



Visit us at <http://www.dogr.res.in>

DOGR

news



Volume 15 | No.1 | January-June, 2011



From **Director's Desk**

Onion and garlic experienced exceptionally high market rates during last year because of bad weather. This gave an impetus and created temptation among the farmers for enhancing area. As a result onion seed prices increased from Rs.600 to 2500 per kg before *rabi* season of 2010-11. Because of delayed rains in Nov 2010. Transplanting of onion and dibbling of garlic was delayed almost by one month as the fields were not ready. It was assumed that bulb size will be affected by delayed planting but it proved to be wrong as the winter was unusually chilled and prolonged till March. This helped in harvesting good quality harvest. Rabi onion and garlic production estimated to the tune of 80.00 and 10.70 lakh tons. Country has exported onion to the tune of 11.91 lakh

tons. This has balanced price fluctuation and farmers are getting better prices even in lean period of May to June. Enhanced storage capacity in Maharashtra and Gujarat is holding sizeable onion and garlic which will be catering the needs of domestic as well as overseas markets till Nov 2010. DOGR technologies of varieties *per se* season, micro irrigation and storage is helping farmers for enhancing quality production and storability. Breeder seed produced by DOGR of all released varieties is being multiplied by Mahabeej and private seed companies. There is heavy demand for breeder seed of all released varieties. Because of limitations in isolation distance, the Directorate is constrained for seed production on large scale. The breeder seed production programme will be enhanced with the help of Networking centres in twelve different states under DOGR.

During the period under report DOGR has released two varieties of onion and one variety of garlic at all India level through networking research programme. Indian Society of *Alliums* organised National Symposium on "*Alliums*: Current Scenario And Emerging Trends" from 12-14 March 2011 at Pune. Symposium was attended by 115 delegates and overseas onion scientists viz: Dr. Mike J. Havey (USA), Dr. John McCallum (New Zealand), and Dr. Timo Peter (Netherlands). There was indepth discussion on emerging issues and symposium could draft valuable recommendations under the guidance of Dr. C.D. Mayee, Chairman, ASRB and Dr. H.P. Singh, Deputy Director General (Hort), ICAR who were the chief guests of the symposium. Society felicitated Dr. K.E. Lawande, Director, DOGR, Dr. U.B. Pandey, Ex-Director, NHRDF and PS, Jain Irrigation Systems Limited, Mr. Suresh Agrawal, Chief Executive, Bejo Sheetal Seeds Pvt. Ltd., and Dr. R.P. Gupta, Director, NHRDF for their life time contribution for onion and garlic research and development. The Directorate also organised second group meeting of All India Network Research Project on Onion and Garlic at TNAU, Ooty from 29-30 April 2011. The group identified three varieties of onion and three of garlic for release at national along with recommendations on production technology.

Ensuring *Kharif* Onion Production through Sets Technology

Kharif onion plays an important role in bridging the critical gap of demand and supply from November to February throughout the country. When the price shoots up, it becomes serious concern and many a times need for intervention from government. Though *kharif* crop is more sensitive and vulnerable, its low productivity and early availability are major constraints yet plays a crucial role for maintaining demand and supply. For enhancing of productivity of *kharif* onion through transplants, DOGR has developed “*Kharif* Onion Production Technology” which is helping in enhancing the productivity. However, early availability of bulbs is difficult through transplanted onion. Usually, *kharif* onion is grown by raising nursery in May under hot and humid conditions, which makes it difficult to properly manage the nursery. Onion sets being much larger than seeds have greater vigour for the early establishment of a large plant which allows them to grow successfully in less favourable growing conditions where the use of transplant and direct sowing are limited. Sets have a shorter growing season than plants from seeds and transplants, and therefore can be exploited when a rapid or early season production is required. The use of sets can help in extending the availability of the commodity throughout the season. There is significant demand from professional growers to produce early crops through sets.

The effect of set size on bulb yield in seventeen onion varieties including advanced lines was evaluated at the experimental farm of DOGR, Rajgurunagar. Seeds were sown on raised beds @ 15 g/m² in the last week of January and harvesting of onion sets was done in the third week of May. After harvesting, sets were graded

according to the diameter: <10 mm, 10-15 mm, 16-20 mm and >20 mm onion sets and stored at room temperature in a ventilated storage structure till planting in the field. Different groups of sets and seedlings were planted in mid July in raised beds.

