CHROMOSOME PAINTING IN OIL PALM HYBRIDS

JUNE 1998

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PORIM TT NO. 49

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PORIM INFORMATION SERIES ISSN 0128-5726

INTRODUCTION

Elaeis guineensis and *Elaeis oleifera* are the two species of oil palm. In Malaysia, *E. guineensis* is the major crop planted since it produces high oil yield. However, *E. oleifera* produces higher unsaturated oil compared to *E. guineensis* but has lower oil yield. *E. oleifera* also has the advantage of slow height increment. In order to introgress the high unsaturation oil trait into *E. guineensis*, oil palm breeders have crossed these two species to produce OxG hybrids. The advantages of OxG hybrids compared to *E. guineensis* are (i) the oil is more unsaturated, and (ii) the height increment is slower. However, the hybrids suffer from the disadvantages of poor oil yield. They are also vigorous in vegetative growth making it difficult to harvest the fruit bunches. For these reasons, the OxG hybrid is backcrossed to its *E. guineensis* parent in order to improve these characteristics. Therefore, it would be useful to breeders to be able to assess the genome composition of the backcross progenies and select only those with a high proportion of the *E. guineensis* parent. The technique of genomic *in situ* hybridization (GISH) was developed to fulfil this objective.

GISH TECHNIQUE

Root tip samples of OxG hybrid were collected and pretreated to increase metaphase index. Chromosome

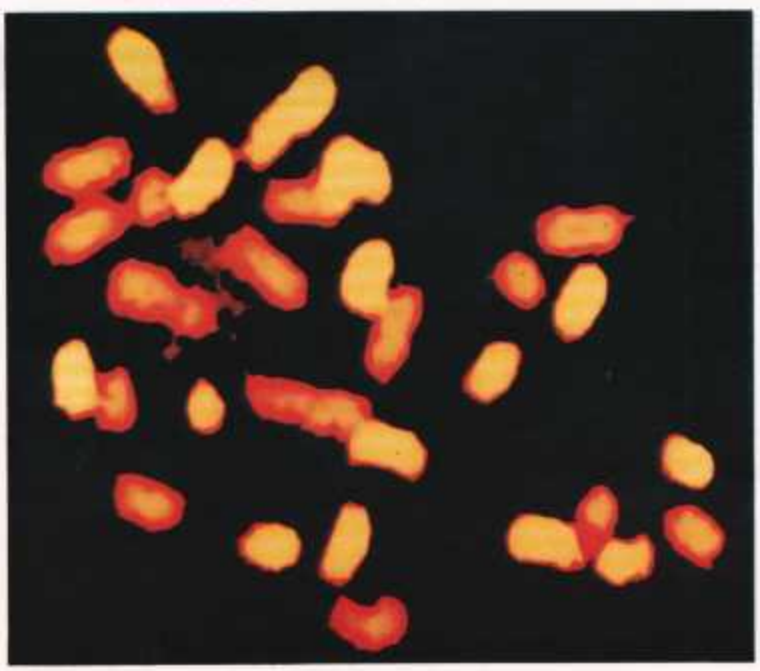

Figure 1. OxG hybrid chromosome with 16 E. oleifera *(yellow) and 16* E. guineensis *(red) chromosomes*

ISSN 0128-5726

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spreads were then prepared on glass slides and stored in - 20°C freezer. Subsequently, total genomic DNA was extracted from young leaves of *E. oleifera* and *E. guineensis*. The *E. oleifera* DNA was labelled with biotin (Bionick Labelling Kit) and used as probe while *E. guineensis* DNA was used as block. The chromosome spreads acted as substrate for both the probe and block to hybridize. Given the proper conditions, the *E. oleifera* probe will hybridize to the *E. oleifera* chromosomes and the *E. guineensis* block hybridizes to the *E. guineensis* chromosomes. FITC-streptavidin reagent binds to the *E. oleifera* chromosomes producing yellow colour while *E. guineensis* chromosomes are coloured red with propidium iodide stain.

BENEFITS

This technique will be useful to plant breeders who need to know the composition of the introgressed parental genomes in backcrosses and wide hybrids during selection.

COST

This technique requires facilities for cytogenetic and molecular biology analyses. The cost of setting up a lab with such facilities is about RM 200,000.00. For analysis of an individual hybrid, the cost ranges from RM40.00 to RM 50.00.

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