

## From Director's Desk

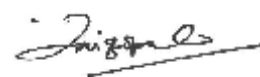
Agriculture, which provides a livelihood to an estimated 2.5 bn people, is lagging behind population growth. Come 2050, the UN predicts earth will be home to another 2 bn people; in order to feed us all, production needs to increase by an estimated 70%. That is a big task, not least since the land that humans have so long been tilling for agriculture is being diverted to other uses including industries, roads, buildings, and other infrastructures. So any increase in production has to come from an increase in productivity per unit area per unit time.

We at the Directorate of Onion and Garlic Research (DOGR) are equally concerned about this. Although second in onion production after China, we are far behind in productivity compared to many countries. We analyzed the factors responsible for that. In the recently held Institute Research Committee meeting of the Directorate, we have reorganized the research programmes to take care of these factors. In order to increase productivity of onion and garlic the one of the foremost requirements is to enhance the breeders' seed production of the improved varieties. Presently more than 70% seed used by the farmers is from their own farms and belong to some very old varieties including landraces. Production of virus free seed of garlic through meristem culture and micropropagation is one of the top priorities identified by the DOGR. Further, both onion and garlic have very narrow genetic base. Hence germplasm needs to be tapped effectively including wild relatives particularly for disease and pest resistance. None of the landraces as well improved varieties released by various institutes/universities carry resistance to diseases and pests. Development of hybrids is another area on which focused work needs to be done particularly for developing near inbred male sterile lines so that heterosis is exploited as with the present material hybrids have little advantage over the open-pollinated ones. Keeping in view the problem of inbreeding depression upon selfing, production of doubled haploids using pollen/ovule culture appears to have good promise. There are many other issues concerning R&D activities, but keeping in view the limited resources the most important ones needs to be tackled on priority.



This year country had record production of both onion and garlic. This has been partly due to increase in area both under onion and garlic, and also to favourable weather conditions both during the preceding late Kharif and Rabi seasons. The sky remained clear with little rains, and desirable temperature regimes. The onion production in the country has crossed 15 million tones with an average yield of 15-16 tons per ha from an area of nearly 1.0 million hectares. This has led to slump in the market price as a result consumers are happy but farmers are at loss. Farmers should withhold the produce and store them for 3-4 months as the prices are expected to rise in due course. The short term storage of onion can be best done in bottom and side ventilated storage structures recommended by the DOGR.

Between January to June 2012, the Directorate organized a number of programmes including stakeholders meeting for the XIIth plan EFC, three farmers' training courses, agriculture education day, foundation day and lastly the 3<sup>rd</sup> group meeting of the All India Network Research Project at Junagarh Agriculture University on 22-23<sup>rd</sup> June, 2012. These hopefully have achieved the purpose for which these were organized. I look forward to suggestions and active participation from all quarters in the relevant activities of DOGR so that maximum possible could be achieved.



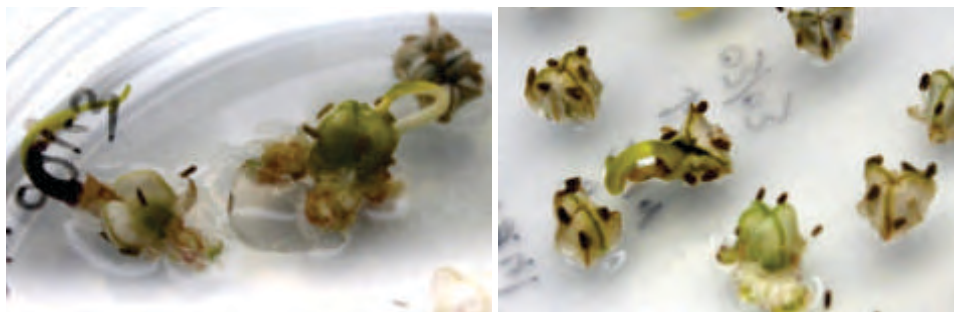
Jai Gopal

## Prospects of Inbred Development in Onion (*Allium cepa* L.) through Induction of Haploids

Dr. S. Anandhan, Sr. Scientist (Biotechnology)

Onion is an important vegetable consumed in daily diet all over the world. However, the varietal development programme of onion has been crippled by virtue of its biennial seed cycle. Bulbing and flowering have same photoperiodic requirements and thus bulbing occurs in first year and flowering and seed set in the next. Bulb onion is widely adapted to the different climates of the world. Thus photoperiodic requirement of onion for bulbing and flowering varies among the genotypes.

