**Supplementary Table 1:** List of buckwheat germplasm collected from North Western Himalayas along with place of collection

|  |  |  |  |
| --- | --- | --- | --- |
| **S. No/ Code** | **Genotype name** | **Place of collection**  | **Species** |
| 1 | BWM-1 | NBPGR | *tartaricum* |
| 2 | BWM-2 | NBPGR | *tartaricum* |
| 3 | BWM-3 | NBPGR | *tartaricum* |
| 4 | BWM-4 | NBPGR | *tartaricum* |
| 5 | BWM-5 | NBPGR | *tartaricum* |
| 6 | BWM-6 | NBPGR | *tartaricum* |
| 7 | BWM-7 | NBPGR | *tartaricum* |
| 8 | BWM-8 | NBPGR | *tartaricum* |
| 9 | BWM-9 | NBPGR | *tartaricum* |
| 10 | BWM-10 | NBPGR | *tartaricum* |
| 11 | BWM-11 | NBPGR | *tartaricum* |
| 12 | BWM-12 | NBPGR | *tartaricum* |
| 13 | BWM-13 | NBPGR | *tartaricum* |
| 14 | BWM-14 | NBPGR | *tartaricum* |
| 15 | BWM-15 | NBPGR | *tartaricum* |
| 16 | BWM-16 | NBPGR | *tartaricum* |
| 17 | BWM-17 | NBPGR | *tartaricum* |
| 18 | BWM-18 | NBPGR | *tartaricum* |
| 19 | BWM-19 | NBPGR | *esculentum* |
| 20 | BWM-20 | NBPGR | *esculentum* |
| 21 | BWM-21 | NBPGR | *esculentum* |
| 22 | BWM-22 | NBPGR | *esculentum* |
| 23 | BWM-23 | NBPGR | *esculentum* |
| 24 | BWM-24 | NBPGR | *esculentum* |
| 25 | BWM-25 | NBPGR | *esculentum* |
| 26 | BWM-26 | NBPGR | *esculentum* |
| 27 | BWM-27 | NBPGR | *esculentum* |
| 28 | BWM-28 | NBPGR | *esculentum* |
| 29 | BWM-29 | NBPGR | *esculentum* |
| 30 | BWM-30 | NBPGR | *esculentum* |
| 31 | BWM-31 | NBPGR | *esculentum* |
| 32 | BWM-32 | NBPGR | *esculentum* |
| 33 | BWM-33 | NBPGR | *esculentum* |
| 34 | BWM-34 | NBPGR | *esculentum* |
| 35 | BWM-35 | NBPGR | *esculentum* |
| 36 | BWM-36 | NBPGR | *esculentum* |
| 37 | BWM-37 | NBPGR | *esculentum* |
| **S.No./ Code** | **Genotype name** | **Place of collection**  | **Species** |
| 38 | BWM-38 | NBPGR | *esculentum* |
| 39 | BWM-39 | NBPGR | *esculentum* |
| 40 | BWM-40 | NBPGR | *esculentum* |
| 41 | BWM-41 | NBPGR | *esculentum* |
| 42 | BWM-42 | NBPGR | *esculentum* |
| 43 | BWM-43 | NBPGR | *esculentum* |
| 44 | BWM-44 | NBPGR | *esculentum* |
| 45 | BWM-45 | NBPGR | *esculentum* |
| 46 | BWM-46 | NBPGR | *esculentum* |
| 47 | BWM-47 | NBPGR | *esculentum* |
| 48 | BWM-48 | NBPGR | *esculentum* |
| 49 | BWM-49 | NBPGR | *tartaricum* |
| 50 | BWM-50 | NBPGR | *tartaricum* |
| 51 | BWM-51 | NBPGR | *tartaricum* |
| 52 | BWM-52 | NBPGR | *tartaricum* |
| 53 | BWM-53 | NBPGR | *tartaricum* |
| 54 | BWM-54 | NBPGR | *tartaricum* |
| 55 | BWM-55 | NBPGR | *tartaricum* |
| 56 | BWM-56 | NBPGR | *tartaricum* |
| 57 | BWM-57 | NBPGR | *tartaricum* |
| 58 | BWM-58 | NBPGR | *tartaricum* |
| 59 | BWM-59 | NBPGR | *tartaricum* |
| 60 | M1 | Machil | *esculentum* |
| 61 | M2 | Machil | *tartaricum* |

