UNDER THE AUSPICES OF THE MINISTRY OF AGRICULTURE AND FISHERIES MOROCCO

Ministère de l'Agriculture et de la Pêche Maritime

2016 International Conference on PULSES

FOR HEALTH, NUTRITION AND SUSTAINABLE AGRICULTURE IN DRYLANDS

Marrakesh, Morocco, 18-20 April, 2016

CONFERENCE PROGRAM & ABSTRACT BOOK

ICARDA
Science for Better Livelihoods in Dry Areas

INRA

FONDATION OCP

IFAD
Investing in rural people

Food and Agriculture Organization of the United Nations

CGIAR RESEARCH PROGRAM ON Grain Legumes

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AGENDA

Date/Time	Activity	Speaker
April 17, 2016		
17:00-19:00	*Evening registration*	
April 18, 2016		
08:00-08:50	*Registration*	
08:50-10:00	***Conference Opening Ceremony***	
08:50-09:30	*Welcome addresses*	- *Ministry of Agriculture and Fisheries, Morocco* - *FAO* - *Fondation OCP* - *IFAD* - *CRP-GL* - *BOT-ICARDA* - *ICARDA*
09:30-10:00	***KN01:*** *Soil Health and Environmental Management for Sustainable Agricultural Production Systems*	*Rattan Lal, The Ohio State University, USA*
10:00-10:30	***Coffee Break***	
10:30-12:00	***Session 1, Plenary: Global Pulses Scenario – Production, Consumption and Trade*** ***Chair: Périn Saint Ange, Associate Vice-President, IFAD*** ***Co-Chair: Andrew Jacobs, Director of AGT Foods, GPC***	
10:30-11:00	***KN02:*** *Global pulses consumption, production and trade scenario: Trends and Outlook*	*Pramod K Joshi, IFPRI*
11:00-11:30	***KN03:*** *Opportunities for enhancing pulses production to bridge demand-supply gap*	*Mahmoud Solh, ICARDA*
11:30-12:00	***KN04:*** *Status and prospects of pulses in Morocco*	*Nabil Chaouki, Ministry of Agriculture, Morocco*
12:00-13:30	***Panel discussion: Opportunities for bridging demand-supply gap in pulses***	*Representatives from Government, FAO, IFAD, CRP-GL, ICARDA, NARS leaders, private sector(GPC), farmers*
13:30-14:30	***Lunch***	
	CONCURRENT SESSIONS 2 & 3	
14:30 – 16:00	***Session 2: Pulses – Global Health, Nutrition and Gender*** ***Chair: Riccardo Del Castello, Communication for Development officer, FAO*** ***Co-Chair: Nawfel Roudies, Director, ADP, Fondation OCP***	
14:30-15:00	***KN05:*** *Potential of pulses in the context of global health challenges*	*Dilrukhi Thavarajah, Clemson University, USA*
15:00-15:15	***OP01:*** *Alleviating micronutrient deficiency through iron fortification of lentil dal*	*Rajib Podder, University of Saskatchewan , Canada*
15:15-15:30	***OP02:*** *Lupins – a protein crop able to perform in drylands*	*Federico Andreotti, Wageningen University Netherlands*
15:30-15:45	***OP03:*** *Lentil - A dietary solution to Arsenic poisoning in Bangladesh*	*Judit E.G. Smits, University of Calgary, Canada*
15:45-16:00	***OP04:*** *The role of women and the youth in pulses value chains*	*Esther Mwihaki Njuguna, CRP-GL, Kenya*

