

# Patterns of Genetic Variation in a Soybean Germplasm Collection as Characterized with Genotyping-by-Sequencing

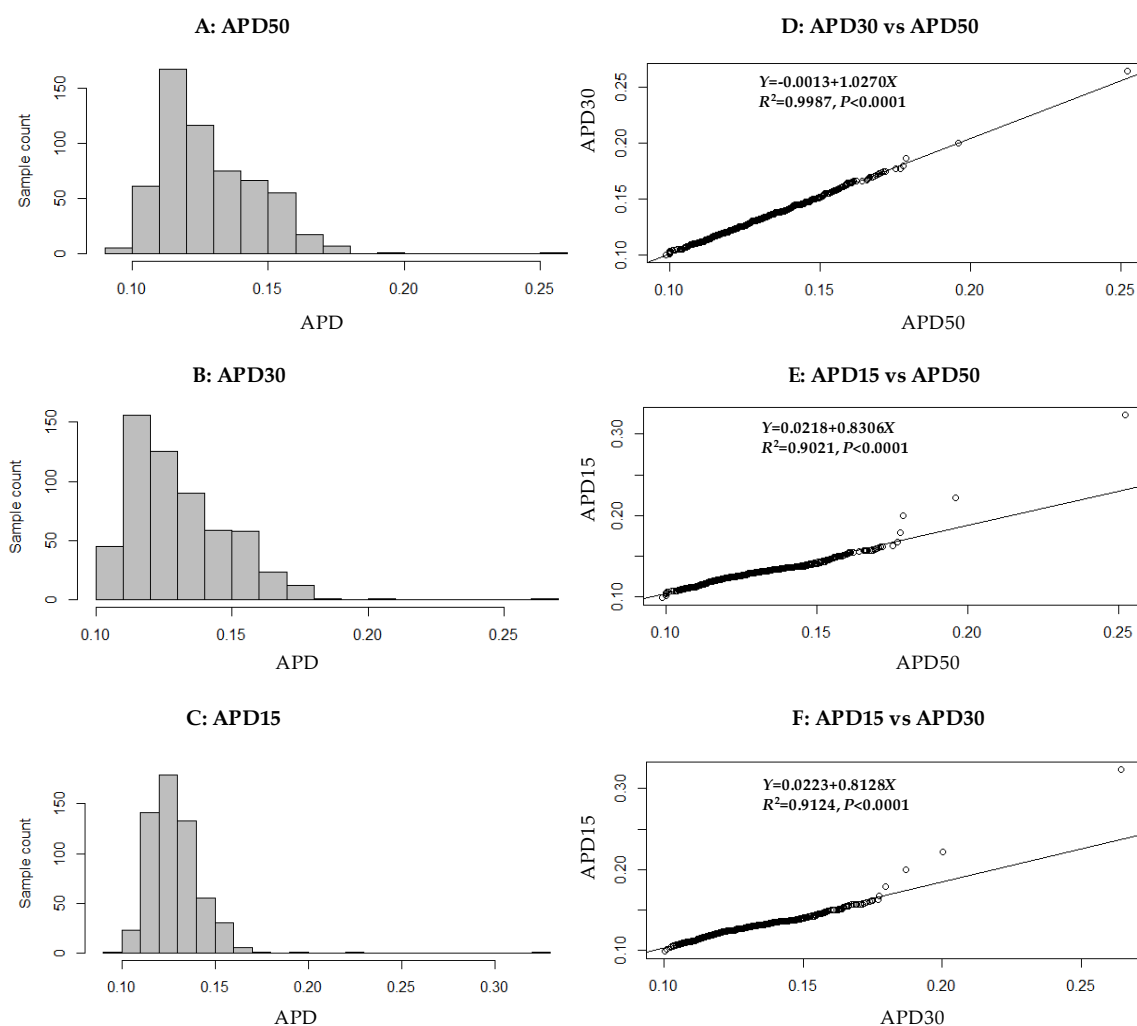
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**Figure S1.** Average pairwise dissimilarity (APD) for three levels of SNP missing value (50%, 30% and 15%) (A: APD50, B: APD30 and C: APD15) and their correlations (D: APD30 vs APD50, E: APD15 vs APD50, F: APD15 vs APD30).

**Table S1.** List of four new adaptors with sequence information used in the genotyping-by-sequencing procedure.

| Adaptor                   | Sequence (5' to 3')  |
|---------------------------|--|
| <i>Pst</i> I_CGACG_top    | ACA CTC TTT CCC TAC ACG ACG CTC TTC CGA TCT CGA CGT GCA          |
| <i>Pst</i> I_CGACG_bottom | /5Phos/CGT CGA GAT CGG AAG AGC GTC GTG TAG GGA AAG AGT GTA GAT C |
| <i>Pst</i> I_GATGA_top    | ACA CTC TTT CCC TAC ACG ACG CTC TTC CGA TCT GAT GAT GCA          |
| <i>Pst</i> I_GATGA_bottom | /5Phos/TCA TCA GAT CGG AAG AGC GTC GTG TAG GGA AAG AGT GTA GAT C |
| <i>Pst</i> I_AATCG_top    | ACA CTC TTT CCC TAC ACG ACG CTC TTC CGA TCT AAT CGT GCA          |
| <i>Pst</i> I_AATCG_bottom | /5Phos/CGA TTA GAT CGG AAG AGC GTC GTG TAG GGA AAG AGT GTA GAT C |
| <i>Pst</i> I_GTATA_top    | ACA CTC TTT CCC TAC ACG ACG CTC TTC CGA TCT GTA TAT GCA          |
| <i>Pst</i> I_GTATA_bottom | /5Phos/TAT ACA GAT CGG AAG AGC GTC GTG TAG GGA AAG AGT GTA GAT C |

**Table S2.** List of 571 soybean accessions with the country of origin, country group (CG), maturity group (MG), average pairwise dissimilarity (APD), PCoA-group (PG) and STRUCTURE-cluster (SC).

| Key | Sample       | Origin | CG | MG | APD    | PG | SC | Key | Sample             | Origin | CG | MG | APD    | PG | SC | Key | Sample        | Origin | CG | MG | APD    | PG | SC |
|-----|--------------|--------|----|----|--------|----|----|-----|--------------------|--------|----|----|--------|----|----|-----|---------------|--------|----|----|--------|----|----|
| 1   | CN29752_S1   | HUN    | 9  | 5  | 0.1254 | 2  | 2  | 97  | CN32351_S1         | JPN    | 8  | 5  | 0.1340 | 2  | 2  | 193 | CN30633_S1    | RUS    | 2  | 5  | 0.1206 | 2  | 2  |
| 2   | CN29792_S2   | RUS    | 2  | 5  | 0.1064 | 2  | 2  | 98  | CN35348_S2         | HUN    | 9  | 5  | 0.1274 | 2  | 2  | 194 | CN30634_S2    | CHN    | 3  | 5  | 0.1199 | 2  | 2  |
| 3   | CN29793_S3   | CHE    | 16 | 5  | 0.1077 | 2  | 2  | 99  | CN35373_S3         | ROM    | 12 | 5  | 0.1280 | 2  | 2  | 195 | CN31690_S3    | CHN    | 3  | 5  | 0.1215 | 2  | 2  |
| 4   | CN29795_S4   | DEU    | 6  | 5  | 0.1126 | 2  | 2  | 100 | CN42821_S4         | CHE    | 16 | 5  | 0.1185 | 2  | 2  | 196 | CN31692_S4    | CHN    | 3  | 5  | 0.1112 | 2  | 2  |
| 5   | CN30389_S5   | DEU    | 6  | 5  | 0.1205 | 2  | 2  | 101 | CN107435_S5        | CZE    | 23 | 5  | 0.1188 | 2  | 2  | 197 | CN32053_S5    | CHN    | 3  | 5  | 0.1087 | 2  | 2  |
| 6   | CN30391_S6   | NLD    | 13 | 5  | 0.1185 | 2  | 2  | 102 | CN107437_S6        | KOR    | 5  | 5  | 0.1153 | 2  | 2  | 198 | CN32257_S6    | RUS    | 2  | 5  | 0.1306 | 2  | 2  |
| 7   | CN32356_S7   | YUG    | 19 | 5  | 0.1138 | 2  | 2  | 103 | CN107650_S7        | KOR    | 5  | 5  | 0.1233 | 2  | 2  | 199 | CN32442_S7    | RUS    | 2  | 5  | 0.1120 | 2  | 2  |
| 8   | CN32451_S8   | GBR    | 18 | 5  | 0.1128 | 2  | 2  | 104 | CN107804_S8        | KOR    | 5  | 3  | 0.1272 | 2  | 2  | 200 | CN32634_S8    | HUN    | 9  | 5  | 0.1272 | 2  | 2  |
| 9   | CN32547_S9   | DEU    | 6  | 5  | 0.1346 | 2  | 2  | 105 | CN107822_S9        | CAN    | 1  | 3  | 0.1194 | 2  | 2  | 201 | CN32639_S9    | DEU    | 6  | 5  | 0.1116 | 2  | 2  |
| 10  | CN32826_S10  | DEU    | 6  | 5  | 0.1102 | 2  | 2  | 106 | CN107879_S10       | CAN    | 1  | 2  | 0.1266 | 2  | 2  | 202 | CN32829_S10   | UKR    | 17 | 5  | 0.1078 | 2  | 2  |
| 11  | CN33248_S11  | CAN    | 1  | 5  | 0.1047 | 2  | 2  | 107 | CN107880_S11       | RUS    | 2  | 2  | 0.1268 | 2  | 2  | 203 | CN33253_S11   | CHE    | 16 | 5  | 0.1034 | 2  | 2  |
| 12  | CN33259_S12  | CAN    | 1  | 5  | 0.1134 | 2  | 2  | 108 | CN107881_S12       | RUS    | 2  | 1  | 0.1256 | 2  | 2  | 204 | CN33255_S12   | CAN    | 1  | 5  | 0.1054 | 2  | 2  |
| 13  | CN33309_S13  | CAN    | 1  | 5  | 0.1215 | 2  | 2  | 109 | CN107882_S13       | RUS    | 2  | 2  | 0.1073 | 2  | 2  | 205 | CN33265_S13   | CAN    | 1  | 5  | 0.0998 | 2  | 2  |
| 14  | CN33312_S14  | CAN    | 1  | 5  | 0.1167 | 2  | 2  | 110 | CN107883_S14       | RUS    | 2  | 1  | 0.1081 | 2  | 2  | 206 | CN33273_S14   | KOR    | 5  | 5  | 0.1065 | 2  | 2  |
| 15  | CN33314_S15  | CHN    | 3  | 5  | 0.1073 | 2  | 2  | 111 | CN107884_S15       | CAN    | 1  | 2  | 0.1128 | 2  | 2  | 207 | CN33911_S15   | KOR    | 5  | 5  | 0.1025 | 2  | 2  |
| 16  | CN33321_S16  | KOR    | 5  | 5  | 0.1200 | 2  | 2  | 112 | CN107885_S16       | DEU    | 6  | 2  | 0.1127 | 2  | 2  | 208 | CN35308_S16   | KOR    | 5  | 5  | 0.1211 | 2  | 2  |
| 17  | CN33329_S17  | KOR    | 5  | 5  | 0.1196 | 2  | 2  | 113 | CN115251_S17       | SWE    | 4  | 5  | 0.0997 | 2  | 2  | 209 | CN35318_S17   | KOR    | 5  | 5  | 0.1164 | 2  | 2  |
| 18  | CN33380_S18  | KOR    | 5  | 5  | 0.1199 | 2  | 2  | 114 | CN115252_S18       | USA    | 15 | 5  | 0.1105 | 2  | 2  | 210 | CN35372_S18   | KOR    | 5  | 5  | 0.1206 | 2  | 2  |
| 19  | CN35919_S19  | KOR    | 5  | 5  | 0.1118 | 2  | 2  | 115 | CN115253_S19       | USA    | 15 | 5  | 0.1002 | 2  | 2  | 211 | X0CN35382_S19 | KOR    | 5  | 5  | 0.1134 | 2  | 2  |
| 20  | CN36138_S20  | UKR    | 17 | 5  | 0.1181 | 2  | 2  | 116 | CN115254_S20       | JPN    | 8  | 5  | 0.1168 | 2  | 2  | 212 | CN35757_S20   | RUS    | 2  | 5  | 0.1213 | 2  | 2  |
| 21  | CN36143_S21  | MDA    | 23 | 5  | 0.1125 | 2  | 2  | 117 | CN115255_S21       | POL    | 10 | 5  | 0.1131 | 2  | 2  | 213 | CN35758_S21   | CAN    | 1  | 5  | 0.1243 | 2  | 2  |
| 22  | CN36334_S22  | RUS    | 2  | 5  | 0.1008 | 2  | 2  | 118 | CN115256_S22       | DEU    | 6  | 5  | 0.1140 | 2  | 2  | 214 | CN35916_S22   | CAN    | 1  | 5  | 0.1351 | 2  | 2  |
