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

VOL. 4 JUNE 1987 MEMBERS ONLY NO. 2

EDITORIAL

The International Oil Palm Conference organised by the Incorporated Society of Planters (ISP) and Palm Oil Research Institute of Malaysia (PORIM) and held in Malaysia every 4-5 years is a much look-forward-to event by oil palm scientists and agriculturists all over the world. This is the occasion where individuals (and companies) attempt to project themselves, compare notes and renew social and professional contacts besides enjoying the opportunity of getting away from the hum-drum of the usual work routine. Despite a somewhat slow start in the preparation run-up, the Conference managed to attract about a thousand participants. A quarter to a third of this number were researchers and plant breeders from practically every major palm oil producing country were represented. A notable exception were our friends from Brazil.

As the success of every plantation begins with good planting materials, rightly so too, the breeding oriented papers dominated the start of the Conference. There were 12 papers presented spanning 4 sessions and occupying time equivalent to a full working day. I do not propose to make a critique or review of the breeding papers nor even include the abstracts in this Newsletter, as most ISOPB members were at the Conference and those who missed out, would be able to get hold of the preprints from their colleagues. I would however, like to make some observations here regarding the Conference.

Many of the planters, who constituted the greater part of the audience, and even some agronomists have complained that the breeding papers (and also some agronomy papers) tended to be too specialist-inclined i.e. speaking in a totally "alien lingo" so to speak. I suppose a scientist presenting a paper to such a mixed audience of about three quarters planters and one quarter scientists will always be at a dilemma. Shall he direct his presentation to his scientific peers to test his mettle as a scientist and lose the greater part of his audience or shall he simplify his talk to win over the lay audience and in the process may lose some of the scientific impact?

2/...

Some of the more experienced speakers e.g. Hereward Corley, have recognised that the Conference was still pretty much a planter's conference (although scientists tend to increasingly dominate it) and directed their talk to the main audience, leaving the scientists to check the technical details in the paper preprints. They succeeded as speakers. Lately, there have been many articles in scientific magazines which highlighted the increasing undesirable trend in scientists not being able to communicate with non-scientists. This is perhaps the reflection of the rapid advances in scientific and technological knowledge. Nevertheless if scientists cannot convey their ideas and discoveries across to the administrators and politicians, they would lose their impact as innovators of new ideas and technology. In fact in many universities now, a pre-requisite in the training of Ph.D candidates is the ability to speak and write well. As such perhaps we, as scientists, should regard the International Oil Palm Conference as an occasion to challenge ourselves in the ability to deliver our ideas successfully to a general audience.

On the other hand, perhaps too, some thoughts on the structure of the Conference should also be given. There is increasingly more scientific papers and participation by scientists in the Conference. The audience will be divided into two big groups with divergent interests and background. Presentations and discussions will be unlikely to be able to satisfy both groups at the same time. The Conference should perhaps be organised into a main session attended by all participants with general papers with overviews on broad topics of interest and concurrent scientific and management sessions to allow more detailed presentations and discussions on specific experimental findings and case studies. This will cut down on the length (and tedium) of the Conference and allow freer and more effective exchange of ideas and information.

Immediately after the International Oil Conference, the ISOPB Workshop on Prospects of Interspecific Hybrids was held at PORIM. There was a notable absence of some ISOPB members who presumably had more pressing matters to attend to but for the 40 or so breeders and

agronomists present, it was a very enlightening and successful workshop made possible by the interesting presentations of the speakers and the very able chairmanship of N.T. Arasu. I have made a brief review of the subject for my own company basing on the papers presented, and this review is reproduced here. I have also included the General Discussion and Conclusions section of Rajanaidu et al. and the abstract of Ismail et al.'s papers, which were not covered in the review. The proceedings of this workshop should be out early.

