Newsletter BERITA ISOPB

THE INTERNATIONAL SOCIETY FOR OIL PALM BREEDERS
PERSATUAN AHLI-AHLI PEMBIAK BAIK KELAPA SAWIT ANTARA BANGSA

JAN - JUNE 1992 MEMBERS ONLY VOL. 9 NO. 1

EDITORIAL

The IRHO's International Oil Palm Experiment (INOP), of the 1950s had a major influence on the methodology of oil palm breeding ever since. It was found that highest yield were obtained by crossing the Deli *dura* with the African *tenera/pisifera*. And this fitted well into a reciprocal recurrent selection breeding scheme. Both the idea and the scheme continue to dominate oil palm breeding world wide.

In coconuts the MAWA hybrid (Malayan Dwarf x West African Tall) is amongst the highest yielding and dominates coconuts breeding.

Jean-Pierre Gascon , who will be conferred a honorary fellowship of the ISOPB on July 2nd 1992, was instrumental in the above two discoveries and the founding of the IRHO's Breeding Division. This issue of the ISOPB newsletter pays tribute to him and his considerable contributions to oil palm breeding.

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FEATURE ARTICLE I :

Jean-Pierre Gascon
Biographical Notes

Jean-Pierre Gascon first came into contact with oil palm in 1948 at the Pobé Research Station in Dahomey (now Benin), where he played an active role in setting up the International Experiment, a vast planting material exchange programme between Africa and Asia. He very soon instigated the setting up of the IRHO Breeding Division, to coordinate and organize oil palm and coconut improvement. He was the first to see the merits of applying reciprocal recurrent selection to a perennial plant. The results were spectacular (Yield improvements of around 30%) and won him praise from the World Bank and the Rockefeller Foundation. For him, true recognition came with the launch of the Oil Palm Plans - 100,000 hectares in the Ivory Coast, 40,000 hectares in Cameroon and 30,000 hectares in Benin - made possible by these advances.

His reputation led him to the Far East, where he launch the Indonesian Research centre programmes, which currently supply improved seeds to development projects, and with which IRHO still has close ties. Numerous oil palm plantations in Africa, Asia, Latin America and Oceania have now been set up with IRHO material. He also coordinated work on coconut, which led to the extension of high-yielding hybrids that are now in widespread use.

Always in touch with the development of new techniques and methods, he launched an oil palm vegetative propagation programme using in vitro culture in 1970, in conjunction with ORSTOM. A micropropagation procedure by somatic embryogenesis is currently in use in five laboratories in Malaysia, Indonesia, the Ivory Coast and France.

He was posted back to France in 1972, and became Head of tropical plant improvement as a whole via the CIRAD plant studies and breeding programme (MICAP) in 1984, which he coordinated until his retirement in 1989.

Biography

Name - First Name : GASCON, Jean-Pierre Napolèon

Date of Birth : 21st September 1927

Marital Status : Married, two children

Education : Baccalaurèat, 11945, Lycèe Albert de Mun, Paris Graduate Agronomist, ENSA Nancy, 1948 Bachelor of Sciences, University of Nancy, 1948. Engineer, ESAAT Saint Mandè, 1951 Geneticist, ORSTOM Bondy, 1953

Career : Assistant, then Head of the Oil Palm Breeding Service at the Pobè Station (Benin), from August 1948 to 1950. Seconded to ORSTOM Bondy, then military service from 1950 to 1952.

Director of the IRHO Breeding Division, posted to:
- Pobè (Benin), 1953-59
- La Mè (Ivory Coast), 1959-72
- Paris, 1972-77
- Montpellier, 1977-84

Head of the CIRAD plant studies and breeding programme (MICAP), 1984-89. Retired in March 1989. J.P. Gascon is undoubtedly a leading light in oil palm and coconut genetics and plant breeding in general, and has carried out numerous missions in Africa, America, Asia and Europe.

