>Procapra sp</i>	Muscle, tissue and blood (invasive)	SSR	Exclusion of low quality samples. Gel electrophoresis. Null allele frequency and Hardy Weinberg equilibrium.	Chen et al., 2012.
<i>Nyctereutes procyonoides</i>		SSR	Detection of genotyping errors and null alleles. Statistical validation (Hardy-Weinberg, linkage disequilibrium and Bonferroni correction).	Hong et al., 2013.
<i>Ovis aries</i>	Blood (invasive)	SSR	Detection of genotyping errors and null alleles. Allele number calculation (observed and effective). Allele permutations	Al-Barzinji et al., 2011.
<i>Moschus berezovskii</i>	Blood and tissue (invasive)	SSR	Standardized DNA extraction. Multiple washes (SSC) High polymorphism assessment (marker quality) Statistical validation (Hardy-Weinberg and linkage disequilibrium).	Zhao et al., 2008.
<i>Capreolus pygargus</i>	Feces (non-invasive)	SSR and mtDNA cytochrome b	PCR controls: Inclusion of positive control. Negative control inclusion. Verification by gel electrophoresis. Null allele or dropout detection (Microchecker). Hardy-Weinberg equilibrium (HWE) tests. Evaluation of linkage disequilibrium (LD).	Liu et al., 2024.
<i>Otocolobus manul</i>	Feces (non-invasive)	SSR	Gel electrophoresis Genotype replication: Triplicate (wild individuals) Duplicate (zoo individuals) Indirect error rate estimation	Robinson et al., 2024.

			Hardy-Weinberg equilibrium (HWE) tests.	
<i>Cervus elaphus</i>	Tissue and blood (invasive)	SSR	DNA quality and purity by spectrophotometry. PCR standardization. Indirect error rate estimation Hardy-Weinberg equilibrium (HWE) tests. Linkage disequilibrium (LD) evaluation.	Edelhoff et al., 2020.
<i>Myrmecophaga tridactyla</i>	Blood (Invasive)	SSR	Repeat genotyping. Gel electrophoresis Hardy-Weinberg equilibrium (HWE) and Bonferroni correction tests.	Collevatti et al., 2007
<i>Meles meles</i>	Tissue (invasive)	SSR	Hardy-Weinberg equilibrium tests (HWE) and Linkage disequilibrium (LD) evaluation	Pope et al., 2007
<i>Ovis canadensis</i>	Blood, Tissue and hair (mixed)	SSR	Exclusion of low quality samples. PCR standardization. Gel electrophoresis. Hardy-Weinberg equilibrium (HWE) tests.	Werdel et al., 2020
<i>Muscardinus avellanarius</i>	Tissue (invasive)	SSR	PCR controls: Inclusion of positive control. Negative control inclusion. Null allele detection. Hardy-Weinberg equilibrium (HWE) tests and Holm-Bonferroni correction.	Bani et al., 2017.
<i>Ailuropoda melanoleuca</i>	Blood, skin and feces (mixed).	Major histocompatibility complex (MHC class II) markers.	Experimental PCR replication. Gel electrophoresis. Hardy-Weinberg statistical validation and linkage disequilibrium.	Chen et al., 2010.
<i>Ochotona princeps</i>	Tissue and feces (mixed)	STR	Replication of genotypes. Null allele detection. Hardy-Weinberg equilibrium (HWE) tests.	Klingler et al., 2023.
<i>Cervus albirostris</i>	Feces (non-invasive)	SSR	Polymorphism assessment (PIC) Hardy-Weinberg equilibrium (HWE) verification. Calculation of the number of alleles (Na) and effective alleles (Ne).	Han et al., 2022
<i>Mustela nigripes</i>	Tissue and feces (mixed)	SSR/STR	Replication of genotypes. PCR controls: Inclusion of positive control. Negative control inclusion.	Cain et al., 2011

