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SEED DEVELOPMENT AND IAA BIOSYNTHETIC GENES ARE REGULATED DIFFERENTIALLY IN THE DEFECTIVE ENDOSPERM-18 SEED MUTANT OF MAIZE

LANUBILE A.*, KLADNIK A.**, BERNARDI J.*, CHOUREY P.S.***, MAROCCO A.*

*) Institute of Agronomy, Genetics and Field Crops, University of Piacenza, Via Emilia Parmense 84, 29100 Piacenza (Italy)
**) Department of Biology, Biotechnical Faculty, University of Ljubljana, Vecna Pot 111, SI-1000, Ljubljana (Slovenia)
***) USDA-ARS, Center for Medical, Agricultural and Veterinary Entomology, Gainesville, FL 32608-1069 (USA)

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The *defective endosperm*-18 *(de*18*)* mutant accumulates substantially less dry matter in the endosperm than its normal counterpart. The auxin IAA levels in *de*18 endosperm are 15 times lower respect to the wildtype. The addition of synthetic auxins to the developing *de*18 grains rescues the wild type phenotype. Previous studied showed that auxin is involved in enhancing post-mitotic nuclear DNA synthesis (endoreduplication), that is positively correlated with cell enlargement and cell volume. We have investigated whether the reduced endosperm of *de*18 is due to impaired cell division and endoreduplication process, as a consequence of the low auxin levels. Nuclear endoreduplication level, number and size of cells have been measured in wild-type B37 and *de*18 kernels at 8, 12, 14 and 16 DAP with the optical miscroscope and computer image analysis, using the 3D model developed for maize endosperm. Observations of cells distribution with different ploidy levels in both genotypes, showed that at 8 DAP most of cells in the endosperm were 3C and 6C cells and they were restricted mainly to the outermost layers. Endoreduplication began in the nuclei of the central starchy endosperm cells (12C) and proceeded basally and outward until 16 DAP, where 96C and 192C nuclei were localized in the central part of endosperm. The most significant differences between *de*18 and B37 were detected at 8 DAP, where the mutant showed a deficiency in the ploidy level, number and volume of cells. The expression level of auxin regulated genes appears to be reduced in *de*18 during endosperm development, as revealed by q-PCR analyses. A comparative analysis of expression of five genes involved in IAA biosynthesis showed significant alterations of expression in the mutant than the wild type at different stages of endosperm development.