

## In this Issue

This issue of *Plant Genetic Resources: Characterization & Utilization* comprises eight full research papers and three short communications. As usual, the range in topics is very wide, ranging from the medicinally important woody climber *Morinda* to major crop species such as sorghum and groundnut.

### Full research papers

#### **Diversity and geographical gaps in *Cajanus scarabaeoides* (L.) Thou. germplasm conserved at the ICRISAT genebank**

Upadhyaya *et al.* address the common problem faced by *ex situ* curators of identifying gaps in a collection to improve coverage of the global variation available. Their focus is on *Cajanus scarabaeoides*, a wild, crossable relative of pigeonpea which harbours some beneficial traits. The assessment of the 100 accessions maintained at the ICRISAT genebank showed that the accessions were polymorphic with respect to most of the quantitative and qualitative traits analysed. The species is seen as a source of genes for precocious flowering and early maturity, as well as high seed number per pod and number of pods set. The natural distribution of *C. scarabaeoides* is rather similar to that assumed for pigeonpea. Geographical gaps in the collection were identified across the full range of the species' distribution in South and South-East Asia.

#### **Distribution of downy mildew (*Bremia lactucae* Regel) resistances in a genebank collection of lettuce and its wild relatives**

Genebanks can represent a major store of genetic diversity useful for crop improvement, but van Treuren *et al.* point out that it is usually necessary to conduct large screens to identify material of breeding interest. They document here the distribution among 1223 accessions of cultivated lettuce and 14 related wild species of resistance against 28 races of downy mildew. Directed breeding has succeeded in generally raising the level of resistance to this disease, with the result that the chances of finding novel genes are now much greater among wild material than in the primary gene pool. *Lactuca serriola*, a very close relative of cultivated lettuce, appeared to represent a particularly good source of downy mildew resistance, especially in accessions originating from Eastern Europe and Northern Asia.

#### **Screening of wild and cultivated lentil germplasm for resistance to stemphylium blight**

Podder *et al.* report their search for resistance against stemphylium blight among commercial lentil cultivars and closely related wild species. Their screen of 70 accessions, including several *Lens* species, involved exposing the material to a highly aggressive pathogen isolate under both growth room and greenhouse conditions. Most of the cultivated accessions were susceptible, but >70% of the wild material performed as well, if not better than the resistant check variety 'Eston'. Some of the wild species accessions that had already been typed as resistant against anthracnose and ascochyta blight were also highly resistant to stemphylium blight. The highest frequency of resistance was in *L. lamottei* followed by *L. ervoides*.

#### **Correspondence between genetic structure and farmer's taxonomy – a case study from dry-season sorghum landraces in northern Cameroon**

Soler *et al.* assess the genetic structure underlying landrace diversity in two types of dry-season sorghum collected in two villages in northern Cameroon. The aim was to establish a link between the classification given by the producers and the genotype. The study compared clustering based on a Bayesian method (STRUCTURE) with the more recently developed DAPC method, based on combining principal component analysis with discriminant analysis. The landraces showed a strong genetic structure, which matched with the morphological classification given by the producers.

#### **Genetic diversity among INERA-Mulungu (DR Congo) *Musa* spp. germplasm and their relatedness with those in Tanzania using numerical taxonomy**

A diversity study of banana and plantain accessions curated at the INERA-Mulungu genebank in the DRC (a secondary centre of plantain diversification) was conducted by Nzaweze *et al.* Based on numerical morpho-taxonomy (32 vegetative and 66 reproductive traits), 37 distinct clones were identified. The nine subgroups represented were AAB-Silk, AAB-Pome, AAB-Plantain, AABP-Pisang Awak, AAA-Cavendish, AAA-Ibota, AAA-Gros Michel, AAA-Green-Red and AAA-Lujugira-Mutika. A number of probable duplicates were

identified, and some conclusions were reached regarding pedigree relationships.

**Portable search engine for registered crop germplasm: a new concept for enhancing access to information on plant genetic resources**

Archak and Kumar have developed a search engine relevant for crop germplasm which can operate both online and off-line. Raw data are converted from an MS-Excel to an XML-data format, which is suitable for querying search terms based on a looping regular expression matching. The concept has been implemented in the form of an 'Inventory of registered crop germplasm' on the Web as well as on a portable memory (CD or flash drive). The search engine works with minimal hardware and software requirements to enable its widespread utility and so to ensure greater access to information regarding registered crop germplasm.

**Geographical distribution and phenotypic diversity of wild/weedy sorghum [*Sorghum bicolor* (L.) Moench] in Ethiopia: implications for germplasm conservation and crop-wild gene flow**

Gene flow between wild and cultivated *Sorghum bicolor* in a region of Ethiopia where wild and cultivated forms co-occur has been analysed by Adugna and Bekele. Their assessment was based on variation in both quantitative and qualitative characters in 30 populations sampled from five geographical regions and eight agroecologies. A high level of phenotypic diversity was observed among the populations, particularly in the warm semi-arid lowland agroecologies. The subspecies *verticilliflorum* and *drumondii* were present in diverse habitats throughout northern and central Ethiopia. In some areas, weedy types displayed domestication traits such as the absence of awns and reduced seed shattering. The existence of morphologically intermediate forms was taken to indicate the likelihood of gene flow between cultivated and wild forms, and thus it was concluded that deploying transgenic sorghum would pose a risk for transgene movement into wild Ethiopian populations.

**Phenotypic evaluation of the Chinese mini-mini core collection of peanut (*Arachis hypogaea* L.) and assessment for resistance to bacterial wilt disease caused by *Ralstonia solanacearum***

Jiang *et al.* suggest that the core collection (576 accessions) and even the mini-core collection (298 accessions) of groundnut assembled by the Chinese Academy of Agricultural Sciences are too unwieldy to efficiently evaluate and characterize diversity at the level of agronomic and

disease resistance traits. They therefore have developed a mini-mini core collection of 99 accessions based on the consideration of 21 morphological traits. A comparison between the core set and the mini-mini core set showed that the latter was fully representative for 20 out of the 21 traits. When the mini-mini core collection was assessed for resistance to bacterial wilt disease, two accessions showing high levels of resistance were identified.

**Short communications**

**Collection, characterization and olfactory evaluation of *Pandanus* species in Southern India**

Zanan and Nadaf report a survey of the *Pandanus* species endemic to the coastal regions of Southern India. The fragrance of the staminate inflorescences of the seven species identified was compared with those of the commercial species *P. odorifer*. A number of these Indian species were shown to produce a quality of fragrance which could be exploited commercially in the form of essential oil.

**Anthocyanin indexes, quercetin, kaempferol and myricetin concentration in leaves and fruit of *Abutilon theophrasti* Medik. genetic resources**

Variation for the leaf and fruit content of anthocyanin, quercetin, kaempferol, and myricetin (potential sources of medicinal or nutraceutical products) in velvetleaf (*Abutilon theophrasti* Medik) was explored by Morris and Wang. A panel of 42 accessions was analysed using reverse-phase HPLC. Some of the traits were correlated with one another.

**Molecular distinction of two closely resembling *Morinda* species using rbc L and mat K loci for quality management of Indian herbal medicines**

*Morinda reticulata* and *M. umbellata* are both medicinally important woody climbers native to the southern Western Ghats in India. Their close morphological resemblance can cause confusion, which is problematical when the plant material is used for the formulation of herbal medicine. Authentication based on variation in DNA sequences is seen as a means of avoiding misidentification. Nair *et al.* report the development of an assay based on genes encoding a maturase kinase and the large subunit of ribulose 1,5-bisphosphate carboxylase able to distinguish between the two species.

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