Significant differences were observed among varieties in respect of set production. Maximum number of sets were recorded in DOGR-1203 (561/m²) followed by Bhima Super (456/m²), Bhima Red (420/m²), Bhima Raj (419/m²) and RGO-53 (360/m²). Percentage of less than 10 mm sets varied from 6.4% (Bhima Shweta) to 52.0% (Red *Kharif* Massing-IV) whereas more than 20 mm sets ranged from 0.7% (DOGR-1203) to 24.1% (Phule Samarth). Highest percentage of 10-15 mm sets was recorded in JNDWO-85 (55.7%) followed by Agrifound White (53.5%), W-448 (51.6%), DOGR-1203 (48.0%) and Phule Safed (45.8%).

Little variations were observed among four groups of onion sets in respect of mean of marketable yield of all varieties (20.0 to 22.3 t/ha) except >20 mm sets which recorded 28.3 t/ha marketable yield. Irrespective of variety, marketable yield was higher when large sized sets were used. The time to bulb maturity increased with decreasing size of sets. Days to bulbs maturity was recorded 74 to 95 days in the crop through sets, whereas 97 to 110 days were required for transplanted crop. This revealed that sets are useful for early production of onion bulb as compared to transplanted crop. Highest marketable yield was obtained in Red *Kharif* Massing-I (31.0 t/ha) followed by Red *Kharif* Massing-IV (30.9 t/ha), Bhima Shweta (27.8 t/ha), Bhima Super (26.5 t/ha) and W-448 (26.1 t/ha) planted through sets. These results need further confirmation at different locations.



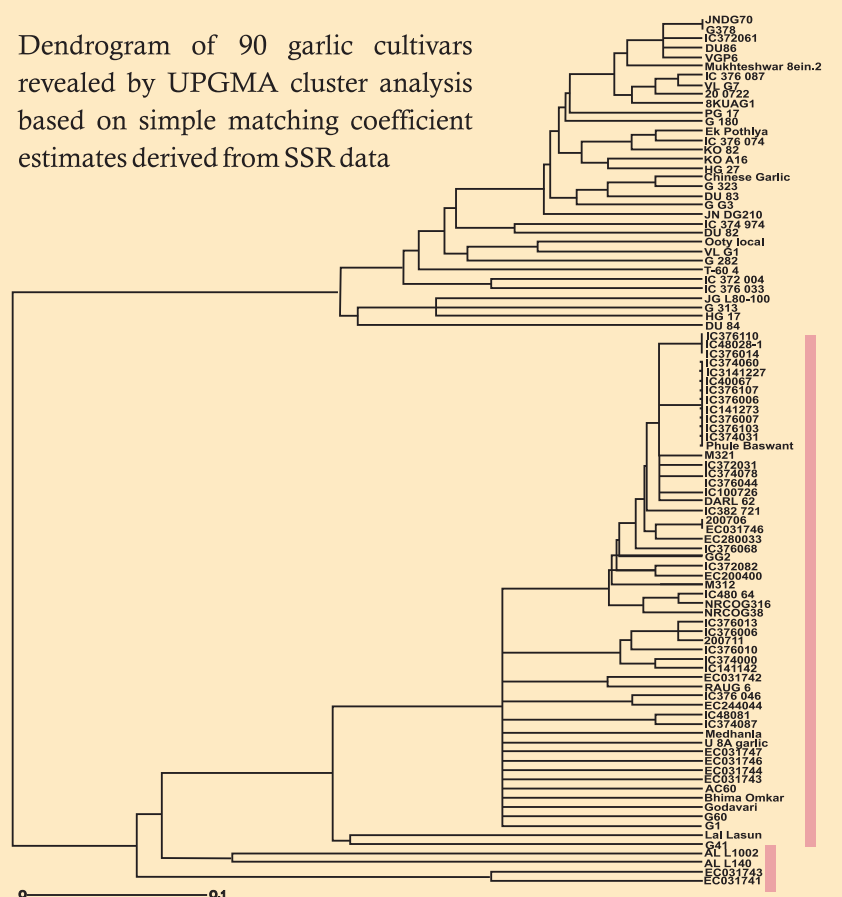
Figure: Onion sets along with commercial bulbs (DOGR-1203, Bhima Super and Bhima Shweta)

Microsatellite Markers Based Estimation of Genetic Diversity in Garlic (*Allium sativum* L.) Using Cross Amplification of Onion SSRs and Garlic ESTs.

