Biotechnology in Agriculture and Forestry 12

Haploids in Crop Improvement I

Edited by Y. P. S. Bajaj

Springer-Verlag

Haploids In Crop Improvement One

Kaijun Zhao,Rukmini Mishra,Raj Kumar Joshi

Haploids In Crop Improvement One:

Haploids in Crop Improvement I Y. P. S. Bajaj,2012-12-06 Haploid plants have the gametophytic number of chromosomes They are of great importance especially in studies on the induction of muta tions and also for the production of homozygous plants they are needed in large numbers The conventional methods employed by plant breeders for their production are cumbersome time consuming laborious and rather inefficient Sometimes it may take years to produce a pure line However with the introduction of in vitro techniques especially anther culture for the induction of androgenesis it has become increasingly evi dent that these methods considerably accelerate the production of haploids for plant breeding programs During the last decade in vitro produced haploids have been incor porated into breeding programs of many agricultural crops and positive results have been obtained especially with rice wheat potato barley maize asparagus sunflower brassica tobacco etc Among these rice and wheat are the best examples in which a number of improved varieties have been released In wheat the breeding cycle can be shortened by three or four generations when the pollen haploid breeding method is used instead of conventional cross breeding The release of the wheat varieties Jinghua 1 and Florin is a typical example of what can be achieved with other crops Taking these developments into considera tion the present volume Haploids in Crop Improvement I was compil ed *Haploids in Crop Improvement II* Constantine E. Don Palmer,Wilfred A. Keller,Kenneth J. Kasha,2006-01-27 Doubled haploid technology is an important tool for plant breeding It allows for significant time reduction in the achievement of homozygous breeding lines of value in crop improvement This volume provides an excellent overview of haploid induction and the application of doubled haploids The authors emphasize advances made in the understanding of microspore embryogenesis but treat also advances in gynogenesis and the manipulation of parthenogenetic haploid development The text contains a thorough discussion of the application of haploidy to the improvement of a number of species from various families including Brassicaceae Poaceae and Solanaceae The various methods applicable to these species are described in detail Each chapter contains critical evaluation of the scientific literature and an extensive list of references This volume is ideally suited for plant breeders geneticists and plant cell biologists **Doubled Haploids: Technological Advances and Role In Crop Improvement** Zenu Jha,Satish B. Verulkar,Suprasanna Penna,2025-03-05 This contributed volume covers the technology of double haploid production with special reference to anther culture and double haploid production in crop plants and applications for basic and applied research in crop improvement Globally plant breeders aim to achieve higher crop productivity by using different breeding techniques The double haploid genotypes have made this monotonous work easier and more efficient to a greater extent by achieving homozygosity and genetic fixation Haploids are genotype with a gametophytic chromosome number and a double haploid is a genotype developed when haploid cells undergo chromosome doubling Artificial production of double haploids can easily shorten the time required to create homozygous plants which is vital in plant breeding The book discusses how

