ICRISAT
Happenings
Newsletter
04 March 2016
No. 1717

Participants at the launch ceremony of the Mali Agri-business Incubation Hub exhibit some of their processed products.

Transforming agriculture into business through an incubation hub in Mali

Attracting youth to the agriculture sector by transforming it into a business and offering them new avenues and opportunities to engage along the agriculture value chain will be the focus of the Mali Agribusiness Incubation Hub (MAIH) launched recently.

The incubation hub will primarily focus on Youth Business Incubation (YBI), Agro Processing Business Incubation (APBIU) and Seed Business Incubation Units (SBIU). The hub will promote young entrepreneurs in agro processing products; cereals and fruits; and seed business through skills and services based opportunities.

The hub will operate in a public private partnership mode and will serve the Francophone African countries. It has a 'hub and spoke' model located in three institutes: ICRISAT-Mali, Institut d'Economie Rurale (IER), Sotuba and Institut Polytechnique Rural (IPR), Katibougou.

At the launch of the hub more than 50% of the 600 participants registered for the incubation program.

Mr Kassoum Dénon, Malian Minister of Agriculture, appreciated the efforts of MAIH promoters and said, "it is a strategic initiative of the Mali government to transform agriculture into business opportunities and create an enabling environment that can not only create wealth but also maximize employment," as he called for full engagement of all other ministries and concerned actors "in a spirit of frank cooperation by pledging support and resources for the success of the activities of the incubator".

"Promotion of agro-ventures in these areas offers lot of scope for entrepreneurship and employment opportunities, meaning that new income sources will open up especially for rural youth and women," said Dr Bourema Dembele, Chairman, MAIH and Director General, IER.

"One of the unique interventions is the seed business incubation program in which farmer cooperatives are promoted as seed business. Such programs will also be planned and implemented in Africa. ICRISAT will extend all

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Transforming agriculture into business... from page 1

Demonstration of machines as part of the launch ceremony of the Youth Business incubation (YBI).

help in implementing such programs to especially benefit the small and marginal farmers of Africa," said Dr Ramadjita Tabo, Director - West and Central Africa, ICRISAT Mali.

The launching of MAIH was held in two phases. The official ceremony on 22 February was attended by the Malian Minister of Agriculture and other ministers of the Government of Mali. A second launch, dedicated to the Youth Business Incubation (YBI) was held on 23 February at IPR targeting mainly students and other youth interested in entrepreneurship in agribusiness sector.

"The incubation is a motivation as it breaks the barriers in the agricultural sector, providing opportunities for businesses and wealth creation. If the incubator is well operated, and it focuses on supporting the youth and incubating them to grow into business, it will contribute both in creating jobs and employers," said Mr Dramane Tounkara, National Coordinator of Global Youth Innovation Network for Mali.

"A proper implementation of the pilot phase of the Mali Agribusiness Incubation Hub program will initiate other incubation activities for young leaders. We want the incubator to bring them necessary encouragement, motivation and guidance," said Mr Amadou Cisse, Director General, Agency for Youth Employment."

According to Dr Mahamoudou Famanta, Director, IPR, "Youth Incubator is significant in creating opportunities for youth and changing the livelihood of farmers."

The event was presided over by Mr Dénon and attended by many dignitaries: Dr Nango Dembele, Minister of Livestock and Fisheries, Mr Konimba Sidibe, Minister of Investment Promotion and Private Sector, Professor Assetou Foune Migan, Minister of Scientific Research, and Mr Mahamane Baby, Minister of Employment and Vocational Training and Mr Jean Larsen, Private Sector Counselor, Embassy of Denmark.

"I started a seeds business at a time when it was difficult to get support from the banking system for agribusiness. I faced a lot of rejections, but I was able to stand with perseverance. Nowadays, thanks to the incubator, young people who want to create enterprises may not have to go through some of that; many opportunities are there but they still need to stand strong and be brave" said Madam Coulibaly Maimouna Sidibe, CEO of a pioneering private seed company, Faso Kaba.

"Youth can now count on good support from the incubator to strengthen their capabilities and help them start their businesses and accomplish their dreams," said Dr Jean Moreira, Value Chain and Post-harvest Technology Consultant, Africa Rice.