Garlic (*Allium sativum* L.) is one of the most important vegetable *alliums* consumed worldwide for its food and medicinal uses. India is the second largest in acreage and production of garlic after China. Though it is propagated asexually yet it exhibits considerable variation in morphological traits. Assessment of genetic diversity based on molecular markers is important since it is unaffected by the environmental conditions and reveals the true genetic nature of the germplasm. Ninety garlic accessions collected from different parts of the country and exotic lines from USA (1), China (1), Hong Kong (1), Taiwan (8) and *Allium longicuspis* as the progenitor source were used in the present study. Sixty genomic and EST based onion microsatellites and 8 newly reported garlic microsatellites were used for amplification. Out of the 60 onion microsatellite markers, 5 (8%) markers were cross transferable and revealed polymorphism in garlic accessions whereas out of 8 reported garlic microsatellite markers, 7 (88 %) were amplifiable. In addition to this, newly developed database for microsatellites viz., GarlicESTdb was used for microsatellite mining. A total of 4,825 sequences were mined for obtaining Class 1 SSR markers using MISA software and 31 microsatellites were developed. Out of 31, 11 (37%) were amplifiable in garlic germplasm. Overall 23 SSR markers were amplifiable and out of them 4 SSR (one from reported garlic microsatellites and 3 from newly developed SSRs) amplified a single band and these were not taken into consideration for further analysis.

Here we characterized 19 polymorphic SSR markers for assessment of genetic diversity in garlic germplasm.

Dendrogram of 90 garlic cultivars revealed by UPGMA cluster analysis based on simple matching coefficient estimates derived from SSR data



These SSRs produced a total of 88 alleles across 90 garlic accessions, with an average of 5 alleles per locus. The averages for gene diversity and PIC values were 0.58 and 0.52, respectively. 11 SSR markers were very informative with a PIC value of greater than 0.5. Considerable genetic diversity was observed in the germplasm and it was observed that cluster formation was independent of the colour or geographical location of the material. We found that clustering was mostly on the basis of day length requirement for bulb formation in garlic. Till now only 8 garlic SSRs have been reported and we are reporting 19 SSRs useful for future studies on diversity assessment, core set construction and garlic germplasm identification.

DOGR Organises National Symposium on

Indian Society of Alliums, Rajgurunagar, Pune organized "National Symposium on Alliums: Current Scenario and Emerging Trends" in collaboration with Directorate of Onion and Garlic Research, (ICAR), Rajgurunagar, Pune, National Horticultural Mission, New Delhi, National Horticultural Research & Development Foundation (NHRDF), Nasik and Vaikunth Mehta National Institute of Co-operative Management (VAMNICOM), Pune from 12-14th March, 2011 at VAMNICOM, Pune. A total of 115 scientists, working on onion and garlic, from India and abroad attended the symposium. Dr. C. D. Mayee, Chairman, ASRB, Dr. H. P. Singh, DDG (Horticulture), Dr. T. A. More, VC, MPKV, Rahuri, Mr. Nitin Gadre, Director, VAMNICOM, Pune, Dr. A. K. Mehta, ADG (Agri. Extension), Dr. A. S. Sidhu, Director, IIHR, Bangalore, Dr. K. P. R. Vittal, Director, NIASM, Baramati, Dr. R. T. Patil, Director, CIPHT, Ludhiana, Dr. Nazeer Ahmed, Director, CITH, Srinagar, Dr. R. P. Gupta, Director, NHRDF, Nasik, Dr. B. Singh, Project Coordinator and Acting Director, IIVR Varanasi, Mr. D. M. Sable, Project Manager, MSAMB, Pune and Mr. Suresh O. Agrawal, MD, Bejo-Sheetal, Jalna were the important dignitaries from India who participated in the Symposium. Foreign dignitaries who attended the symposium were Dr M. J. Havey, USDA-ARS, University of Wisconsin, USA, Dr. John McCallum, New Zealand and Dr. Timo Peter, Netherland.