			Hardy-Weinberg equilibrium (HWE) verification.	
<i>Panthera tigris jacksoni</i>	Feces and blood (mixed)	SSR and mtDNA	Exclusion of low quality samples. Controls and PCR replicates: Inclusion of positive control. Inclusion of negative control. Repeat genotyping. Multitube method	Allberry et al., 2024.
<i>Ozotoceros bezoarticus</i>	Feces and blood (mixed)	RAPD and mtDNA	PCR standardization. Gel electrophoresis. Duplicate and genotyping errors. Hardy-Weinberg equilibrium (HWE) tests, linkage disequilibrium (LD) assessment and Bonferroni correction.	Bonfim-Mantellatto et al 2017.
<i>Tuesday Tuesday</i>	Hair	SSR	Exclusion of low quality samples. PCR controls and replicates. Triplicate genotyping. Number of alleles. Hardy-Weinberg equilibrium (HWE) tests, linkage disequilibrium (LD) evaluation.	O'Reilly et al., 2024
<i>Phataginus tricuspis</i>	Tissue (invasive)	SSR	DNA quality and purity by spectrophotometry. Duplication and genotyping errors. Hardy-Weinberg equilibrium (HWE) tests, linkage disequilibrium (LD) assessment and Bonferroni correction.	Aguillon et al., 2020
<i>Canis lupus</i>	Tissue (invasive)	SNPs	Removal of SNPs with low genotyping rate (<2%). Filtering by minor allele frequency (MAF < 1%). Pruning for linkage disequilibrium (LD) Hardy-Weinberg equilibrium (HWE) tests	Ericson et al., 2020
<i>Peromyscus melanophrys</i>	Tissue (invasive)	SSR	DNA quality and purity by spectrophotometry. Gel electrophoresis.	Mussali et al., 2013
<i>Dromiciops gliroides</i>	Tissue (invasive)	SSR	PCR standardization. Duplication and genotyping errors. Pruning for linkage disequilibrium (LD). Hardy-Weinberg equilibrium (HWE) testing.	Valladares et al., 2019.

<i>Prionailurus bengalensis</i>	Tissue (invasive)	SNPs and SSRs	PCR standardization. Duplication and genotyping errors. Pruning for linkage disequilibrium (LD). Hardy-Weinberg equilibrium (HWE) testing.	Eo et al., 2016
<i>Odocoileus virginianus</i> and <i>Odocoileus hemionus hemionus</i>	Tissue (invasive)	SSR and mtDNA	PCR standardization. Detection of null alleles and repeats. Duplication and genotyping errors. Pruning for linkage disequilibrium (LD). Hardy-Weinberg equilibrium (HWE) tests.	Cullingham et al., 2011.
<i>Macaca mulatta</i>	Blood (invasive)	SSR	PCR standardization. Detection of null alleles and repeats. Gel electrophoresis verification. Hardy-Weinberg equilibrium (HWE) testing.	Xu et al., 2019.
<i>Macrotis lagotis</i>	Blood and tissue (invasive)	SNPs	Filtering and quality control in SNPs. Hardy-Weinberg equilibrium (HWE) testing.	Lott et al., 2019.
<i>Macropus giganteus</i>	Blood and tissue (invasive)	SSR	PCR standardization. Detection of null alleles and repeats. Hardy-Weinberg equilibrium (HWE) testing.	Barber and Old et al., 2018.
<i>Cervus elaphus</i>		SSR	Amplification with multiplex PCR and standardized repeats. Detection of null alleles and repeats. Hardy-Weinberg equilibrium (HWE) testing.	Frank et al., 2022.
<i>Canis aureus</i>	Tissue (invasive)	SSR and mtDNA	DNA quality and purity by spectrophotometry. Duplication and genotyping errors. Gel electrophoresis PCR standardization. Detection of null alleles and repeats. Hardy-Weinberg equilibrium (HWE) tests, linkage disequilibrium (LD) assessment and Bonferroni correction.	Zanchos et al., 2009.
<i>Phascolarctos cinereus</i>	Blood and tissue (invasive)	SNPs	PCR standardization. Evaluation with FastQC Demultiplexing and sample identification.	Kjeldsen et al., 2016.