Hybrid seed production depends on the availability of inbred lines. Uniformity in inbred lines is of use in developing hybrids with uniform traits and performance. Inbreds can also be of use in developing synthetics and composites. Onion crop is cross pollinated and shows high degree of heterozygosity and severe inbreeding depression. Because of severe inbreeding depression, inbred onion lines are generally developed by self pollination of a single bulb for one or two generations followed by sib mating among a few selected bulbs. The inbred lines thus developed remain quite heterozygous, allowing changes in genetic constitution over time by drift or selection. Also the two generations per cycle in onion takes a long time for developing inbreds. It makes breeding for varieties or hybrids with uniform traits for yield, bulb quality and colour difficult. Hence, developing inbreds



Gynogenic embryo germinating from ovary in culture

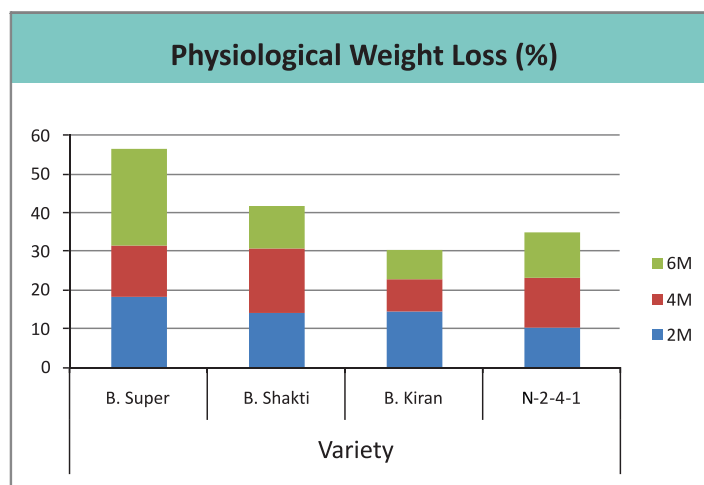
through *in vitro* haploid production will be a method of choice to obtain homozygous purelines.

At this directorate, haploid induction in onion has been achieved through gynogenesis by flower bud culture. Unopened flower buds which are about to open in three days were cultured on Murren's media. The flower bud matures and the embryo develops from ovule. The developed embryo germinates on the same media with proper shoot and roots. The embryonic seedling can be differentiated from the shoot regeneration with complete seedling structure. Gynogenesis was achieved in seven varieties and two male sterile lines. The germinated embryos are being maintained on basal media for normal plantlet development. The plantlets were confirmed for haploidy through chromosome count. The haploids developed in the institute will be used for doubled haploid production. The doubled haploid will be exploited for developing uniform improved varieties and hybrids.

## Evaluation of Onion Varieties in Ambient Storage

Dr. A.A. Murkute, Sr. Scientist (Horticulture)

Storage is an important form of value addition for onion to reap maximum possible profit. Being a daily diet item, its demand is steady throughout the year. Therefore, the storage loss which sometimes crosses 50% of total harvest brings heavy price fluctuation and inflation in the market. In India, out of three cropping seasons of onion *kharif* crop becomes available in October - November which contributes 20% to total annual production. The Late *kharif* crop becomes available in January - March which contributes another 20% to total annual production. Whereas, *rabi* crop becomes available in April - May and contributes 60% to total annual production. There is a large gap of harvest from June to October. It means, only *rabi* produce remains available in the market for five-six months i.e. up to October- November.