He is:

- an Officer of the Ordre National in the Ivory Coast (1972)
- Chevalier of the Ordre National du Mèrite in France (1977)
- Chevalier of the Ordre National du Mèrite in Benin (1992)
- a laureate of the prix du Rayonnement français dans le tiers-monde (1983)
- a laureate of the prix de l' Acadèmie des Sciences de France for his work on development (1991)

Name of organization: I.R.H.O., CIRAD Oil Crops Department

Position : Director of the IRHO Breeding Division and Head of the CIRAD plant studies and breeding programme (MICAP) until March 1989.

Address : Domaine des Tasnières - NANCAY
18330 NEUVY s/BARANGEON
France
(Tel.: 48 51 84 29)

Notable publications

- GASCON, J.P. and de BERCHOUX, C. (1964) - Caractéristiques de la production *d' Elaeis guineensis Jacq*, de diverses origines et de leurs croisements. Application à huile. OLEAGINEUX 20, 1, pp. 1-7.

- MEUNIER, J. and gASCON, J.P. (1972) - Le schéma général d'amélioration de palmier à huile à l'IRHO. OLEAGINEUX 27, 1, pp. 1-12.

- GASCON, J.P. and de NUCE de LAMOTHE, M. (1978) - Genetic improvement of the coconut: results and prospects. Proceedings of the International Conferance on Cocoa and Coconut, Kuala Lumpur.

- NOIRET, J.M., GASCON, J.P. and PANNETIER, C. (1985) - Oil palm production through in vitro culture. OLEAGINEUX 40, 7, PP.

- GASCON, J.P., NOIRET, J.M. and MEUNIER, J. (1989) - Oil palm. In OIL CROPS OF THE WORLD: their breeding and utilization. G. ROBBELEN RK, A. DOWNEY, ASHRI, Ed. (McGRAW-HILL Pub. Co.).

FEATURE ARTICLE II

PERFORMANCE OF OIL PALM PLANTING MATERIALS PRODUCED IN MALAYSIA

by

Kushari A.,[1] Rajanaidu N.,[1] Jalani S. and[1] Zakri H.[2]

1 - Palm Oil Research Institude of Malaysia
2 - Universiti Kebangsaan Malaysia

Introduction

Comaparative DxP trials are often conducted by seed producers and large plantation companies to guide them on the relative performance of planting materials of diverse origins.

The limitations of such trials such as sample size being unrepresentative of all the materials from each origin, period of recording, etc, are well recognised and data from such trials has to be suitably read.

Commonly such trials are planted under the good growing conditions of experimental land with good terrain and soils. In 1983 the Palm Oil Research Institute of Malaysia (PORIM) conducted such a trial under the more difficult growing conditions characteristic of some inland planting in Malaysia namelyrolling terrain, inland soils and a more monsoonal climate.

Materials and Methods

Ninety nine DxP progenies from six seed producers were field planted in September 1983 in the PORIM station at Paka in Terengganu state. The material was planted in six blocks with each progeny represented by six palms in each block. All 594 palms within a block were randomised to conform to an ICRD design.

Four years of yield records, bunch analysis data and height measurements were taken between 1987 and 1990.

Results and Discussion

Analysis of variance (*Table 1*) shows significant differences between blocks and this was expected in view of markedly different terrain in different blocks. This of course is also confounded with difference between the rather small samples of six palms, from each progeny in each block.

Table 1. Mean squares for average bunch yield (1987-1990).

Source	df	FFB	BNO	ABWT
Blocks (B)	5	7648.34^{**}	153.24^{**}	117.78^{**}
Origins (0)	5	32815.55^{**}	213.00^{**}	446.20^{**}
Progenies/Origin (F)	93	4796.65^{**}	60.09^{**}	27.40^{**}
O x B	25	1853.90^{**}	14.19^{NS}	5.04^{NS}
F x B	465	2007.07^{**}	16.85^{**}	5.72^{**}
Between palms	2710	1763.94	14.71	5.38

Harmonic mean = 5.41 NS $p > 0.05$, ** $p < 0.01$

Differences between origins were highly significant for FFB yield and its two components and likewise between the progenies from each of most if not all origins. This would suggest that most of the producers are producing relatively heterogenous materials given the very high variances from other sources in this trials. The Ranking of origins was generally consistent in the different blocks for bunch number and mean bunch weight but not for their product, bunch yield. The progenies of each origin on the other hand generally did not rank the same in the different blocks for all three characters.

