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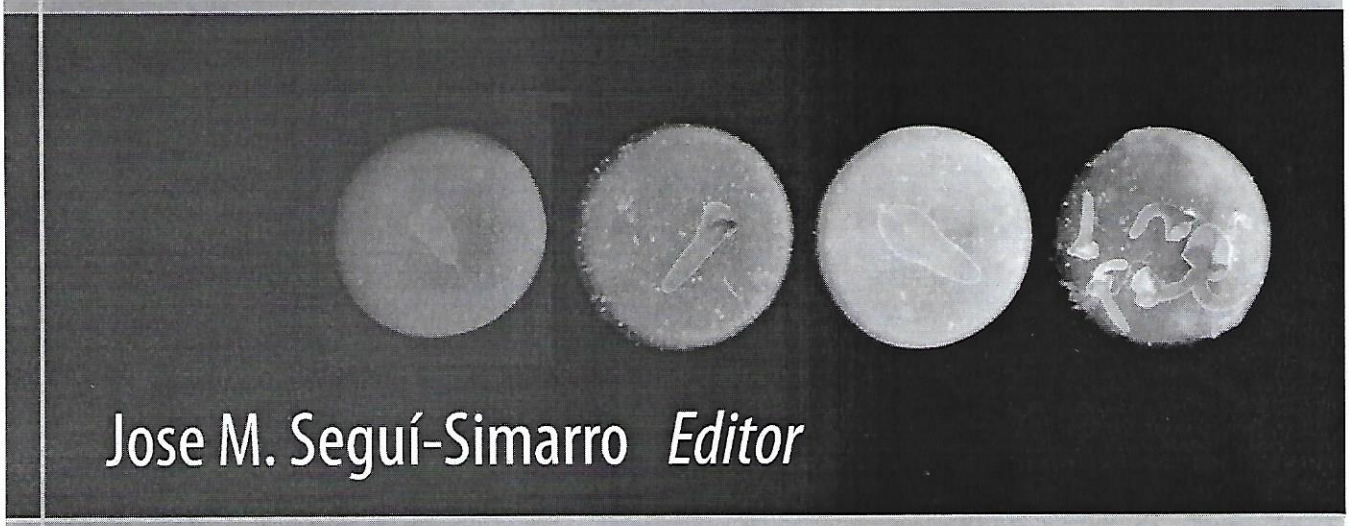

Jose M. Seguí-Simarro *Editor*

Doubled Haploid Technology

Volume 2
Hot Topics, Apiaceae, Brassicaceae, Solanaceae

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Contents

Chapter 21

Induction of Haploid Embryos in *Datura metel* by Anther Culture

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Abstract

Microspores, with a haploid number of chromosomes, are destined to produce the male gametophyte, which hosts the male gametes that fertilize the female egg cell. During microsporogenesis, a particular stage of development is amenable to be switched to undergo embryogenesis and developed into a haploid plant. By doubling the chromosomes, a doubled haploid plant, homozygous for all the gene loci, is produced. These plants are useful to study the expression of recessive genes and in plant breeding as a rapid pathway to achieve homozygosity.

Key words Anther culture, *Datura metel*, Doubled haploids, Haploid embryos

1 Introduction

Microspores, under normal circumstances, are destined to produce the male gametophytes, pollen grains. In pollen, male gametes (sperm cells) are developed. After pollen germination, they fertilize the egg cell in sexual plant reproduction. Microspores and pollen are produced in abundance by anthers (the male sporangia). During microspore development (or microsporogenesis), the diploid chromosome number of microspore mother cells is reduced by half, thereby yielding a haploid set of chromosomes in each microspore cell. However, Guha and Maheshwari [1] discovered another dimension of microspore development that has significant biotechnological implications. They demonstrated that, when anthers are cultured in vitro, microspores can be diverted from the normal gametophytic developmental pathway to undergo repeated cell divisions leading to the formation of embryos or calli, from which plants can be regenerated. This phenomenon of plant formation from cultured microspores is also referred to as androgenesis or haploid induction. Androgenic plants can be derived either by anther culture or by isolated microspore culture in defined culture

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