Editor

Feature Article

Prospects of Oleifera x Guineensis Hybrids for Commercial Plantations

Introduction

Interest in the American oil palm Elaeis oleifera (syn. E. melanocoa) and its hybrid stems from their following attributes:

a. Slow stem growth which facilitates harvesting and prolongs the economic life of the palm. Their height growth is about half to a third of that of current DxP.

b. Tolerance to certain diseases and pests. This is particularly so in South and Central America where the normal W. African oil palm is very susceptible and hence prevents the establishment of oil palm plantations in certain areas. In Malaysia oleifera x guineensis (OxG) hybrids have been suggested to be more tolerant to Ganoderma disease.

c. Higher content of unsaturated oil (iodine value, IV = 60-80, cf. E. guineensis IV = 50) and lower content of saturated oil.

Higher level of unsaturation results in a more fluid oil which will not cloud or solidify at low temperatures, which is desirable for competing in the cooking and salad oil market in the temperature countries.

Consumers in affluent countries also prefer oils with more unsaturated fatty acids because of the popular conception of the linkage of saturated oil consumption and predisposition to heart diseases and other health risks. Palm oil producers are disputing this misconception based on recent experimental findings with palm oil.

Although E. oleifera is capable of high FFB yield, its oil content is very low. Its oil to bunch (O/B %) seldom exceeds 10% and is generally about 1-5%. This is a consequence of lower fruit to bunch (F/B %) due to a larger staly, lower mesocarp to fruit

(M/F % = 30–40%) and lower oil content in the wet mesocarp (O/M = 30-40%). Average figures for current DxP are M/F ≃ 80%, O/M ≃ 50%.

Although many prospections have been made in the natural groves of South America by PORIM, IRHO and the South Americans, no oleifera with oil content anywhere near current DxP levels has been found. Although it is conceivable with further prospection and breeding the oil yielding ability of pure oleifera can be raised to a reasonable level, this would be a rather slow process.

Early observations on the performance of the interspecific cross i.e. E. oleifera x E. guineensis which showed that the F1 hybrids were capable of high oil yields, with intermediate height growth and percent unsaturation as compared to the parents, led to extensive testings of further OxG F1 crosses by various groups to identify superior combinations for prospective seed production, for cloning and for further breeding. In a recent ISOPB (International Society of Oil Palm Breeders) Workshop on Prospects of Interspecific Hybrids held just after the 1987 Oil Palm Conference, various groups shared their results, experiences and views on this subject. This paper attempts to summarise and review the deliberations of this Workshop together with our own experiences and views.

United Plantations' Experience

United Plantations has tested OxG hybrids involving the KLM (the oleifera palm, presumably of Brazilian origin found in Lake Gardens), Brazilian and Colombian oleiferas. Their experiences have been favourable.

The KLM hybrids gave a mean FFB yield of 29.7 t/ha, O/B = 19.7%, height 40% shorter than the DxP progenies and an IV = 61.

The Brazilian hybrids also gave credible FFB yields of about 25 t/ha and O/B = 20–22%. Mean height increment was 6.24 m/yr and IV = 65. The hybrids were less susceptible to Ganoderma as compared to DxP. Hybrid pollen production was poor with poor pollen viability

suggesting that the palms were partially sterile and fruit set was probably brought about mainly by pollen from surrounding E. guineensis palms.

FFB yields were also good (≃ 25 t/ha) with the Colombian hybrids. Mean O/B (≃ 18.3%) was slightly lower. The hybrids generally performed poorly on hill slopes and the hybrids also varied in their relative performance with respect to sites. Mean IV value was higher with half the progenies having IV values exceeding 72.

Marihat Research Station's (Indonesia) Experience

Surinam hybrids were shorter than Brazilian hybrids and the latter shorter than Colombian hybrids. Surinam hybrids also had the smallest canopy suggesting that a higher density planting may be possible.

Yield-wise, Brazilian hybrids were the best giving 248.2 kg/p at the 7th year. Colombian hybrids were generally lower yielding. Surinam hybrids, perhaps due to their smaller size, were lower yielding initially but tended to catch up to the Brazilian in later years.

Extraction wise, all the hybrids were poor, with Brazilian (16.0%), Surinam (10.7%) and Colombian (6.3%). Brazilian had the best M/F (72.8%).

In terms of IV, Brazilian hybrids were similar to Surinam hybrids at about 62-63%. Figures for Colombian hybrids were not available.