double haploids can help in accelerating conventional plant breeding programs and make early release of cultivars with superior and desirable traits along with greater utility in other research aspects of plant breeding genetics and genetic engineering It also explains the role of double haploids in complementing back cross breeding by transferring genes of interest from wild relatives thus breaking genetic barriers The book highlights the role of double haploids in genetic studies like inheritance of quantitative traits quantitative trait loci QTL mapping Genomics gene identification whole genome mapping and production of stable transgenic plants This book is essential for plant breeders geneticists researchers and students in agricultural and crop sciences offering insights into the transformative potential of double haploid technology in modern plant breeding *In Vitro Haploid Production in Higher Plants* S. Mohan Jain,S.K. Sopory,R.E. Veilleux,2013-03-09 Since the beginning of agricultural production there has been a continuous effort to grow more and better quality food to feed ever increasing popula tions Both improved cultural practices and improved crop plants have al lowed us to divert more human resources to non agricultural activities while still increasing agricultural production Malthusian population predictions continue to alarm agricultural researchers especially plant breeders to seek new technologies that will continue to allow us to produce more and better food by fewer people on less land Both improvement of existing cultivars and development of new high yielding cultivars are common goals for breeders of all crops In vitro haploid production is among the new technologies that show great promise toward the goal of increasing crop yields by making similar germplasm available for many crops that was used to implement one of the greatest plant breeding success stories of this century i e the development of hybrid maize by crosses of inbred lines One of the main applications of anther culture has been to produce diploid homozygous pure lines in a single generation thus saving many generations of backcrossing to reach homozygosity by traditional means or in crops where self pollination is not possible Because doubled haploids are equivalent to inbred lines their value has been appreciated by plant breeders for decades The search for natural haploids and methods to induce them has been ongoing since the beginning of the 20th century *Accelerated Plant Breeding, Volume 1* Satbir Singh Gosal,Shabir Hussain Wani,2020-05-23 Plant improvement has shifted its focus from yield quality and disease resistance to factors that will enhance commerical export such as early maturity shelf life and better processing quality Conventional plant breeding methods aiming at the improvement of a self pollinating crop such as wheat usually take 10 12 years to develop and release of the new variety During the past 10 years significant advances have been made and accelerated methods have been developed for precision breeding and early release of crop varieties This work summarizes concepts dealing with germplasm enhancement and development of improved varieties based on innovative methodologies that include doubled haploidy marker assisted selection marker assisted background selection genetic mapping genomic selection high throughput genotyping high throughput phenotyping mutation breeding reverse breeding transgenic breeding shuttle breeding speed breeding low cost high throughput field phenotyping etc It is an important reference with special focus on accelerated

development of improved crop varieties Biotechnologies of Crop Improvement, Volume 1 Satbir Singh Gosal,Shabir Hussain Wani,2018-06-22 During the past 15 years cellular and molecular approaches have emerged as valuable adjuncts to supplement and complement conventional breeding methods for a wide variety of crop plants Biotechnology increasingly plays a role in the creation conservation characterization and utilization of genetic variability for germplasm enhancement For instance anther microspore culture somaclonal variation embryo culture and somatic hybridization are being exploited for obtaining incremental improvement in the existing cultivars In addition genes that confer insect and disease resistance abiotic stress tolerance herbicide tolerance and quality traits have been isolated and re introduced into otherwise sensitive or susceptible species by a variety of transgenic techniques Together these transformative methodologies grant access to a greater repertoire of genetic diversity as the gene s may come from viruses bacteria fungi insects animals human beings unrelated plants or even be artificially derived Remarkable achievements have been made in the production characterization field evaluation and commercialization of transgenic crop varieties worldwide Likewise significant advances have been made towards increasing crop yields improving nutritional quality enabling crops to be raised under adverse conditions and developing resistance to pests and diseases for sustaining global food and nutritional security The overarching purpose of this 3 volume work is to summarize the history of crop improvement from a technological perspective but to do so with a forward outlook on further advancement and adaptability to a changing world Our carefully chosen case studies of important plant crops intend to serve a diverse spectrum of audience looking for the right tools to tackle complicated local and global issues *Applied Plant Physiology* Mr. Rohit Manglik,2024-07-29 Functional processes in plants and how they relate to productivity and stress management **Advanced Crop Improvement, Volume 1** Aamir Raina,Mohammad Rafiq Wani,Rafiul Amin Laskar,Nasya Tomlekova,Samiullah Khan,2023-08-01 As per the reports of FAO the human population will rise to 9 billion by the end of 2050 and 70% of more food must be produced over the next three decades to feed the additional population The breeding approaches for crop improvement programs are dependent on the availability and accessibility of genetic variation either spontaneous or induced by the mutagens Plant breeders agronomists and geneticists are under constant pressure to expand food production by employing innovative breeding strategies to enhance yield adaptability nutrition resistance to biotic and abiotic stresses In conventional breeding approaches introgression of genes in crop varieties is laborious and time consuming Nowadays new innovative plant breeding techniques such as molecular breeding and plant biotechnology supplement the traditional breeding approaches to achieve the desired goals of enhanced food production With the advent of recent molecular tools like genomics transgenics molecular marker assisted back crossing TILLING Eco TILLING gene editing CRISPR CAS non targeted protein abundant comparative proteomics genome wide association studies have made possible mapping of important QTLs insertion of transgenes reduction of linkage drags and manipulation of genome In general conventional and modern plant breeding approaches would be strategically ideal for

