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salinity tolerance in plants is a complex problem encompassing numerous morphological physiological and biochemical processes and adaptations at the cellular sub cellular and whole plant levels the book comprising eleven chapters deals with diverse aspects of salt tolerance including plant response to salinity and sodicity crop tolerance at different growth stages and criteria for evaluating the same the mechanism of salt injury viz osmotic ionic and nutrient imbalance has been dealt with adopting an integrated appraoch likewise the recent information on photosynthesis respiration carbohydrate nitrogen and protein metabolism enzyme dynamics and plant hormones as well as nodulation and symbiotic nitrogen fixation in legumes has been elaborated comprehensively special attention has been given to the interaction between essential nutrients and salinity as it is vital for alleviation of adverse effects of salt stress the synthesis of knowledge on different mechanisms of salt resistance including osmoregulation with organic and inorganic solutes has also been presented various methods of introducing salt tolerance in plants such as breeding genetic variations physiological approaches tissue culture somaclonal variation somatic hybridation and recombinat dna technology have been discussed the nature and properties of salt affected soils and groundwaters and principles for amelioration and management of these critical problems have been included in this book furthermore afforestation and agroforestry techniques for salt affected soils with emphasis on salt tolerant tree species and suitable tree crop combinations also find their much needed due space in the present book salinity continues to be one of the world s most serious environmental problems in agriculture the increasing world population and urbanization are forcing farmers to utilize marginal lands as well as poor quality water one of the strategies in dealing with salinity is growing salt tolerant plants and there has been increased need to understand the effects of salinity on crops owing to its high nutritive value and wide adaptability to diverse environments amaranth is considered a promising crop for marginal lands and semiarid regions the objective of the study was to investigate the response of amaranth to salinity stress and evaluate stress amelioration by calcium and seed priming salinity tolerance during germination and early seedling growth was examined for six genotypes of amaranth amaranthus species at different salt concentrations

ranging from 0 to 200 mm nacl or na2so4 enhancement of germination was observed at 25 mm while increasing salt concentrations reduced the germination percentage as well as germination rate a tricolor and accession 83 were able to germinate in 200 mm nacl while there was no germination at 200 mm na2so4 in all the genotypes overall accession 83 was the most resistant and a hybridus the most sensitive genotype particularly at high salt concentrations inhibition of germination was greater in na2so4 than in nacl salinity treatments amaranth was more salt tolerant at germination than at seedling growth seedling emergence survival and growth were reduced by salinity and at much lower concentrations than at seed germination differences in salt tolerance were noted among the genotypes salinity stress was initiated at different growth stages cotyledon stage 2 leaf stage and 4 leaf stage in order to determine whether tolerance of amaranth differs with the stage of development the treatment either continued until termination of the experiment or for 14 days at each stage amaranth plants were less sensitive to salinity when the stress was initiated at the 4 leaf stage lower salt concentrations had less detrimental effects than higher concentrations when applied at the cotyledon stage application of low salt concentration at cotyledon stage for 14 days did not have any effect on plant growth the results indicate that it is feasible to use saline water for growing amaranth with minimum yield losses if salt concentration duration of exposure and time of salinization are carefully managed differences in salinity tolerance among amaranth genotypes were analyzed in terms of plant survival growth gas exchange water use and leaf anatomical changes a hypochondriacus and a cruentus showed greater tolerance to salinity since they survived in 200 mm nacl treatment and the reduction in growth at 50 and 100 mm was lower than that of a tricolor and accession 83 a hypochondriacus and a cruentus were more efficient water users and partitioned photosynthates towards shoot growth as opposed to the other two genotypes photosynthetic rate stomatal conductance stomatal density and apertures were reduced by salinity but were higher in a tricolor than in a cruentus salinity resulted in a cruentus developing thicker leaves compared to a tricolor productivity on saline soils can be increased by growing genotypes more tolerant to salinity the interactive effect of salinity and water stress on amaranth plant growth was evaluated it was found that the reduction in shoot growth was greater in plants submitted to water stress than in those submitted to salt or salt water stress water use efficiency was increased while leaf water and osmotic potentials were reduced