| 23  | CN36422_S23  | RUS    | 2  | 5  | 0.1124 | 2  | 2  | 119 | CN115257_S23       | POL    | 10 | 5  | 0.1103 | 2  | 2  | 215 | CN35918_S23   | RUS    | 2  | 5  | 0.1045 | 2  | 2  |
| 24  | CN107446_S24 | UKR    | 17 | 5  | 0.1104 | 2  | 2  | 120 | CN115258_S24       | POL    | 10 | 5  | 0.1017 | 2  | 2  | 216 | CN35920_S24   | RUS    | 2  | 5  | 0.1234 | 2  | 2  |
| 25  | CN107450_S25 | RUS    | 2  | 5  | 0.1371 | 3  | 3  | 121 | CN115259_S25       | POL    | 10 | 5  | 0.1497 | 3  | 3  | 217 | CN35921_S25   | CAN    | 1  | 5  | 0.1238 | 2  | 2  |
| 26  | CN107455_S26 | CAN    | 1  | 5  | 0.1252 | 3  | 3  | 122 | Maple Arrow_S26    | OBL    | 24 | 4  | 0.1352 | 3  | 3  | 218 | CN36139_S26   | CAN    | 1  | 5  | 0.1417 | 2  | 2  |
| 27  | CN107477_S27 | CAN    | 1  | 2  | 0.1406 | 3  | 3  | 123 | Maple Glen_S27     | OBL    | 24 | 4  | 0.1340 | 3  | 3  | 219 | CN36141_S27   | CAN    | 1  | 5  | 0.1096 | 2  | 2  |
| 28  | CN107479_S28 | RUS    | 2  | 2  | 0.1412 | 3  | 3  | 124 | ACOrford_S28       | OBL    | 24 | 4  | 0.1380 | 3  | 3  | 220 | CN36335_S28   | UNK    | 11 | 5  | 0.1188 | 2  | 2  |
| 29  | CN107486_S29 | JPN    | 8  | 2  | 0.1445 | 3  | 3  | 125 | Accord_S29         | OBL    | 24 | 4  | 0.1469 | 3  | 3  | 221 | CN36337_S29   | BEL    | 14 | 5  | 0.1195 | 2  | 2  |
| 30  | CN107501_S30 | RUS    | 2  | 2  | 0.1352 | 3  | 3  | 126 | RD714_S30          | OBL    | 24 | 4  | 0.1164 | 3  | 3  | 222 | CN36340_S30   | NLD    | 13 | 5  | 0.1138 | 2  | 2  |
| 31  | CN107511_S31 | DEU    | 6  | 2  | 0.1255 | 3  | 3  | 127 | ACGlengarry_S31    | OBL    | 24 | 4  | 0.1334 | 3  | 3  | 223 | CN36342_S31   | FRA    | 7  | 5  | 0.1151 | 2  | 2  |
| 32  | CN107524_S32 | CAN    | 1  | 1  | 0.1455 | 3  | 3  | 128 | DH3604_S32         | OBL    | 24 | 4  | 0.1513 | 3  | 3  | 224 | CN39070_S32   | FRA    | 7  | 5  | 0.1124 | 2  | 2  |
| 33  | CN107529_S33 | USA    | 15 | 2  | 0.1220 | 3  | 3  | 129 | Toki_S33           | OBL    | 24 | 4  | 0.1547 | 3  | 3  | 225 | CN42928_S33   | SWE    | 4  | 5  | 0.1133 | 2  | 2  |
| 34  | CN107590_S34 | UKR    | 17 | 3  | 0.1312 | 3  | 3  | 130 | Chikala_S34        | OBL    | 24 | 4  | 0.1312 | 3  | 3  | 226 | CN45087_S34   | SWE    | 4  | 5  | 0.1270 | 2  | 2  |
| 35  | CN107598_S35 | YUG    | 19 | 3  | 0.1547 | 3  | 3  | 131 | QGC10N_S35         | OBL    | 24 | 4  | 0.1605 | 3  | 3  | 227 | CN45088_S35   | RUS    | 2  | 5  | 0.1482 | 2  | 2  |
| 36  | CN107630_S36 | GBR    | 18 | 2  | 0.1379 | 3  | 3  | 132 | QGC12N_S36         | OBL    | 24 | 4  | 0.1552 | 3  | 3  | 228 | CN45090_S36   | ROM    | 12 | 5  | 0.1056 | 2  | 2  |
| 37  | CN107652_S37 | DEU    | 6  | 5  | 0.1307 | 3  | 3  | 133 | Dares_S37          | OBL    | 24 | 4  | 0.1269 | 3  | 3  | 229 | CN45095_S37   | JPN    | 8  | 5  | 0.1114 | 2  | 2  |
| 38  | CN107654_S38 | RUS    | 2  | 5  | 0.1381 | 3  | 3  | 134 | Apalis_S38         | OBL    | 24 | 4  | 0.1529 | 3  | 3  | 230 | CN45107_S38   | USA    | 15 | 5  | 0.1706 | 2  | 2  |
| 39  | CN107655_S39 | JPN    | 8  | 5  | 0.1384 | 3  | 3  | 135 | Loriot_S39         | OBL    | 24 | 4  | 0.1505 | 3  | 3  | 231 | CN51375_S39   | UNK    | 11 | 5  | 0.1218 | 2  | 2  |
| 40  | CN107656_S40 | RUS    | 2  | 5  | 0.1392 | 3  | 3  | 136 | Jari_S40           | OBL    | 24 | 4  | 0.1453 | 3  | 3  | 232 | CN52633_S40   | SWE    | 4  | 5  | 0.1109 | 2  | 2  |
| 41  | CN107657_S41 | RUS    | 2  | 5  | 0.1330 | 3  | 3  | 137 | DH710_S41          | OBL    | 24 | 4  | 0.1418 | 3  | 3  | 233 | CN52634_S41   | SWE    | 4  | 5  | 0.1136 | 2  | 2  |
| 42  | CN107658_S42 | RUS    | 2  | 5  | 0.1252 | 3  | 3  | 138 | SG1010_S42         | OBL    | 24 | 4  | 0.1409 | 3  | 3  | 234 | CN52635_S42   | UNK    | 11 | 5  | 0.1092 | 2  | 2  |
| 43  | CN107659_S43 | RUS    | 2  | 5  | 0.1270 | 3  | 3  | 139 | Roselin_S43        | OBL    | 24 | 4  | 0.1437 | 3  | 3  | 235 | CN52639_S43   | CHN    | 3  | 5  | 0.1134 | 2  | 2  |
| 44  | CN107660_S44 | RUS    | 2  | 5  | 0.1368 | 3  | 3  | 140 | AACVireo_S44       | OBL    | 24 | 4  | 0.1408 | 3  | 3  | 236 | CN52640_S44   | UNK    | 11 | 5  | 0.1131 | 2  | 2  |
| 45  | CN107661_S45 | RUS    | 2  | 5  | 0.1264 | 3  | 3  | 141 | AACEdward_S45      | OBL    | 24 | 4  | 0.1316 | 3  | 3  | 237 | CN52643_S45   | UNK    | 11 | 5  | 0.1086 | 2  | 2  |
| 46  | CN107662_S46 | RUS    | 2  | 5  | 0.1619 | 3  | 3  | 142 | AACNaruto_S46      | OBL    | 24 | 4  | 0.1226 | 3  | 3  | 238 | CN52645_S46   | UNK    | 11 | 5  | 0.1101 | 2  | 2  |
| 47  | CN107663_S47 | RUS    | 2  | 5  | 0.1384 | 3  | 3  | 143 | Heron_S47          | OBL    | 24 | 4  | 0.1415 | 3  | 3  | 239 | CN52646_S47   | UNK    | 11 | 5  | 0.1101 | 2  | 2  |
| 48  | CN107664_S48 | RUS    | 2  | 5  | 0.1193 | 3  | 3  | 144 | ACColibri_S48      | OBL    | 24 | 4  | 0.1379 | 3  | 3  | 240 | CN52647_S48   | RUS    | 2  | 5  | 0.1100 | 2  | 2  |
| 49  | CN107666_S49 | RUS    | 2  | 5  | 0.1472 | 1  | 1  | 145 | Nattosan_S49       | OBL    | 24 | 4  | 0.1585 | 1  | 1  | 241 | CN52648_S49   | RUS    | 2  | 5  | 0.1229 | 1  | 1  |
| 50  | CN107667_S50 | RUS    | 2  | 5  | 0.1472 | 1  | 1  | 146 | Canatto_S50        | OBL    | 24 | 4  | 0.1600 | 1  | 1  | 242 | CN52649_S50   | RUS    | 2  | 5  | 0.1273 | 1  | 1  |
| 51  | CN107668_S51 | RUS    | 2  | 5  | 0.1249 | 1  | 1  | 147 | AACUmani_S51       | OBL    | 24 | 4  | 0.1591 | 1  | 1  | 243 | CN52650_S51   | RUS    | 2  | 5  | 0.1249 | 1  | 1  |
| 52  | CN107800_S52 | RUS    | 2  | 5  | 0.1455 | 1  | 1  | 148 | AACSpringfield_S52 | OBL    | 24 | 4  | 0.1573 | 1  | 1  | 244 | CN52652_S52   | UNK    | 11 | 5  | 0.1252 | 1  | 1  |
| 53  | CN107801_S53 | ROM    | 12 | 5  | 0.1502 | 1  | 1  | 149 | AACHali_S53        | OBL    | 24 | 4  | 0.1372 | 1  | 1  | 245 | CN52871_S53   | RUS    | 2  | 5  | 0.1446 | 1  | 1  |
| 54  | CN107803_S54 | ROM    | 12 | 3  | 0.1530 | 1  | 1  | 150 | AACShinju_S54      | OBL    | 24 | 4  | 0.1541 | 1  | 1  | 246 | CN52872_S54   | CAN    | 1  | 5  | 0.1498 | 1  | 1  |
