A MUTATIONAL APPROACH TO THE STUDY OF EMBRYO-ENDOSPERM INTERACTION DURING MAIZE SEED DEVELOPMENT


*) Dipartimento di Produzione Vegetale, Università degli Studi di Milano, Via Celoria 2, 20133 Milano, Italia
**) Dipartimento di Scienze Biomolecolari e Biotecnologie, Università degli Studi di Milano, Via Celoria 26, 20133 Milano, Italia

Zea mays, seed mutants, endosperm development

Seed development implies the coordinated development of its two compartments, the embryo and the endosperm, and the establishment of a flow of signals and metabolites between the two, as well as from the maternal tissues. To gain more insight into such events, we characterized three monogenic mutants, referred to as emp (empty pericarp) on the basis of their extreme endosperm reduction. Histological analysis of the three mutants revealed an endosperm reduced to a variable extent but still able to elaborate a basal endosperm transfer layer (BETL), an embryo surrounding region (ESR) and a well differentiated aleurone. The placento-chalazal layer is significantly reduced and a loss of adhesion between pedicel tissues and the basal transfer layer is evident. The embryo appears retarded in its growth but not impaired in its morphogenesis. Two of the mutants (emp*-7065, emp*-8075) differentiate leaf primordia, while emp*-8077 appears arrested at the coleoptilar stage. Immature embryo rescue was successful, even though the seedlings appear retarded in their growth. Mature dry seeds do not germinate, as if a signal required for germination is missing in the mutant. In all three mutant endosperms programmed cell death (PCD) is delayed, as well as the endoreduplication process. The picture emerging from these observations is of a general delay in processes related to growth as a consequence of a mutation affecting endosperm development as a primary event.