The inaugural function was chaired by Dr. H. P. Singh, DDG (Horticulture). Dr. C. D. Mayee was the chief guest and Mr. Nitin Gadre was the guest of honour. Dr. K. E. Lawande, President of ISA and Director DOGR, extended warm welcome to all dignitaries, guests and delegates. In his welcome address, he stressed about the role of Indian Society of Alliums and theme of the Symposium and briefed about onion and garlic research achievements in the country and research achievements of the Directorate. Symposium drafted salient recommendations as under

- In respect of core collection and reference accessions in onion and garlic, phenotyping followed by genotyping using molecular markers must be carried out.
- Breeding cycles in onion can be reduced by taking advantage of the climatic variability present in different zones of our country.
- Tissue culture protocols for mass multiplication of male-sterile onion lines and virus free garlic stocks must be developed at commercial scale
- Development of doubled haploids for heterosis breeding programme and genomic studies should be taken up on



From L to R: Dr. KE Lawande, Dr. HP Singh, Dr CD Mayee, Mr. Nitin Gadre



Alliums: Current Scenario and Emerging Trends



priority basis. Genomic studies should be taken up in a partnership mode since this area, in onion and garlic, is still in its nascent stage.

- It has been repeatedly found that although a number of varieties have been released by ICAR/SAUs yet the availability of quality seeds to the farmers is not achieved. DOGR and NHRDF should identify potential varieties and impress upon the developing institutes/SAU's to mandatorily provide breeder seed to seed producing agencies.
- All KVK's of the country should come forward to produce quality seed at least in one hectare of their own farm to meet the local demand.
- Emphasis should be given to develop integrated nutrient management practices in onion and garlic for sustainable soil/plant health and to realize yield with higher quality.
- Intensification in efforts for collection and identification of *T. tabaci*, from different regions of the country, to understand the putative biotypes and study the correlation between thrips populations and IYSV is needed.
- Spray of pyrethroids should be avoided to prevent pesticide resistance and there should be more focus on IRM in thrips. Biocontrol agents have good potential for thrips management must be identified.
- Artificial curing facilities developed at AICRP (PHT), Bangalore and also at NHRDF, Karnal needs to be revalidated at DOGR, Rajgurunagar.

- For proper supply chain management of onion, productivity of Kharif onion should be enhanced vis-a-vis enhancement of a storability of *rabi* onion. The technologies generated in this regard should be demonstrated in different states through NHM.
- There is need for research on forward linkages for quality export of onion for continuing position as number one exporter in the world.
- For safer futures, the recommendations of the good agricultural practices (GAP) and the pre harvest intervals (PHI) should strictly be adhered to. It was also suggested that the strategies to minimize pesticide residues in onion should also be worked out.

- Government of India should formulate a national policy on onion and garlic supply chain management vis-a-vis price stabilization.

Dr. K.E. Lawande, Director DOGR Receives Lifetime Achievement Award

The Indian Society of Alliums conferred Lifetime Achievement Award upon Dr K.E. Lawande, Director DOGR in a National Symposium on Alliums: Current Scenario and Emerging Trends held at VAMNICOM, Pune during 12-14 March, 2011. A distinguished alumnus of IARI, New Delhi and a renowned vegetable breeder from Mahatma Phule Krishi Vidyapeeth Rahuri, Prof. Lawande was bestowed with the charge of founder Director of the then National Research Centre for Onion and Garlic Research in May 1997. Despite its modest beginning and several constraints NRCOG has emerged as a versatile institute over a period of a time with immense social relevance in the context of onion and garlic growers in India. Several promising varieties and agro-technologies have been disseminated from DOGR. The exclusive and zealous endeavors of Dr Lawande for more than a decade have culminated into the transformation of National Research Centre to a Directorate with 13 centers across the country and 15 voluntary centers. All the success and recognition to the lab was neither handed over to it on a platter nor accomplished overnight. There lie behind all these accomplishments, the fervor of scientific inquisitiveness, ingenuity, and innovativeness and above all a determination of visionary leadership who headed this organisation. The Lifetime Achievement Award conferred upon Dr K.E. Lawande by Indian Society of Alliums is a testimony of his outstanding contributions in providing appropriate direction to research and development programmes pertaining to onion and garlic in Indian context.



Release of DOGR Onion varieties at National Level

Onion varieties Bhima Shakti and Bhima Shweta were identified at national level for release during II AINRPOG group meeting held at Ooty (TNAU, Coimbatore) during 29-30 April 2011.