| 55  | CN107805_S55 | ROM    | 12 | 3  | 0.1311 | 1  | 1  | 151 | AACRin_S55         | OBL    | 24 | 4  | 0.1511 | 1  | 1  | 247 | CN52873_S55   | FRA    | 7  | 5  | 0.1267 | 1  | 1  |
| 56  | CN107806_S56 | SVK    | 23 | 5  | 0.1270 | 1  | 1  | 152 | CN29751_S56        | ROM    | 12 | 5  | 0.1716 | 1  | 1  | 248 | CN52875_S56   | NLD    | 13 | 5  | 0.1248 | 1  | 1  |
| 57  | CN107807_S57 | CAN    | 1  | 5  | 0.1403 | 1  | 1  | 153 | CN30316_S57        | ROM    | 12 | 5  | 0.1568 | 1  | 1  | 249 | CN107406_S57  | CHN    | 3  | 5  | 0.1331 | 1  | 1  |
| 58  | CN107808_S58 | SWE    | 4  | 3  | 0.1439 | 1  | 1  | 154 | CN30637_S58        | ITA    | 22 | 5  | 0.1533 | 1  | 1  | 250 | CN107423_S58  | CHN    | 3  | 5  | 0.1389 | 1  | 1  |
| 59  | CN107809_S59 | CAN    | 1  | 3  | 0.1485 | 1  | 1  | 155 | CN30642_S59        | DEU    | 6  | 5  | 0.1612 | 1  | 1  | 251 | CN107449_S59  | FRA    | 7  | 5  | 0.1228 | 1  | 1  |
| 60  | CN107812_S60 | CAN    | 1  | 2  | 0.1395 | 1  | 1  | 156 | CN32320_S60        | ITA    | 22 | 5  | 0.1608 | 1  | 1  | 252 | CN107453_S60  | FRA    | 7  | 5  | 0.1307 | 1  | 1  |
| 61  | CN107817_S61 | CAN    | 1  | 1  | 0.1464 | 1  | 1  | 157 | CN32394_S61        | POL    | 10 | 5  | 0.1585 | 1  | 1  | 253 | CN107454_S61  | SWE    | 4  | 5  | 0.1300 | 1  | 1  |
| 62  | CN107818_S62 | NLD    | 13 | 3  | 0.1495 | 1  | 1  | 158 | CN32416_S62        | AUT    | 20 | 5  | 0.1655 | 1  | 1  | 254 | CN107462_S62  | SWE    | 4  | 2  | 0.1318 | 1  | 1  |
| 63  | CN107824_S63 | BEL    | 14 | 1  | 0      |    |    |     |                    |        |    |    |        |    |    |     |               |        |    |    |        |    |    |

|     |              |     |    |   |        |   |   |     |              |     |    |   |        |   |   |     |              |     |    |   |        |   |   |
|-----|--------------|-----|----|---|--------|---|---|-----|--------------|-----|----|---|--------|---|---|-----|--------------|-----|----|---|--------|---|---|
| 289 | CN30629_S1   | ROM | 12 | 5 | 0.1274 | 2 | 2 | 385 | CN30318_S1   | CHN | 3  | 5 | 0.1269 | 2 | 2 | 481 | CN35332_S1   | KOR | 5  | 5 | 0.1188 | 2 | 2 |
| 290 | CN32352_S2   | KOR | 5  | 5 | 0.2522 | 2 | 2 | 386 | CN30644_S2   | HUN | 9  | 5 | 0.1340 | 2 | 2 | 482 | CN35341_S2   | KOR | 5  | 5 | 0.1180 | 2 | 2 |
| 291 | CN32631_S3   | KOR | 5  | 5 | 0.1094 | 2 | 2 | 387 | CN31631_S3   | ROM | 12 | 5 | 0.1118 | 2 | 2 | 483 | CN39109_S3   | UNK | 11 | 5 | 0.1150 | 2 | 2 |
| 292 | CN32669_S4   | CAN | 1  | 5 | 0.1153 | 2 | 2 | 388 | CN31719_S4   | NLD | 13 | 5 | 0.1294 | 2 | 2 | 484 | CN107461_S4  | CHN | 3  | 5 | 0.1165 | 2 | 2 |
| 293 | CN35310_S5   | CAN | 1  | 5 | 0.1147 | 2 | 2 | 389 | CN31984_S5   | NOR | 23 | 5 | 0.1225 | 2 | 2 | 485 | CN107665_S5  | RUS | 2  | 5 | 0.1158 | 2 | 2 |
| 294 | CN35311_S6   | CAN | 1  | 5 | 0.1172 | 2 | 2 | 390 | CN32354_S6   | HUN | 9  | 5 | 0.1129 | 2 | 2 | 486 | CN107810_S6  | FRA | 7  | 3 | 0.1088 | 2 | 2 |
| 295 | CN35344_S7   | CHN | 3  | 5 | 0.1290 | 2 | 2 | 391 | CN35337_S7   | KOR | 5  | 5 | 0.1194 | 2 | 2 | 487 | CN107811_S7  | FRA | 7  | 2 | 0.1181 | 2 | 2 |
| 296 | CN39071_S8   | FRA | 7  | 5 | 0.1208 | 2 | 2 | 392 | CN35342_S8   | KOR | 5  | 5 | 0.1278 | 2 | 2 | 488 | CN107813_S8  | SWE | 4  | 2 | 0.1047 | 2 | 2 |
| 297 | CN39168_S9   | DEU | 6  | 5 | 0.1118 | 2 | 2 | 393 | CN35383_S9   | KOR | 5  | 5 | 0.1216 | 2 | 2 | 489 | CN107814_S9  | SWE | 4  | 2 | 0.1113 | 2 | 2 |
| 298 | CN52636_S10  | UNK | 11 | 5 | 0.0986 | 2 | 2 | 394 | CN36009_S10  | CHN | 3  | 5 | 0.1200 | 2 | 2 | 490 | CN107815_S10 | SWE | 4  | 2 | 0.1149 | 2 | 2 |
| 299 | CN52644_S11  | KOR | 5  | 5 | 0.1136 | 2 | 2 | 395 | CN36218_S11  | CHN | 3  | 5 | 0.1061 | 2 | 2 | 491 | CN107816_S11 | SWE | 4  | 2 | 0.1146 | 2 | 2 |
| 300 | CN52651_S12  | SWE | 4  | 5 | 0.1157 | 2 | 2 | 396 | CN52628_S12  | SWE | 4  | 1 | 0.1228 | 2 | 2 | 492 | CN107819_S12 | JPN | 8  | 3 | 0.1197 | 2 | 2 |
| 301 | CN52653_S13  | FRA | 7  | 5 | 0.1115 | 2 | 2 | 397 | CN107473_S13 | BEL | 14 | 2 | 0.1173 | 2 | 2 | 493 | CN107820_S13 | SWE | 4  | 1 | 0.1164 | 2 | 2 |
| 302 | CN107424_S14 | FRA | 7  | 5 | 0.1105 | 2 | 2 | 398 | CN107512_S14 | FRA | 7  | 2 | 0.1202 | 2 | 2 | 494 | CN107826_S14 | RUS | 2  | 2 | 0.1144 | 2 | 2 |
| 303 | CN107513_S15 | SWE | 4  | 2 | 0.1129 | 2 | 2 | 399 | CN107592_S15 | JPN | 8  | 2 | 0.1199 | 2 | 2 | 495 | CN107830_S15 | HUN | 9  | 2 | 0.1156 | 2 | 2 |
| 304 | CN107531_S16 | CHN | 3  | 2 | 0.1164 | 2 | 2 | 400 | CN107602_S16 | ROM | 12 | 2 | 0.1234 | 2 | 2 | 496 | CN107832_S16 | POL | 10 | 2 | 0.1197 | 2 | 2 |
| 305 | CN107544_S17 | RUS | 2  | 1 | 0.1095 | 2 | 2 | 401 | CN107831_S17 | POL | 10 | 1 | 0.1176 | 2 | 2 | 497 | CN107836_S17 | HUN | 9  | 3 | 0.1150 | 2 | 2 |
| 306 | CN107545_S18 | RUS | 2  | 2 | 0.1077 | 2 | 2 | 402 | CN107834_S18 | HUN | 9  | 3 | 0.1233 | 2 | 2 | 498 | CN107848_S18 | SWE | 4  | 2 | 0.1291 | 2 | 2 |
| 307 | CN107546_S19 | RUS | 2  | 2 | 0.1067 | 2 | 2 | 403 | CN35323_S19  | KOR | 5  | 5 | 0.1113 | 2 | 2 | 499 | CN107856_S19 | SWE | 4  | 2 | 0.1243 | 2 | 2 |
| 308 | CN107547_S20 | RUS | 2  | 2 | 0.1132 | 2 | 2 | 404 | CN35333_S20  | KOR | 5  | 5 | 0.1140 | 2 | 2 | 500 | CN107858_S20 | SWE | 4  | 2 | 0.1138 | 2 | 2 |
| 309 | CN107548_S21 | RUS | 2  | 1 | 0.1095 | 2 | 2 | 405 | CN35334_S21  | KOR | 5  | 5 | 0.1262 | 2 | 2 | 501 | CN107860_S21 | JPN | 8  | 1 | 0.1446 | 2 | 2 |
| 310 | CN107552_S22 | RUS | 2  | 1 | 0.1093 | 2 | 2 | 406 | CN35343_S22  | KOR | 5  | 5 | 0.1192 | 2 | 2 | 502 | CN107861_S22 | SWE | 4  | 1 | 0.1165 | 2 | 2 |
| 311 | CN107553_S23 | RUS | 2  | 2 | 0.1113 | 2 | 2 | 407 | CN35354_S23  | KOR | 5  | 5 | 0.1153 | 2 | 2 | 503 | CN107870_S23 | DEU | 6  | 2 | 0.1187 | 2 | 2 |
| 312 | CN107554_S24 | RUS | 2  | 2 | 0.1152 | 2 | 2 | 408 | CN35356_S24  | KOR | 5  | 5 | 0.1181 | 2 | 2 | 504 | CN29742_S24  | CHN | 3  | 5 | 0.1139 | 2 | 2 |
| 313 | CN107555_S25 | RUS | 2  | 3 | 0.1035 | 2 | 2 | 409 | CN35357_S25  | KOR | 5  | 5 | 0.1448 | 3 | 3 | 505 | CN29747_S25  | CHN | 3  | 5 | 0.1510 | 3 | 3 |
