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 is a slow growing cross-pollinated plantation crop. Commercial plants are hybrids called the *teneras* obtained from crosses of *duras* and *pisiferas*. These plantations of hybrids from controlled crosses consist of genetically dissimilar individuals. The average yield of these crosses is obtained from per tree productions, which often vary considerably. Hence, identical reproduction of elite materials requires the use of *in vitro* cloning. As compared to seed production, tissue culture of oil palm allows rapid multiplication of uniform planting material with desired characteristics like better yield or other traits like improved oil quality, drought tolerance etc. Hence it is extremely important to develop a protocol for micro-propagating elite oil palms, for India to supplement efforts for achieving self sufficiency in indigenous planting material production.

Malaysia and other oil palm producing countries are working on oil palm tissue culture for the past 30-35 years. Though there was a setback in the tissue culture of oil palm due to somaclonal variation in countries like Malaysia, now they have found out means to identify the variation and there are about 20 laboratories in other parts of the world taking up commercial oil palm tissue culture.

As there was no readymade protocol available in the public domain for tissue culture since after the commercialization has begun, many details of tissue culture in oil palm are not easily available. Hence, experiments with explants from mature palm (palms of more than five years of age) were started at DOPR. At present, methodology for tissue culture in oil palm has been standardized and the plants have reached secondary nursery stage. The basic methodology in micro-propagation involves culturing the meristematic tissues in a callus induction media followed by sub culture to induce embryogenic callus and subsequent production of embryoids. Once the embryoids are formed, they are transferred to the proliferation media. After sufficient multiplication has taken place, it is allowed for shoot development and rooting and then transferred for hardening and transfer to nursery.

Concurrently, for ensuring rapid multiplication of oil palm planting materials, DOPR is taking efforts towards commercialization of the technology through AgrInnovate India Limited to ensure that the benefits reach the stakeholders at the earliest.

