Supplementary Information

Assessing SNP genotyping of noninvasively collected wildlife samples using

microfluidic arrays

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Supplementary Table S2 Samples used in this study. For some samples the sampling location (country and/or origin) is unknown (-). M, male; F, female; U, unknown sex.

Supplementary Figure S1 Overview of numbers of samples and loci included in each analysis based on quality criteria.

Supplementary Table S3 Overview of individuals that were represented by multiple samples in SNP and microsatellite data sets. One mismatch at one locus was accepted to consider two genotypes as belonging to the same individual. Note that brown bear samples had been individualized using microsatellites in the course of a previous study and consequently no matching genotypes were found in this study. *n*, number of samples; f.a., sample failed in microsatellite amplification; NA, matching not available due to failed microsatellite amplification of one of the samples.

Supplementary Table S4 Genetic variability in grey wolves, European wildcats and brown bears for SNPs and microsatellites. *n*, sample size; *Na*, mean number of different alleles over loci; H_0 , observed heterozygosity; H_E ; expected heterozygosity; ML, number of monomorphic loci. For sample groups with $n \le 5$ no calculations were performed (5 grey wolves, 2 potential wildcat hybrids, 16 brown bears).

Supplementary Table S5 Pairwise F_{ST} values for grey wolves with microsatellite data (above the diagonal, n = 30 samples and 13 loci) and SNP data (below the diagonal, n = 35 samples and 85 loci). All samples were collected in Germany. Only groups with n > 5 were considered (5 wolves from 2 locations excluded). Probability values were based on 999 permutations; $*p \le 0.05$; $**p \le 0.01$; $***p \le 0.001$.

Supplementary Table S6 Pairwise F_{ST} values for European wildcats and domestic cats with microsatellite data (above the diagonal, n = 24 samples and 14 loci) and SNP data (below the diagonal, n = 35 samples and 65 loci). Note that the SNP panel we used here was designed to detect hybridization of wildcats and domestic cats (that is, maximize differentiation). All samples were collected in Germany. Potential hybrids (based on SNP data) were excluded from these analyses (n = 1 for msats, n = 2 for SNPs). Probability values were based on 999 permutations; *** $p \le 0.001$.

Supplementary Table S7 Pairwise F_{ST} values for brown bears with microsatellite data (above the diagonal, n = 55 samples and 18 loci) and SNP data (below the diagonal, n = 55 samples and 69 loci). All samples were collected in Greece. Only groups with n > 5 were considered (16 bears from 5 locations excluded). Probability values were based on 999 permutations; n.s., not significant; $*p \le 0.05$; $**p \le 0.01$; $***p \le 0.001$. Negative values were converted to zero.

Supplementary Figure S2 Delta K for STRUCTURE runs corresponding to Supplementary Figure S3.

Supplementary Figure S3 STRUCTURE plots showing results for the most likely K (***), second most likely K (**) and third most likely K (*) as calculated with the Evanno method based on SNP and microsatellite genotypes and their combination. Colour-coded bars below the STRUCTURE plots correspond to the sample groupings based on sampling region (grey wolves, brown bears) or species identification (wildcats or domestic cats, based on SNP data).

Supplementary Figure S4 STRUCTURE plots showing results for the most likely K (***), second most likely K (**) and third most likely K (*) (upper panels) as calculated with the Evanno method (lower panels, respectively) based on SNP and microsatellite data sets. Colour-coded bars below the STRUCTURE plots correspond to the sample groupings based on sampling region (grey wolves, brown bears) or species identification (wildcats and domestic cats, based on SNP data).

Supplementary Figure S5 PCoA for wolves and wildcats showing outliers (SNP data, original data set). Further examination of these samples indicated low SNP call rates (wolf 71%; wildcats 77%, 78%). These samples were removed from the figure in the main text, Figure 3, and from further analyses.

Supplementary Figure S6 PCoA analyses for subsets of SNP and microsatellite markers used in this study to genotype grey wolves. Each point represents an individual's genotype, colour-coded to its sampling region. Subsets of loci were selected based on highest heterozygosity (H_E) for each locus.

Supplementary Figure S7 PCoA analyses for subsets of SNP markers used in this study to genotype grey wolves. Each point represents an individual's genotype, colour-coded to its sampling region. Subsets of loci were selected randomly; three times each case (a, b, c).

Supplementary Figure S8 PCoA analyses for subsets of SNP and microsatellite markers used in this study to genotype European wildcats, domestic cats and hybrids. Each point represents an individual's genotype, colour-coded to species identity. Subsets of loci were selected based on highest heterozygosity (H_E) for each locus.

Supplementary Figure S9 PCoA analyses for subsets of SNP and microsatellite markers used in this study to genotype European wildcats, domestic cats and hybrids. Each point represents an individual's genotype, colour-coded to species identity. Subsets of loci were selected based on highest F_{ST} for each locus.

Supplementary Figure S10 PCoA analyses for subsets of SNP markers used in this study to genotype European wildcats, domestic cats and hybrids. Each point represents an individual's genotype, colour-coded to species identity. Subsets of loci were selected randomly; three times each case (a, b, c).

Supplementary Figure S11 PCoA analyses for subsets of SNP and microsatellite markers used in this study to genotype brown bears. Each point represents an individual's genotype, colour-coded to its sampling region. Subsets of loci were selected based on highest heterozygosity (H_E) for each locus.

Supplementary Figure S12 PCoA analyses for subsets of SNP markers used in this study to genotype brown bears. Each point represents an individual's genotype, colour-coded to its sampling region. Subsets of loci were selected randomly; three times each case (a, b, c).

Supplementary Methods

Mitochondrial DNA sequencing

Brown bear hair samples were checked macroscopically for species identification, in order to avoid wild boar hairs. Grey wolf scats and cat hairs were checked for species identity using mtDNA sequencing in order to avoid samples from other species (mainly, fox, dog or domestic cat). PCR reactions of 15 µl contained 3 µl DNA, 1.5 µl 10x Standard Taq Buffer (New England BioLabs), 1.8 µl of 25 mM MgCl₂, 0.2 µl of BSA (10 µg/µl), 1.2 µl of 2.5 mM dNTPs, 0.5 µl of species specific forward and reverse primers (10 μ M) (Supplementary Table S1), 0.2 μ l of Taq DNA polymerase (5 U/ μ l) (New England BioLabs) and 6.1 µl of molecular grade water. PCRs were performed in a T1 plus Thermocycler (Biometra). Initial denaturation was at 95 °C for 3 min, followed by 35 cycles of 94 °C for 30 s, 54 °C for 30 s, and 72 °C for 1 min and a final extension at 72 °C for 10 min. PCR products were purified with 2 µl Exonuclease I and FastAP[™] Thermosensitive Alkaline Phosphatase mixture (1:2; Thermo Scientific) at 37 °C for 15 min, followed by 80 °C for 15 min and diluted 1:20 (scats) or 1:40 (hairs). Sequencing was performed using the BigDye Terminator 3.1 Cycle Sequencing Kit (Applied Biosciences) using a cycling protocol which involved an initial denaturation step at 95 °C for 60 s, followed by 30 cycles of 10 s at 96 °C, 10 s at 50 °C and 2 min at 60 °C. The products were purified using ABI-XTerminator beads (Applied Biosystems) and separated on an ABI 3730 DNA Analyzer (Applied Biosystems). Sequences of wolves and wildcats were aligned with Geneious $v7.1.8^{1}$ and aligned to our laboratory reference samples to identify haplotypes.