| 314 | CN107556_S26 | CAN | 1  | 2 | 0.1239 | 2 | 2 | 410 | CN35361_S26  | KOR | 5  | 5 | 0.1478 | 3 | 3 | 506 | CN29749_S26  | CHN | 3  | 5 | 0.1478 | 3 | 3 |
| 315 | CN107558_S27 | CAN | 1  | 3 | 0.1077 | 2 | 2 | 411 | CN35756_S27  | RUS | 2  | 5 | 0.1311 | 3 | 3 | 507 | CN29750_S27  | CHN | 3  | 5 | 0.1401 | 3 | 3 |
| 316 | CN107560_S28 | CAN | 1  | 2 | 0.1293 | 2 | 2 | 412 | CN35917_S28  | RUS | 2  | 5 | 0.1472 | 3 | 3 | 508 | CN29790_S28  | CHN | 3  | 5 | 0.1438 | 3 | 3 |
| 317 | CN107561_S29 | CAN | 1  | 2 | 0.1134 | 2 | 2 | 413 | CN36008_S29  | CHN | 3  | 5 | 0.1111 | 3 | 3 | 509 | CN29798_S29  | CHN | 3  | 5 | 0.1510 | 3 | 3 |
| 318 | CN107562_S30 | CAN | 1  | 2 | 0.1192 | 2 | 2 | 414 | CN36214_S30  | CHN | 3  | 5 | 0.1328 | 3 | 3 | 510 | CN32001_S30  | UNK | 11 | 5 | 0.1347 | 3 | 3 |
| 319 | CN107563_S31 | CAN | 1  | 1 | 0.1219 | 2 | 2 | 415 | CN36216_S31  | CHN | 3  | 5 | 0.1414 | 3 | 3 | 511 | CN33247_S31  | CAN | 1  | 5 | 0.1314 | 3 | 3 |
| 320 | CN107568_S32 | CAN | 1  | 2 | 0.1255 | 2 | 2 | 416 | CN36217_S32  | CHN | 3  | 5 | 0.1392 | 3 | 3 | 512 | CN33251_S32  | CAN | 1  | 5 | 0.1311 | 3 | 3 |
| 321 | CN107566_S33 | CAN | 1  | 2 | 0.1040 | 2 | 2 | 417 | CN36336_S33  | RUS | 2  | 5 | 0.1560 | 3 | 3 | 513 | CN33254_S33  | UNK | 11 | 5 | 0.1368 | 3 | 3 |
| 322 | CN107569_S34 | CAN | 1  | 3 | 0.1138 | 2 | 2 | 418 | CN39077_S34  | CAN | 1  | 5 | 0.1597 | 3 | 3 | 514 | CN33257_S34  | CAN | 1  | 5 | 0.1504 | 3 | 3 |
| 323 | CN107571_S35 | CAN | 1  | 3 | 0.1032 | 2 | 2 | 419 | CN39084_S35  | CAN | 1  | 5 | 0.1699 | 3 | 3 | 515 | CN33258_S35  | CAN | 1  | 5 | 0.1365 | 3 | 3 |
| 324 | CN107572_S36 | CAN | 1  | 3 | 0.1054 | 2 | 2 | 420 | CN39086_S36  | CAN | 1  | 5 | 0.1515 | 3 | 3 | 516 | CN33260_S36  | CAN | 1  | 5 | 0.1386 | 3 | 3 |
| 325 | CN107573_S37 | CAN | 1  | 2 | 0.1138 | 2 | 2 | 421 | CN39087_S37  | CAN | 1  | 5 | 0.1405 | 3 | 3 | 517 | CN33263_S37  | CAN | 1  | 5 | 0.1324 | 3 | 3 |
| 326 | CN107574_S38 | CAN | 1  | 3 | 0.1143 | 2 | 2 | 422 | CN39096_S38  | CAN | 1  | 5 | 0.1268 | 3 | 3 | 518 | CN33264_S38  | CAN | 1  | 5 | 0.1269 | 3 | 3 |
| 327 | CN107577_S39 | CAN | 1  | 2 | 0.0998 | 2 | 2 | 423 | CN39099_S39  | CAN | 1  | 5 | 0.1337 | 3 | 3 | 519 | CN33266_S39  | CAN | 1  | 5 | 0.1351 | 3 | 3 |
| 328 | CN107578_S40 | CAN | 1  | 1 | 0.1282 | 2 | 2 | 424 | CN39114_S40  | CAN | 1  | 5 | 0.1344 | 3 | 3 | 520 | CN33267_S40  | CAN | 1  | 5 | 0.1294 | 3 | 3 |
| 329 | CN107579_S41 | CAN | 1  | 2 | 0.1024 | 2 | 2 | 425 | CN39131_S41  | CAN | 1  | 5 | 0.1473 | 3 | 3 | 521 | CN33277_S41  | CAN | 1  | 5 | 0.1345 | 3 | 3 |
| 330 | CN107580_S42 | CAN | 1  | 2 | 0.1062 | 2 | 2 | 426 | CN39150_S42  | CAN | 1  | 5 | 0.1347 | 3 | 3 | 522 | CN33278_S42  | CAN | 1  | 5 | 0.1363 | 3 | 3 |
| 331 | CN107581_S43 | CAN | 1  | 2 | 0.1042 | 2 | 2 | 427 | CN39169_S43  | CAN | 1  | 5 | 0.1322 | 3 | 3 | 523 | CN33279_S43  | CAN | 1  | 5 | 0.1369 | 3 | 3 |
| 332 | CN107582_S44 | CAN | 1  | 2 | 0.1170 | 2 | 2 | 428 | CN39193_S44  | CAN | 1  | 5 | 0.1341 | 3 | 3 | 524 | CN35264_S44  | UNK | 11 | 5 | 0.1337 | 3 | 3 |
| 333 | CN107583_S45 | CAN | 1  | 2 | 0.1311 | 2 | 2 | 429 | CN42536_S45  | CHN | 3  | 5 | 0.1415 | 3 | 3 | 525 | CN35265_S45  | UNK | 11 | 5 | 0.1383 | 3 | 3 |
| 334 | CN107585_S46 | CAN | 1  | 2 | 0.1062 | 2 | 2 | 430 | CN51844_S46  | CAN | 1  | 5 | 0.1218 | 3 | 3 | 526 | CN35319_S46  | KOR | 5  | 5 | 0.1464 | 3 | 3 |
| 335 | CN107588_S47 | CAN | 1  | 2 | 0.1046 | 2 | 2 | 431 | CN51845_S47  | CAN | 1  | 5 | 0.1319 | 3 | 3 | 527 | CN35330_S47  | KOR | 5  | 5 | 0.1439 | 3 | 3 |
| 336 | CN107593_S48 | CAN | 1  | 2 | 0.1143 | 2 | 2 | 432 | CN107353_S48 | CAN | 1  | 5 | 0.1331 | 3 | 3 | 528 | CN35331_S48  | KOR | 5  | 5 | 0.1451 | 3 | 3 |
| 337 | CN107594_S49 | CAN | 1  | 1 | 0.1195 | 1 | 1 | 433 | CN107385_S49 | CAN | 1  | 5 | 0.1465 | 1 | 1 | 529 | CN35339_S49  | KOR | 5  | 5 | 0.1710 | 1 | 1 |
| 338 | CN107595_S50 | CAN | 1  | 1 | 0.1346 | 1 | 1 | 434 | CN107397_S50 | CAN | 1  | 5 | 0.1556 | 1 | 1 | 530 | CN35364_S50  | KOR | 5  | 5 | 0.1638 | 1 | 1 |
| 339 | CN107596_S51 | CAN | 1  | 1 | 0.1513 | 1 | 1 | 435 | CN107408_S51 | CAN | 1  | 5 | 0.1556 | 1 | 1 | 531 | CN36135_S51  | CAN | 1  | 5 | 0.1538 | 1 | 1 |
| 340 | CN107597_S52 | CAN | 1  | 1 | 0.1221 | 1 | 1 | 436 | CN107476_S52 | HUN | 9  | 2 | 0.1786 | 1 | 1 | 532 | CN36215_S52  | CHN | 3  | 5 | 0.1540 | 1 | 1 |
| 341 | CN107599_S53 | CAN | 1  | 2 | 0.1491 | 1 | 1 | 437 | CN107480_S53 | FRA | 7  | 2 | 0.1542 | 1 | 1 | 533 | CN36249_S53  | UNK | 11 | 5 | 0.1478 | 1 | 1 |
| 342 | CN107600_S54 | CAN | 1  | 2 | 0.1450 | 1 | 1 | 438 | CN107490_S54 | DEU | 6  | 2 | 0.1510 | 1 | 1 | 534 | CN39075_S54  | UNK | 11 | 5 | 0.1664 | 1 | 1 |
| 343 | CN107603_S55 | CAN | 1  | 2 | 0.1273 | 1 | 1 | 439 | CN107492_S55 | DEU | 6  | 2 | 0.1509 | 1 | 1 | 535 | CN39178_S55  | CAN | 1  | 5 | 0.1554 | 1 | 1 |
| 344 | CN107604_S56 | CHN | 3  | 3 | 0.1287 | 1 | 1 | 440 | CN107494_S56 | DEU | 6  | 2 | 0.1565 | 1 | 1 | 536 | CN42220_S56  | CAN | 1  | 5 | 0.1550 | 1 | 1 |
| 345 | CN107605_S57 | CHN | 3  | 2 | 0.1275 | 1 | 1 | 441 | CN107495_S57 | DEU | 6  | 2 | 0.1767 | 1 | 1 | 537 | CN42379_S57  | CAN | 1  | 5 | 0.1495 | 1 | 1 |
| 346 | CN107606_S58 | RUS | 2  | 2 | 0.1420 | 1 | 1 | 442 | CN107496_S58 | DEU | 6  | 2 | 0.1685 | 1 | 1 | 538 | CN42387_S58  | CAN | 1  | 5 | 0.1479 | 1 | 1 |
| 347 | CN107608_S59 | HUN | 9  | 1 | 0.1172 | 1 | 1 | 443 | CN107497_S59 | DEU | 6  | 1 | 0.1672 | 1 | 1 | 539 | CN45056_S59  | CAN | 1  | 5 | 0.1527 | 1 | 1 |
| 348 | CN107609_S60 | DEU | 6  | 3 | 0.1329 | 1 | 1 | 444 | CN107498_S60 | DEU | 6  | 1 | 0.1750 | 1 | 1 | 540 | CN46335_S60  | CAN | 1  | 5 | 0.1463 | 1 | 1 |
| 349 | CN107610_S61 | DEU | 6  | 2 | 0.1441 | 1 | 1 | 445 | CN107510_S61 | DEU | 6  | 2 | 0.1461 | 1 | 1 | 541 | CN51846_S61  | CAN | 1  | 5 | 0.1450 | 1 | 1 |
| 350 | CN107611_S62 | DEU | 6  | 2 | 0.1348 | 1 | 1 | 446 | CN107514_S62 | FRA | 7  | 2 | 0.1775 | 1 | 1 | 542 | CN52740_S62  | CAN | 1  | 5 | 0.1349 | 1 | 1 |
| 351 | CN107613_S63 | DEU | 6  | 2 | 0.1257 | 1 | 1 | 447 | CN107516_S63 | FRA | 7  | 1 | 0.1531 | 1 | 1 | 543 | CN52874_S63  |     |    |   |        |   |   |