The MAIH is promoted by IER, IPR, Conseil Ouest Africain pour la Recherche et le Développement Agricole/West and Central African Council for Agricultural Research and Development (CORAF/WECARD), African Agribusiness Incubation Network (AAIN) and the Universities, Business and Research in Agricultural Innovation (UniBRAIN) project of Forum for Agricultural Research in Africa (FARA) and ICRISAT. It will benefit from the support of ICRISAT's Agri Business Incubation program (ABI) of the Agribusiness and Innovation Platform (AIP). The MAIH is part of a mandate given to ICRISAT-ABI by UniBRAIN-FARA and funded by Danish International Development Agency (DANIDA). UniBRAIN has set up six value chain Agribusiness Incubation and Innovation Consortia (AIICs) in five African countries and MAIH will be also strategically supported by AAIN. ■

For more on Mali http://exploreit.icrisat.org/page/mali/700

Project: Mali Agribusiness Incubation Hub (MAIH)

Partners: Institut d'Economie Rurale (IER), ICRISAT, Institut Polytechnique Rural (IPR), FASAKOBA (Seed Company), Africa Rice, West and Central African Council for Agricultural Research and Development (CORAF/WECARD), African Agri Business Incubation Network (AAIN), Research in Agricultural Innovation (UniBRAIN), Agence pour la Promotion de l'Emploi des Jeunes (APEJ) and ICRISAT

Investor: UniBRAIN-FARA, AAIN and DANIDA

CGIAR Research Program: Dryland Cereals and Grain Legumes

Addressing malnutrition by mainstreaming pearl millet biofortification breeding

Participants at the review meeting.

Having successfully released biofortified pearl millet variety, Dhanashakti and the pearl millet hybrid ICMH 1201 (Shakti-1201), in 2014, ICRISAT is gearing to further scale up efforts to address malnutrition due to micronutrient dietary deficiency, particularly iron (Fe) and zinc (Zn). At a recent review meeting some areas were identified for future focus: integrate pearl millet biofortification program at ICRISAT with mainstream breeding; adopt modern tools and techniques for breeding; integrate conventional breeding with genomics; include micronutrients in the cultivar release policy; build partnerships; conduct strategic research on biofortified cultivar development; and develop tools for precise large-scale screening for micronutrients.

Currently, several pearl millet hybrids, with 75 mg per kg iron density and 25-35% higher grain yield have been developed, and are at various stages of testing in national trials in India. Besides that, two varieties, ICMH 1202 (Nirmal -7) and ICMH 1301 are currently undergoing farm trials and are targeted for commercial release in 2017.

While a strong public-private partnership (PPP) for pearl millet biofortification research in India already exists, with 26 partners (6 from national agricultural research systems [NARS] and 20 private seed companies), the need for inter-sectorial partnership involving agriculture, nutrition, food industry and medical community was raised. Highlighting the spread of ICRISAT's biofortification research, it was highlighted that a few companies have started using the high iron lines developed at ICRISAT and the All India Coordinated Pearl Millet Improvement Project (AICPMIP) has initiated the first Coordinated Initial Biofortified Hybrid Trial in 2014, with 15 hybrids, of which 9 hybrids are bred at ICRISAT.

Dr Wolfgang Pfeiffer, Director-Operations, HarvestPlus, shared the HarvestPlus Phase III progress and the strategic shifts and 2016 plans for different crops. He emphasized on crop development strategy, commercialization through seed companies and branding biofortified products to create market demand as essential and urged partners to scale-up the pipeline for biofortified pearl millet hybrids in target regions for impact. Dr Pfeiffer stated that in biofortification breeding priority will be given to maintenance breeding. Inclusion of biofortification in national and state policy frameworks as integral part of nutrition agenda will enhance the mainstreaming of micronutrients in agri-food systems, he added.

Dr SP Wani, Director-Asia Research Program, in his welcome speech, stated that while millets are smart food and climate resilient by nature, the biofortification research at ICRISAT has added more value to this dryland crop to align with ICRISAT priorities to address malnutrition.

Dr HP Yadav, Project Coordinator, AICPMIP, gave an overview of pearl millet biofortification at NARS and shared AICPMIP plans for biofortified hybrid trial for which the candidate entries will be identified from 2015 HarvestPlus trials and finalized in the upcoming AICPMIP workshop. He stressed that development of value added products from biofortified pearl millet cultivars such as ready to cook and multigrain mixtures can be suitable for mid-day meal schemes.