Oil and kernel content from a sample of bunches from each origin are shown in *Table 2*. Because bunch analysis commenced as soon the palms came into bearing the figures are slight underestimates. There were slight differences (P=0.05) between origins for % O/B and more marked differences for % K/B. Similarly the six origins differed significantly for height in the seventh year, the shortest being 1.51m and the tallest 1.70m.

Table 2. Average oil to bunch (O/B), Kernel to bunch (K/B), and palm height between six origins

Origin	O/B (%)	K/B (%)	Total Oil (Kg/palm/year)	Height (m) at 7 years
1	24.29	5.98	35.37	1.59
2	24.99	6.84	41.81	1.65
3	24.28	6.08	33.80	1.52
4	24.20	5.45	35.86	1.70
5	22.29	7.23	34.78	1.64
6	24.25	5.63	38.26	1.51
Mean	24.07	6.20	36.65	1.60
s.e	0.52	2.26	2.00	0.04
F-test	*	**	*	**

* $P < 0.05$, ** $p < 0.101$, Total Oil = Mesocarp oil + Kernel oil

SOCIETY NEWS

1. International Symposium on Science of Oil Palm Breeding.

The details of the symposium program, papers etc are given below:

SYMPOSIUM PROGRAMME

Date/Time	*Event*
30.06.1992 (Tuesday)	
1600 - 1800	MIXER CIRAD Conference Room *Sponsored by* ***CIRAD***
01.07.1992 (Wednesday)	
0800	Registration
0900	Welcome speech by the President/Representative of the International Society for Oil Palm Breeders (ISOPB)
0910	Opening - Address by Mr. Brunin C. Director of IRHO, France
0920	Key-note address by Mr. Meunier J. IRHO, France
1000	Tea
SESSION 1 01.07.1992 (Wednesday)	
Chairperson:	***Mr. Noiret, J.M.*** ***IRHO, France***
1030 - 1100 Paper 1	Oil Palm Genetic Resources Rajanaidu, N; Jalani, S; Kushairi, D Palm Oil Research Institute of Malaysia (PORIM), Malaysia
1100 - 1130 Paper 2	Some ancestral oil palms and their descendants Rosenquist, E., Consultant Agronomist, U.K.
1130 - 1200 Paper 3	Variation and inheritance in the oil palm Rao, V. (EPA Mgmt.) and Rajanaidu, N (PORIM), Malaysia
1200- 1230 Paper 4	Variation for electrophoretic and RELP markers in oil palm Jack, P (Unilever), U.K.
Paper 5	By IRHO
1230 - 1300 General discussion	
1300 - 1400 Lunch	
SESSION II	
Chairperson: Mr. Tan Yap Pau ***United Plantations, Malaysia***	
1400 - 1430 Paper 6	Oil Palm Breeding Techniques Chin Cheuk Weng, FELDA, Malaysia
1430 - 1500 Paper 7	Breeding plans and selection methods in oil palm Soh A.C. AAR, Malaysia
1500 - 1530 Paper 8	Genotype x Environment Studies in oil palm

Lee Chong Hee (OPRS) and Rajanaidu, N (PORIM), Malaysia

1530 - 1600 Paper 9

Production of oil palm planting material - seeds and clones
Jaequemard J.C and Durand - Gasselin -IRHO Ivory Coast

1600 - 1630 General Discussion

1630 - 1700 Tea

SESSION III 02.07.1992 (Thursday)

Chairperson:Dr. Wonki - Appiah
OPRS, Ghana

800 - 0830 Paper 10

Breeding for resistance or tolerance to pest and diseases in oil palm
Noiret, J.M. and Renard, L. IRHO, France

0830 - 0900 Paper 11

Breeding for drought tolerance in oil palm
Hossou, M. S R P H de Pobe

0900 - 0930 Paper 12

Measure of oil palm mitochandrial character for early evaluation of productivity- results and perspectives
Koutou, A., La Me Station, Ivory Coast

