OIL PALM CLONAL PROPAGATION THROUGH SOMATIC EMBRYOGENESIS

RESEARCH PROGRAMMES AND RESULTS FROM COTE D'IVOIRE

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INTRODUCTION

Oil palm clonal *in vitro* propagation has been practised since 1981 in Côte d'Ivoire in the IDEFOR-DPO Laboratory, in collaboration with ORSTOM and CIRAD-CP. The regeneration process has been assessed at a large scale with steady planting of clonal material. After more than 15 years of activity, the IDEFOR-DPO Laboratory is now able to present important results on the performance of the process.

MATERIAL & METHODS

Clonal oil palm plantlets were obtained from immature leaves through somatic embryogenesis [1, 2]. The tissue culture protocole involves the induction of somatic embryos on calli obtained through dedifferentiation of young leaflets. Mass production of somatic embryos is obtained by adventive embryogenesis on a hormone-free medium.

RESULTS

1- Performance of the process

From 1981 to date, 460 palms have been sampled for tissue culture, including the recloning of ramets, cloning of *pisifera* palms and backcrosses. Success rates in embryogenesis on callus vary according to the genetic origin of the ortet (Table 1). Embryogenesis on nodular callus was obtained with an overall success rate of 87 %. This phenomenon is still difficult to control. To date, the total production of the La Mé Laboratory has reached 750,000 ramets (Fig. 1), originating from 216 different clones. Success rates observed during the late phases of the process are given in Table 2. The overall area planted with clonal material in Côte d'Ivoire has now reached 800 ha.

2- Oil production

Patterns of oil production in clones fit with the theoretical model [3, 4]. Improvements in oil production can attain 25-30 % (with reference to the standard cross L2T x D10D) for the best clones originating from 1st cycle RRS. (Table 3).

3- Clonal fidelity

Vegetative development is normal for all the planted clones. Occurrence of the mantled abnormality has been recorded on 50% of the clones, 6% of the assessed ramets being severely affected (Table 4). No significant increase in the frequency of the abnormality has been recorded, even after 7 years of proliferation for some clones. Reversion to the normal phenotype is not rare: after 9 years in the field, 100% of the slightly mantled palms and 50% of the severely mantled ones have become normal in their flowering.

Fig. 1. Ramets production at the IDEFOR-DPO La Mé Laboratory.

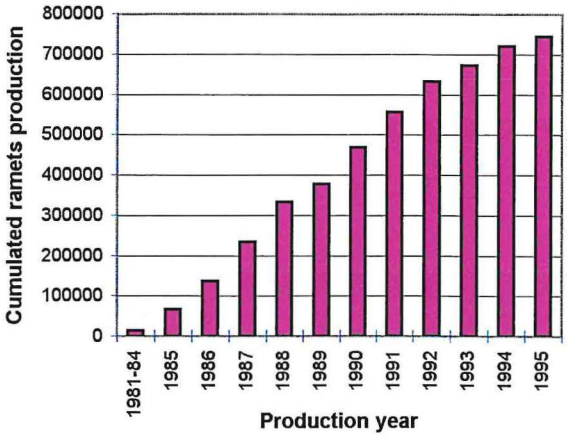

Table 1. Clone creation: influence of the genetic origin of ortets.

		Callogenesis		Embryogenesis on calluses	
Origin of ortet	No of ortets	%	Coef. of Var. (%)	%	time (months)
Deli x La Mé	273	31 %	57	89 %	17 ± 2
Deli x Yangambi	38	9 %	90	92 %	23 ± 6
Deli x Nifor	9	7 %	70	78 %	26 ± 15
La Mé x La Mé (Pisifera)	12	9 %	156	58 %	23 ± 4

Table 2. Success rates during the late phases of the micropropagation process.

Rooting*			Acclimatisation**			Prenursery***			Nursery***			Overall rates	
No initial	*No final*	*%*	*No initial*	*No final*	*%*	*No initial*	*No final*	*%*	*No initial*	*No final*	*%*	*Prenursery/ Nursery*	*Acclim./ Nursery*
424,082	371,576	88%	660,562	550,956	83%	152,041	120,669	79%	113,157	88,381	78%	62 %	51 %

* Period: 1990-1995; **: Period 1981-1995; ***: Period 1986-1995.

Table 3. Characteristics of oil production in clones (with references to L2T x D10D).

	*3-5 years period**			*Adult period***		
	FFB	extraction rate	oil	FFB	extraction rate	oil
Average	105 %	108 %	114 %	98 %	108 %	105 %
Selection 1/5	124 %	112 %	136 %	114 %	112 %	128 %

*: 28 clones; **: 21 clones.

Table 4. Distribution of the mantled abnormality in IDEFOR-DPO clones produced from La Mé Laboratory.

	Flowered palms	Observed clones	Normal palms	Slightly mantled palms	Severely mantled palms
No	29,415	127	26,571	1092	1752
%	100		90.3 %	3.7 %	6.0 %

CONCLUSION & PERSPECTIVES

The work of the IDEFOR-DPO Laboratory in La Mé has enabled the assessment at a large scale of the micropropagation process developed by the ORSTOM/CIRAD-CP group. The La Mé Laboratory currently collects and stores in a general database all the data coming both from the Laboratory and from the field for each planted ramet. The considerable amount of information collected is an essential tool for the study and the understanding of phenomena causing the mantled abnormality in oil palm.

References:

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