Proceedings of

'Workshop to Review the Conduct of DUS Tests'

(11-12 August, 2010)

At

NAARM, Hyderabad

Organized by

Protection of Plant Varieties & Farmers' Rights Authority

NASC Complex, DPS Marg, Opp. Todapur Village

New Delhi 110 012

Proceedings of the Two days Workshop to Review the Conduct of DUS Tests

A two day Workshop to review the conduct of DUS tests was organized by Protection of Plant Varieties and Farmers' Rights Authority on 11th and 12th August 2010 in the Auditorium of National Academy of Agricultural Research Management, Hyderabad. Workshop was attended by about 100 participants representing different DUS test Centres notified by the Authority (PD/PC/Nodal and Co-Nodal Officers), Chairman of DUS test Monitoring team, ICAR Institutes, SAUs and private seed companies. The detailed programme of the meeting is enclosed as Annexure I.

Welcome and opening remarks:

At the outset, **Shri R.K. Trivedi**, Registrar, PPV&FRA gave a formal welcome to the Chief Guest Dr. M.V. Rao, Guest of Honour, Dr. E.A. Siddiqui, Dr. S. Nagarajan, Chairperson, PPV & FRA, Dr. A.K. Malhotra, Registrar General, PPV & FRA, distinguishing guests, Chairmen of different DUS test Monitoring teams, PD/PC/Nodal and Co-Nodal Officers of different DUS test Centres, representatives of private seed companies and the participants of the workshop. He presented a brief overview of the PPV&FR Act, Authority, development of DUS descriptors, identification of DUS test Centres, receiving of applications and conduct of DUS tests. He informed the house that DUS descriptors of various crop species including field crops and horticultural crops (vegetables, fruits and flowers) have been notified / or are under notification for receiving applications. Also, Authority has issued certificate of registration to the breeders / farmers for more than 150 plant varieties in different crop species. He expressed his happiness that for the second time such workshop is being conducted to share the experiences in the conduct of DUS tests.

Dr. A.K. Malhotra, Registrar General, PPV&FRA in his introductory remarks said that successful conduct of DUS is the edifice of Plant Variety Protection. To have sustainable food security, PPV&FR Act is paving the way for strong seed industry and to facilitate quality seeds to farmers. He said this meeting is a two way interaction process to fine tune the maintenance breeding of reference varieties, DUS procedures and Data processing for better plant variety protection.

He said that it is essentially required that the Authority recognize and help the farming communities in getting the compensation/ benefit share for their contribution in protection and/or conservation of genetic resources utilized in the development of new varieties in many cases. He indicated that it is a very complex issue since it would be difficult to decide the owners of the varieties. He explained that the activity of conservation is done by the communities for two reasons, firstly for livelihood and secondly for the cause of humanity. As the maintenance of the conserved material is equally important so different hotspots has to be examined separately in terms of its environment, mode of cultivation and life style prevailing in that area before providing the money as benefit share. Local varieties/land races/genetic resources utilized for development of varieties may belong to several communities and multiple claims may come on surface. So, to avoid such difficulties it is important that Authority launches some programme / project for evaluation, characterization, documentation and database creation of material available with the communities. Moreover, PPV & FRA and NBA may come together to work out the solution to conserve the genetic resources of the country and stop genetic erosion.

Dr. S. Nagarajan, Chairperson, PPV & FRA in his remarks elaborated on the progress in plant variety protection, which is based on the core principals drawn from UPOV. From 2010-11 it will be new varieties alone will be registered for which extant varieties protection is closed for 12 crops. He stressed on the need to have cent percent genetic purity through maintenance breeding. He said that seed treatment should not be done as it may affect the seed morphology. No treated seed will be accepted for DUS testing. He also spoke about the process of filing application and said that rather than monitoring all the morphological traits the best differentiating traits may be mentioned. He advised all the PDs to follow the correct date of sowing to get best expressions of characters. All the seed samples should be accompanied by a seed germination and quality report given by a referred seed testing lab. He said guided tours are encouraged to see the expression of the characters for those entries which are under DUS testing. The main purpose is to create a competition and encourage further breeding efforts. The procedures in horticultural, plantation and floricultural crops are being streamlined to reduce the time to issue the certificates after DUS testing. The guidelines are ready

for Eucalyptus and Casurina. He also elaborated on new species for which the guidelines and registration will be opened up in the coming days. He thanked all who helped in reviewing the registration process and all the issues on DUS testing and plant variety protection.

Dr. E.A. Siddiq, Guest of Honour, in his remarks mentioned in detail about the growth of plant variety protection scenario in India. He said it is highly appropriate to review the working of DUS centres, maintenance breeding and concerning issues. He congratulated Dr. Nagarajan for setting in motion the excellent procedures and working set up that enabled protection of plant varieties. He spoke at length on EDVs and the need for setting up standards for these.

