



ENVIRONMENTAL FACTORS INFLUENCING *LOLIUM TEMULENTUM* L. (DARNEL RYEGRASS) SEED GERMINATION

FARAJ A.H.¹, COLAK E.S.², ISIK D.^{2*}

¹Date palm Research Centre, Basrah University, Iraq.

²Department of Plant Protections, Faculty of Agriculture, Erciyes University, Kayseri, Türkiye.

*Corresponding author email: dogani@erciyes.edu.tr

(RECEIVED 20 OCT 2022; RECEIVED IN REVISED FORM 8 MAR 2023; ACCEPTED 16 MAR 2023)

ABSTRACT – Darnel ryegrass (*Lolium temulentum* L.) is an annual long-day plant belonging to the Poaceae family, that is common in grain fields worldwide. *L. temulentum* is a valuable model grass species for studying stress in forage and turf grasses. This study was conducted to assess the impact of critical environmental factors (temperature, light, pH, and salinity) on the seed biology of *L. temulentum*. The findings of this study indicated that the seeds of this weed germinate after three days at temperatures between 20 °C and 30 °C, 14 days at 10 to 15 °C, and 28 days at 5 °C. Furthermore, at a temperature of 35 °C to 40 °C, the seeds did not germinate for 28 days. After 14 days, this species' most significant germination percentage was 91.6 % at 10 °C and 20 °C. Seeds did not germinate when incubated for 14 days under continuous darkness, whereas germinated at 32.5 % when subjected to light for 12 h daily. Also, the results showed no significant effect of examined pH (4-10) and salinity (0, 25, 50, 100, 150, 200, and 250) levels on seed germination of *L. temulentum*. The information gained from the analysis will provide a valuable biological plant germination resource that will be used to develop approaches as to how the plant can improve under abiotic stress factors.

KEYWORDS: LIGHT, pH, SALINITY, TEMPERATURE, WEED.

INTRODUCTION

Darnel Ryegrass (*Lolium* spp.) is a bothersome weed in agricultural production globally, and it is moreover a valued cover crop, turf and cultivated forage species. High adaptive potential and diversity are identified to contribute to its achievement as a weed species and generate difficulties in precise species identification in fields (Maity et al., 2021). The genus of *Lolium* (Poaceae) comprises of several perennial and annual species. *Lolium* spp. are native to North Africa, Europe and temperate Asia, but have spread over the last 200 years to North and South America, New Zealand, Australia and southern parts of Africa. *Lolium* spp. were moved to new areas mainly as turf, pasture plants and cover crops, in contaminated livestock feed and commercial crop

seed. Morphology of *Lolium* is very similar among members of the genus (Matzrafi et al., 2021).

One of the *Lolium* species *Lolium temulentum* L. is of global agricultural significance as both weeds and as pasture crops. Furthermore, it is a significant irritant in developing countries, and it is included among the 'Worst Weeds' in the world (Senda & Tominaga, 2004). The succulent weed *L. temulentum* originated in the Mediterranean and spread to temperate countries where wheat and grains are grown. Its spread into tropical regions in many countries is hindered by extended periods of elevated temperatures and little humidity (Holm et al., 1991). Due to a lack of studies, there is not much information on this plant's seed germination and emergence. Like other grass weeds of winter crops in temperate regions, it reproduces by seed. Low temperatures and high soil moisture promote its germination and growth; however,