



# DOPR NEWS

## DIRECTORATE OF OIL PALM RESEARCH

(Indian Council of Agricultural Research)

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### From the Director's Desk

Dear Readers,

Oil Palm plantations produce about 20-25 tonnes of fresh fruit bunches (FFB) and 9-11 tonnes of fronds per hectare annually. The oil palm has a large requirement for nutrients. These nutrients are removed largely in the harvested fresh fruit bunches and also partially get immobilized in the trunk. Under optimum management conditions, mineral fertilizers account for 20% of cost of production. Thus, fertilizers represent the largest variable external input cost item in oil palm production. Fertilizer application is an important factor for maximizing the returns in oil palm cultivation. Unless recommended doses of fertilizers in conjunction with organic manure are applied, the continuous exploitation of soils would have drastic effect on yields and soil productivity. Nutrient mining and soil productivity decline are, therefore, the major concern in oil palm growing regions.

Oil Palm is a high input, nutrient demanding crop and net mining of nutrients from soil is enormous. Oil palm gardens yielding 25 tonnes of FFB/ha/year removes 93.5 kg N, 11.0 kg P, 92.7 kg K and 20.3 kg Ca. The Oil Palm has a relatively shallow root system with most of the active roots found in the upper 30 cm of the soil. Compared with annual crops and even with most of the dicotyledonous tree crops, the root system of oil palm is coarse and is relatively inefficient in uptake of nutrients. To maintain adequate nutrient supply to the palm, the nutrient concentration in the soil must be higher than the quantity required for most of the other crops. Oil palm is, therefore, a crop that is very sensitive to the soil environment and requires much higher concentration of nutrients in the soil solution.

Directorate of Oil Palm Research along with the oil palm research centres of All India Coordinated Research Project on Palms could work out the fertilizer requirements for oil palm cultivation in Andhra Pradesh, Karnataka, Kerala, Maharashtra and Tamil Nadu states.

Unless the oil palm gardens are managed well, soils under oil palm get depleted predictably at a rapid rate and microbial biomass declines rapidly, if inputs of labile carbon to the soil are reduced. Organic matter dynamics are more variable in space and time in oil palm plantations than for most of the other tree crops. During the economic life of the oil palm plantation

(about 30 years), the weeded circle and the palm avenues receive much lower organic matter inputs than the frond piles and, therefore, it moves towards different equilibrium with respect to contents of soil organic matter over different period of time.

Earlier studies indicated that organic matter, nitrogen, phosphorus and other cation levels decreased considerably; thereby oil palm productivity and they suggest that oil palm alone is not a long-term protective crop. Moreover, most soils under oil palm in India are coarse textured (sandy or sandy loam soils), which have little structure and are vulnerable to structural degradation with low organic matter and micro-biota, incapable of storing nutrients that require continuous addition of inorganic soluble nutrients. Further, change in land use system from annuals to oil palm would have significant effect on dynamic soil properties and with time, changes occurring in structure, horizon thickness etc., are also evident.

Oil palm, being a high input crop, biomass productivity is considerably high and there is a large potential for sequestration of carbon in both soil and plant biomass and also better nutrient re-cycling within ecosystem. Studying the chronosequence of strands would be useful in generating information on ecosystem dynamics in particular to understand assimilates of different ages to the different stage of development of a single strand. Quantification of soil fertility changes as well as its impact on crop productivity is imperative for long term sustainability of the crop.

Considering these factors, Directorate of Oil Palm Research is initiating a research project to study temporal variations in the composition of fronds, production of oil palm wastes and its rate of decomposition, partitioning of energy (carbon) and nutrient content in oil palm belonging to different age groups and to develop leaf analysis norms in oil palm plantations for different soils, varieties and geographical associations. The major outcome of this project would be to obtain bench mark information on nutrient budgeting in oil palm that could aid in location-specific advisory and diagnostic services.

**S. Arulraj**  
Director

## Performance of Indian oil palm hybrids

With a view to assess the productivity of oil palm hybrids imported from external sources like ASD Costa Rica, Ivory Coast and Papua New Guinea with that of indigenously developed hybrids (commonly called Palode hybrids), a field trial was conducted during 1996-2011 at Directorate of Oil Palm Research, Pedavegi. Fresh Fruit Bunch (FFB) yield and other parameters were recorded continuously and were used for comparing the performance of the hybrids. Results indicated that there was no difference in FFB yield recorded among hybrids from different sources though hybrids differed significantly for number of bunches and bunch size. It was interesting to note that Palode hybrids recorded highest SLW (Specific Leaf Weight=1.11 kg/sq cm) thus, reflecting their promiscuity towards drought / water stress tolerance.

