

Table S1: Meteorological conditions in Novi Sad, Serbia during the vegetation seasons of pea in 2019 and 2020, and long-term average temperatures

| Temperature (°C) | | | | Precipitation (mm) | | | |
|------------------|-------------|-------------|-------------------|--------------------|-------------|-------------|-------------------|
| Month | Year | | Long-term average | Month | Year | | Long-term average |
| | 2019 | 2020 | | | 2019 | 2020 | |
| I | 0.1 | 0.6 | 0.5 | I | 42 | 23 | 40 |
| II | 4.9 | 7.2 | 1.7 | II | 16 | 46 | 33 |
| III | 10.1 | 8.8 | 6.4 | III | 18 | 55 | 42 |
| IV | 14.6 | 12.6 | 11.9 | IV | 54 | 12 | 48 |
| V | 14.9 | 16.1 | 17.2 | V | 147 | 48 | 73 |
| VI | 22.8 | 20.9 | 20.2 | VI | 64 | 163 | 23 |
| VII | 22.7 | 22.8 | 22.1 | VII | 22 | 76 | 64 |
| Average | 12.9 | 12.7 | 11.4 | Average | 51.8 | 60.4 | 46.1 |

Table S2: Meteorological conditions in Kessenich, Belgium during the vegetation seasons of pea in 2019 and 2020, and long-term average temperatures

| Temperature (°C) | | | | Precipitation (mm) | | | |
|------------------|-------------|-------------|-------------------|--------------------|-------------|-------------|-------------------|
| Month | Year | | Long-term average | Month | Year | | Long-term average |
| | 2019 | 2020 | | | 2019 | 2020 | |
| I | 1.6 | 4.5 | 2.1 | I | 0.35 | 0.35 | 0.28 |
| II | 5.3 | 6.3 | 2.8 | II | 0.29 | 0.48 | 0.29 |
| III | 7.8 | 6.1 | 5.8 | III | 0.35 | 0.35 | 0.29 |
| IV | 10.7 | 11.6 | 9.9 | IV | 0.33 | 0.35 | 0.27 |
| V | 12.2 | 13.4 | 13.7 | V | 0.35 | 0.35 | 0.29 |
| VI | 19.8 | 17.9 | 17.1 | VI | 0.44 | 0.35 | 0.30 |
| VII | 20.5 | 18.5 | 19.1 | VII | 0.35 | 0.36 | 0.30 |
| Average | 11.1 | 11.2 | 10.1 | Average | 0.35 | 0.37 | 0.29 |

Table S3. Pearson's correlation coefficient (r) for analyzed traits between two years (2019 and 2020)

| Trait | Serbia | Belgium |
|------------|---------|---------|
| | r | r |
| GPP | 0.60*** | 0,98 |
| PPP | 0.44*** | 0,40*** |
| SPP | 0.45*** | 0,28*** |
| FL | 0.13 | 0,10*** |
| PH | 0.77*** | 0,82*** |
| PL | 0.46*** | 0,68*** |
| PoL | 0.75*** | 0,61*** |
| TSW | 0.92*** | 0,80*** |

| | | |
|-------------|---------|---------|
| SWPP | 0.48*** | 0,42*** |
| SY | 0,74*** | 0,73*** |
| PC | 0,27*** | 0,17*** |

Significant at $p \leq 0.001$ (***)

