

Effect of high temperature and soil moisture on seed germination of four summer weeds

Sudheesh Manalil and Bhagirath S. Chauhan

The Centre for Crop Science, Queensland Alliance for Agriculture and Food Innovation (QAAFI),
The University of Queensland, Gatton, Queensland 4343, Australia
(s.manalil@uq.edu.au)

Summary Heat waves are increasingly common in Australia and may affect the germination of weeds. The effect of elevated temperature on bladder ketmia, sesbania pea, button grass and windmill grass was assessed in a factorial experiment (with three replications) with four levels of temperature (ambient, 45, 55 and 65°C), two levels of soil moisture (dry and 50% field capacity) and two burial depths (surface and 2 cm). Thirty seeds of two populations of each weed species from high and medium rainfall regions of Queensland were used in this study. Soil was filled in trays and seeds enclosed in nylon bags were placed at two soil depths. One set of trays was moistened to 50% of field capacity. Seeds were incubated for 4 hours in a hot air oven set at the required temperature and

germination was assessed in the laboratory. Thermo-chron loggers were used to monitor the soil and oven temperature. Germination of button grass and wind mill grass was unaltered by the treatments; however, a significant increase in germination of sesbania pea compared to the ambient temperature condition (25–28% germination) was observed at surface layers incubated at 45°C and for all the treatments maintained at 55 and 65°C. Maximum germination (67%) was observed for the moist soil at 2 cm maintained at 65°C. Bladder ketmia germination was improved only for the moist soil at 2 cm incubated at 65°C. The studies indicate that heatwaves may alter the germination and emergence of weeds.

Keywords Biology, climate change, heat waves.