IRHO's Experience

The French (IRHO) had the most experience with OxG hybrids being involved with them experimentally and commercially in South America. They have tested more than 2,000 hybrid progenies and found that the best hybrid progeny could only achieve 87% of the oil yielding ability of normal DxP. The disappointing result was due

to sterility and poor bunch quality. The best hybrid progeny could achieve only 18.5% O/B while the average mill extraction of a commercial OxG plantation in Colombia was only 15.9%.

Brazilian hybrids were generally more fertile with lower IV values while Colombian hybrids were less fertile but with better oil quality.

They felt that reported results of OxG hybrid yielding ability were likely to be overestimates. This was because of the presence of bunches of varying fertility (in terms of total fruit set as well as percentage parthenocarpic fruit set), which tended to be grouped as normal or one type of bunch. Similarly bunch analysis were made only on normal or "representative" bunches, which were in fact not representative due to varying levels of parthenocarpic fruit set and this could not ascertained before hand. Use of the bunch analysis procedures adopted for W. African palms without modification would lead to overestimation of the O/B % especially with bunches having higher percentage of parthenocarpic fruits which generally have lower oil content.

To IRHO, their current interest in the hybrids was mainly from the point of view of their resistance or tolerance to devastating diseases eg. Fusarium wilt, heart-rot and insect pest attacks; especially for South America. Slow height growth was of not much concern because in the countries in which they advise, labour availability was not a severe constraint. Also slow stem growth can also be found in the guineensis populations. As for high unsaturated oil, they reported that the European Economic Commission might ban hydrogenation, in which case present palm oil composition would be advantageous. They doubted that end-users would pay a premium for oils with higher unsaturation.

Concluding Remarks

From the above, it appears that it is unlikely that OxG hybrid progenies can achieve the oil yielding potential of DxP materials and are likely to be 20-30% lower at best. This is the consequence of

infertility and the lower oil content of the fruits. One approach is to select out high yielding fertile individuals and clone them. In the light of the recent report on abnormal clonal oil palms this presumption becomes uncertain. Furthermore interspecific hybrids eg. sugarcane, potato are notorious for exhibiting somaclonal variation or variation arising from tissue culture. The other approach which is perhaps more certain, is by breeding but this will involve at least 5-6 generations of backcrossing to the parents i.e. 40-50 years. In short there is no easy shortcut to obtain high oil yielding OxG hybrids.

Are there strong compelling reasons why we should switch to planting OxG hybrids, at least in sizeable hectarages and accept a lower oil production or invest in a large hybrid development programme to achieve oil yields comparable to DxP materials?

Slow stem growth of palms will be of advantage in this country because of labour shortage. However slow stem growth palms can be found within the guineensis and its exploitation is easier instead of resorting to interspecific hybridization. Tolerance to Ganoderma has yet to be proven and even if it is true, Ganoderma problem is mainly confined to coastal areas. Similarly, Ganoderma resistance can perhaps be also found in the guineensis population. Lack of progress in this area is due to the lack of an effective screening technique.

The only strong reason is the higher oil unsaturation. Owing to differing expert opinions surrounding the health risk of palm oil consumption, it is perhaps unwise to alter the palm oil composition for this purpose and especially if the EEC should ban the hydrogenation of liquid vegetable oils for margarine production.

There is a case for developing more liquid palm oil, for penetrating the cooking and salad oil market in the temperate countries. But would refiners pay a premium for such palm oils? Also, there is existing genetic variability for higher fluid oils in the guineensis population.

In the light of the above, OxG hybrid development should remain a modest effort, at least for the moment, in the overall oil palm breeding programme.

References

1. Escobar R. 1982. Preliminary results of the collection and evaluation of the American oil palm Elaeis oleifera (HBK, Cortes) in Costa Rica. In: Pushparajah, E and Chew Poh Soon (eds). The Oil Palm in Agricultural in the Eighties. Vol. 1, pp 79-93. Kuala Lumpur Incorporated Society of Planters.

