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Regular consumption of plant-based protein foods instead of animal-based protein foods reduces the risk factors for cardiovascular diseases, diabetes and certain cancers. Apart from human health, the adverse effects to the environment due to the production of protein is much higher for animal sources than plant sources. Greenhouse gas emissions from the production of one pound of lamb meat, for example, are thirty times higher than one pound of lentils. As consumers are increasingly aware of personal health and environmental impact of food production, the demand for plant protein foods is increasing globally. This trend has prompted several large-scale collaborative research projects on plant-based protein products supported by the industry and governmental agencies. Several established multinational meat companies have started adding plant-protein product lines to meet the current demand. This book presents the first comprehensive compilation of literature on plant-based protein foods. Chapters cover protein extraction technologies from plants, comparison of amino acid profiles of plant- and animal-based proteins, approaches to product development for plant-based protein products, health benefits of plant-based protein foods, market opportunities, and future challenges. Plant Protein Foods is an essential reference for consumers, students, researchers, food manufacturers and other stakeholders interested in this domain.
Agro-Ecosystem Diversity: Impact on Food Security and Environmental Quality presents cutting-edge exploration of developing novel farming systems and introduces landscape ecology to agronomy. It encompasses the broad range of links between agricultural development and ecological impact and how to limit the potential negative results. Presented in seven sections, each focusing on a specific challenge to sustaining diversity, the book provides insights toward the argument that by re-introducing diversity, it should be possible to maintain a high level of productivity of agro-ecosystems while also maintaining and/or restoring a satisfactory level of environment quality and biodiversity. Demonstrates that diversified agro-ecosystems can be intensified with environmental quality preserved, restored and enhanced Includes analysis of economic constraints leading to specialization of farms and regions and the social locking forces resisting to diversification of agro-ecosystems Presents a global vision of world agriculture and the tradeoff between a necessary increase in food production and restoring environment quality
This guide features cutting-edge methods for using cover crops to enhance vineyard performance. Based on extensive research, this guide details technical and theoretical information on how cover crops affect vineyards and promote ecological stability. With how-to instructions for activities such as field application, this practical reference is a must-have for vineyard owners, managers, consultants, and pest control advisers.
Agricultural Salinity Assessment and Management
Fundamentals of Field Crop Breeding
Fabaceae, Liliaceae, Solanaceae, and Umbelliferae
poultry products : raw, processed, prepared
Plant Protein Foods

Abstract: Did you know that the dark meat of a young tom turkey, roasted with skin, has more calcium and less saturated fat than that of a young hen turkey? This information comes from a comprehensive analysis of all kinds of fowl, including pheasant, squab and guinea, presented by the USDA. The analysis covers proximate content, minerals, vitamins, lipids and amino acids for 100 g. edible portion and 1 lb. as purchased for various par and whole poultry, raw and cooked by various methods. Poultry food products such as frankfurters, spreads, sausages and boned, canned meat are included.
