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Current Developments in Breeding and Prospects for Drought-Tolerance, Improved Yield, and Sustainable Production in Sub-Saharan Africa (SSA) -- 15. Breeding Advancements in Neglected Legume Species for Drought Tolerance -- 16. Future perspectives in legume breeding for sustainable agriculture.

Sommario/riassunto

This contributed volume highlights cutting-edge breeding techniques in legumes, specifically targeting drought tolerance. It examines the challenges faced and explores future perspectives for achieving sustainable legume production. The dual challenges of a rapidly growing global population and climate change impose immense pressure on agricultural systems to meet current and future food demands. Climate change significantly threatens agriculture, causing substantial yield losses due to biotic and abiotic stresses, with drought being one of the most severe environmental factors impacting plant productivity. Water, which constitutes approximately 80-95% of the fresh biomass of plants, is vital for various physiological processes, including plant growth, development, and metabolism. Legumes, second only to cereals in global food production, account for 27% of world primary crop production and fulfill 33% of protein requirements. Cultivated across diverse climates and soil types, legumes contribute to over 35% of global vegetable oil production. However, drought remains a major yield-limiting factor in grain legumes, a challenge expected to intensify in the future. Drought adversely affects legumes at all growth stages, disrupting germination (through malfunctioning enzymes like proteases and amylases), nutrient uptake (due to reduced water use efficiency), growth (by inhibiting cell division and leaf expansion), and yield formation (by restricting photosynthesis). Given these challenges, the scientific community is focusing on developing drought-resistant legume cultivars to ensure future food security. This volume consolidates research efforts on advancing drought-tolerant legumes using marker-assisted breeding techniques. This book will serve as a valuable resource for students, researchers, and breeding professionals engaged in legume breeding for drought tolerance. By fostering advancements in sustainable agriculture, this volume aims to contribute to global food security and empower stakeholders in addressing climate change-induced agricultural challenges.