developing new elite crop varieties to meet the feeding requirement of the increasing world population This book highlights the latest progress in the field of plant breeding and their applicability in crop improvement The basic concept of this 2 volume work is to assess the use of modern breeding strategies in supplementing conventional breeding toward the development of elite crop varieties for obtaining desired goals of food production **Genetic Resources, Chromosome Engineering, and Crop Improvement** Ram J. Singh,Prem P. Jauhar,2005-03-16 The first book in this new series discusses grain legumes which rank only second to cereals in supplying calories and protein to the world s population With each chapter written by an internationally renowned scientist the book reviews the role of alien germplasm for the domestication of each major legume crop Discussion for each crop covers or *Molecular Biology and Genetic Engineering* P. K. Gupta,2008 PART I Molecular Biology 1 Molecular Biology and Genetic Engineering Definition History and Scope 2 Chemistry of the Cell 1 Micromolecules Sugars Fatty Acids Amino Acids Nucleotides and Lipids Sugars Carbohydrates 3 Chemistry of the Cell 2 Macromolecules Nucleic Acids Proteins and Polysaccharides Covalent and Weak Non covalent Bonds 4 Chemistry of the Gene Synthesis Modification and Repair of DNA DNA Replication General Features 5 Organisation of Genetic Material 1 Packaging of DNA as Nucleosomes in Eukaryotes Techniques Leading to Nucleosome Discovery 6 Organization of Genetic Material 2 Repetitive and Unique DNA Sequences 7 Organization of Genetic Material 3 Split Genes Overlapping Genes Pseudogenes and Cryptic Genes Split Genes or Interrupted Genes 8 Multigene Families in Eukaryotes 9 Organization of Mitochondrial and Chloroplast Genomes 10 The Genetic Code 11 Protein Synthesis Apparatus Ribosome Transfer RNA and Aminoacyl tRNA Synthetases Ribosome 12 Expression of Gene Protein Synthesis 1 Transcription in Prokaryotes and Eukaryotes 13 Expression of Gene Protein Synthesis 2 RNA Processing RNA Splicing RNA Editing and Ribozymes Polyadenylation of mRNA in Prokaryotes Addition of Cap m7G and Tail Poly A for mRNA in Eukaryotes 14 Expression of Gene Protein Synthesis 3 Synthesis and Transport of Proteins Prokaryotes and Eukaryotes Formation of Aminoacyl tRNA 15 Regulation of Gene Expression 1 Operon Circuits in Bacteria and Other Prokaryotes 16 Regulation of Gene Expression 2 Circuits for Lytic Cycle and Lysogeny in Bacteriophages 17 Regulation of Gene Expression 3 A Variety of Mechanisms in Eukaryotes Including Cell Receptors and Cell Signalling PART II Genetic Engineering 18 Recombinant DNA and Gene Cloning 1 Cloning and Expression Vectors 19 Recombinant DNA and Gene Cloning 2 Chimeric DNA Molecular Probes and Gene Libraries 20 Polymerase Chain Reaction PCR and Gene Amplification 21 Isolation Sequencing and Synthesis of Genes 22 Proteins Separation Purification and Identification 23 Immunotechnology 1 B Cells Antibodies Interferons and Vaccines 24 Immunotechnology 2 T Cell Receptors and MHC Restriction 25 Immunotechnology 3 Hybridoma and Monoclonal Antibodies mAbs Hybridoma Technology and the Production of Monoclonal Antibodies 26 Transfection Methods and Transgenic Animals 27 Animal and Human Genomics Molecular Maps and Genome Sequences Molecular Markers 28 Biotechnology in Medicine l Vaccines Diagnostics and Forensics Animal and Human Health Care 29 Biotechnology in

