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Genetic Engineering in Oil Palm Improvement*

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*The amenability of oil palm (*Elaeis guineensis *Jacq.) tissues to transgene transfer was first demonstrated more than 10 years ago. Since then several techniques, both direct and vector-mediated, were developed to introduce useful genes into different target tissues of oil palm. In both cases, plants produced were either chimearic or transgenic. The genes introduced include those conferring resistance to insect pests, diseases, herbicide, antibiotics, and more recently those involved in the biosynthesis of fatty acids and bioplastics. The first batches of transgenic plants produced were engineered to harbour the cowpea trypsin inhibitor (CpTI) gene and the plants are now more than eight years old. The stability of transgene integration was continuously monitored throughout the plants' life span using molecular techniques. The transgenic CpTI plants in the planthouse took almost four years to flower, two years more than plants planted under field conditions. Transgenes were detected in both reproductive and non-reproductive organs of T_0 plants. Continuous bioassays on the eight year-old CpTI plants showed increased tolerance to bagworm larvae (*Metisa plana *Walker) as compared to non-transformed controls. Using the same strategy but with different gene(s), work are in progress to address basal stem rot caused by* Ganoderma boninense *in oil palm. Recently, several genes involved in biosynthesis of fatty acids and bioplastics were successfully transferred into target tissues and regenerated into complete plants. Preliminary assessment indicates successful gene transfer. Functional expressions of genes leading to changes in fatty acid profiles and the production of PHB have also been demonstrated. Results from transmission electron microscopy (TEM) analyses on leaves from plants transformed with PHB genes showed the presence of additional granules having properties similar to those of PHB produced in other plants. Whilst the golden crop is being transformed with other useful genes expressing novel traits, the techniques of gene transfer for oil palm is continuously improved with emphasis given on their efficiency, role of different promoters, enhancers, transgene stability and inheritance, gene targeting and also novel gene transfer techniques.*

Keywords*: Oil palm, transgene transfer, resistance to insects/diseases*