**Supplementary Table 2:** List of qualitative and quatitative traits in the studied accessions of Buckwheat

|  |  |  |  |
| --- | --- | --- | --- |
| S.No. | Character | Abbreviation | Unit/code |
| 1 | Plant height per plant | PHP | Cm |
| 2 | No. of primary branches | PBP | Number |
| 3 | No. of secondary branches | SBP | Number |
| 4 | Leaf no. per plant | LNP | Code |
| 5 | Leaf blade length | LBL | Cm |
| 6 | Leaf blade width | LBW | cm |
| 7 | Inflorescence length per plant | ILP | cm |
| 8 | Petiole length | PLP | cm |
| 9 | Flower colour | FCP | 1:greenishyellow,2: pink,3:white |
| 10 | Stem colour | SCP | 1:red , 2:green |
| 11 | Leaf colour | LCP | 1: green,2:red |
| 12 | Leaf margin colour | LMC | 1: pink, 2: green |
| 13 | Petiole colour | PCP | 1: green, 2: pink |
| 14 | Seed anthocyanin colour | SAC | 1: green, 2: pink |
| 15 | Seed colour | SCC | 1:Grey-Green,2:Grey-brown ,3:Black |
| 16 | Seed shape | SSP | 1:Elliptic,2:Ovate,3:Trullate |
| 17 | Seed weight per weight | SWS | g/100 seeds |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Trait |  | Sum of Squares | df | Mean Square |  F | Sig. |
| PHP | Between Groups | 277167.548 | 60 | 4619.459 | 182.67 | 0 |
|  | Within Groups | 6170.4 | 244 | 25.289 |  |  |
|  | Total | 283337.948 | 304 |  |  |  |
| PBP | Between Groups | 381.79 | 60 | 6.363 | 6.994 | 0 |
|  | Within Groups | 222 | 244 | 0.91 |  |  |
|  | Total | 603.79 | 304 |  |  |  |
| SBP | Between Groups | 1104.61 | 60 | 18.41 | 7.804 | 0 |
|  | Within Groups | 575.6 | 244 | 2.359 |  |  |
|  | Total | 1680.21 | 304 |  |  |  |
| LNP | Between Groups | 121847.666 | 60 | 2030.794 | 82.956 | 0 |
|  | Within Groups | 5973.2 | 244 | 24.48 |  |  |
|  | Total | 127820.866 | 304 |  |  |  |
| LBL | Between Groups | 279.594 | 60 | 4.66 | 19.411 | 0 |
|  | Within Groups | 58.576 | 244 | 0.24 |  |  |
|  | Total | 338.17 | 304 |  |  |  |
| LBW | Between Groups | 364.8 | 60 | 6.08 | 26.295 | 0 |
|  | Within Groups | 56.419 | 244 | 0.231 |  |  |
|  | Total | 421.219 | 304 |  |  |  |
| ILP | Between Groups | 30.022 | 60 | 0.5 | 3.192 | 0 |
|  | Within Groups | 38.252 | 244 | 0.157 |  |  |
|  | Total | 68.274 | 304 |  |  |  |
| PL | Between Groups | 812.964 | 60 | 13.549 | 32.426 | 0 |
|  | Within Groups | 101.956 | 244 | 0.418 |  |  |
|  | Total | 914.92 | 304 |  |  |  |
| SWS | Between Groups | 53.705 | 60 | 0.895 | 751.429 | 0 |
|  | Within Groups | 0.291 | 244 | 0.001 |  |  |
|  | Total | 53.995 | 304 |  |  |  |

**Supplementary Table 3:** F-values obtained in the ANOVA for the studied quantitative

morphological traits (p≤0.05)

 Refer to the table 1 for the code of traits

**Supplementary Table** **4:** Pearson correlation matrix established between the 16 polymorphic morphological traits

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Trait | PHP | PBP | SBP | LNP | LBL | LBW | ILP | PLP | FCP | SCP | LCP | LMC | PCP | SAC | SCC | SSP | SWS |
| PHP | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PBP | 0.544\*\* | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SBP | 0.280\* | 0.239 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| LNP | 0.419\*\* | 0.337\*\* | 0.497\*\* | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| LBL | 0.167 | 0.182 | 0.107 | 0.116 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |
| LBW | -0.107 | -0.041 | 0.194 | 0.125 | 0.736\*\* | 1 |  |  |  |  |  |  |  |  |  |  |  |
| ILP | 0.177 | 0.103 | 0.076 | -0.097 | 0.247 | 0.138 | 1 |  |  |  |  |  |  |  |  |  |  |
| PLP | 0.034 | -0.027 | 0.124 | 0.111 | 0.223 | 0.412\*\* | 0.232 | 1 |  |  |  |  |  |  |  |  |  |
| FCP | 0.173 | 0.302\* | -0.076 | 0.024 | 0.166 | -0.21 | 0.224 | -0.03 | 1 |  |  |  |  |  |  |  |  |
| SCP | -0.157 | -0.063 | 0.014 | -0.108 | 0.003 | 0.209 | -0.298 | 0.015 | -0.194 | 1 |  |  |  |  |  |  |  |
| LCP | -0.215 | -0.145 | -0.033 | -0.139 | -0.003 | 0.156 | -0.099 | 0.052 | -0.24 | .309\* | 1 |  |  |  |  |  |  |
| LMC | -0.156 | -0.081 | 0.001 | -0.092 | -0.008 | -0.107 | 0.205 | -0.118 | 0.159 | -0.176 | 0.028 | 1 |  |  |  |  |  |
| PCP | 0.354\*\* | 0.222 | -0.054 | -0.028 | 0.08 | -0.047 | 0.042 | 0.133 | 0.096 | 0.107 | -0.174 | -.608\*\* | 1 |  |  |  |  |
| SAC | 0.455\*\* | 0.395\*\* | -0.043 | 0.187 | 0.328\*\* | -0.031 | 0.173 | 0.043 | 0.528\*\* | -0.292 | -0.196 | -0.092 | 0.293\* | 1 |  |  |  |
| SCC | 0.151 | 0.039 | 0.109 | 0.193 | -0.006 | -0.04 | -0.039 | -0.013 | 0.109 | 0.237 | 0.102 | 0.098 | -0.047 | 0.089 | 1 |  |  |
| SSP | 0.404\*\* | 0.377\*\* | 0.103 | 0.115 | 0.187 | 0.031 | 0.253\* | 0.073 | 0.294\* | -0.092 | -0.21 | -0.05 | 0.314\* | 0.291\* | 0.034 | 1 |  |
| SWS | 0.179 | 0.129 | 0.084 | 0.037 | 0.265\* | -0.009 | 0.186 | 0.031 | 0.523\*\* | -.423\*\* | -.278\* | 0.202 | -0.017 | 0.517\*\* | -0.074 | 0.193 | 1 |

\*\*. Correlation is significant at the 0.01 level (2-tailed).

\*. Correlation is significant at the 0.05 level (2-tailed).

 Refer to the table 1 for the code of traits