

Role of Plant Introductions in Varietal Development of Pulses in India

Masood Ali, Sanjeev Gupta, BB Singh and Shiv Kumar

Indian Institute of Pulses Research, Kanpur, Uttar Pradesh

Plant Introduction is the oldest and simplest method of breeding as well as an effective mean to overcome the narrow genetic diversity observed in certain parts of the world. Over a period of time several promising introductions in pulses were made in India from different countries. A total of 11 exotics of chickpea, 2 of pigeonpea, 10 of mungbean, two of lentil, three of Rajmash and three of fieldpea have contributed in the development of 51 cultivars of different pulse crops released in India. Chickpea variety , Pragati, was the outcome of the direct introduction of Cyprus local. Besides, 16 cultivars of chickpea released in India have been developed through utilization of exotic germplasm as an immediate parent in their pedigrees. Some of these varieties are Pusa 261, Pusa 244, Pusa 267, C 104, L 550, L 144, BG 1003, BG 1053, Phule G 12, BG 391, Gaurav and BGD 72. Pigeonpea cultivar, Hy 3C was a secondary selection from exotic line PI 2817-2. Another exotic line Brazil 1-1 has been used as a source of earliness in pigeonpea, which, in combination with NPWR 15, NP 41 and NP 69, has led to the development of early maturing varieties Mukta, Sharad and Pusa Ageti. Promising introductions were extensively utilized in the development of at least seventeen popular cultivars in mungbean. Pusa Vishal, a selection from

AVRDC accession NM 2, released for NWPZ has been becoming popular because of its large seed size (6 g/100 seed weight). Selections made from exotic material introduced from China and Iran have led to the development of Shining Moong 1 and PS 16, respectively. These selections were widely used in crossing programme and subsequently few superior cultivars such as KM 1, Sunaina and RMG 62 were released. Introduction of an early , rust resistant macrosperma line , Precoz, from Argentina has accelerated microsperma x macrosperma crosses in lentil resulting in the development of NDL 1 and DPL 58. Rajmash cultivar Uday was selected from exotic germplasm , EC 94453 introduced from Bulgaria, while Amber and Utkarsh were selected from Columbian accessions, ET 8447 and EC 400431, respectively. The pea variety, Hans was a mutant of L 116, an exotic accession from Sweden , and Harbhajan was a selection from exotic line, EC 33866. Exotic pea accessions for useful traits viz., resistant to pea mosaic virus (EC 271572), resistant to powdery mildew (EC 322745 and EC 381853), tolerant to drought (EC 389374) are yet to be exploited in pea improvement programme. Access to unique and potential valuable germplasm is key to sustained pulse improvement programme.

Plant Introductions in Soybean-Achievements and Opportunities

SP Tiwari

Assistant Director General (Seed), Indian Council of Agricultural Research, Krishi Bhawan, New Delhi-110 001

Soybean presently covers about 7 million hectares in the country and significantly contributes towards agrarian economy and farm-prosperity. Although soybean has originated in China, the north-eastern region of the Indian sub-continent has a degree of endemic variability. The earlier soybean introductions have been owing to propinquity of these areas with China. Early varieties like Punjab White/ Punjab-1 and a host of strains grouped under Bhat/ Bhatmash/ Kali Tur are also part of this

endemic variability. These have saved the Indian soybean variability from the founder-effect as, later, most of the yellow-seeded varieties and strains of soybean in India have been introduced via USA. Several important genes such as those for resistance to yellow mosaic virus and other diseases, nutritional characteristics, photosensitivity, long-juvenility etc. have been introduced in India, mainly from USA followed by Taiwan, Brazil and other countries. Of late, a sizable number of black-

seeded soybean varieties of Indian provenance have been repatriated from USDA, USA. The introductions particularly for specific genes of interest have helped in bringing about a renaissance of this ancient crop of northern India into a commercial crop of the country.

Opportunities exist to further have directed-introduction for several traits and genes of interest which were hitherto unimportant but are presently assuming significance such as those for food and nutritional quality, lack of anti-nutritional factors etc.

Introduction and Management of Groundnut Germplasm in India

K Rajgopal and MS Basu

National Research Centre for Groundnut, PB No. 5, Ivnagar Road, Junagadh-362 001, Gujarat

Groundnut (*Arachis hypogaea* L.), which is a premier oilseed crop is cultivated in more than 100 countries, spread across 40°N and 40°S latitudes. The crop is grown in about 24 m ha with a total production of 31 m tones and productivity of 1304 kg ha⁻¹. Groundnut occupies about 35 % of the area and 40 % of the production among the oilseed crops, and is being cultivated in 7.6 m ha producing about 7.8 m tonnes (nuts in shell) with productivity of about 1000 kg/ha.

The genus *Arachis* L. includes both diploid and tetraploid taxa confined to South American countries viz., Argentina, Bolivia, Brazil, Paraguay and Uruguay. The cultivated groundnut is believed to be originated in northern Argentina and southern Bolivia. Prior to early 1500, groundnut was not known outside the Americas and worldwide distribution of two seeded and three seeded forms took place soon after the discovery of New World. The groundnut moved up the west coast from Peru to Mexico and then across the pacific to Philippines. The introduction of groundnut to African agriculture is accredited to Portuguese. The earliest form successfully introduced into southeastern United States was probably from Africa. Groundnut was introduced to India in the east coast of the erstwhile Madras Province in the middle of 19th century and assumed agricultural importance in the late 19th and early 20th centuries. It was surmised that groundnut was introduced to India from Manila (Philippines). Presently about 90 per cent of the total production of India is shared by Andhra Pradesh (27 percent), Tamil Nadu (23.4 percent), Gujarat (17.2 percent), Karnataka (13.8 percent) and Maharashtra (8.3 percent).

Arachis hypogaea is placed under the family Fabaceae, tribe Aeschynomeneae and subtribe Stylosanthinae. The

genus is divided into nine sections (Krapovickas and Gregory 1994) viz., *Arachis*, *Caulorhizae*, *Erectoides*, *Extranervosae*, *Heteranthae*, *Procumbentes*, *Rhizomatosae*, *Trierectoides* and *Triseminatae*. The section *Arachis* comprises the cultivated groundnut, tetraploid species *A. monticola* and a number of diploid wild species. Among the cultivated forms, subspecies *fastigiata* has been divided into four botanical varieties, *fastigiata*, *peruviana* Krapov and WC Gregory, *aequatoriana* Krapov. and WC Gregory and *vulgaris* C. Harz. The sub species *hypogaea* comprises two botanical varieties, *hypogaea* and *hirsuta* Kohler (Table 1).

As per the revised classification (Singh & Simpson 1994), the primary gene pool comprises *A. hypogaea* and a tetraploid *A. monticola* which is freely cross-compatible. The cross-compatible diploid species of section *Arachis* forms the secondary gene pool. The tertiary gene pool comprises the members of the section *Procumbentes* that probably co-evolved the species of series *Perennes* of the section *Arachis* and are weakly cross compatible with section *Arachis*.

The National Research Centre for Groundnut (NRCG) was established in 1979 by the ICAR with a mandate to conduct, coordinate and steer research programme on groundnut based production systems. One of the major objectives of NRCG is to collect, characterize, evaluate, conserve and document groundnut genetic resources. The centre is identified as National Active Germplasm Sites under the Indian Plant Genetic Resources System (IPGRS) the activities of which are monitored by NBPGR, New Delhi. The All India Co-ordinated Research Project on Oilseeds was shouldering the responsibility of collection of groundnut germplasm at national level prior to the establishment of the Centre.