OP14: Walking on the wild side - expanding genetic diversity for future lentil breeding

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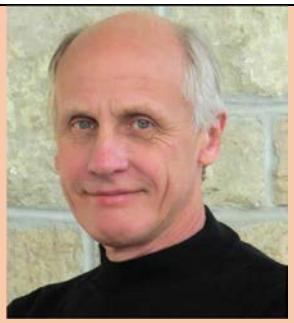

Albert Vandenberg is a professor and NSERC Industrial Research Chair on Lentil Genetic Improvement at the University of Saskatchewan. He has been actively conducting research on genetics and breeding of lentils since 1983. During his tenure, Canada has expanded its lentil production from 24,000 acres in the 1980s to 3 million acres in 2014, with more 90% of the production coming from Saskatchewan. Canada has become the world's largest producer and exporter of lentils, a crop that is expanding in per capita consumption around the world. Dr. Vandenberg is a leading influence in the Canadian pulse industry and has been instrumental in the development and commercialization of varieties of many pulse market classes. Dr. Vandenberg is engaged in many aspects of pulse crop research, including genomics, agronomy, processing and utilization, and human nutrition. In 2013 he received the Global Pulse Industry Award for Excellence from Confédération Internationale du Commerce et des Industries des Légumes Secs - International Pulse Trade and Industries Confederation (CICILS-IPTIC), the peak body for the world's pulse crop industry.

Systematic use of genetic variability through judicious use of diverse germplasm maximizes genetic gain per generation, and therefore, maximizes economic value of the crop. Sometime, however, the required genetic variation is simply not to be found in the cultivated germplasm. Under these circumstances, breeders may consider the use of wild relatives. The genus Lens consists of the cultivated *L. culinaris* plus six wild species. Wild relatives of lentil represent a rich source of resistance to both biotic and abiotic stresses, yet very little is known about them. The lentil research and breeding group at the University of Saskatchewan has been studying cultivated lentil and its wild relatives for the past two decades and has generated a wealth of cultivated x wild genetic resources, some of which have already shown utility in the breeding program. In the past few years we have worked with several international partners (Spain, Turkey, Morocco, Bangladesh, and Ethiopia) to phenotype promising individuals from three inter-specific populations (two *L. culinaris* x *L. ervodies* and one *L. culinaris* x *L. orientalis*) under several biotic and abiotic stresses. Over the next few years we plan to phenotypically and genotypically characterize the genetic variability available within the primary and secondary gene pools of genus Lens to determine the genetic basis of domestication and adaptation characteristics. Tools will also be generated for tracking introgressions from wild genomes into the cultivated one. The goal is to develop breeder-friendly resources for tracking key domestication genes, response to photoperiod, temperature and light quality, and generate resources and tools to allow breeders to better use exotic germplasm and wild relatives while reducing any negative impacts. It is anticipated that results of our work will contribute to lentil genetic improvement, conservation of biodiversity, and global food security.