Medicine 2 Gene Therapy Human Diseases Targeted for Gene Therapy Vectors and Other Delivery Systems for Gene Therapy 30 Biotechnology in Medicine 3 Pharmacogenetics Pharmacogenomics and Personalized Medicine Phannacogenetics and Personalized 31 Plant Cell and Tissue Culture Production and Uses of Haploids 32 Gene Transfer Methods in Plants 33 Transgenic Plants Genetically Modified GM Crops and Floricultural Plants 34 Plant Genomics 35 Genetically Engineered Microbes GEMs and Microbial Genomics References *Genome Editing Technologies for Crop Improvement* Kaijun Zhao,Rukmini Mishra,Raj Kumar Joshi,2022-08-01 This book compiles the relevant information related to genome editing tools and their roles in crop improvement The book contains a brief introduction about various genome editing tools and their application in major crops It discusses the genome editing approaches and the strategies used for genome editing in different crops Some of the chapters cover the detailed methodology of sgRNA design vector construction and transformation in different crops followed by data analysis A few chapters focus on the applications of genome editing tools towards crop improvement This book will be of particular interest to plant biologists working in the field of genome editing and crop breeders It will provide valuable information and useful material for our readers experimental work **Alien Gene Transfer in Crop Plants, Volume 1** Aditya Pratap,Jitendra Kumar,2013-11-01 Genetic engineering and biotechnology along with conventional breeding have played an important role in developing superior cultivars by transferring economically important traits from distant wild and even unrelated species to the cultivated varieties which otherwise could not have been possible with conventional breeding There is a vast amount of literature pertaining to the genetic improvement of crops over last few decades However the wonderful results achieved by crop scientists in food legumes research and development over the years are scattered in different journals of the World The two volumes in the series Alien Gene Transfer in Crop Plants address this issue and offer a comprehensive reference on the developments made in major food crops of the world These volumes aim at bringing the contributions from globally renowned scientists at one platform in a reader friendly manner The 1st volume entitled Alien Gene Transfer in Crop Plants Innovations Methods and Risk Assessment will deal exclusively with the process and methodology The contents of this volume have been designed to appraise the readers with all the theoretical and practical aspects of wide hybridization and gene transfer like processes and methods of gene transfer role of biotechnology with special reference to embryo rescue genetic transformation protoplast fusion and molecular marker technology problems such as cross incompatibility and barriers to distant hybridization and solutions to overcome them Since wild and weedy relatives of crop plants may have negative traits associated with them there are always possibilities of linkage drag while transferring alien alleles Therefore problems and limitations of alien gene transfer from these species will also be discussed in this series Further the associated risks with this and assessment of risks will also be given due weightage Gene Pool Diversity and Crop Improvement Vijay Rani Rajpal,S. Rama Rao,S.N. Raina,2016-02-02 The world population is estimated to reach to more than 10 billion by the year 2050 These projections pose a challenging situation for

the agricultural scientists to increase crops productivity to meet the growing food demands The unavailability and or inaccessibility to appropriate gene pools with desired traits required to carry out genetic improvement of various crop species make this task formidable for the plant breeders Incidentally most of the desired genes reside in the wild genetic relatives of the crop species Therefore exploration and characterization of wild genetic resources of important crop species is vital for the efficient utilization of these gene pools for sustainable genetic improvements to assure food security Further understanding the myriad complexities of genic and genomic interactions among species more particularly of wild relatives of crop species and or phylogenetically distant germplasm can provide the necessary inputs to increase the effectiveness of genetic improvement through traditional and or genetic engineering methods This book provides comprehensive and latest insights on the evolutionary genesis of diversity access and its utilization in the evolution of various crop species A comprehensive account of various crops origin exploitation of the primary secondary and tertiary gene pools through breeding biosystematical cytogenetical and molecular phylogenetical relationships and genetic enhancement through biotechnological interventions among others have been provided as the necessary underpinnings to consolidate information on the effective and sustainable utilization of the related genetic resources The book stresses upon the importance of wild germplasm exploration characterization and exploitation in the assimilation of important crop species The book is especially intended for students and scientists working on the genetic improvement of crop species Plant Breeders Geneticists Taxonomists Molecular Biologists and Plant Biotechnologists working on crop species are going to find this book very useful

