



# DOR Newsletter



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## Events

### DOR Felicitates Farm Innovators

Directorate of Oilseeds Research celebrated Farm Innovators Day on February 28, 2013. Seventeen innovative farmers from Maharashtra, Karnataka, Andhra Pradesh, West

Dispenser, Tractor Mounted Broom Sprayer and Solar Sprayer developed by Shri Mahipal Chary, Shri T. Guruvaiah, Shri Syed Subhani and Shri B. Mallesh, respectively were



Bengal and Tamil Nadu participated in the programme. Dr. M. Padmaiah, Principal Scientist and Head (Social Sciences) welcomed the participants and highlighted the

very innovative and appreciated by the participants. Shri P. Ganesh, Brigadier (Retd.) in his address as Chief Guest briefly described his involvement in solving the problems of the farmers, encouraging and making them aware the innovative method of cultivating the crops more particularly in Andhra Pradesh. He also appraised that the exchange of ideas between scientists and farmers and other stakeholders will address the issues of sustainable crop production. Dr. K.S. Varaprasad, Project Director, DOR preside over the function and emphasized the importance of searching and documenting of grassroot level innovations made by the farmers and rural youth. These farmers were felicitated for their innovation and new ideas in oilseed farming. Dr. Harvir Singh, former Principal Scientist and Head (Crop Protection) also attended the function. At the end, Dr. I.Y.L.N. Murthy, Principal Scientist and Head (Crop Production) thanked all the guests and farmers for their active participation.

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## Meetings

### Quinquennial Review Team Meetings

The Quinquennial Review Team (QRT) meeting to review the Crop Protection works carried out during 2007-12 in DOR mandate crops was held at DOR on January 28, 2013. The meeting was Chaired by Dr. Ravinder Khetrpal, Regional Director (South Asia), CABI and Member, QRT. Dr. K.S.Varaprasad, Project Director, DOR; Dr. G.Nagaraj, Member; Dr. I.Y.L.N. Murthy, Member Secretary, QRT and



Dr. T. Ramesh Babu, Head, Division of Entomology, ANGRAU were also present during the deliberations. The meeting was attended by DOR Crop Protection scientists, Heads of section at DOR and pathologists and entomologists from AICRP centres. Dr. K.S.Varaprasad welcomed the QRT and other participants. Dr. Ravinder Khetrpal while addressing the gathering stressed the importance of linkages between research programmes of crop protection, crop production and crop improvement. Dr. Harvir Singh, Head (Crop Protection) highlighted the achievements on pest and disease management in DOR mandate crops. Later research highlights were presented by scientists working on crop protection at DOR and AICRP centres of sunflower, safflower and castor. The Chairman discussed the constraints implementing research programmes and recommendations have been finalized for the future line of work to develop effective IPM strategies.

The QRT meeting to review the works on Crop Improvement and Crop Production in DOR mandate crops was held on February 5, 2013 at DOR. Dr. J.H.Kulkarni, Ex-Vice Chancellor, UAS, Dharwad and the Chairman, QRT;

Dr. V.Muralidharan, Retd.Professor (Oilseeds), TNAU, Coimbatore; Dr. Ravinder Khetrpal, Regional Director (South Asia), CABI; Dr. Y.Eswara Prasad, Former Head, Department of Agricultural Economics, ANGRAU; Dr. G. Nagaraj, Principal Scientist (Retd.), Members of QRT, Dr. K.S.Varaprasad, Project Director, DOR; Dr. A.R.G Ranganatha, Project Coordinator (Sesame & Niger) and Dr. R.L.Srivastava, Project Coordinator (Linseed) were present. The significant achievements under each of the projects undertaken at this Directorate were presented by the Heads of Crop Improvement and Crop Production sections. It was followed by the presentations of research achievements under AICRP (Sesame & Niger) and Linseed. The QRT reviewed research and developmental activities and recommendations were made. QRT also had meeting with DOR-IMC and appraised the recommendations made by the QRT on February 6, 2013. At the end, Dr. I.Y.L.N. Murthy, Head (Crop Production) and Member Secretary, QRT proposed vote of thanks.

### Research Advisory Committee Meeting

The 26<sup>th</sup> RAC meeting was held on January 30, 2013 at DOR, Hyderabad under the Chairmanship of Dr. M. Mahadevappa, Director, JCC, Rural Development Foundation, Mysore. The other members of RAC present were Dr. S.S. Banga, National Professor, Department of Plant Breeding, PAU, Ludhiana; Dr. M. Devender Reddy, Former-Director, WTC, ANGRAU, Hyderabad; Shri P. Gopal Reddy, and Shri Vishnupant Rao Mahale, IMC Members, DOR. Dr. K.S.Varaprasad, Project Director welcomed the Chairman and members of RAC and made a presentation on the achievements of DOR for the last six months. The





committee reviewed the action taken report on the recommendations made by the committee during their tenure *i.e.*, from September, 2010 to February, 2013. RAC visited DOR Research farm at Rajendranagar. The Project Investigators of the research projects explained the field trials of safflower and castor experiments to RAC. The meeting ended with a vote of thanks proposed by Dr. Harvir Singh, Head (Crop Protection) & Member Secretary, RAC.