**Table S3.** Sequence summary for 571 assayed soybean samples, including NCBI accession information.

| Key | NCBI accession | Sample   | Raw reads | Filtered reads | Key | NCBI accession | Sample          | Raw reads | Filtered reads | Key | NCBI accession | Sample   | Raw reads | Filtered reads |
|-----|----------------|----------|-----------|----------------|-----|----------------|-----------------|-----------|----------------|-----|----------------|----------|-----------|----------------|
| 1   | SAMN18102822   | CN29752  | 1,191,331 | 1,070,473      | 97  | SAMN18102918   | CN32351         | 1,325,514 | 1,182,712      | 193 | SAMN18103014   | CN30633  | 890,153   | 753,935        |
| 2   | SAMN18102823   | CN29792  | 1,121,537 | 1,042,152      | 98  | SAMN18102919   | CN35348         | 1,117,338 | 1,000,042      | 194 | SAMN18103015   | CN30634  | 802,154   | 664,427        |
| 3   | SAMN18102824   | CN29793  | 356,138   | 335,707        | 99  | SAMN18102920   | CN35373         | 1,102,693 | 985,011        | 195 | SAMN18103016   | CN31690  | 786,684   | 666,546        |
| 4   | SAMN18102825   | CN29795  | 1,106,121 | 1,010,604      | 100 | SAMN18102921   | CN42821         | 1,147,578 | 1,032,452      | 196 | SAMN18103017   | CN31692  | 856,358   | 748,875        |
| 5   | SAMN18102826   | CN30389  | 1,037,252 | 951,490        | 101 | SAMN18102922   | CN107435        | 1,157,584 | 1,040,328      | 197 | SAMN18103018   | CN32053  | 902,588   | 749,199        |
| 6   | SAMN18102827   | CN30391  | 1,000,473 | 911,911        | 102 | SAMN18102923   | CN107437        | 1,071,745 | 976,345        | 198 | SAMN18103019   | CN32257  | 1,089,948 | 921,100        |
| 7   | SAMN18102828   | CN32356  | 957,516   | 871,907        | 103 | SAMN18102924   | CN107650        | 1,083,639 | 976,602        | 199 | SAMN18103020   | CN32442  | 1,024,226 | 862,787        |
| 8   | SAMN18102829   | CN32451  | 1,169,603 | 1,065,773      | 104 | SAMN18102925   | CN107804        | 995,603   | 888,347        | 200 | SAMN18103021   | CN32634  | 1,246,185 | 1,063,076      |
| 9   | SAMN18102830   | CN32547  | 1,048,690 | 952,543        | 105 | SAMN18102926   | CN107822        | 1,083,999 | 966,479        | 201 | SAMN18103022   | CN32639  | 797,073   | 633,001        |
| 10  | SAMN18102831   | CN32826  | 964,792   | 902,287        | 106 | SAMN18102927   | CN107879        | 967,479   | 866,372        | 202 | SAMN18103023   | CN32829  | 852,715   | 734,979        |
| 11  | SAMN18102832   | CN33248  | 903,496   | 825,280        | 107 | SAMN18102928   | CN107880        | 894,686   | 804,226        | 203 | SAMN18103024   | CN33253  | 676,143   | 582,483        |
| 12  | SAMN18102833   | CN33259  | 957,876   | 873,373        | 108 | SAMN18102929   | CN107881        | 909,461   | 823,434        | 204 | SAMN18103025   | CN33255  | 792,137   | 686,637        |
| 13  | SAMN18102834   | CN35309  | 1,056,761 | 963,361        | 109 | SAMN18102930   | CN107882        | 798,377   | 725,717        | 205 | SAMN18103026   | CN33265  | 725,701   | 610,250        |
| 14  | SAMN18102835   | CN35312  | 835,423   | 766,561        | 110 | SAMN18102931   | CN107883        | 811,422   | 736,665        | 206 | SAMN18103027   | CN33273  | 720,564   | 627,058        |
| 15  | SAMN18102836   | CN35314  | 839,682   | 778,119        | 111 | SAMN18102932   | CN107884        | 792,812   | 719,124        | 207 | SAMN18103028   | CN33911  | 609,711   | 517,658        |
| 16  | SAMN18102837   | CN35321  | 854,876   | 777,491        | 112 | SAMN18102933   | CN107885        | 894,2231  | 829,646        | 208 | SAMN18103029   | CN35308  | 876,285   | 747,840        |
| 17  | SAMN18102838   | CN35329  | 970,524   | 882,728        | 113 | SAMN18102934   | CN115251        | 826,076   | 759,882        | 209 | SAMN18103030   | CN35318  | 975,988   | 821,291        |
| 18  | SAMN18102839   | CN35380  | 944,423   | 877,478        | 114 | SAMN18102935   | CN115252        | 879,542   | 815,274        | 210 | SAMN18103031   | CN35372  | 832,872   | 689,982        |
| 19  | SAMN18102840   | CN35919  | 1,201,627 | 1,131,061      | 115 | SAMN18102936   | CN115253        | 706,229   | 648,707        | 211 | SAMN18103032   | CN35382  | 889,201   | 747,163        |
| 20  | SAMN18102841   | CN36138  | 875,212   | 799,466        | 116 | SAMN18102937   | CN115254        | 839,645   | 769,492        | 212 | SAMN18103033   | CN35757  | 887,212   | 729,298        |
| 21  | SAMN18102842   | CN36143  | 955,699   | 872,599        | 117 | SAMN18102938   | CN115255        | 813,459   | 756,687        | 213 | SAMN18103034   | CN35758  | 667,575   | 521,718        |
| 22  | SAMN18102843   | CN36334  | 324,339   | 295,518        | 118 | SAMN18102939   | CN115256        | 907,745   | 836,164        | 214 | SAMN18103035   | CN35916  | 821,527   | 681,858        |
| 23  | SAMN18102844   | CN52642  | 838,926   | 769,149        | 119 | SAMN18102940   | CN115257        | 885,542   | 812,728        | 215 | SAMN18103036   | CN35918  | 764,824   | 666,470        |
| 24  | SAMN18102845   | CN107446 | 874,132   | 803,280        | 120 | SAMN18102941   | CN115258        | 724,185   | 664,886        | 216 | SAMN18103037   | CN35920  | 806,116   | 689,433        |
| 25  | SAMN18102846   | CN107450 | 1,129,720 | 1,062,994      | 121 | SAMN18102942   | CN115259        | 1,076,671 | 1,002,120      | 217 | SAMN18103038   | CN35921  | 941,324   | 884,267        |
| 26  | SAMN18102847   | CN107455 | 1,068,991 | 1,009,178      | 122 | SAMN18102943   | Maple Arrow     | 1,043,797 | 972,858        | 218 | SAMN18103039   | CN36139  | 941,521   | 888,271        |
| 27  | SAMN18102848   | CN107477 | 989,394   | 933,369        | 123 | SAMN18102944   | Maple Glen      | 1,001,205 | 930,962        | 219 | SAMN18103040   | CN36141  | 840,749   | 793,152        |
| 28  | SAMN18102849   | CN107479 | 889,827   | 837,541        | 124 | SAMN18102945   | AC Orford       | 931,195   | 868,065        | 220 | SAMN18103041   | CN36335  | 845,629   | 797,358        |
| 29  | SAMN18102850   | CN107486 | 1,118,240 | 1,052,321      | 125 | SAMN18102946   | Accord          | 1,069,688 | 998,562        | 221 | SAMN18103042   | CN36337  | 954,298   | 903,432        |
| 30  | SAMN18102851   | CN107501 | 957,545   | 909,857        | 126 | SAMN18102947   | RD714           | 376,191   | 353,552        | 222 | SAMN18103043   | CN36340  | 956,668   | 906,262        |
| 31  | SAMN18102852   | CN107511 | 891,273   | 839,863        | 127 | SAMN18102948   | AC Clengarry    | 986,797   | 920,319        | 223 | SAMN18103044   | CN36342  | 914,354   | 863,921        |
| 32  | SAMN18102853   | CN107524 | 992,063   | 933,858        | 128 | SAMN18102949   | DH3604          | 1,076,459 | 1,004,811      | 224 | SAMN18103045   | CN39070  | 976,468   | 920,752        |
| 33  | SAMN18102854   | CN107529 | 957,417   | 902,303        | 129 | SAMN18102950   | Toki            | 1,091,754 | 1,015,549      | 225 | SAMN18103046   | CN42928  | 1,009,845 | 954,816        |
| 34  | SAMN18102855   | CN107590 | 1,173,594 | 1,108,886      | 130 | SAMN18102951   | Chikala         | 951,741   | 892,072        | 226 | SAMN18103047   | CN45087  | 911,196   | 859,376        |
| 35  | SAMN18102856   | CN107598 | 1,155,661 | 1,085,400      | 131 | SAMN18102952   | QGC10N          | 954,420   | 889,274        | 227 | SAMN18103048   | CN45088  | 914,203   | 859,624        |
| 36  | SAMN18102857   | CN107630 | 1,011,937 | 954,274        | 132 | SAMN18102953   | QGC12N          | 939,707   | 877,730        | 228 | SAMN18103049   | CN45090  | 906,495   | 857,741        |
| 37  | SAMN18102858   | CN107652 | 1,057,593 | 999,377        | 133 | SAMN18102954   | Dares           | 809,331   | 753,186        | 229 | SAMN18103050   | CN45095  | 983,076   | 932,182        |