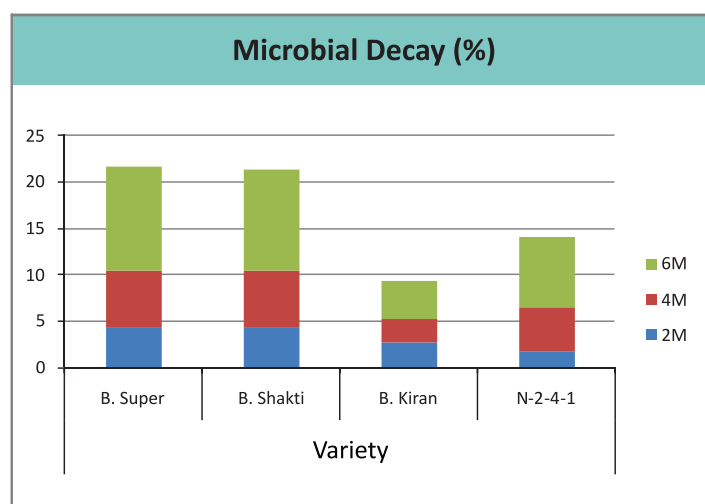
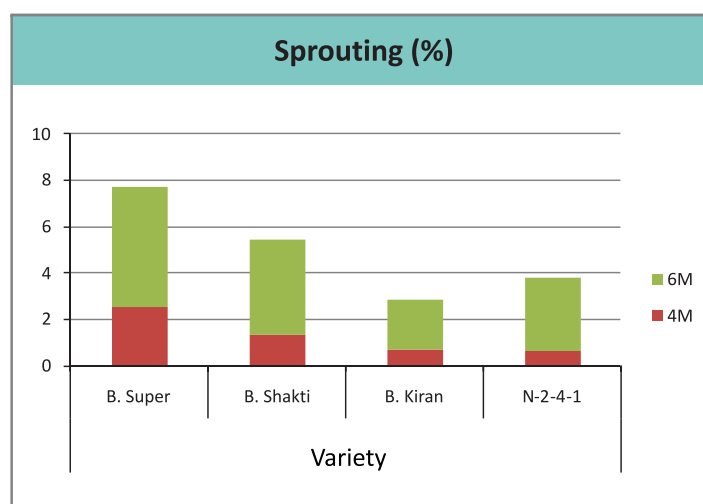


Therefore, the price appreciation during the storage period of *rabi* produce is imperative.

The Directorate of Onion and Garlic Research has released several varieties that suits the producers' preference. Among the different varieties the performance of recommended for *rabi* season was evaluated for storability attributes. Varieties Bhima Kiran, Bhima Shakti, Bhima Super and N-2-4-1 were cultivated during rabi 2010-2011 season as per the standard agro-techniques recommended by DOGR. The properly cured produce of all the varieties was stored in 'Top and Bottom ventilated storage structure'. The data pertaining to physiological weight loss, sprouting of bulbs and microbial decay was recorded after every two month's interval and expressed in percentage.

The physiological weight loss increased over the period. After two months the lowest weight loss was observed in N-

2-4-1 (10.18%). However, after six months Bhima Kiran recorded the lowest weight loss (30.35%) followed by N-2-4-1 (34.81%), Bhima Shakti (41.67%) and Bhima Super (56.66%). The sprouting in the stored commodity was recorded only after two months of storage in all the varieties. Bhima Kiran recorded the lowest sprouting of the bulbs (2.85%) followed by N-2-4-1 (3.77%), Bhima Shakti (5.46%) and Bhima Super (7.70%). The microbial decay increased over the period and maximum rotting was observed in the last two months. The lowest rotting was noted in Bhima Kiran (9.35%) followed by N-2-4-1 (14.02%), Bhima Shakti (21.41%) and Bhima Super (21.69%). It may be concluded that the Bhima Kiran is the best variety for long duration (six months) storage. The N-2-4-1 may be regarded as having medium storability. However, Bhima Shakti and Bhima Super were found to have poor storage life.