2. Santos, M.M., E. Barcelos, and J.C. Nascimento 1986. Genetic resources of Elaeis oleifera (H.B.K.) Cortes in Brazilian Amazon In: Soh, A.C., N. Rajanaidu, Mohd Nasir Hassan Basri (ed). Proceedings of International Workshop on Oil Palm Germplasm and Utilization. Workshop Proc. Palm Oil Res. Int. Malaysia. No. 10 pp 95-101.

3. Tan, Y.P. 1987. Performance of OG hybrids in Lower Perak, Malaysia. Paper presented in ISOPB Workshop on Prospects of Interspecific Hybrids, PORIM, Bangi.

4. Lubis, R.A., K. Pamin and Lubis, A.U. 1987. Perspective of hybrid E. oleifera x E. guineensis for breeding purposes in Indonesia. Paper presented in ISOPB Workshop on Prospects of Interspecific Hybrids, PORIM Bangi.

5. Meunier, J. 1983. F1 hybrids, E. oleifera x E. guineensis. PORIM Seminar.

A.C. Soh

Genetic analysis of yield, vegetative growth and fatty acid composition in interspecific hybrids (Elaeis oleifera x Elaeis guineensis)

Rajanaidu, N., V. Rao and A. Khusairi

General Discussion and Conclusions

Three hybrids trials which are a part of genotype x environment interaction study were analysed separately to understand the inheritance of yield, fatty acid and vegetative traits. The results show that in trial .819 FFB is controlled by DR, in .830 by HR and in trial .832 by DR and HR. It shows that genetic estimates vary greatly with the type of breeding material and the environment where these material are tested. In trial .830, a number of males (pisiferas) were crossed to only one female and this could have inflated variation between males ($\sigma^2 m$).

In the case of vegetative data, the traits are either completely controlled by HR (FP) or by DR (RL, IN and LA).

The important items in the fatty acid compositon - IV and C18:1 are controlled by HR and the $h^2 f$ for C18:1 and IV are high indicating that there is a considerable variation for these traits in the Oleifera population and screening and selecting individuals for high C18:1 and IV is important to produce hybrids with high IV.

A pilot exercise in milling ffb from Elaeis oleifera x E. guineensis hybrid oil palms

S. Ismail, S.T. Tan, W.K. Ng, S.K. Ng & B.J. Wood

ABSTRACT

The hybrid palm offers the advantages of an oil with higher unsaturated fatty acid content and a palm with lower height increment. This makes it potentially an attractive alternative to planting the normal commercial oil palm, E. guineensis. In recent years, several medium scale blocks of hybrids using E. oleifera as the mother palm crossed with E. guineensis pisifera pollen, have been planted, to examine the characteristics in more detail. This trial reports a pilot milling exercise in 1985, on one such 1981 planting of 3½ ha. 49 t of ffb was accumulated on a 30-day harvesting interval, and cut to a minimum standard of "loose fruit detachment commenced".

The quantity of products were collected separately for recording as accurately as the milling conditions allowed. Bunches were hand fed to the thresher separately, because otherwise their tissues jammed the conveyor. Other than this, milling procedure was normal.

Oil and kernel extraction ratios, as expected from bunch analysis comparisons, were very low, at 2.82 and 1.29% respectively. The former is likely to be an underestimate due to the recording difficulty in so small a batch, particularly with the need to keep the oil quite separate from normal CPO in the mill machinery.

Efb and cyclone fibre were at a higher proportion than in the range of normal tenera materials. Product losses in processing were about similar to the latter.

It was concluded that planting the hybrid from such seedling sources would not be an attractive proposition, due to its low extractions, but some individual palms approach teneras in this respect, offering prospects for cloning. No insurmountable harvesting, handling and processing problems are likely to arise on the commercial scale. End use aspects of the products from this trial are reported elsewhere.

Second International Conference on Quantitative Genetics, at Raleigh, North Carolina (May 31-June 5, 1987)

The second International Conference on Quantitative Genetics, at Raleigh, North Carolina was held at Raleigh nearly 10 years after the first. About 400 participants attended the Conference; mainly those who had links with NCSU. Eminent geneticists like Kempthorne and Jinks missed the Conference because of ill health and their papers were read by their colleaques. (See obituary of Prof. Jinks).

