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Molecular and Types of Genetic Markers

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DESCRIPTION

A molecular marker is a molecule extracted from a source that provides information about the source. DNA, for example, is a single molecule marker that provides details about the life form from which it was extracted. Another example is that certain proteins can be biochemical markers of Alzheimer's disease in the person from whom they are extracted. Non-biological molecular markers are possible. Environmental studies frequently employ non-biological markers. A molecular marker (also known as a genetic marker) is a piece of DNA that is linked to a specific location inside the genome. In single molecule biology and biotechnology, molecular markers are used to identify a specific DNA sequence in a pool of unidentified DNA. There are numerous types of genetic markers, each with its own set of limitations and strengths. There are three types of genetic markers First Generation Markers, Second Generation Markers, and New Generation Markers. These markers may also be used to identify supremacy and co-dominance within the genome. Using a marker to identify dominance and co-dominance may aid in distinguishing heterozygotes from homozygotes within the organism. Co-dominant markers are more useful because they identify more than one allele, allowing someone to track a specific trait using mapping techniques. These markers enable the amplification of specific sequences in the genetic code for comparison and analysis. As previously stated, genomic markers have specific strengths and weaknesses, so prior consideration and knowledge of the markers is required. For example, a RAPD marker may be sensitive to reproducible results if it is dominant (identifies only one band of distinction). This is usually due to the circumstances under which it was created. When a sample is produced, RAPDs are also used under the assumption that two samples share the same locus. Molecular mapping assists in locating specific markers within the genome. For the analysis of genetic material, two types of maps can be created. The first is a physical map that aids in determining where you are on a chromosome as well as which chromosome you are on. The second type of map is a linkage map, which shows how specific genes are connected to other genes on a chromosome. This linkage map may recognize distances from other genes using the unit of measurement (cM) centimorgans. Co-dominant markers can be used in modelling to identify specific locations within a genome and can represent phenotypic differences. The linking of markers can aid in the identification of specific polymorphisms within the genome. These polymorphisms indicate minor changes within the genome, such as nucleotide substitutions or sequence rearrangement. It is advantageous to identify a few polymorphic distinctions between two species as well as similar sequences between two species when creating a map. When using microsatellites to study the genetics of a specific crop, keep in mind that markers have limitations. It is necessary to first determine the genetic variability inside the organism being studied. Examine how identifiable a specific genomic sequence is near or in candidate genes. Distances among points can be calculated using maps. Genetic markers can assist in the creation of novel traits that can be mass-produced. Molecular markers and maps can be used to identify these novel traits. Colour, for example, may be controlled by only a few genes. MAS can identify qualitative traits (traits that require fewer than two genes), such as colour (marker assisted selection).

CONCLUSION

Once a desired marker is identified, it can be followed across multiple filial generations. A recognisable marker may aid in the tracking of specific traits of interest when crossing between different genus and species in the hopes of passing on specific traits to offspring.

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CONFLICT OF INTEREST

The author's declared that they have no conflict of interest.

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