Applications of Fast Breeding Technologies in Crop Improvement and Functional Genomics Study Xingguo Ye,James A. Birchler , Fangpu Han,2024-07-30 During the latest ten years fast breeding technologies have been effectively applied in crop trait modification gene mapping and functional genomics study which include haploid induction based on inducer lines genome editing mediated by CRISPR Cas9 and molecular selection based on special markers By using CRISPR Cas9 many crop traits such as disease resistance good quality early maturity high grain weight male sterile and pre harvest sprouting tolerance have been modified in a few generations Particularly new haploid inducer lines have been created in maize rice Arabidopsis wheat alfalfa foxtail millet tomato and Brassica oleracea by editing MTL PLA1 NLD DMP and PLD3 genes via CRISPR Cas9 for largely producing haploid grains directly Additionally new types of molecular markers have been developed and used to trace agronomically important traits for easily screening and locating gene position on chromosomes for gene cloning except for generally employed makers like SSR SNP and EST *Concise Encyclopedia of Crop Improvement* Rolf Schlegel,2007-11-24 How were today complex approaches to improving crops developed The quest for a steady food supply sparked plant breeding attempts over 12 000 years ago The Concise Encyclopedia of Crop Improvement is a comprehensive resource explaining the development of crop improvement methods over the centuries This extensive history of development is examined in detail including influential individuals in the field plant cultivation in Asia since the

Neolithic time techniques used in the Old World and cropping in ancient America The advance of scientific plant breeding in the twentieth century is extensively explored including hybrid breeding biotechnological improvement and genetic manipulation **Plant Techniques** S.M. Khasim,K. Thammasiri,S. Rama Rao,M. Rahamtulla,2024-08-09 This book deals with the basic concepts of Plant Science including botanical micro technique and microtomy staining techniques molecular techniques plant tissue culture electron microscopy and cryopreservation and germplasm storage It is the outcome of several decades of research and teaching in plant biology to undergraduate and postgraduate students of Plant Science Horticulture Microbiology and Biotechnology Print edition not for sale in Bangladesh Bhutan India Nepal Pakistan and Sri Lanka Plant Biology and Biotechnology Volume - II Mr. Rohit Manglik,2024-01-27 EduGorilla Publication is a trusted name in the education sector committed to empowering learners with high quality study materials and resources Specializing in competitive exams and academic support EduGorilla provides comprehensive and well structured content tailored to meet the needs of students across various streams and levels **Plant Biology and Biotechnology** Bir Bahadur,Manchikatla Venkat Rajam,Leela Sahijram,K. V. Krishnamurthy,2015-06-19 Plant genomics and biotechnology have recently made enormous strides and hold the potential to benefit agriculture the environment and various other dimensions of the human endeavor It is no exaggeration to claim that the twenty first century belongs to biotechnology Knowledge generation in this field is growing at a frenetic pace and keeping abreast of the latest advances and calls on us to double our efforts Volume II of this two part series addresses cutting edge aspects of plant genomics and biotechnology It includes 37 chapters contributed by over 70 researchers each of which is an expert in his her own field of research Biotechnology has helped to solve many conundrums of plant life that had long remained a mystery to mankind This volume opens with an exhaustive chapter on the role played by thale cress Arabidopsis thaliana which is believed to be the Drosophila of the plant kingdom and an invaluable model plant for understanding basic concepts in plant biology This is followed by chapters on bioremediation biofuels and biofertilizers through microalgal manipulation making it a commercializable prospect discerning finer details of biotic stress with plant fungal interactions and the dynamics of abiotic and biotic stresses which also figure elsewhere in the book Breeding crop plants for desirable traits has long been an endeavor of biotechnologists The significance of molecular markers marker assisted selection and techniques are covered in a dedicated chapter as are comprehensive reviews on plant molecular biology DNA fingerprinting techniques genomic structure and functional genomics A chapter dedicated to organellar genomes provides extensive information on this important aspect Elsewhere in the book the newly emerging area of epigenetics is presented as seen through the lens of biotechnology showcasing the pivotal role of DNA methylation in effecting permanent and transient changes to the genome Exclusive chapters deal with bioinformatics and systems biology Handy tools for practical applications such as somatic embryogenesis and micropropagation are included to provide frontline information to entrepreneurs as is a chapter on somaclonal variation