Target species	Target region	Primer Name	Sequence	Reference
European wildcat	Control region	LF4 (fwd) H16498 (rev)	GACATAATAGTGCTTAATCGTGC CCTGAAGTAAGAACCAGATG	2 3
Grey wolf	Control region	L15995 (fwd) H16498 (rev)	CTCCACTATCAGCACCCAAAG CCTGAAGTAAGAACCAGATG	4 3

Microsatellite genotyping

Unlinked autosomal microsatellite data for grey wolves and European wildcats were obtained as part of the regular genetic monitoring conducted in our laboratory. Brown bear microsatellite genotyping data was obtained from collaborators in Greece⁵. The markers and laboratory procedures are described elsewhere (wolves, ⁶; wildcats, ⁷; brown bears, ⁸). Briefly, a multiple-tubes approach was applied for wolves and wildcats, as is common practice for noninvasive samples, including three (wildcat, domestic cat) or four (grey wolf) replicates per sample. Each microsatellite PCR of 10 µl consisted of 2X HotStarTaq Master Mix (Qiagen), 0.2 µM of each primer, 2 ng BSA and 3.7-3.8 µl of DNA. PCRs were performed in a T1 plus Thermocycler (Biometra). Initial denaturation was set to 95 °C for 3 min, followed by 4-5 cycles of 94 °C for 30 s, 60 °C for 90 s, and 72 °C for 60 s; 5 cycles of 94 °C for 30 s, 58 °C for 90 s, and 72 °C for 60 s; 5 cycles of 94 °C for 30 s, 54 °C for 90 s, and 72 °C for 60 s; and 20-25 cycles of 94 °C for 30 s, 50 °C for 90 s, and 72 °C for 60 s. Final extension was at 72 °C for 30 min. PCR products were diluted 1:5 prior to sequencing. Fragment length analysis was performed on an ABI 3730 DNA Analyzer (Life Technologies) and fragment sizes were determined using the software GeneMarker v1.90 (Softgenetics LLC) by comparison to internal LIZ size standards. The details of brown bear microsatellite genotyping are described in ⁵. The microsatellite call rate for each sample was calculated as the percentage of successfully amplified PCR reactions over all replicates of a sample and over all investigated loci.

Supplementary Table S2 Samples used in this study. For some samples the sampling location (country and/or origin) is unknown (-). M, male; F, female; U, unknown sex.

Sample ID	Species	Sample Type	Collection Date	Country	Federal State/Region	Sex
WE121	C. lupus	scat	20130514	Germany	Sachsen	М
WE122	C. lupus	scat	20130831	Germany	Sachsen	U
WE124	C. lupus	scat	20130527	Germany	Sachsen	U
WE125	C. lupus	scat	20131213	Germany	Brandenburg	F
WE126	C. lupus	scat	20131213	Germany	Brandenburg	М
WE136	C. lupus	scat	20040106	Germany	Sachsen	F
WE137	C. lupus	scat	20040112	Germany	Sachsen	U
WE138	C. lupus	scat	20040113	Germany	Sachsen	U
WE139	C. lupus	scat	20040117	Germany	Sachsen	U
WE141	C. lupus	scat	20120610	Germany	Brandenburg	F
WE142	C. lupus	scat	20120610	Germany	Brandenburg	М
WE160	C. lupus	scat	20140319	Germany	Sachsen-Anhalt	U
WE161	C. lupus	scat	20140228	Germany	Sachsen-Anhalt	U
WE162	C. lupus	scat	20131212	Germany	Sachsen-Anhalt	М
WE163	C. lupus	scat	20140205	Germany	Sachsen-Anhalt	F
WE164	C. lupus	scat	20140124	Germany	Sachsen-Anhalt	F
WE165	C. lupus	scat	20140208	Germany	Sachsen-Anhalt	U
WE166	C. lupus	scat	20140130	Germany	Sachsen-Anhalt	F
WE167	C. lupus	scat	20140228	Germany	Sachsen-Anhalt	F
WE168	C. lupus	scat	20140204	Germany	Sachsen-Anhalt	U
WE169	C. lupus	scat	20140129	Germany	Sachsen-Anhalt	М
WE170	C. lupus	scat	20140319	Germany	Sachsen-Anhalt	М
WE171	C. lupus	scat	20140307	Germany	Sachsen-Anhalt	М
WE173	C. lupus	scat	20140129	Germany	Sachsen-Anhalt	М
WE174	C. lupus	scat	20140107	Germany	Sachsen-Anhalt	F
WE175	C. lupus	scat	20140117	Germany	Sachsen-Anhalt	M
WE191	C. lupus	scat	20140304	Germany	Niedersachsen	U
WE192	C. lupus	scat	20130826	Germany	Niedersachsen	U
WE196	C. Jupus	scat	20130415	Germany	Niedersachsen	U
WE197	C. Jupus	scat	20130325	Germany	Niedersachsen	M
WE199	C lunus	scat	20140428	Germany	Mecklenburg-Vornommern	M
WE200	C lunus	scat	20130427	Germany	Niedersachsen	F
WE200	C lunus	scat	20140122	Germany	Brandenburg	M
WE201	C lunus	scat	20140220	Germany	Brandenburg	M
WE202	C lunus	scat	20130126	Germany	Brandenburg	M
WE203	C lunus	scat	20140206	Germany	Brandenburg	F
WE205	C lunus	scat	20131220	Germany	Brandenburg	
WE203	C lupus	scat	20131220	Germany	Brandenburg	F
WE207	C lunus	scat	20131220	Germany	Brandenburg	M
WE209	C lunus	scat	20131220	Germany	Brandenburg	
WE203	C lupus	scat	20131220	Germany	Brandenburg	M
WE212	C lunus	scat	20140122	Germany	Brandenburg	M
WE213	C lupus	scat	20140122	Germany	Brandenburg	
WE214	C. lupus	scat	20140210	Germany	Brandenburg	M
WF217	C. Junus	scat	20130125	Germany	Brandenburg	F
WE123	C lunus	scat	20140924	Germany	Sachsen	F
WF124		scat	20140630	Germany	Sachsen	M
WF125		scat	20140030	Germany	Sachsen	F
WF125		scat	20141218	Germany	Sachsen	F
WF417	C. lupus	scat	20141213	Germany	Sachsen	M
WE417	C. lupus	scat	20150202	Germany	Sachson	
WEA10	C lupus	scat	20150202	Germany	Sachsen	F
WE413	C. lupus	scat	20150219	Germany	Sachson	
WEA2A	C. Iupus	scat	20150215	Gormany	Sachson	
WF424	C. Iupus	scat	20150215	Germany	Sachson	N/
VVF420	C. Iupus	scat	20150220	Germany	Sachson	
VVF427	C. Iupus	scat	20150218	Germany	Sachson	
VVF428	C. Iupus	scat	20150205	Germany	Sachson	
VVF429	C. Iupus	scat	20150207	Cormony	Sachsen	
VVF436	C. Iupus	scat	20150218	Germany	Sachsen	
VVF439	C. Iupus	stdt	20150213	Germany	Bayorn	
FJ133	F. S. CULUS	hairs	20151002	Germany	Bayern	N4
FJ134	F. S. CULUS	lidiis baire	20150302	Germany	Ddyelli Nordrhoin Westfolge	
	F. S. SIIVESTIIS	ildiis boirc	20150219	Cormony	Recipional De-	
FJI/I	r. s. silvestris	IIdIIS	20130227	Germany	nilelillariu-Pfalz	I F