### Institute Management Committee Meeting

The 29<sup>th</sup> meeting of the Institute Management Committee (IMC) was held on February 6, 2013 under the Chairmanship of Dr. K.S.Varaprasad, Project Director, DOR. The other members attended the meeting were Dr R.Sudhakara Rao, Director of Research, ANGRAU; Smt. G. Indira, ADA, Government of Andhra Pradesh; Shri. P. Gopal Reddy and Shri. Vishnupant Narayanrao Mahale, Members (non-official); Dr. T.Radhakrishnan, Principal Scientist, DGR, Junagadh; Dr. G.K.Gupta, Principal Scientist, DSR, Indore; Dr. A.R.G.Ranganatha, Project Coordinator (Sesame & Niger), Jabalpur; Dr. S.N.Sudhakara Babu, Principal Scientist, DOR; Mr. K.Srinivasa Rao, FAO, DRR and Mr.Anil Behari, SAO, DOR and Member Secretary.

The Chairman welcomed the IMC Members and presented the research achievement of the Directorate. The committee appreciated the work being carried out at the



Directorate. The Member Secretary apprised the committee about the action taken report on the proceedings of the last IMC meeting. The agenda items proposed by DOR were approved by the committee.

### Interface Meet of Stakeholders

An interface meeting on the technologies offered by the DOR was held on February 21, 2013. Thirty representatives from various seed and bio-pesticide companies were participated. Dr. K.S.Varaprasad, Project Director, DOR in



his welcome address indicated that the purpose of the meeting is to foster linkages between public and private sector for collaborations based on mutual interests and strengths. Dr. K.K.Sharma, Principal Scientist & Head (GTL), ICRISAT appreciated the unique initiative taken by the Directorate and explained the power of partnerships by quoting the initiatives taken up at ICRISAT through consortium approach. Various salable technologies *viz.*, *Bacillus thuringiensis*, *Beauveria bassiana*, *Trichoderma harzianum* formulations, gene constructs and sunflower necrosis disease resistant transgenic events developed at DOR were presented in the meet. Availability of parental lines/hybrids in sunflower, safflower and castor as well as the core competent areas for contract research was also highlighted.

### Annual South Zone ZTM & BPD Meeting

Annual South Zone ZTM & BPD (Zonal Technology Management & Business Planning and Development) meeting for the year 2012-13 was organized at this Directorate on March 7, 2013 which was sponsored by CIFT, South Zone ZTMC, Cochin. Dr.I.Y.L.N.Murthy, Officer-in-Charge, ITMU, DOR welcomed the participants and acknowledged the contributions and guidance provided by the ZTM & BPD, South Zone in facilitating the activities of ITMUs in relation to the intellectual property protection

and technology management. This meeting was presided by Dr. K.S.Varaprasad, Project Director, DOR and in his address, he highlighted the importance of developing technologies which can be licensed to the private partners



for disseminating the technologies very fast. He also opined that the ITMU of each Institute should take proactive role in identifying the technologies which are ready for commercialization and the partners for licensing. Dr. C.N. Ravishankar, Principal Investigator, ZTM & BPD Unit, South Zone, ZTMC, CIFT, Cochin briefly presented the work done by South Zone ZTMC in 2012-13. The incharges of ITMU of the ICAR Institutes located in South Zone presented their Annual Report for the year 2012-13. Dr. K.S.Varaprasad gave the concluding remarks by summarizing the proceedings and proposing the recommendations emerged out of the technical sessions. Dr. C.N. Ravishankar, Principal Investigator, ZTM & BPD Unit, CIFT, Cochin proposed vote of thanks.

## A Success Story

### Amelioration of living standards of tribal farmers through technological interventions in castor

To improve the living conditions of tribal farmers through interventions of oilseeds technologies especially in castor, the DOR implemented the Tribal Sub-Plan Scheme (2011-12) in five villages viz., Macharam, Jangamreddypalle, Chitlamkunta, Petranchemu and Maddimadugu of Amrabad mandal, Mahabubnagar district. Though, castor is an age old crop in the district, the crop lost its share in these villages due to several reasons, of which diseases like *Botrytis*, wilt as well as insect pests such as semilooper, tobacco caterpillar,

etc. In order to create the awareness among the tribal farmers, DOR provided training covering various aspects of production technologies of *rabi* castor including cropping systems for sustainable production both at their doorstep and on farm level.