The lack of progress in the theory of Quantitative Genetics was rather apparent at the Conference. However, this was compensated by a number of interesting papers on the "applied" side. There was also an attempt to study quantative genetics using the recombinant DNA method.

The programme of the Conference covered the following topics; theoretical advances, finding genes affecting quantitative traits, human quantitative traits, inbreeding populations, developments based on work of C.C. Cockerham, changes in quantitative genetics technology, genotype-environment interaction, quantitative genetics in forestry; inserting single genes affecting quantitative traits, mathematical and statistical issues, complex human traits, epistasis and heterosis, selection advances in domestic species, ecology and evolution, new sources of variation and quantitative genetics in crop improvement.

N. Rajanaidu

OBITUARY

PROFESSOR J.L. JINKS CBE, FRS, PROFESSOR OF GENETICS, UNIVERSITY OF BIRMINGHAM, SECRETARY OF THE AFRC (UK)

The scientific community has lost a leading geneticist in the world by the untimely death of Prof. Jinks. Losing someone of the intellectual capabilities, drive, dedication and innovative power of John Jinks is a blow to the progress of science.

Briefly, John was a member of University of Birmingham from 1947 until his death and he was justly proud of having spent 37 of those 40 years in the Department of Genetics. He always had wide interests in biology and genetics and researched and published in such diverse areas as bacterial genetics, extra-nuclear inheritance and animal behaviour. However, his first and most enduring passion was for biometrical genetics, the study of the inheritance of complex characters under multigene control such as yield in crops and intelligence in man. He was concerned not only with developing the formal framework of theory and methodology underlying this central yet little understood area of genetics, but also its application to plant and animal breeding, evolution and natural selection. Though a prolific writer, he was perhaps most effective when communicating verbally, being an inspiring teacher who seldom let the demands of administration keep him from his students. He always kept his office open to under- and post-graduate students for discussion. The book "Biometrical Genetics", co-authored by Mather and Jinks has become standard text for reference on biometrical genetics by many.

The empirical approach was central to his philosophy of life and his scientific work was founded on extensive field and laboratory experimentation and rigorous statistical analysis. He was pre-eminent in his area of research with a justly deserved international reputation for which he was elected to Fellowship of the Royal Society in 1970 and awarded the CBE in 1983.

He was an independent thinker loathe to accept popular beliefs, whether in science or in the world at large without subjecting them to detailed critical analysis. He frequently espoused unpopular causes, as in his views on the genetical basis of hybrid vigour and cytoplasmic inheritance, both of which later became conventional wisdom.

At the Department of Genetics, University of Birmingham, he ensured that the foundations laid by his predecessor and mentor, Sir Kenneth Mather, the first head of the Department, were soundly and effectively build upon. During the 20 years as it's head the number of academic staff increased from 5 to 16 and research interests diversified to accommodate microbial and then later molecular genetics with an accompanying expansion in its international reputation. From the late 1960's, he increasingly involved himself in university academic administration, first as Dean of Science and Engineering (1972-75) and then as Pro-Vice-Chancellor (1981-84). In these areas, as well as outside the University on Research Councils, the UGC, governing bodies of research institutes and the editorial boards of journals, he showed clear thinking, incisiveness and innovative skills. In all of these areas he showed great flair for financial matters and strategic planning for the most part superior to his peers. His accessibility and free use of information involving all his staff resulted in a happy and cohesive Department, a legacy much appreciated by his successor. What he could have offered is lost; what he gave in his contributions to the scientific world were enormous gains.

N. Rajanaidu

NEWS

Genetics Update

A Gen(i)e Behind Every Malady

It looks like genes are implicated in virtually every known human malady.

Researchers at St. Mary's Hospital Medical School, London, found that some people possess genetic factors which predispose them to susceptibility to the modern human scourge, AIDS or HIV virus. People who fail to become infected despite exposure to the virus apparently have a different form of protein found on their cells and in their blood serum, than those found in critical AIDS victims. The protein, group specific component (GC) manifests in 3 forms. Gc1 fast (Gc1f), Gc1 slow (Gcls) and Gc2. Individuals homozygous for Gc1f are AIDS susceptible while Gc2Gc2 individuals are unlikely to be infected by AIDS.