by the salinity stress treatments in drying soil plants previously salinized had a greater degree of osmotic adjustment so that plants were able to continue growth for a longer period compared to water stressed plants the effect of calcium in ameliorating salt stress was investigated supplementary calcium either as caso4 or cacl2 ameliorated the negative effects of salinity on growth gas exchange membrane permeability and mineral uptake in a separate experiment it was shown that it is feasible to mitigate the adverse effects of salinity on amaranth seed germination seedling survival and growth by seed priming and that the positive effect of priming persisted to vegetative growth stage priming with caso4 nacl showed a greater positive response than priming with the individual salts a major worldwide threat to agricultural productivity is undoubtedly due to environments with stressful factors including drought salinity and extreme temperatures based on contributions presented at the international conference on biosaline agriculture and high salinity tolerance held in gammarth tunisia november 2006 this book reviews the current state of knowledge in biosaline agriculture and high salinity tolerance in plants salinity and water stress limit crop productivity worldwide and generate substantial economic losses each year yet innovative research on crop and natural resource management can reveal cost effective ways in which farmers can increase both their productivity and their income presenting recent research findings on salt stress water

stress and stress adapted plants this book offers insights into new strategies for increasing the efficiency of crops under stressful environments the strategies are based on conventional breeding and advanced molecular techniques used by plant physiologists and are discussed using specific case studies to illustrate their potential the book emphasizes the effects of environmental factors on specific stages of plant development and discusses the role of plant growth regulators nutrients osmoprotectants and antioxidants in counteracting their adverse affects synthesising updated information on mechansisms of stress tolerance at cell tissue and whole plant level this book provides a useful reference text for post graduate students and researchers involved in the fields of stress physiology and plant physiology in general with additional readership amongst researchers in horticulture agronomy crop science conservation environmental management and ecological restoration halophytes for food security in dry lands addresses the concerns surrounding global food scarcity especially focusing on those living in arid and dry lands the book touches on food crises in dry regions of the world and proposes halophytes as an alternate source of consumption for such areas halophytes those plants that thrive in saline soil and provide either food source options themselves or positively enhance an eco system s ability to produce food and are thus an important and increasingly recognized option for addressing the needs of the nearly 1 6 of the world s population that lives in these arid and semi arid climates including presentations from the 2014 international conference on halophytes for food security in dry lands this book features insights from the leading researchers in the subject it is a valuable resource that includes information on the nutritional value of halophytes their genetic basis and potential enhancement adaption of halophytes and lessons learned thus far provides comprehensive coverage of the importance and utilization of halophytes to compensate the demand of food in whole world especially in the dry regions contains insights from ecological to molecular fields includes edible halophytes as well as those that enhance food producing eco systems presents information for improving abiotic stress tolerance in plants world population is growing at an alarming rate and is anticipated to reach about six billion by the end of year 2050 on the other hand agricultural productivity is not increasing at a required rate to keep up with the food demand the reasons for this are water shortages depleting soil fertility and mainly various abiotic stresses the fast pace at which developments and novel findings that are recently taking place in the cutting edge areas of molecular biology and basic genetics have reinforced and augmented the efficiency of science outputs in dealing with plant abiotic stresses in depth understanding of the stresses and their effects on plants is of paramount importance to evolve effective strategies to counter them this book is broadly dived into sections on the stresses their mechanisms and tolerance genetics and adaptation and focuses on the mechanic aspects in addition to touching some adaptation features the chief objective of the book hence is to deliver state of the art information for comprehending the nature of abiotic stress in plants we attempted here to present a judicious mixture of outlooks in order to interest workers in all areas of plant sciences soil salinity is a key abiotic stress and poses serious threats to crop yields and quality of produce owing to the underlying complexity conventional breeding programs have met with limited success even genetic engineering approaches via transferring overexpressing a single direct action gene per event did not yield optimal results nevertheless the biotechnological advents in last decade coupled with the availability of genomic sequences of major crops and model plants have opened new vistas for understanding salinity responses and improving salinity tolerance in important glycophytic crops our goal is to summarize these findings for those who wish to understand and target the molecular mechanisms for producing salt tolerant and high yielding crops through

