At the beginning of the 21st Century, mankind faces the dual challenges of providing enough food for a growing population with a background of reduced resources and a more variable climate. In this context, genomics and associated molecular marker technology must play an important role in developing new varieties better adapted to address these challenges. During the last decade, molecular marker technology has provided a wide range of novel approaches to improve selection strategies and together with the rapid accumulation of genomics tools and the emergence of high throughput technologies has facilitated practical implementation into cereal breeding. The availability of new molecular tools and technologies is beginning to filter through the breeding programmes to have a significant impact on plant variety development and is proving to be the essential element required to accelerate this process. The results of specific applications of molecular markers, potential of genomic selection and the application of genomics in cereals will be presented and discussed.

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