Dr M Govindaraj, Principal Investigator-Pearl Millet Biofortification, ICRISAT, highlighted that several advanced lines have now been validated for high Fe content. These are being extensively used at ICRISAT to generate next-generation of high Fe breeding lines and can also be used in the partners' breeding programs. He emphasized the all India performance of new pipeline high-Fe and high-yield hybrid ICMH 1301 and partners' appreciation of the hybrid's performance.

Dr Parminder Virk, Manager-Crop Development, HarvestPlus-CIAT, discussed the importance of setting the target iron level for biofortified products and precautions to avoid dust and soil contamination. Dr Pfeiffer stressed that the new waves of high-iron products and high-iron and high-yielding hybrids are key drivers of success and can attract donor investment in future. In consultation with national partners, Dr Govindaraj finalized the 2016 work plan with 24 multi-location trials including hybrids and hybrid parents at various stages of testing across India.

ICRISAT organized the pearl millet biofortification review and planning meeting on 29 February at ICRISAT-India to review the results of biofortification trials 2015 and develop follow-up work plans for 2016 crop season. Thirty researchers from public and private sector organizations partnering in this research and three delegates from HarvestPlus-CIAT participated in this meeting. ■

For full list of project partners refer web version.

Message from Board Chair, ICRISAT

Professor Chandra Madramootoo

2016 INTERNATIONAL YEAR OF PULSES

Farmers and consumers need to be 'pulse smart'

Chickpea harvest at Prakasam district, Andhra Pradesh, India.

Pulses are truly magic, offering a win-win-win situation for the farmer, the consumer and the planet. Farmers and consumers globally would benefit by being more 'pulse smart'. They are multi-functional crops that are good for nutrition and soil productivity, and are dryland crops that need less water and have the potential to weather climate change.

Traditionally pulses were an important part of daily diets, particularly in Asia. However, there has been a decline in the consumption of pulses over the past decade or two and pulses have been neglected in our diets. Therefore, the UN has declared 2016 as the International Year of Pulses to rekindle interest and knowledge on pulses and bring them back into our diets.

Highly nutritious and good for health

Pulses have high nutrition value. They are rich in calcium, iron and zinc. They are commonly referred to as the poor person's meat as they are rich in protein and are comparatively less expensive. Conversely, developed countries should be aware that in addition to providing an opportunity to diversify their diets, pulses help address obesity and manage chronic diseases like diabetes and coronary conditions.

In the semi-arid tropics, women farmers form a major part of the labor force in pulse farming. Crops like pigeonpea and chickpea are usually grown as rotation crops and do not require a lot of manual labor. Women can spend their productive time in rearing children, looking after the household, cooking meals and so on besides growing these crops. Also women know the nutritional value of these crops. They know that when they are short of income these crops are cheaper and easier to grow and they will be able to provide a nutritious meal for their family.

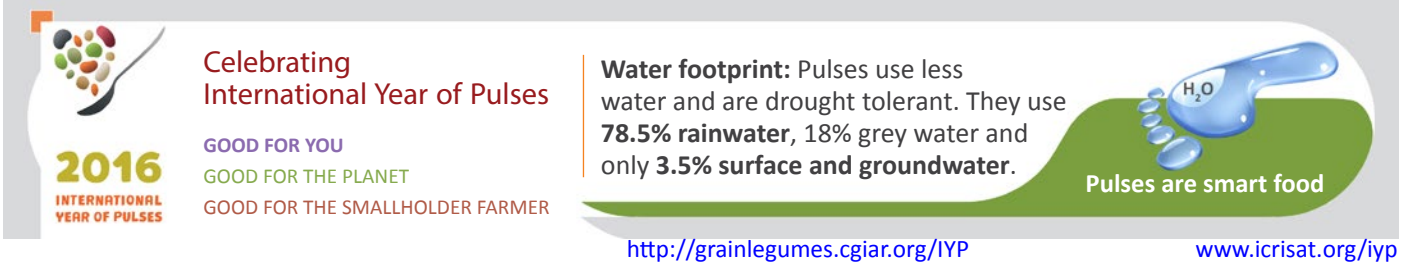
Climate-smart alternatives

In the drylands and in parts of arid and semi-arid tropics where ICRISAT works, pulses are an important crop as there are highly water efficient. They help improve soil fertility by fixing nitrogen and promoting soil microbial activity. Pulses also make a positive contribution in reducing the release of greenhouse gases. They have a lower environmental footprint and can better withstand climate change, thus reducing risk for the smallholder farmer in developing countries.

