

GENERAL INTRODUCTION

Breeders and scientists continuously seek to develop new techniques which can be used for introgression of desirable traits into plants and animals. These improvements are requested to meet the demands of today and the future. Breeding concerns quality as well as quantity of production and should be seen in the light of a predicted population expansion that will need more food of a better standard.

The introduction of new traits into plants and animals may be very difficult as often many breeding generations are needed, some traits can be difficult or expensive to evaluate directly, many traits are controlled by several genes whose expression is under environmental influence. Amongst the initiatives to overcome these problems, a range of biotechnological methods have found their way into plant and animal breeding through the last decades. These include DNA marker systems and associated techniques.

Molecular marker technology is now integrated into existing plant and animal breeding programmes all over the world, in order to allow researchers to access, transfer and combine genes at a rate and with a precision not previously possible.

MAS is ideally suited for introgression of major genes with specific effects, but molecular markers are increasingly being used in plant and animal breeding programmes for dissecting and tagging polygenic characters (QTLs). At present, the development of the so-called 'third generation of molecular markers': e.g. SNPs (Single Nucleotide Polymorphisms) or DArT (Diversity Array Technology), are creating novel perspective for exploiting the immense reservoir of polymorphisms in plant and animal genomes and are expected to provide the increase in resolution needed to locate and identify the many genes involved in the complex quantitative traits.

Notwithstanding the wide and successful applications of molecular markers in breeding programmes, some question remains: e.g. 'Is always MAS a fast track to increase genetic gain in breeding programmes?' , 'Under what conditions will MAS be most useful?' 'Is MAS cost effective compared to conventional breeding methods.....?'

This workshop is aimed at focusing and spread significant results obtained through the application of MAS, and brilliant scientist from key research Institution all over Europe will provide examples of successful application of molecular marker techniques to plant and animal breeding programmes. But the workshop is also aimed at stimulating discussion on drawbacks and problems related to MAS application and will end with round table, coordinated by Dr Andrea Sonnino from FAO (Food and Agriculture Organization of the United Nations) on 'The impact of MAS in developing world'.

I want to thank all the speakers for having accepted to participate and the team of scientific coordinators for their help and essential contribution. Special thanks to the Biotechnology Foundation for giving us hospitality and in particular to Dr Elena Spoldi, Dr. Claudia Mondino and their collaborators for their efficiency and competence in the organization of the Workshop.

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