Dr. M.V. Rao, Chairman of the Inaugural session, delivering the key note address, congratulated Dr. S. Nagarajan, Chairperson of PPV&FRA for his excellent work in streamlining the DUS testing for enabling plant variety protection. He said we have travelled from an era of free exchange of germplasm in the past to an era of protection of plant varieties to claim plant breeders rights. He observed that we have strongest research system in the world and the efforts should now be geared to register all the new material. Special efforts are needed to characterize horticultural crops, where there is lot of variability, and to protect them under PPV&FR Act 2001. The DUS testing in future would require to take care of genetically modified seeds. India is having many species which are of economic importance, hence plant variety protection efforts needs to strengthened on mission mode to register all extant, new and farmers varieties.

The inaugural session concluded with a vote of thanks by Dr. Ajay Kumar Singh, STO, PPV&FRA, New Delhi.

Technical Session I: 'Progress of DUS Test Centres & Plant Variety Registrations'

The Session was Chaired by Dr. E.A. Siddiqui, Chairman DUS Test Monitoring Team for Rice and Co-Chaired by Dr. A.K. Basu, Chairman DUS Test Monitoring Team for Cotton. Rapporteurs for this Technical Session were Dr. Dr P. Srimathi, Prof. & Head, Dept. of Seed Science & Technology, TNAU, Coimbatore and Dr. Dr Rakesh Seth, Senior Scientist (Seed Tech.), IARI Regional Station, Karnal. Presentations were made on 'Conduct of DUS test & maintenance of reference varieties in Maize' by Dr. Jyoti Kaul, Directorate of Maize Research, New Delhi (Nodal Centre for DUS tests of Maize), 'Conduct of DUS testing in Rice' by Dr. L.V. Subbarao, Directorate of Rice Research, Hyderabad (Nodal Centre for DUS tests of Maize) and 'Conduct of DUS test, recording of DUS characters and maintenance of Reference Varieties in Cotton' by Dr. K. Rathinavel, CICR, Coimbatore (Nodal Centre for DUS tests of Cotton).

Dr. Jyoti Kaul in her presentation highlighted the outcome of the project as: (i) 18 hybrids/varieties were granted certificates (ii) 46 applications were accepted for protection (iii) two years of DUS testing had been completed for 23 new hybrids / inbreds at two locations. She further suggested that the DUS characters like plant height, time of tassel anthesis, time of silk emergence should not be linked with quantitative figures as they show variations with agro-climatic conditions. There should be separate DUS characteristics for inbred and hybrids particularly for Kernel characters and ear diameter. She also stressed that traits associated with xenia effect (e.g. grain colour, test weight, texture) requires selfing for data recording. She also added special corn traits viz., poppiness, QPM and Brix value also to be included in the test. Difficulties were also faced in differentiating conico-cylindrical from conical and cylindrical cobs. She suggested for modification of existing test plot design.

Dr. Subba Rao reported that so far DRR has characterized 620 lines while CRRI has characterized 421, Karnal 421, Jorhat 421 and Coimbatore 135. A total of 27 extant rice varieties have been accepted by the Authority for registration, in which 17 were filed by DRR, 6 from SAUs and 4 from Private sector. Six farmers' varieties have also been tested for registration. He suggested that there is a need to enhance the budget, due to steep increase in the cost of agricultural operations and there is a requirement of

permanent manpower (Technical Assistant). Further, he emphasized that DUS Testing material for rice needs to be sent to the Nodal Centre latest by May, and the list of reference varieties should be communicated before dispatch of the seed material. He stressed that there should be limited number of reference varieties and only most promising ones should be selected for comparison. He also suggested that breeders should provide pedigree diagram of their varieties.

Dr. K. Rathinavel, CICR, Coimbatore informed that 413 lines were characterized at 5 centres viz., HAU, Hisar, PAU Ludhiana, CICR Nagpur, UAS Dharwad and CICR Coimbatore. He suggested modification in the DUS guidelines for growth habit as zero branching, compact, semi-spreading and spreading instead of classifying on the basis of plant height in quantitative figures. He also stressed to include the characteristic 'fused bract' as a new character in DUS guidelines and petal colour / density of the pigmentation in petal spots need to be clarified and included in the revised guideline. He also suggested for modification of test plot design.

Technical Session II: 'Progress of DUS Test Centres & Plant Variety Registrations'

The Session was Chaired by Dr. A.K. Basu, Chairman DUS Test Monitoring Team for Cotton and Co-Chaired by Dr. K.A. Nayeem, Chairman DUS Test Monitoring Team for –Bread wheat. Rapporteurs for this Technical Session were Dr. V. Shanthy, and Dr. M.N. Premachandran. Presentations were made on 'Conduct of DUS test in Jute' by Dr. D. Kumar, Centre for Research in Jute and Allied Fibres, Barrackpore (Nodal Centre for DUS tests of Jute), 'Progress of DUS test and maintenance of reference varieties in Sorghum' by Dr. Vilas K. Tonapi, NRC for Sorghum Research, Hyderabad (Nodal Centre for DUS tests of Sorghum), 'Progress of DUS test and data management of Reference Varieties in Pearl Millet' by Dr. O.P Jadhav, AICMIP, Jodhpur and 'Conduct of DUS test in Bread wheat' by Dr. Sushila Kundu, Directorate of Wheat Research, Karnal (Nodal Centre for DUS tests of Bread wheat).