A total of 96 tribal farmers having bore wells were selected and provided them the seeds of castor hybrids released from DOR viz., DCH-519 and DCH-177. Despite having apprehension about castor under *rabi*, the farmers were convinced to sow in October, 2011. Tribal farmers are growing castor in *rabi* first time in those selected villages. The soils of the villages are mostly chelka/sand loam, hence, flood irrigation was the constraint, besides, it was a drought year, water in bore wells gone in to deeper layers. Farmers are not having micro-irrigation facility were provided with 55 sprinkler sets in three villages to overcome the irrigation problem to some extent. To mitigate drudgery among the



women farmers, 125 secateurs were supplied for harvesting of spikes. While most of the fields are located nearer to foot of the hills, farmers are often facing transport problem of agricultural produces, so they were supplied 3 bullock carts as village asset in the three villages. To protect the farm produce during rains, they were also supplied tarpaulin. During the season, a krishi mela was also organized in the village and the farmers shared their experiences under tribal sub-plan (TSP). Dr. K.S Varaprasad, Project Director & incharge TSP and Dr. M. Padmaiah, Principal Scientist & Scheme Coordinator and Mr. Mitra, Deputy Secretary, ICAR, New Delhi participated in the krishi mela.



The outcome of technological interventions showed encouraging results to the farmers. One of the farmers namely Mr. Suryachandra has got Rs.50000/- from two acres land. Majority of tribal farmers got on an average of Rs. 8000/- per acre, despite severe drought. It indicates that there is scope to get higher economic returns under good and evenly distributed rainy years because of technological interventions.

## Field Days

### Safflower Germplasm-cum-Breeders Day

Safflower germplasm-cum-breeders field day was organized at DOR research farm located at ICRISAT, Patancheru, Hyderabad on March 5, 2013. Ten safflower breeders from AICRP and voluntary centres and scientists



from DOR attended the programme. The breeders scored 1260 exotic germplasm accessions for selection of key accessions based on phenotypic traits and observed the variability in high oil varieties imported from Mexico. Participants also visited breeding plots and observed preliminary varietal and hybrid trials of DOR material in various generations and national crossing programme.

### Rabi Castor Field Day

The *rabi* castor field day was organized by TSP-DOR on March 16, 2013 at Jangamreddypalle village, Amrabad mandal, Mahaboobnagar district. About 500 farmers participated in the programme from three mandals. Out of them 90% of farmers were belonging to Chenchus community. The scientists from DOR, DRR, DSR and PDP, along with the officials from State Agriculture Department,

JDA, Mahaboobnagar district participated in the field day. The field visit was followed by farmers interaction with the scientist and state agricultural officials. Dr. K.S.Varapasad, Project Director, DOR advised the farmers to follow the



improved technology for getting higher benefits. Farmers shared their experiences pertaining to castor crop both in *kharif* and *rabi* seasons. They expressed about *Botrytis* free cultivars. Dr. Mangal Sain, Principal Scientist, DRR spoke on paddy production technologies, while Dr.Rama Rao, Principal Scientist, PDP talked on backyard poultry and improved breeds like Vanaraja and Gramapriya. Dr. Rajendra R. Chapke, Senior Scientist (Agricultural Extension), DSR spoke on *kharif* jowar production technologies. The programme was coordinated by Dr. M.Padmaiah, Principal Scientist and Officer In-charge, TSP-DOR with the support of Mr.Anjaneyulu and Mr.Ramaswamy of the Chaitanya Rythu Mitra Society, Amrabad.

### Sunflower Germplasm Field Day

A field day on sunflower germplasm was organized at



DOR, Hyderabad on February 8, 2013. About 15 sunflower breeders' from different AICRP centres attended the programme at Narkhoda Research Farm of DOR. The germplasm field day provided the sunflower breeders a unique opportunity to observe 430 trait specific sunflower accessions raised for the germplasm day. The breeders selected trait specific germplasm as per their requirement for use in breeding programmes. The sunflower research scientists from DOR also participated in the field day.

### Visit of Monitoring team for Sunflower DUS trial

The Monitoring Team visited the sunflower DUS trial on January 22, 2013 under the Chairmanship of Dr. D.M.Hegde, Ex-Project Director, DOR. The other



members were Shri Dipal Roy Choudhary, Jt.Registrar, PPV&FRA, New Delhi; Dr. N.Mukta, Nodal Officer, DOR and Dr. C.Lavanya, Associate Nodal Officer, DOR. Representatives from three private seed companies also visited the trials. The crop expression and data recording was monitored and the team was satisfied with the conduct of the trial.

