

Improvement of Oil Palm Productivity

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Abstract

Since 2009 Indonesia is the largest palm oil producer in the world. At the same time, Indonesia became the largest oil palm seed producer as well as consumer in the world. However, some major challenges facing in oil palm upstream industries in Indonesia are a narrow basic of genetic material, a long period needed for breeding cycle, limited human resources and research findings, and a limited genetic source for abiotic as well as biotic stress in some specific areas, and low absorption efficiency of nutrition. This paper explains the main research activities to improve the oil palm productivity. To enlarge and enrich the oil palm germplasm in Indonesia, a consortium of oil palm companies has carried out some explorations, such as to Cameron, Angola, and others countries. Moreover, the application of new gene resources has been studied for the phenotypic characters, genetic diversities and heterosities by using molecular markers. Elite varieties of oil palm could be obtained faster by the application of micro satellite and Single Nucleotide Polymorphism (SNP) markers from DNA genome sequences of selected genotype in early phase. The application and commercialization of oil palm tissue culture were the big challenge for the industry to improve the oil palm productivity at large scale, it might be included the clone of elite oil palm and DxP bi clonal seedlings with 20-30% higher of productivity compared to conventional oil palm. The originality of ramets could be done by using DNA fingerprinting. Genetic engineering technology focused on water stress tolerant, resistance to *Ganoderma sp.* and oil synthesis. Subsequently, the techniques of anther culture to produce dihaploid homozygous plant as a pure line will be used as a parental for F1 Tenera hybrid in order to produce oil palm with two to three times higher productivity compared to conventional oil palm.

Key words: oil palm, Elaeis guineensis Jacq, biotechnology, tissue culture, productivity

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