

**Fig. S1.** Soil water potential of the reference management (M1) along the growing season for four upland rice cultivars at three measured depths. A, BRS A501 CL; B, BRS Esmeralda; C, BRS Serra Dourada; D, Rio Paraguai.

**Table S1.** Description of upland rice cultivars used in this trial.

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| **Cultivar** | **Year released/origin** | **Description** |
| BRS A501 CL | 2018/BASF-EMBRAPA | Long grain, mid-season clearfield variety, tolerant to Kifix herbicide, flowering at 77 days, plant height of 107 cm. |
| BRS Esmeralda | 2012/EMBRAPA | Long grain, mid-season conventional variety, flowering at 77 days, camping-resistant, pant height of 103 cm. |
| BRS Serra Dourada | 2009/EMBRAPA | Long grain, mid-season conventional variety, flowering at 76 days, *Pyricularia oryzae* resistant, plant height of 98 cm. |
| Rio Paraguai | 1992/EMBRAPA | Long grain, mid-season conventional variety, flowering at 84 days, hardiness to common diseases, plant height of 114 cm. |

EMBRAPA, Empresa Brasileira de Pesquisa Agropecuária; BASF, Badische Anilin & Soda Fabrik.

**Table S2.** Description of water stress management for the upland rice cultivars.

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| **Irrigation management** | **Cultivar** | **Imposition of water stress (days after emergence)** | **Stress period (days)** |
| M2-M3 | BRS A501 CL | 77-95 | 18 |
|  | BRS Esmeralda | 76-93 | 17 |
|  | BRS Serra Dourada | 71-88 | 17 |
|  | Rio Paraguai | 91-110 | 19 |
| M4-M5 | BRS A501 CL | 96-110 | 14 |
|  | BRS Esmeralda | 93-107 | 14 |
|  | BRS Serra Dourada | 89-103 | 14 |
|  | Rio Paraguai | 111-126 | 15 |

M2, 70% of the RM at the flowering stage; M3, 40% of the RM at the flowering stage; M4, 70 % of the RM at the grain-filling stage; M5, 40 % of the RM at the grain-filling stage. RM, 100% of the field capacity.

**Table S3.** Analysis of variance (F-values) for physiological traits among irrigation managements and cultivars.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Source of variation** | **df** | **A** | **gs** | **E** | **iWUE** | **LWP** | **CWSI** | **Chlorophyll index** |
| Developmental stage (T) | 1 | 17.99\* | 1.59ns | 0.27ns | 0.08ns | 0.25ns | 5.19ns | 8.63\*\* |
| Irrigation management(M) | 4 | 64.7\*\* | 13.52\*\* | 32.70\*\* | 6.89\*\* | 29.32\*\* | 3.79\*\* | 2.69\* |
| Cultivar (C) | 3 | 17.17\*\* | 6.42\*\* | 8.12\*\* | 2.96\* | 7.00\*\* | 10.91\*\* | 113.28\*\* |
| T x M | 4 | 211.57\*\* | 65.91\*\* | 144.29\*\* | 17.74\*\* | 21.68\*\* | 38.23\*\* | 2.22ns |
| T x C | 3 | 6.51\*\* | 7.61\*\* | 26.97\*\* | 9.06\*\* | 1.89ns | 23.33\*\* | 0.77ns |
| M x C | 12 | 3.88\*\* | 1.37ns | 1.91\* | 1.35ns | 2.61\*\* | 1.39ns | 1.85\* |

Degrees of freedom, df; net photosynthesis rate, A; stomatal conductance, gs; transpiration, E; intrinsic water use efficiency, iWUE; leaf water potential, LWP; and crop water stress index, CWSI. \*Significant at the 0.05 probability level. \*\*Significant at the 0.01 probability level. nsNo significant.

**Table S4.** Analysis of variance (F-values) for grain yield, yield components and water use efficiency and harvest index among irrigation managements and cultivars.

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| --- | --- | --- | --- | --- | --- | --- |
| **Source of variation** | **df** | **SPN** | **FG** | **TGW** | **GY** | **WUE** |
| **Irrigation management (M)** | 4 | 14.6\*\* | 39.8\*\* | 17.6\*\* | 66.2\*\* | 59.1\*\* |
| **Cultivar (C)** | 3 | 30.0\*\* | 23.8\*\* | 96.1\*\* | 38.1\*\* | 54.9\*\* |
| **M x C** | 12 | 0.6ns | 2.0\* | 2.1\* | 2.0\* | 2.4\* |

Degrees of freedom, df; panicles per plant, PP; spikelets per panicle, SPN; filled grain percentage, FG; 1000-grain weight, TGW; grain yield, GY; water use efficiency, WUE. \*Significant at the 0.05 probability level. \*\*Significant at the 0.01 probability level. nsNo significant.