## Training Organized

### PPV&FRA Awareness-cum-Training Programme

The Protection of Plant Varieties and Farmers Rights Authority (PPV&FRA), New Delhi sponsored awareness-cum-training programme on Protection of Plant Varieties and Farmers Rights was conducted at DOR, Hyderabad on January 24, 2013. The awareness-cum-training programme was basically aimed at dissemination of the information on provisions of Protection of Plant Varieties and Farmers

Rights Act, 2001 with special emphasis on Breeders, Farmers and Community Rights and DUS Test guidelines of oilseeds. The training was attended by around 100 participants including KVK personnel from both Govt. and NGO Sector of Zone V, representatives from private seed companies and innovative/progressive farmers from 5 districts of Andhra Pradesh viz., Mahaboobnagar, Kurnool, Sangareddy, Rangareddy and Medak. Dr.N.Anisetty Murthy, Ex-Expert



Member, FAO was the Chief Guest for the programme. In his address, Dr. Murthy covered the genesis of plant variety protection and its implications at the global level. During awareness programme interactive lectures delivered by Dr.K.S.Varaprasad, Project Director; Dr.Harvir Singh, Head, Crop Protection; Dr.C.Lavanya, Principal Scientist and Dr.N.Mukta, Principal Scientist of DOR; Dr.Sarath Babu, Principal Scientist, NBPGR Regional Station, Hyderabad and Dr.L.V.Subba Rao, Principal Scientist, DRR, Hyderabad. In addition a video film on Farmers Rights under PPV & FR Act, 2001 documented by PPV&FR Authority was screened. The farmers have shown keen interest to learn about provisions for protection of farmer's varieties and other rights for farmer under the PPV&FR Act, 2001. The resource persons clarified the queries raised by the farmers. Dr.K.S.Varaprasad, Project Director, DOR advised the farmers and KVK personnel to inventorize the material developed or maintained by them to derive benefit from the provisions of the Act.

### Hands-on training on "Microbial Agents of Major Insect Pests and Diseases of Crops"

A hands-on training on "Microbial Agents of Major Insect



Pests and Diseases of Crops” was organized during March 11-20, 2013 by the Crop Protection Section, DOR, Hyderabad towards resource generation. Out of nine participants attended, 4 from industry, 4 from KVKs and 1 from ICAR. The training focused on the several agriculturally important microbials viz., plant disease antagonists (*Pseudomonas* spp., *Trichoderma* spp.), insecticidal bacterium (*Bacillus thuringiensis*), entomopathogenic fungi (*Beauveria bassiana*, *Nomuraea rileyi*, *Metarhizium anisopliae*, *Verticillium lecanii*, *Paecilomyces fumosoroseus*), baculoviruses and entomopathogenic nematodes (*Steinernema glaseri* and *Heterorhabditis indica*). The participants were given hands-on training for most part on aspects like isolation, identification, characterization



including molecular approaches, culturing and maintenance, spray drying, mass production and formulation and quality control. Dr. P.S.Vimala Devi, Principal Scientist (Entomology) and Dr. R.D. Prasad, Principal Scientist (Plant Pathology) were the Course Directors of the training programme.

## Research Highlights

### Quantification of delta endotoxin in DOR Bt-1 formulation

*Bacillus thuringiensis* (Bt) is an insecticidal bacterium, marketed worldwide for control of many important plant pests mainly caterpillars belonging to the order Lepidoptera. A novel, simple and low cost mass production methodology for Bt on the principle of solid-state fermentation was developed at the Directorate employing a local isolate DOR Bt-1 belonging to Bt var. *kurstaki*. The wettable powder

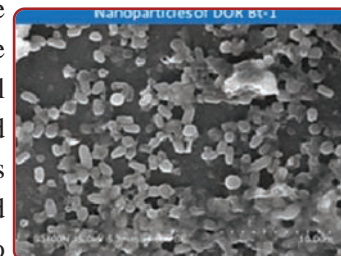
formulation of DOR Bt-1 was registered with the Central Insecticides Board (CIB). DOR Bt-1 formulation has been found effective against several lepidopteran pests including castor semilooper on castor, gram pod borer on pigeonpea, leaf folder and stem borer on rice, etc. The production and formulation technology has been licensed to 39 firms till date. DOR Bt-1 formulation is now available under different trade names in the country viz., Cezar, VBt, Jas-Bt, Caterpillin, Grant-Bt, Beater, Dipole etc. In accordance with the revised guidelines of CIB effective from 01/01/2011, quantification of the delta endotoxin in the DOR Bt-1 formulation was carried out through Enzyme-Linked Immuno Sorbent Assay (ELISA) using Cry1Ac Bt-Quant kit of CICR, Nagpur. Delta endotoxin present in the formulation was solubilized into 100mm sodium hydroxide and used for the quantification. The delta endotoxin in the DOR Bt-1 formulation was found to be 5.75% on an average.

*P. S. Vimala Devi*

### Nanotechnology for increasing the effectiveness of DOR Bt-1 belonging to *Bacillus thuringiensis* var. *kurstaki*

Nanotechnology offers considerable opportunities for the development of innovative products arising from the improved or novel functionalities of nanosized materials and substances (collectively termed nanomaterials), which also have a much larger surface to mass ratio compared with bulk equivalents. Topical sprays of Bt are advantageous in terms of their safety, specificity and potency compared to chemical sprays, and are also biodegradable. However improved formulations of the active ingredient are essential to make Bt formulations comparable to chemical insecticides in terms of the speed of kill. Formulations with small and narrow particle-size distribution will improve the coverage of sprays on the foliage.

