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Nota di contenuto

Securing Wheat Cultivation for Global Food Safety -- Climate Change in Wheat (Triticum spp.) Under the Light of Remote Sensing, Digital Evolution, Artificial intelligence -- Geographic Information Systems, Remote Sensing, Agroecosystems, Global Databases and Agricultural Planning -- Big Data Utilisation In Wheat Genetic Resources -- High Throughput Phenotyping in Wheat -- Combination of High Throughput Phenotyping and Genomics in Precise Wheat Breeding -- Predictive Modeling of Wheat Production in Turkiye: A NARX Network Approach Incorporating Climatic and Economic Factors -- Weather Forecasting and State-of-the-art Soil Analysis in Irrigated Precision Wheat Production -- How Low-Cost UAVs Could Revolutionize Field Research as a Substitute for Traditional Agronomic Measurements in Crop Phenotyping? -- Perfecting Wheat Quality, Quality Analysis, and Production Processes via Digital and Artificial Intelligence Approaches -- Infrared Sensing for Wheat Biochemical Analysis: Methods and Protocols -- Modern Approaches to Wheat Diseases -- Weed Management Approaches with GIS, Digital Approaches and Artificial Intelligence in Wheat Cultivation -- Smart Farming for Sustainable Wheat Intensification.

Sommario/riassunto

The global population is projected to exceed 9 billion by 2050, leading to imminent food shortages not only for the current but also future generations. Anticipated increases in appetite coming 50 years will pose significant challenges to food production. This demand will exert additional pressure on agriculture for the escalating need for food. On one hand, research indicates a 60% increase in food production is necessary to accommodate the projected 9 billion people, on the other hand, a substantial portion of the population is grappling with various micronutrient deficiencies, such as iron, zinc, iodine, vitamin A, and folic acid, a condition referred to as "hidden hunger." Hence, it is imperative to exert substantial efforts towards developing improved cultivars under enhanced technological conditions. Concerns about climate change are anticipated to profoundly affect soil water availability, carbon storage, and crop yields. Droughts in the Mediterranean and Africa are expected to worsen during certain seasons. Each year, climate change leads to substantial losses in agricultural production, with a worsening scenario in the future. Wheat breeding has witnessed significant advancements with the wheat genomics, whole-genome sequencing, high-throughput phenotyping, genome-editing technologies, and marker-assisted breeding. These enable genome-based breeding to produce higher enough yielding by 2050. Speed breeding has a crucial role in the incorporation of new genes into breeding pipelines, facilitating the creation of innovative homozygous advanced lines, and accelerating the identification and functional characterization of new genes. Climate change and recent technological advancements necessitate efficient utilization of remote sensing, digital tools, and artificial intelligence approaches, have gained prominence in wheat agriculture. This book aims to encompass both past and upcoming research activities in this domain. It serves as a valuable resource for wheat breeders interested in leveraging modern data technologies in their research endeavours.