Dr. D. Kumar, in his presentation suggested that two separate trials may be conducted as per grouping based on premature flowering resistance as there will be excessive vegetative growth in early sown crop causing less flowering and seed set.

The fibre strength and fineness being affected by environment ideal standard condition for retting need to be developed.

Dr. Vilas K. Tonapi suggested that best expression of characters are obtained during *Kharif* season so testing may be done only during *Kharif* with two replications for both grain and forage sorghum. The glume may be included when seed weight of forage sorghum is taken. The tip of panicle and curvature of panicle may be included as DUS character. He said that inbreds and hybrids can be tested together only if appropriate reference varieties are selected from the database. He also advocated for reducing the number of reference varieties. He suggested that traits such as scented grain, pop sorghum, grain for alcohol, forage quality, roti quality, high protein, etc. may be considered as special characters which may be tested with special fee and according to test procedures to be notified later.

Dr. O.P Jadhav suggested that Reference varieties may be shared with the nodal centre. He stressed that database of reference varieties must be regularly updated and reference varieties should be different for hybrids and inbreds. He also pointed out that Authority should provide the seed material within the time frame for preventing delayed sowing. He request for additional funding for expenses on maintenance breeding of reference varieties and for cold storage facilities in sorghum

Dr. Sushila Kundu emphasized that selection of reference varieties must be based on the availability of appropriate quantity of seed material. She stressed on timely supply of seed material from the Authority latest by the first week of October and reduction of number of reference varieties. She suggested that DUS monitoring should be done twice, one at the time of flowering and other at maturity. She also requested for granting additional funds for purchase of laptop, digital camera, payment of HRA to SRF and timely release of funds

Dr. S. Nagarajan, Chairperson PPV&FRA suggested that apart from jute other allied fibre crops such as sunhemp, agave, etc are also to be tested for fibre quality. Number of special characteristics and standard protocols for fibre testing of these crops also will be looked in to by the committee for special characteristics, similar to that in cotton.

Technical Session III: 'Feed back from Monitoring Team'

The Session was Chaired by Dr. R.R. Hanchinal, Vice Chancellor, UAS Dhadwad and Co-Chaired by Dr. Sushila Kundu, Nodal Officer, DUS test Centre for Bread wheat. Rapporteurs for this Technical Session were Dr. Dr. P. Borah, and Dr. Dr D. Khare. Presentations were made Chairman of different DUS test Monitoring teams constituted by the PPV & FR Authority for evaluating the conduct of DUS trials at different DUS test Centres.

Dr. O.P. Govilla, Chairman, DUS test Monitoring Team for Pearl Millet informed that DUS testing of candidate varieties was conducted meticulously at MPVKV, Rahuri with proper expression of distinguishing traits. Whereas at CAZRI, Jodhpur it was not up to the mark due to poor site selection. He emphasized that to test the distinctiveness only important traits of the candidate variety should be observed and reference varieties should be selected based on the consultation of both the testing centers and Nodal Officer. Performance of the reference varieties at both the centers was not uniform therefore it needs proper maintenance. The test should be monitored in the last week of August or first fortnight of September with optimum expression of the distinctive traits. Authority should group inbred and hybrid separately for per expression of the traits.

Dr. K.A. Nayeem, Chairman, DUS test Monitoring Team for Bread wheat, informed that the DUS test was performed under excellent condition at both the Centres i.e. at Indore and Karnal. He reported that one of the candidate variety has inherent germination problem. He advocated that all the private companies should characterize their varieties based on the recommended DUS test guidelines.

Dr. A.K. Basu, Chairman, DUS test Monitoring Team for Cotton, advocated that date of monitoring team visit should be finalized in consultation with the In-charge of test centre at appropriate stage of the crop. Recommended crop husbandry should be adopted for proper expression of the trait. Reference varieties should be selected based on the location of the centre that is south, north or central zone. Selected reference varieties should not be susceptible to insect pest, especially to jassids.

Dr. S. Nagarajan indicated his concern on the genetic purity of the number of Bt hybrids available in the market. He also emphasized that in case of duplication of the variety the priority has to be finalized for first come first serve basis both in the Authority as well as in GEAC. He also informed the house that the Institution under which the notified DUS Centre is located should provide all the facilities for the best conduct of the test.

Dr. H.S. Sen, Chairman, DUS test Monitoring Team for Jute, informed that even after conducting the test under optimum condition, some variations were observed in the listed traits. He was in the opinion that the sowing should be in two different dates i.e., for fibre and seed purpose. Molecular characterization, retting procedure and anatomical variations for fibres were recommended as special characteristics for establishing distinctiveness.