Table S4: The list of pea genotypes analysed in the study

| Eucleg no | Accession name | Accession Number | Population type * | Country of origin | Variety type by usage | Gen collection** |
|------------|----------------|------------------|-------------------|-------------------|-----------------------|------------------|
| EUC_PS_001 | 00-10 | 00-10 | BL | North America | Dry | ASR |
| EUC_PS_002 | 00-11 | 00-11 | BL | North America | Dry | ASR |
| EUC_PS_003 | 00-2060 | 00-2060 | BL | North America | Dry | ASR |
| EUC_PS_004 | 00-2061 | 00-2061 | BL | North America | Garden | ASR |
| EUC_PS_005 | 00-2062 | 00-2062 | BL | North America | Dry | ASR |
| EUC_PS_006 | 00-2063 | 00-2063 | BL | North America | Garden | ASR |
| EUC_PS_007 | 00-2064 | 00-2064 | BL | North America | Dry | ASR |
| EUC_PS_008 | 00-2066 | 00-2066 | BL | North America | Garden | ASR |
| EUC_PS_009 | 00-2067 | 00-2067 | BL | North America | Dry | ASR |
| EUC_PS_010 | 00-2068 | 00-2068 | BL | North America | Dry | ASR |
| EUC_PS_011 | 00-2069 | 00-2069 | BL | North America | Dry | ASR |
| EUC_PS_012 | 00-2071-2 | 00-2071-2 | BL | North America | Garden | ASR |
| EUC_PS_013 | 00-2072 | 00-2072 | BL | North America | Dry | ASR |
| EUC_PS_014 | 00-2073 | 00-2073 | BL | North America | Garden | ASR |
| EUC_PS_015 | 00-2084 | 00-2084 | BL | North America | Dry | ASR |
| EUC_PS_016 | 00-2086 | 00-2086 | BL | North America | Garden | ASR |
| EUC_PS_017 | 00-2087 | 00-2087 | BL | North America | Garden | ASR |
| EUC_PS_018 | 00-2091 | 00-2091 | BL | North America | Dry | ASR |
| EUC_PS_019 | 00-2100 | 00-2100 | BL | North America | Dry | ASR |
| EUC_PS_020 | 00-2103 | 00-2103 | BL | North America | Dry | ASR |
| EUC_PS_021 | 00-2106 | 00-2106 | BL | North America | Dry | ASR |
| EUC_PS_022 | 00-2122 | 00-2122 | BL | North America | Dry | ASR |
| EUC_PS_023 | 00-2177 | 00-2177 | BL | North America | Dry | ASR |

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|------------|-------------|-------------|----|---------------|---------------|-----|
| EUC_PS_024 | 00-7 | 00-7 | BL | North America | Garden | ASR |
| EUC_PS_025 | 03PP054.46 | 03PP054.46 | V | Australia | Dry | ASR |
| EUC_PS_026 | 171-11001 | 171-11001 | BL | North America | Forage | ASR |
| EUC_PS_027 | AP18 | AP18 | V | North America | Forage | ASR |
| EUC_PS_028 | AP2 | AP2 | V | North America | Forage | ASR |
| EUC_PS_029 | Ariel | Ariel | V | New Zealand | Dry | ASR |
| EUC_PS_030 | Banner | Banner | V | North America | Dry | ASR |
| EUC_PS_031 | Columbia | Columbia | V | North America | Dry | ASR |
| EUC_PS_032 | Courier | Courier | V | North America | Dry | ASR |
| EUC_PS_033 | Cruiser | Cruiser | V | North America | Dry | ASR |
| EUC_PS_034 | Ginny | Ginny | V | North America | Dry | ASR |
| EUC_PS_035 | H3-2 | H3-2 | V | North America | Forage | ASR |
| EUC_PS_036 | hyline | hyline | V | North America | Dry | ASR |
| EUC_PS_037 | icicle | icicle | V | North America | Forage | ASR |
| EUC_PS_038 | Journey | Journey | V | North America | Forage | ASR |
| EUC_PS_039 | Koyote | Koyote | V | North America | Winter dry | ASR |
| EUC_PS_040 | Monarch | Monarch | V | North America | Dry | ASR |
| EUC_PS_041 | Pacifica | Pacifica | V | North America | Dry | ASR |
| EUC_PS_042 | PRL 6254 | PRL 6254 | V | New Zealand | Dry | ASR |
| EUC_PS_043 | Pro 6243 | Pro 6243 | V | North America | Dry | ASR |
| EUC_PS_044 | Pro 7123 | Pro 7123 | V | North America | Dry | ASR |
| EUC_PS_045 | Pro 7127 | Pro 7127 | V | North America | Dry | ASR |
| EUC_PS_046 | Pro 7405 | Pro 7405 | V | North America | Dry | ASR |
| EUC_PS_047 | Pro 7410 | Pro 7410 | V | North America | Dry | ASR |
| EUC_PS_048 | Pro 822 | Pro 822 | V | North America | Dry | ASR |
| EUC_PS_049 | Pro101-7133 | Pro101-7133 | V | North America | Dry | ASR |
| EUC_PS_050 | Whero | Whero | V | North America | Dry | ASR |
| EUC_PS_051 | Whistler | Whistler | V | North America | Winter forage | ASR |
| EUC_PS_052 | Yarrum | Yarrum | V | Australia | Dry | ASR |
| EUC_PS_053 | ASR 4064 | ASR 4064 | V | Belgium | Garden | ASR |