## RESEARCH HIGHLIGHTS

### Long term storage of *oleifera* seeds

While investigating the desiccation property of *oleifera* seeds for long term storage, kernels with seed testa of two colours i.e brown and black were observed. It could be inferred that seed coat of brown colour testa was susceptible to microbial infection than dark seeds during germination test.



### Understanding oil palm root development for better irrigation management

Root distribution pattern studies indicated that there was wide variation in root densities at different depths and at different distances from the palm base. Root biomass at various depths in the oil palm

plantations indicated that the primary roots contributed more to the total root biomass followed by secondary and tertiary roots. At different depths, root biomass was maximum at 10-20 cm depth followed by 20-30 and 30-40 cm depth. There was a constant decline of root biomass from 40 cm downwards till 100 cm. It is generally recognized that oil palm is a surface feeder and most of the root system is confined to the top 50cm from the surface. There was very less root activity below the depth of 60cm. Density of roots was maximum at 1m distance from palm base and decreased with the distance from palm base.

Thus it can be inferred that irrespective of the soil and climatic conditions, oil palm root system confines to the top layers of the soil and is basically a surface feeder. In this context, it is tempting to advise that, even by using basin irrigation one can get a better water use efficiency by reducing the quantity of water per irrigation and simultaneously increasing the frequency of irrigation, which will reduce deep percolation losses.

Considering the advantage of surface feeding nature of oil palm, micro irrigation will have an advantage of being able to supply required quantities of water more frequently i.e., on a daily basis and therefore, will be more efficient in oil palm than the basin irrigation system.

## TRANSFER OF TECHNOLOGY

**Officers trained :** Training programmes were organised to officers on "Oil Palm Production Technology" and "Oil Palm Hybrid Seed Production" at the main campus at Pedavegi, A.P. and at Research Centre at Palode, Kerala as per the following details.

During these training programmes, series of lectures were delivered on different aspects of oil palm production. Visits to experimental fields were arranged to demonstrate method of planting, control



Programme	Venue and Date	Officers from	No. of participants
Oil Palm Production Technology	DOPR, Pedavegi, A.P. August 23-30, 2011	Andhra Pradesh, Tamil Nadu, Karnataka and Orissa	20
Oil Palm Hybrid Seed Production	DOPR, RC, Palode, Kerala. September 21-23, 2011	Andhra Pradesh and Kerala	4
Oil Palm Production Technology	DOPR, RC, Palode, Kerala. September 24-25, 2011	Tamil Nadu	30

of pests and diseases, application of fertilizer, collection of samples for leaf analysis etc. Bagging, pollination and bunch analysis for hybrid seed production were demonstrated. The subject matter scientists clarified the trainees' doubts during visits to farmers' fields / experimental fields. Compendium of lectures on 'Oil Palm production technology', 'Hybrid seed production in oil palm' were distributed to the trained officers.

**Farmers trained:** Five training programmes on "Oil Palm Cultivation" were organised to farmers from Orissa, Gujarat, Karnataka and Tamil Nadu.

Lectures on oil palm cultivation practices were delivered. Visit to experimental fields were arranged to demonstrate fertilizer application, method of irrigation, ablation, weeding, mulching and harvesting. Pest, disease and nutrient disorder symptoms were also demonstrated. Farmers were shown video film on "oil palm cultivation". They also visited oil palm plantations of progressive farmers. Literature on oil palm cultivation practices was also provided.



Date	Venue	Farmers represented from	No. of participants
July 25-26, 2011	DOPR, Pedavegi	Orissa	22
July 28-29, 2011	DOPR, Pedavegi	Orissa	24
September 14-15, 2011	DOPR, Pedavegi	Gujarat	21
September 28-29, 2011	DOPR, Pedavegi	Karnataka	22
September 14, 2011	DOPR, RC, Palode	Tamil Nadu	10

### Participation in Exhibition

Directorate of Oil Palm Research, Pedavegi, Andhra Pradesh participated in the Exhibition conducted by Department of Horticulture, Govt. of Andhra Pradesh on the occasion of Workshop on 'Oil Palm cultivation, processing and Value addition' during August 3-4, 2011 at APHU, Venkataramannagudem, A.P.

DOPR, Research Centre, Palode, Kerala participated in the Exhibition conducted during 'Agri-Science Fair (Harithotsavam 2011)' from September 19-24, 2011 at College of Agriculture, Vellayani, Kerala.