Farmers growing traditional crops in the semi-arid tropics are going to face much more difficulty because of climate change, heat stress and rising temperatures. Of all the pulses, pigeonpea and chickpea that originated in the dryland tropics are highly tolerant to drought and heat. These two crops stand out in terms of growing in harsh ecological zones.

In view of the potential negative impact of climate change and the restrictions farmers have to face, ICRISAT is pushing its breeding programs to get more of these pulses out in the drier areas.

For more from ICRISAT on the International Year of Pulses, click here. ■ http://www.icrisat.org/iyp/



New publications

Global Cropland Area Database (GCAD) derived from Remote Sensing in Support of Food Security in the Twenty-first Century: Current Achievements and Future Possibilities.

Authors: Teluguntla P, Thenkabail PS, Xiong J, Gumma MK, Giri C, Milesi C, Ozdogan M, Congalton R, Tilton J, Sankey TT, Massey R, Phalke A and Yadav K

Published: 2015. In: Land Resources Monitoring, Modeling, and Mapping with Remote Sensing (Remote Sensing Handbook). Taylor & Francis, Boca Raton, Florida, 01-45.

Abstract: The precise estimation of the global agricultural cropland- extents, areas, geographic locations, crop types, cropping intensities, and their watering methods (irrigated or rainfed; type of irrigation) provides a critical scientific basis for the development of water and food security policies. By year 2100, the global human population is expected to grow to 10.4 billion under median fertility variants or higher under constant or higher fertility variants with over three quarters living in developing countries, in regions that already lack the capacity to produce enough food. With current agricultural practices, the increased demand for food and nutrition would require in about 2 billion hectares of additional cropland, about twice the equivalent to the land area of the United States, and lead to significant increases in greenhouse gas productions.

http://oar.icrisat.org/9224/

Salt-tolerant genes from halophytes are potential key players of salt tolerance in glycophytes.

Authors: Himabindu Y, Chakradhar T, Reddy MC, Kanygin A, Redding KE and Chandrasekhar T

Published: 2015. Environmental and Experimental Botany, 124. pp 39-63. ISSN 0098-8472

Abstract: Salinity is one of the most important abiotic factors, besides drought, extreme temperatures, light and metal stress. The enhanced burden of secondary salinization induced through anthropogenic activities increases pressure on glycophytic crop plants. The recent isolation and characterization of salt tolerance genes encoding signaling components from halophytes, which naturally grow in high salinity, has provided tools for the development of transgenic crop plants with improved salt tolerance and economically beneficial traits. In addition understanding of the differences between glycophytes and halophytes with respect to levels of salinity tolerance is also one of the prerequisites to achieve this goal.

http://oar.icrisat.org/9277/

Xylanase Production by Isolated Fungal Strain, Aspergillus fumigatus RSP-8 (MTCC 12039): Impact of Agro-industrial Material as Substrate.

Authors: Ravichandra K, Yaswanth VVN, Nikhila B, Ahmad J, Rao PS, Uma A, Ravindrababu V and Prakasham RS

Published: 2016. Sugar Tech, 18 (1): pp 29-38. ISSN 0974-0740

Abstract: In the present investigation, the imperative role of agro-industrial biomass for improved xylanase production was evaluated using isolated fungal strain. The study suggested that, in xylanase production by Aspergillus fumigatus RSP-8, one of the major limiting factors is substrate chemical complexity.

http://oar.icrisat.org/9279/

Imputation of single nucleotide polymorphism genotypes in biparental, backcross, and topcross populations with a hidden Markov model.

Authors: Hickey JM, Gorjanc G, Varshney RK and Nettelblad C

Published: 2015. Crop Science, 55. pp. 1-13. ISSN 0011-83X

Abstract: In this research an existing general algorithm for tracing allele inheritance in known pedigrees was modified to enable genotype imputation in specific crosses (biparental, backcross, and topcross) that are common in plant breeding. The extension was tested with a series of representative simulated examples of these crosses. The results show success of imputation is affected by many factors including the number of low-density markers per cM, level of inbreeding or intercrossing of the individuals to have genotypes imputed, level of inbreeding of the parents of a cross, and genome length; but not by the number of high-density markers or by the interaction between the genome length and the number of low-density markers. With as few as one or two markers per 20 cM genotype imputation was successful when parents were inbred. Therefore, genotyping strategies in which inbred parents of a cross are genotyped at high-density and their descendants are genotyped with 200 to 400 markers genome wide may be cost effective and useful in practical plant breeding programs that utilize genomic selection.

http://oar.icrisat.org/9281/

Evolution and impacts of groundnut research and development in Malawi: An ex-post analysis.