Principles and farm-tested practices for no-till market gardening--for healthier, more productive soil! From the host of the popular The No-Till Market Garden Podcast—heard around the world with nearly one million downloads! Discovering how to meet the soil's needs is the key task for every market gardener. In this comprehensive guide, Farmer Jesse Frost shares all he has learned through experience and experimentation with no-till practices on his home farm in Kentucky and from interviews and visits with highly successful market gardeners in his role as host of The No-Till Market Garden Podcast. The Living Soil Handbook is centered around the three basic principles of no-till market gardening: Disturb the soil as little as possible Keep it covered as much as possible Keep it planted as much as possible. Farmer Jesse then guides readers in applying those principles t their own garden environment, with their own materials, to meet their own goals. Beginning with an exploration of the importance of photosynthesis to living soil, Jesse provides in-depth information on: Turning over beds Using compost and mulch Path management Incorporating biology, maintaining fertility Cover cropping Diversifying plantings through intercropping Production methods for seven major crops Throughout, the book emphasizes practical information on all the best tools and practices for growers who want to build their livelihood around maximizing the health of their soil. Farmer Jesse reminds growers that “as possible” is the mantra for protecting the living soil: disturb the soil as little as you possibly can in your context. He does not believe that growers should anguish over what does and does not qualify as “no-till.” If you are using a tool to promote soil and biology, that's the goal. Jesse's goal with The Living Soil Handbook is to provide a comprehensive set of options, materials, and field-tested practices to inspire growers to design a soil-nurturing no-till system in their unique garden or farm ecosystem. "[A] practical, informative debut. . . .Gardeners interested in sustainable agriculture will find this a great place to start."—Publishers Weekly "Frost offers a comprehensive, science-based, sympathetic, wholly practical guide to soil building, that most critical factor in vegetable gardening for market growers and home gardeners alike. A gift to any vegetable plot that will keep on giving."—Booklist (starred review)
A collection of all of Vavgilov's works on the origin and geography of cultivated plant species.
Meristems, Growth and Development in Woody Plants
The Golden Nematode Handbook
The Use of Saline Waters for Crop Production
The Lentil
Catalogue of Research Literature for Development: Food production and nutrition
The A-Z Guide to Food as Medicine, Second Edition
This book describes the concepts, strategies and techniques for pulse-crop improvement in the era of climate change, highlighting the latest advances in plant molecular mapping and genome sequencing. Genetic mapping of genes and QTLs has broadened the scope of marker-assisted breeding and map-based cloning in almost all major pulse crops. Genetic transformation, particularly using alien genes conferring resistance to herbicide, insects and diseases has facilitated the development of a huge number of genetically modified varieties of the major pulse crops. Since the genome sequencing of rice in 2002, genomes of over 7 pulse crops have been sequenced. This has resulted in the possibility of deciphering the exact nucleotide sequence and chromosomal positions of agroeconomic genes. Most importantly, comparative genomics and genotyping-by-sequencing has opened up a new vista for exploring wild crop relatives for identification of useful donor genes.
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
This first volume of the Handbook of Plant Breeding book series is devoted to vegetable crops breeding. Each chapter is dedicated to a major vegetable crop. Each chapter contains a comprehensive review of the diversity, breeding techniques, achievements and use of the most advanced molecular techniques in the genetic improvement of these crops. The purpose of the book is to provide breeders and researchers from the public and private sectors with updated information and the latest novelties in the breeding of specific crops of economic relevance. Also, it serves as a major reference book for post-graduate courses and PhD courses on breeding vegetable crops.
Quantitative Genetics in Maize Breeding
Conservation Plants for the Northeast
Physiological, Molecular and Genetic Perspectives
Managing Cover Crops Profitably (3rd Ed.)
Extended Versions of Papers Presented at the Symposium on Biological Nitrogen Fixation for Sustainable Agriculture at the 15th Congress of Soil Science, Acapulco, Mexico, 1994
Cover Crops for Walnut Orchards
The book provides wide range of information on seed storage. In the beginning the biology of seeds and factors which influence seed viability and storage is explained. How the seed storage can be made more effective from the initial selection and dryingof seeds to protective measures, packaging and transportation is explanied. All type of illustrations are provided in respect of machinery and facilities commonly used in the treatment and storage of seeds. Among many other, short accounts are given of varietal variation in viability of seeds variation in tolerance of mechanical injury sustained during handling, and cytological changes which take place during storage, including the spontaneous appearance of mutations and occurrence of chromosomal abnormalities. A Well produced and thorough book likely to be valued by all PG, researchers, seed societies botanist and Agriculturists and all those who are interested about seed storage.