this 2 volume book series we critically assess the potential venues for imparting salt stress tolerance to major crops in the post genomic era accordingly perspectives on improving crop salinity tolerance by targeting the sensory ion transport and signaling mechanisms are presented here in volume 1 volume 2 will focus on the potency of post genomic era tools that include rnai genomic intervention genome editing and systems biology approaches for producing salt tolerant crops this book offers effective low cost and user friendly protocols for the pre field selection of salt tolerant mutants in cereal crops it presents simple methods for measuring soil salinity including soil sampling and the analysis of water soluble salts and describes a detailed but simple screening test for salt tolerance in rice wheat and barley seedlings which uses hydroponics the protocols are devised for use by plant breeders and can be easily accommodated into breeding practice in biology the very big global and thevery small molecular issues currently appear to be in the limelight ofpublic interest and research funding policies they are in danger of drifting apart from each other they apply very coarse and very fine scaling respectively but coherence is lost when the various intermediate levels of different scales are neglected regarding salinity we are clearly dealing with a global problem which due to progressing salinization of arable land is of vital interest for society explanations and basic understanding as well as solutions and remedies may finally lie at the molecular level it is a general approach in science to look for understanding of any system under study at the next finer or lower level of scaling this in itself shows that we need a whole ladder of levels with increasingly finer steps from the global impact to the molecular bases of salinity relations it is in this vein that the 22 chapters of this book aim at providing an integrated view of salinity 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 the symposium on high salinity tolerant plants held at the university of al ain in december 1990 dealt primarily with plants tolerating salinity levels exceeding that of ocean water and which at the same time are promising for utilization in agriculture or forestry the papers of the proceedings of this symposium have been published in two volumes this volume 1 deals with mangroves and inland high salinity tolerant plants and ecosystems and is divided into the following categories 1 vegetation analyses and descriptions of mangroves 2

ecosystem analyses 3 physiological analyses 4 utilization of mangroves and saltmarsh plants 5 soil and water analyses volume 2 deals with the improvement of salinity tolerance for traditional crops under marginal soils and irrigation water and is published in tasks for vegetation science series tavs vol 28 for over fifty years the methods in enzymology series has been the critically acclaimed laboratory standard and one of the most respected publications in the field of biochemistry the highly relevant material makes it an essential publication for researchers in all fields of life and related sciences this volume features articles on the topic of osmosensing and osmosignaling written by experts in the field the symposium on high salinity tolerant plants held at the university of al ain in december 1990 dealt primarily with plants tolerating salinity levels exceeding that of ocean water and which at the same time are promising for utilization in agriculture or forestry the papers of the proceedings of this symposium have been published in two volumes this volume 1 deals with mangroves and inland high salinity tolerant plants and ecosystems and is divided into the following categories 1 vegetation analyses and descriptions of mangroves 2 ecosystem analyses 3 physiological analyses 4 utilization of mangroves and saltmarsh plants 5 soil and water analyses volume 2 deals with the improvement of salinity tolerance for traditional crops under marginal soils and irrigation water and is published in tasks for vegetation science series tavs vol 28 the symposium on high salinity tolerant plants held at the university of al ain in december 1990 dealt primarily with plants tolerating salinity levels exceeding that of ocean water and which at the same time are promising for utilization in agriculture or forestry these plants could be very useful for a country like the uae where fresh water resources are very scarce and the groundwater available at some places is already very salty more than 60 million woody trees shrubs have been planted so far and more are planned for the inland plains underlain with brackish groundwater these species were no solution for the widely barren shoreline of the uae here mangrove species were of potential use and one species avicennia marina