Overcoming barriers to sexual incompatibility has also long been a focus of biotechnology and is addressed in chapters on wide hybridization and hybrid embryo rescue Another area of accomplishing triploids through endosperm culture is included as a non conventional breeding strategy Secondary metabolite production through tissue cultures which is of importance to industrial scientists is also covered Worldwide exchange of plant genetic material is currently an essential topic as is conserving natural resources in situ Chapters on in vitro conservation of extant threatened and other valuable germplasms gene banking and related issues are included along with an extensive account of the biotechnology of spices the low volume high value crops Metabolic engineering is another emerging field that provides commercial opportunities As is well known there is widespread concern over genetically modified crops among the public GM crops are covered as are genetic engineering strategies for combating biotic and abiotic stresses where no other solutions are in sight RNAi and micro RNA based strategies for crop improvement have proved to offer novel alternatives to the existing non conventional techniques and detailed information on these aspects is also included The book s last five chapters are devoted to presenting the various aspects of environmental marine desert and rural biotechnology The state of the art coverage on a wide range of plant genomics and biotechnology topics will be of great interest to post graduate students and researchers including the employees of seed and biotechnology companies and to instructors in the fields of plant genetics breeding and biotechnology

Plant Mutation Breeding and Biotechnology Q. Y. Shu,Brian P. Forster,H. Nakagawa,Hitoshi Nakagawa,2012 Abstract This book presents contemporary information on mutagenesis in plants and its applications in plant breeding and research The topics are classified into sections focusing on the concepts historical development and genetic basis of plant mutation breeding chapters 1 6 mutagens and induced mutagenesis chapters 7 13 mutation induction and mutant development chapters 14 23 mutation breeding chapters 24 34 or mutations in functional genomics chapters 35 41 This book is an essential reference for those who are conducting research on mutagenesis as an approach to improving or modifying a trait or achieving basic understanding of a pathway for a trait **Cytogenetics, Evolution, Biostatistics and Plant Breeding** Shukla R.S. & Chandel P.S.,2004-09 Cytology Genetics Evolution Biostatistics and Plant Breeding for B Sc M Sc Students

Unveiling the Energy of Verbal Beauty: An Emotional Sojourn through **Haploids In Crop Improvement One**

In a world inundated with screens and the cacophony of quick transmission, the profound power and mental resonance of verbal beauty frequently disappear in to obscurity, eclipsed by the regular assault of noise and distractions. However, situated within the lyrical pages of **Haploids In Crop Improvement One**, a charming function of literary splendor that impulses with natural emotions, lies an memorable journey waiting to be embarked upon. Written by way of a virtuoso wordsmith, this exciting opus instructions readers on an emotional odyssey, lightly exposing the latent potential and profound impact embedded within the elaborate web of language. Within the heart-wrenching expanse with this evocative analysis, we will embark upon an introspective exploration of the book is key subjects, dissect their fascinating writing style, and immerse ourselves in the indelible impact it leaves upon the depths of readers souls.

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web by utilizing the half equivalence point on the titration curve the pka of the acid analyte was determined to be 3 655 furthermore using the stoichiometric ratio between the naoh and the acid analyte 1 1 we could experimentally determine the number of moles of the acid in the solution to be 000731 moles making the experimental molar mass

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web goals understand that parts of an acid base titration be able to determine the k a or k b from ph data associated with the titration of a weak acid or base be able to determine the molar mass of a solid monoprotic acid from titration data be able to calculate k a1 and k a2 for a polyprotic acid by the end of this lab students should be able to

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standardization of sodium hydroxide naoh and oxalic acid h2c2o4 2h2 o and the molar mass of an unknown solid acid using the molar mass of the standardized sodium hydroxide solution

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web this point of titration is referred to as the equivalence point considering the 1 1 stoichiometry of this acid base reaction naoh aq c6h4 cooh cook aq c6h4 coona cook aq h2o l the point of equivalence is the point of titration when the number of

moles of naoh na added is equal to the number of moles of khp nb in the