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Emergence of 'Strawhull' Red Rice Ecotypes from Various Soil and Water Depths

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Two field plot experiments were conducted on a Sharkey clay at Rohwer and a Crowley silt loam at Stuttgart to study emergence of 'strawhull' red rice ecotypes from Arkansas (AR), Louisiana (LA) and Mississippi (MS) to different initial water levels and soil depths under water-seeded rice conditions.

In experiment I, 'strawhull' red rice ecotypes from AR, LA, MS and the Alan variety were germinated under 0, 5, 10 and 15 cm of initial water level. The laboratory germination test for AR, LA, MS and rice was 93, 100, 95 and 90% at 25°C, respectively. Metal frames of 76 x 76 cm were used and the red rice seeds were seeded on the soil surface before flooding and pregerminated rice seeds put into the water. A split-plot design was used in a RCB with three replications. The main plot was water level and the subplot either red rice ecotypes or rice. Experiment I was seeded on June 3 and repeated on July 18 at Rohwer and June 2 and August 3 at Stuttgart, respectively. In the experiment II, red rice ecotypes at seeding depths of 0 and 2.5 cm in soil were compared in a 10 cm water depth. Rice was pregerminated in an incubator at 25°C and planted into the water at the soil surface only. Experiment II was seeded on June 2 and July 21 at Stuttgart. The plots were drained 5 days after the initial flooding and pinpoint water management was used. Each subplot consisted of a plastic pot of 20 x 18 x 13 cm of red rice free soil and buried until its edge was even with the soil surface. Ten seeds per each red rice ecotype and rice was seeded in each pot. Emergence was recorded at 7 and 14 days after planting (DAP).

In The June 3 planting of Experiment I at Rohwer, AR, LA and MS red rice ecotypes and rice emerged 62, 83, 86, and 69 % at 7DAP, and 65, 87, 90 and 58% at 14 DAP across water depths, respectively. Main effect of water depths of 0, 5, 10 and 15 cm allowed 79, 79, 70 and 72% of seeds emergence at 7 DAP, and 78, 80, 72 and 69% at 14 DAP, respectively. In the June 2 planting at Stuttgart, average emergence across water depths of 53, 81, 68 and 66% at 7 DAP, and 46, 81, 69 and 49% at 14 DAP was obtained from AR, LA and MS red rice ecotypes and rice, respectively. Main effects of water depths gave 67, 63, 73 and 65% at 7 DAP, and 63, 65, 62 and 56% at 14 DAP by 0, 5, 10 and 15 cm, respectively. In the July 18 planting at Rohwer, the seeds of AR, LA and MS red rice ecotypes and rice emerged 63, 95, 95 and 87% at 7 DAP, and 38, 77, 76 and 52% at 14 DAP across water depths, respectively. The main effect of water depths of 0, 5, 10 and 15 cm on emergence was 81, 87, 90 and 81% at 7 DAP, and 55, 57, 74 and 66% at 14 DAP. At Stuttgart in the August 3 planting of Experiment I, emergence for the AR, LA and MS red rice ecotypes and rice averaged across water depths was 66, 93, 86 and 78% at 7 DAP, and 40, 68, 73 and 81% at 14 DAP, respectively. The main effect of water depths on emergence was 71, 86, 88 and 77% at 7 DAP, and 64, 58, 70 and 71 % at 14 DAP for 0, 5, 10 and 15 cm, respectively. In the experiment II, when red rice seeds and rice were on the surface average emergence was 37, 63, 57 and 47% in the June 2 planting, and 67, 90, 87 and 67% in the July 21 planting at 7 DAP for AR, LA and MS red rice ecotypes and rice, respectively. At 14 DAP, emergence of 30, 50, 57 and 33% was obtained in the June 2 planting, and 67, 87, 87 and 60% in the July 21 planting for AR, LA and MS ecotypes and Alan. There was no emergence of red rice seeds from 2.5 cm soil depth at 7 DAP. In the June 2 planting, there was no emergence of any red rice ecotypes from the 2.5 cm of soil depth at 14 DAP, while in the July 21 planting red rice emerged 20, 37 and 10 % for AR, LA and MS ecotypes, respectively.