			Hardy-Weinberg equilibrium (HWE) tests.	
<i>Spermophilus lateralis</i>	Tissue (invasive)	SSR	PCR standardization. Detection of null alleles and repeats. Hardy-Weinberg equilibrium (HWE) tests, linkage disequilibrium (LD) assessment and Bonferroni correction.	McEachern et al., 2011.
<i>Aepyceros melampus petersi</i> and <i>A. m. melampus</i>	Tissue (invasive)	SSR	PCR optimization and standardization. Gel electrophoresis Repetition and validation of genotypes. Null allele and repeat detection. Hardy-Weinberg equilibrium (HWE) tests, linkage disequilibrium (LD) assessment and Bonferroni correction.	Lorenzen and Siegismund, 2004.
<i>Elephas maximus</i>	Tissue (invasive)	SSR	PCR optimization and standardization. Gel electrophoresis Hardy-Weinberg equilibrium (HWE) tests, linkage disequilibrium (LD) assessment.	Maurer-Gilles et al 2024
<i>Panthera leo</i>	Blood (invasive)	SSR	Standardized PCR conditions (Multiplex PCR kit) Repeat and genotype validation. Detection of null alleles and repeats.	Morandin et al., 2014.
<i>Mustela sibirica</i>	Tissue (invasive)	SSR	Genotype replication. PCR controls: positive control inclusion. Gel electrophoresis Hardy-Weinberg equilibrium (HWE) tests.	Zhao et al., 2018.
<i>Loxodonta africana</i>	Feces (non-invasive).	SSR	Genotype replication. PCR controls: positive control inclusion. Negative control inclusion. Gel electrophoresis Detection of null alleles and repeats. Hardy-Weinberg equilibrium (HWE) tests and Bonferroni correction.	Okello et al., 2008.
<i>Sus scrofa</i>	Tissue and blood (invasive)	SSR	DNA quality and purity by spectrophotometry.	Hagemann et al; 2022

			Duplication and genotyping errors. Gel electrophoresis PCR standardization. Detection of null alleles and repeats.	
<i>Ursus americanus</i>	Tissue (invasive)	SSR	Duplication and genotyping errors. Gel electrophoresis and fluorimetry. PCR standardization. Hardy-Weinberg equilibrium (HWE) testing, linkage disequilibrium (LD) assessment.	Murphy et al., 2015.
<i>Ursus arctos</i>	Blood, tissue, hair and feces (mixed).	SSR	Duplicate and genotyping errors. Gel electrophoresis. PCR standardization. PCR controls: Inclusion of positive control. Multi-tube method. Detection of null alleles and repeats. Hardy-Weinberg equilibrium (HWE) tests and Bonferroni correction.	Buono et al., 2022.
<i>Ovis vignei punjabiensis</i>	Feces (non-invasive)	SSR	Duplicate and genotyping errors. PCR standardization. Hardy-Weinberg equilibrium (HWE) tests, linkage disequilibrium (LD) assessment.	Bajwa et al., 2023.
<i>Tapirus terrestris</i>	Feces (non-invasive)	SSR	Duplicate and genotyping errors. PCR standardization. PCR controls: Inclusion of positive control. Multi-tube method. Null allele and repeat detection.	Saranholi et al., 2022.
<i>Ovis gmelini musimon</i>	Hair and feces (non-invasive).	SSR	Duplicate and genotyping errors. PCR standardization. PCR controls: Inclusion of negative control. Double PCR amplification. Gel electrophoresis.	Portanier et al., 2019.
<i>Lepus capensis</i>	Hair and feces (non-invasive).	STR and mtDNA	PCR controls: Inclusion of negative control. Double PCR amplification. Detection of null alleles and repeats.	Canu et al., 2012.