Protein plays a critical role in human nutrition. Although animal-derived proteins constitute the majority of the protein we consume, plant-derived proteins can satisfy the same requirement with less environmental impact. Sustainable Protein Sources allows readers to understand how alternative proteins such as plant, fungal, algal, and insect protein can take the place of more costly and less efficient animal-based sources. Sustainable Protein Sources presents the various benefits of plant and alternative protein consumption, including those that benefit the environment, population, and consumer trends. The book presents chapter-by-chapter coverage of protein from various sources, including cereals and legumes, oilseeds, pseudocereals, fungi, algae, and insects. It assesses the nutrition, uses, functions, benefits, and challenges of each of these proteins. The book also explores opportunities to improve utilization and addresses everything from ways in which to increase consumer acceptability, to methods of improving the taste of products containing these proteins, to the ways in which policies can affect the use of plant-derived proteins. In addition, the book delves into food security and political issues which affect the type of crops that are cultivated and the sources of food proteins. The book concludes with required consumer choices such as dietary changes and future research ideas that necessitate vigorous debate for a sustainable planet. Introduces the need to shift current animal-derived protein sources to those that are more plant-based Presents a valuable compendium on plant and alternate protein sources covering land, water, and energy uses for each type of protein source Discusses nutritive values of each protein source and compares each alternate protein to more complete proteins Provides an overview of production, including processing, protein isolation, use cases, and functionality Presents solutions to challenges, along with taste modulation Focuses on non-animal derived proteins Identifies paths and choices that require consumer and policymaker debate and action
Maize is used in an endless list of products that are directly or indirectly related to human nutrition and food security. Maize is grown in producer farms, farmers depend on genetically improved cultivars, and maize breeders develop improved maize cultivars for farmers. Nikolai I. Vavilov defined plant breeding as plant evolution directed by man. Among crops, maize is one of the most successful examples for breeder-directed evolution. Maize is a cross-pollinated species with unique and separate male and female organs allowing techniques from both self and cross-pollinated crops to be utilized. As a consequence, a diverse set of breeding methods can be utilized for the development of various maize cultivar types for all economic conditions (e.g., improved populations, inbred lines, and their hybrids for different types of markets). Maize breeding is the science of maize cultivar development. Public investment in maize breeding from 1865 to 1996 was $3 billion (Crosbie et al., 2004) and the return on investment was $260 billion as a consequence of applied maize breeding, even without full understanding of the genetic basis of heterosis. The principles of quantitative genetics have been successfully applied by maize breeders worldwide to adapt and improve germplasm sources of cultivars for very simple traits (e.g. maize flowering) and very complex ones (e.g., grain yield). For instance, genomic efforts have isolated early-maturing genes and QTL for potential MAS but very simple and low cost phenotypic efforts have caused significant and fast genetic progress across genotypes moving elite tropical and late temperate maize northward with minimal investment. Quantitative genetics has allowed the integration of pre-breeding with cultivar development by characterizing populations genetically, adapting them to places never thought of (e.g., tropical to short-seasons), improving them by all sorts of intra- and inter-population recurrent selection methods, extracting lines with more probability of success, and exploiting inbreeding and heterosis. Quantitative genetics in maize breeding has improved the odds of developing outstanding maize cultivars from genetically broad based improved populations such as B73. The inbred-hybrid concept in maize was a public sector invention 100 years ago and it is still considered one of the greatest achievements in plant breeding. Maize hybrids grown by farmers today are still produced following this methodology and there is still no limit to genetic improvement when most genes are targeted in the breeding process. Heterotic effects are unique for each hybrid and exotic genetic materials (e.g., tropical, early maturing) carry useful alleles for complex traits not present in the B73 genome just sequenced while increasing the genetic diversity of U.S. hybrids. Breeding programs based on classical quantitative genetics and selection methods will be the basis for proving theoretical approaches on breeding plans based on molecular markers. Mating designs still offer large sample sizes when compared to QTL approaches and there is still a need to successful integration of these methods. There is a need to increase the genetic diversity of maize hybrids available in the market (e.g., there is a need to increase the number of early maturing testers in the northern U.S.). Public programs can still develop new and genetically diverse products not available in industry. However, public U.S. maize breeding programs have either been discontinued or are eroding because of decreasing state and federal funding toward basic science. Future significant genetic gains in maize are