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Editorial

For over a century, there has been a virtually unbroken trend in favour of increasingly intensive use of industrially synthesized nitrate fertilizer and against the traditional inclusion of legumes as drivers of the nitrogen cycle in agricultural production systems. While this has enabled world's population to more than double during the same period, it has come at significant cost to the global greenhouse gas inventory and freshwater quality (Erisman *et al*., 2008). Since it is projected that the intensity of agricultural production to feed world's 7.5 billion-plus mouths will continue to increase for the foreseeable future, legume crops, more than ever, hold the key to sustainable agricultural systems and balanced diets for the twenty-first century (Foyer *et al*., 2016). However, re-balancing agricultural inputs and rethinking our diets is not as simple as turning back the clock to how things were done at the beginning of the twentieth century. To fulfil their peerless potential to sustainably feed a growing population, diverse legumes and legume-derived foods tailored to modern tastes and expectations of convenience are needed to drive increased demand; while on the supply side, legumes that are more productive and resilient to climate change are needed to drive uptake by farmers. It is not just the socio-economic backdrop which is changing; scientific advances offer new opportunities to meet these grand challenges. It is in this context that Plant Genetic Resources has decided to highlight research on legume genetic resources by means of a special issue. New opportunities for more effective exploitation and accelerated breeding of this important group of crops include: the advent of sequenced genomes for a growing number of grain, forage and model legume species; the introduction of powerful new multi-parent mapping strategies and genomic selection methodologies, ever-falling genotyping costs and new phenotyping technologies, and each of these areas impinge on the characterization and utilization of PGR.

In this thematic issue, we wish to highlight recent progress in the development and characterization of genetic resources that will pave the way for rapid progress in the discovery and genetic dissection of novel legume traits needed to improve yield, optimise quality and nutritional value as well as mitigating yield losses due to pests, pathogens and climate change. These pages feature research articles covering a pleasing diversity of legume species – faba bean, groundnut, pea, lentil and mungbean, while genetic resources of a fascinating but under-utilized forage legume – sainfoin – are introduced by way of a timely review (Mora-Ortiz and Smith, 2018).

Major new population resources are announced in these pages – of particular note are three interconnected elite pea recombinant inbred line (RIL) populations using founders representing the major genetic pillars of the elite European pea genepool (Moreau *et al*., 2018) and a large RIL population from a diverse four-way faba bean cross (Khazaei *et al*., 2018b). The serendipitous co-existence of a number of traits of interest embodied in a single faba bean accession – ILB938/2 – provides the impetus to document its origin, pedigree and phenotypic characteristics in greater detail (Khazaei *et al*., 2018a), while the diversity embodied in a single Greek lentil landrace holds equally fascinating insights (Tsanakas *et al*., 2018). Smart screening strategies that illustrate how *existing* legume genetic resources can be fully valorized are also found here; notably, improved iron deficiency chlorosis responses are found in a groundnut mini-core collection screened using physiological proxy measurements (Pattanashetti *et al*., 2018), water-use efficiency traits evaluated in diverse lentil wild relatives (Gorim and Vandenberg, 2018), and valuable resistance to preharvest sprouting in mungbean (Lamichaney *et al*., 2018).

Finally, somewhat exceptionally for PGR, in acknowledgement of the fact that we stand on the shoulders of giants, and to inspire a new generation of legume researchers, we commemorate the life's work of two 'giants' – Jean Picard and David Bond – who sadly are no longer with us but memories of whom are fondly cherished by those who knew them (Duc and Stoddard, 2018).

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