FJ199	F. s. silvestris	hairs	20150203	Germany	Bayern	М
FJ337	F. s. silvestris	hairs	20150325	Germany	Bayern	М
FJ412	F. s. silvestris	hairs	20150314	Germany	Bayern	U
FJ423	F. s. catus	hairs	20150314	Germany	Bayern	М
FJ477	F. s. catus	hairs	20151202	Germany	Baden-Württemberg	F
FJ482	F. s. silvestris	hairs	20150403	Germany	Hessen	М
FJ559	F. s. silvestris	hairs	20150123	Germany	Hessen	М
FJ601	F. s. silvestris	hairs	20150113	Germany	Hessen	F
FJ642	F. s. catus	hairs	20150225	Germany	Rheinland-Pfalz	F
FJ651	F. s. silvestris	hairs	20150403	Germany	Hessen	Μ
FJ657	F. s. silvestris	hairs	20151103	Germany	Hessen	М
FJ699	F. s. silvestris	hairs	20150222	Germany	Hessen	М
FJ702	F. s. silvestris	hairs	20150228	Germany	Hessen	Μ
FJ708	F. s. silvestris	hairs	20151103	Germany	Hessen	Μ
FJ777	F. s. catus	hairs	20150704	Germany	Saarland	F
FJ782	F. s. catus	hairs	20150319	Germany	Saarland	F
FJ783	F. s. silvestris	hairs	20150704	Germany	Saarland	U
FJ790	F. s. catus	hairs	20150319	Germany	Saarland	F
K150465	F. s. silvestris	hairs	20150603	Germany	Rheinland-Pfalz	F
K150526	F. s. silvestris	hairs	20151104	Germany	Thüringen	М
K150568	F. s. silvestris	hairs	20150225	Germany	Sachsen-Anhalt	F
K150571	F. s. silvestris	hairs	20150225	Germany	Sachsen-Anhalt	F
K150578	F. s. catus	hairs	20151003	Germany	Sachsen-Anhalt	М
K150584	F. s. catus	hairs	20121009	Germany	Niedersachsen	U
K150602	F. s. catus	hairs	20120716	Germany	Niedersachsen	М
K150689	F. s. silvestris	hairs	20150226	Germany	Rheinland-Pfalz	М
K150706	F. s. silvestris	hairs	20150503	Germany	Rheinland-Pfalz	М
K150721	F. s. silvestris	hairs	20150313	Germany	Rheinland-Pfalz	М
K150731	F. s. silvestris	hairs	20150320	Germany	Rheinland-Pfalz	F
K150828	F. s. silvestris	hairs	20150903	Germany	Niedersachsen	М
K150835	F. s. silvestris	hairs	20150903	Germany	Niedersachsen	F
K150848	F. s. silvestris	hairs	20140729	Germany	Niedersachsen	U
K150858	F. s. silvestris	hairs	20150403	Germany	Niedersachsen	F
K150861	F. s. silvestris	hairs	20150327	Germany	Rheinland-Pfalz	М
K150875	F. s. silvestris	hairs	20150330	Germany	Rheinland-Pfalz	U
K150895	F. s. silvestris	hairs	20150203	Germany	Rheinland-Pfalz	F
K151063	F. s. silvestris	hairs	20151103	Germany	Rheinland-Pfalz	F
K151072	F. s. silvestris	hairs	20150323	Germany	Rheinland-Pfalz	F
K151129	F. s. silvestris	hairs	20150313	Germany	Rheinland-Pfalz	М
K151200	F. s. silvestris	hairs	20150326	Germany	Bayern	U
K151264	F. s. silvestris	hairs	20150406	Germany	Hessen	Μ
K151294	F. s. silvestris	hairs	20150519	Germany	Baden-Württemberg	М
K151297	F. s. silvestris	hairs	20150417	Germany	Baden-Württemberg	Μ
K151415	F. s. silvestris	hairs	20150702	Germany	Hessen	Μ
K151443	F. s. silvestris	hairs	20150315	Germany	Hessen	Μ
K151445	F. s. silvestris	hairs	20150315	Germany	Hessen	Μ
K151455	F. s. silvestris	hairs	20150317	Germany	Niedersachsen	F
K151468	F. s. silvestris	hairs	20150226	Germany	Niedersachsen	М
K151475	F. s. catus	hairs	20151103	Germany	Sachsen-Anhalt	F
K151811	F. s. catus	hairs	20150709	Germany	Bayern	F
H1014	U. arctos	hairs	20080527	Greece	Central Pindos	М
H1057	U. arctos	hairs	20080527	Greece	Central Pindos	Μ
H1069	U. arctos	hairs	20080529	FYR Macedonia (FYROM)	-	Μ
H1080	U. arctos	hairs	20080528	FYR Macedonia (FYROM)	-	F
H1087	U. arctos	hairs	20080529	FYR Macedonia (FYROM)	-	F
H1125	U. arctos	hairs	20080528	Greece	Southern Pindos	М
H1132	U. arctos	hairs	20080530	Greece	Southern Pindos	М
H1163	U. arctos	hairs	20080605	Greece	Northern Pindos	Μ
H164	U. arctos	hairs	20050326	Greece	Central Pindos	Μ
H166	U. arctos	hairs	20050326	Greece	Central Pindos	Μ
H169	U. arctos	hairs	20050326	Greece	Central Pindos	М
H171	U. arctos	hairs	20050326	Greece	Central Pindos	Μ
H179	U. arctos	hairs	20050326	Greece	Central Pindos	М
H218	U. arctos	hairs	20050430	Greece	Central Pindos	Μ
H2299	U. arctos	hairs	20090617	Greece	Southern Pindos	Μ
H238				C	Control Physics	
	U. arctos	hairs	20050530	Greece	Central Pindos	IVI
H2454	U. arctos U. arctos	hairs hairs	20050530 20090625	Greece	Vitsi - Varnoundas	M

