during 2008, 2009, 2010 and 2011 *kharif* seasons, at Birsa Agricultural University research plot, in a Completely Randomized Block Design with three replications. Each plot consisted of four rows of 5 m length, spaced 45 cm apart with interplant distance of 15 cm. Varieties were evaluated for 21 characters. These descriptors were recorded as per IBPGR (IBPGR, 1992). This is essential for their protection under Plant Variety Protection legislation, because varietal testing for Distinctness, Uniformity and Stability are the basis for granting protection of new variety under PPV&FR Act, 2001. All the varieties showed similar expression for each character over the years depicting the stability of varieties. None of the attribute showed intra-varietal variation. On the basis of 21 descriptors, varieties were grouped into different categories for each character and may be used as reference varieties. All the varieties of determinate type *viz*., Birsa Urid 1, G 338, Pant U 19, Pant U 30, Pant U 31, T 9, UG 218 and Uttara were also erect in growth habit. Varieties like Birsa Urid 1, CO 5, LBG 17, LBG 20, LBG 402, LBG 611, LBG 623, LBG 645, LBG 648, LBG 685, Mash 1, Mash 2, Mash 414, Naveen, Pragaya, Sekhar U3 and Uttara were of ovate leaflet (terminal) shape types.

PP75: Genotype by environment interaction of some faba bean genotypes under diverse broomrape environments of Tigray, Ethiopia

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Advanced breeding lines with acceptable resistance and tolerance levels to broomrape is an important way of decreasing yield losses to small holder farmers. The objective of this research was to assess the yield stability of faba bean genotypes under diverse broomrape (*Orobanche crenata*) prone production environments. Six faba bean genotypes (ICARDA source) were tested across six environments. The AMMI analysis showed significant ($P<0.01$) genotype, environment and genotype by environment interaction and the environment explained higher sum of square for the response variable grain yield. The AMMI one gives the best model fitness for the grain yield and broomrape number. Using the AMMI 1 biplot, polygon view of the GGE biplot and comparison of genotypes based on ideal genotype**,** the genotype ILB4358 (cv. HASHENGE released in 2015) gave high yield (>3.5 t ha^{-1}) and stable with low Orobanche number followed by the genotype Sel.F5/3382/2003-4. Using the AMMI biplot analysis E3 (Adigolo, 2011) and E4 (Adigolo, 2012) were unfavorable environments, while, E1 (Awliegara, 2011), E2 (Awliegara,), E5 (Kolatsihidi, 2011) and E6 (Kolatsihidi, 2012) were favorable testing environments.

PP76: Molecular diversity and mapping towards enhanced valorization of lentil genetic resources and marker-assisted selection for efficient cultivar development

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Lentil (*Lens culinaris* Medik.) is an important crop for sustainable farming thanks to its ability to fix the atmospheric nitrogen enhancing soil fertility and allowing substantial reduction in fertilizer use. Recently, DNA markers have been deployed in Moroccan lentil breeding program aiming molecular diversity analysis of local landraces, molecular tagging of agronomic traits and towards marker-assisted breeding. For instance, 19 Simple Sequence Repeats (SSR) and seven primer combinations of Amplified Fragment Length Polymorphism (AFLP) markers were successfully used to characterize Moroccan

landraces of lentil. Genetic differentiation according to agro-environmental origins (dry areas, highlands and favourable areas) was demonstrated allowing oriented selection of genotypes to be included in breeding programs. Landraces from dry areas especially those originating from Jemaat Shaim would result in greater genetic gain for drought tolerance, while landraces from highlands (middle Atlas mountains) would result in greater genetic gain for cold tolerance. Furthermore, genetic evidence for the differentiation of 'lentils of Ain Sbit' as a local product quality mark (*produit de terroir*) were obtained, thus offering efficient tools for enhanced valorization and for the protection of this landrace for the benefits of local farmers. Also, a number of SSR and AFLP alleles that were identified to be linked with drought tolerance could differentiate landraces according to their response to drought stress. These alleles could be used in marker-trait association studies. On the other hand, important molecular markers including Single Nucleotide Polymorphism (SNP) were identified to be associated with quantitative trait loci related to root and shoot traits conferring drought tolerance in a recombinant inbred line population. Also the previously developed genetic linkage map related to this population was enhanced using a combination of co-dominant and dominant markers. The use of the identified DNA markers in the lentil breeding program would result in a more efficient cultivar development and enhanced valorization of genetic resources.

PP77: Pulse crops in Georgia

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The article discusses the study and practical application issues of pulse crops in Georgia. It is highlighted that pulse crops, such as, bean, soybean, chickpea, lentil, faba bean and others play an important role in providing the population with food supply. Also the pulse crops significantly improve the yield of agricultural crops by accumulating nitrogen in the soil. The following issues are dealt in the article: genetic resources of pulse crops in Georgia, the spread of the most important crops in the country, its agricultural importance, pests and diseases, and the measures to control them.

PP78: Responsiveness of chickpea to climate change

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Appropriate changes in the genetic options are needed to cope up with the changing climate and farming system to ensure food security and sustainable cereal production for the ever growing populations in developing world. Among the food legumes, chickpea is one of the key commodity for nutritious food-basics with high protein contents and is consumed by large population of across the Mediterranean and South Asia regions in various forms. Knowledge of the association of chickpea yield with the climatic factors is important in identifying and modifying the climate resilient traits of chickpea. Using systematic research data collected from 1996-97 to 2013-14 at Tel Hadya, Syria and Terbol, Lebanon on grain yield, potential yield estimated from the response of highest yielding genotype, and yield from the local checks, correlations were made and the result showed that the average May maximum daily temperature was the most influential factor on the average yield productivity as well as the potential productivity chickpea genotypes. An additional variable which improved the prediction model was number of frost days during March for average yield and average minimum temperature during April for the potential yield.