

Temperature-dependent Germination Rates Among Several California

Accessions of *Echinochloa colona*. Alex Ceseski¹, Lynn Sosnoskie PhD¹, Sarah Morran PhD¹, Brad Hanson PhD¹ ¹University of California, Davis

The purpose of this study was to determine how temperature affects the germination of junglerice (*Echinochloa colona*) from the Central Valley of California. Seeds from six junglerice accessions (A3, A8, C6 all from the Sacramento Valley and H5, L2, SV2 from the San Joaquin Valley), were scarified in concentrated sulfuric acid for 30 minutes; 50 seeds of each biotype were placed in Petri dishes containing 7.0mL of 0.2% Captan fungicide solution. The trials were conducted in two growth chambers with temperatures ranging from 15°C to 40°C, and set to a 16/8-hour light/dark cycle and 50% RH. The Petri dishes were held in nested cardboard flats to exclude intense, direct light and minimize desiccation potential.

Seeds were monitored, daily, until germination slowed to <1 seedling in three days or until all seeds had germinated. A seed was considered germinated when the emerged radicle was as long as the seed coat, about 2mm; germinated seeds were counted and then discarded at each observation point. The 20°C trial was run concurrently with the 15°C trial, so it was not terminated until the 15°C trial was. The 25°C, 30°C, 35°C, and 40°C trials were terminated at 10 days after plating. Each biotype was replicated four times per temperature, with a total of 24 petri dishes per temperature.

The rate of germination increased with increased temperature. At 15°C, 50% germination was achieved in a timespan ranging from 5 days after plating (SV2) to 37 days after plating (L2). At 20°C, 50% germination was achieved 2 to 4 days after plating for all biotypes. At 25°C, 30°C, and 35°C, 50% germination had occurred by 2 days after plating. At 40°C, all biotypes but SV2 reached 50% germination by 3 days after plating; SV2 reached 50% at 4 days. With the exception of SV2 at 35°C and 40°C, and L2 at all temperatures, maximum germination percentages ranged from 84% to 98% and were achieved in as soon as 3 days after plating (30° & 35°C) and as long as 49 days after plating (15°C). The least amount of germination occurred with accession L2; maximum germination for L2 ranged from 59% to 76%. Total germination percentages for SV2 were 94%, 97%, 96%, 92%, 71% and 67% at 15°C, 20°C, 25°C, 30°C, 35°C, and 40°C, respectively. It is unknown if the reductions in germination in SV2 at higher temperatures were the result of maternal factors affecting seed development/maturation, differences in seed dormancy mechanisms, or seed injury in response to scarification.

All of the temperature treatments will be evaluated at least twice more. With future data and analysis we hope to provide an adequate profile on junglerice germination potentials under different environmental conditions, which will further our ability to describe the species' invasion potential.