H2557 U. arctos hairs 2009017 Greece Vits - Varnoundas M H2589 U. arctos hairs 20090617 Serbia - F H2630 U. arctos hairs 20090617 Serbia - F H2640 U. arctos hairs 20090618 Greece Vits - Varnoundas M H2711 U. arctos hairs 20090622 Greece Central Pindos M H2712 U. arctos hairs 20090822 FYK Macdonia (FROM) - F H2750 U. arctos hairs 20090824 Serbia - F H2750 U. arctos hairs 20090824 Serbia - F H2760 U. arctos hairs 20100236 Greece Central Pindos M H3073 U. arctos hairs 20100226 Greece Vits - Varnoundas M H3365 U. arctos hairs 20100220 Greece Vits - Varnoun	H254	U. arctos	hairs	20050530	Greece	Central Pindos	М
H2592 U. arctos hairs 20090617 Serbia - F H2595 U. arctos hairs 20090727 Serbia - F H2669 U. arctos hairs 20090727 Serbia - F H2669 U. arctos hairs 20090292 Greece Vitsi - Varnoundas M H2716 U. arctos hairs 2009022 Greece Central Pindos F H2716 U. arctos hairs 2009028 Greece Central Pindos M H2757 U. arctos hairs 20090284 Greece Central Pindos M H2767 U. arctos hairs 20100256 Greece Vitsi - Varnoundas M H3097 U. arctos hairs 20100256 Greece Vitsi - Varnoundas M H3333 U. arctos hairs 20100210 Greece Vitsi - Varnoundas M H3345 U. arctos hairs 20100210 Greece	H2557	U. arctos	hairs	20090730	Greece	Vitsi - Varnoundas	М
H2595 U. arctos hairs 20090517 Serbia	H2592	U. arctos	hairs	20090617	Serbia	-	М
H2630 U. arctos hairs 20090727 Serbia - F H2669 U. arctos hairs 20090818 Greece Vitisi - Varnoundas M H2714 U. arctos hairs - Albania - F H2716 U. arctos hairs 2009022 FYR Macedonia (YROM) - F H2750 U. arctos hairs 20090824 Serbia - F H2750 U. arctos hairs 20090824 Greece Central Pindos M H2767 U. arctos hairs 20100526 Greece Vitsi - Varnoundas M H3037 U. arctos hairs 20100526 Greece Vitsi - Varnoundas M H3330 U. arctos hairs 20100526 Greece Vitsi - Varnoundas M H3350 U. arctos hairs 20100720 Greece Vitsi - Varnoundas M H3360 U. arctos hairs 20100723 Greece	H2595	U. arctos	hairs	20090617	Serbia	-	F
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H2712 U. arctos hairs 20090929 Greece Central Pindos M H2716 U. arctos hairs 20090822 FYK Macedonia (FYROM) - F H2750 U. arctos hairs 20090828 Greece Central Pindos F H2750 U. arctos hairs 20090824 Serbia - - H2767 U. arctos hairs 20090824 Serbia - - H H2767 U. arctos hairs 2000526 Greece Vitsi - Varnoundas M H3073 U. arctos hairs 20100526 Greece Vitsi - Varnoundas M H3260 U. arctos hairs 2010023 Greece Vitsi - Varnoundas M H3350 U. arctos hairs 2010020 Greece Vitsi - Varnoundas M H3360 U. arctos hairs 20100923 Greece Vitsi - Varnoundas M H3361 U. arctos hairs 20100923	H2669	U. arctos	hairs	20090818	Greece	Vitsi - Varnoundas	M
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1213 U. arctos hairs 20090822 FYR Macedonia (FYROM) - F H2750 U. arctos hairs 20090824 Greece Central Pindos F H2750 U. arctos hairs 20090824 Serbia - F H279 U. arctos hairs 20090824 Serbia - F H279 U. arctos hairs 20000423 Greece Central Pindos M H3073 U. arctos hairs 20100526 Greece Vitsi -Varnoundas M H3260 U. arctos hairs 20100623 Greece Vitsi -Varnoundas M H3353 U. arctos hairs 20100720 Greece Vitsi -Varnoundas M H3489 U. arctos hairs 20100923 Greece Vitsi -Varnoundas M H3489 U. arctos hairs 20050730 Greece Central Pindos M H354 U. arctos hairs 20050730 Greece <td>H2716</td> <td>11 arctos</td> <td>hairs</td> <td>-</td> <td>Albania</td> <td>-</td> <td>F</td>	H2716	11 arctos	hairs	-	Albania	-	F
13:250 U. arctos hairs 20091028 Greece Central Pindos F H2750 U. arctos hairs 2009024 Serbia - F H2751 U. arctos hairs 2009024 Serbia - F H2751 U. arctos hairs 2000523 Greece Vitsi - Varnoundas M H3073 U. arctos hairs 20100526 Greece Vitsi - Varnoundas M H3036 U. arctos hairs 20100526 Greece Vitsi - Varnoundas M H3360 U. arctos hairs 20100720 Greece Vitsi - Varnoundas M H3360 U. arctos hairs 20100720 Greece Vitsi - Varnoundas M H3361 U. arctos hairs 20100720 Greece Vitsi - Varnoundas M H3362 U. arctos hairs 2000030 Greece Central Pindos M H3364 U. arctos hairs 2000030	H2719	U arctos	hairs	20090822	EVR Macedonia (EVROM)	_	F
112567 U. arctos hairs 20000824 Serbia - F H279 U. arctos hairs 20050830 Greece Central Pindos M H2867 U. arctos hairs 20100423 Greece Vitsi-Varnoundas M H3073 U. arctos hairs 20100526 Greece Vitsi-Varnoundas M H3099 U. arctos hairs 20100526 Greece Vitsi-Varnoundas M H3363 U. arctos hairs 20100719 Greece Vitsi-Varnoundas M H3365 U. arctos hairs 20100720 Greece Vitsi-Varnoundas M H3389 U. arctos hairs 20100923 Greece Vitsi-Varnoundas M H3365 U. arctos hairs 20005730 Greece Central Pindos M H356 U. arctos hairs 20006021 - - M H455 U. arctos hairs 20007021 - - M H459 U. arctos hairs 20007021	H2750	U. arctos	hairs	20091028	Greece	Central Pindos	F
11259 U. arctos hairs 20050530 Greece Central Pindos M H2867 U. arctos hairs 20100526 Greece Vitsi-Varnoundas M H3098 U. arctos hairs 20100526 Greece Vitsi-Varnoundas M H3330 U. arctos hairs 20100526 Greece Vitsi-Varnoundas M H3360 U. arctos hairs 20100623 Greece Vitsi-Varnoundas M H3365 U. arctos hairs 20100719 Greece Vitsi-Varnoundas M H3390 U. arctos hairs 20100923 Greece Vitsi-Varnoundas M H356 U. arctos hairs 20050730 Greece Central Pindos M H356 U. arctos hairs 20050730 Greece Central Pindos M H435 U. arctos hairs 20050730 Greece Central Pindos M H435 U. arctos hairs 20003013 <td>H2767</td> <td>U arctos</td> <td>hairs</td> <td>20090824</td> <td>Serbia</td> <td>-</td> <td>F</td>	H2767	U arctos	hairs	20090824	Serbia	-	F
11250 U. arctos hairs 20100423 Greece Visi-Varnoundas M H3073 U. arctos hairs 20100526 Greece Visi-Varnoundas M H3099 U. arctos hairs 20100526 Greece Visi-Varnoundas M H3333 U. arctos hairs 20100529 Greece Visi-Varnoundas M H3335 U. arctos hairs 20100719 Greece Visi-Varnoundas M H3336 U. arctos hairs 20100720 Greece Visi-Varnoundas M H3389 U. arctos hairs 20100923 Greece Visi-Varnoundas M H3489 U. arctos hairs 2000530 Greece Central Pindos M H356 U. arctos hairs 2005030 Greece Central Pindos M H435 U. arctos hairs 2005030 Greece Central Pindos M H435 U. arctos hairs 2007026 Greece Visi-Varnoundas F H549 U. arctos	H279	U. arctos	hairs	20050524	Greece	Central Pindos	M
International and the second	H2867	U. arctos	hairs	20030330	Greece	Vitsi - Varnoundas	M
H309 D. Jitus Hairs Z0100520 Orece Visi Varioundas M H3260 U. arctos hairs Z0100523 Greece Visi - Varioundas M H3260 U. arctos hairs Z0100529 Greece Visi - Varioundas M H3365 U. arctos hairs Z0100720 Greece Visi - Varioundas M H3380 U. arctos hairs Z0100720 Greece Visi - Varioundas M H3489 U. arctos hairs Z0100923 Greece Visi - Varioundas M H3489 U. arctos hairs Z0009730 Greece Central Pindos M H455 U. arctos hairs Z006031 - - M H455 U. arctos hairs Z0070821 - - M H589 U. arctos hairs Z0071001 Greece Central Pindos F H589 U. arctos hairs Z0071103 Greece <t< td=""><td>H2072</td><td>U. arctos</td><td>hairs</td><td>20100425</td><td>Greece</td><td>Vitsi - Varnoundas</td><td>M</td></t<>	H2072	U. arctos	hairs	20100425	Greece	Vitsi - Varnoundas	M
H3260 D. dr.tos Hairs Z0100520 Offece Southern Pindos M H3360 U. arctos hairs Z0100623 Greece Southern Pindos M H3333 U. arctos hairs Z0100720 Greece Vitsi - Varnoundas M H3349 U. arctos hairs Z0100720 Greece Vitsi - Varnoundas M H3365 U. arctos hairs Z0100720 Greece Mount Voras M H3364 U. arctos hairs Z0100931 Greece Mount Voras M H3526 U. arctos hairs Z0050730 Greece Central Pindos M H453 U. arctos hairs Z0050811 - - M H458 U. arctos hairs Z0070821 - - M H549 U. arctos hairs Z0071026 Greece Central Pindos F H549 U. arctos hairs Z0071102 Greece Centra	П3075	U. urctos	hairs	20100520	Greece	Vitsi Varnoundas	NA
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TSSS 0. artics Inits 20100629 Offece Visi - Varnoundas M H3365 U. arctos hairs 20100710 Greece Visi - Varnoundas M H3369 U. arctos hairs 20100720 Greece Visi - Varnoundas M H3489 U. arctos hairs 20100923 Greece Mount Voras F H356 U. arctos hairs 20050730 Greece Central Pindos M H435 U. arctos hairs 20060821 - - M H528 U. arctos hairs 20071001 Greece Central Pindos F H549 U. arctos hairs 20071026 Greece Central Pindos F H549 U. arctos hairs 20071114 Greece Central Pindos F H589 U. arctos hairs 20071103 Greece Central Pindos M H610 U. arctos hairs 20071103 Greece	H3200	U. arctos	hairs	20100023	Greece	Vitsi Varnoundas	IVI N4
H3350 U. arctos hairs 20100720 Greece Visi- Varnoundas M H3390 U. arctos hairs 20100902 Greece Visi- Varnoundas M H3489 U. arctos hairs 20100902 Greece Visi- Varnoundas M H356 U. arctos hairs 20050730 Greece Central Pindos M H435 U. arctos hairs 20050330 Greece Central Pindos M H445 U. arctos hairs 20050821 - - M H549 U. arctos hairs 20070821 - - M H549 U. arctos hairs 2007101 Greece Central Pindos F H558 U. arctos hairs 20071114 Greece Central Pindos F H589 U. arctos hairs 20071203 Greece Central Pindos M H604 U. arctos hairs 20071030 Greece Northern	П3333	U. urclos	haira	20100629	Greece		
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H3849 D. arctos hairs 20100902 Greece Vits - varioundas M H3526 U. arctos hairs 20050730 Greece Central Pindos M H4356 U. arctos hairs 20060330 Greece Central Pindos M H445 U. arctos hairs 20030730 Greece Central Pindos M H454 U. arctos hairs 20030633 - - M H454 U. arctos hairs 20070821 - - M H549 U. arctos hairs 20071026 Greece Central Pindos F H561 U. arctos hairs 2007114 Greece Central Pindos M H604 U. arctos hairs 20071203 Greece Central Pindos M H610 U. arctos hairs 2007103 Greece Central Pindos M H622 U. arctos hairs 20071031 Greece Northern Pind	H3390	U. arctos	hairs	20100720	Greece	Vitsi - Varnoundas	IVI