| 38  | SAMN18102859   | CN107654 | 969,074   | 913,382        | 134 | SAMN18102955   | Apalis          | 881,044   | 822,470        | 230 | SAMN18103051   | CN45107  | 974,050   | 925,470        |
| 39  | SAMN18102860   | CN107655 | 962,238   | 905,063        | 135 | SAMN18102956   | Loriot          | 829,932   | 773,796        | 231 | SAMN18103052   | CN51375  | 1,084,696 | 1,019,326      |
| 40  | SAMN18102861   | CN107656 | 1,009,650 | 951,244        | 136 | SAMN18102957   | Jari            | 1,044,801 | 976,711        | 232 | SAMN18103053   | CN52633  | 1,136,367 | 1,075,223      |
| 41  | SAMN18102862   | CN107657 | 924,131   | 869,993        | 137 | SAMN18102958   | DH710           | 1,048,318 | 976,046        | 233 | SAMN18103054   | CN52634  | 587,744   | 557,582        |
| 42  | SAMN18102863   | CN107658 | 927,837   | 875,026        | 138 | SAMN18102959   | SG1010          | 795,003   | 741,824        | 234 | SAMN18103055   | CN52635  | 844,346   | 801,622        |
| 43  | SAMN18102864   | CN107659 | 1,039,282 | 977,723        | 139 | SAMN18102960   | Roselin         | 822,841   | 767,676        | 235 | SAMN18103056   | CN52639  | 1,001,946 | 944,261        |
| 44  | SAMN18102865   | CN107660 | 912,379   | 860,169        | 140 | SAMN18102961   | AAC Vireo       | 860,016   | 800,879        | 236 | SAMN18103057   | CN52640  | 965,351   | 903,821        |
| 45  | SAMN18102866   | CN107661 | 920,897   | 871,254        | 141 | SAMN18102962   | AAC Edward      | 917,208   | 855,594        | 237 | SAMN18103058   | CN52643  | 905,735   | 856,881        |
| 46  | SAMN18102867   | CN107662 | 977,450   | 919,349        | 142 | SAMN18102963   | AAC Naruto      | 833,044   | 780,056        | 238 | SAMN18103059   | CN52645  | 927,249   | 875,525        |
| 47  | SAMN18102868   | CN107663 | 1,155,572 | 1,087,868      | 143 | SAMN18102964   | Heron           | 802,484   | 752,202        | 239 | SAMN18103060   | CN52646  | 878,060   | 827,698        |
| 48  | SAMN18102869   | CN107664 | 820,310   | 774,117        | 144 | SAMN18102965   | AC Colibri      | 1,097,186 | 1,034,276      | 240 | SAMN18103061   | CN52647  | 995,411   | 939,599        |
| 49  | SAMN18102870   | CN107666 | 1,061,151 | 988,732        | 145 | SAMN18102966   | Nattosan        | 921,782   | 858,666        | 241 | SAMN18103062   | CN52648  | 867,366   | 825,924        |
| 50  | SAMN18102871   | CN107667 | 993,828   | 928,331        | 146 | SAMN18102967   | Canato          | 941,142   | 874,554        | 242 | SAMN18103063   | CN52649  | 931,532   | 884,961        |
| 51  | SAMN18102872   | CN107668 | 958,580   | 904,290        | 147 | SAMN18102968   | AAC Umami       | 849,276   | 789,215        | 243 | SAMN18103064   | CN52650  | 876,745   | 833,660        |
| 52  | SAMN18102873   | CN107680 | 870,696   | 814,130        | 148 | SAMN18102969   | AAC Springfield | 878,111   | 815,256        | 244 | SAMN18103065   | CN52652  | 783,150   | 744,428        |
| 53  | SAMN18102874   | CN107801 | 930,016   | 869,795        | 149 | SAMN18102970   | AAC Halli       | 1,055,548 | 987,946        | 245 | SAMN18103066   | CN52871  | 925,758   | 874,555        |
| 54  | SAMN18102875   | CN107803 | 911,939   | 854,217        | 150 | SAMN18102971   | AAC Shinju      | 1,022,585 | 954,483        | 246 | SAMN18103067   | CN52872  | 922,634   | 875,191        |
| 55  | SAMN18102876   | CN107805 | 983,437   | 919,611        | 151 | SAMN18102972   | AAC Rin         | 1,073,546 | 1,004,745      | 247 | SAMN18103068   | CN52873  | 621,259   | 591,589        |
| 56  | SAMN18102877   | CN107806 | 988,495   | 930,265        | 152 | SAMN18102973   | CN29751         | 1,178,062 | 1,095,622      | 248 | SAMN18103069   | CN52875  | 822,537   | 784,309        |
| 57  | SAMN18102878   | CN107807 | 966,970   | 901,752        | 153 | SAMN18102974   | CN30316         | 1,039,389 | 970,373        | 249 | SAMN18103070   | CN107406 | 996,276   | 942,631        |
| 58  | SAMN18102879   | CN107808 | 994,952   | 929,291        | 154 | SAMN18102975   | CN30637         | 937,383   | 875,721        | 250 | SAMN18103071   | CN107423 | 901,893   | 852,894        |
| 59  | SAMN18102880   | CN107809 | 1,217,471 | 1,137,806      | 155 | SAMN18102976   | CN30642         | 988,843   | 923,393        | 251 | SAMN18103072   | CN107449 | 419,920   | 400,330        |
| 60  | SAMN18102881   | CN107812 | 1,110,699 | 1,036,223      | 156 | SAMN18102977   | CN32320         | 978,759   | 912,169        | 252 | SAMN18103073   | CN107453 | 638,331   | 607,742        |
| 61  | SAMN18102882   | CN107817 | 1,043,445 | 976,231        | 157 | SAMN18102978   | CN32394         | 1,019,960 | 948,491        | 253 | SAMN18103074   | CN107454 | 976,781   | 926,753        |
| 62  | SAMN18102883   | CN107818 | 920,062   | 859,122        | 158 | SAMN18102979   | CN32416         | 1,015,942 | 944,513        | 254 | SAMN18103075   | CN107462 | 980,606   | 932,076        |
| 63  | SAMN18102884   | CN107824 | 980,421   | 913,593        | 159 | SAMN18102980   | CN32662         | 982,088   | 911,688        | 255 | SAMN18103076   | CN107463 | 496,829   | 473,271        |
| 64  | SAMN18102885   | CN107827 | 1,244,540 | 1,168,243      | 160 | SAMN18102981   | CN32760         | 574,988   | 537,555        | 256 | SAMN18103077   | CN107464 | 1,064,090 | 1,006,958      |
| 65  | SAMN18102886   | CN107828 | 982,086   | 919,334        | 161 | SAMN18102982   | CN32766         | 1,026,271 | 953,361        | 257 | SAMN18103078   | CN107465 | 737,506   | 702,551        |
| 66  | SAMN18102887   | CN107833 | 912,161   | 851,552        | 162 | SAMN18102983   | CN33908         | 949,860   | 887,604        | 258 | SAMN18103079   | CN107466 | 945,722   | 898,714        |
| 67  | SAMN18102888   | CN107835 | 1,059,970 | 994,604        | 163 | SAMN18102984   | CN35313         | 898,595   | 836,255        | 259 | SAMN18103080   | CN107467 | 986,078   | 933,056        |
| 68  | SAMN18102889   | CN107837 | 765,297   | 712,745        |     |                |                 |           |                |     |                |          |           |                |

|     |              |          |           |           |     |              |          |           |           |     |              |          |           |           |
|-----|--------------|----------|-----------|-----------|-----|--------------|----------|-----------|-----------|-----|--------------|----------|-----------|-----------|
| 289 | SAMN18103110 | CN30629  | 393,789   | 329,357   | 385 | SAMN18103206 | CN30318  | 991,158   | 875,271   | 481 | SAMN18103302 | CN35332  | 1,259,303 | 1,146,070 |
| 290 | SAMN18103111 | CN32352  | 859,171   | 728,496   | 386 | SAMN18103207 | CN30644  | 902,438   | 810,382   | 482 | SAMN18103303 | CN35341  | 967,128   | 877,086   |
| 291 | SAMN18103112 | CN32631  | 668,302   | 569,839   | 387 | SAMN18103208 | CN31631  | 1,467,720 | 1,366,545 | 483 | SAMN18103304 | CN39109  | 1,239,337 | 1,125,077 |
| 292 | SAMN18103113 | CN32669  | 898,581   | 773,597   | 388 | SAMN18103209 | CN31719  | 962,923   | 866,681   | 484 | SAMN18103305 | CN107461 | 1,084,902 | 1,001,145 |
| 293 | SAMN18103114 | CN35310  | 737,852   | 624,892   | 389 | SAMN18103210 | CN31984  | 1,056,784 | 953,410   | 485 | SAMN18103306 | CN107665 | 1,069,497 | 970,125   |
| 294 | SAMN18103115 | CN35311  | 862,751   | 740,011   | 390 | SAMN18103211 | CN32354  | 849,606   | 767,141   | 486 | SAMN18103307 | CN107810 | 931,332   | 855,393   |
| 295 | SAMN18103116 | CN35344  | 895,098   | 772,870   | 391 | SAMN18103212 | CN35337  | 933,276   | 858,728   | 487 | SAMN18103308 | CN107811 | 1,015,903 | 914,405   |
| 296 | SAMN18103117 | CN39071  | 705,305   | 603,640   | 392 | SAMN18103213 | CN35342  | 1,150,237 | 1,056,515 | 488 | SAMN18103309 | CN107813 | 1,273,402 | 1,151,055 |
