Table S1. Soil chemical properties of the experimental site

|  |  |
| --- | --- |
| Parameter | Values |
| pH | 8.33 |
| Electrical conductivity (dsm-1) | 0.23 |
| Organic carbon (%) | 0.25 |
| Available N (kg ha-1) | 269.7 |
| Available P2O5 (kg ha-1) | 45.6 |
| Available K2O (kg ha-1) | 296.2 |
| Available Ca (Cmol (p+) kg-1) | 43.7 |
| Available Mg (Cmol (p+) kg-1) | 18.13 |
| Available Sulphur (mg kg-1) | 7.44 |
| Free lime (%) | 27.0 |
| Cation exchange capacity (Cmol (p+) kg-1) | 95.1 |
| Base saturation (%) | 67.0 |
| DTPA-extractable Zn (mg kg-1) | 2.26 |
| DTPA-extractable Fe (mg kg-1) | 3.91 |
| DTPA-extractable Cu (mg kg-1) | 1.97 |
| DTPA-extractable Mn (mg kg-1) | 2.95 |

Table S2.REML variance components for IDC tolerance and yield related traits for pooled data across two years in groundnut mini core

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Traits | Genotype | Genotype × Environment | Error (Residual) | Wald’s statistic † (Environment) |
| IDC tolerance traits |  |  |  |  |
| VCR 20d | 0.079\*\* | 0.088\*\* | 0.153 | 0.040 |
| VCR 40 d | 0.052\* | 0.116\*\* | 0.257 | 1.350 |
| VCR 60 d | 0.062\*\* | 0.056\*\* | 0.228 | 612.6\*\* |
| VCR 80 d | 0.150\*\* | 0.038\* | 0.213 | 38.83\*\* |
| VCR 100 d | 0.124\*\* | 0.063\*\* | 0.232 | 26.69\* |
| SCMR 20 d | 6.26\*\* | 4.18\*\* | 12.83 | - |
| SCMR 40 d | 3.75 | 14.29\*\* | 24.20 | 0.04 |
| SCMR 60 d | 5.13\*\* | 5.65\*\* | 18.57 | 658.2\*\* |
| SCMR 80 d | 14.02\*\* | 4.16\* | 24.31 | 0.31 |
| SCMR 100 d | 12.43\*\* | 7.45\*\* | 24.17 | 31.76\* |
| Yield related traits |  |  |  |  |
| Plant height (cm) | 2.270\* | 10.467\*\* | 3.648 | 8.58\* |
| No.of primary branches | 0.109\*\* | 0.240\*\* | 0.318 | 8.74\* |
| No.of pods per plant | 1.812\*\* | 2.891\*\* | 1.178 | 2.67 |
| Pod yield (g-1 plant) | 0.602\*\* | 1.601\*\* | 0.487 | 26.45\*\* |
| Shelling out turn (%) | 5.806\*\* | 11.59\*\* | 4.670 | 349.5\*\* |
| Hundred seed weight (g) | 6.944\*\* | 6.881\*\* | 2.937 | 1.97 |

VCR – Visual chlorotic rating; SCMR – SPAD chlorophyll meter reading; d – days after sowing

\*,\*\* - Significance at p=0.05 and p=0.01, respectively

† Wald’s statistic – significance test for environmental (year) differences

Table S3.Ferrous and chlorophyll content among selected genotypes of different botanical varieties with varying IDC response in groundnut mini core

