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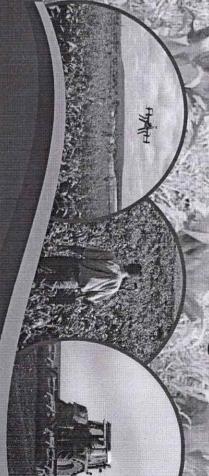
Dr. Singh has more than 16 years of experience in various corporate and teaching, research and administration. He has published 32 research papers, 02 book, 06 book chapters, and popular articles in different national and international repute journals. Dr. Singh received the Young Scientist Award in 2018 and Best Teacher Award in 2022 for their outstanding contribution in the field of Agronomy. Main thematic research area is nutrient management and cropping system research and supervised more than 28 PG students and 03 Ph. D. scholars are registered. Dr. Singh actively involved in extension activities and time to time delivered radio and expert talks for the

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Chapter - 41

DNA Markers: Molecular Tools for Crop Improvement

Kanchan Lakhera and Kriti Shrinet

1. Introduction/Background

Agriculturists, crop growers, breeders over thousands of years have tried to improve the crop varieties for numerous characteristics like crop yield, fast growth, nutritional value, stress tolerance, disease resistance etc. In earlier times the crop improvement involved selection of plants with best phenotypic traits and collecting their seeds for the next growing season. With the advent of breeding technologies breeders were able to develop new inter and intra specific varieties but at the core of these conventional breeding program lies the selection of plants which was again based on the phenotypic characters. Though conventional methods of plant breeding helped in improving the agronomic traits of the plant varieties but it suffers from one major drawback that development ofbetter crop varieties is restricted by the very long crop duration and that usually results in decades to develop a new cultivar of a crop.

With the introduction of molecular markers or DNA markers, these has proven to be a new powerful breeding tool to make more accurate and useful selections in breeding populations.DNA markers are immensely popular as molecular toolsbecause these are inexpensive, stable, and easy to handle by the user. DNA marker is a sequence with a known location in a genome. Molecular Markers are used to 'flag' the position of a particular gene or the inheritance of a particular characteristic or gene. DNA markers can be part of a gene but often them neutral with no known function. Markers often reflect variation at the level of DNA sequences.

DNA markers have a wide range of applications in different areas of research like

- Markers are used as landmark in the construction of chromosome and genome maps.
- b) Molecular markers have played a major role in facilitating the implementation of molecular breeding in plants.
- c) Molecular markers can be employed for the detection of genetic variation, cultivar identification and genotyping.

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