**Supplementary Table 1(a): List of indigenous collection of forage sorghum germplasm**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sr.No** | **Accession name** | **IC number** | **Village** | **District** | **State** | **Year** |
| 1 | IG02-391 | IC-401266 | Basava | Sonbhadra | Uttar Pradesh | 2005 |
| 2 | IG02-387 | IC-401262 | Nijarpur | Mirzapur | Uttar Pradesh | 2005 |
| 3 | IG02-406 | IC-401281 | Pasala | Shehdol | Madhya Pradesh | 2005 |
| 4 | IG02-407 | IC-401282 | Mudarea | Umarea | Madhya Pradesh | 2005 |
| 5 | IG02-415 | IC-401290 | Gadakota | Sagar | Madhya Pradesh | 2005 |
| 6 | IG02-410 | IC-401285 | Barahi | Umarea | Madhya Pradesh | 2005 |
| 7 | IG02-411 | IC-401286 | Amha | Umarea | Madhya Pradesh | 2005 |
| 8 | IG02-412 | IC-401287 | Karahia | Umarea | Madhya Pradesh | 2005 |
| 9 | IG02-416 | IC-401291 | Jhikani | Sagar | Madhya Pradesh | 2005 |
| 10 | IG02-423 | IC-401298 | Jhikani | Sagar | Madhya Pradesh | 2005 |
| 11 | IG02-420 | IC-401295 | Jhikani | Sagar | Madhya Pradesh | 2005 |
| 12 | IG02-419 | IC-401294 | Jhikani | Sagar | Madhya Pradesh | 2005 |
| 13 | IG02-422 | IC-401297 | Jhikani | Sagar | Madhya Pradesh | 2005 |
| 14 | IG03-424 | IC-401299 | Pali | Sagar | Madhya Pradesh | 2005 |
| 15 | IG02-386 | IC-401261 | Rajapur | Mirzapur | Uttar Pradesh | 2005 |
| 16 | IG02-385 | IC-401260 | Bhasour | Mirzapur | Uttar Pradesh | 2005 |
| 17 | IG02-383 | IC-401258 | Lahuria | Mirzapur | Uttar Pradesh | 2005 |
| 18 | IG02-396 | IC-401271 | Kanchannagar | Sarguja | ChhattisGarh | 2005 |
| 19 | IG02-431 | IC-401306 | Narahat | Lalitpur | Uttar Pradesh | 2005 |
| 20 | IG02-429 | IC-401304 | Grahanth | Sagar | Madhya Pradesh | 2005 |
| 21 | IG02-434 | IC-401309 | Batna | Lalitpur | Uttar Pradesh | 2005 |
| 22 | IG02-440 | IC-401315 | Kumrol | Lalitpur | Uttar Pradesh | 2005 |
| 23 | IG02-441 | IC-401316 | Kumrol | Lalitpur | Uttar Pradesh | 2005 |
| 24 | IG02-442 | IC-401317 | Kumrol | Lalitpur | Uttar Pradesh | 2005 |
| 25 | IG02-439 | IC-401314 | Mangaria | Lalitpur | Uttar Pradesh | 2005 |
| 26 | IG02-443 | IC-401318 | Lahuria | Mirzapur | Uttar Pradesh | 2005 |
| 27 | IG02-437 | IC-401312 | Batna | Lalitpur | Uttar Pradesh | 2005 |
| 28 | IG02-438 | IC-401313 | Mangaria | Lalitpur | Uttar Pradesh | 2005 |
| 29 | IG02-435 | IC-401310 | Batna | Lalitpur | Uttar Pradesh | 2005 |
| 30 | IG02-376 | IC-401251 | Bhasour | Mirzapur | UttarPradesh | 2005 |
| 31 | IG02-379 | IC-401254 | Lahuria | Mirzapur | Uttar Pradesh | 2005 |
| 32 | IG02-389 | IC-401264 | Basava | Sonbhadra | Uttar Pradesh | 2005 |
| 33 | IG02-381 | IC-401256 | Lahuria | Mirzapur | Uttar Pradesh | 2005 |
| 34 | IG03-340 | IC471364 | Narsinghapurum | Coimbatore | Tamil Nadu | 2003 |
| 35 | IG01-450 | IC-355487 | Sumarakhedi | Dewas | Madhya Pradesh | 2005 |
| 36 | IG01-437 | IC-355475 | Relai | Rajgarh | Madhya Pradesh | 2005 |
| 37 | IG01-440 | IC-355478 | Jaipura | Rajgarh | Madhya Pradesh | 2005 |
| 38 | IG01-436 | IC-355474 | Relai | Rajgarh | Madhya Pradesh | 2005 |
| 39 | IG01-466 | IC-355499 | Chhupair | Sagar | Madhya Pradesh | 2003 |
| 40 | IG03-313 | IC 470763 | Patara | Hamirpur | Madhya Pradesh | 2003 |
| 41 | IG01-431 | IC-355469 | Dehrka | Shivpuri | Madhya Pradesh | 2003 |
| 42 | IG03-325 | IC 470775 | Bendaghat | Banda | Uttar Pradesh | 2003 |
| 43 | IG03-318 | IC 470768 | Bakewar | Fatehpur | Uttar Pradesh | 2003 |
| 44 | IG03-315 | IC 470765 | Ghatampur | Kanpur rural | Uttar Pradesh | 2003 |
| 45 | IG03-327 | IC 470777 | Bhuraghat | Banda | Uttar Pradesh | 2003 |
| 46 | IG03-328 | IC 470778 | Maudaha | Mahoba | Uttar Pradesh | 2003 |
| 47 | IG02-444 | IC-401319 | Lahuria | Mirzapur | Uttar Pradesh | 2005 |
| 48 | IG02-508 | IC-401602 | Mataund | Banda | Uttar Pradesh | 2005 |
| 49 | IG02-502 | IC-401596 | Rebai | Mahoba | Uttar Pradesh | 2005 |
| 50 | IG02-504 | IC-401598 | Rebai | Mahoba | Uttar Pradesh | 2005 |
| 51 | IG02-510 | IC-401604 | Kharada | Banda | Uttar Pradesh | 2005 |
| 52 | IG02-501 | IC-401595 | Rebai | Mahoba | Uttar Pradesh | 2005 |
| 53 | IG02-509 | IC-401603 | Kharada | Banda | Uttar Pradesh | 2005 |
| 54 | IG02-503 | IC-401597 | Rebai | Mahoba | Uttar Pradesh | 2005 |
| 55 | IG01-482 | IC-355511 | Piparia | Hosangabad | Madhya Pradesh | 2002 |
| 56 | IG01-467 | IC-355500 | Sasan | Sagar | Madhya Pradesh | 2003 |
| 57 | IG01-528 | IC-355518 | Piparia | Hosangabad | Madhya Pradesh | 2002 |