Authors: Tsusaka TW, Msere HW, Siambi M, Mazvimavi K and Okori P

Published: 2016. African Journal of Agricultural Research, 11 (3). pp. 139-158. ISSN 1991-637X

Abstract: This study aims to assess the economic impacts of investments in groundnut research and development (R&D) in Malawi, covering the period 1982-2013. Relevant information on investments and changes in outputs was gathered from a range of sources including a smallholder household survey and secondary data provided by international and national agricultural research programs, and non-governmental organizations. The economic surplus approach (the PEDPIS method and the Akino-Hayami method) was employed to compute the internal rate of return (IRR) and the net present value (NPV). It was found that the IRR for the base scenario was 22%, higher than the opportunity cost of capital being 11%, indicating that the investment was competitive as well as profitable.

The NPV ranged from US$204 million to US$206 million, depending on the calculation method. With sensitivity analyses, the NPV remained positive and the IRR stayed above 11% in all scenarios except when the research and extension costs were raised by 50%. The IRR compares well among impacts of crop research in sub-Saharan Africa. The result implies the need for policy formulation towards long-term commitment to developing improved seeds, reinforcement of the seed systems, and enhancement of extension services to smallholders.

http://oar.icrisat.org/9283/

Genome-wide dissection of AP2/ERF and HSP90 gene families in five legumes and expression profiles in chickpea and pigeonpea.

Authors: Agarwal G, Garg V, Kudapa H, Doddamani D, Pazhamala LT, Khan AW, Thudi M, Lee SH and Varshney RK

Published: 2016. Plant Biotechnology Journal. pp. 1-15. ISSN 1467-7652

Abstract: Comprehensive survey identified a total of 147 AP2/ERF genes in chickpea, 176 in pigeonpea, 131 in Medicago, 179 in common bean and 140 in Lotus, whereas the number of HSP90 genes ranged from 5 to 7 in five legumes. This study identified potential candidate genes in response to heat stress in chickpea while for FW and SMD stresses in pigeonpea. For instance, two DREB genes (Ca_02170 and Ca_16631) and three HSP90 genes (Ca_23016, Ca_09743 and Ca_25602) in chickpea can be targeted as potential candidate genes. Similarly, in pigeonpea, a HSP90 gene, C.cajan_27949, was highly responsive to SMD in the resistant genotype ICPL 20096, can be recommended for further functional validation. Also, two DREB genes, C.cajan_41905 and C.cajan_41951, were identified as leads for further investigation in response to FW stress in pigeonpea.

http://oar.icrisat.org/9287/

Tester Effect on Combining Ability and Its Relationship with Line Performance per se for Grain Iron and Zinc Densities in Pearl Millet.

Authors: Kanatti A, Rai KN, Radhika K and Govindaraj M

Published: 2016. Crop Science, 56. 01-08. ISSN 1435-0653

Abstract: Two broad-based and diverse populations of pearl millet [Pennisetum glaucum (L.) R. Br.] were crossed with 14 diverse inbred lines in each of two experiments to produce 56 topcross hybrids, which were evaluated along with their parental lines for grain Fe and Zn densities. Results showed that there was highly significant and moderately high positive correlation between the topcross hybrid performance per se (a measure of GCA) produced with the two testers, both for Fe and Zn densities in both experiments. However, the correlation between performance per se of lines and their topcross hybrids averaged over both testers (giving more reliable estimates of GCA than individual testers) was even higher for both micronutrients and in both experiments. Thus, while each tester was effective in identifying 30 to 35% of the top-ranking high general combiners as reflected in topcross hybrid performance, line performance per se was even more effective in identifying these top-ranking combiners for both micronutrients in both experiments, indicating that based on performance per se lines can be selected for high GCA of Fe and Zn densities in pearl millet.

http://oar.icrisat.org/9288/

Identification of candidate genes for dissecting complex branch number trait in chickpea.