occurs widely and has been successfully planted for about a decade converting the tree plantations into economically useful cropping systems is still a problem requiring much research and development the book deals in several sections with conventional irrigation systems using marginal water the species used in these systems are mostly hybrids of conventional crops the irrigation systems however have similar problems as may be expected for irrigation with seawater papers show the participants experiments in this area the volume serves as a link between scientists working for the improvement of classical irrigation systems and those interested in the application of a new dimension of salinity levels for irrigation water life presumably arose in the primeval oceans with similar or even greater salinity than the present ocean so the ancient cells were designed to withstand salinity however the immediate ancestors of land plants most likely lived in fresh or slightly brackish water the fresh brackish water origins might explain why many land plants including some cereals can withstand moderate salinity but only 1 2 of all the higher plant species were able to re discover their saline origins again and survive at increased salinities close to that of seawater from a practical side salinity is among the major threats to agriculture having been one of the reasons for the demise of the ancient mesopotamian sumer civilisation and in the present time causing huge annual economic losses of over 10 billion usd the effects of salinity on plants include osmotic stress disruption of membrane ion transport direct toxicity of high cytoplasmic concentrations of sodium and chloride on cellular processes and induced oxidative stress ion transport is the crucial starting point that determines salinity tolerance in plants transport via membranes is mediated mostly by the ion channels and transporters which ensure selective passage of specific ions the molecular and structural diversity of these ion channels and transporters is amazing

obtaining the detailed descriptions of distinct ion channels and transporters present in halophytes marine algae and salt tolerant fungi and then progressing to the cellular and the whole organism mechanisms is one of the logical ways to understand high salinity tolerance transfer of the genes from halophytes to agricultural crops is a means to increase salt tolerance of the crops the theoretical scientific approaches involve protein chemistry structure function relations of membrane proteins synthetic biology systems biology and physiology of stress and ion homeostasis at the time of compiling this e book many aspects of ion transport under salinity stress are not yet well understood the e book has attracted researchers in ion transport and salinity tolerance we have combined our efforts to achieve a wider more detailed understanding of salt tolerance in plants mediated by ion transport to understand present and future ways to modify and manipulate ion transport and salinity tolerance and also to find natural limits for the modifications the halophytes are highly specialized plants which have greater tolerance to salt they can germinate grow and reproduce successfully in saline areas which would cause the death of regular plants most halophytic species are found in salt marsh systems along seashores or around landlocked inland lakes and flat plains with high evaporation the halophytes play very significant role in the saline areas specially in the coast by overcoming the salinity in different ways viz with regulating mechanisms in which excess salts are excreted and with out regulating mechanism which may include succulents or cumulative types besides that they protect coast from erosion and cyclones provide feeding ground and nursery for fish shrimps and birds halophytes get increasing attention today because of the steady increase of the salinity in irrigation systems in the arid and semi arid regions where the increasing population reaches the limits of freshwater availability in many countries halophytes have been successfully grown on saline wasteland to provide animal fodder and have the potential for rehabilitation and even reclamation of these sites the value of certain salt tolerant grass species has been recognized by their incorporation in pasture improvement programs in many salt affected regions throughout the world there have been recent advances in selecting species with high biomass and protein levels in combination with their ability to survive a wide range of environmental conditions including salinity saline land is a resource capable of significant production recent advances in research in breeding for salt tolerance in wheat biotechnology in rice and selection and rehabilitation of salt tolerant plants are of economic importance in arid saline conditions this book gives some practical approaches for saline agriculture and afforestation and describes examples of cultivating salt tolerant halophytic plants for commercial interest on salt affected land or with highly salinized water in australia china central asia egypt pakistan and russia it also explores the possibilities of arid saline agriculture and afforestation in uae the latest update on improving crop resistance to abiotic stress using the advanced key methods of proteomics genomics