14:30-16:00	***Session 3: Innovations in Pulses Genomics*** ***Chair: Fred Muehlbauer, Research Geneticist, WSU*** ***Co-Chair: Michael Baum, Director, BIGM, ICARDA***	
14:30-15:00	***KN06:*** *Pulse genomics comes of age*	*Rajeev K Varshney, ICRISAT*
15:00-15:15	***OP05:*** *A role for genetics in the era of vast sequence datasets*	*Noel Ellis, New Zealand*
15:15-15:30	***OP06:*** *The lentil genome – from the sequencer to the field*	*Kirstin Bett, University of Saskatchewan, Canada*
15:30-15:45	***OP07:*** *Genome-wide SNP identification, linkage map construction and QTL mapping of mineral nutrients in pea*	*Rebecca McGee, USDA, USA*
15:45-16:00	***OP08:*** *Deploying genome sequence information for pigeonpea improvement*	*Rachit K Saxena, ICRISAT*
16:00-16:30	***Coffee break and Poster Session***	
	CONCURRENT SESSIONS 4 & 5	
16:30-18:00	***Session 4: Pulses and Natural Resource Management*** ***Chair: Andrew Noble, Deputy Director General (Research), ICARDA*** ***Co-Chair: Abdallah Aboudrar, ENA-Meknes***	
16:30-17:00	***KN07:*** *The next step to increase legume nitrogen fixation: Host plant improvement*	*Thomas R Sinclair, NCSU, USA*
17:00-17:15	***OP09:*** *A plus for pulses: symbiotic nitrogen fixation for sustainable intensification in the drylands*	*Rachid Serraj, CGIAR-ISPC, Italy*
17:15-17:30	***OP10:*** *Soil health, the missing link in sustainable pulses production*	*Ashok K Patra, ICAR-IISS, India*
17:30-17:45	***OP11:*** *Interaction of nitrogen fixation and water use efficiency in chickpeas*	*Carola Blessing, University of Sydney, Australia*
17:45-18:00	***OP12:*** *Phenotypic and genotypic diversity for tolerance to environmental stresses in Rhizobia nodulating lentil and chickpea in Morocco*	*Imane Thami-Alami, INRA, Morocco*
16:30-18:00	***Session 5: Pulses Genetic Resources: Conservation and Utilization*** ***Chair: Shoba Sivasankar, Director, CRP Grain Legumes*** ***Co-Chair: Janny van Beem, GCDT***	
16:30-17:00	***KN08****: Plant genetic resources for climate resilient crop cultivars for food and nutrition*	*Hari D Upadhyaya, ICRISAT*
17:00-17:15	***OP13****: Approaches for efficient conservation and mining of temperate pulses genetic resources*	*Ahmed Amri, ICARDA*
17:15-17:30	***OP14****: Walking on the wild side – expanding genetic diversity for future lentil breeding*	*Bert Vandenberg, University of Saskatchewan, Canada*
17:30-17:45	***OP15****: Mining natural genetic variation from old and new germplasm collections for chickpea breeding*	*R Varma Penmetsa, UC-Davis, USA*
17:45-18:00	***OP16****: Molecular approach for studying genetic diversity and population genetic structure of Asiatic Vigna accessions*	*Aditya Pratap, IIPR, India*
20:00-22:30	***Gala dinner***	

April 19, 2016		
08:30-11:00	***Side Event: Practical Issues in Pulses Production and Marketing in Morocco Organizer: Moroccan Society of Agronomy and Horticulture (SMAHo)***	
08:30-11:00	***Session 6, Plenary: Opportunities for Enhancing Pulses Production Chair: Mahmoud Solh, Director General, ICARDA Co-Chair: Rachid Dahan, Secretary General, INRA***	
08:30-09:00	***KN09:*** *Opportunities and limitations of multidimensional crop improvement in grain legumes to support increased productivity in mixed crop livestock systems*	*Michael Blummel, ILRI*
09:00-09:15	***OP17:*** *Rice fallow – an opportunity for horizontal expansion of pulses*	*Masood Ali, ICAR, India*
09:15-09:30	***OP18:*** *Varietal and seed use of faba bean in Ethiopia: implication for the national seed system*	*Dawit Alemu, EIAR, Ethiopia*
09:30-09:45	***OP19:*** *Increased adoption of modern technologies and competiveness of legumes value chain players through the Private Public Partnership*	*Mphatso Dakamau, AICC, Malawi*
09:45-10:00	***OP20****: Plant-pollinator inter-play in pulses in the context of ecosystem health*	*María José Suso, CSIC, Spain*
10:00-10:15	***OP21****: Ensuring seed security and production of rainfed pulses in semi-arid tropics*	*Ch Ravinder Reddy, MSSRF, India*
10:15-10:30	***OP22****: Pulses suitability assessment for sustainable productivity of drylands of Morocco*	*Rachid Moussadek, INRA, Morocco*
10:30-10:45	***OP23****: Adoption and impact of improved legume varieties in rotation on cereal yield, household income and food self-sufficiency in the Ethiopian highlands*	*Solomon Tiruneh, AARI, Ethiopia*
10:45-11:00	***OP24:*** *Spatial big data analytics for intensification of pulses*	*Chandrasekhar Biradar, ICARDA*
10:30-11:00	***Linking FAO event on Soils & Pulses (Rome) and ICARDA/IFAD event on Pulses (Marrakesh)***	***Eleonora Lago (IFAD) & Mahmoud Solh (ICARDA)***
11:00-11:30	***Coffee break***	
	CONCURRENT SESSIONS 7 & 8	
11:30-13:00	***Session 7: Innovation in Pulses Breeding Chair: Bert Vandenberg, Professor, University of Saskatchewan Co-Chair: Clare Coyne, Research Geneticist, USDA***	
11:30-12:00	***KN10:*** *Enhancing genetic gains through innovations in breeding approaches*	*William Erskine, University of Western Australia, Australia*
12:00-12:15	***OP25****: Transgenics – a way forward for managing key stresses in pulses*	*NP Singh, IIPR, India*
12:15-12:30	***OP26:*** *Exploitation of heterosis for a major breakthrough in pulses*	*CV Sameer Kumar, ICRISAT*
Á12:30-12:45	***OP27:*** *Breeding pulses for nutritional quality with emphasis on bio-fortification*	*Ashutosh Sarker, ICARDA*
12:45-13:00	***OP28:*** *Association mapping for flowering time in lentil*	*Jitendra Kumar, IIPR, India*