Dr. S. Kundu was of the opinion that seed of the reference varieties should be pure to compare with candidate varieties and in monitoring team all the representatives of the candidate varieties should be included.

Dr. Hanchinal concluded that the entire DUS test should be performed on the healthy soil with proper agronomic practices. He suggested that for optimum plant population at Jodhpur, dry sowing should be done with regular irrigation on the soil rich with carbon content. Importance of maintenance breeding of reference varieties was also suggested.

Day 02 (12/08/2010)

Technical Session IV, V & VI (Merged Sessions)

'DUS testing Industry Perspective' and

'Progress of Maintenance Breeding at DUS Test Centres'

Status of DUS Test Centres (Vegetables/Oil Seed/Sugarcane /Spices) & Development of DUS descriptors (IFGTB, etc.)

The Session was Chaired by Dr. O.P. Govila and Co-Chaired by Sh. R.K. Trivedi, Registrar, PPV & FRA. Rapporteurs for this Technical Session were Dr. Dr J. Singh and Dr. S.R. Dhua. Presentations were made by Chairman of different DUS test Monitoring teams constituted by the PPV & FR Authority for evaluating the conduct of DUS trials at different DUS test Centres.

Status of DUS Test Centres (Vegetables/Oil Seed/Sugarcane /Spices) & Development of DUS descriptors were presented by the following Centres:

Dr. M.N. Premachandran, Sugarcane Breeding Institute Research Centre, Agali, Kerala informed that Data on the DUS characters of the 141 varieties for which complete information was recorded was provided to PPV & FR Authority in October 2009. Presently the Centre is maintaining 174 reference varieties. He added that the nodal region of cane of all reference varieties have been photographed for record. As for the financial year 2010-11, no funds have been allocated for the technical manpower, the Centre requested to provide funds for the same.

Nodal Officer, IISR, Lucknow presented the list of varietal collection made available by different Institutions of the Country such as five from Sugarcane Research Station, Buralikson, Assam Agril. University, Assam, one from Sugarcane Research Station, Bethuadahari, West Bengal, three from Sugarcane Breeding Institute Regional Station, Motipur, Bihar, thirteen from Sugarcane Research Institute, Pusa, Samastipur, Bihar, fifty nine from UPCSR, Shahjahanpur, three from IISR, Lucknow, six each from CCSHAU Regional Research Station, Karnal and GBPAUT, Pantnagar and five from PAU Ludhiana. He informed that the Centre is having the complete database for all the varieties in the collection as per DUS Guidelines. The Centre also suggested for three special test characteristics viz. sucrose content, fibre content and fibre quality.

Dr. V.A. Amalraj, Nodal Officer, Sugarcane Breeding Institute, Coimbatore reported that the Centre has identified 180 Tropical varieties, maintaining 179 varieties out of which 170 reference varieties have been characterized. They have also developed a database of these reference collections. He also informed that the Centre has filed 10 application of extant nature for registration in the Authority. He intimated that out of total

budget of Rs. 31.65 released by the Authority till 31/03/2010 it has utilized Rs. 24,07,909/- and refunded Rs. 5,52,859/- back to the Authority.

Dr. Bakshi Ram, Sugarcane Breeding Institute, Regional Centre, Karnal presented the report. He submitted that a total of 102 sub-tropical sugarcane varieties were collected from different Sugarcane Research Institutions in North India and multiplied for further studies. A total of 86 reference varieties were characterized for 27 morpho-metric traits as per DUS guidelines. The data was submitted to PPV&FRA in March 2010 for uploading in IINDUS software. He also presented the infrastructure developed and equipments purchased in the project. He projected that in 2009-10 Rs. 2,00,000/- and in 2010-11 Rs. 1,00,000/- was allocated to the Centre out of which Rs. 1,79,183/- was utilized and a balance of Rs. 20,817/- is with the Centre.

Nodal Officer, Directorate of Groundnut Research, Ivnagar Road, Junagadh informed that the Centre has characterized about thirty varieties as example varieties and 110 released varieties as per National Test Guideline. Total 19 characteristics were taken for characterization out of which 5 were quantitative and 14 were qualitative He highlighted the field facilities and lab facilities developed at the DUS centre as well the utilization of budget allocated to them. During 2009-10 Rs. 2,50,000/- was allocated to tem out of which Rs. 2,44,201/- has been utilized.

Dr. N. Mukta, Nodal Officer, Directorate of Oilseeds Research, Hyderabad, presented the status of Castor, sunflower and safflower. She informed that 30 DUS charactersitcs had been finalized for castor, 34 for sunflower and 26 for safflower. Further, DUS characterized was done for 29 reference varieties in castor, 25 in sunflower and 25 in safflower. Several issues such as DUS testing centre for sunflower, modalities for maintenance breeding of hybrids and parental lines through AICRP centres, conduct of special tests, purchase of minor equipments and provision of HRA for SRF working in the project were also raised by her.