Authors: Bajaj D, Upadhyaya HD, Das S, Kumar V, Gowda CLL, Sharma S, Tyagi AK and Parida SK

Published: 2016. Plant Science. 01-24. ISSN 0168-9452 (In Press)

Abstract: The present study exploited integrated genomics-assisted breeding strategy for genetic dissection of complex branch number quantitative trait in chickpea. Candidate gene-based association analysis in a branch number association panel was performed by utilizing the genotyping data of 401 SNP allelic variants mined from 27 known cloned branch number gene orthologs of chickpea. The genome-wide association study (GWAS) integrating both genome-wide GBS- (4556 SNPs) and candidate gene-based genotyping information of 4957 SNPs in a structured population of 60 sequenced desi and kabuli accessions (with 350–400 kb LD decay), detected 11 significant genomic loci (genes) associated (41% combined PVE) with branch number in chickpea. Of these, seven branch number-associated genes were further validated successfully in two inter (ICC 4958 x ICC 17160)- and intra (ICC 12299 x ICC 8261)-specific mapping populations. The axillary meristem and shoot apical meristem-specific expression, including differential up- and down-regulation (4–5 folds) of the validated seven branch number-associated genes especially in high branch number was apparent as compared to the low branch number-containing parental accessions and homozygous individuals of two aforesaid mapping populations. Collectively, this combinatorial genomic approach delineated diverse naturally occurring novel functional SNP allelic variants in seven potential known/candidate genes [PIN1 (PIN-FORMED protein 1), TB1 (teosinte branched 1), BA1/LAX1 (BARREN STALK1/LIKE AUXIN1), GRAS8 (gibberellic acid insensitive/GAI, Repressor of ga13/RGA and Scarecrow8/SCR8), ERF (ethylene-responsive element-binding factor), MAX2 (more axillary growth 2) and lipase] governing chickpea branch number. The useful information generated from this study have potential to expedite marker-assisted genetic enhancement by developing high-yielding cultivars with more number of productive (pods and seeds) branches in chickpea.

http://oar.icrisat.org/9289/

Smallholder Farmers' Perspectives on Climatic Variability and Adaptation Strategies in East Africa: The Case of Mount Kilimanjaro in Tanzania, Taita and Machakos Hills in Kenya

Authors: Mwalusepo S, Massawe ES, Affognon H, Okuku GO, Kingori S, Mburu DM,

Ong'amo GO, Muchugu E, Calatayud PA, Landmann T, Muli E, Raina SK, Johansson T and Ru BPL

Published: 2015. Earth Science & Climatic Change, 06 (10). 01-09. ISSN 2157-7617

Abstract: This paper examines farmers' perceptions and understanding of climatic variability, coping strategies adopted and factors that influence the choice of a particular adaptation. The study uses cross section data collected from 510 farmers in three mountain gradients sites, namely; Mount Kilimanjaro of Tanzania, Taita and Machakos Hills of Kenya. Farmers' perceptions were compared to actual trend in meteorological records over the last thirty years (1981-2010). The result revealed that farmers in East Africa were partly aware of climate variability, mainly in temperature and rainfall patterns. Many respondents reported that conditions are drier and rainfall timing is becoming less predictable. The perception of farmers on temperature and rainfall were in line with recorded meteorological data, but contrary with that of recorded rainfall in Machakos which was perceived to be decreasing by the farmers. Farmers perceived changes in rainfall and temperature to have negative effects on the production and management of crops. The common adaptation strategies used by farmers include water harvesting, soil conservation techniques and shifting of planting periods. The most important variables affecting farmers choices in regards to adaptation option were, lack of access to credit, farming experience and household size. As a conclusion, there is a need for these factors to be taken into account in the development and implementation of smallholder farmers' adaptation strategies to climate variability in East Africa. Additionally, dedicated capacity building and extensive outreach initiatives on adaptation through governments, researchers, policy-makers and the farmers groups themselves are needed to achieve large scale success.

http://oar.icrisat.org/9290/

Assessment of yield gap in chickpea through improved pulse production and protection technology

Authors: Kathal D, Ghosh R, Sharma M and Rao SK

Published: 2015. International Journal of Management and Social Science Research Review, 1 (17). pp. 66-68. ISSN 2349-6738

Abstract: The Assessment and comparison of yield gap of the demonstrations over farmers practice under IPPPT component. The demonstration was conducted in several village of Jabalpur during year 2008-2011. The average chickpea yield was obtained 16.16 q/ha, which was higher than the farmers practices (11.58 q/ha) and the data observed that max yield potential of chickpea 20.3 q/ha through Improved Pulse Production Protection Technology (IPPPT). The IPPPT programme was effective in changing attitude, skill and knowledge of recent technology for high yielding varieties, balanced dose of the fertilizer and biological disease management of chick pea including their adoption.