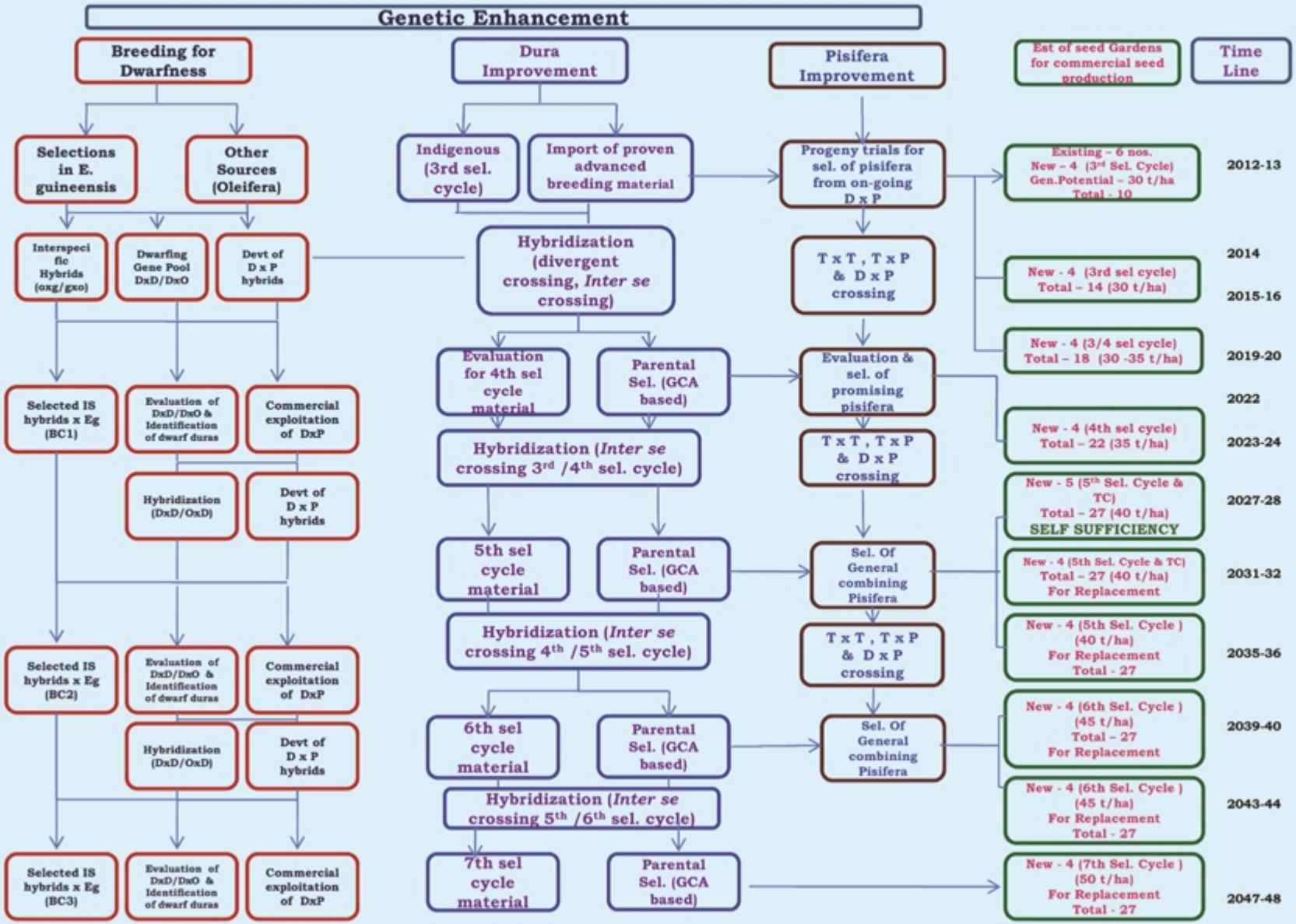
S. ARULRAJ
DIRECTOR

Sectoral News

Promotion of Oil Palm in North Eastern Region States

In the Regional Committee Meeting for North East Region held at Jorhat, Assam during April 17-19, 2013, it was decided that Directorate of Oil Palm Research (DOPR) shall initiate pro-active programme for promotion of oil palm cultivation in North East Region for improving the economic status of farming community in the region through prevention of Jhum cultivation and development of a series of agro-based industries that have the potential for bringing economic prosperity in the region. Further, based on the initiative of DOPR, a meeting was organised at Krishi Bhavan, New Delhi on June 17, 2013 and it was suggested that all the States in the North Eastern Region could consider cultivation of oil palm and prepare proposals for implementation of Oil Palm Development Programme during the current year in consultation with DAC and DOPR. In addition, DOPR was requested to conduct a series of capacity building programmes of 3 days duration to officers of State Department of Agriculture/Horticulture and orientation training of 2 days duration to farmers on "Prospects of oil palm cultivation". A road map for Capacity Building Programmes for North Eastern States was finalized in the meeting held at Shillong on July 10, 2013 for North Eastern States.

Oil Palm Crop Improvement in India: Road Map for 2050



RESEARCH ACHIEVEMENTS / NEW FINDINGS

Genetic diversity in oil palm

Genetic diversity among nine oil palm germplasm accessions (27 palms) was studied using 11 SSR primers. Maximum similarity (0.90) was observed between ZS2-215 and ZS2-216 while maximum dissimilarity was recorded between ZS5-497 and ZS8-263 (recorded least similarity of 0.56). The UPGMA based dendrogram (Fig.1) showed three major clusters with 71% similarity.

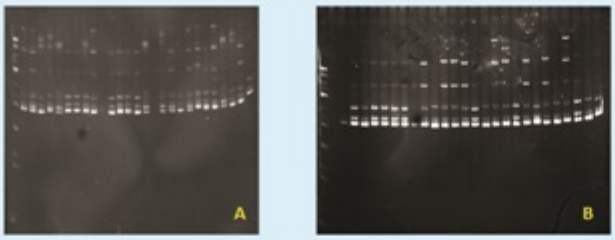


Fig.1. Oil palm genetic diversity using SSR primers (A) Primer -171 (B) Primer -215
Lane 1 to 28: Marker (100bp), ZS1, ZS1, ZS1, ZS1, ZS2, ZS2, ZS2, ZS3, ZS3, ZS3, ZS4, ZS4, ZS4, ZS5, ZS5, ZS5, ZS5, ZS6, ZS6, ZS6, ZS8, ZS8, ZS8, ZS8, ZS8, ZS8 & ZS9.