Dr. K.H. Singh, DRMR, Bharatpur informed that currently they are maintaining 262 cultivars out of which 50 have been evaluated. Database of 111 rapeseed mustard varieties has been prepared. The Centre has also grouped the varieties of Indian

Mustard, Karan rai, Turnip rai (*B. rapa*) and Gobhi sarson. He also discussed the difficulties faced in maintenance of purity due to different pollination mechanism, non availability of isolated plots at one site, presence of impurities in procured seed, grouping of varieties into different states of characteristics based upon ranges, heterogeniety of experimental plots and volunteer plants. He also proposed to improve the experimental precision, efforts to increase the uniformity, grouping must based on standard checks and not on prescribed range, to include molecular markers and image analyzers in DUS testing.

Dr. Arun Gupta, VPKAS (ICAR), Almora presented the progress report on Maize, Soybean & Rajmash. He informed that the Centre has created an e-book for released soybean varieties. This e-book provides information on passport data and distinguishing characters of each soybean variety. It provides information on 89 soybean varieties. The Centre is also developing e-bulletin on DUS characterization of VPKAS maize varieties. He also discussed the constraints in maize such as brace root is not fully developing, anthocyanin pigmentation showed high variation within plot, monkey menace, porcupine problem and issue of technical persons leaving the project. He also enlisted the equipments purchased and facilities created at the Centre. He also informed that the Centre has organized two sensitization workshop on PPV&FRA. He informed that during 2009-10 Rs. 4,00,000/- was released by the Authority and the Centre had a carry over of Rs.15,325/- with them. The Centre expended Rs. 3,88,000/- and Rs. 27,325/- is remaining with them.

Nodal Officer, Indian Institute of Spices Research, Calicut presented their report on Black pepper, Small cardamom, Ginger, Turmeric. He reported that the Centre has characterized 27 varieties of ginger, 35 varieties of turmeric, 18 of black pepper and 14 varieties of small cardamom.

Nodal Officer, Institute of Forest Genetics & Tree Breeding (Indian Council of Forestry Research & Education), Coimbatore presented their report on development of DUS descriptors in Eucalypts and Casuarina. He informed that the Centre has characterized and maintaining a total of 102 clones of Eucalyptus. He explained the morphology of different DUS characteristics. He also indicated the clones which needed

validation and suggested locations for validation, in Tamil Nadu at Puthukottai, Viruthachallam & Tirukoilur and in Hyderabad at Hyderabad, Rajamundry and Nellore. Regarding Casuarina, he informed that Seeds from 39 locations in 14 countries (17 Natural Provenances - Australia Pacific and SE Asia and 22 Landraces - South Asia and East Africa) were collected. He said that the new germplasm has been extensively tested in the coastal and inland locations spread over 3 States and 1 UT to match the provenance with site. He discussed different DUS characteristics of Casuarina.

Dr. B. Singh, Nodal Officer, IIVR, Varanasi presented that during the first phase of the project, DUS test guidelines for Tomato, Brinjal, Okra, Cauliflower, Cabbage, Onion, Garlic and potato were developed. During the Second phase maintenance breeding activity was carried out for 83 varieties of tomato, 60 varieties of brinjal, 31 varieties of okra, 8 varieties of cauliflower, 6 varieties of cabbage, 34 varieties of vegetable pea and 10 varieties of French bean. He also informed that the Authority has assigned another project for validating crop specific DUS Testing guidellines for Cucumber, Bottle Gourd, Bitter Gourd, Pumpkin and Pointed Gourd. Three Centres have been identified for completing the task with IIVR working on Cucumber, pumpkin, Bitter gourd, Bottle gourd and Pointed gourd, IIHR, Bangalore working on Cucumber, Pumpkin, Bitter gourd and Bottle gourd while IARI, New Delhi working on Bottle gourd, Bitter gourd, pointed gourd. The overall budget estimated to complete this task was reflected as Rs. 51,76,200/- (IIVR, Varanasi having a share of Rs. 26,04,600/-; IIHR, Bangalore having Rs. 12,63,800 and IARI, New Delhi having Rs. 13,07,800/-). He also informed that first installment of the budget has been released by the Authority. He also informed about the infrastructure facilities created at the Centre.

D. Khare, Nodal Officer, J.N. Krishi Vishwa Vidyalaya, Jabalpur presented the status of Lentil, Field pea and Linseed. He informed that total 31 varieties of Lentil, 38 varieties of field pea and 12 varieties of vegetable pea, 71 varieties of Linseed and 70 varieties of sesame have been characterized for different DUS characteristics. He reported that the Centre has characterized 31 new lines of linseed and also multiplied seed of linseed varieties.

