

Handbook of Seed Physiology: Applications to Agriculture

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The latest findings in seed physiology—discussed as they relate to agricultural problems!

Presenting the latest findings in the area of seed physiology as well as the practical applications of that knowledge in the field, the Handbook of Seed Physiology: Applications to Agriculture provides a comprehensive view of seed biology and its role in crop performance. Key topics include seed germination, crop emergence, crop establishment, dormancy, preharvest sprouting, plant hormones, abscisic and giberellic acids, weeds, grain quality, oil crops, and malting quality. Abundant case studies provide information of value to researchers, students, and professionals in the fields of seed science, field crop research, crop science, agronomy, and seed technology.

The Handbook of Seed Physiology discusses vital topics which serve as the basis for the development of techniques and processes to improve seed performance and crop yield. In this text, you will explore:

- the effect of the soil physical environment on seed germination
- the roles of physiology, genetics, and environment in the inception, maintenance, and termination of dormancy
- the relationship between the termination of dormancy and the synthesis and signaling of gibberellins and abscisic acid
- mechanisms of orthodox seed deterioration and approaches for repair of seed damage
- characteristics, behavior, and mechanisms of desiccation tolerance in recalcitrant seeds
- the role of seed moisture in free radical assaults on seeds and the protective function of raffinose oligosaccharides
- the production of free radicals and their effect on lipids and lipid peroxidation
- components of grain quality in oil crops and factors influencing them
- structural components and genotypic and environmental factors affecting barley malting quality

In addition to the latest scientific information in the area of seed physiology, this text provides insights into practical applications of that knowledge through the description of:

- screening protocols for germination tolerance to temperature and water stress
- methods for improving seed performance in the field
- techniques for controlling preharvest sprouting of cereals
- breeding and production strategies for improving grain quality
- population-based threshold models in the prediction of germination and emergence patterns
- modeling changes in dormancy to predict weed emergence

Extensive reference sections accompanying each chapter include both foundation texts and current research. Principles and concepts discussed in the text are elaborated upon through equations, figures, and tables covering such topics as water and soil thermal regimes; seed water potential; temperature and water effects on germination; free radical attack; and molecular structures. Exploring concepts, techniques, and processes related to seed germination and crop establishment, this comprehensive, one-of-a-kind reference is an indispensable tool for seed scientists and agricultural professionals. Add it to your library today and put seed physiology research to work in establishing high-quality “next crops”!

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