and metabolomics the wellbalanced international mix of contributors from industry and academia cover work carried out on individual crop plants while also including studies of model organisms that can then be applied to specific crop plants soil salinity is a key abiotic stress and poses serious threats to crop yields and quality of produce owing to the underlying complexity conventional breeding programs have met with limited success even genetic engineering approaches via transferring overexpressing a single direct action gene per event did not yield optimal results nevertheless the biotechnological advents in last decade coupled with the availability of genomic sequences of major crops and model plants have opened new vistas for understanding salinity responses and improving salinity tolerance in important glycophytic crops our goal is to summarize these findings for those who wish to understand and target the molecular mechanisms for

producing salt tolerant and high yielding crops through this 2 volume book series we critically assess the potential venues for imparting salt stress tolerance to major crops in the post genomic era accordingly perspectives on improving crop salinity tolerance by targeting the sensory ion transport and signaling mechanisms were presented in volume 1 volume 2 now focuses on the potency of post genomic era tools that include rnai genomic intervention genome editing and systems biology approaches for producing salt tolerant crops this book offers an overview of salt stress which has a devastating effect on the yields of various agricultural crops around the globe excessive salts in soil reduce the availability of water inhibit metabolic processes and affect nutrient composition osmotic balance and hydraulic conductivity plants have developed a number of tolerance mechanisms such as various compatible solutes polyamines reactive oxygen species and antioxidant defense mechanisms ion transport and compartmentalization of injurious ions the exploitation of genetic variation use of plant hormones mineral nutrients soil microbe interactions and other mechanical practices are of prime importance in agriculture and as such have been the subject of multidisciplinary research covering both theoretical and practical aspects the book provides essential physiological ecological biochemical environmental and molecular information as well as perspectives for future research it is a valuable resource for students teachers and researchers and anyone interested in agronomy ecology stress physiology environmental science crop science and molecular biology highlights the potential of biosaline agriculture in a changing environment covers all important topics related to halophyte biology including biochemistry genetics and genomics provides information on potential use of halophytes each topic is explained in detail and examined from various angles more than 100 contributions by international experts this book discusses the role of salt in current agricultural approaches including the low salt tolerance of agricultural crops and trees impact of saline soils and salt resistant plants halophytes are extremely salt tolerant plants which are able to grow and survive under salt at concentrations as high as 5 g l by maintaining negative water potential the salt tolerant microbes inhabiting the rhizospheres of halophytes may contribute to their salt tolerance and the rhizospheres of halophytic plants provide an ideal opportunity for isolating various groups of salt tolerant microbes that could enhance the growth of different crops under salinity stress the book offers an overview of salt tolerant microbes ability to increase plant tolerance to salt to facilitate plant growth the potential of the halophytes rhizospheres as a reservoir of beneficial salt tolerant microbes their future application as bio inoculants in agriculture and a valuable resource for an alternative way of improving crop tolerance to salinity and promoting saline soil based agriculture this special collection of reviews highlights some of the recent advances in applied aspects of plant halophytes microbe interactions and their contribution towards eco friendly approaches saline soil based agriculture life presumably arose in the primeval oceans with similar or even greater salinity than the present ocean so the ancient cells were designed to withstand salinity however the immediate ancestors of land plants most likely lived in fresh or slightly brackish water the fresh brackish water origins might explain why many land plants including some cereals can withstand moderate salinity but only 1 2 of all the higher plant species were able to re discover their saline origins again and survive at increased salinities close to that of seawater from a practical side salinity is among the major threats to agriculture having been one of the reasons for the demise of the ancient mesopotamian sumer civilisation and in the present time causing huge annual economic losses of over 10 billion usd the effects of salinity on plants include osmotic stress disruption of membrane ion transport direct toxicity of high cytoplasmic concentrations of sodium and chloride on cellular processes and induced oxidative stress ion transport is the crucial