Nodal Officer, All India Coordinated Research Project on Sesame and Niger, Jabalpur informed that the major activities were carried out for characterization of Sesame varieties at PCU, Jabalpur; STRU, Jabalpur and NSP, RAU, Durgapura. He presented the details of parameters and citerion for assessment of 56 reference varieties maintained at the Centre for different DUS characteristics (seed yield, days to maturity, productive branches/plant, seed weight, free fatty acid (FFA) content, oxalic acid content and oil content) and Grouping characteristics. He informed that a total budget of Rs. 32,06.000/- has been released till 31/03/2010. Rs.11,35,175/- was utilized during the financial year 2009-10 and a balance amount of Rs. 2,61,413/- is remaining with the Cemtre as on 31/03/2010. He also requested to consider one Centre in Southern part of the country, modification in some of the essential characteristics and funds for carrying out maintenance breeding work.

Dr. S.R. Dhua, CRRI suggested that same set of reference varieties are to be maintained at Nodal Centre and sub-centre so that there is no difficulty in selection of reference varieties. He also requested the Authority to provide funds for maintenance of database, proper drainage and irrigation facilities, repairing of fences, purchase of digital cameras, laptops for data recording, provisions of independent seed testing laboratories and destruction of test material and HRA to SRFs working in the projects. He suggested that seed material should be dispatched well before sowing dates to avoid loss of data.

Nodal Officer, Directorate of Medicinal and Aromatic Plants Research, Anand, Gujarat and National Research Centre for Seed Spices, Ajmer, Rajasthan presented the joint report on development of DUS Testing Guidelines of *Plantago ovata* Forsk. He reported that an amount of Rs. 5,00,000/- was allocated for the financial year 2009-10 out of which Rs. 373124/- was utilized and Rs. 126876/- remained as balance amount. In 2010-11 Rs. 123124 was further released to the Centre. In the current financial year, Centre has expended Rs. 57230/- and Rs. 192770/- is remaining with them. He said that in 2010-11 Centre shall carry out maintenance of the identified reference varieties in Isabgol (*Plantago ovata* Forsk.), development of DUS guidelines for Kalmegh

(*Andrographis paniculata* Nees.) and development of DUS guidelines for Guggal [*Commiphora wightii* Arnott. (Bhandari)].

Dr. K.V. Prasad, Indian Agricultural Research Institute, New Delhi presented the Significant Achievements DUS testing of Rose and Chrysanthemum. In 2006-07, 35 Rose varieties were evaluated and based on the data generated the example varieties were recorded. In 2007-08 38 Rose varieties and 67 chrysanthemum varieties were evaluated according to the modified guidelines. During 2008-09, 75 rose varieties and 54 chrysanthemum varieties were characterized as per the guidelines. In 2009-10, 57 rose varieties and 41 chrysanthemum varieties were characterized. Since roses exhibits enormous variation in leaf structure, out of the 61 characters finalized for rose 8 pertain to leaf characters in terms of size, shape and colour. The leaf morphology of 41 varieties of rose was recorded. A digital library of all the characteristics is created and a digital image dada base is created.

He also raised certain issues such as change in names of varieties as it changes hands, enhanced budget requirement for year round maintenance of varieties, expensive planting material, no standards available for production of planting material and frequent shifting of technical personnel to other lucrative avenues. He also insisted that since globally, ornamentals are single largest commodity with IPR titles, exposure to global systems is very essential.

Representatives of the Seed Companies also made small presentations and gave certain suggestions which are as follows:

Dr. V.S. Dogaonkar, Ankur Seeds, suggested that care should be taken for timely sowing of DUS plot. He also stressed on registration of transgenic varieties and said that during the DUS trials proper isolation distance should be maintained to avoid transmission of traits and effect on expression of characteristics. He said that parents of transgenic hybrids must also be registered provided they have biosafety clearance from the competent authority.

Dr. Jagadish Kumar, Indo-American Seeds Private Limited, requested that seed material of reference varieties should also be provided to the applicants for comparison

with the candidate varieties at their Centres. He also inquired whether some funds may be allocated to private seed companies for carrying out maintenance breeding activities. He suggested that persons from Seed sector should also be invited to attend the training programs carried out by the Authority.

Dr. Gururaj Kulkarni, Syngenta Seeds Private Limited, suggested that private seed companies may also be associated in DUS testing and their Research Centres may be utilized for this purposes.

Dr. Surendra Prakash, Krishi Dhan Seeds Limited, suggested that independent bodies may be appointed / notified by the Authority to carry out DUS tests of candidate varieties. He also suggested the number of plants taken up for generating DUS data may be reduced so that more entries may be included in limited space.

Dr. B.S. Dahiya, Ganga Kaveri Seeds Limited, suggested that Authority must frame a cut off date for receipt of seed material from the applicants so as to timely dispatch them for DUS testing. He indicated that instead of supplying seed material of reference varieties, DUS data of such varieties can be generated and provided to the interested parties.