**Supplementary Table 1(b): The list of exotic collections of forage sorghum germplasm**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sr. No** | **EC Number** | **Column** | **Country** | **Year** |
| 1 | EC 507787 | CFSH-52 | Canada | 2005 |
| 2 | EC 512449 | CHMS-105 | Canada | 2005 |
| 3 | EC 512444 | CHMS-100 | Canada | 2005 |
| 4 | EC 512452 | CHMS-107 | Canada | 2005 |
| 5 | EC 512434 | CHMS-89 | Canada | 2005 |
| 6 | EC 512437 | CHMS-93 | Canada | 2005 |
| 7 | EC 512461 | CHMS-116 | Canada | 2005 |
| 8 | EC 512455 | CHMS-110 | Canada | 2005 |
| 9 | EC 512458 | CHMS-113 | Canada | 2005 |
| 10 | EC 512457 | CHMS-112 | Canada | 2005 |
| 11 | EC 512459 | CHMS-114 | Canada | 2005 |
| 12 | EC 512453 | CHMS-108 | Canada | 2005 |
| 13 | EC 507831 | CFSH-98 | Canada | 2005 |
| 14 | EC 507820 | CFSH-86 | Canada | 2005 |
| 15 | EC 507816 | CFSH-82 | Canada | 2005 |
| 16 | EC 507815 | CFSH-80 | Canada | 2005 |
| 17 | EC 507822 | CFSH-88 | Canada | 2005 |
| 18 | EC 507829 | CFSH-96 | Canada | 2005 |
| 19 | EC 507827 | CFSH-94 | Canada | 2005 |
| 20 | EC 507801 | CFSH-65 | Canada | 2005 |
| 21 | EC 512393 | CHMS-45 | Canada | 2005 |
| 22 | EC 512394 | CHMS-46 | Canada | 2005 |
| 23 | EC 512388 | CHMS-40 | Canada | 2005 |
| 24 | EC 512389 | CHMS-41 | Canada | 2005 |
| 25 | EC 512402 | CHMS-55 | Canada | 2005 |
| 26 | EC 512396 | CHMS-49 | Canada | 2005 |
| 27 | EC 512404 | CHMS-57 | Canada | 2005 |
| 28 | EC 512395 | CHMS-47 | Canada | 2005 |
| 29 | EC 512397 | CHMS-50 | Canada | 2005 |
| 30 | EC 512403 | CHMS-56 | Canada | 2005 |
| 31 | EC 512399 | CHMS-52 | Canada | 2005 |
| 32 | EC 512401 | CHMS-53 | Canada | 2005 |
| 33 | EC 512405 | CHMS-58 | Canada | 2005 |
| 34 | EC 512406 | CHMS-59 | Canada | 2005 |
| 35 | EC 512432 | CHMS-86 | Canada | 2005 |
| 36 | EC 512431 | CHMS-85 | Canada | 2005 |
| 37 | EC 512430 | CHMS-84 | Canada | 2005 |
| 38 | EC 512428 | CHMS-82 | Canada | 2005 |
| 39 | EC 512429 | CHMS-83 | Canada | 2005 |
| 40 | EC 512425 | CHMS-80 | Canada | 2005 |
| 41 | EC 512433 | CHMS-87 | Canada | 2005 |
| 42 | EC 512414 | CHMS-70 | Canada | 2005 |
| 43 | EC 512379 | CHMS-32 | Canada | 2005 |
| 44 | EC 507875 | CHMS-4 | Canada | 2005 |
| 45 | EC 507874 | CHMS-3 | Canada | 2005 |
| 46 | EC 512364 | CHMS-17 | Canada | 2005 |
| 47 | EC 507862 | CFSH-4 | Canada | 2005 |
| 48 | EC 507796 | CFSH-60 | Canada | 2005 |