The Directorate developed a low cost formulation of a local isolate of Bt var. *kurstaki* DOR Bt-1 and



commercialized the technology successfully. Studies have been initiated for increasing the efficacy of DOR Bt-1 employing nanotechnology. DOR Bt-1 powder containing particles sized  $105\mu$  was subjected to high pressure homogenization to generate nanoparticles (NPs) of Bt. These NPs were characterized for size through dynamic light scattering and electron microscopy for visualizing even the smallest nanoparticles *i.e.*, less than even 50 nm. NPs of Bt resulted in higher mortality of 6 and 8 days old larvae *Helicoverpa armigera* at a 50% lower dose coupled with faster kill over the  $105\mu$  particles. Hence, high pressure homogenization holds immense scope for increasing the efficacy of Bt.

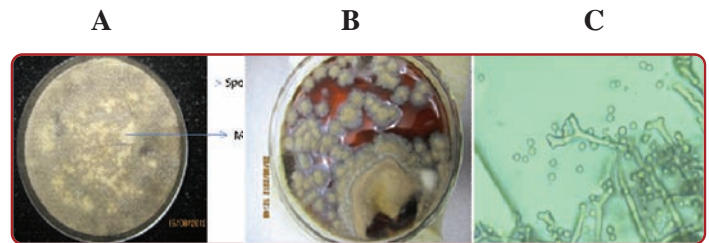
**P. S. Vimala Devi**

### ***In vitro* sporulation of grey rot pathogen of castor and development of a screening method for *Botrytis* grey rot under artificial epiphytotic conditions**

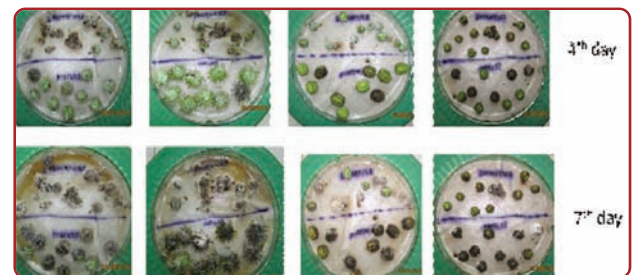
One of the most devastating diseases of castor is Grey rot, caused by the necrotrophic fungus *Botryotinia ricini* (Godfrey) Whetzel. The anamorphic phase of *B. ricini*, known as *Amphobotrys ricini* (N.F. Buchw.) Hennebert is responsible for disease epidemics. Botrytis grey rot/gray mold infects the inflorescence or the capsules of castor causing severe yield losses. To study the host-pathogen interactions in castor, it was imperative to develop the pure culture of *B. ricini* pathogen. Previous studies had reported profuse mycelial growth and sclerotia formation under *in vitro* culture conditions and difficulty in obtaining sporulation of grey rot pathogen (*B. ricini*) of castor.

In the particular study, the culture media composition and conditions of growth were optimized for profuse *in vitro* sporulation of *B. ricini*. The pathogenicity of the pure/ *in vitro* raised culture was verified using a susceptible variety DCS-9. ITS sequencing of the isolated pure culture was done. BLAST analysis of the ITS sequence was carried out to identify the pathogen as *Amphobotrys ricini*. The spore cultures were maintained in glycerol stock. A screening method was developed to screen the *Botrytis* pathogen under artificial epiphytotic conditions or under lab conditions using Petri/culture plates. The *in vitro* raised spores were used for screening four castor lines (DCS-9, RG3216, RG3309, RG2787) using this method and were found to be comparable with the cut-spike method of screening. The immature spikes/capsules were found to be more susceptible than

mature spikes/capsules of susceptible variety in both cut-spike experiment as well as the Petri-plate method of screening. Season-independent screening and preliminary screening on a large scale in lab conditions can be done using this method.



*In vitro* sporulation of grey rot fungus of castor (*B. ricini*)  
A. In culture medium B. In broth C. Conidia



Screening of castor lines for *B. ricini* using the *in vitro* raised spores

4<sup>th</sup> Day

7<sup>th</sup> Day



Cut-spike experiment of screening in glass house using DCS-9 also gave comparable symptom development

**Sujatha. T. Parvathy, M.A. Raoof and R.D. Prasad**

### **Deposition of Gene Sequencing of *Bacillus thuringiensis* isolate in Gene Bank**

The sequence of novel cry1Aa gene for the delta endotoxin from the local isolate DOR Bt-6 (NAIMCC-B-00167) belonging to *Bacillus thuringiensis* var. *kurstaki* was deposited in National Center for Biotechnology Information (NCBI) gene bank with gene bank accession number KC421096 and the toxin has been designated as Cry1Aa23.