11:30-13:00	***Session 8: Innovation in Productivity Management*** ***Chair: Mohamed Badraoui, Director General, INRA*** ***Co-Chair: Masood Ali, Formerly Director, IIPR***	
11:30-12:00	***KN11:*** *Innovations in productivity management of pulses*	*KHM Siddique, University of Western Australia, Australia*
12:00-12:15	***OP29****: Exploring management options to increase pulses production by using simulation models*	*Hélène Marrou, SupAgro, France*
12:15-12:30	***OP30****: Integration of pulses for a more productive cereal systems with lower environmental footprints*	*Yashpal Singh Saharawat, ICARDA*
12:30-12:45	***OP31****: Innovation platform approach and agricultural food legumes value-chain improvement in Morocco*	*El Houssine El Mzouri, INRA-Morocco*
12:45-13:00	***OP32****: Innovative techniques for pulses improvement and adoption of newer technologies with reference to climate change*	*Om Gupta, JNKVV, India*
13:00-14:00	***Lunch time***	
	CONCURRENT SESSIONS 9 & 10	
14:00-15:30	***Session 9: Innovation in Abiotic Stress Management*** ***Chair: Prof. KHM Siddique, Director, Institute of Agriculture, UWA*** ***Co-Chair: Prof. Ahmed Bamouh, Professor, IAV-Hassan II***	
14:00-14:30	***KN12:*** *Impact of high temperature stress on pulses*	*PV Vara Prasad, KSU, USA*
14:30-14:45	***OP33****: Dissecting water saving traits in pulses: efforts and future trends*	*Michel Ghanem, ICARDA*
14:45-15:00	***OP34****: Faba bean improvement towards drought stress through the exploitation of genetic diversity*	*Lamiae Ghaouti, IAV Hassan II*
15:00-15:15	***OP35****: Combined effect of drought and heat stresses is more profound than their standalone effects in chickpea*	*Srinivasan Samineni, ICRISAT*
15:15-15:30	***OP36:*** *Pigeon pea success story in Eastern and Southern Africa: achievements and prospects*	*Ganga Rao NVPR, Kenya*
14:00-15:30	***Session 10: Innovation in Biotic Stress Management*** ***Chair: Rebecca McGee, Research Geneticist, USDA, USA*** ***Co-Chair: Seid K Ahmad, Legumes Pathologist, ICARDA***	
14:00-14:30	***KN13:*** *Integrated management of parasitic weeds to reclaim pulses area in Mediterranean region*	*Diego Rubiales, CSIC, Spain*
14:30-14:45	***OP37****: Management of soil-borne diseases for sustainable pulses production*	*Weidong Chen, USDA, USA*
14:45-15:00	***OP38****: Integrated pest management of food legume insect pests in North Africa, West and Central Asia*	*Mustapha El-Bouhssini, ICARDA*
15:00-15:15	***OP39****: Foliar diseases in food and forage legumes*	*Eva Madrid, Max Planck Institute, Germany*
15:15-15:30	***OP40****: Combating wilt susceptibility in chickpea – a success story and challenges ahead*	*Deep Ratna Saxena, RVSKVV, India*
15:30-16:00	***Coffee break and Poster session***	