## Celebration of Agriculture Education Day

India is a land of Agriculture and majority of our population gets its livelihood from this pious profession. Thus, to enlighten and persuade the young pupil of our country towards the agricultural profession through agriculture education, the 'Agriculture Education Day' was organized at



Students appearing in essay writing competition

Directorate of Onion and Garlic Research on February 18, 2012. Different competitions were organized on the day for the school students of class VIII to X to encourage them towards the envisaged goal. Students of Kendriya Vidyalay (CME), Pune, Mahatma Gandhi Vidyalay, Rajgurunagar and Pius Memorial High School, Rajgurunagar participated in the essay writing competition on the topic "Agriculture as a profession". A quiz-test was also organized.

In the welcome address, Dr C.R. Ramesh elaborated the concept of the celebration of the Agriculture Education day and urged students to opt for career in agriculture business. Chief Guest of the function Dr. P.K. Korde, Principal, Hutatma Rajguru Mahavidyalay, Rajgurunagar discussed about the Agriculture Education policy in the country and emphasized its strengthening. The winners of different competitions were awarded with memento and certificates by the Chief Guest. The coordinator of the event Dr. A.A. Murkute proposed vote of thanks.

## हिंदी राजभाषा कार्यान्वयन समिति

निदेशक, प्याज एवं लहसुन अनुसंधान निदेशालय राजगुरुनगर, पुणे कि अध्यक्षता में दिनांक 19/03/2012 को अपरान्ह 3.00 बजे प्रशासनिक एवं प्रयोगशाला भवन के सभा कक्ष में निदेशालय की राजभाषा कार्यान्वयन समिति की बैठक हुई। बैठक में डॉ. जय गोपाल, निदेशक एवं अध्यक्ष, राजभाषा कार्यान्वयन समिति के साथ अन्य सदस्य भी उपस्थित थे।

समिति ने पिछले बैठक के कार्यवृत्त की समीक्षा की और हिंदी में पत्राचार बढ़ाने के लिए आवश्यक उपायों पर विस्तृत कार्यक्रम कि रूपरेखा बनायी। सभी अनुभागों के पत्र हिंदी में जारी किए जाने की आवश्यकता पर बल दिया गया तथा यह निर्धारित किया गया कि प्रेषणकर्ता हिंदी पते लिखकर पत्र भेजेगा। जिन कार्मिकों को हिंदी का ज्ञान नहीं है ऐसे कार्मिकों को पुणे नगर राजभाषा कार्यान्वयन समिति से संपर्क कर हिन्दी प्रशिक्षण के लिए भारत सरकार के पुणे स्थित कार्यालयों में भेजने पर निदेशक महोदय ने अनुमति प्रदान की। निदेशालय के सभी जगह साइन बोर्ड को द्विभाषी करवाने के लिए प्रभारी संपदा को नामित किया गया। सभा के अंत में यह भी फैसला लिया गया कि हिंदी में सबसे अधिक कार्य करनेवाले कार्मिकों को हिंदी दिवस/सप्ताह/पखवाड़ा के समय प्रथम, द्वितीय एवं तृतीय पुरस्कारों से सम्मानित किया जाएगा।

## Quinquennial Review of DOGR



### Discussion of QRT with scientists of DOGR

The Quinquennial Review Team (QRT) 2006-2011 constituted by ICAR, visited Directorate of Onion and Garlic Research (DOGR), Rajgurunagar during 23/2/2012 to 27/02/2012. The team was comprised of Dr. Brahma Singh as Chairman and Dr. R. K. Jain, Dr. D. Veeraragavathatham, Dr. P. S. Sirohi, Dr. Harihar Ram, as members and Dr. Vijay Mahajan as Member Secretary. Felicitation of the Chairman and members by Dr Jai Gopal, Director DOGR was followed by the Director's presentation to highlight the salient achievements of the Directorate. The scientists elaborated the progress of individual projects and outcomes in terms of technologies developed and disseminated, papers published, and infrastructure developed during the review period. After exhaustive review the QRT complimented that DOGR has significant output not only in research achievements and technology

