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ONE CENTURY OF DURUM WHEAT BREEDING: AN ITALIAN LEGACY

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Durum wheat is the main crop in Italy in terms of land area being grown in about 1.3 million ha, mainly in the Southern part of the peninsula and in the islands. The European Union is the first producer of durum wheat in the world with more than 10.0 million tons of grain, with Italy playing a leading role: 50% of the durum area and production. This context accounts for the scientific effort to improve durum production and quality made by Italian breeders, exploiting the rich reservoir of genetic variation present in the Mediterranean area as well as the germplasm introduced from distant geographical areas. Durum breeding activities began at the outset of the XX century by exploiting the genetic variation present in landraces from Southern Italy, North-Africa and West Asia. A special mention deserves the cv. Cappelli released in 1915, a milestone in durum wheat breeding. From middle of '70s, yield increase became the main target to be achieved by introgression of useful traits from hexaploid and wild wheat species, mutagenesis, and the use of semi-dwarf materials. The intense breeding activity has led to the constant release of leading cultivars by private seed companies. The recent advances and integration of molecular markers, plant genomics and biotechnology with classical breeding methodology has provided the basis for molecular durum breeding. Information on exploiting wild and cultivated germplasm resources, induced novel genetic variation by TILLING, molecular dissection of quantitative traits and QTL studies to identify causal genes, genome sequencing and gene cloning efforts, has contributed to gene discovery and implementation in practical durum breeding programs. Co-ordinated efforts between Italian researchers and international institutions engaged in wheat improvement has contributed to design an efficient durum ideotype for a sustainable and productive agriculture.

ABSTRACT