Dr. Sobha Rani, DRR informed the House that as there is a scarcity of seed material of reference varieties, DRR has taken up an initiative for multiplying the seeds of reference material and it can be shared with private sector under Material Transfer Agreement.

Recommendations and Concluding remarks:

Based on the experience of the nodal officials in conducting the DUS testing and discussion made during the Technical session, following suggestions / recommendations were made:

(i) While selecting example and reference varieties, their number and appropriateness should be taken care of and if required consultation with the concerned Institute may be made.

(ii) Keeping in view the practical problems / experiences shared by the nodal officials, existing crop specific DUS test guidelines may be reviewed by a sub committee and if required, proposed modifications / suggestions may be incorporated.

(iii) Considering the fact that applications for registration of plant varieties are largely coming from the private seed industry, it was urged upon that public sector should file more varieties for registration. ICAR/SAUs may be asked to advise the crop specific institutions/centers to follow the suggestion. This is urgent and important to protect the intellectual property generated by them before they are illegally used.

(iv) Funds may be provided by the Authority for undertaking maintenance breeding work, once in two years for open-pollinated crops and once in three years for self-pollinated crops.

(v) The authority may consider the request of Nodal officials for increasing the number of technical staff and revising their pay by including HRA for effective management of DUS test.

(vi) Complete and correct information on the pedigree of the candidate varieties/hybrids applied for registration by the applicants to be made mandatory.

(vii) A deadline should be fixed for receiving the seed material from the applicants and it should be dispatched to the respective DUS test Centres well before the sowing season of the crop species.

Dr. A.K. Malhotra, Registrar General, PPV & FRA concluded the Session and expressed satisfaction that in a short span of time all issues were discussed with due attention and Authority will work out on the suggestions given by different speakers and participants of the workshop. He further added that to sort out the issues at a faster rate, all communications must be made in the name of Registrar General of the Authority. He gave personal thanks to all the dignitaries and participants for attending and discussing the issues raised during the Workshop.

The two days workshop ended with the vote of thanks given by Dr. L.V. Subbarao, DRR.

Annexure I

Workshop to Review the conduct of DUS Test

11-12 August, 2010

Venue: NAARM, Auditorium, Hyderabad

Inaugural Session

10.00-10.05 Hrs	:	Invocation	
10.05-10.10 Hrs	:	Lighting of the lamp	
10.10-10.20 Hrs	:	Welcome	R.K.Trivedi Registrar, PPV&FRA
10.20-10.35 Hrs	:	Introductory address	Dr. A.K. Malhotra Registrar General PPV&FRA
10.35-10.50 Hrs	:	Remarks by the Chairperson	Dr. S. Nagarajan PPV&FRA
10.50-11.00 Hrs	:	Key note address	Padmashri. Dr. M.V. Rao
11.00-11.20 Hrs	:	Key note address	Padmashri. Dr. M.V. Rao
11.20-11.25 Hrs	:	Vote of Thanks	Dr. Ajay K. Singh STO, PPV&FRA
11.25-11.45 Hrs	:	Tea Break	

Rapporteurs

1. Dr. Vilas Tonapi
2. Dr. K. Rathinavel

Technical Session: I **Progress of DUS test centres & Plant Variety registrations**

Chairman: Dr. E.A. Siddiq
Co-chairman: Dr. A.K. Basu

Rapporteurs : Dr. Srimathi & Dr. Rakesh Seth

12.00-12.15 Hrs	:	Conduct of DUS tests & maintenance of reference varieties in Maize	Dr. Jyoti Kaul DMR
12.15-12.30 Hrs	:	Conduct of DUS Test in Rice	Dr. L.V. Subba Rao DRR
12.30-12.45 Hrs	:	Conduct of DUS Test, recording of DUS characters and maintenance of reference varieties in cotton	Dr. K. Rathinavel CICR
12.45-1.15 Hrs	:	Discussion	
1.15-2.00 Hrs	:	Lunch Break	

Technical Session: II **Progress of DUS test centres & Plant Variety registrations**

Chairman: Dr. A.K Basu
Co-chairman: Dr. K.A. Nayeem

Rapporteurs: Dr. V.Shanthy & Dr. M.N. Premachandran

2.00-2.15 Hrs	:	Conduct of DUS test in Jute	Dr. D Kumar CRIJAF
2.15-2.30 Hrs	:	Progress of DUS test & maintenance of reference varieties in Sorghum	Dr. Vilas A. Tonapi DSR
2.30-2.45 Hrs	:	Progress of DUS test & data management of reference varieties in Pearl Millets	Representative of Pearl Millets
2.45-3.15 Hrs		Conduct of DUS test in Wheat	Representative of DWR
3.15-3.45 Hrs	:	Discussion	
3.45-4.00 Hrs	:	Tea Break	