development in onion and garlic but also in research farms development and equipping the laboratories. The Chairman noted that the Directorate has also established strong linkages with several national and international institutions and organizations. It also gave compliments for the Directorate's endeavors for the seed production of released varieties and attempts to commercialize the same through public and private partnership approach. The active involvement of Directorate in training programmes for farmers, stake holders, extension workers, etc. with regard to future perspective was appreciated by the committee. Further, the QRT visited seed production farms at Kalus and Manjri and fields of onion growers who are being guided by DOGR. Keeping in view the constraints in terms of manpower, availability of power, budget, infrastructure etc. the committee made certain valuable recommendations. One of the members of QRT, Dr. R.K. Jain visited DOGR on 27.3.2012 and critically reviewed the work going in Plant Protection.

## Institute Research Council (IRC) Meet

Institute Research Council (IRC) meeting was held on 02-03 April 2012 at Rajgurunagar, under the chairmanship of Dr. Jai Gopal, Director. Scientists presented the progress reports and salient achievements of the projects. The critical gaps in the ongoing research programmes were discussed at length and the technical programmes were finalized with appropriate modifications. New programmes were initiated to coincide with the XII plan.



## Farmers' Training Programmes at DOGR

DOGR regularly arranges training programmes for the dissemination of technical knowledge and R&D innovation to the targeted clientele. During the past six months, three training programs were organized for the farmers of different regions on 'Scientific cultivation of onion and garlic'. Under ATMA scheme, fifteen onion and garlic growers from Bhusawal taluka of Jalgaon district participated in the training programme organized during Mach 5 to 7, 2012. The two training programmes were organized during May 30 to June 1, 2012 and June 4 to 6, 2012. These were sponsored by NCAP and *Gramin Vikas Kendra*, Bihar Sharif, Bihar for the farmers of Nalanda District, Bihar. The relevant topics were covered by the scientists under these programmes. Lectures were delivered on varieties, cultivation practices, fertilizer management, micro-irrigation, pest control, harvesting, storage and postharvest management including processing. The various agro-practices were demonstrated to farmers with experiments laid at Rajgurunagar, Manjri and Kalus farms of the Directorate. The famers were also exposed to different agro-innovative technologies. A visit to the laboratories of Directorate was also organized during this period. Dr Jai Gopal, Director DOGR had extensive deliberations with the



### Valedictory function of farmers' training programme

farmers in the valedictory functions to know their specific constraints related to sustainable production techniques. To manage frequent price fluctuations and get appropriate market price, Dr Jai Gopal emphasized that farmers should develop a professional attitude and follow storage and processing of onion and garlic. The training programmes were coordinated by Dr S.S. Gadge, Senior Scientist (Extension).

## DOGR Celebrates Foundation Day

Foundation Day of Directorate of Onion and Garlic Research (DOGR) was celebrated on June 16, 2012 to commemorate glorious past, vibrant present and promising future. Founded as National Research Centre for Onion and Garlic Research in 1994 at Nashik, Maharashtra, it was rechristened as Directorate of Onion and Garlic Research in 2008 by virtue of augmented responsibilities of All India Network Research Project on Onion and Garlic.



Mr. Dilip Mohite Patil, MLA, Khed addressing the gathering

Dr Jai Gopal, Director DOGR extended warm welcome to dignitaries and participants including farmers. In welcome address he focused on the ramifications of onion and garlic industry in the country. He also elaborated the various endeavors being taken by DOGR to enhance the production and productivity of onion and garlic. The foundation day lecture was delivered by Dr K.E. Lawande, Vice Chancellor, Dr. BS Konkan Krishi Vidyapeeth, Dapoli. He revealed that the varieties released by DOGR are being well adopted and doing excellent in the country. Dr Lawande emphasized that the country needs to store about 40 lakh ton of onion to stabilize supply chain and commended the designs of storage structures developed by DOGR. Chief Guest of the function Mr. Dilip Mohite Patil, MLA, Khed, discussed the adverse effects of industrialization on agriculture and shrinkage of arable land. He advocated pro-farmers' policies including minimum support price, and adequate compensation in adversaries. The progressive farmers were felicitated on the occasion who also shared their experiences. Dr V. Mahajan coordinated the programme and proposed vote of thanks.

