**Supplementary Material**

**Table S1: Weather data of experimental sites during the course of study**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Locations / Months** | **Multan** | | | | **Vehari** | | | |
| Mean temp (°C) | Mean RH (%) | Total rainfall (mm) | Mean sunshine hours | Mean temp (°C) | Mean RH (%) | Total rainfall (mm) | Mean sunshine hours |
| November 2011 | 21.47 | 75.84 | 0.00 | 6.91 | 20.98 | 76.32 | 0.00 | 7.01 |
| December 2011 | 14.50 | 71.53 | 0.00 | 6.75 | 15.21 | 72.17 | 1.24 | 6.67 |
| January 2012 | 12.22 | 77.79 | 15.00 | 6.43 | 12.13 | 80.16 | 19.57 | 6.32 |
| February 2012 | 13.70 | 63.85 | 0.00 | 7.19 | 13.21 | 67.73 | 0.00 | 7.28 |
| March 2012 | 20.65 | 55.13 | 0.00 | 6.72 | 19.91 | 56.17 | 0.87 | 6.88 |
| April 2012 | 26.70 | 63.92 | 24.72 | 8.23 | 25.87 | 64.67 | 32.17 | 8.19 |
| May 2012 | 32.55 | 55.85 | 1.10 | 8.54 | 32.05 | 57.47 | 2.22 | 8.36 |
| June 2012 | 34.00 | 61.15 | 0.00 | 8.19 | 34.41 | 60.12 | 0.00 | 7.73 |
| July 2012 | 33.46 | 66.64 | 16.92 | 7.81 | 32.95 | 67.27 | 17.75 | 7.67 |
| August 2012 | 31.80 | 74.16 | 10.94 | 7.09 | 30.13 | 73.79 | 19.92 | 7.01 |
| September 2012 | 29.40 | 85.55 | 167.17 | 7.03 | 29.58 | 85.05 | 193.65 | 6.97 |
| October 2012 | 25.30 | 72.59 | 3.22 | 8.33 | 26.18 | 74.14 | 0.00 | 8.54 |
| November 2012 | 19.95 | 84.17 | 0.00 | 6.11 | 19.11 | 83.76 | 0.00 | 7.49 |
| December 2012 | 14.85 | 83.52 | 4.00 | 6.12 | 14.29 | 82.19 | 5.19 | 6.68 |
| January 2013 | 12.35 | 80.45 | 0.00 | 5.62 | 12.98 | 79.91 | 0.00 | 5.74 |
| February 2013 | 16.00 | 87.37 | 72.93 | 5.74 | 15.87 | 87.12 | 89.32 | 5.91 |
| March 2013 | 22.00 | 75.65 | 16.73 | 8.43 | 21.76 | 74.64 | 12.98 | 7.96 |
| April 2013 | 26.95 | 60.95 | 1.33 | 7.78 | 26.11 | 62.12 | 0.00 | 8.11 |
| May 2013 | 32.90 | 54.92 | 0.00 | 9.86 | 33.98 | 55.47 | 0.00 | 7.92 |
| June 2013 | 34.06 | 67.85 | 50.70 | 8.19 | 34.45 | 64.53 | 63.11 | 8.28 |
| July 2013 | 33.97 | 64.51 | 16.91 | 7.92 | 33.23 | 65.44 | 0.00 | 8.18 |
| August 2013 | 31.55 | 72.22 | 74.23 | 7.17 | 31.23 | 73.32 | 3.21 | 7.27 |
| September 2013 | 30.90 | 61.87 | 3.22 | 7.87 | 31.02 | 63.33 | 7.54 | 7.86 |
| October 2013 | 28.75 | 71.82 | 2.19 | 8.11 | 28.13 | 72.65 | 0.00 | 8.19 |

**Table S2. Analysis of variance for the influence of years, locations and planting system on yield and related traits of wheat**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Source of variation** | **Mean Sum of squares** | | | | | |
| **Productive tillers** | **Spike length** | **Grains per spike** | **1000-grain weight** | **Grain yield** | **Straw yield** |
| Replications | 451.2 | 0.14 | 1.10 | 2.63 | 4583 | 169067 |
| Year (Y) | 120.1 NS | 0.06NS | 3.79 NS | 0.08NS | 736404\* | 2589841\* |
| Error1 | 77.6 | 0.07 | 0.50 | 0.80 | 472 | 161998 |
| Location (L) | 669.9 NS | 0.42\* | 93.18\*\* | 12.80NS | 18825\* | 910591\* |
| Y × L | 19.2 NS | 0.01 NS | 3.67\* | 0.54 NS | 19179\* | 772141\* |
| Error2 | 786.2 | 0.06 | 0.70 | 2.15 | 6792 | 72845.8 |
| Planting system (S) | 4966.1\*\* | 2.11\*\* | 40.82\*\* | 48.37\*\* | 970598\*\* | 4693602\*\* |
| Y ×S | 210.0 NS | 0.11 NS | 1.68 NS | 4.09 NS | 138816\*\* | 1789126\* |
| L × S | 91.7 NS | 0.05 NS | 4.28\* | 0.99 NS | 37555\* | 465949 NS |
| Y × L × S | 44.5 NS | 0.66 NS | 1.92 NS | 1.28 NS | 26248NS | 331722 NS |
| Error3 | 3693.7 | 1.39 | 8.97 | 35.75 | 95851 | 2302647 |

NS = Non-significant; \* = Significant at p≤0.05; \*\* = Significant at p≤0.01

**Table S3.** **Analysis of variance for the influence of years, locations and cropping systems on yield and related traits of cotton**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Source of variation** | **Sum of squares** | | | | | |
| **Monopodial branches** | **Sympodial branches** | **Number of bolls** | **Boll weight** | **Seed cotton yield** | **Lint yield** |
| Replications | 0.01 | 0.71 | 0.04 | 0.003 | 2538.78 | 2672 |
| Year (Y) | 9.185E-34 NS | 217.71\* | 9.61\* | 0.11 | 816376\* | 117820\* |
| Error1 | 0.01 | 0.11 | 0.06 | 0.008 | 2806.97 | 1461 |
| Location (L) | 0.03\* | 24.97\* | 12.92\*\* | 0.20\*\* | 434814\*\* | 37179\* |
| Y × L | 5.556E-04 NS | 2.00NS | 0.01 NS | 0.016\* | 36044.8\* | 12748\* |
| Error2 | 0.01 | 1.98 | 0.14 | 0.005 | 3384.65 | 5113 |
| Cropping system (S) | 1.81\*\* | 944.29\*\* | 2158.05\*\* | 4.441\*\* | 1.434E+07\*\* | 3759904\*\* |
| Y ×S | 0.05\* | 100.67\*\* | 30.34\*\* | 0.071\*\* | 131623\*\* | 8002NS |
| L × S | 0.01 NS | 5.81\* | 0.71 NS | 0.007NS | 64465.8\*\* | 2369 NS |
| Y × S × L | 0.01 NS | 2.50 NS | 4.60\* | 0.009 | 62735.7\*\* | 4954 NS |
| Error3 | 0.17 | 13.08 | 6.22 | 0.034 | 55505.8 | 43683 |

NS = Non-significant; \* = Significant at p≤0.05; \*\* = Significant at p≤0.01