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|------------|------------------|----------|----|----------------|------------|----------|
| EUC_PS_054 | ASR 4027 | ASR 4027 | V | Belgium | Garden | ASR |
| EUC_PS_055 | ASR 4139 | ASR 4139 | V | Belgium | Garden | ASR |
| EUC_PS_056 | ASR 4150 | ASR 4150 | V | Belgium | Garden | ASR |
| EUC_PS_057 | ASR 4134 | ASR 4134 | V | Belgium | Garden | ASR |
| EUC_PS_058 | JI 2713 | JI2713 | SW | Russia | Wild | IBERS |
| EUC_PS_059 | JI 2546 | JI2546 | W | Georgia | Wild | IBERS |
| EUC_PS_060 | JI 201 | JI0201 | W | Italy | Wild | IBERS |
| EUC_PS_061 | JI 1346 | JI1346 | L | Mongolia | Landrace | IBERS |
| EUC_PS_062 | JI 2545 | JI2545 | L | Netherlands | Landrace | IBERS |
| EUC_PS_063 | JI 3541 | JI3541 | BL | India | Sugar snap | IBERS |
| EUC_PS_065 | JI 1478 | JI1478 | L | Afganistan | Landrace | IBERS |
| EUC_PS_066 | JI 778 | JI0778 | BL | North America | Dry | IBERS |
| EUC_PS_067 | JI 3022 | JI3022 | GS | Russia | Dry | IBERS |
| EUC_PS_068 | JI 1482 | JI1482 | L | Afganistan | Landrace | IBERS |
| EUC_PS_069 | JI 1124 | JI1124 | L | Nepal | Landrace | IBERS |
| EUC_PS_110 | Campus | Campus | V | Denmark | Dry | IBERS |
| EUC_PS_111 | Kareni | Kareni | V | France | Dry | IBERS |
| EUC_PS_112 | Mascara | Mascara | V | Denmark | Dry | IBERS |
| EUC_PS_113 | Sakura | Sakura | V | United Kingdom | Marrowfat | IBERS |
| EUC_PS_114 | JULITA | NGB9927 | L | Sweden | Sugar pea | NorthGen |
| EUC_PS_117 | BLÅ ÄRTER 1 | NGB11727 | L | Sweden | Dry | NorthGen |
| EUC_PS_118 | BLÅÄRT 2 | NGB11735 | L | Sweden | Dry | NorthGen |
| EUC_PS_120 | VIDEMOSEÄRT | NGB11759 | L | Denmark | Garden | NorthGen |
| EUC_PS_121 | GOTLÄNDSK BLÅÄRT | NGB11760 | L | Sweden | Dry | NorthGen |
| EUC_PS_126 | SKÅNSK GRÅÄRT | NGB14155 | L | Sweden | Dry | NorthGen |
| EUC_PS_129 | BOHUSÄRT | NGB14637 | L | Sweden | Dry | NorthGen |
| EUC_PS_130 | SÖRMLÄNSK BÖNÄRT | NGB14640 | L | Sweden | Dry | NorthGen |
| EUC_PS_131 | LIT | NGB14642 | L | Sweden | Dry | NorthGen |
| EUC_PS_145 | ALFTA | NGB17867 | L | Sweden | Dry/garden | NorthGen |
| EUC_PS_146 | VÄSE | NGB17868 | L | Sweden | Dry | NorthGen |
| EUC_PS_147 | VISINGSÖ | NGB17870 | L | Sweden | Dry | NorthGen |
| EUC_PS_148 | Tjörn | NGB18053 | L | Sweden | Dry | NorthGen |
| EUC_PS_153 | SPARLÖSA GRÅÄRT | NGB20190 | L | Sweden | Dry | NorthGen |
| EUC_PS_154 | HISINGS GRÅÄRT | NGB20192 | L | Sweden | Dry | NorthGen |
| EUC_PS_155 | TJÖRN från SESAM | NGB21238 | L | Sweden | Garden | NorthGen |
| EUC_PS_156 | RABER | NGB22830 | L | Sweden | Garden | NorthGen |

