**Appendix S1.** Different genetic markers used in analyses of the 10 European wolf populations. Population division according to Chapron *et al*. (2014). mtDNA, mitochondrial DNA; SNP, single nucleotide polymorphism.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Wolf population | Country |  | Markers used | | | | Study |
| Samples | mtDNA (bp) | Autosomal microsatellites (*N* of loci) | Y chromosome microsatellites (*N* of loci) | SNP |
| **Scandinavian** | Sweden and Norway | Scandinavia (*N* = 36) and USA (*N* = 5) | ̶ | 12 | ­̶ | ̶ | Ellegren *et al.* (1996) |
| 29 individuals, Swedish zoos | ̶ | 11 | ̶ | ̶ | Ellegren (1999) |
| Scandinavia (*N* = 27), also Finland (*N* = 16), Russia (*N* = 26) and Baltic countries (*N* = 31) | ̶ | ̶ | 4 | ̶ | Sundqvist *et al.* (2001) |
| Scandinavia (*N* = 93) 1984–2001, historical Scandinavia (*N* = 30) 1829–1965, also Finland and north-western Russia (*N* = 93) | 350 | 19 | 4 | ̶ | Vilà *et al*. (2003*a*) |
| Scandinavia (*N* = 57) 1829–1979, also Finland (*N* = 22) | 229 | 15 | 4 | ̶ | Flagstad *et al.* (2003) |
| Scandinavia (*N* = 108), also Finland (*N* = 72) | ̶ | ̶ | ̶ | 24 | Seddon *et al*. (2005) |
| Scandinavia (*N* = 48) 1983-2002 | ̶ | 32 (163) | ̶ | ̶ | Liberg *et al*. (2005) |
| Scandinavia (*N* = 199), also Finland (*N* = 79) | 350 | 20 | ̶ | ̶ | Seddon *et al*. (2006) |
| Scandinavia (*N* = 87) 1991-2001 | ̶ | 31 | ̶ | ̶ | Bensch *et al*. (2006) |
| Scandinavia (*N* = 112), also Russia (*N* = 24) from Tvier and Smolensk 1984-2005 | ̶ | 258 | ̶ | ̶ | Hagenblad *et al*. (2009) |
| **Karelian** | Finland | (*N* = 118) 1996–2004 | ̶ | 10 | ̶ | ̶ | Aspi *et al*. (2006) |
| Finland | (*N* = 118) 1996–2004  Karelia (*N* = 29), 1995–2000,  Arkhangelsk (*N* = 14) 1995–2000 | ̶ | 10 | ̶ | ̶ | Aspi *et al*. (2009) |
| Finland | (*N* = 298) 1995–2009 | ̶ | 17 | ̶ | ̶ | Jansson *et al.* (2012) |
| Finland | (*N* = 114) 1845–1993; (*N* = 298) 1995–2009; Karelia (*N* = 37) 1995–2010 | 430 | 15 | ̶ | ̶ | Jansson *et al*. (2014) |
| **Baltic** | Estonia and Latvia | Estonia (*N* = 116), Latvia (*N* = 50) 2004–2009 | ̶ | 16 | ̶ | ̶ | Hindrikson *et al*. (2013) |
| Lithuania | (*N* = 29) | 647 | 27 | ̶ | ̶ | Baltrūnaitė *et al.* (2013) |
| 2009–2010 |
| Poland and Belarus | (*N* = 29) | 300 | 20 | ̶ | ̶ | Jędrzejewski *et al*. (2005) |
| Poland | microsatellites (*N* = 215), mtDNA (*N* = 153), SNPs (*N* = 32) | 230 | 11 | ̶ | 9 | Czarnomska *et al.* (2013) |
| **Central European Lowland** | Poland, East Germany | microsatellites (Poland *N* = 48, Eastern Germany *N* = 9), mtDNA (Poland *N* = 28, Eastern Germany *N* = 5) SNPs (Poland *N* = 2) | 230 | 11 | ̶ | 9 | Czarnomska *et al.* (2013) |
| **Carpathian** | Poland | microsatellites (*N* = 185), mtDNA (*N* = 147), SNPs (*N* = 32) | 230 | 11 | ̶ | 9 | Czarnomska *et al.* (2013) |
| Poland | (*N* = 39) Carpathian Mountains 2001–2009 | ̶ | 8 | ̶ | ̶ | Gula *et al* (2009) |
|  | Slovakia | Slovakia (*N* = 194) | ̶ | 15 | ̶ | ̶ | Bakan *et al*. (2014) |
| **Alpine** | Italy | (*N* = 896) Alps 1982–2004 | ̶ | 12 | ̶ | ̶ | Fabbri *et al.* (2007) |
| Italy | (*N* = 156) Alps 1999–2000 | 404 | 6 | ̶ | ̶ | Lucchini *et al*. (2002) |
| **Italian peninsula** | Italy | (*N* = 22) central and northern Italy | ̶ | ̶ | ̶ | ̶ | Randi *et al*. (1995) |