Bhima Shakti

Bhima Shakti (1156) (IC No. 572769) was identified for four zones viz., Zone III (Delhi, UP, Haryana, Bihar and Punjab), Zone IV (Rajasthan and Gujarat), Zone V (MP, Chhattisgarh and Orissa) and Zone VI (Maharashtra, Karnataka and Andhra Pradesh) for *late kharif* as well as *rabi* season.

Onion - Bhima Shweta (Rabi)

Bhima Shweta (White El. Comp. Selection/ NRCWO-2) (IC No. 572761) was identified for three zones viz., Zone III (Delhi, UP, Haryana, Bihar and Punjab), Zone V (MP, Chhattisgarh and Orissa) and Zone VI (Maharashtra, Karnataka and Andhra Pradesh) for *rabi* season.



All India Network Research Project on Onion & Garlic 29-30, April 2011, Ooty (TNAU, Coimbatore)

The second group meeting of All India Network Research Project on Onion and Garlic was organized by TNAU, Coimbatore at Ooty during 29-30, April 2011. Dr N. Kumar, Dean HC & RI, TNAU, Coimbatore delivered the welcome address. In keynote address Dr. K.E. Lawande, Director DOGR outlined the importance of onion and garlic vis-à-vis problems associated with these sensitive commodities along with importance of networking centres. He expressed sincere gratitude towards university authorities for organization of AINRP.

Dr. P. Subbian, Registrar, TNAU, Coimbatore delivered presidential address. Chief Guest of the function Dr H.P. Singh, DDG (Hort), ICAR, New Delhi suggested for formulating groups to discuss the line of future research keeping in view the impact of climatic change and future requirements of the market. Dr. L. Pugalandhi, Organizing Secretary & Professor and Head (Vegetable Crops), TNAU proposed vote of thanks. The meet proceeded with different technical sessions. Plenary session was chaired the Dr. P. Murugesu Bhupati, Vice-Chancellor, TNAU. The group identified three varieties of the onion and three varieties of the garlic for release at national level. Eight recommendation on production technology were also finalized for release.



New Varieties Released

Garlic - Bhima Purple



Bhima Purple (IC 570742) was identified at National level for release during II AINRPOG group meeting at Ooty (TNAU, Coimbatore) during 2011 for two zones viz., Zone III (Delhi, UP, Haryana, Bihar and Punjab) and Zone VI (Maharashtra, Karnataka and Andhra Pradesh). This line has been identified for high yield and better quality. It has been developed through clonal selection of the local material obtained from Angul, Orissa. The bulbs are medium in size, compact and purple in colour, 16-20 cloves per bulb, TSS 33.6% and allicin @ 2.9 mg/g (fresh weight basis) and 9.6 mg/g (dry weight basis). Leaves narrow with medium green colour and the average yield observed over multi-location trials was 68.9 q/ha.

Transfers

Dr Asha Devi, Sr. Scientist (Genetics) transferred to CTCRI, Trivandrum

Mr N. Gopal, promoted as AO and transferred to NRC for Grapes

New Appointments

Dr Ashutosh A Murkute, Sr Scientist (Horticulture) joined on 10/01/2011

Dr S. Anandhan, Sr Scientist (Biotechnology) joined on 17/01/2011

Distinguished Visitors



Dr AS Sidhu, Director IIHR visited DOGR on 15/3/2011



Dr Nazeer Ahmed, Director CITH Srinagar visited DOGR on 15/3/2011

Participation in ICAR Inter Zonal Games Meet at IGFRI, Jhansi

DOGR team participated in various games viz. table tennis, badminton, carom, chess etc at ICAR Inter Zonal Games Meet held at IGFRI, Jhansi, during February 15-19, 2011.



Published by: Dr. K.E. Lawande, Director. Compiled and Edited by: Dr. S.J. Gawande & Dr. Ashutosh A. Murkute
Directorate of Onion and Garlic Research
Rajgurunagar – 410 505, Dist. Pune, Maharashtra
Phone: 02135-222026, 222697 Fax: 02135-224056 E-mail: director@dogr.res.in / aris@dogr.res.in
Website : <http://www.dogr.res.in>

Designed & Printed by: Anson Advertising & Marketing, Pune. Tel.: 24213244 Fax: 24210013 Email: ansonorama@gmail.com