

NEW CHALLENGES IN POTATO BREEDING TO COPE WITH CLIMATE CHANGE: DUAL TOLERANCE TO HEAT AND DROUGHT

Mehmet Emin ÇALIŞKAN¹

e-mail: caliskanme@nigde.edu.tr

Abstract

Potato is a cool season crop with an optimal growth temperature between 17 and 21°C, and it also very sensitive to drought stress. All climate scenarios indicate that the global climate is changing and will continue to change in the near future. The main challenges from climate change to agriculture and food production are the more frequent and severe drought and floods as well as adverse effects of high growth temperatures. The total global yield in the regions currently cropped with potato was calculated to decline up to 32% without adaptation to climate change. The breeding of heat and drought tolerant potato cultivars is one of the most feasible and practical approaches to cope with global warming. However, breeders are generally focused on development of heat or drought tolerant potato cultivars instead of dual tolerance to both stresses. Previous studies indicate that tolerance mechanism for heat and drought is different in potato. Screening of many breeding lines against heat and drought stress under field conditions during early generations is not feasible for many breeding programs due to high cost and labor requirements. Therefore, rapid and reliable screening methods are needed to evaluate large populations in early generations. Biotechnological tools offer some advantages to breeders for screening large populations especially against biological stress factors, but no sound achievements obtained for abiotic stress factors in potato up to now. Currently our research group has several projects to develop novel screening tools to identify heat and drought tolerant genotypes.

Key words: *Solanum tuberosum* L., abiotic stress, water stress, temperature, phenotyping