starting point that determines salinity tolerance in plants transport via membranes is mediated mostly by the ion channels and transporters which ensure selective passage of specific ions the molecular and structural diversity of these ion channels and transporters is amazing obtaining the detailed descriptions of distinct ion channels and transporters present in halophytes marine algae and salt tolerant fungi and then progressing to the cellular and the whole organism mechanisms is one of the logical ways to understand high salinity tolerance transfer of the genes from halophytes to agricultural crops is a means to increase salt tolerance of the crops the theoretical scientific approaches involve protein chemistry structure function relations of membrane proteins synthetic biology systems biology and physiology of stress and ion homeostasis at the time of compiling this e book many aspects of ion transport under salinity stress are not yet well understood the e book has attracted researchers in ion transport and salinity tolerance we have combined our efforts to achieve a wider more detailed understanding of salt tolerance in plants mediated by ion transport to understand present and future ways to modify and manipulate ion transport and salinity tolerance and also to find natural limits for the modifications this open access book is an outcome of the collaboration between the soil and water management crop nutrition section joint fao iaea division of nuclear techniques in food and agriculture department of nuclear sciences and applications international atomic energy agency iaea vienna austria and dr shabbir a shahid senior salinity management expert freelancer based in united arab emirates the objective of this book is to develop protocols for salinity and sodicity assessment and develop mitigation and adaptation measures to use saline and sodic soils sustainably the focus is on important issues related to salinity and sodicity and to describe these in an easy and user friendly way the information has been compiled from the latest published literature and from the authors publications specific to the subject matter the book consists of six chapters chapter 1 introduces the terms salinity and sodicity and describes various salinity classification systems commonly used around the world chapter 2 reviews global distribution of salinization and socioeconomic aspects related to salinity and crop production chapters 3 covers comprehensively salinity and sodicity adaptation and mitigation options including physical chemical hydrological and biological methods chapter 4 discusses the efforts that have been made to demonstrate the development of soil salinity zones under different irrigation systems chapter 5 discusses the quality of irrigation water boron toxicity and relative tolerance to boron the effects of chlorides on crops chapter 6 introduces the role of nuclear techniques in saline agriculture historically scientists and laymen have regarded salinity as a hazar dous detrimental phenomenon this negative view was a principal reason for the lack of agricultural development of most arid and semi arid zones of the world where the major sources of water for biological production are saline the late hugo boyko was probably the first scientist in recent times to challenge this commonly held pessimistic view of salinity his research in israel indicated that many plants can be irrigated with saline water even at seawater strength if they are in sandy soil a technique that could open much barren land to agriculture this new even radical approach to salinity was clearly enunciated in the book he edited and most appropriately entitled salinity and aridity new approaches to old problems 1966 a decade later three members of the united states national science foundation nsf lewis mayfield james aller and oskar zaborsky formulated the biosaline concept namely that poor soils high solar insolation and saline water which prevail in arid lands should be viewed as useful resources rather than as disadvantages and that these resources can be used for non traditional production of food fuels and chemicals the first international workshop on biosaline research was con vened at kiawah island south carolina in 1977 by a san pietro this bulletin explains how soil salinity affects field crops provides information on the

salt tolerance of field crops and tells how to manage crops on saline soils the identification and development of turfgrasses with improved salinity tolerance is necessary to maintain adequate turf quality when utilizing nonpotable irrigation water high salinity can cause salt stress injury resulting in poor turf quality therefore breeders need to develop cultivars with improved salinity tolerance however the development of salt tolerant cultivars has been slow due in part to the fact that inheritance of salinity tolerance is complex previous screening techniques developed for turfgrasses have included growing plants directly in hydroponic saltwater solutions or some modification including salt solution sand culture system however these do not include foliar exposure to irrigation water the goal of this thesis was to develop novel salinity screening procedures for cool season turfgrasses to accurately mimic realistic management conditions and screen and evaluate germplasm and cultivars for salinity tolerance the novel screening methods were