H352b D. arctos hairs 20100923 Greece Mount Voras F H355c U. arctos hairs 20060330 Greece Central Pindos M H435 U. arctos hairs 20060310 Greece Central Pindos M H445 U. arctos hairs 20080821 - - M H548 U. arctos hairs 20071021 - - M H549 U. arctos hairs 20071026 Greece Vitsi - Varnoundas F H541 U. arctos hairs 2007101 Greece Central Pindos F H588 U. arctos hairs 20071114 Greece Central Pindos M H604 U. arctos hairs 20071203 Greece Central Pindos M H610 U. arctos hairs 20071203 Greece Central Pindos M H641 U. arctos hairs 20071016 Greece Northern Pindos	H3489	U. arctos	hairs	20100902	Greece	Vitsi - Varnoundas	M
H35b D. arctos hairs 20050/30 Greece Central Pindos M H435 U. arctos hairs 20030613 - - M H45 U. arctos hairs 2000821 - - M H528 U. arctos hairs 2007021 - M M H549 U. arctos hairs 20071001 Greece Vitsi - Varnoundas F H541 U. arctos hairs 20071026 Greece Central Pindos F H589 U. arctos hairs 20071114 Greece Central Pindos M H610 U. arctos hairs 20071103 Greece Central Pindos M H612 U. arctos hairs 20071103 Greece Central Pindos M H622 U. arctos hairs 20071031 Greece Northern Pindos M H633 U. arctos hairs 20071031 Greece Northern Pindos	H3526	U. arctos	hairs	20100923	Greece	Mount Voras	F
H435 D. arctos hairs 20060330 Greece Central Pindos M H435 U. arctos hairs 20030613 - - M H495 U. arctos hairs 20070821 - - M H549 U. arctos hairs 20071026 Greece Vitsi - Varnoundas F H551 U. arctos hairs 20071026 Greece Central Pindos F H589 U. arctos hairs 20071114 Greece Central Pindos M H604 U. arctos hairs 20071203 Greece Central Pindos M H610 U. arctos hairs 20071203 Greece Central Pindos M H610 U. arctos hairs 20071005 Greece Northern Pindos M H643 U. arctos hairs 20071031 Greece Northern Pindos M H644 U. arctos hairs 20071031 Greece Northern Pi	H356	U. arctos	hairs	20050730	Greece	Central Pindos	M
H45 U. arctos hairs 20030613 - - M H495 U. arctos hairs 20060821 - - F H528 U. arctos hairs 20070821 - - M H549 U. arctos hairs 20071026 Greece Central Pindos F H589 U. arctos hairs 20071114 Greece Central Pindos F H589 U. arctos hairs 20071203 Greece Central Pindos M H610 U. arctos hairs 20071203 Greece Central Pindos M H622 U. arctos hairs 20071005 Greece Southern Pindos M H634 U. arctos hairs 20071031 Greece Northern Pindos M H643 U. arctos hairs 20071031 Greece Northern Pindos M H674 U. arctos hairs 20071031 Greece Northern Pindos	H435	U. arctos	hairs	20060330	Greece	Central Pindos	M
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H549U. arctoshairs20071001GreeceVitsi - VarnoundasFH561U. arctoshairs20071026GreeceCentral PindosFH589U. arctoshairs20071114GreeceCentral PindosMH604U. arctoshairs200711203GreeceCentral PindosMH610U. arctoshairs20071203GreeceCentral PindosMH622U. arctoshairs20071005GreeceSouthern PindosMH649U. arctoshairs20071031GreeceNorthern PindosMH663U. arctoshairs20071031GreeceNorthern PindosMH674U. arctoshairs20071031GreeceNorthern PindosFH678U. arctoshairs20071203GreeceNorthern PindosMH674U. arctoshairs20071031GreeceNorthern PindosMH771U. arctoshairs20080225GreeceNorthern PindosMH771U. arctoshairs20080402GreeceNorthern PindosMH784U. arctoshairs20080402GreeceNorthern PindosMH794U. arctoshairs20080402GreeceNorthern PindosMH794U. arctoshairs20080402GreeceNorthern PindosMH805U. arctoshairs20080403GreeceNorthern PindosM <td>H528</td> <td>U. arctos</td> <td>hairs</td> <td>20070821</td> <td>-</td> <td>-</td> <td>Μ</td>	H528	U. arctos	hairs	20070821	-	-	Μ
H561U. arctoshairs20071026GreeceCentral PindosFH589U. arctoshairs20071114GreeceCentral PindosMH598U. arctoshairs20071114GreeceCentral PindosMH604U. arctoshairs20071203GreeceCentral PindosMH610U. arctoshairs20071203GreeceCentral PindosMH622U. arctoshairs2007106GreeceSouthern PindosMH649U. arctoshairs20071031GreeceNorthern PindosMH649U. arctoshairs20071031GreeceNorthern PindosMH674U. arctoshairs20071031GreeceNorthern PindosFH678U. arctoshairs20071205GreeceNorthern PindosFH771U. arctoshairs20080225GreeceNorthern PindosMH787U. arctoshairs20080402GreeceNorthern PindosMH787U. arctoshairs20080403GreeceNorthern PindosMH805U. arctoshairs20080403GreeceNorthern PindosMH819U. arctoshairs20080403GreeceNorthern PindosMH814U. arctoshairs20080403GreeceNorthern PindosMH815U. arctoshairs20080403GreeceNorthern PindosM <tr<< td=""><td>H549</td><td>U. arctos</td><td>hairs</td><td>20071001</td><td>Greece</td><td>Vitsi - Varnoundas</td><td>F</td></tr<<>	H549	U. arctos	hairs	20071001	Greece	Vitsi - Varnoundas	F
H589U. arctoshairs20071114GreeceCentral PindosFH598U. arctoshairs20071114GreeceCentral PindosMH604U. arctoshairs20071203GreeceCentral PindosMH610U. arctoshairs20071203GreeceCentral PindosFH622U. arctoshairs2007105GreeceCentral PindosMH649U. arctoshairs20071016GreeceNorthern PindosMH663U. arctoshairs20071031GreeceNorthern PindosMH674U. arctoshairs20071031GreeceNorthern PindosFH678U. arctoshairs20071205GreeceNorthern PindosFH771U. arctoshairs2008025GreeceCentral PindosMH772U. arctoshairs2008028GreeceCentral PindosMH787U. arctoshairs20080402GreeceNorthern PindosMH805U. arctoshairs20080403GreeceNorthern PindosMH819U. arctoshairs20080403GreeceNorthern PindosMH836U. arctoshairs20080403GreeceNorthern PindosMH831U. arctoshairs20080423GreeceNorthern PindosMH831U. arctoshairs20080423GreeceSouthern PindosM	H561	U. arctos	hairs	20071026	Greece	Central Pindos	F
H598U. arctoshairs2007114GreeceCentral PindosMH604U. arctoshairs20071203GreeceCentral PindosMH610U. arctoshairs20071203GreeceCentral PindosFH622U. arctoshairs20071106GreeceSouthern PindosMH649U. arctoshairs20071031GreeceNorthern PindosMH663U. arctoshairs20071031GreeceNorthern PindosFH674U. arctoshairs20071031GreeceNorthern PindosFH778U. arctoshairs20071031GreeceNorthern PindosFH771U. arctoshairs20071031GreeceNorthern PindosMH772U. arctoshairs2008025GreeceCentral PindosMH771U. arctoshairs20080328GreeceCentral PindosMH787U. arctoshairs20080402GreeceNorthern PindosMH813U. arctoshairs20080403GreeceNorthern PindosMH813U. arctoshairs20080403GreeceNorthern PindosMH836U. arctoshairs20080423GreeceNorthern PindosMH836U. arctoshairs20080424MH837U. arctoshairs20080423GreeceVitsi - VarnoundasMH83	H589	U. arctos	hairs	20071114	Greece	Central Pindos	F
H604U. arctoshairs20071203GreeceCentral PindosMH610U. arctoshairs20071103GreeceCentral PindosFH622U. arctoshairs20071106GreeceSouthern PindosMH649U. arctoshairs20071031GreeceNorthern PindosMH663U. arctoshairs20071031GreeceNorthern PindosMH674U. arctoshairs20071031GreeceNorthern PindosFH678U. arctoshairs20071031GreeceNorthern PindosMH702U. arctoshairs20071205GreeceNorthern PindosMH771U. arctoshairs20080225GreeceCentral PindosMH787U. arctoshairs20080402GreeceCentral PindosMH895U. arctoshairs20080402GreeceNorthern PindosMH813U. arctoshairs20080403GreeceNorthern PindosMH814U. arctoshairs20080403GreeceNorthern PindosMH815U. arctoshairs20080423GreeceNorthern PindosMH814U. arctoshairs20080423GreeceSouthern PindosMH815U. arctoshairs20080423GreeceVitsi - VarnoundasMH814U. arctoshairs20080423GreeceCentral PindosM	H598	U. arctos	hairs	20071114	Greece	Central Pindos	М
H610U. arctoshairs20071203GreeceCentral PindosFH622U. arctoshairs20071106GreeceSouthern PindosMH649U. arctoshairs20071005GreeceNorthern PindosMH663U. arctoshairs20071031GreeceNorthern PindosMH674U. arctoshairs20071031GreeceNorthern PindosFH678U. arctoshairs20071031GreeceNorthern PindosFH678U. arctoshairs20071205GreeceNorthern PindosMH702U. arctoshairs20080225GreeceCentral PindosMH771U. arctoshairs20080225GreeceCentral PindosMH787U. arctoshairs20080422GreeceCentral PindosMH877U. arctoshairs20080402GreeceNorthern PindosMH813U. arctoshairs20080403GreeceNorthern PindosMH814U. arctoshairs20080403GreeceSouthern PindosMH836U. arctoshairs20080423GreeceVitsi - VarnoundasMH837U. arctoshairs20080423GreeceVitsi - VarnoundasMH836U. arctoshairs20080423GreeceSouthern PindosMH837U. arctoshairs20080423GreeceVitsi - VarnoundasM <td>H604</td> <td>U. arctos</td> <td>hairs</td> <td>20071203</td> <td>Greece</td> <td>Central Pindos</td> <td>Μ</td>	H604	U. arctos	hairs	20071203	Greece	Central Pindos	Μ
H622U. arctoshairs20071106GreeceSouthern PindosMH649U. arctoshairs20071005GreeceNorthern PindosMH663U. arctoshairs20071031GreeceNorthern PindosMH674U. arctoshairs20071031GreeceNorthern PindosFH678U. arctoshairs20071031GreeceNorthern PindosMH702U. arctoshairs20071205GreeceNorthern PindosMH711U. arctoshairs20080225GreeceCentral PindosMH787U. arctoshairs20080328GreeceCentral PindosMH805U. arctoshairs20080402GreeceNorthern PindosMH813U. arctoshairs20080402GreeceNorthern PindosMH813U. arctoshairs20080403GreeceNorthern PindosMH814U. arctoshairs20080403GreeceNorthern PindosMH836U. arctoshairs20080403GreeceSouthern PindosMH837U. arctoshairs20080423GreeceVitsi - VarnoundasMH847U. arctoshairs20080424MH847U. arctoshairs20080425GreeceVitsi - VarnoundasMH851U. arctoshairs20080425GreeceCentral PindosM	H610	U. arctos	hairs	20071203	Greece	Central Pindos	F
H649U. arctoshairs20071005GreeceNorthern PindosMH663U. arctoshairs20071031GreeceNorthern PindosMH674U. arctoshairs20071031GreeceNorthern PindosFH678U. arctoshairs20071031GreeceNorthern PindosFH702U. arctoshairs20071205GreeceNorthern PindosFH771U. arctoshairs20080225GreeceCentral PindosMH787U. arctoshairs20080225GreeceCentral PindosMH794U. arctoshairs20080402GreeceNorthern PindosMH805U. arctoshairs20080402GreeceNorthern PindosMH813U. arctoshairs20080403GreeceNorthern PindosMH813U. arctoshairs20080403GreeceNorthern PindosMH814U. arctoshairs20080403GreeceNorthern PindosMH815U. arctoshairs20080404GreeceSouthern PindosMH814U. arctoshairs20080424MH877U. arctoshairs20080423GreeceCentral PindosMH871U. arctoshairs20080425GreeceCentral PindosMH871U. arctoshairs20080425GreeceCentral PindosMH939U	H622	U. arctos	hairs	20071106	Greece	Southern Pindos	Μ
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Supplementary Figure S1 Overview of numbers of samples and loci included in each analysis based on quality criteria.

