KOMODITAS: KELAPA SAWIT

TEEAL 2006-2008

PLANT GENETICS AND BREEDING (2 JDL)

Expression of Bacillus thuringiensis insecticidal protein gene in transgenic oil palm
Electronic Journal of Biotechnology. 2006. 9 (2). 117-126
Author(s): Lee-Mei-Phing. (phing_san@yahoo.com). Yeun-Li-Huey. (lihuey@hotmail.com). Abdullah-Ruslan. (russzn@ukm.my)
Author Affiliation: Abdullah, Ruslan; Univ Kebangsaan Malaysia, Fac Sci and Technol, Sch Biosci and Biotechnol, Oil Palm Biotechnol Grp, Bangi 43600, Selangor, Malaysia
Abstract:
Oil palm, like all other crops, is susceptible to attack from several insect pests causing significant reduction in productivity. In the past, cry genes from Bacillus thuringiensis have been reported to be effective in conferring resistance towards insect pests in crops such as corn and rice. One of the advantages of these toxin proteins is their specificity towards certain harmful insects. A rapid and efficient method was developed for the transformation and evaluation of CryIA(b) expression in oil palm. A recombinant vector was introduced into immature embryos (IEs) of oil palm via the biolistic method. More than 700 putative transformed IEs from independent transformation events were generated. Transient transformation efficiency of 81-100 % was achieved. We found that pretreatment of target tissues with phytohormones is essential for increasing the transformation efficiency. This finding could enable higher transformation rate in oil palm that was previously difficult to transform. PCR analysis further confirmed the presence of the CryIA(b) in the transformed tissues. Expression of CryIA(b) from PCR-positive samples was further confirmed using a rapid gene expression detection system. This novel and rapid detection system could serve as a good opportunity to analyze the impact of transgenes upon transfer to the new environment, especially for crops with long generation cycle, such as oil palm
Descriptors: Molecular Genetics (Biochemistry and Molecular Biophysics); Pest Assessment Control and Management insect resistance, transformation efficiency, long generation cycle

Development of transformation vectors for the production of potentially high oleate transgenic oil palm
***Electronic Journal of Biotechnology*.** 2008. 11 (3). 1-9
Author(s): Yunus-Abdul-Masani-Mat. (masani@mpob.gov.my). Kadir-Ahmad-Parveez-Ghulam. (parveez@mpob.gov.my)
Author Affiliation**:** Yunus, Abdul Masani Mat ; Malaysian Palm Oil Board, Biol Res Div, Adv Biotechnol and Breeding Ctr, POB 10620, Kuala Lumpur 50720, Malaysia

Abstract:
The main target of Malaysian Palm Oil Board (MPOB) genetic engineering programme is to produce high oleate transgenic palms. The availability of effective transformation vector is one of the pre-requisites for genetic manipulation of oil palm through recombinant DNA technology. Here, we describe the construction of a series of transformation vectors that have a maize ubiquitin promoter (UbiPro)-driven bar gene for selection of transformants on herbicide (Basta or Bialaphos), and mesocarp-specific promoter (MSP1) for expression of the transgenes [antisense palmitoyl-ACP-thioesterase (PAT) and sense beta-ketoacyl-ACP-synthase II (KASII) and sense Delta 9-stearoyl-ACP-desaturase (SAD)] potentially responsible for high oleate content in oil palm mesocarp. The transformation vectors constructed in this study are suitable for use in both particle bombardment (biolistic) and Agrobacterium-based transformation protocols
Descriptors: Methods and Techniques; Molecular Genetics (Biochemistry and Molecular Biophysics)

PLANT DISEASES (1 JDL)

Effects of inoculum potential, shading and soil temperature on root infection of oil palm seedlings by the basal stem rot pathogen Ganoderma boninense
Plant Pathology. 2007. 56 (5). 862-870
Author(s): Rees-R-W. Flood-J. Hasan-Y. Cooper-R-M Author Affiliation: Department of Biology and Biochemistry, University of Bath, Claverton Down, Bath, BA2 7AY, UK
Abstract:
Ganoderma boninense causes severe losses to oil palm in South East Asia. The disease typically manifests itself as basal stem rot, but there remains controversy over the route of infection and source of inoculum. Using isolates differing in aggressiveness, infection via roots was confirmed; it was also shown that large inoculum provided as Ganoderma-infested palm- or rubber-wood blocks (12x6x6 cm) is necessary for soil infection of seedlings after 6-8 months. Smaller blocks (3x3x3 cm) produced rapid (less than or equal to 3 months) infection of roots and lower stem when physically attached to roots. Therefore fragmentation of infested palm wood from a felled, mature plantation before subsequent replanting may provide inoculum. Failure of G. boninense to grow through non-sterile soil or organic debris from frond bases, suggests it is a poor competitor and that roots must contact inoculum directly. Severe disease occurred after 8 months on inoculated seedlings under shade, but not on seedlings exposed to sun. Soil temperatures in sunlight frequently rose above 40 deg C and reached 45 deg C, whereas in shade they never exceeded 32 deg C. Ganoderma boninense is probably inhibited in exposed soil since optimal growth in vitro was 25-30 deg C, and there was no recovery from 45 deg C. Soil temperature may explain why symptoms often first appear in mature plantations when canopy formation creates shade. Infection is not peculiar to senescing palms but can occur throughout the growth cycle