## Publications

### Research Papers

- Aziz Qureshi, A., Prasad, R.D. and Nageswara Rao, N. 2012. Response of plant growth promoting rhizobacteria on the growth, phosphorus and potassium nutrition of sunflower (*Helianthus annuus* L.). *Journal of Oilseeds Research*, **29**(2): 173-175.
- Bharati Bhat, N., Raja Ram Reddy, D., Chander Rao, S. and Singh, T.V.K. 2012. Integrated disease management of sunflower necrosis disease. *Indian Journal of Plant Protection*, **40**(2): 99-104.
- Dudhe, M.Y., Moon, M.K. and Lande, S.S. 2011. Study of gene action for restorer lines in sunflower. *Helia*, **34** (54): 159-164.
- Francis, G., Oliver, J. and Sujatha, M. 2013. Non-toxic *Jatropha* plants as a potential multipurpose multi-use oilseed crop. *Industrial Crops and Products*, **42**:397-401.
- Meena, H.P., Sujatha, M. and Varaprasad, K.S. 2013. Achievements and bottlenecks of heterosis breeding of sunflower (*Helianthus annuus* L.) in India. *The Indian Journal of Genetics and Plant Breeding*, **73**(2): 123-130.
- Mukta, N. 2012. Assessment of genetic diversity in non-sparsely spiny safflower (*Carthamus tinctorius* L.). *Journal of Oilseeds Research*, **29**(2): 152-156.
- Murthy, I.Y.L.N. and Alivelu, K. 2013. Comparison of few statistical models describing castor (*Ricinus communis*) seed yield response to phosphate fertilizer. *The Indian Journal of Agricultural Sciences*, **83**(1): 99-102.
- Prathap Reddy, K., Chander Rao, S., Bharadwaja Kirti, P. and Sujatha, M. 2013. Development of a scoring scale for powdery mildew (*Golovinomyces cichoracearum* (DC.) V.P. Heluta) disease and identification of resistance sources in cultivated and wild sunflowers. *Euphytica*, **190**: 385-399.
- Ramesh, M., Lavanya, C. and Brahmeshwar Rao, M.V. 2012. Genetic divergence in some indigenous and exotic germplasm lines of castor (*Ricinus communis* L.) under rainfed conditions. *Indian Journal of Dryland Agricultural Research and Development*, **27**(2): 79-83.
- Ramesh, P., Sudhakara Babu, S.N., Aziz Qureshi, Md.A. and Nagendra Rao, T. 2013. Effect of conservation agricultural and nutrient management practices on castor (*Ricinus communis*) - sorghum (*Sorghum bicolor*) cropping system in rainfed Alfisols. *Indian Journal of Agronomy*, **58**(2): 168-174.
- Sunil, N., Vinod Kumar, Sujatha, M., Rajeswara Rao, G. and Varaprasad, K.S. 2013. Minimal descriptors for characterization and evaluation of *Jatropha curcas* L. germplasm for utilization in crop improvement. *Biomass and Bioenergy*, **48**: 239-249.
- Vekattakumar, R., Padmaiah, M. and Sarada, C. 2012. Strategies to increase castor (*Ricinus communis* L.) production in India through effective resource-use management practices. *Journal of Oilseeds Research*, **29** (2): 131-134.

### Book Chapters

- Bir Bahadur, Murthy, G.V.S. and Sujatha, M. 2013. Pollen of *Jatropha* L. taxonomic and phylogenetic considerations. In: Bir Bahadur, Mulpuri Sujatha and Nicolas Carels (Eds.). *Jatropha: Challenges for a New Energy Crop*, Vol.2: Genetic Improvement and Biotechnology. Springer Publishers, USA. Pp.45-74.
- Nitish Kumar, Muppala Reddy, P. and Sujatha, M. 2013. Genetic transformation of *Jatropha curcas*: Current status and future prospects. In: Bir Bahadur, Mulpuri Sujatha and Nicolas Carels (Eds.). *Jatropha, Challenges for a New Energy Crop*, Vol.2: Genetic Improvement and Biotechnology. Springer Publishers, USA. Pp.535-546.
- Sujatha, M. 2013. Genetic diversity, molecular markers and marker assisted breeding in *Jatropha*. In: Bir Bahadur, Mulpuri Sujatha and Nicolas Carels (Eds.). *Jatropha: Challenges for a New Energy Crop*, Vol. 2: Genetic Improvement and Biotechnology. Springer Publishers, USA. Pp.395-422.
- Sujatha, M., Bir Bahadur and Papi Reddy, T. 2013. Interspecific hybridization in the genus *Jatropha*. In: Bir Bahadur, Mulpuri Sujatha and Nicolas Carels (Eds.). *Jatropha: Challenges for a New Energy Crop*, Vol.2: Genetic Improvement and Biotechnology. Springer Publishers, USA. Pp.423-444.
- Sujatha, M., Papi Reddy, T., Sathaiah, V. and Bir Bahadur. 2013. Genetic affinities of *Jatropha* with other euphorbiaceous taxa. In: Bir Bahadur, Mulpuri Sujatha and Nicolas Carels (Eds.). *Jatropha: Challenges for a*

New Energy Crop, Vol.2: Genetic Improvement and Biotechnology. Springer Publishers, USA. Pp.445-456.