| Italy | (*N* = 70) throughout Italy | ̶ | 7 | ̶ | ̶ | Dolf *et al*. (2000) |
| Italy | (*N* = 101) 1985-2000 other European countries (*N* = 49) | 546 | ̶ | ̶ | ̶ | Randi *et al*. (2000) |
| Italy | (*N* = 464) 1998–2004 | ̶ | 10 | ̶ | ̶ | Scandura *et al.* (2006) |
| Italy | (*N* = 2127) Apennines 1982–2004 | ̶ | 12 | ̶ | ̶ | Fabbri *et al.* (2007) |
| Italy | (*N* = 38) throughout Italy | ̶ | 6 | ̶ | ̶ | Scandura, *et al*. (2001) |
| Italy | (*N* = 282) also Croatia (*N* = 152) and Bosnia and Herzegovina (*N* = 9) in 1990-2011 | 280 | 12 | 4 | ̶ | Fabbri *et al*. (2014) |
| Italy | (*N* = 414) Apennines 2000-2009 | 350 | 12 | 4 | ̶ | Caniglia *et al.* (2014) |
| France and Switzerland | (*N* = 99) 1992–2001 | 342 | ̶ | ̶ | ̶ | Valière *et al*. (2003) |
| Italy | (*N* = 318) Apennines | ̶ | 6 | ̶ | 9 | Fabbri *et al*. (2012) |
| Italy | (*N* = 267) Apennines, also samples across Europe | ̶ | 18 | ̶ | ̶ | Lucchini *et al*. (2004) |
| Italy | (*N* = 74) Apennines 1998–2004 | ̶ | 9 | ̶ | ̶ | Scandura *et al.* (2011) |
| **Dinaric-Balkan** | Serbia | (*N* = 53) Former Yugoslav Republic of Macedonia (*N* = 18) and Bosnia and Herzegovina (*N* = 17) during 1997–2010) | 280 | ̶ | ̶ | ̶ | Djan *et al*. (2014) |
| Croatia | (*N* = 91) Bosnia-Herzegovina (*N* = 4) 1996–2006 | 281 | ̶ | ̶ | ̶ | Gomerčić *et al.* (2010) |
| Croatia | (*N* = 152), also in Italy (*N* = 282) and Bosnia and Herzegovina (*N* = 9) 1990–2011 | 280 | 12 | 4 | ̶ | Fabbri *et al.* (2014) |
| Bulgaria,  Georgia | Georgia (*N* = 33), Nagorno-Karabakh (*N* = 31), Armenia (*N* = 1), Bulgaria (*N* = 124), Spain (*N* = 12) 2000–2012 | 660 | 14 | ̶ | 167,000 (typed only for samples from Nagorno-Karabakh) | Pilot *et al.* (2014*a*) |
| Bulgaria,  Greece | Bulgaria (*N* = 109), Greece (*N* = 10) 2000-2011 | 257 | 14 | ̶ | ̶ | Moura *et al.* (2014) |
| Serbia, Bulgaria | Serbia (*N* = 120), Bulgaria (*N* = 25) | ̶ | 15 | ̶ | ̶ | Bakan *et al*.(2014) |
| Slovenia | Slovenia (*N* = 517),  Croatia (*N* = 245)  2010–2013 | ̶ | 32 | ̶ | ̶ | Majić-Skrbinšek (2014) |
| **NW Iberian** | Spain | (*N* = 74) | 313 | 13 | ̶ | ̶ | Ramirez *et al.* (2006) |
| Spain | (*N* = 47) 1994–2008, NE Russia (*N* = 47) 1984–1996 | 333 | 13 | 4 | ̶ | Sastre *et al.,* 2011 |
| Portugal | (*N* = 23) 1995–2008 | ̶ | 9 | ̶ | ̶ | Van Asch *et al.* (2010) |
| **Sierra Morena** | | Spain (*N* = 5) | ̶ | 425 | 21 | 4 | Ferrand *et al*. (2005) |  |
| **Accross Europe** | | NE Europe (*N* = 10), Scandinavia (*N* = 2), Balkan (*N* =13), Carpathian (*N* = 4), Italy (*N* = 14), Iberia (*N* = 65) | 261 | ̶ | ̶ | ̶ | Vilà *et al.* (1997) |
| across Europe (*N* = 643) 1958–2004 | 257 | 14 | ̶ | ̶ | Pilot *et al.* (2006) |
| across Europe (*N* = 150) 1985–2000 | 546 | ̶ | ̶ | ̶ | Randi *et al.* (2000) |
| across Europe (*N* = 947) 1958–2004 | 661 | ̶ | ̶ | ̶ | Pilot *et al.* (2010) |
| Eastern Europe (*N* = 54), Italy (*N* = 19), Iberia (*N* = 6) | ̶ | ̶ | ̶ | 61,000 | Pilot *et al.* (2014*b)* |
| NE Europe (*N* = 70), Balkan (*N* = 29), Carpathian (*N* = 23), Italy (*N* = 50) 1995-2010 | ̶ | ̶ | ̶ | 67,000 | Stronen *et al.* (2013) |
| NE Europe (*N* = 57), Italy (*N* = 20), Spain (*N* = 10) | ̶ | ̶ | ̶ | 48,000 | vonHoldt *et al.* (2011) |
| NE Europe (*N* = 27), Balkan (*N* = 26), Italy (*N* = 28), Iberia (*N* = 103) | 350 | ̶ | ̶ | ̶ | Vilà *et al.* (1999) |