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Genotype (ICG #) | Botanical variety | VCR at 60d | SCMR at 60 d | Ferrous (mg kg-1) | Chl. a (mg g-1) | Chl. b (mg g-1) | Total Chl. (mg g-1) |
| 5051 | *hypogaea* bunch | 2.0 | 23.8 | 9.164 | 1.846 | 0.394 | 2.240 |
| 5662 | *hypogaea* bunch | 3.0 | 20.1 | 5.886 | 0.557 | 0.099 | 0.656 |
| 11862 | *hypogaea* bunch | 3.0 | 16.4 | 5.707 | 0.525 | 0.084 | 0.608 |
| 4156 | *hypogaea* runner | 2.5 | 22.6 | 6.213 | 0.561 | 0.091 | 0.652 |
| 862 | *hypogaea* runner | 3.0 | 14.2 | 5.811 | 0.382 | 0.051 | 0.433 |
| 163 | *hypogaea* runner | 3.5 | 12.8 | 4.753 | 0.416 | 0.080 | 0.496 |
| 6993 | *hypogaea* runner | 4.0 | 8.1 | 4.172 | 0.294 | 0.059 | 0.353 |
| 6022 | *fastigiata* | 4.0 | 8.4 | 3.725 | 0.248 | 0.039 | 0.288 |
| 11651 | *vulgaris* | 2.5 | 18.9 | 9.000 | 1.107 | 0.194 | 1.300 |
| 12697 | *vulgaris* | 3.0 | 17.5 | 7.346 | 0.547 | 0.112 | 0.659 |
| 13941 | *vulgaris* | 3.5 | 13.3 | 8.610 | 1.032 | 0.132 | 1.164 |
| 36 | *vulgaris* | 3.5 | 6.8 | 6.154 | 0.440 | 0.047 | 0.487 |
| 4750 | *vulgaris* | 4.5 | 5.0 | 4.381 | 0.149 | 0.026 | 0.175 |
| 9418 | *vulgaris* | 4.0 | 9.5 | 5.841 | 0.210 | 0.044 | 0.254 |
| 11088 | *peruviana* | 3.0 | 16.9 | 3.993 | 0.318 | 0.039 | 0.357 |
| 10036 | *peruviana* | 3.5 | 10.2 | 5.006 | 0.353 | 0.062 | 0.415 |
| *Checks* |  |  |  |  |  |  |  |
| ICGV 86031 | *vulgaris* | 2.0 | 25.5 | 8.94 | 1.462 | 0.184 | 1.646 |
| R 9227 | *vulgaris* | 4.0 | 5.9 | 5.33 | 0.377 | 0.067 | 0.444 |
| *Correlation* |  |  |  |  |  |  |  |
| VCR |  | - | -0.947\*\* | -0.707\*\* | -0.783\*\* | -0.721\*\* | -0.779\*\* |
| SCMR |  | - | - | 0.645\*\* | 0.725\*\* | 0.671\*\* | 0.721\*\* |

VCR – Visual chlorotic rating; d – Days after sowing; Chl. – Chlorophyll

\*\* Significance at p=0.01

Table S4. Correlation coefficients among VCR and SCMR at five stages and yield related traits across two years

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variables† | VCR-40d | VCR-60d | VCR-80d | VCR-100d | SCMR-20d | SCMR-40d | SCMR-60d | SCMR-80d | SCMR-100d | PHT | NPB | NP | PYP | SHO | HSW |
| VCR-20d | **0.633** | **0.496** | **0.531** | **0.489** | **-0.897** | **-0.664** | **-0.525** | **-0.532** | **-0.452** | -0.121 | **-0.296** | **-0.292** | **-0.275** | -0.045 | -0.081 |
| VCR-40d |  | **0.577** | **0.568** | **0.458** | **-0.658** | **-0.939** | **-0.577** | **-0.546** | **-0.433** | -0.127 | **-0.251** | **-0.309** | **-0.284** | -0.077 | **-0.160** |
| VCR-60d |  |  | **0.655** | **0.686** | **-0.600** | **-0.623** | **-0.893** | **-0.675** | **-0.667** | **-0.176** | **-0.259** | **-0.256** | **-0.363** | 0.020 | **-0.238** |
| VCR-80d |  |  |  | **0.761** | **-0.596** | **-0.628** | **-0.684** | **-0.951** | **-0.759** | **-0.313** | **-0.312** | **-0.362** | **-0.341** | -0.012 | **-0.157** |
| VCR-100d |  |  |  |  | **-0.594** | **-0.550** | **-0.745** | **-0.758** | **-0.959** | **-0.270** | **-0.410** | **-0.256** | **-0.287** | 0.107 | **-0.198** |
| SCMR-20d |  |  |  |  |  | **0.723** | **0.660** | **0.611** | **0.582** | 0.115 | **0.366** | **0.244** | **0.275** | 0.016 | **0.175** |
| SCMR-40d |  |  |  |  |  |  | **0.651** | **0.617** | **0.540** | 0.119 | **0.272** | **0.276** | **0.270** | 0.058 | 0.131 |
| SCMR-60d |  |  |  |  |  |  |  | **0.701** | **0.762** | **0.218** | **0.316** | **0.191** | **0.304** | -0.099 | **0.201** |
| SCMR-80d |  |  |  |  |  |  |  |  | **0.771** | **0.315** | **0.336** | **0.342** | **0.339** | -0.032 | **0.151** |
| SCMR-100d |  |  |  |  |  |  |  |  |  | **0.298** | **0.412** | **0.214** | **0.252** | -0.127 | **0.144** |
| PHT |  |  |  |  |  |  |  |  |  |  | **0.300** | 0.115 | **0.185** | -0.112 | **0.191** |
| NPB |  |  |  |  |  |  |  |  |  |  |  | **0.227** | **0.225** | **-0.217** | **0.246** |
| NP |  |  |  |  |  |  |  |  |  |  |  |  | **0.697** | **0.403** | 0.023 |
| PYP |  |  |  |  |  |  |  |  |  |  |  |  |  | **0.323** | **0.276** |
| SHO |  |  |  |  |  |  |  |  |  |  |  |  |  |  | -0.076 |