Chipping endocarp and de-operculum to break dormancy in oil palm

To hasten the germination and curtail the pre- sowing treatment period, experiments were conducted to determine optimal treatment to break seed dormancy. Results showed that endocarp chipping combined with de-operculum recorded highest germination (88%) and took 3, 4 and 8 days to initiate germination, attain 50% germination and final germination, respectively. For chipping the seeds, automation could be explored to scale up germinated seed supply to development agencies.

New oil palm hybrids under testing

Directorate of Oil Palm Research, Pedavegi developed eleven new oil palm hybrids (ID: DOPR 41 to 51) and supplied to the All India Coordinated Research Project on Palms Centre, Vijayrai, Andhra Pradesh for further testing. These hybrids have positive characters such as high yield potential along with slow annual height increment.

Development of molecular diagnostic kit for rapid detection of basal stem rot pathogen in oil palm

Thirty five Ganoderma samples were collected from the basal stem rot affected fields and used for development of molecular diagnostic kit. The ganoderma specific primers *gan-1* and *gan-2* that were already validated were used for their specificity confirmation (Fig.2). All the 35 samples were amplified in PCR reaction and the specificity was confirmed. The primers were cross checked for their specificity against other fungi of oil palm like *Schizophyllum sp, Marasmius palmivora, Glomerella cingulata, Colletotrichum, Pestalotia palmarum, Fuasrium, Botryodiplodia theobromae* etc. But none of the fungal DNAs were amplified. The correct tissue to be sampled for diagnosing the basal stem rot is identified. Samples from 25 basal stem rot disease affected palms were taken from four parts of the palm *viz.*, root, basal stem, upper stem and leaf. Among the tissues, basal stem tissue recorded highest colony forming units of *Ganoderma lucidum* in all the 25 palms. This result was supported by ganoderma specific primers (Fig.3). The DNA could be isolated from basal stem tissue by Raedar method and the disease could be diagnosed using the above specific primers.

Fig.2. Gan-1 and gan-2 primers are specific to *Ganoderma lucidum*, not to other fungi of oil palm. Lane 1: *Ganoderma lucidum*; Lane 2: *Phellinus noxius*; Lane 3: *Marasmius palmivorus*; Lane4: *Glomerella cingulata*; Lane 5: *Pestalotia palmarum*

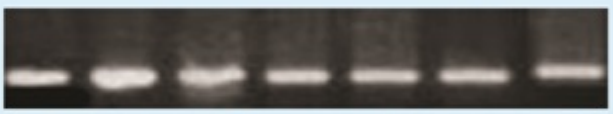


Fig. 3. Detection of *Ganoderma lucidum* from basal stem tissue

Transfer of Technology

Officers Trained: Organized training on "Package of Practice of Oil Palm and FFB harvesting Standards" to 18 officers from Andhra Pradesh during May 16-17, 2013. Lectures on subject matter were delivered and criteria for selection of ripened bunches and harvesting of FFB were demonstrated.

Farmers Trained: Organized two training programmes at DOPR, Pedavegi on "Oil palm cultivation" to 30 farmers from Odisha. Lectures on oil palm cultivation and visits to farmers' oil palm plantations and oil palm processing unit were organised. One day training on "Oil Palm cultivation" was organised to 10 farmers from Thirunelveli, Tamil Nadu at DOPR, Research Centre, Palode, Kerala.

Oil palm technology disseminated through Mobile Message Services: Six contents on oil palm technology were developed and published as voice messages to 68,082 mobile/land line numbers of oil palm growers.

