Abstract:

Climate change is a major threat to most of the agricultural crops grown in tropical and sub-tropical areas globally. Drought stress is one of the consequences of climate change that has a negative impact on crop growth and yield. In the past, many simulation models were proposed to predict climate change and drought occurrences, and it is extremely important to improve essential crops to meet the challenges of drought stress which limits crop productivity and production. Wheat and barley are among the most common and widely used crops due to their economic and social values. Many parts of the world depend on these two crops for food and feed, and both crops are vulnerable to drought stress. Improving drought stress tolerance is a very challenging task for wheat and barley researchers and more research is needed to better understand this stress. The progress made in understanding drought tolerance is due to advances in three main research areas: physiology, breeding, and genetic research. The physiology research focused on the physiological and biochemical metabolic pathways that plants use when exposed to drought stress. New wheat and barley genotypes having a high degree of drought tolerance are produced through breeding by making crosses from promising drought-tolerant genotypes and selecting among their progeny. Also, identifying genes contributing to drought tolerance is very important. Previous studies showed that drought tolerance is a polygenic trait and genetic constitution will help to dissect the gene network(s) controlling drought tolerance. This review explores the recent advances in these three research...