**Supplementary Table 2: Correlation coefficient among 13 quantitative traits of 108 sorghum genotypes.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Traits | DTF | PH | NLP | LL | LW | PL | SG | LWP | SWP | LSR | DTM | GFY | DMY |
| DF | 1 |  |  |  |  |  |  |  |  |  |  |  |  |
| PHT | 0.169 | 1 |  |  |  |  |  |  |  |  |  |  |  |
| NLP | 0.328\*\* | 0.677\*\* | 1 |  |  |  |  |  |  |  |  |  |  |
| LL | 0.089 | 0.485\*\* | 0.472\*\* | 1 |  |  |  |  |  |  |  |  |  |
| LW | 0.045 | 0.592\*\* | 0.629\*\* | 0.628\*\* | 1 |  |  |  |  |  |  |  |  |
| PL | -0.236 | 0.146 | -0.033 | 0.004 | -0.177 | 1 |  |  |  |  |  |  |  |
| SG | 0.225\* | 0.598\*\* | 0.794\*\* | 0.528\*\* | 0.681\*\* | 0.031 | 1 |  |  |  |  |  |  |
| LWP | 0.090 | 0.610\*\* | 0.739\*\* | 0.631\*\* | 0.839\*\* | 0.017 | 0.821\*\* | 1 |  |  |  |  |  |
| SWP | 0.068 | 0.650\*\* | 0.746\*\* | 0.590\*\* | 0.767\*\* | 0.115 | 0.828\*\* | 0.950\*\* | 1 |  |  |  |  |
| LSR | 0.129 | -0.130 | -0.014 | 0.153 | 0.181 | -0.396 | -0.059 | 0.099 | -0.168 | 1 |  |  |  |
| DM | 0.868\*\* | 0.148 | 0.359\*\* | 0.082 | 0.130 | -0.243 | 0.279\*\* | 0.129 | 0.101 | 0.156 | 1 |  |  |
| GFY | 0.074 | 0.647\*\* | 0.750\*\* | 0.599\*\* | 0.784\*\* | 0.099 | 0.834\*\* | 0.965\*\* | 0.999\*\* | -0.124 | 0.108 | 1 |  |
| DMT | 0.145 | 0.588\*\* | 0.683\*\* | 0.567\*\* | 0.751\*\* | -0.014 | 0.744\*\* | 0.830\*\* | 0.833\*\* | -0.075 | 0.173 | 0.838\*\* | 1 |