16:00-19:00	***FAO Side Event: International Year of Pulses, Regional Dialogue for Africa*** ***Riccardo Del Castello, FAO*** ***Contd….. on April 20, 2016***	
16:00-18:00	***Panel Discussion: ICARDA Research Strategy***	***Kamel Shideed, ICARDA***
20:00-22:00	***Dinner***	
April 20, 2016		
08:30-13:00	***Session 11: Toward Sustainable Food Production Systems in Drylands*** ***Chair: Kamel Shideed, Assistant Director General (IC), ICARDA*** ***Co-chair: Mohamed El Gharous, PM6P***	
08.30-8.40	*Introduction*	*Kamel Shideed, ICARDA*
08:40-10:00	***A: Knowledge Sharing – Country Successes, Lessons Learnt & Challenges Ahead*** *(7 minute lightening presentations by country NARS and project leads)*	
08:40-09:25	*India-Morocco Food Legumes Initiative*	*SA Patil, Advisor, Fondation OCP, India*
	Morocco	*Dahan Rachid, INRA*
	India	*Ch Ravinder Reddy, MSSRF*
	Bangladesh	*Mohd Omar Ali, BARI*
	Nepal	*Yam Pandey, NARC*
09:25-10 :00	*Strengthening Wheat-Legumes Systems in West Asia & North Africa*	
	Egypt	*Mohamed Solomon, FCRI*
	Sudan	*Gamal Elkheir Khalifa Ismaeel, ARC*
	Tunisia	*Mohamed Salah Gharbi, INRAT*
	Morocco	*Hamida Hilali, INRA*
	Ethiopia	*Asnake Fikre, EIAR*
10:00-10:30	***Coffee break***	
10:30-12:00	***B. Achieving Diversification & Sustainable Intensification of Cereal Based Systems with Pulses***	
10:30-11:30	*Thematic Roundtables: Facilitated by Andrea Gros and Rajita Majumdar, ICARDA*	
11:30-11:50	*Presentation on roundtable outcomes*	
12:00-13:00	***Joining Hands on a Practical Path Forward: Science, Policy, Institutions & Markets*** ***Chair: Philippe Ellul, CGIAR Consortium***	
12:00-12:20	*Call for votes and recommendations*	
12:20-12:30	*Concluding Remarks*	*Philippe Ellul, CGIAR Consortium*
12:30-13:00	*Media Q&A/Open floor*	
	Vote of Thanks	
13:00-14:00	***Lunch***	


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proteins showed that the control has a slightly higher protein level when compared to other treatments. Manganese resulted in higher proteins content in straw, but the protein content of the seeds was not influenced by any treatment. We conclude that under dry land farming, applying zinc and manganese fertilization alone or combined could improve lentil productivity through the increase of yield components, harvest index, grain yields but the results have not confirmed what is mentioned by the literature on the effect of zinc on improving protein. This could be due to weather conditions that limited the availability of zinc to the plant.

PP149: *Lupinus angustifolius* seed proteins as food ingredient: human health benefits and cross-allergenicity implications

Jose C Jimenez-Lopez

Spanish National Research Council (CSIC), Cordoba, Spain * (josecarlos.jimenez@eez.csic.es)

Now-a-days, considerable interest has been focused towards legume seed proteins. Narrow-leafed lupin or NLL (*Lupinus angustifolius* L.), a legume crop belonging to the Fabaceae family, is a worldwide important pulse, which displays a wide range of benefits for agriculture, acting as a disease break for crops in rotation, and at molecular level, lupin seed proteins may also be involved in possible plant pathogens suppression. Therefore, NLL, with low content in alkaloids, is attracting great attention lately because of their nutritional attributes and human health benefits. These properties are associated to the high protein, dietary fiber content, absence of gluten, helping to reduce blood pressure the risk of cardiovascular disease, and contributing to reduction of glucose and cholesterol blood levels. NLL as an important source of proteins for human consumption, seems to be particularly promising as a source of innovative food ingredients due to average protein content similar to soybean and an adequate composition of essential amino-acids. However, and with the rapid introduction of novel foods and as a new ingredients in traditional foods, the number of allergic people becoming a serious and a growing problem in the Western world. The aim of the current work was to evaluate different functional features of NLL seed proteins, focusing on their health promoting properties and allergy. Our results indicate that particular seed proteins might be potential new bioactive molecules with antioxidant, anti-inflammatory and anti-diabetic activities, opening the gate for possible plant-based prevention, management and therapeutic approaches to the world main health concern and increasing disease diabetic epidemics. It also highlight multiple forms of polypeptides with IgE-binding characteristics in patients with lupin specific allergy, having the potential to trigger an immune response leading to allergy symptoms. The comparison of the IgE-binding to several legumes and nuts/seeds proteins has allowed us to get an overall broad picture of the immunological cross-reactivity among proteins of widely used different seed species and to hypothesize the role of the most conserved specific polypeptides. Based on current molecular data, lupin allergy might be more complicated than previously thought because of the involvement of a large number of polypeptides.