The oncogene, HER-2/neu, known to cause human breast cancer, has been found to exist in multiple copies i.e. gene amplification, in many tissue samples, particularly from patients which had more than three affected lymph nodes in the armpits. The number of affected lymph nodes is indicative of the course of development of the disease which helps doctors to decide how to treat the disease. If a biochemical marker can be found for the gene, then the gene amplication can be another indicator of the stage of disease development.

Alzheimer's disease, the most common form of senile dementia which blights elderly people, can be traced to a defective gene. The cause of Alzheimer's disease is due to the deposition of abnormal proteins in the brain cells. One of the protein components is A4. Using a complementary DNA or cDNA probe on the genetic library from the brain of a normal human foetus, the gene encoding a protein that included the complete A4 sequence was found. It has been postulated

that in Alzheimer's disease something goes wrong with the breakdown of this large membrane protein molecule which is a receptor for chemical signals; leaving the highly insoluble A4 protein behind which accumulates.

Manic depression, symptomised by frequent drastic swings from elation to despair, can be traced to a simple genetic defect. It is clear now that different genes are involved in different populations. By studying the family tree of the Amish people, a closed religious community in Pennsylavania, and using recombinant DNA technique, they found that two possible marker genes on Chromosome 11 seemed to be linked to manic depression. But studies by other groups on Icelandic and other North American communities, showed that the genes involved are different.

To some non-geneticists,such increasing publicity as the above perhaps would seem to suggest that geneticists are playing up their importance and pitching their skills for sale? Especially now that gene-therapy is a possibility besides genetic counselling!

Shooting Genes

Despite some recent experimental claims, there is still no routinely applicable technique for genetic engineering of monocots. There is no really suitable vector system available and if non-vector delivery e.g. electroporation into protoplasts, are used, regeneration of whole plants from the transformed cells poses major problems. A novel method recently tried is to use a gun-powder charged gun to shoot tungsten microparticles, with DNA precipitated on them, into the plant cells. Using such an approach a plasmid carrying the chloramphenicol acetyl transferase (cat) gene, was shot into onion epidermal cells, and the gene was found to be expressed. However, it should be noted that onion epidermal cells, as compared to meristematic cells, are not the type of cells generally used to regenerate whole plants. Also the state and location of the inserted DNA is not known, and it is unlikely that the DNA has integrated into the nuclear DNA.

Biological Plant Protecting Agent

Using recombinant-DNA techniques, researchers at Durham University, U.K., inserted the chitinase gene into Agrobacterium and inoculated the bacteria into the soil. The bacteria sought out the plants and accumulated at the wounds where they expressed the pesticidal protein, which destroyed the cells walls of fungi, insects and nematodes. This protected the plants until they healed when the wounds ceased to release the activating chemicals. At this stage, expression of the pesticide is switched off.

This system has the advantage that the pesticide is produced exactly where and when required, so eliminating waste, reducing environmental impact and reducing the metabolic burden on both the plant and the bacterium. Also, Agrobacterium is attracted to roots of both dicots and monocots.

A patent for the product has been obtained and ICI is developing it as a commercial product.

Ribozymes

Genetic engineering took off with the discovery of bacterial restriction enzymes which can cut long stretches of DNA at specific sites. There was no RNA cutting enzyme until the recent discovery of ribozyme or RNA enzyme, which is not a protein. This enzyme was found in the intron, (intervening sequences between the coding sequences of the gene), which was generally thought to have no function. This particular intron acted as an enzyme which looped up and sliced itself from the RNA molecule.

Plant Patent

Agrigenetics Corp., has recently been granted a U.S. patent on sunflower hybrids with high oleic acid oil. The oleic acid content of the hybrids is 80-85% as compared to 20-25% in normal sunflower oil. The advantage of the high oleic acid oil is its oxidative stability conferring a longer shelf life to products fried with its oil.