			Hardy-Weinberg equilibrium (HWE) and Bonferroni correction tests.	
<i>Puma concolor</i>	Hair and feces (non-invasive).	mtDNA cytochrome b	PCR controls: Inclusion of negative control. Double PCR amplification. Hardy-Weinberg equilibrium (HWE) tests, linkage disequilibrium (LD) assessment.	Miotto et al., 2011.
<i>Martes americana</i> and <i>Martes caurina</i>	Hair (non-invasive)	STR and mtDNA	Duplication and genotyping errors. Hardy-Weinberg equilibrium (HWE) tests.	Lucid et al., 2020.
<i>Chaetophractus vellerosus</i>	Tissue (invasive)	SSR	DNA quality and purity by spectrophotometry. Gel electrophoresis. Hardy-Weinberg equilibrium (HWE) tests.	Nardelli et al., 2016.
<i>Macaca thibetana</i>	Blood (invasive)	SSR	PCR standardization. Hardy-Weinberg equilibrium (HWE) tests, linkage disequilibrium (LD) assessment.	Li et al., 2014.
<i>Lontra longicaudis</i>	Blood and Feces (mixed)	SSR	PCR standardization. Repeat genotyping. Multitube method.	Latorre-Cardenas et al., 2019.
<i>Hydropotes inermis argyropus</i>	Tissue (invasive)	SSR	PCR standardization. Gel electrophoresis. Detection of null alleles and repeats. Hardy-Weinberg equilibrium (HWE) testing.	Lee et al., 2011.
<i>Ursus arctos marsicanus</i>	Tissue (invasive)	SSR	Standardized PCR conditions (Multiplex PCR kit) Detection of null alleles and repeats. Hardy-Weinberg equilibrium (HWE) tests.	Scarpulla et al., 2021.
<i>Phacochoerus aethiopicus delameri</i>	Tissue (invasive)	SSR and mtDNA	Standardized PCR conditions Detection of null alleles and repeats. ligand disequilibrium (LD) assessment.	Muwanika et al., 2012.
<i>Rupicapra rupicapra rupicapra</i>	Tissue and hair (mixed)	mtDNA	DNA extraction replication and PCR. Detection of null alleles and repeats.	Šprem et al., 2016.
<i>Lama glama</i>)	Blood (invasive)	SSR	DNA extraction replication and PCR. Standardized PCR conditions (Multiplex PCR kit).	Paredes et al., 2020

			Capillary electrophoresis.	
<i>Ursus arctos</i>	Hair, feces and tissue (mixed).	SSR	DNA extraction and PCR replication. Hardy-Weinberg equilibrium (HWE) and linkage disequilibrium (LD) tests.	Turnock et al., 2024.
<i>Bos gaurus</i>	Feces and tissue (mixed)	SSR	DNA extraction and PCR replication. Gel electrophoresis. Multitube method.	Pitimol and Srikosamatara, 2023.
<i>Camelus dromedarius</i>	Blood (invasive)	SSR	DNA extraction and PCR replication. Detection of null alleles and repeats.	Piro et al., 2020
<i>Rangifer tarandus</i>	Tissue (invasive)	SSR	DNA extraction replication and PCR. Gel electrophoresis. Hardy-Weinberg equilibrium (HWE) tests.	Courtois et al., 2003.
<i>Vulpes vulpes</i>	Tissue and hair (mixed)	SSR	Exclusion of low quality samples. DNA extraction and PCR replication. Hardy Weinberg equilibrium test and Bonferroni correction. Ligand imbalance.	Wandeler et al., 2023.
<i>Lepus americanus</i>	Fabric and hair (mixed)	SSR	DNA extraction replication and PCR. Gel electrophoresis. Hardy Weinberg equilibrium test.	Burton et al., 2002.
<i>Loxodonta africana</i>	Tissue and feces (mixed)	SSR and mtDNA	DNA extraction replication and PCR. Hardy Weinberg equilibrium test and Bonferroni correction). Ligand imbalance.	Nyakaana and Arctander, 1999.
<i>Canis lupus</i>	Tissue (invasive)	SSR and mtDNA	Exclusion of low quality samples. Use of taqPolymerase. Gel electrophoresis Hardy Weinberg equilibrium test.	Roy et al., 1994.
<i>Giraffa camelopardalis tippelskirchi</i>	Tissue (invasive)	Microsatellites GT	Exclusion of low-quality samples. Gel electrophoresis. Hardy Weinberg equilibrium test.	Huebinger et al., 2002.
<i>Rattus fuscipes greyii</i>	Tissue (invasive)	MHC gene Major Histocompatibility Complex.	Double PCR amplification. Temperature Gradient Gel Electrophoresis	Seddon and Baverstock, 1999.

<i>Ursus maritimus</i>	Tissue and blood (invasive)	MHC gene Major Histocompatibility Complex.	Exclusion of poor quality samples. Gel electrophoresis.	Paetkau et al., 1995.
<i>Rattus fuscipes</i>	Tissue (invasive).	MHC gene Major Histocompatibility Complex.	Temperature Gradient Gel Electrophoresis Hardy Weinberg Equilibrium Test.	Ward and Skibinski, 1985
<i>Panthera tigris tigris</i>	Feces, tissue and blood (mixed)	STR	Exclusion of low quality samples. Standardized PCR conditions (Multiplex PCR kit). Detection of null alleles and repeats.	Singh et al., 2017