PP150: Cultivar-dependent variation in lentil (*Lens culinaris* L.) and implications for selecting food-feed varieties

Jane Wamatu*, Asemahegn Mersha, Ashraf Alkhtib, Million Eshete, Seid Ahmed Kemal, Adugna Tolera, Mohammed Beyan, and Barbara Rischkowsky

International Center of Agricultural Research in the Dry Areas (ICARDA), Addis Ababa, Ethiopia.
*(j.wamatu@cgiar.org)

Lentil straw is one of the extensively used livestock feed in mixed crop-livestock systems in Sub-Saharan Africa. To identify the importance of varietal and environmental sources of variation in the nutritive

value of straw for livestock feed, 71 genotypes of lentil were evaluated for straw fodder quality and their potential trade-offs with straw and grain yield. Straw fodder quality traits chosen were crude protein, in-vitro digestibility and in-vitro metabolisable energy content, analyzed using a combination of conventional laboratory techniques and Near Infrared Reflectance Spectroscopy (NIRS). Results from eight trials across three sites using randomized complete block design showed highly significant genotypic variation in grain and straw yields as well as in straw fodder quality traits. A positive correlation between grain yield and straw yield was observed ($r=0.55$, $P<0.01$). The correlation between crude protein of the straw and grain yield was strong and negative ($r=-0.73$; $P<0.01$), the correlations were weak and negative between grain yield and total in-vitro organic matter digestibility ($r=-0.12$; $P<0.01$) and between grain yield and metabolisable energy ME ($r=-0.03$; $P>0.05$). Crude protein can, therefore, be considered as an important criteria for varietal selection for food-feed traits. The study pinpoints to the possibility of incorporating straw traits to generate food-feed varieties of lentil to address the high demand for grain and livestock fodder in the mixed crop-livestock farming system of Ethiopia.

PP151: Variation in the straw traits of morphological fractions of faba bean and implications for selecting for food-feed varieties

Ashraf Alkhtib*, Jane Wamatu, Teklu Wegi, and Barbara Rischkowsky

International Center of Agricultural Research in the Dry Areas (ICARDA), Addis Ababa, Ethiopia.
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Five varieties of faba bean (four improved released varieties and one local variety) were investigated for varietal variation in straw yield, nutritive value of straw morphological fractions and grain yield. Samples of the whole plant biomass were collected and separated into grain and straw. The straw was further divided into leaves, stems and pods. Straw samples were analyzed for their chemical composition (CP, NDF, ADF, ADL, TIVOMD) and ME. The PUI was employed to rank the varieties. The results demonstrated significant varietal variation in grain yield, straw yield and in the proportions of botanical fractions of straw, grain yield and straw yield. The improved varieties were superior to the local variety in grain yield, straw yield and PUI. The local variety had the highest proportion of stem and the lowest proportion of leaf and pods. Significant varietal differences ($P<0.001$) were detected in TIVOMD, ME, NDF, ADF and ADL of whole straw. The leaves showed the highest TIVOMD and content of CP, while pods were highest in ME. Canonical correlation analysis showed significant ($P<0.001$) correlations between the nutritive value of the whole straw and the nutritive value and proportions of its botanical fractions. Grain and straw yields were positively, strongly and significantly ($P<0.001$) correlated. Weak correlations were detected between the grain yield and straw quality traits. Ranking the varieties differed when the grain yield, straw quality scores and PUI were considered. However the weak correlation existed between straw quality, including straw quality index or PUI to select food-feed varieties of faba bean. These findings indicate the possibility of selecting faba bean varieties which combine superior grain and straw traits.

PP152: Lentil seed quality as influenced by environmental factors

Renuka Shrestha*, Shiv Kumar, Albert Vandenberg, Ashutosh Sarker, Rajendra Darai and Dhan Bahadur Gharti

Nepal Agricultural Research Council, Nepal; International Center for Agricultural Research in the Dry Areas (ICARDA), Rabat, Morocco. *(renuka.shrestha@gmail.com)

Field experiments consisting of eighteen lentil genotypes were evaluated at research stations under Nepal Agricultural Research Council located at varied agro-ecological zones with the elevation ranging from