

A report on the Brain Storming session on ‘Crop improvement, production technology, seed production and processing of garlic’ held at National Horticultural Research and Development Foundation, Nasik on 29th November 2014.

A step towards increasing Garlic productivity

Garlic is one of the important bulb crop grown and used as a spice or a condiment throughout India. It is mainly used for flavouring and seasoning vegetables and meat dishes. It also has many medicinal properties. Garlic preparations are given in whooping cough and other lung diseases and stomach disorders. It is used specifically for the treatment of sore eyes and earache. It is also used for lowering cholesterol and blood pressure. It has an influence on platelet aggregation an important factor in cardiovascular disease. Its use is helpful in preventing cancer.

Garlic is grown worldwide in 14.65 lakh hectares, with a total production of 248.37 lakh tons and productivity of 16.94 tons/ha as per FAO Year 2012. China is the world leader in area (8.50 lakh ha) as well as in production (200.00 lakh tons), followed by India (2.02 lakh ha and 11.50 lakh tons). Other major garlic-growing countries are Republic of Korea, Egypt, Russian Federation, Bangladesh, Ethiopia, Myanmar, USA, Ukraine, Spain, Argentina, Brazil, and Iran.

The productivity of garlic is highest in Uzbekistan 24.80 tons/ha, followed by Egypt 24.34 tons/ha, China 23.53 tons/ha, Kazakhstan 20.38 tons/ha, USA 18.66 tons/ha, Rep. of Korea 11.99 tons/ha, Brazil 10.63 tons/ha and Ethiopia 10.47 tons/ha the major garlic growing countries. India, although holds second place in area and production, the productivity is very low 5.69 tons/ha as per FAO Year 2012.

India is projected to have a population of 1.7 billion by 2050, and there is no possibility of increase in cultivable land. To cater to the requirement of this ever-increasing population and keeping per capita consumption at the present rate 4.0 g/person/day and 87.5% population consumes garlic (Above 5 year's age group) and export requirement increases to 3.0 lakh MT, Processing 2.5 lakh MT and seed bulbs 1.50 lakh MT and losses 4.50 lakh MT (15%) than total requirement during 2050 will be around 30.0 lakh MT. To achieve this target average productivity per hectare needs to be increased to 10 tons/ha compared with the existing productivity around 5.20 tons/ha and storages losses needs to be reduced to some extent.

In the conclusion of the National Brainstorming Session on “Crop improvement, production technology, seed production and processing of garlic”, Dr. N. K. Krishna Kumar Deputy Director General (Horticultural Science), ICAR, New Delhi took stock of the present status of production, research achievements, technology adoption by farmers and future requirement of garlic keeping in view the increased awareness about the medicinal and nutritional properties. More than 25 eminent scientists working in research and development of garlic from across the country representing various institutions and agricultural universities as well private food-processing companies attended the session. The National Horticultural Research and Development Foundation (NHRDF), Nasik) was the organizer of this brain storming session on garlic.

The brain storming session was inaugurated by Dr. N.K. Krishna Kumar, Deputy Director General (Horticultural Science), ICAR, New Delhi. He briefed about the importance of garlic use in daily life due to its medicinal properties. The low productivity of garlic in India is one of the major issues of concern. Though there are many reasons for low yield, including short day length conditions available in India, sub-optimal standards of cultivation, weather vagaries and non-availability of virus free quality planting material and use of local low-yielding varieties are important among them.

Dr. Krishna Kumar stressed on the need to augment garlic productivity through genetic improvement and supply of virus free planting material, besides reducing storage losses. Eleven lead lectures were delivered by renowned researchers from the public as well as private sectors, followed by open discussion. The deliberations were under two themes, viz. (i) Crop Improvement & production technology and (ii) Seed production, Protection and Processing. The open discussion that followed reviewed the present status of garlic varieties cultivated in India under short day and long day conditions and the availability of virus free quality planting material to improve productivity.

The brain storming session recommended the several future course of action to increase the production, productivity and quality of garlic. Garlic improvement research should be accelerated for developing high yielding, allicin rich clones through creation of heritable variation by induction of flowering and conventional cum molecular breeding/ inter-specific hybridization/ somaclonal variation/bulbils exploitation. Technology for developing virus free garlic through meristem-tip culture, hardening, establishment, identifying virus free areas for multiplication and to scale up the protocol for commercial propagation need to be addressed. Collaborations with private companies should be explored.

The brain storming session also suggested working on garlic genomics and molecular markers for germplasm characterisation and identification of duplicates should be initiated. Exploration trip for collection of flowering garlic accessions from Central Asian and Himalayan regions should be carried out on priority.

The brain storming session also recommended for study to Intensive multilayered garlic seed production under poly house using LED and carrying populations from G1-G4 for comparing yield advantage. The session further suggested that organic garlic production and its impact on quality need to be explored. The studies on effect of Sulphur, Boron, Calcium and magnesium on garlic quality need to be addressed. Chemical profiling of garlic accessions and great headed garlic should be done in collaboration with ICAR-DMAPR, Anand. Long day garlic in NEH and cold arid region should be popularized for augmenting production for local supply and export. Experiments need to be initiated for protected cultivation of garlic for higher productivity.

The session suggested that thermo cryotherapy to be promoted in a big way for lessening viral disease problems in garlic and need for establishment of core collection of cryopreserved and virus eliminated garlic in India. Emphasis was made on evaluation of eco-friendly plant protection technologies with available bio-pesticides formulation, as garlic food safety is of prime importance. Development of bigger clove garlic varieties with high TSS suitable for processing industries are the need of hour. Need for developing varieties with low reducing sugars thereby avoiding yellowing in processed garlic is required.

It was also suggested that farmers friendly nutrient, pest and disease symptom chart along with control measures should be developed. Gene chip technology (micro array) should be developed for identification of all pathogens including virus / fungus. The garlic sample from different states should be collected by NHRDF for study of pesticide residues in terms of food safety measures. The mechanization in garlic by pelleting of garlic clove may be tested in collaboration with Jain Irrigation System by DOGR and NHRDF. Dr. N.K.Krishna Kumar suggested that brain storming Session on Garlic should be organized once in every three years and review of previous year's recommendations be made. The strategies suggested can boost production, productivity and quality of garlic in the country.