| 297 | SAMN18103118 | CN39168  | 852,797   | 726,588   | 393 | SAMN18103214 | CN35383  | 1,189,190 | 1,073,838 | 489 | SAMN18103310 | CN107814 | 853,396   | 772,656   |
| 298 | SAMN18103119 | CN52636  | 538,164   | 466,415   | 394 | SAMN18103215 | CN36009  | 1,444,432 | 1,326,724 | 490 | SAMN18103311 | CN107815 | 820,591   | 754,917   |
| 299 | SAMN18103120 | CN52644  | 786,541   | 654,533   | 395 | SAMN18103216 | CN36218  | 1,334,650 | 1,232,944 | 491 | SAMN18103312 | CN107816 | 860,495   | 791,056   |
| 300 | SAMN18103121 | CN52651  | 900,665   | 755,165   | 396 | SAMN18103217 | CN52628  | 949,634   | 864,704   | 492 | SAMN18103313 | CN107819 | 875,822   | 787,150   |
| 301 | SAMN18103122 | CN52653  | 630,697   | 571,212   | 397 | SAMN18103218 | CN107473 | 876,135   | 800,409   | 493 | SAMN18103314 | CN107820 | 933,304   | 859,857   |
| 302 | SAMN18103123 | CN107424 | 875,466   | 733,456   | 398 | SAMN18103219 | CN107512 | 841,590   | 765,557   | 494 | SAMN18103315 | CN107826 | 877,851   | 807,226   |
| 303 | SAMN18103124 | CN107513 | 706,540   | 621,698   | 399 | SAMN18103220 | CN107592 | 1,252,539 | 1,148,616 | 495 | SAMN18103316 | CN107830 | 750,106   | 686,903   |
| 304 | SAMN18103125 | CN107531 | 868,564   | 745,841   | 400 | SAMN18103221 | CN107602 | 922,555   | 836,456   | 496 | SAMN18103317 | CN107832 | 829,139   | 757,889   |
| 305 | SAMN18103126 | CN107544 | 835,802   | 716,130   | 401 | SAMN18103222 | CN107831 | 818,706   | 735,710   | 497 | SAMN18103318 | CN107836 | 1,231,237 | 1,097,309 |
| 306 | SAMN18103127 | CN107545 | 572,425   | 531,658   | 402 | SAMN18103223 | CN107834 | 794,329   | 708,547   | 498 | SAMN18103319 | CN107848 | 914,233   | 822,292   |
| 307 | SAMN18103128 | CN107546 | 375,962   | 333,943   | 403 | SAMN18103224 | CN35323  | 803,930   | 731,163   | 499 | SAMN18103320 | CN107856 | 1,115,688 | 1,016,082 |
| 308 | SAMN18103129 | CN107547 | 489,520   | 431,342   | 404 | SAMN18103225 | CN35333  | 952,997   | 866,588   | 500 | SAMN18103321 | CN107858 | 793,495   | 722,655   |
| 309 | SAMN18103130 | CN107548 | 421,824   | 377,197   | 405 | SAMN18103226 | CN35334  | 993,541   | 902,734   | 501 | SAMN18103322 | CN107860 | 884,176   | 789,832   |
| 310 | SAMN18103131 | CN107552 | 736,097   | 647,581   | 406 | SAMN18103227 | CN35343  | 935,254   | 848,909   | 502 | SAMN18103323 | CN107861 | 844,582   | 762,825   |
| 311 | SAMN18103132 | CN107553 | 654,498   | 570,639   | 407 | SAMN18103228 | CN35354  | 927,833   | 845,891   | 503 | SAMN18103324 | CN107870 | 1,001,505 | 901,150   |
| 312 | SAMN18103133 | CN107554 | 709,536   | 602,243   | 408 | SAMN18103229 | CN35356  | 1,386,495 | 1,281,299 | 504 | SAMN18103325 | CN29742  | 897,906   | 812,420   |
| 313 | SAMN18103134 | CN107555 | 936,859   | 888,361   | 409 | SAMN18103230 | CN35357  | 1,045,931 | 975,534   | 505 | SAMN18103326 | CN29747  | 1,211,407 | 1,123,314 |
| 314 | SAMN18103135 | CN107556 | 1,207,800 | 1,131,405 | 410 | SAMN18103231 | CN35361  | 991,055   | 924,631   | 506 | SAMN18103327 | CN29749  | 1,013,837 | 944,643   |
| 315 | SAMN18103136 | CN107558 | 1,064,359 | 1,003,053 | 411 | SAMN18103232 | CN35756  | 994,120   | 930,995   | 507 | SAMN18103328 | CN29750  | 1,171,551 | 1,102,718 |
| 316 | SAMN18103137 | CN107560 | 997,510   | 944,942   | 412 | SAMN18103233 | CN35917  | 1,017,884 | 950,045   | 508 | SAMN18103329 | CN29790  | 924,852   | 860,799   |
| 317 | SAMN18103138 | CN107561 | 1,065,565 | 1,007,675 | 413 | SAMN18103234 | CN36008  | 396,080   | 369,587   | 509 | SAMN18103330 | CN29798  | 1,046,733 | 978,587   |
| 318 | SAMN18103139 | CN107562 | 1,167,829 | 1,100,881 | 414 | SAMN18103235 | CN36214  | 911,236   | 853,912   | 510 | SAMN18103331 | CN32001  | 876,192   | 821,919   |
| 319 | SAMN18103140 | CN107563 | 1,208,851 | 1,135,105 | 415 | SAMN18103236 | CN36216  | 974,605   | 909,148   | 511 | SAMN18103332 | CN33247  | 1,069,330 | 1,001,510 |
| 320 | SAMN18103141 | CN107568 | 1,196,084 | 1,127,216 | 416 | SAMN18103237 | CN36217  | 1,171,339 | 1,097,515 | 512 | SAMN18103333 | CN33251  | 901,947   | 837,270   |
| 321 | SAMN18103142 | CN107566 | 1,133,717 | 1,073,527 | 417 | SAMN18103238 | CN36336  | 1,359,822 | 1,267,872 | 513 | SAMN18103334 | CN33254  | 1,090,332 | 1,019,988 |
| 322 | SAMN18103143 | CN107569 | 1,035,185 | 979,193   | 418 | SAMN18103239 | CN39077  | 1,185,040 | 1,105,925 | 514 | SAMN18103335 | CN33257  | 1,116,144 | 1,041,491 |
| 323 | SAMN18103144 | CN107571 | 1,146,178 | 1,085,972 | 419 | SAMN18103240 | CN39084  | 1,120,190 | 1,046,819 | 515 | SAMN18103336 | CN33258  | 903,408   | 840,268   |
| 324 | SAMN18103145 | CN107572 | 956,470   | 902,879   | 420 | SAMN18103241 | CN39086  | 1,076,100 | 1,008,756 | 516 | SAMN18103337 | CN33260  | 865,095   | 803,561   |
| 325 | SAMN18103146 | CN107573 | 1,196,419 | 1,136,008 | 421 | SAMN18103242 | CN39087  | 650,290   | 606,706   | 517 | SAMN18103338 | CN33263  | 950,015   | 890,895   |
| 326 | SAMN18103147 | CN107574 | 1,410,167 | 1,338,035 | 422 | SAMN18103243 | CN39096  | 974,661   | 914,221   | 518 | SAMN18103339 | CN33264  | 866,125   | 806,681   |
| 327 | SAMN18103148 | CN107577 | 927,874   | 879,952   | 423 | SAMN18103244 | CN39099  | 1,147,717 | 1,075,185 | 519 | SAMN18103340 | CN33266  | 946,319   | 879,686   |
| 328 | SAMN18103149 | CN107578 | 908,696   | 854,454   | 424 | SAMN18103245 | CN39114  | 1,122,789 | 1,056,064 | 520 | SAMN18103341 | CN33267  | 1,034,703 | 970,386   |
| 329 | SAMN18103150 | CN107579 | 760,526   | 714,594   | 425 | SAMN18103246 | CN39131  | 1,192,959 | 1,113,880 | 521 | SAMN18103342 | CN33277  | 1,017,583 | 951,227   |
| 330 | SAMN18103151 | CN107580 | 1,161,306 | 1,103,412 | 426 | SAMN18103247 | CN39150  | 1,618,902 | 1,521,313 | 522 | SAMN18103343 | CN33278  | 1,156,219 | 1,078,743 |
| 331 | SAMN18103152 | CN107581 | 911,884   | 865,729   | 427 | SAMN18103248 | CN39169  | 1,051,157 | 981,038   | 523 | SAMN18103344 | CN33279  | 1,029,580 | 956,410   |
| 332 | SAMN18103153 | CN107582 | 902,398   | 855,367   | 428 | SAMN18103249 | CN39193  | 995,627   | 929,768   | 524 | SAMN18103345 | CN33264  | 917,362   | 858,151   |
| 333 | SAMN18103154 | CN107583 | 1,086,979 | 1,030,407 | 429 | SAMN18103250 | CN42536  | 933,446   | 872,301   | 525 | SAMN18103346 | CN35265  | 1,036,800 | 969,185   |
| 334 | SAMN18103155 | CN107585 | 788,221   | 739,642   | 430 | SAMN18103251 | CN51844  | 951,012   | 892,623   | 526 | SAMN18103347 | CN35319  | 950,249   | 883,503   |
| 335 | SAMN18103156 | CN107588 | 1,046,265 | 990,117   | 431 | SAMN18103252 | CN51845  | 971,469   | 907,456   | 527 | SAMN18103348 | CN35330  | 835,354   | 781,186   |
| 336 | SAMN18103157 | CN107593 | 947,791   | 895,539   | 432 | SAMN18103253 | CN107353 | 1,063,837 | 995,648   | 528 | SAMN18103349 | CN35331  | 987,470   | 921,925   |
| 337 | SAMN18103158 | CN107594 | 848,579   | 798,984   | 433 | SAMN18103254 | CN107385 | 786,728   | 730,006   | 529 | SAMN18103350 | CN35339  | 1,200,681 | 1,109,452 |
| 338 | SAMN18103159 | CN107595 | 1,092,019 | 1,026,138 | 434 | SAMN18103255 | CN107397 | 1,135,566 | 1,057,052 | 530 | SAMN18103351 | CN35364  | 1,004,690 | 931,793   |
| 339 | SAMN18103160 | CN107596 | 1,218,501 | 1,136,059 | 435 | SAMN18103256 | CN107408 | 938,783   | 871,639   | 531 | SAMN18103352 | CN36135  | 916,495   | 849,508   |
| 340 | SAMN18103161 | CN107597 | 1,079,713 | 1,019,018 | 436 | SAMN18103257 | CN107476 | 1,098,070 | 1,024,600 | 532 | SAMN18103353 | CN36215  | 935,422   | 867,077   |
| 341 | SAMN18103162 | CN107599 | 1,260,987 | 1,172,356 | 437 | SAMN18103258 | CN107480 | 962,871   | 893,132   | 533 | SAMN18103354 | CN36249  | 1,271,964 | 1,192,657 |