Technical Session: III **Feed back from DUS Test Monitoring Team**

Chairman: Dr. R.R. Hanchinal
Co-chairman: Dr. S.Kundu

Rapporteurs: Dr. P. Borah & Dr D. Khare

4.00- 4.15 Hrs	:	10 Minutes presentation by all Monitoring team heads
4.15 - 4.30 Hrs	:	
4.30-4.45 Hrs	:	
4.45 - 5.00 Hrs		Discussion

Day 2: Aug 12, 2010

Session IV: **DUS testing Industry perspective**

Session V: **Progress of Maintenance Breeding at DUS Test Centres**

Session VI: **Status of DUS Test Centres (Vegetables/Oil Seed/Sugarcane /Spices) & Development of DUS descriptors (IFGTB etc.)**

Chairman: Dr. O.P. Govila
Co-Chair: Dr. R.K. Trivedi

Rapporteurs: Dr. S.R. Dhua & Dr. J. Singh

DUS testing at Public & Private Sector	Representative of SAUs.
DUS test infrastructure at ICAR	ICAR Representative
Observation of Seed Industry	Industry Representatives on DUS testing

Invited 4-5 speakers from DUS test centres at ICAR/SAU

Presentation	IIVR
Presentation	IISR-Lucknow
Presentation	IISR-Calicut
Presentation	DOR-Hyderabad
Presentation	IFGTB-Coimbatore

Discussion

Concluding remark by Registrar General

Vote of Thanks

Lunch Break

LIST OF PARTICIPANTS FOR
'**WORKSHOP TO REVIEW THE CONDUCT OF DUS TEST'**

S. No.	Name of Participant	Representation	Address
1.	Dr. G.V. Jagdish, Consultant –Quality Assurance	Seed Industry	Indo-American Hybrid Seeds (India) Pvt. Ltd., P B No.7099, 7th Kilometer , Banashankari - Kengeri Link Road, Channasandra Village, Subramanyapura Post, Uttarahalli Hobli, Bangalore-560061 Ph: +91 080-28611499, Fax: +91 080-28612356
2.	Dr. Nadiram Saha, Rice Breeder		
3.	Dr. V. Sivakumar, Scientist D	Indian Council of Forestry Research & Education	Institute of Forest Genetics and Tree Breeding, Coimbatore
4.	Mrs. R. Anandalakshmi, Scientist D		
5.	Mrs. Rekha R. Warrier, Scientist D		
6.	Dr. K. Rathinavel, Nodal Officer, DUS Project	ICAR	Central Institute for Cotton Research, Regional Station, Lawley Road Post, Coimbatore -641003
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14.	Dr. Satyabrata Maiti, Director	ICAR	Directorate of Medicinal and Aromatic Plants Research (DMAPR), Anand, Gujarat
15.	Dr. KA Geeta, DUS Nodal Officer		
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17.	Dr. V.A. Amalraj Principal Scientist & Nodal Officer	ICAR	SBI- Coimbatore Centre SBI-Agali Centre
18.	Dr. M.N. Premachandran Principal Scientist & Nodal Officer		
19.	Dr. P.R. Vijaya Kumari, Senior Scientist, Div. Crop Improvement	**ICAR**	**Central Institute for Cotton Research, Nagpur**
20.	Dr. V. Santhy, Scientist (Sr. Scale), Div. Crop Improvement		
21.	P.K. Singh Geneticist PC Unit Linseed	SAU	CSAU, Kanpur
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30.	Dr. Manju Vishwakarma General Manager (Vegetable Group)		
31.	Dr. G.T. Nikhade, General Manager (Cereals & Pulses Group)		
32.	Bhupesh R. Pathak Technical Officer (Regulatory Affairs)		
33.	Dhirendra Khare Nodal Officer & Senior Scientist	ICAR	Department of Plant Breeding and Genetics, J.N. Krishi Vishwa Vidyalaya, Jabalpur-482004 (MP) Tele: (O) 0761-2461632 Mobile: 09893276471
34.	M.S. Bhalo Co. Nodal Officer and Senior Scientist		
35.	Dr. B. Singh Project Coordinator (Vegetable Crops)	ICAR	All India Coordinated Research Project Vegetable Crops Indian Institute of Vegetable Research Post Bag No.01, P.O. Jakhini, Shahanshahpur Varanasi - 221305 U.P. India
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38.	Dr. P. Srimathi, Professor and Head,		
39.	Mr. Ch. Suresh- GM(R&D)	Seed Industry	**Prabhat Agri Biotech Ltd.** **6-3-541/B, Opp. Heritage Foods** **Punjagutta, Hyderabad 500082** **Phone 040-23322945** **Fax: 23325680**
40.	Mr. Surya Rao-Asst. Manager (PPV & PD)		
41.	Miss Manpreet Hora – Sr.IPR Officer		
42.	N.P.SINGH Project Coordinator (Chickpea	ICAR	All India Coordinated Research Project on Chickpea Indian Institute of Pulses Research, Kanpur-208024 Tel;O512-257010952