## III<sup>rd</sup> Group Meeting of AINRP on Onion and Garlic Research



**Inauguration of III<sup>rd</sup> AINRPOG group meeting**

The third group meeting of All India Network Research Project on Onion and Garlic Research was held at Junagadh Agricultural University, Junagadh on 22-23<sup>rd</sup> June, 2012. The meeting was inaugurated and chaired by Shri Dileep Sanghani, Hon'ble Minister of Agriculture, Animal Husbandry, Fisheries & Cow breeding, Prison, Law & Justice, Legislative & Parliamentary Affairs, Government of Gujarat, and Co-chaired by Shri Kanubhai Bhalala, Hon'ble Minister of State, Agriculture & Water Resources. They emphasized the importance of onion & garlic in daily life and export. Dr. K.E. Lawande, Vice Chancellor, BSKKV, Dapoli was the chief guest. He advised to develop varieties and hybrids resistant to pests and diseases besides increasing the storage capacity of onion in onion growing areas. Dr. N.C. Patel, Vice Chancellor, JAU, Junagadh was guest of honour. He gave priority to mechanization of onion & garlic

cultivation. Dr. Jai Gopal, Director, DOGR in his key note address introduced the importance of onion & garlic network project and its achievements and ongoing research programmes. He also spoke about national and international status of these important crops and researchable issues to increase productivity and stabilize production. Dr. C.J. Dangaria, DRS, JAU, Junagadh spoke about the achievements of the University and welcomed the guests. Organizing Secretary of the group meeting was Dr. L.K. Dhaduk, Research Scientist (Garlic & Onion), JAU. He proposed vote of thanks during inaugural session.

There were four technical sessions viz. General Session, Crop improvement, Crop production and Crop protection. Research achievements and planning of next year experiments were thoroughly discussed. Dr. B.S. Dhankhar, Ex ADG (Hort), Dr. P.S. Naik, Director, IIVR, Dr. B. Singh, Project Co-ordinator(VC), Shri U.B. Pandey, Ex Director, NHRDF, Dr. P. Kalia, Head, Division of Veg. Crops, IARI, New Delhi, Dr. I.U. Dhruj, ADR, JAU, Junagadh were invited experts. They acted as Chairman/Co-Chairman of various sessions. Scientists from different parts of the country from public and private sectors participated in the group meeting to formulate and conduct the research programmes in the country. Plenary session was chaired by Dr. N.C. Patel, Vice Chancellor and co-chaired by Dr. B.S. Dhankhar, Ex ADG (VC). Vote of thanks was proposed by Dr. Vijay Mahajan, Nodal Officer, AINRPOG & Principal Scientist, DOGR. An exhibition of DOGR varieties and technologies was also arranged on the occasion for the benefit of participants and farmers. The two days deliberations were fruitful and the meeting was a grand success, as was evident from its appreciation by one and all.

## Distinguished Visitors

### Chairman ASRB Visits Directorate

Dr. Gurbachan Singh, Chairman, Agricultural Scientists Recruitment Board (ASRB) visited DOGR on April 17, 2012. Dr Jai Gopal, Director DOGR received the Hon'ble chairman and briefed him about the various activities of the Directorate. Dr Singh visited the institute's farm and had comprehensive discussion on the on-going projects and related R&D activities. He also visited all the laboratories of the Directorate. Dr Gurbachan Singh praised the cleanliness in the campus and appropriately laid out experiments in the field. He elaborated innovative steps which are being taken up by ASRB and solicited the suggestions from the scientists to improve the system of assessment and recruitment of scientific staff.