dependent on the incorporation of useful and unique genetic diversity not available in industry (e.g., NDSU EarlyGEM lines). The integration of pre-breeding methods with cultivar development should enhance future breeding efforts to maintain active public breeding programs not only adapting and improving genetically broad-based germplasm but also developing unique products and training the next generation of maize breeders producing research dissertations directly linked to breeding programs. This is especially important in areas where commercial hybrids are not locally bred. More than ever public and private institutions are encouraged to cooperate in order to share breeding rights, research goals, winter nurseries, managed stress environments, and latest technology for the benefit of producing the best possible hybrids for farmers with the least cost. We have the opportunity to link both classical and modern technology for the benefit of breeding in close cooperation with industry without the need for investing in academic labs and time (e.g., industry labs take a week vs months/years in academic labs for the same work). This volume, as part of the Handbook of Plant Breeding series, aims to increase awareness of the relative value and impact of maize breeding for food, feed, and fuel security. Without breeding programs continuously developing improved germplasm, no technology can develop improved cultivars. Quantitative Genetics in Maize Breeding presents principles and data that can be applied to maximize genetic improvement of germplasm and develop superior genotypes in different crops. The topics included should be of interest of graduate students and breeders conducting research not only on breeding and selection methods but also developing pure lines and hybrid cultivars in crop species. This volume is a unique and permanent contribution to breeders, geneticists, students, policy makers, and land-grant institutions still promoting quality research in applied plant breeding as opposed to promoting grant monies and indirect costs at any short-term cost. The book is dedicated to those who envision the development of the next generation of cultivars with less need of water and inputs, with better nutrition; and with higher percentages of exotic germplasm as well as those that pursue independent research goals before searching for funding. Scientists are encouraged to use all possible breeding methodologies available (e.g., transgenics, classical breeding, MAS, and all possible combinations could be used with specific sound long and short-term goals on mind) once germplasm is chosen making wise decisions with proven and scientifically sound technologies for assisting current breeding efforts depending on the particular trait under selection. Arnel R. Hallauer is C. F. Curtiss Distinguished Professor in Agriculture (Emeritus) at Iowa State University (ISU). Dr. Hallauer has led maize-breeding research for mid-season maturity at ISU since 1958. His work has had a worldwide impact on plant-breeding programs, industry, and students and was named a member of the National Academy of Sciences. Hallauer is a native of Kansas, USA. José B. Miranda Filho is full-professor in the Department of Genetics, Escola Superior de Agricultura Luiz de Queiroz - University of São Paulo located at Piracicaba, Brazil. His research interests have emphasized development of quantitative genetic theory and its application to maize breeding. Miranda Filho is native of Pirassununga, São Paulo, Brazil. M.J. Carena is professor of plant sciences at North Dakota State University (NDSU). Dr. Carena has led maize-breeding research for short-season maturity at NDSU since 1999. This program is currently one the of the few public U.S. programs left integrating pre-breeding with cultivar development and training in applied maize breeding. He teaches Quantitative Genetics and Crop Breeding Techniques at NDSU. Carena is a native of Buenos Aires, Argentina. http://www.ag.ndsu.nodak.edu/plantsci/faculty/Carena.htm
Management of Biological Nitrogen Fixation for the Development of More Productive and Sustainable Agricultural Systems
Botany, Production and Uses
Agroecosystem Diversity
Survey, Laboratory, Control, and Quarantine Procedures
Plant Genetic Resources of Legumes in the Mediterranean
Science and Technology
This book covers the nutritional and nutraceutical profiles of a wide range of popularly consumed vegetables and nuts. The first half of the book focuses on popular vegetables, and describes how higher vegetable consumption reduces the risk of diseases ranging from diabetes to osteoporosis, diseases of the gastrointestinal tract, cardiovascular diseases, autoimmune diseases and cancer. The book also includes an interesting section on the antioxidant potential of mushrooms. In turn, the second half discusses the nutritional value of various nuts. Nuts are nutrient-dense foods with complex matrices rich in unsaturated fats, high-quality protein, fiber, minerals, tocopherols, phytosterols and phenolics. The respective chapters illustrate how the consumption of nuts could ward off chronic diseases like hypertension, cancer, inflammation, oxidative stress, high blood pressure, coronary heart disease etc. In order to effectively promote vegetable and nut consumption, it is necessary to know and understand the nutritional and nutraceutical profiles of vegetables & nuts. Given its scope, the book will be of interest to students, researchers, food scientists, olericulturists, dietitians and agricultural scientists alike. Those working in the vegetable and nut processing industries, horticultural departments and other agricultural departments will also find the comprehensive information relevant to their work.
