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Nota di contenuto	1. Nanomaterials: Scope, applications, and challenges in agriculture -- 2. Nutrient phyto-availability upon nanoparticle application -- 3. Effects of plant-based eco-friendly nanoparticles on growth, chemical composition and bioactivity of plants -- 4. Effect of zinc oxide nanoparticles on crop plants: A perspective analysis -- 5. Response of titanium nanoparticles to plant growth: Agricultural perspective -- 6. Impact of silver oxide nanoparticles on plant physiology: A critical review -- 7. Silicon nanoparticles and plants: Current knowledge and future perspectives -- 8. Copper nanoparticles: A new generation of fungicidal agent and plant growth promoter -- 9. Interaction of copper nanoparticles with plants: Uptake, accumulation and toxicity -- 10.

Nanotechnological advances with PGPR applications -- 11. Impending and inadvertent abundance of engineered nanomaterials in soil: Vicissitudes to the soil microbiome and plant health -- 12. Boon or bane: Nanomaterials in plant growth and development.

Sommario/riassunto

Nanotechnology is a branch of science that embraces the study and application of nanoparticles (NPs), i.e., those particles having at least one dimension measuring from 1–100 nm. This book presents recent developments involving the role of nanoparticles on plant physiology and growth. Nanotechnology applications include improvement of agricultural production using bio-conjugated NPs (encapsulation), transfer of DNA in plants for development of insect pest-resistant varieties, nanoformulations of agrochemicals such as pesticides and fertilizers for crop improvement, and nanosensors/nanobiosensors in crop protection for identification of diseases and residues of agrochemicals. Recent findings on the increased use of nanotechnology in agriculture by densely populated countries such as China and India indicate that this technology may impart a substantial impact on reducing hunger, malnutrition, and child mortality. Nanomaterials have recently experienced significant scrutiny in the basic and applied sciences as well as in bio-nanotechnology. A range of NP types (e.g., ZnO-NPs, Au-NPs, CuO-NPs, CNTs, AgO-NPs and TiO₂-NPs) have been examined by researchers for their impacts on plant growth and development. In addition, particle size, size distribution, shape, surface and core chemistry, crystallinity, agglomeration state, purity, redox potential, catalytic activity, surface charge, and porosity are being investigated to understand and predict the behavior of NPs. This book addresses these issues and many more. Chapters incorporate both theoretical and practical aspects of plant nanotechnology and may serve as baseline information for future research through which significant development is possible. This book will be useful to researchers, instructors and students both in universities and research institutes, especially in relation to biological and agricultural sciences.