0930 -1000 Paper 13

Levels of C-methylation as molecular markers in oil palm
Dr. Farida shah, UKM, Malaysia

1000 - 1030General Discussion

Tea

SESSION IV

Chairperson:Dr. Ho Chai Yee
Ebor Research, Sime Darby, Malaysia

1130 - 1200 Paper 15

Oil palm breeding programmes in Malaysia
Yong Yit Yuan *et al.*, Chemara, Malaysia

1200 - 1230 Paper 16

Oil palm breeding programmes in Indonesia
Mr. A. Lubis *et al.*
Marihat Research Station, Indonesia

1230 - 1300 General discussion

1300 - 1400 Lunch

SESSION V

Chairperson: Dr. Edson Barcelas
Brazil

1400 - 1430 Paper 17

Oil palm breeding in Ghana
Dr. Wonki - Appiah, OPRS, Ghana

1430 - 1500 Paper 18

Elaeis oleifera breeding programme
Rajanaidu, *et al*, PORIM, Malaysia

1500 - 1530 Paper 19

Future prospects of oil palm breeding
Corley, R.H.V. Unilever, U.K.

Chairperson: Mr. B. J. Wood

1530 - 1630

Discussion on future research directions in oil palm breeding

1630

Tea

1900

Dinner at "Mas de Saporta-Coteaux du Languedoc", Montpellier in honor of Mr. Gascon, J.

03.07.1992 (Friday)

0800 Morning

: Visit to CIRAD Research Center
: in vitro culture of palms (oil palm and coconut)
: in vitro culture of other tropical species
: Genome analysis

: Modelling
: Pest and disease (virology)
: Documentation center
: Oil and fat chemistry

1300 - 1400 Lunch

1400 - 1800 Visit of a vine research center

SOME ABSTRACTS

BREEDING PLANS AND SELECTION METHODS IN OIL PALM

by

A.C. Soh

The scientific basis and experimental results of the two main basic breeding plans in oil palm - modified reciprocal recurrent selection (RRS) and modified recurrent selection (MRS) were reviewed. Results of the relative efficacy of the two plans appeared to be stronger for the former. Backcross breeding, recombinant inbred breeding and breeding for clonal propagation were considered as special side programs to exploit as commercial cultivars materials generated from the main breeding programme.
Use of the selection techniques commonly practiced in animal breeding such as best linear prediction (BLP), selection index and best linear unbiased prediction (BLUP) of breeding values in oil palm is illustrated and encouraged. Breeding towards an ideal or optimum hybrid genotype using such techniques is suggested.

Developments in animal and forest tree breeding besides molecular biology, will have much relevance to oil palm breeding and computer-assisted selection will be indispensable. Breeders should draw up breeding plans which will be able to exploit emergent materials and techniques to the fullest.

OIL PALM BREEDING TECHNIQUES

by

Chin Cheuk Weng

Breeding techniques for; (1) collection, storage and utilization of pollen; (2) bagging and constructed pollination of female inflorescences; (3) seed processing and germination; (4) yield recording; (5) bunch analysis; (6) fatting acid composition; (7) height measurement; and (8) vegetative measurements were reviewed. Stringent quality control measures for bagging of both male and female inflorescences and also controlled pollination of female inflorescences are essential to ensure ligetimate crosses. New techniques need to be developed for early confirmation of the legitimacy of the crossings.

Similarly bunch analysis is also labour intensive, with a significant amount of time required to depericarp the fruits into thin slices mannually. So far no new reliable techniques which are simpler or more rapid have been developed to replace the present process.

To conclude, oil palm breeding techniques will continue to evolve with time, with refinements or modifications to suit ever changing conditions. New techniques are also needed for early confirmation of the legitimacy of the crossings.

USE OF DNA MARKERS (RFLPs) IN OIL PALM BREEDING

by

Jack, P.L. and Mayes, S.