Biochar is the carbon-rich product when biomass (such as wood, manure or crop residues) is heated in a closed container with little or no available air. It can be used to improve agriculture and the environment in several ways, and its stability in soil and superior nutrient-retention properties make it an ideal soil amendment to increase crop yields. In addition to this, biochar sequestration, in combination with sustainable biomass production, can be carbon-negative and therefore used to actively remove carbon dioxide from the atmosphere, with major implications for mitigation of climate change. Biochar production can also be combined with bioenergy production through the use of the gases that are given off in the pyrolysis process. This book is the first to synthesize the expanding research literature on this topic. The book's interdisciplinary approach, which covers engineering, environmental sciences, agricultural sciences, economics and policy, is a vital tool at this stage of biochar technology development. This comprehensive overview of current knowledge will be of interest to advanced students, researchers and professionals in a wide range of disciplines.
Genetic erosion, that is, the loss of native plant and genetic diversity has been exponential from the Mediterranean Basin through the Twentieth century. This careless eradication of species and genetic diversity as a result of human activities from a 'hot-spot' of diversity threatens sustainable agriculture and food security for the temperate regions of the world. Since the early 1900s there has been a largely ad hoc movement to halt the loss of plant diversity and enhance its utilisation. The Convention on Biological Diversity and Food and Agriculture Organisation of the United Nations International Undertaking on Plant Genetic Resources, both highlight the need to improve conservation methodologies and enhance utilisation techniques. It has been argued that the most important component of biodiversity is the genetic diversity of crop and forage species used to feed humans and livestock. These cultivated and related wild species provides the raw material for further selection and improvement. Leguminosae species are of major economic importance (peas, chickpeas, lentils and faba beans, as well as numerous forage species) and provide a particularly rich source of protein for human and animal foods. Their distribution is concentrated in the Mediterranean region and therefore the improvement of their conservation and use in the region is critical. This text is designed to help ensure an adequate breadth of legume diversity is conserved and to help maximise the use of that conserved diversity. The subjects of conservation and use of legume diversity, the Mediterranean ecosystem and taxonomy of legumes are introduced. Generic reviews of the taxonomy, centre of diversity, ecogeographic distribution, genetic diversity distribution, conservation status, conservation gaps and future research needs are provided, along with a discussion of the importance of rhizobia to the maintenance of legume diversity. Current ex situ and in situ conservation activities as well current legume uses are reviewed. In conclusion future priorities for ex situ and in situ plant genetic conservation and use of Mediterranean legumes are highlighted. All contributors look forward rather than simply reviewing past and current activities and therefore it is hoped that the identification of genetic erosion, location of taxonomic and genetic diversity and promotion of more efficient utilisation of conserved material will be enhanced.