http://oar.icrisat.org/9291/

Gene action and combining ability estimates using cytoplasmic-genic male sterile lines to develop pigeonpea hybrids for rainfed condition

Authors: Tikle AN, Sameer Kumar CV, Vijay Kumar R and Saxena KB

Published: 2016. International Journal of Scientific and Research Publications, 06 (01). pp. 502-506. ISSN 2250-3153

Abstract: Pigeonpea is the only food legume where cytoplasmic-genic male sterility is being exploited for commercial use of hybrids. The discovery of stable CMS system and breeding of commercial hybrids in pigeonpea has become a landmark in increasing the productivity of this crop. Keeping in view the combining ability estimates were worked out through Line x Tester analysis of 10 hybrids developed by crossing 2 lines (Males) with five cytoplasmic male sterile (CMS) lines (Females) to know the genetic architecture of yield attributes.

Analysis of variance revealed significant differences among genotypes, crosses, lines, testers and Line x tester interactions for most of the traits. Preponderance of non-additive gene action was realized by higher values of specific combining ability compared to general combining ability. The average degree of dominance were more than unity (>1) and predictability ratio was less than unity (<1) for all the traits, signifying non-additive gene action resulted from dominance, over dominance, epistasis and various other interactions. Hence, heterosis breeding is effective for increasing yield potential of hybrids in pigeonpea. The proportional contribution of testers was observed to be lower than that of line x tester interactions, thus highest estimates of SCA variances. The estimates of GCA effects indicated male parent ICPL 87119 was good general combiner for days to maturity and pollen fertility and among the female parent ICP 2043 was good general combiner. Cross combinations ICP 2043 x ICP 87119, ICP 2048 x ICP 20108, ICP 2078 x ICP 87119 and ICP 2092 x ICP 20108 were found to be good specific combinations for seed yield plant1 and other desirable traits.

http://oar.icrisat.org/9292/

TAKE 2 | Highlights of Science Seminars

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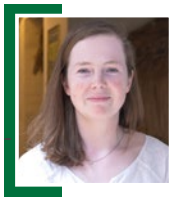
http://www.icrisat.org/icrisat-take2.htm



Wheat pre-breeding at NIAB: from germplasm to genomics.

Dr Alison Bentley *– Programme Leader Trait Genetics, The John Bingham Laboratory, National Institute of Agricultural Botany (NIAB), Cambridge, UK*
https://youtu.be/6NCrQfcSjHo

Accelerating innovation: Rothamsted's Future Science Strategy.

Dr Achim Dobermann *– Director & Chief Executive, Rothamsted Research, UK*
https://youtu.be/c56-nmpU3qw

The Peanut Foundation - Industry Funding of Genomic Research.

Dr Steve Brown *– Executive Director, The Peanut Foundation, Athens, Georgia, USA*
https://youtu.be/3W7GK2GKrDM

Modifications of source-sink relationships lead to enhanced stress tolerance.

Prof. Eduardo Blumwald*, Professor of Cell Biology, Department of Plant Sciences, University of California, Davis, USA*
https://youtu.be/AkFdWnfn-ok

An International Effort in Peanut Genetics and Genomics.

Dr Baozhu Guo *– Research Plant Pathologist, United States Department of Agriculture, Agricultural Research Service, Crop Protection & Management Research Unit, Georgia, USA.*
https://youtu.be/5rSruGB6xJw

Understanding plant response to growth under nitrogen limitation conditions to improve crop nitrogen use efficiency.

Dr Steven Rothstein *– Professor and University Research Chair, Department of Molecular and Cellular Biology, University of Guelph, Canada*
https://youtu.be/jBhfivB67yY

Global Futures and Strategic Foresight: Quantitative modeling to inform decision making in the CGIAR and its partners.

Keith D Wiebe *– Senior Research Fellow, Environment & Production Technology Division, IFPRI, USA.*
https://youtu.be/diBB65C75HY

Can we breed for efficient root system for water and nutrient uptake in crops?.

Prof. Kadambot H.M. Siddique *– Hackett Professor of Agriculture Chair and Director, The UWA Institute of Agriculture, The University of Western Australia, Perth*
https://youtu.be/U-Jtcz30h_E