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|------------|----------------|-----------|----|--------|------------|----------|
| EUC_PS_162 | WBH 1304 | NGB101304 | BL | Sweden | Dry | NorthGen |
| EUC_PS_163 | Marieholm | NGB101818 | L | Sweden | Dry | NorthGen |
| EUC_PS_165 | WBH 1846 | NGB101846 | L | Greece | Garden | NorthGen |
| EUC_PS_169 | Smolenskij 812 | NGB101987 | BL | Russia | Garden | NorthGen |
| EUC_PS_170 | Brioärt | NGB101997 | V | Sweden | Forage | NorthGen |
| EUC_PS_172 | Gråärt | NGB103590 | L | Sweden | Dry | NorthGen |
| EUC_PS_176 | G32 | G32 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_177 | G28 | G28 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_181 | G12 | G12 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_182 | TR | TR | V | Serbia | Forage/dry | IFVCNS |
| EUC_PS_183 | JZ | JZ | V | Serbia | Dry | IFVCNS |
| EUC_PS_184 | PR | PR | V | Serbia | Dry | IFVCNS |
| EUC_PS_185 | L - 15/4 | L-15/4 | BL | Serbia | Forage/dry | IFVCNS |
| EUC_PS_186 | JV | JV | V | Serbia | Dry | IFVCNS |
| EUC_PS_188 | SEP4 | SEP4 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_189 | SEP5 | SEP5 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_190 | SEP8 | SEP8 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_191 | SEP9 | SEP9 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_192 | SEP10 | SEP10 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_193 | SEP11 | SEP11 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_194 | SEP14 | SEP14 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_196 | G47 | G47 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_198 | A7Z | A7Z | BL | Serbia | Dry | IFVCNS |
| EUC_PS_199 | A15 Z | A15Z | BL | Serbia | Dry | IFVCNS |
| EUC_PS_200 | K1- 18 | K1-18 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_201 | K2- 18 | K2-18 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_202 | G42 | G42 | BL | Serbia | Forage/dry | IFVCNS |
| EUC_PS_203 | G14 | G14 | BL | Serbia | Forage/dry | IFVCNS |
| EUC_PS_206 | G49 | G49 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_207 | PIS 054 | PIS054 | BL | Serbia | Forage | IFVCNS |
| EUC_PS_208 | PIS 179 | PIS179 | BL | Serbia | Forage | IFVCNS |
| EUC_PS_209 | PIS 183 | PIS183 | BL | Serbia | Forage/dry | IFVCNS |
| EUC_PS_210 | PIS 184 | PIS184 | BL | Serbia | Forage | IFVCNS |
| EUC_PS_211 | PIS 067 | PIS067 | BL | Serbia | Forage | IFVCNS |
| EUC_PS_212 | HR 2 | HR2 | V | Serbia | Forage | IFVCNS |
| EUC_PS_213 | KZ5 | KZ5 | BL | Serbia | Dry | IFVCNS |