- Vimala Devi, P.S., Ranga Rao, G.V., Gopalakrishnan, S. and Sivakumar, G. 2012. Environmental impact of microbial pesticides. *In: Sharma, H.C., Dhillon, M.K. and Sahrawat, K.L. (Eds.). Environmental Safety of Biotech and Conventional IPM Technologies. Studium Press LLC, USA. Pp.261-272.*

## TV Presentation

“Rabi amudam sagulo chenchu rythulaku avagahana sadassu” by Dr. M. Padmaiah, Principal Scientist, CVR News, Hyderabad, broadcast on March 19, 2013.

## HRD

### Participation in training Programmes/Workshops/Seminars/Conferences etc.,

Name	Programme	Venue	Date
Dr. Sujatha, T. P.	Training on “Global Biosafety Management Programme”	CU&SGMC, Hyderabad	January 12-13, 2013
Shri G.Raghunath	Training programme on “KOHA Library Management System”	ANGRAU, Hyderabad	January 17-19, 2013
Dr. P.Padmavathi	National Symposium on “Climate Change and Indian Agriculture: Slicing down the Uncertainties”	CRIDA, Hyderabad	January 22-23, 2013
Dr. P.S.Vimala Devi	National Workshop on “Gender Budgeting and Rural Development”	NIRD, Jaipur	February 04-06, 2013
Dr. P.Duraimurugan	4 <sup>th</sup> International Conference on “Insect Science 2013”	GKVK, UAS, Bangalore	February 14-17, 2013
Dr. I.Y.L.N.Murthy	Technology Management for Researchers	NAARM, Hyderabad	February 28-March 06, 2013
Shri G.Raghunath	Training programme on “Elementary Data Analysis”	IASRI, New Delhi	March 11-15, 2013
Shri P.Srinivasa Rao	Training programme on “Website Development and Hosting”	IASRI, New Delhi	March 18-22, 2013
Shri V.Sambasiva Rao	“Basic Training Programme for use of Hindi on Computer”	MANAGE, Hyderabad	March 18-22, 2013

## Personnel

### Promotions

Name	Present Post	Promoted Post	Date of Promotion
Shri M.Indrasena Reddy	Tractor Driver (T-2)	Tractor Driver (T-3)	June 29, 2011
Shri Y.Venkateshwara Rao	Tractor Driver (T-2)	Tractor Driver (T-3)	June 29, 2011
Shri N.Vasanth	Fitter (T-2)	Fitter (T-3)	June 29, 2011
Shri K.Srinivas	Generator Operator (T-2)	Generator Operator (T-3)	September 20, 2011



## Retirement

Dr. Harvir Singh, Principal Scientist (Agricultural Entomology) and Head (Crop Protection) retired from ICAR service on January 31, 2013. On his superannuation, the Project Director and staff of DOR wish him a very happy, prosperous, healthy and peaceful retired life.



## Awards and Recognitions

- Shri B.V. Rao, Photographer secured runner-up position in Carrom for Men at the ICAR Inter Zonal Sports Meet 2013 held at IARI, New Delhi during January 18-21, 2013.
- Shri B.V. Rao, Photographer secured runner-up position in Carrom for Men at the South Zone Sports Meet (Zone IV) held at Sugarcane Breeding Institute, Coimbatore during February 18-22, 2013.
- Mrs. S. Swarupa Rani, Assistant secured runner-up position in Shuttle Badminton (Single) for Women at the South Zone Sports Meet (Zone IV) held at Sugarcane Breeding Institute, Coimbatore during February 18-22, 2013.



## Participation in Exhibition and Field Days

- DOR participated and exhibited its improved technologies in sunflower, castor and safflower at the Exhibition held at NAARM, Rajendranagar during the visit of the State Agricultural Minister, Govt. of India, New Delhi on January 7, 2013.
- DOR scientists participated in the castor and safflower field day conducted by REEDS under TSP-DOR at Velupalli, Giddalore Mandal, Ongole district on February 22, 2013. About 200 farmers from five villages participated in the field day. Field visit followed by farmers' interaction with the scientists and district

agricultural officials was organized. Some of the farmers shared their experience on the performance of castor hybrid viz., DCH-177 and safflower.

- DOR scientists participated in the castor and safflower field day conducted by the IPWWA-Jadcharla at RC Thanda, Mahaboobnagar district under TSP-DOR on March 9, 2013. About 100 tribal farmers have participated in the field day. There was a field visit and farmers interaction with the scientists of DOR.