| 342 | SAMN18103163 | CN107600 | 1,142,124 | 1,062,084 | 438 | SAMN18103259 | CN107490 | 940,009   | 874,733   | 534 | SAMN18103355 | CN39075  | 868,263   | 807,362   |
| 343 | SAMN18103164 | CN107603 | 1,156,064 | 1,094,789 | 439 | SAMN18103260 | CN107492 | 991,830   | 925,091   | 535 | SAMN18103356 | CN39178  | 995,552   | 926,207   |
| 344 | SAMN18103165 | CN107604 | 698,136   | 658,498   | 440 | SAMN18103261 | CN107494 | 747,865   | 697,456   | 536 | SAMN18103357 | CN42220  | 1,278,259 | 1,193,253 |
| 345 | SAMN18103166 | CN107605 | 1,046,122 | 1,383,190 | 441 | SAMN18103262 | CN107495 | 1,279,806 | 1,188,749 | 537 | SAMN18103358 | CN42379  | 1,178,901 | 1,096,112 |
| 346 | SAMN18103167 | CN107606 | 1,134,855 | 1,067,087 | 442 | SAMN18103263 | CN107496 | 893,923   | 826,468   | 538 | SAMN18103359 | CN42387  | 926,478   | 858,064   |
| 347 | SAMN18103168 | CN107608 | 644,731   | 606,034   | 443 | SAMN18103264 | CN107497 | 1,102,065 | 1,027,230 | 539 | SAMN18103360 | CN45056  | 1,117,905 | 1,035,993 |
| 348 | SAMN18103169 | CN107609 | 1,139,439 | 1,073,395 | 444 | SAMN18103265 | CN107498 | 984,669   | 914,026   | 540 | SAMN18103361 | CN46335  | 885,883   | 820,715   |
| 349 | SAMN18103170 | CN107610 | 1,179,304 | 1,100,565 | 445 | SAMN18103266 | CN107510 | 926,458   | 861,854   | 541 | SAMN18103362 | CN51846  | 1,158,118 | 1,078,030 |
| 350 | SAMN18103171 | CN107611 | 609,116   | 568,223   | 446 | SAMN18103267 | CN107514 | 917,656   | 852,041   | 542 | SAMN18103363 | CN52740  | 919,173   | 857,334   |
| 351 | SAMN18103172 | CN107613 | 1,170,172 | 1,107,373 | 447 | SAMN18103268 | CN107516 | 845,565   | 785,156   | 543 | SAMN18103364 | CN52874  | 966,878   | 905,903   |
| 352 | SAMN18103173 | CN107615 | 973,260   | 914,107   | 448 | SAMN18103269 | CN107517 | 1,172,492 | 1,092,173 | 544 | SAMN18103365 | CN52877  | 980,838   | 913,341   |
| 353 | SAMN18103174 | CN107616 | 1,096,397 | 1,029,584 | 449 | SAMN18103270 | CN107518 | 1,227,503 | 1,140,701 | 545 | SAMN18103366 | CN107352 | 962,460   | 890,909   |
| 354 | SAMN18103175 | CN107617 | 860,153   | 813,997   | 450 | SAMN18103271 | CN107519 | 1,066,693 | 991,765   | 546 | SAMN18103367 | CN107359 | 951,927   | 880,897   |
| 355 | SAMN18103176 | CN107618 | 972,291   | 919,234   | 451 | SAMN18103272 | CN107520 | 862,049   | 801,671   | 547 | SAMN18103368 | CN107360 |           |           |

**Table S4.** The pairwise group genetic distances obtained from AMOVA analysis of 24 countries or groups (in the lower diagonal). The corresponding statistical significances are shown in the upper diagonal. A plus sign shows the significant test at  $p < 0.05$ , while the minus sign indicates a non-significant test at  $p > 0.05$ . See the 24 countries or groups in Table 1.

| Group | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | 11    | 12    | 13    | 14    | 15    | 16    | 17    | 18     | 19    | 20     | 21    | 22    | 23    | 24 |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------|-------|-------|-------|----|
| 1     |       | +     | +     | +     | +     | +     | -     | +     | +     | -     | -     | -     | +     | +     | -     | -     | -     | -      | -     | +      | -     | -     | +     | +  |
| 2     | 0.026 |       | -     | +     | +     | +     | +     | +     | +     | +     | -     | +     | +     | +     | -     | -     | -     | -      | -     | +      | -     | -     | +     | +  |
| 3     | 0.023 | 0.018 |       | +     | +     | +     | +     | +     | -     | +     | -     | -     | +     | -     | -     | -     | -     | -      | -     | +      | -     | -     | +     | +  |
| 4     | 0.050 | 0.048 | 0.040 |       | +     | +     | +     | -     | -     | -     | +     | +     | -     | -     | -     | -     | -     | -      | -     | +      | -     | +     | -     | +  |
| 5     | 0.075 | 0.049 | 0.052 | 0.071 |       | +     | +     | +     | +     | +     | +     | +     | +     | +     | -     | -     | -     | -      | -     | +      | -     | -     | +     | +  |
| 6     | 0.040 | 0.041 | 0.044 | 0.045 | 0.092 |       | -     | +     | -     | +     | -     | -     | +     | -     | -     | -     | -     | -      | -     | -      | -     | -     | -     | +  |
| 7     | 0.026 | 0.034 | 0.033 | 0.050 | 0.077 | 0.017 |       | +     | -     | +     | -     | -     | +     | +     | -     | -     | -     | -      | -     | -      | -     | -     | -     | +  |
| 8     | 0.069 | 0.058 | 0.053 | 0.030 | 0.058 | 0.093 | 0.076 |       | +     | -     | +     | +     | -     | +     | -     | -     | -     | -      | -     | +      | +     | +     | +     | +  |
| 9     | 0.057 | 0.053 | 0.044 | 0.033 | 0.076 | 0.028 | 0.036 | 0.064 |       | +     | +     | -     | -     | -     | -     | -     | -     | -      | -     | +      | -     | -     | -     | +  |
| 10    | 0.027 | 0.041 | 0.035 | 0.024 | 0.072 | 0.063 | 0.046 | 0.033 | 0.064 |       | -     | +     | -     | +     | -     | -     | -     | -      | -     | +      | +     | +     | +     | +  |
| 11    | 0.013 | 0.023 | 0.022 | 0.042 | 0.076 | 0.035 | 0.023 | 0.060 | 0.056 | 0.024 |       | -     | +     | +     | -     | -     | -     | -      | -     | +      | -     | -     | +     | +  |
| 12    | 0.047 | 0.060 | 0.050 | 0.083 | 0.102 | 0.016 | 0.021 | 0.128 | 0.028 | 0.092 | 0.051 |       | +     | +     | -     | -     | -     | -      | -     | -      | -     | -     | -     | +  |
| 13    | 0.087 | 0.076 | 0.074 | 0.010 | 0.095 | 0.070 | 0.071 | 0.049 | 0.053 | 0.046 | 0.070 | 0.105 |       | -     | -     | -     | -     | -      | -     | +      | -     | +     | -     | +  |
| 14    | 0.091 | 0.087 | 0.073 | 0.057 | 0.102 | 0.077 | 0.106 | 0.109 | 0.093 | 0.126 | 0.126 | 0.144 | 0.079 |       | +     | -     | +     | -      | -     | +      | -     | -     | -     | +  |
| 15    | 0.056 | 0.053 | 0.054 | 0.061 | 0.056 | 0.090 | 0.073 | 0.047 | 0.070 | 0.060 | 0.051 | 0.110 | 0.075 | 0.180 |       | -     | -     | -      | -     | -      | -     | +     | -     | +  |
| 16    | 0.031 | 0.046 | 0.031 | 0.024 | 0.062 | 0.029 | 0.021 | 0.059 | 0.017 | 0.043 | 0.041 | 0.038 | 0.031 | 0.114 | 0.077 |       | -     | -      | -     | -      | -     | -     | -     | +  |
| 17    | 0.091 | 0.083 | 0.086 | 0.120 | 0.122 | 0.137 | 0.107 | 0.112 | 0.127 | 0.099 | 0.083 | 0.149 | 0.151 | 0.227 | 0.098 | 0.115 |       | -      | -     | -      | -     | -     | +     | +  |
| 18    | 0.034 | 0.027 | 0.025 | 0.032 | 0.069 | 0.037 | 0.066 | 0.073 | 0.070 | 0.057 | 0.054 | 0.081 | 0.067 | 0.042 | 0.094 | 0.091 | 0.091 |        | -     | -      | -     | -     | -     | +  |
| 19    | 0.098 | 0.083 | 0.081 | 0.061 | 0.125 | 0.082 | 0.127 | 0.126 | 0.102 | 0.126 | 0.127 | 0.146 | 0.089 | 0.007 | 0.158 | 0.130 | 0.204 | -0.023 |       | -      | -     | -     | -     | +  |
| 20    | 0.214 | 0.250 | 0.238 | 0.276 | 0.312 | 0.150 | 0.168 | 0.350 | 0.218 | 0.322 | 0.238 | 0.145 | 0.301 | 0.332 | 0.357 | 0.283 | 0.351 | 0.249  | 0.304 |        | -     | -     | -     | +  |
| 21    | 0.125 | 0.147 | 0.124 | 0.131 | 0.168 | 0.058 | 0.083 | 0.198 | 0.085 | 0.220 | 0.139 | 0.089 | 0.157 | 0.085 | 0.241 | 0.134 | 0.276 | 0.108  | 0.108 | 0.193  |       | -     | -     | +  |
| 22    | 0.173 | 0.221 | 0.201 | 0.220 | 0.276 | 0.073 | 0.103 | 0.325 | 0.144 | 0.302 | 0.187 | 0.074 | 0.253 | 0.270 | 0.403 | 0.272 | 0.387 | 0.178  | 0.225 | -0.015 | 0.165 |       | -     | -  |
| 23    | 0.093 | 0.108 | 0.100 | 0.062 | 0.130 | 0.032 | 0.058 | 0.140 | 0.051 | 0.125 | 0.101 | 0.057 | 0.076 | 0.086 | 0.170 | 0.053 | 0.220 | 0.070  | 0.094 | 0.217  | 0.055 | 0.143 |       | +  |
| 24    | 0.123 | 0.178 | 0.170 | 0.238 | 0.246 | 0.198 | 0.206 | 0.285 | 0.261 | 0.216 | 0.181 | 0.225 | 0.291 | 0.238 | 0.254 | 0.252 | 0.270 | 0.162  | 0.209 | 0.357  | 0.300 | 0.285 | 0.279 |    |