### RADIO TALK

**Dr. B. N. Rao**, Pr. Scientist, delivered a talk in Telugu on "Oil Palmlo poshakala yajamanyam" (Fertilizer management in oil palm) - interview broadcast by AIR, Vijayawada on 2<sup>nd</sup> July, 2011.

### RESEARCH ARTICLES PUBLISHED

P. Murugesan, S. Gopakumar and H. Haseela. 2011 Performance of *tenera x tenera* progenies derived from Thodupuzha (Kerala) Oil Palm germplasm II. Bunch quality components. 2011. *Indian J. of Hort.* 68(3): 303-306

### MEETINGS CONDUCTED

#### Institute Joint Staff Council Meeting

First meeting of the eighth Institute Joint Staff Council was held on September 27, 2011 and discussed various matters related to welfare of the staff.



## TRAININGS / WORKSHOPS / CONFERENCES / SEMINARS / MEETINGS ATTENDED

Dr. S. Arulraj, Director participated/attended the following:

- Meeting of the Project Screening Committee on ISOPOM Schemes (being implemented at DOPR and also new schemes proposed by DOPR) held at Krishi Bhavan on July 14, 2011.
- Directors' Conference held at NBPGR Auditorium, Pusa, New Delhi on July 15, 2011 and ICAR Foundation Day Celebrations held at NASC, New Delhi on July 16, 2011.
- Review Meeting of AICRP Schemes implemented by Horticulture Division of ICAR - held at Krishi Bhavan, New Delhi on July 25, 2011.
- Second Meeting of the "Working Sub-group of Horticulture Crops" held at NASC, New Delhi on July 26, 2011.
- Mid term Evaluation Meeting of ICAR Regional Committee II held at CIFRI, Barrackpore, Kolkata on September 24, 2011.
- Chaired the "Oil Palm Growers Interface Programme" conducted by the Department of Horticulture on September 8, 2011, in which farmers from four Districts of Karnataka State participated.
- Dr. S. Arulraj and Dr. K. Suresh participated in the "5<sup>th</sup> Round Table Meeting on Sustainable Agriculture and Climate Change" held at CRIDA, Hyderabad during August 23-24, 2011.
- Dr. P. Kalidas, Dr. K. Suresh, Dr. M. V. Prasad and Dr. K. Ramachandrudu, Scientists, attended workshop on "Oil Palm cultivation, processing and value addition" during August 3-4, 2011 at APHU, Venkataramannagudem, A.P.
- Dr. P. Murugesan and Dr. K. Sunil Kumar, Scientists, attended and presented oil palm germplasm NAGS information in the workshop held during July 29-30, 2011 at NBPGR, New Delhi.
- Dr. P. Kalidas, Pr. Scientist, was nominated for a study tour to Malaysia on Oil Palm and Palm oil organized by Malaysia Palm Oil Council (MPOC) in association with Solvent Extractors Association of India from September 30, 2011 to October 5, 2011.

- Dr. M. Jayanthi, Sr. Scientist was deputed for a three month training programme in the area of Allele Mining (Horticulture) at University of Guelph, Canada from September 20 to December 24, 2011, under HRD programme of NAIP.
- Dr. M. V. Prasad attended Regional Technical workshop on oil palm cultivation at Nagarhalli, Gadag District, Karnataka and delivered lecture on "Oil Palm Cultivation", where in 500 farmers participated. Honourable Minister for Agriculture, government of Karnataka participated in the programme.

### *Campus News*

Ms. G. Sujatha, worked under the guidance of Dr. P. K. Mandal, Sr. Scientist, DOPR, was awarded Ph.D degree in Biotechnology in the faculty of Natural Sciences by Acharya Nagarjuna University, Guntur, Andhra Pradesh during July 2011.

### VISITS TAKEN UP

Expert team consisting of Dr. P. Murugesan, Dr. Sunil Kumar & Dr. Goutam Mandal visited OPIL seed garden, Thodupuzha, Kerala during September 2-5, 2011, for mother palm selection. The team identified mother palms that could be used for hybrid seed production.

### NEW APPOINTMENTS / PROMOTIONS

- > Mr. J. Mohan Rao, T-3 (Technical Assistant) promoted to T-4 with effect from 1.7.2008.
- > Mr. M. Rambabu, T-1 (Field Assistant) promoted to T-2 with effect from 6.1.2009.

### TRANSFERS

Dr. P. K. Mandal, Sr. Scientist (Biochemistry) transferred on August 2, 2011 to National Research Centre on Plant Biotechnology (NRCPB), New Delhi on promotion as Principal Scientist.

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and Mrs. J. Jameema**

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