DNA molecular markers (especially RFLPs) have become widely used in the plant sciences in a number of ways, including

genetic fingerprinting, determination of genetic distances, genome analysis and more recently identification of markers linked to desirable breeding traits. We have been exploiting such DNA marker system in oil palm for the last 6 years. Early work was concerned with confirming the identity of tissue culture-derived clones with the original selected palms (genetic fingerprinting). For this purpose we have selected DNA markers revealing high levels of polymorphism, for example one probe (p0Pg 54) generates at least 50 distinct banding patterns amongst 124 genotypes. A further hypervariable clone (pSMP6) has been identified and in this case DNA sequence analysis reveals a complex mosaic of interspersed repetitive domains. More recently we have initiated a programme aimed at the construction of an oil palm RFLP-linkage map with the intention of identifying markers to characters such as shell thickness, Fusarium wilt resistance and more long term, oil quality and yield. Mapping is being accomplished in a number of populations including selfed materials, crosses between distinct *E.guineensis* accessions and possibly *E.guineensis x E. oleifera* inter-specific crosses, should there be sufficient breeding interest in introgressing desirable *E.oleifera* characters. Widely differing values of DNA polymorphism have been obtained in each of these crosses, ranging between 15% (for selfings), 50% (for distinct crosses) and 95% (for inter-specifics).

SOME ANCESTRAL PALMS AND THEIR DESCENDANTS

by

E.A. Rosenquist

Three oil palm breeding populations of restricted origin are discussed.

i) **The Serdang Avenue Palms** which were introgressed with the unrelated Ulu Remis population and have since been distributed to many countries.

ii) **The SP540-AVROS Population** which has been distributed as a "pure" breeding population of restricted origin to many countries and which is still being widely used as a source of *pisifera*.

iii) **The Dumpy Palm** which has not fulfilled early expectations but which is of renewed interest as it appears to be very resistant to vascular wilt (*Fusarium Oxysporum*

2. ISOPB Workshop on Critical Issues in Oil Palm Tissue Culture.

This workshop on some of the most important issues in oil palm tissue culture - propagation, ortet selection, clonal evaluation, screening etc will be held in Kuala Lumpur next year in conjunction with International Oil Palm Conference. Among the issues addressed will be:

- Ortet selection
- Culture protocols and methods
- early screening for fidelity
- field evaluation
- alternative strategies for exploitation
- New technologies

Other News

1. IN A LIGHTER VEIN

The passages below are taken from an oil palm publication of 1913 and seem as much relevant today as then.

On harvesting

"The owners profess to be unable to climb the trees or even to make palm oil, and they engage men from another district to do this for them. This appears to be a case of laziness which has become a custom."

"In some parts the harvesters cut the palm fruits when they are quite black and far from ripe,.....and is partly due to impatience, partly to want brought on from improvidence, and partly because there is no law or custom against it.

On processing

"When they are approached with this suggestion their invariable reply is that they don't know the way (to make good quality oil); this is spoken with an air that implies that they don't wish to learn either, and with an expression of mild sympathy and contempt for your suggestion. This plea of ignorance is untrue in most cases. Those who make oil by hard and semi-hard methods make it thus for sale, but for their own use they prepare sweet soft oil without fermentation of the fruits. At one market I saw some particularly unpleasant looking and smelling hard oil, and on asking if they would be content to eat it they said certainly not, but "them (middlemen) are fit to buy it for white man".

On marketing

"A great deal of trickery or fraud is practiced at these markets. A favourite trick is to dent the sides of kerosene tins so that they hold less. At one market, the buyers (middlemen) are so keen to get oil that they waylay the seller on the way to the market in the very early morning, when it is still quite dark, in the endeavour to buy his oil. I saw a case where a buyer bought two pots of oil for twenty shillings when it was quite dark, paid over the money and let the seller depart without even ascertaining his name, and then found out when it became light that he had bought two pots of muddy water with half an inch of oil on the surface."

On quality testing

"The examination consists chiefly in smelling the oil. The smell to an expert will inform him to a large extent whether the oil is hard or soft; the harder the oil the sourer and more unpleasant the smell. To remedy this, however the oil is often boiled before it is offered for sale, allowing it to get slightly burnt so that the burnt smell may take away the sour smell.