compared to standard techniques to determine the feasibility of this screening method for breeding purposes inheritance characteristics associated with salinity tolerance will determine the effectiveness of a breeding program in developing new cultivars with increased salinity tolerance to achieve the objectives a number of greenhouse and field experiments were designed between the summers of 2005 and 2010 overhead irrigated salt spray chambers were constructed in the greenhouse and used to evaluate perennial ryegrass clones and kentucky bluegrass cultivars for salinity tolerance at various salinity concentrations cultivars of three cool season turfgrass species were established in the field and screened for salinity tolerance using overhead irrigation using the same field screening procedure salinity tolerance screening was performed on a number of diverse perennial ryegrass genotypes as well as parents and progeny from controlled crosses significant differences were observed between salinity treatments in the field and greenhouse variation in salinity responses ranged from highly tolerant to highly susceptible the three salinity screening techniques evaluated were highly correlated however methods utilizing overhead irrigation resulted in higher salinity stress compared to the hydroponic technique inheritance studies indicated that additive gene effects accounted for the majority of the variance associated with salinity tolerance in perennial ryegrass indicating that recurrent selection programs should be effective in developing of salt tolerant cultivars salinity is one of the emerging problems in world wide due to the consequence of global warming the area under severity of soil salinity in both coastal and inland ecosystems across the globe is increasing constantly salinity affects approximately 7 per cent of total global land area among the food crops rice is one of the most suitable crops for these coastal areas because of its ability to flourish in flooded soils and leaching salts out of the soil hence this investigation in rice oryza sativa l was carried out to study the genetics of salinity tolerance based on the diversity analysis 14 parents were selected and for crossing the combining ability analysis revealed that the importance of non additive gene action in controlling all the salinity tolerant and yield contributing traits the characters viz chlorophyll a b ratio and shoot na k ratio had negative significant association and chlorophyll stability index catalase and peroxidase were positive significant association with the grain yield the in vitro screening revealed that the salt tolerant genotypes were recorded high callus induction frequency than the salt susceptible varieties the symposium on high salinity tolerant plants held at the university of al ain in december 1990 dealt primarily with plants tolerating salinity levels exceeding that of ocean water and which at the same time are promising for utilization in agriculture or forestry the papers of the proceedings of this symposium have been published in two volumes this volume 1 deals with mangroves and inland high salinity tolerant plants and ecosystems and is divided into the following categories 1 vegetation analyses and descriptions of mangroves 2 ecosystem analyses 3 physiological analyses 4

utilization of mangroves and saltmarsh plants 5 soil and water analyses volume 2 deals with the improvement of salinity tolerance for traditional crops under marginal soils and irrigation water and is published in tasks for vegetation science series tavs vol 28 this book will shed light on the effect of salt stress on plants development proteomics genomics genetic engineering and plant adaptations among other topics understanding the molecular basis will be helpful in developing selection strategies for improving salinity tolerance the book will cover around 25 chapters with contributors from all over the world environmental conditions and changes irrespective of source cause a variety of stresses one of the most prevalent of which is salt stress excess amount of salt in the soil adversely affects plant growth and development and impairs production nearly 20 of the world s cultivated area and nearly half of the world s irrigated lands are affected by salinity processes such as seed germination seedling growth and vigour vegetative growth flowering and fruit set are adversely affected by high salt concentration ultimately causing diminished economic yield and also quality of produce most plants cannot tolerate salt stress high salt concentrations decrease the osmotic potential of soil solution creating a water stress in plants and severe ion toxicity the interactions of salts with mineral nutrition may result in nutrient imbalances and deficiencies the consequence of all these can ultimately lead to plant death as a result of growth arrest and molecular damage to achieve salt tolerance the foremost task is either to prevent or alleviate the damage or to re establish homeostatic conditions in the new stressful environment barring a few exceptions the conventional breeding techniques have been unsuccessful in transferring the salt tolerance trait to the target species a host of genes encoding different structural and regulatory proteins have been used over the past 5 6 years for the development of a range