Palm Oil News

According to researchers at Edinburgh University, the higher the level of linoleic acid in your body fat, the lower is your risk of suffering a heart attack. This new study establishes that eating little linoleic acid increases the risk of heart disease, even if you eat little saturated fat and have low levels of cholesterols in the blood.

The Malaysian Government is contemplating taking legal action against the American Soybean Association for its malicious and false anti-palm oil advertisement. Meanwhile the U.S. Government has declared that they are not associated with ASA's anti-palm oil lobby efforts.

PORIM will be leading a team of experts from Malaysia, Europe and America, and conducting a symposium on Palm Utilisation and Nutrition in six major cities in the U.S., as part of its efforts to counter ASA's anti-palm oil lobby.

Owing to a sharp rise in Chinese consumer incomes and a corresponding improvement in diets, China is expected to buy more than 750,000 tons of foreign vegetable oils, for 1987-1988 as compared to 60,000 tons only 4 years ago. Of this, 350,000 tons will be palm oil while 300,000 will be soyabean oil. China will now be a new major player in the vegetable-oil market and among the big four together with India, Pakistan and Russia.

The monthly average prices for palm oil for January to March 1987, in comparison with other selected oils are given below:

Oil	Price (US$ per tonne)
Crude palm oil	331.7
Palm Olein	391.0
Palm kernel oil	399.7
Coconut oil	404.7
Soyabean oil	303.7
Rapeseed oil	290.7

187

Oil	Price (US$ per tonne)
Cotton seed oil	492.3
Sunflower oil	326.0
Groundnut oil	506.7

Other News:

The American authorities have expressed concern about the serious decline in new scientific and professional expertise in food agricultural and natural resource disciplines.

Undergraduate and graduate students enrolling in colleges of agriculture and life sciences have declined in numbers and so are the quality of the students, as compared to other disciplines.

The competitive position of American agriculture in the world markets has declined. This has been due in part of efforts of the international crop research centres, research and development by competing nations, and a loss of mind power and research capacity in U.S.

Research has become increasingly expensive and sophisticated and with the decrease in funds for R & D allocated by federal and state agencies, there has been a corresponding decline in the quantity and quality of persons trained to conduct research.

There are still major concerns in U.S., for the impact of agricultural technology on the environment in areas of soil erosion, water quality, resource conservation and food quality, and for the sustainability of American agriculture, to warrant new competencies and research to meet these needs. The professional societies concerned have been requested to seek ways and means to improve the quality of agricultural education and its support.

The Green Revolution Coming to Africa

The green revolution began in Asia in the late 60's. Today most Asian countries are self-sufficient in food. This was brought about by research and development of new varieties and techniques of producing food crops; spear-headed by the internationally funded research institutes e.g. International Rice Research Institute (IRRI), Asian Vegetable Research and Development Institute, (AVRDC). Africa had a late start. The International Institute of Tropical Agriculture (IITA) in Nigeria started only in 1967 and began work only in 1969. ICRISAT, International Crops Research Institute for the Semi-Arid Tropics was formed in India in 1972 but unfortunately varieties developed in India were not suitable for Africa. ICRISAT's Sahelian centre in Nigeria was opened only in 1981.

One would think that with the Asian success and experience and varieties developed, the revolution in Africa would be faster. It is not so. Circumstances in Africa are very different. Varieties and techniques developed in Asia were based on high inputs i.e. high fertilizer, adequate water, good soils and good management which were absent in Africa. The African environment is definitely hostile, with deserts, and areas prone to drought, strong winds and infested with debilitating pests and diseases. Nevertheless scientists at the research institutes are now coming out with new varieties of food and cash crops, farm animals and new farming systems and technologies to tame this environment. Africa's green revolution is poised to take-off and only needs adequate support from the host and donor countries.

Readers Write

Dear Editor,

I refer to Mr. B.J. Wood's comments on processing of fertile pisiferas. FELDA Agricultural Services has carried out an observation trial on processing of fertile pisifera bunches, and has found that the kernels remain intact even after going through the normal mill processing.

Yours sincerely,
C.W. Chin
Felda