2. IN A SERIOUS VEIN

Some members would have received their copy of the latest ISOPB Publications "Proceedings of **YIELD POTENTIAL IN THE OIL PALM** while others may wish to buy from the Society (MYR $ 40 per copy).

Two pages were inadvertently left out i.e after page 124 and 136 in the proceedings. The two pages are given below for members who may wish to detach them and insert in the proceedings.

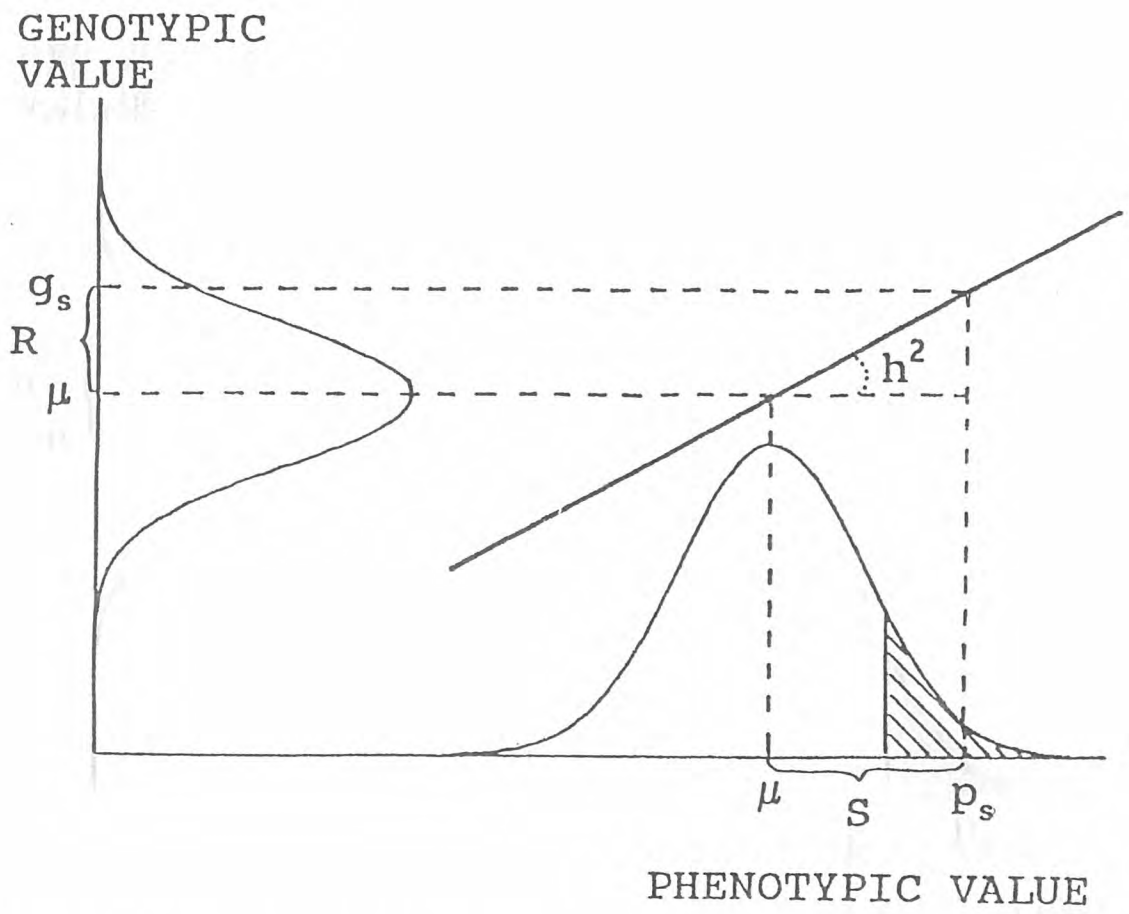

Figure 1 . The expected selection response (R) is estimated from the selection differential (S) by the regression of genotype on phenotype. μ denotes the overall mean; p_s is the mean phenotypic value and g_s the mean genotypic value of the selected progenies; h^2 is the slope of the regression line and is termed the heritability.