of abiotic stress tolerant plants it has been shown that using regulatory genes is a more effective approach for developing stress tolerant plants thus understanding the molecular basis will be helpful in developing selection strategies for improving salinity tolerance this book will shed light on the effect of salt stress on plants development proteomics genomics genetic engineering and plant adaptations among other topics the book will cover around 25 chapters with contributors from all over the world biology of halophytes is a monograph on the biological aspects of halophytes and their behavior under saline conditions it explores the physioecological characteristics of halophytes such as reproduction growth metabolism water relations mineral nutrition salt transport salt secretion and salt resistance it also provides ecological information on higher marine plants particularly submerged angiosperms mangroves and high coast plants organized into 16 chapters this volume begins with an overview of sources of salinity and the development and nature of salines and salt affected soils it proceeds with a discussion of the classification of halophytes their mutual relationships distribution and sociology it also summarizes autecological information on some terrestrial halophytes and introduces the reader to the formative effects of salinity interrelationships between plants and spatial distribution within the community ion transport and mineral nutrition and regulation of salt content of shoots before concluding with a short review on ecotypic differentiation in halophytes this book will be a valuable resource for advanced students as well as teachers of plant and environmental sciences this volume focuses on reclamation management and utilization of salt affected soils their sustainable use and evaluation of plants inhabiting naturally occurring saline habitats it is of interest to scientists and students as well as agricultural institutions and farmers to increase the awareness of salinity problems the volume is supported by unesco doha qatar and has an international authorship salt stress is one of the most damaging abiotic stresses because most crop plants are susceptible to salinity to different degrees according to the fao about 800 million has of land are affected by salinity worldwide unfortunately this situation will worsen in the context of

climate change where there will be an overall increase in temperature and a decrease in average annual rainfall worldwide this special issue presents different research works and reviews on the response of plants to salinity focused from different points of view physiological biochemical and molecular levels although an important part of the studies on the response to salinity have been carried out with arabidopsis plants the use of other species with agronomic interest is also notable including woody plants most of the conducted studies in this special issue were focused on the identification and characterization of candidate genes for salt tolerance in higher plants this identification would provide valuable information about the molecular and genetic mechanisms involved in the salt tolerance response and it also supplies important resources to breeding programs for salt tolerance in plants

- Ecophysiology Of High Salinity Tolerant Plants
- Towards The Rational Use Of High Salinity Tolerant Plants
- Biosaline Agriculture And High Salinity Tolerance
- Towards The Rational Use Of High Salinity Tolerant Plants
- Towards The Rational Use Of High Salinity Tolerant Plants
- Salinity Tolerance In Plants Methods Mechanisms And Management
- Salinity Tolerance In Plants Mechanisms And Regulation Of Ion Transport
- Salinity Tolerance In Plants Mechanisms And Regulation Of Ion Transport
- Towards The Rational Use Of High Salinity Tolerant Plants
- Salinity Responses And Tolerance In Plants Volume 2
- Salinity Responses And Tolerance In Plants Volume 1
- Biotechnologies Of Crop Improvement Volume 3
- Biosaline Agriculture And Salinity Tolerance In Plants
- Salt Stress In Plants
- Salt Tolerance Of Field Crops
- Abiotic Stress In Plants
- Salinity Environment Plants Molecules
- Saline Soil based Agriculture By Halotolerant Microorganisms
- Salt Stress Microbes And Plant Interactions Causes And Solution
- Halophytes For Food Security In Dry Lands
- Handbook Of Halophytes
- Improving Crop Resistance To Abiotic Stress
- Biosalinity In Action Bioproduction With Saline Water
- Molecular Responses To Cold Drought Heat And Salt Stress In Higher Plants
- Salinity And Water Stress
- Cotton Physiology
- Osmosensing And Osmosignaling
- Guideline For Salinity Assessment Mitigation And Adaptation Using Nuclear And Related Techniques
- Ecophysiology And Responses Of Plants Under Salt Stress
- Screening And Evaluation Of Cool season Turfgrasses For Increased Salinity Tolerance
- Agriculture Information Bulletin
- Salinity Tolerance From Model Or Wild Plants To Adapted Crops
- Molecular And Genetic Characterization For Salt Tolerance In Rice
- Salinity Tolerance In Plants
- Protocols For Pre Field Screening Of Mutants For Salt Tolerance In Rice Wheat And Barley
- Agricultural Salinity Assessment And Management
- Biology Of Halophytes
- Responses Of Amaranth To Salinity Stress
- Prospects For Saline Agriculture
- A Guide To Changing Plant Communities