Proceedings of the 52nd Italian Society of Agricultural Genetics Annual Congress
Padova, Italy – 14/17 September, 2008
ISBN **978-88-900622-8-5**

Poster Abstract – D.68

CHARACTERIZATION OF OIL PALM IN VITRO REGENERATION SYSTEM: MICRODENSITOMETRIC ANALYSIS IN REPRODUCTIVE AND DEVELOPMENTAL PROCESSES

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oil palm, somaclonal variation, meiosis, microdensitometric analyses

Oil palm (Elaeis guineensis J.) represents the most important plant cultivation in the majority of subtropical regions of the Asiatic continent, as well as the derived palm oil is mainly used in diet and in biofuel production. For the economic importance of this cultivation, many Asiatic Companies are interested in *in vitro* culture of oil palm, particularly in the propagation of the most productive F1 genotypes (Dura x Pisifera); however *in vitro* cultivation induces a large number of unproductive somaclonal variants and the ones affected in floral and fruit formation (mantled phenotype) can be identified and eliminated only at sexual maturity after 5 years of field growing.

Since 1996, our group has been collaborating with Malaysian Palm Oil Board (MPOB) to characterise the *in vitro* regeneration system of oil palm. Several approaches were performed to analyze cytogenetic and molecular phenomena, occurring during the proliferation and the regeneration processes, confirming the presence of a gametic-like reprogramming in the acquisition of embryogenic capacity (Geri et al. 1999; Giorgetti et al. 2007a). In order to analyze the expression of some oil palm floral genes, experiments of *in situ* hybridization were performed in floral-like structures and in *in vivo* inflorescences of normal and mantled plants (Giorgetti et al. 2007b). Moreover, a study of meiosis by FISH analyses showed the presence of DNA extrusion of specific sequences (repetitive sequences) and validated the idea of a DNA modulation content during the development *in vivo* as *in vitro*. To confirm this phenomenon, an extensive microdensitometric analysis was performed during the progression of meiosis as well as during the establishment of new embryogenic culture, on new regenerated plants at different times, and finally on seedling obtained from adult regenerated normal and abnormal mantled plants.

A variable loss of DNA content/nucleus in regenerated plants was demonstrated, in some case very severe but no variation was present in seedlings (open pollinated derived) from adult regenerated mother plants. The clear cut information, coming from these data, is that the regeneration process is imputable to induce a DNA modulation/loss per cell in the regenerated plants but progressively DNA sequences are regained before the meiotic process completion. This information, once definitively confirmed, point out directly to mechanisms of somaclonal variation.

Geri C *et al.*,1999, Genome, 42 (6):1134-1143.
Giorgetti L *et al.*, 2007a, Caryologia 60(3): 279-289.

Giorgetti L *et al.*, 2007b, Proceedings of the PIPOC 2007 International Palm Oil Congress (Agricolture, Biotechnology & Substainability) 26-30 August , Kuala Lumpur Convention Center, Malaysia, Vol. I pag 277-298.