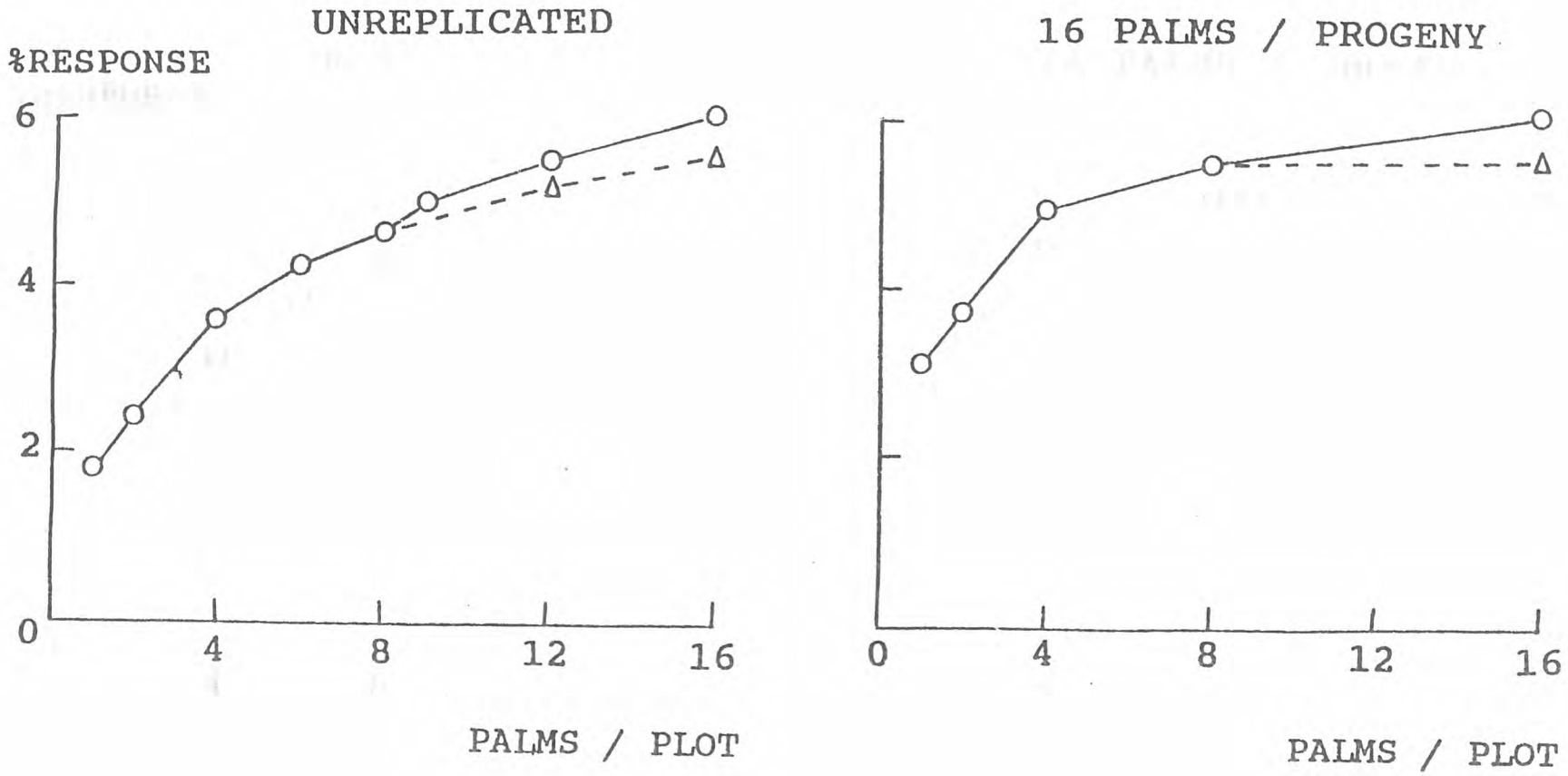

Figure 2 Simulated effect of the number of palms per plot on the expected selection response for (nearly) square plots and for double-row plots for the case of (a) unreplicated plots and (b) a constant number of 16 palms per progeny.