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|------------|-------------|-------------|----|---------------|------------|--------|
| EUC_PS_214 | KZ6 | KZ6 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_215 | G - K | G-K | BL | Serbia | Dry | IFVCNS |
| EUC_PS_216 | G - Dž | G-Dž | BL | Serbia | Dry | IFVCNS |
| EUC_PS_217 | G - F | G-F | BL | Serbia | Dry | IFVCNS |
| EUC_PS_218 | K - TM | K-TM | BL | Serbia | Dry | IFVCNS |
| EUC_PS_219 | K - MPR | K-MPR | BL | Serbia | Dry | IFVCNS |
| EUC_PS_220 | Ob TR | ObTR | BL | Serbia | Forage/dry | IFVCNS |
| EUC_PS_221 | Ob KR/2 | ObKR/2 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_222 | Ob K2/1 | ObK2/1 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_223 | Ob K3/1 | ObK3/1 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_224 | A14Z | A14Z | BL | Serbia | Dry | IFVCNS |
| EUC_PS_225 | A2Z | A2Z | BL | Serbia | Dry | IFVCNS |
| EUC_PS_226 | A8Z | A8Z | BL | Serbia | Dry | IFVCNS |
| EUC_PS_227 | G-ČA-O | G-ČA-O | BL | Serbia | Dry | IFVCNS |
| EUC_PS_228 | SEP140 | SEP140 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_229 | ObK1/1 | ObK1/1 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_230 | PI - 1 | PI-1 | V | Serbia | Forage | IFVCNS |
| EUC_PS_231 | Ob L2 | ObL2 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_232 | Ob L3 | ObL3 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_233 | Ob L6 | ObL6 | BL | Serbia | Dry | IFVCNS |
| EUC_PS_234 | PIS178 | PIS178 | BL | Serbia | Forage | IFVCNS |
| EUC_PS_241 | Aragorn | Aragorn | V | North America | Dry | ASR |
| EUC_PS_242 | Flex | Flex | V | North America | Forage | ASR |
| EUC_PS_243 | Greenwood | Greenwood | V | North America | Dry | ASR |
| EUC_PS_244 | Kayanne | Kayanne | V | Denmark | Dry | ASR |
| EUC_PS_245 | Solido | Solido | V | Netherlands | Marrowfat | ASR |
| EUC_PS_246 | yellowstone | yellowstone | V | North America | Dry | ASR |
| EUC_PS_247 | KARAT | KARAT | V | Serbia | Dry | IFVCNS |
| EUC_PS_248 | PARTNER | PARTNER | V | Serbia | Dry | IFVCNS |
| EUC_PS_249 | DUKAT | DUKAT | V | Serbia | Dry | IFVCNS |
| EUC_PS_250 | JUNIOR | JUNIOR | V | Serbia | Forage | IFVCNS |
| EUC_PS_252 | A10Z** | A10Z** | BL | Serbia | Dry | IFVCNS |
| EUC_PS_253 | KOSMAJ | KOSMAJ | V | Serbia | Forage | IFVCNS |
| EUC_PS_254 | Mak 116 | Mak116 | V | Serbia | Dry | IFVCNS |
| EUC_PS_255 | UKR 015A | UKR015A | V | Serbia | Dry | IFVCNS |
| EUC_PS_256 | UKR 133S | UKR133S | V | Serbia | Dry | IFVCNS |

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|-------------------|----------|---------|---|--------|-----|--------|
| EUC_PS_257 | UKR 223A | UKR223A | V | Serbia | Dry | IFVCNS |
| EUC_PS_258 | UKR 138S | UKR138S | V | Serbia | Dry | IFVCNS |
| EUC_PS_259 | UKR 101I | UKR101I | V | Serbia | Dry | IFVCNS |
| EUC_PS_260 | UKR 134G | UKR134G | V | Serbia | Dry | IFVCNS |

* BL—breeding Line; V—variety; SW—semi-wild; W—wild; L—landrace; GS—genetic stock.

** ASR—Agro Seed Research, Kessenich; IBERS—Institute of Biological, Environmental and Rural Sciences, Aberystwyth;
NorthGen—NorthGen Genetic Resource Center, Alnarp; IFVCNS—Institute of Field and Vegetable Crops, Novi Sad