Handbook of Plant Breeding
Genetic Resources, Chromosome Engineering, and Crop Improvement
Aberdeen Plant Materials Center
Composition of foods
Northeast Cover Crop Handbook
Pulse Improvement
Managing Cover Crops Profitably (3rd Ed.)DIANE Publishing
Cover crops slow erosion, improve soil, smother weeds, enhance nutrient and moisture availability, help control many pests and bring a host of other benefits to your farm. At the same time, they can reduce costs, increase profits and even create new sources of income. You¿ll reap dividends on your cover crop investments for years, since their benefits accumulate over the long term. This book will help you find which ones are right for you. Captures farmer and other research results from the past ten years. The authors verified the info. from the 2nd ed., added new results and updated farmer profiles and research data, and added 2 chap. Includes maps and charts, detailed narratives about individual cover crop species, and chap. about aspects of cover cropping.
Altering the traits of plants for the purpose of generation of desired characteristics is referred to as plant breeding. Breeding of crop plants in order to make them more adapted to human agriculture systems has been in practice for the past 10,000 years. However, the invention of the Mendelian principles of genetics and the consequent development of quantitative genetics in the 20th century has resulted in genetic crop enhancement. In the past 50 years, plant breeding has commenced a molecular era based on molecular tools to analyze RNA, proteins and DNA and relate such molecular outcomes with plant phenotype. These marker trait relations develop rapidly in order to allow more effective breeding. The aim of this book is to provide important information to the readers regarding this field and serve as a valuable source of reference.
Volume 2, Fruits
Yield Gains in Major U.S. Field Crops
Pisum Genetics
The No-Till Grower's Guide to Ecological Market Gardening
Edible Medicinal And Non-Medicinal Plants
Vegetables II
The proceedings of this conference deal with the role of cover crops in water quality management, including reducing water runoff, soil erosion, agrichemical lost in runoff, and nitrate leaching to groundwater
Reprising The 2017 American Library Association Outstanding Academic Title award-winning A-Z Guide to Food As Medicine, this new edition explores the physiological effects of more than 250 foods, food groups, nutrients, and phytochemicals in entries that include: Definition and background information such as traditional medicinal use, culinary facts, and dietary intake and deficiency information Scientific findings on the physiological effects of foods, food groups, and food constituents Bioactive dose when known, such as nutrient Dietary Reference Intakes focusing on 19-to-50-year-old individuals Safety highlights, such as nutrient Tolerable Upper Intake Levels A health professional’s comprehensive nutrition handbook that includes all nutrients, nutrient functions, "good" and "excellent" sources of nutrients, nutrient assessment, and deficiency symptoms, as well as summaries of foods, food groups, and phytochemicals. New to the Second Edition: Disease- and condition-focused Index that leads readers to foods used to manage specific conditions and diseases Focus on practical recommendations for health maintenance and disease prevention, including tables, insets, and updated scientific findings on more than a dozen new foods Accompanying teaching aids and lesson plans available online at http://www.crcpress.com Features: Dictionary-style summaries of the physiological effects of foods, food groups, nutrients, and phytochemicals alphabetically listed for quick access Approximately 60 B & W images of foods; informational tables and insets that define or illustrate concepts such as drug terminologies, classes of phytochemicals, and medicinal aspects of foods and of a plant-based diet Over 1,000 scientific references from peer-reviewed sources, including The Academy of Nutrition and Dietetics Evidence Analysis Library, and position statements of major health organizations
Advances in molecular biology and genome research in the form of molecular breeding and genetic engineering put forward innovative prospects for improving productivity of many pulses crops. Pathways have been discovered, which include regulatory elements that modulate stress responses (e.g., transcription factors and protein kinases) and functional genes, which guard the cells (e.g., enzymes for generating protective metabolites and proteins). In addition, numerous quantitative trait loci (QTLs) associated with elevated stress tolerance have been cloned, resulting in the detection of critical genes for stress tolerance. Together these networks can be used to enhance stress tolerance in pulses. This book summarizes recent advances in pulse research for increasing productivity, improving biotic and abiotic stress tolerance, and enhancing nutritional quality.