Supplementary Table S3 Overview of individuals that were represented by multiple samples in SNP and microsatellite data sets. One mismatch at one locus was accepted to consider two genotypes as belonging to the same individual. Note that brown bear samples had been individualized using microsatellites in the course of a previous study and consequently no matching genotypes were found in this study. *n*, number of samples; f.a., sample failed in microsatellite amplification; NA, matching not available due to failed microsatellite amplification of one of the samples.

SNPs						
Species	Individual ID	n	sample ID	matches	mismatches	missing loci
Grey wolves	А	2	WE207, WE217	85	0	0
(<i>n</i> loci = 85)	В	3	WE170, WE173, WE175	84	1	0
	С	4	WE171, WE201, WE208, WE213	85	0	0
	D	3	WE126, WE212, WE215	85	0	0
	E	2	WF423, WF424	82	1	2
	F	2	WF428, WF429	83	0	2
	G	2	WE167, WE161	85	0	0
European	Н	2	K150052, K150075	64	0	1
wildcats	I	2	K150689, K150706	63	1	1
(<i>n</i> loci = 65)	J	2	K151294, K151297	65	0	0
	К	2	K151415, K151443	65	0	0
Microsatellites						
Grey wolves	А	1	WE207 ^{f.a.} , WE217	NA	NA	NA
(<i>n</i> loci = 13)	В	2	WE170, WE173, WE175 ^{f.a.}	11	1	1
	С	4	WE171, WE201, WE208, WE213	10	1	2
	D	3	WE126, WE212, WE215	12	1	0
	E	2	WF423, WF424	12	1	0
	F	2	WF428, WF429	13	0	0
	G	1	WE167, WE161 ^{f.a.}	NA	NA	NA
European	н	2	K150052, K150075	14	0	0
wildcats	I	2	K150689, K150706	14	0	0
(<i>n</i> loci = 14)	J	2	К151294, К151297	13	0	1
	К	2	K151415, K151443	14	0	0

