

Wild Cereals in Breeding

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Abstract: Globally important cereals, wheat and barley, were domesticated in the Near East region some 10,000 years ago. The original genetic diversity inherited from the wild ancestors was rather narrow, since the available evidence indicates monophyletic domestication, at least in emmer and einkorn wheats. The genetic base of cultivated wheat and barley could have been enriched by occasional gene introgressions from their wild progenitors, but this was just limited to the Near East region, where the natural populations of *Triticum dicoccoides* and *Hordeum spontaneum* may grow in contact with cultivated wheat and barley, respectively. From the beginning of 20th century till the present a lot of knowledge coming from different scientific discipline has become available on wild *Triticeae* phylogeny and relationships with cultivated wheats and barley. Now it is evident that in barley breeding, the only convenient source of “wild” genes is *H. spontaneum*, belonging to the primary gene pool, as defined by Harlan and Zohary. The situation is very different in wheat, where a number of wild relatives have the potential to be donors of useful genes. Methodology is now available for overcoming crossing barriers, sterility in hybrids and lack of chromosome homology in crosses with more distant wild relatives. The crop wild relatives have evolved different adaptive morphological traits and genetic complexes for resistance or tolerance to abiotic and biotic stresses ubiquitous in Central and West Asia, North Africa and Mediterranean Europe, their area of geographical distribution. However, the use of wild species in modern wheat and barley breeding in developed world has been limited to transfer of genes for disease or insect resistance and relatively few wild relative genes were widely exploited. In wheat and barley improvement for developing countries, in particular in breeding for low-input subsistence farming and/or marginal areas, there is a great potential for extensive utilization of wild species. Examples are given from two international agricultural research centers, ICARDA and CIMMYT.