**Dr. Gurbachan Singh at field experiments**



## Dr. P.S. Minhas, Director, NIASM Baramati visits DOGR

Dr. P.S. Minhas, Director, National Institute of Abiotic Stress Management, Baramati visited Directorate of Onion and Garlic Research on 25/5/2012. Dr. C.R. Ramesh cordially received Dr. Minhas and introduced him to the scientific staff of DOGR. Dr Minhas expressed deep sense of gratitude and during the course discussed the R&D programmes of directorate vis-à-vis research mandate of NIAM to explore mutual collaborations. He extended the invitation to the Director to visit NIAM to discuss and finalize the mutual collaborations.



Dr P.S. Minhas in discussion with DOGR scientists

## Human Resource Activities

### National

Title and Venue	Period
<b>Dr. Jai Gopal</b>	
Directors - Vice Chancellors Interface and Directors' Conference of ICAR Institutes at NASC, New Delhi	February 17-18, 2012
Nanotechnology Platform and Outreach Programmes meeting organized by Horticulture Division at ICAR Hqrs., New Delhi	March 12-13, 2012
Meeting of Core Group on state S&T oriented demonstration projects at INSA, New Delhi	March 14, 2012
Meeting with the Director General, ICAR, New Delhi regarding finalization of XII <sup>th</sup> Plan EFC	May 7, 2012
Meeting of Scientific Advisory Committee of KVK, Narayangaon organised by Krishi Vigyan Kendra, Narayangaon, Dist. Pune	June 5, 2012
One day workshop on 'Disposal of Appeal under RTI' conducted by ISTM, New Delhi and organised by Dy. Secretary (WS), ICAR, New Delhi.	June 8, 2012
<b>Dr. V. Mahajan</b>	
All India Plant Breeder's Meet held at NBPGR, New Delhi	May 3-4, 2012
<b>Dr. A.J. Gupta</b>	
Refresher Course on Agricultural Research Management for Newly Recruited Senior / Principal Scientists at NAARM, Hyderabad	January 19 to February 8, 2012
6th DUS Review Meeting and Poster Exhibition at NASC Complex, IARI, New Delhi	May 21-22, 2012
<b>Dr. S.J. Gawande</b>	
Meeting of RFD Nodal officers at ICAR, New Delhi	February 22, 2012

Title and Venue	Period
<b>Dr. A.A. Murkute</b>	
Refresher Course on Agricultural Research Management for Newly Recruited Senior / Principal Scientists at NAARM, Hyderabad	January 19 to February 8, 2012
<b>Dr. S. Anandhan</b>	
Refresher Course on Agricultural Research Management for Newly Recruited Senior / Principal Scientists at NAARM, Hyderabad	January 19 to February 8, 2012
All India Plant Breeder's Meet held at NBPGR, New Delhi	May 3-4, 2012
<b>Mrs. Jayanthimala B.R.</b>	
Training programme Scientific Report Writing and presentation at NAARM, Hyderabad	March 19 – 22, 2012

## International

Dr. Anil Khar, Senior Scientist (Horticulture) participated in 6<sup>th</sup> International Symposium on Edible Alliaceae held during May 21-24, 2012 at Fukuoka, Japan. He presented a key note lecture on topic 'Cross Amplification of Onion Derived Microsatellites and Mining of Garlic EST Database for Assessment of Genetic Diversity in Garlic'. Dr. Khar also chaired the session on 'Genetic Resource'.

## Participation of DOGR Team in ICAR Zonal Sports Tournament

The sports team of DOGR participated in ICAR Zonal Sports Meet - West Zone held at CAZRI, Jodhpur during February 13- 17, 2012. The team participated in Carom, Table Tennis, Badminton and Volley Ball events.



**DOGR Team for Zonal Sports Tournament**

## Recruitment

- Mr Subodh Niraj, Administrative Officer  
w.e.f. 12/06/2012
- Ms Ashwini A. Chavan, Scientist,  
w.e.f. 30/06/2012

## Superannuation

- Mr. V.V. Patil, T- 5, 31/05/2012
- Mr. P.S. Takle, T-3, 31/05/2012



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