**iii) Confirmation of drought tolerance of genotypes with good root traits** (1st year)

 12 genotypes (9 with good, 1 with poor root growth along with 48-1, DCH-519 checks ) were sown during Nov, 2015, to select germplasm lines for drought tolerance. Drought stress was imposed from 30-90DAS.

Table 1: Crop growth before relieving stress (per plant)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Treatment** | **Plant height****(cm)** | **leaf no.** | **Stem girth** **(cm)** | **Sec. Br.** **No.** | **Tert.Br.** **No.** |
| **Control** | 92.2 | 20 | 20.96 | 2 | 3 |
| **stress** | 55.7 | 10 | 14.53 | 1 | 0 |
| **mean**  | **74.0** | **15** | **17.7** | **2** | **1** |
| **Treatment** | **leaf area** **(dm2)** | **TDM** **g)** | **bloom** **(μg/cm2)** | **SLA(dm2/g)** | **RWC (%)** |
| **control** | 21.63 | 103.8 | 216.5 | 1.523 | 80.67 |
| **stress** | 17.19 | 54.6 | 208.6 | 1.324 | 82.92 |
| **mean**  | **19.4** | **79.2** | **212.6** | **1.423** | **81.8** |

Data recorded just before relieving stress shows significant reduction in crop growth viz: plant height, leaf no., branch production and TDM (Table 1a). Relative water content (RWC) increased, specific leaf area (SLA) decreased, no difference in bloom content in leaves with drought stress.

Table 1b : Spike characters of different order branches at harvest (**per plant**)

|  |
| --- |
| **Primary spike characters**  |
|  | **days to harvesting** |  | **ESL cm)** | **cap no.** | **sp+cap wt (g)** | **seed wt (g)** | **test wt (g)** |
| **control** | 105 |  | 30.0 | 48 | 59.9 | 31.6 | 27.54 |
| **mean**  | **103** |  | **24.4** | **40.3** | **46.6** | **24.9** | **26.0** |
| **Secondary spike characters** |
|  | **days to harvesting** | **sp. No.** | **ESL(cm)** | **cap no.** | **sp+cap wt (g)** | **seed** **wt (g)** | **test wt (g)** |
| **control** | 124 | 3 | 14.3 | 21 | 55.5 | 29.6 | 25.05 |
| **stress** | 141 | 2 | 12.3 | 16 | 30.2 | 15.5 | 23.53 |
| **mean**  | **132** | **2** | **13.3** | **18.4** | **42.8** | **22.6** | **24.29** |
| **Tertiary spike characters** |
|  | **days to harvesting** | **sp. No.** | **ESL(cm)** | **cap no** | **sp+cap wt (g)** | **seed wt(g)**  | **test wt (g)** |
| **control** | 162 | 2 | 9.7 | 18 | 41.3 | 23.8 | 21.59 |
| **stress** | 165 | 2 | 9.5 | 10 | 33.5 | 18.5 | 21.11 |
| **mean**  | **164** | **2** | **9.6** | **14** | **37.4** | **21.2** | **21.35** |

Days to harvesting of primary spike was less but that of secondary and tertiary orders was more in stress treatment as the branches produced only after relieving stress in drought stressed plots. Spike number, effective spike length, capsule number per spike of different orders reduced with drought stress. There was reduction in spike weight, seed weight and test weight of different spike orders due to water stress (Table 1b)

Genotypes with less % reduction (<30%) in total seed yield with drought stress include RG 373, RG 1582 (Table 2) and RG 272, RG 289, RG 373, RG 1582, RG 1759 recorded good seed yield even in stress (>50g/pl.). RG 272, RG 289, RG 373, RG 1582, RG 1667, RG 1759 and RG 1963 showed low DSI (<1.0). As there was water scarcity, very limited irrigations with less quantity of water were given even to control plots, so most of the genotypes recorded low DSI values.

Table 2: Total seed yield of different genotypes with drought stress

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S.No.** | **Genotypes** | **Total Seed Yield (g/pl.)** | **% reduction in seed yield** | **DSI** |
| **control** | **stress** |
|  | With Good root |  |  |  |  |
| 1 | RG 272 | 87.8 | 57.2 | 34.8 | 0.78 |
| 2 | RG 289 | 87.3 | 51.6 | 40.8 | 0.92 |
| 3 | RG 373 | 77.7 | 73.5 | 5.4 | 0.12 |
| 4 | RG 2058 | 100.0 | 42.6 | 57.4 | 1.29 |
| 5 | RG 1582 | 81.2 | 57.4 | 29.3 | 0.66 |
| 6 | RG 1667 | 70.0 | 44.5 | 36.4 | 0.82 |
| 7 | RG 1759 | 92.8 | 52.2 | 43.7 | 0.98 |
| 8 | RG 1922 | 57.6 | 29.3 | 49.2 | 1.10 |
| 9 | RG 1963 | 45.3 | 31.0 | 31.6 | 0.71 |
|  | With Poor root |  |  |  |  |
| 10 | RG 1520 | 79.7 | 37.8 | 52.7 | 1.18 |
| 11 | 48-1 (C) | 104.8 | 31.3 | 70.2 | 1.58 |
| 12 | DCH 519 (C) | 112.5 | 45.2 | 59.8 | 1.34 |
|  | mean | **83.1** | **46.1** | **42.6** |  |