Grain Legumes, Volume I
The Fall Army Worm
Principles and Practices of Seed Storage
Biochar for Environmental Management
The Proceedings of an International Conference, West Tennessee Experiment Station, April 9-11, 1991, Jackson, Tennessee
Sustainable Protein Sources
When humankind began to save seed to plant for the next season, they did so hoping to secure a food supply for the future. With that came the inevitable question: Will it be enough? Scientists today are still asking that question. Our dependence on domesticated cultivated varieties has never been greater, even as increasing populations strain our resource base. This book provides a fascinating snapshot-in-time account of the productivity status of all major U.S. field crops. Each crop has a different story to tell. Plant breeding, biotechnology, and agronomy have shaped these stories. It is imperative that we learn from them to ensure continued productivity. The solution is long-term stewardship and the most effective use of our critical resources—water, soil, genetic resources, and human intellect.
This book continues as volume 2 of a multi-compendium on Edible Medicinal and Non-Medicinal Plants. It covers edible fruits/seeds used fresh or processed, as vegetables, spices, stimulants, pulses, edible oils and beverages. It encompasses species from the following families: Clusiaceae, Combretaceae, Cucurbitaceae, Dilleniaceae, Ebenaceae, Euphorbiaceae, Ericaceae and Fabaceae. This work will be of significant interest to scientists, researchers, medical practitioners, pharmacologists, ethnobotanists, horticulturists, food nutritionists, agriculturists, botanists, herbalogists, conservationists, teachers, lecturers, students and the general public. Topics covered include: taxonomy (botanical name and synonyms); common English and vernacular names; origin and distribution; agro-ecological requirements; edible plant part and uses; botany; nutritive and medicinal/pharmacological properties, medicinal uses and current research findings; non-edible uses; and selected/cited references.
The lentil is a crop primarily grown in the developing world. It has the ability to use water efficiently and grow in marginal environments as well as being high in protein. This title includes chapters that outline improvements in production, such as water and soil nutrient management, agronomy, mechanization, and weed management.
Origin and Geography of Cultivated Plants
Antioxidants in Vegetables and Nuts - Properties and Health Benefits
Reconciling Contemporary Agriculture and Environmental Quality
Catalogue of Cultures
Insect Pollination of Cultivated Crop Plants
An Analytical Review of Anatomical, Physiological, and Morphogenic Aspects
The subsistence agriculture of the pre-chemical era efficiently sustained the nitrogen status of soils by maintaining a balance between N loss and N gain from biological nitrogen fixation (BNF): the microbial conversion of atmospheric N to a form usable by plants. This was possible with less intensive cropping, adaptation of rational crop rotations and intercropping schemes, and the use of legumes as green manure. Modern agriculture concentrates on maximum output, however, overlooking input efficiency; It is not sustainable. Intensive monocropping, with no or inadequate crop rotations or green manuring, together with the excessive use of chemical N fertilizers, results in an imbalance between N gain and N loss. The losses are often larger than the gains, and soil N status declines. The challenge is to sustain soil N fertility in many different tropical and temperate farming systems operating at high productivity levels. This requires judicious integration of BNF components, maintaining a good balance between N losses and gains. In this book, papers on BNF in crop forage and tree legumes are augmented with discussions of integrated farming systems involving BNF, soil and N management, and recycling of legume residues. BNF by non-legumes are discussed, and attempts to transform cereals into nodulating plants are critically reviewed. Advances in the development of novel methodologies to understand symbiotic relations and to assess N 2 fixation in the field are described, and means are presented to enhance BNF through plant and soil management or breeding and selection. Problems encountered in exploiting BNF under field conditions are examined, as are promising approaches to improving BNF exploitation.
Cover Crops for Clean Water
The Living Soil Handbook
Cover Cropping in Vineyards
Catalog of Strains
New Developments for Embracing Genomic Selection in Breeding Applications
Genomic Designing of Climate-Smart Pulse Crops