Research articles

- Prasad, M. V., Ananta Sarkar, Mary Rani, K. L. and Jameema, J. 2013. Farmers' adoption pattern in high yielding oil palm plantation - A survey. Journal of Plantation Crops, 41(1): 105-108.
- Praveena Deepthi, K. and Narayan Reddy, P. 2013. Effect of microwave irradiation on stored seed microflora. Progressive Research Journal. Vol 8 December. Special Issue.
- Ravindra Naik, Annamalai, S. J. K., Prabinkumar, S., Prasad, M. V. and Vidhan Singh, T. 2013. Design concept for developing a back pack power mounted harvesting equipment for oil palm. Journal of Plantation Crops, 41(1): 98-100.

Technical Publications

- Behera, S. K., Suresh, K., Prasad, M. V., Rao, B. N. and Ramachandrudu, K. 2013. Soil sampling in oil palm plantations. Extension Folder no. 1/2013. Directorate of Oil Palm Research, Pedavegi. pp 1-4

Book chapters

- Murugesan, P and P. Rethinam, 2013. Seed dormancy and its relevance to quality planting material in oil palm (*Elaeis guineensis*, Jacq.) In: Quality Seeds and Planting Material in Horticultural Crops (Eds H.P.Singh et al), Society for Promotion of Horticulture, Indian Institute of Horticultural Research and National Horticulture Board, Bengaluru, 564-573

Popular articles

- Murugesan, P. 2013. Aseptically breaking oil palm seed dormancy ICAR News Jan-March 2013: page 2-3.
- Ramachandrudu, K., Sekhar, G., Suneetha, V. and Goutam Mandal. 2013. Cultivation of cocoa in grown up oil palm gardens (Telugu). Swarna Sedyam, 16(8): 17-19.
- Ramachandrudu, K., Rao, B.N., Sekhar, G. and Suneetha, V. 2013. Heliconia-An intercrop in grown up oil palm gardens. Sedya Phalam, 8(1): 35-37.
- Ramachandrudu, K., Suneetha, V., Sekhar, G. and Sunil Kumar, K. 2013. Intercrops in grown up oil palm gardens. Sedya Phalam, 8(1): 38-41.
- Ramachandrudu, K., Suresh, K. and Arulraj, S. 2013. Feasibility of cocoa in oil palm gardens. Plant Horti Tech, 12 (6): 14-16.

Participation in Symposia / Seminars / Workshops / Conferences etc.

- Dr. P. Naveen Kumar attended 'National Seminar on Horticultural Biotechnology' at IIHR, Bengaluru on June 14, 2013.
- Dr. P. Murugesan, participated and presented a research paper in 'XIII National Seed Seminar 2013 jointly organized by Indian Society of Seed Technology and University of Agricultural Sciences, at Bengaluru during June 8-12, 2013.

Meetings attended and lectures delivered / papers presented

- Dr. P. Kalidas, Dr. M. V. Prasad and Dr. B. Narsimha Rao attended a meeting on "Vegetable Oil Production in India" at DOR, Hyderabad on April 20, 2013.
- Dr. S Arulraj and Dr. Goutam Mandal, attended 1st meeting of ICAR- Bioversity International Work Plan 2012-16 at Bioversity International, NASC, New Delhi on May 14, 2013 .

Membership in committees / expert teams

- The team consisting of Dr. P. Naveen Kumar, Dr. K. Sunilkumar and Dr. S. K Behera visited the proposed sites for establishment of oil palm seed garden in Mizoram during May 31 to June 1, 2013 and conducted feasibility study.
- Dr. P. Murugesan visited the cashew areas of Plantation Corporation of Kerala Limited (PCKL), Govt. of Kerala for identification of areas suitable for oil palm cultivation during May, 2013.
- Dr R.K. Mathur and Dr B.N. Rao visited IGFRI Regional Research Station Farms, Dharwad, Karnataka to study the feasibility for conducting oil palm progeny evaluation trials.

Transfers

- Dr. K. Manorama, Senior Scientist (Agronomy) and Dr. G. Ravichandran, Senior Scientist (Seed Technology) have been transferred from CPRI, RS, Muthorai, Tamil Nadu and joined at DOPR, Pedavegi on April 25, 2013 and June 3, 2013.

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