Supplementary Table S4 Genetic variability in grey wolves, European wildcats and brown bears for SNPs and microsatellites. *n*, sample size; *Na*, mean number of different alleles over loci; H_0 , observed heterozygosity; H_E ; expected heterozygosity; ML, number of monomorphic loci. For sample groups with $n \le 5$ no calculations were performed (5 grey wolves, 2 potential wildcat hybrids, 16 brown bears).

SNPs						
Species	Groups	n	Na	H _o	H _E	ML
Grey wolf	Germany, Brandenburg	9	1.79 ± 0.05	0.32 ± 0.03	0.28 ± 0.02	18
	Germany, Sachsen	17	1.81 ± 0.04	0.30 ± 0.03	0.27 ± 0.02	16
	Germany, Sachsen-Anhalt	9	1.84 ± 0.04	0.34 ± 0.03	0.28 ± 0.02	14
	Total	40	1.91 ± 0.03	0.31 ± 0.02	0.29 ± 0.02	8
European wildcat ^a	Germany, Domestic cat	7	1.77 ± 0.05	0.21 ± 0.03	0.24 ± 0.02	15
	Germany, Wildcat	28	1.88 ± 0.04	0.11 ± 0.02	0.12 ± 0.02	8
	Total	37	2.00 ± 0.00	0.16 ± 0.01	0.35 ± 0.01	0
Brown bear	Greece, Central Pindos	23	1.81 ± 0.05	0.26 ± 0.02	0.29 ± 0.02	13
	Greece, Northern Pindos	13	1.80 ± 0.05	0.27 ± 0.03	0.29 ± 0.03	14
	Greece, Southern Pindos	6	1.75 ± 0.05	0.26 ± 0.03	0.27 ± 0.03	17
	Greece, Vitsi - Varnoundas	13	1.84 ± 0.04	0.28 ± 0.02	0.32 ± 0.02	11
	Total	70	1.90 ± 0.04	0.28 ± 0.02	0.31 ± 0.02	7
Microsatellites						
Grey wolf	Germany, Brandenburg	7	3.31 ± 0.24	0.51 ± 0.06	0.54 ± 0.05	0
	Germany, Sachsen	15	3.85 ± 0.36	0.62 ± 0.06	0.53 ± 0.05	0
	Germany, Sachsen-Anhalt	8	2.92 ± 0.29	0.46 ± 0.07	0.49 ± 0.07	1
	Total	34	4.46 ± 0.39	0.54 ± 0.05	0.56 ± 0.04	0
European wildcat	Germany, Domestic cat	6	5.29 ± 0.38	0.63 ± 0.04	0.77 ± 0.04	0
	Germany, Wildcat	18	6.00 ± 0.50	0.64 ± 0.04	0.71 ± 0.03	0
	Total	25	7.86 ± 0.74	0.65 ± 0.04	0.77 ± 0.02	0
Brown bear	Greece. Central Pindos	23	4.50 ± 0.22	0.67 ± 0.03	0.66 ± 0.02	0
	Greece. Northern Pindos	13	4.50 ± 0.22	0.68 ± 0.04	0.67 ± 0.03	0
	Greece. Southern Pindos	6	3.83 ± 0.25	0.71 ± 0.08	0.71 ± 0.03	0
	Greece, Vitsi - Varnoundas	13	4.95 ± 0.24	0.74 ± 0.04	0.70 ± 0.02	0
	Total	71	7.06 ± 0.42	0.70 ± 0.03	0.72 ± 0.02	0

^a Note that the SNP panel for wildcats was designed to detect hybridization between wildcats and domestic cats.