† Values in bold are significant at α=0.05; VCR – Visual chlorotic rating, SCMR – SPAD chlorophyll meter reading, d – days after sowing

PHT – Plant height (cm), NPB – Number of primary branches per plant, NP – Number of pods per plant, PYP – Pod yield (g-1 plant),

SHO – Shelling out turn (%), HSW – Hundred seed weight (g)

Table S5. Eigen vector loadings and percentage of variation explained by the first five principal components (PCs) in mini core collection of groundnut

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Component | PC1 | PC2 | PC3 | PC4 | PC5 |
| Eigen value | 7.510 | 1.831 | 1.472 | 1.091 | 0.894 |
| Variation explained (%) | 46.938 | 11.443 | 9.201 | 6.820 | 5.589 |
| Cumulative percentage | 46.938 | 58.381 | 67.582 | 74.402 | 79.991 |
| *Contribution of traits* |  |  |  |  |  |
| VCR-20d | -0.267 | -0.083 | 0.294 | -0.253 | 0.261 |
| VCR-40d | -0.275 | -0.114 | 0.304 | -0.254 | 0.012 |
| VCR-60d | -0.300 | 0.049 | 0.029 | 0.097 | -0.345 |
| VCR-80d | -0.315 | 0.029 | -0.068 | 0.254 | 0.023 |
| VCR-100d | -0.309 | 0.168 | -0.124 | 0.239 | -0.047 |
| SCMR-20d | 0.298 | 0.013 | -0.258 | 0.234 | -0.127 |
| SCMR-40d | 0.296 | 0.064 | -0.314 | 0.178 | -0.013 |
| SCMR-60d | 0.312 | -0.133 | -0.039 | -0.106 | 0.247 |
| SCMR-80d | 0.317 | -0.056 | 0.075 | -0.249 | -0.031 |
| SCMR-100d | 0.305 | -0.202 | 0.124 | -0.282 | 0.010 |
| Plant height (cm) | 0.115 | -0.120 | 0.466 | 0.069 | -0.335 |
| No. of primary branches | 0.169 | -0.127 | 0.323 | 0.367 | -0.430 |
| No. of pods per plant | 0.152 | 0.536 | 0.227 | -0.084 | -0.204 |
| Pod yield (g-1 plant) | 0.167 | 0.469 | 0.339 | 0.070 | 0.116 |
| Shelling out turn (%) | 0.000 | 0.586 | -0.070 | -0.189 | 0.117 |
| Hundred seed weight (g) | 0.093 | -0.042 | 0.346 | 0.560 | 0.605 |

VCR – Visual chlorotic rating, SCMR – SPAD chlorophyll meter reading, d – days after sowing

Table S6.Intercluster distances between class centroids based on hierarchical clustering

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Cluster | I | II | III | IV | V | VI | VII |
| I | 0.000 | 2.314 | 2.373 | 2.965 | 3.752 | 8.320 | 7.951 |
| II |  | 0.000 | 2.547 | 2.561 | 4.708 | 8.917 | 6.405 |
| III |  |  | 0.000 | 3.429 | 2.486 | 6.714 | 8.557 |
| IV |  |  |  | 0.000 | 5.713 | 9.937 | 5.898 |
| V |  |  |  |  | 0.000 | 4.637 | 10.876 |
| VI |  |  |  |  |  | 0.000 | 14.684 |
| VII |  |  |  |  |  |  | 0.000 |