## Distinguished Visitors

- Shri Veeranna Mathikatti, M.L.C. and Former Chairman, Karnataka Legislative Council; Shri P. Ramesh, Ex. M.L.A., Shri Sampath Samrajya and Shri K.N. Onkarappa, Members, B.O.M., U.H.S., Bagalkot, Karnataka visited DOR on January 5, 2013
- A total number of 450 visitors including farmers, trainee participants, delegates and students from various states, other institutes and different agricultural universities, visited DOR during the period January-March, 2013.

## हिन्दी कार्यशाला

निदेशालय में एक दिवसीय कार्यशाला का आयोजन 25 मार्च, 2013 को किया गया। कार्यशाला की अध्यक्षता डॉ. के. एस. वरप्रसाद, परियोजना निदेशक ने की। कार्यक्रम का शुभारंभ श्री. अनिल बिहारी, वरिष्ठ प्रशासनिक अधिकारी के स्वागत भाषण से हुआ। श्री. अनिल बिहारी ने अपने स्वागत भाषण में इस तरह की कार्यशालाओं के आयोजन की आवश्यकता पर प्रकाश डालते हुए कर्मचारियों से हिन्दी में कार्य करने का आग्रह किया।

इस कार्यशाला में श्री. देवी दास, भूतपूर्व सहायक निदेशक, हिन्दी शिक्षण योजना, हैदराबाद ने कार्यलयीन हिन्दी पर प्रकाश डाला। आपने बहुत सरल तरीके से सरकारी पत्रों के प्रकार तथा उनसे संबंधित बहुत सारी महत्वपूर्ण बातें बताईं। उन्होंने कर्मचारियों से अनुरोध किया कि वे हिन्दी में काम करने की शुरुआत तो करें, इस दिशा में लिया गया छोटा सा कदम भी बहुत गहरा असर डालेगा। इस संदर्भ में कार्यालय में हिन्दी भाषा के उपयोग में आने वाली कठिनाइयाँ तथा इसे दूर करने के उपाए बताए। सरकार की राजभाषा नीति और इससे संबंधित नियमों की जानकारी तथा कार्यालय में हिन्दी का उपयोग बढ़ाने संबंधी बहुत सारी महत्वपूर्ण जानकारी प्रदान की।



डॉ. मुक्ता, प्रभारी राजभाषा ने अपने धन्यवाद ज्ञापन में इस जानकारी को बहुत उपयोगी एवं कार्यालय में हिन्दी के उपयोग को बढ़ाने में एक महत्वपूर्ण कदम बताया। कार्यशाला का संयोजन श्री. प्रदीप सिंह, सहा. निदेशक (रा.भा) ने किया। कार्यशाला में निदेशालय के वैज्ञानिक, अधिकारी एवं स्टॉफ सदस्यों ने भाग लिया।

#### From Director's Desk

Integrated Crop Management is one of the important aspects which received relatively less attention. The technologies developed in various fields, crop improvement, crop production and crop protection can be effectively translated for the benefit of the farmers only when integrated crop management is practiced in large scale area at farmers' level. In this direction, we have taken an initiative to demonstrate the integrated crop management in a large



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#### Photo Credits

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plot (0.2 ha) initially at our Narkhoda experimental farm on sunflower. Various technologies developed on sunflower such as crop rotation, fine soil tilth, application of FYM 5 tonnes/ha, best hybrid (DRSH-1), seed hardening, seed treatment with metalyxil and imidacloprid each @ 5 g/kg seed, sowing by dibbling at spacing of 60 x 30 cm, pre-emergence application of herbicide pendimethalin @ 1.0 kg a.i./ha, application of 50% nitrogen at basal, 25% at 30 days after sowing and the remaining 25% at 50% flowering stages based on soil test target yield (15q/ha) (@85:75:30 kg N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O/ha, Elemental sulphur 30 kg S/ha, zinc @ 5 kg/ha as zinc oxide, boron @ 0.2% spray to capitulum at flowering), thinning at 15 days, weeding at 30 days, earthing up, prophylactic protection against *Alternaria* at 60 DAS with carbendazim, *Spodoptera* pheromone traps @ 8/ac, mechanical threshing, etc.

Following the above integrated crop management practices in Alfisols at Narkhoda farm during *kharif* 2012 resulted in seed yield of over 17 q/ha (as against normal realisable yield of 11 q/ha) with a gross return of Rs.66190/- per ha at a cultivation cost of Rs.32989/- per ha. The net returns was Rs.33201/- per ha with a B:C ratio of 2.0. The total man days used was 95 for a 90 days duration crop indicating optimum feasibility for small and marginal farmers without any additional man days beyond their family labour.

The results are further encouraging with the extended implementation of integrated crop management practices on sunflower in about 50 ha at Nizamabad district of Andhra Pradesh in *rabi*, 2012 in farmers' field. We hope to replicate this practice in other mandate crops of DOR as well.

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