Supplementary Table S5 Pairwise F_{ST} values for grey wolves with microsatellite data (above the diagonal, n = 30 samples and 13 loci) and SNP data (below the diagonal, n = 35 samples and 85 loci). All samples were collected in Germany. Only groups with n > 5 were considered (5 wolves from 2 locations excluded). Probability values were based on 999 permutations; $*p \le 0.05$; $**p \le 0.01$; $***p \le 0.001$.

	Brandenburg	Sachsen	Sachsen- Anhalt
Brandenburg	-	0.08**	0.05*
Sachsen	0.08**	-	0.10***
Sachsen-Anhalt	0.06*	0.10***	-

Supplementary Table S6 Pairwise F_{ST} values for European wildcats and domestic cats with microsatellite data (above the diagonal, n = 24 samples and 14 loci) and SNP data (below the diagonal, n = 35 samples and 65 loci). Note that the SNP panel we used here was designed to detect hybridization of wildcats and domestic cats (that is, maximize differentiation). All samples were collected in Germany. Potential hybrids (based on SNP data) were excluded from these analyses (n = 1 for msats, n = 2 for SNPs). Probability values were based on 999 permutations; *** $p \le 0.001$.

	Domestic cat	Wildcat
Domestic cat	-	0.13***
Wildcat	0.79***	-

Supplementary Table S7 Pairwise F_{ST} values for brown bears with microsatellite data (above the diagonal, n = 55 samples and 18 loci) and SNP data (below the diagonal, n = 55 samples and 69 loci). All samples were collected in Greece. Only groups with n > 5 were considered (16 bears from 5 locations excluded). Probability values were based on 999 permutations; n.s., not significant; $*p \le 0.05$; $**p \le 0.01$; $***p \le 0.001$. Negative values were converted to zero.

	Central Pindos	Northern Pindos	Southern Pindos	Vitsi - Varnoundas
Central Pindos	-	0.03**	0.03*	0.05***
Northern Pindos	0.04**	-	0.02 ^{n.s.}	0.03*
Southern Pindos	0.00 ^{n.s.}	0.03 ^{n.s.}	-	0.04*
Vitsi – Varnoundas	0.06***	0.03*	0.04*	-



Supplementary Figure S2 Delta *K* for STRUCTURE runs corresponding to Supplementary Figure S3.



Supplementary Figure S3 STRUCTURE plots showing results for the most likely K (***), second most likely K (*) and third most likely K (*) as calculated with the Evanno method based on SNP and microsatellite genotypes and their combination. Colour-coded bars below the STRUCTURE plots correspond to the sample groupings based on sampling region (grey wolves, brown bears) or species identification (wildcats or domestic cats, based on SNP data).



Supplementary Figure S4 STRUCTURE plots showing results for the most likely K (***), second most likely K (*) and third most likely K (*) (upper panels) as calculated with the Evanno method (lower panels, respectively) based on SNP and microsatellite data sets. Colour-coded bars below the STRUCTURE plots correspond to the sample groupings based on sampling region (grey wolves, brown bears) or species identification (wildcats and domestic cats, based on SNP data).



Supplementary Figure S5 PCoA for wolves and wildcats showing outliers (SNP data, original data set). Further examination of these samples indicated low SNP call rates (wolf 71%; wildcats 77%, 78%). These samples were removed from the figure in the main text, Figure 3, and from further analyses.



Supplementary Figure S6 PCoA analyses for subsets of SNP and microsatellite markers used in this study to genotype grey wolves. Each point represents an individual's genotype, colour-coded to its sampling region. Subsets of loci were selected based on highest heterozygosity (H_E) for each locus.



Supplementary Figure S7 PCoA analyses for subsets of SNP markers used in this study to genotype grey wolves. Each point represents an individual's genotype, colour-coded to its sampling region. Subsets of loci were selected randomly; three times each case (a, b, c).



Supplementary Figure S8 PCoA analyses for subsets of SNP and microsatellite markers used in this study to genotype European wildcats, domestic cats and hybrids. Each point represents an individual's genotype, colour-coded to species identity. Subsets of loci were selected based on highest heterozygosity (H_E) for each locus.



Supplementary Figure S9 PCoA analyses for subsets of SNP and microsatellite markers used in this study to genotype European wildcats, domestic cats and hybrids. Each point represents an individual's genotype, colour-coded to species identity. Subsets of loci were selected based on highest F_{ST} for each locus.



Supplementary Figure S10 PCoA analyses for subsets of SNP markers used in this study to genotype European wildcats, domestic cats and hybrids. Each point represents an individual's genotype, colour-coded to species identity. Subsets of loci were selected randomly; three times each case (a, b, c).



Supplementary Figure S11 PCoA analyses for subsets of SNP and microsatellite markers used in this study to genotype brown bears. Each point represents an individual's genotype, colour-coded to its sampling region. Subsets of loci were selected based on highest heterozygosity (H_E) for each locus.



Supplementary Figure S12 PCoA analyses for subsets of SNP markers used in this study to genotype brown bears. Each point represents an individual's genotype, colour-coded to its sampling region. Subsets of loci were selected randomly; three times each case (a, b, c).

References

- 1. Kearse, M. *et al.* Geneious Basic: an integrated and extendable desktop software platform for the organization and analysis of sequence data. *Bioinformatics* **28**, 1647–1649 (2012).
- 2. Eckert, I., Suchentrunk, F., Markov, G. & Hartl, G. B. Genetic diversity and integrity of German wildcat (*Felis silvestris*) populations as revealed by microsatellites, allozymes, and mitochondrial DNA sequences. *Mamm. Biol.* **75**, 160–174 (2010).
- 3. Fumagalli, L., Taberlet, P., Favre, L. & Hausser, J. Origin and evolution of homologous repeated sequences in the mitochondrial DNA control region of shrews. *Mol. Biol. Evol.* **13**, 31–46 (1996).
- 4. Taberlet, P. & Bouvet, J. Mitochondrial DNA polymorphism, phylogeography, and conservation genetics of the brown bear *Ursus arctos* in Europe. *Proc. R. Soc. B* **255**, 195–200 (1994).
- 5. Karamanlidis, A. A., Hernando, M. d. G., Krambokoukis, L. & Gimenez, O. Evidence of a large carnivore population recovery. Counting bears in Greece. *J. Nat. Conserv.* **27**, 10–17 (2015).
- 6. Harms, V., Nowak, C., Carl, S. & Muñoz-Fuentes, V. Experimental evaluation of genetic predator identification from saliva traces on wildlife kills. *J. Mammal.* **96**, 138–143 (2015).
- 7. Steyer, K., Simon, O., Kraus, Robert H. S., Haase, P. & Nowak, C. Hair trapping with valeriantreated lure sticks as a tool for genetic wildcat monitoring in low-density habitats. *Eur. J. Wildl. Res.* **59**, 39–46 (2013).
- 8. Karamanlidis, A. A. *et al.* Genetic diversity, structure, and size of an endangered brown bear population threatened by highway construction in the Pindos Mountains, Greece. *Eur. J. Wildl. Res.* **58**, 511–522 (2012).