DTF=Days to 50% flowering; PH= Plant height; NLP=Number of leaves per plant; LW- Leaf width; PL=Panicle length; SG=Stem girth; LWP=leaf weight per plant; SWP=Stem weight per plant; LSR=Leaf:stem ratio; DTM=Days to maturity; GFY=Green fodder yield; DMY=Dry matter yield. \*\*,\*\*\* Significant at the 5 and 1% levels respectively.

**Supplementary Table 3: Eigenvectors for the first three components of qualitatively and quantitatively measured traits in 108 sorghum accessions**

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | PC 1 | PC 2 | PC 3 |
| DTF | 0.216 | -0.845 | **0.393** |
| PH | 0.743 | 0.075 | 0.197 |
| NLP | **0.847** | -0.163 | 0.154 |
| LL | 0.688 | 0.027 | -0.262 |
| LW | **0.851** | -0.002 | -0.340 |
| PL | 0.010 | **0.584** | **0.536** |
| SG | **0.888** | -0.033 | 0.105 |
| LWP | **0.950** | 0.083 | -0.153 |
| SWP | **0.947** | **0.196** | 0.053 |
| LSR | -0.015 | -0.472 | -0.721 |
| DTM | 0.254 | -0.850 | **0.354** |
| GFY | **0.954** | **0.176** | 0.020 |
| DMY | **0.881** | 0.053 | -0.018 |
| **Total variance explained** | **52.715** | **16.245** | **10.543** |

DTF=Days to 50% flowering; PH= Plant height; NLP=Number of leaves per plant; LW- Leaf width; PL=Panicle length; SG=Stem girth; LWP=leaf weight per plant; SWP=Stem weight per plant; LSR=Leaf:stem ratio; DTM=Days to maturity; GFY=Green fodder yield; DMY=Dry matter yield

**Supplementary Table 4: Grouping of sorghum germplasm based on disease reaction under natural epiphytic condition during two wet seasons of 2019 and 2020.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Highly Resistant**  **(Score 1)** | **Resistant**  **(Score 2 to 3)** | **Moderately**  **Resistant**  **(Score 4 to 5)** | **Susceptible**  **(Score 6 to 7)** | **Highly**  **Susceptible**  **(Score >7)** |
| **0** | EC512397  EC512393  EC512394  EC512399  IG-02-437 | EC507787, EC512437, EC512459, EC512388, EC512402, EC512396, EC512404, EC512403, EC512401, EC512405, EC512432, EC512431, EC512430, EC512406, EC512428, EC 12429, EC512425, EC512414, IG02-406, IG02-396,  IG02-435, IG02-379,  IG02-381, IG02-444,  IG02-508, IG02-501 | EC512452, EC512434, EC512461,  EC 512455, EC 512458, EC512453,  EC 507831, EC507820, EC 507816,  EC507815, EC507827, EC507801,  EC512389, EC512395, EC512433,  EC512379, EC507875, EC507874,  EC512364, EC507862, IG02-407,  IG02-410, IG02-411, IG02-412,  IG02-416, IG02-420, IG02-419,  IG02-386, IG02-385, IG02-383,  IG02-431, IG02-434, IG02-440,  IG02-441, IG02-442, IG02-439,  IG02-443, IG02-438, IG02-376,  IG02-389, IG03-340, IG01-450,  IG01-440, IG01-436, IG01-466,  IG01-431, IG03-318, IG03-327,  IG03-328, IG02-502, IG02-504,  IG02-510, IG02-509, IG02-503,  IG01-482, IG01-528 | EC512449  EC512444 EC512457 EC507822 EC507829 EC507796  IG02-391 IG02-387 IG02-415 IG02-423 IG02-422 IG02-424 IG01-437 IG03-313 IG03-325 IG03-315 IG01-467 IG02-429  MP Chari |