Advances in Seed Biology

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Monografía

The seed is arguably the most important plant reproductive unit. From the Late Devonian Period some 370 million years ago when the first seeded plants evolved, reproduction through seeds has conferred a key advantage to the dispersal and diffusion of the Spermatopsida among land plants. Beside its essential function in the sexual reproduction of plants, the seed also represents the most economically important agricultural product worldwide, providing energy, nutrients and raw materials for human nutrition, livestock feed and countless manufactured goods. Seeds have been studied for a long time, but until recently investigation has been primarily focused on understanding the biology of their main compartments that is, the embryo, the storage nutrients compartment, and the seed coat, largely as independent units. Recent advances in genetic, biochemical, molecular and physiological research, however, mostly brought about by the deployment of novel high-throughput and high-sensitivity technologies, have begun to uncover and connect the molecular networks that control and integrate different aspects of seed development and help determine the economic value of grain crops with unprecedented details. With an expanding and generally more affluent world population reaching a projected nine billion by midcentury, agriculture is charged with ensuring sufficient grain production in the face of ever more pressing environmental and inputs-availability constraints. An appreciation for how important this is comes from the dramatic decline of global grain stocks over the past decade. Quite literally, humanity is one catastrophic crop-season or harvest away from experiencing severe grain shortages, which would lead to a general unraveling of the world's order. It seems clear, therefore, that a deep and highly integrated understanding of seed genetics, development, and physiology will play a key role in sustaining grain yield and the civilization that depends on it

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