Introduction of wild relatives and new genotypes have considerably helped the genetic improvement programmes in many important crops. At IGFRI Jhansi concerted efforts have led to introduction of several species of *Trifolium*, *Avena*, *Stylosanthes*, *Medicago*, *Leucaena* etc. These lines are being utilized by various breeding tools for development of improved cultivars. The introductions have either been used directly as a variety or selections were made from the introduced materials. The introductions were also used as source of desirable allele for resistance to diseases, drought and lodging, grain or fodder quality and other valuable agronomic characters.

Further improved varieties/ strains in *Cenchrus, Chloris, Dichanthium, Panicum, Setaria, Stylosanthes, Desmodium, Medicago, Trifolium, Avena* and *Leucaena* could provide useful genetic resources for forage improvement programmes in India for livestock feed and fodder. Sustained efforts are required for achieving such objectives.

Plant Introduction–Achievements and Opportunities in Fruit and Plantation Crops in South Asia

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South Asia comprising of Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka grows more than 40 fruit and 7 plantation crops commercially and is a centre of rich variability/gene pool for various fruit and plantation crops. Among these, India is known to be the primary centre of origin for many tropical and subtropical fruits like *aonla, bael, ber, bilimbi*, citrus, garcinia, jack fruit, *jamun, karonda, khejri, lasora,* mango, phalsa, *pilu,* tamarind, wood apple, etc and secondary centre of origin for apple, banana, cashew, coconut, mulberry, pomegranate, *Prunus, Pyrus, Rubus,* etc. Many of these fruits are also known to have major centre of diversity in other countries of South Asia. Many of the fruit crops although not originated in this region, have a wide range of variability owing to long period of domestication and diverse climatic and growing conditions resultantly a rich gene pool for genetic enhancement.

Plant introduction has been practiced since the start of crop husbandry. The early introduction of fruit and plantation crops was brought through traders, invaders, travelers etc. and was done without any specific plans. Many of today's commercial fruit and plantation crops grown are the result of these unorganized introductions. Some of the early introductions were grapes, pomegranate, sapota, loquat and custard apple. Pineapple reached India as early as 1548, guava, papaya in the sixteenth century and litchi in seventeenth century. After 1870, European and American settlers and Missionaries carried out introduction of pome, stone and nut fruits. During this period Captain Lee in Kullu valley, Coutts in Shimla and EC Stokes in Kotgarh made valuable introductions. Pychard (A French person) introduced many apple varieties in Kashmir between 1910 to 1920. As a result several temperate fruits namely apple, pear, peach, plum, apricot, walnut and almond fully adapted and established in the temperate region. Several of today's commercial cultivars were introduced during the period. Portuguese in Malabar Coast introduced cashew nut while Oil palm was introduced in India towards the end of 19th century.

In India, planned introduction of important tropical, subtropical, temperate fruits and different plantation crops was taken up in 1946 under a scheme at the Division of Botany, IARI, which was upgraded as Plant Introduction and Exploration unit in 1956 and as the Division of Plant Introduction in 1961. It was separated in 1976 as an independent institute, named as NBPGR. Over the last 28 years, NBPGR has introduced 5301 accessions of different fruit and plantation crops from more than 25 countries under strict quarantine. These collections are being maintained at various national active germplasm sites e.g. arecanut at Vittal, arid fruits at Bikaner, banana at Tiruchirapalli, cashew at Ullal and Puttur, citrus at Nagpur, coconut at Kasargod, grapes at Pune, oilpalm at Eluru, tropical fruits at Bangalore, subtropical fruits at Lucknow, temperate fruits at Srinagar

and Shimla. Several new fruit crops have also been introduced in the South Asian region. Some of these fruit crops have been commercialized/adapted namely, kinnow, jojoba, macademia nut, mangosteen, passion fruit, tomatillo, prickly pear, kiwi fruit, olive, pecan nut, persimmon, seabuckthorn, etc. In south Asia , India has the largest collection of almost all the fruit and plantation crops particularly in apple, *ber*, banana, citrus, coconut, grape, guava and mango at various germplasm collection sites.

In spite of large introductions much remains to be introduced particularly in fruit crops. Many wild species in mango, superior types in pineapple, papaya, litchi, *ber* and temperate fruits are still to be introduced in different countries of South Asia. There is also much to be introduced in rootstock materials particularly in citrus, grape, *ber*, sapota, *Annona* and in all temperate fruit crops with particular reference to biotic and abiotic stress tolerance and dwarfing behaviour. A wide range of varieties/ hybrids are also to be introduced in some tropical and subtropical fruits like Annona, avocado, banana, *ber*, citrus, grape, litchi, mango, papaya, mangosteen, etc. Emphasis would be to introduce new fruit crops. Attempts need be made to introduce diverse germplasm, wild species, genetic stocks and cultivars with diseases and stress tolerance from South American, Central Asian and South East Asian countries. Besides, emphasis on high export potential varieties of different fruits such as coloured varieties in mango and guava, large fruited types in sapota, wine types in grapes and high juice yielding varieties in *Citrus* species and some temperate fruits from European and Mediterranean countries need to be introduced.

Genetic Resources of Spices

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Spices have played a major role in human life and history. India is the land of spices and many important spices like black pepper, cardamom, ginger, turmeric, cinnamon, tamarind and garcinia are native to India. India has a good amount of diversity in these crops. Collection, conservation and evaluation of native diversity is being pursued vigourously. India is also a major producer and exporter of these spices.

The other important spices relevant in Indian context are coriander, chilli, fennel, fenugreek, cumin, nutmeg, clove and vanilla in addition to other minor spices. Being crops of exotic origin, the indigenous genetic diversity in these crops is limited and does not represent the actual diversity available in these crops. Their variability is limited to the earlier introductions and their recombinants. Careful and unbiased collections from the centres of diversity can enhance the utility of the collection for crop improvement especially in developing high quality and disease resistant types. For example introduction of cumin genotypes with high oil and sweet fennel types, containing mostly anethole, and smaller quantities of *d*-phellandrene and *d*-limonene and no fenchone from European region will enrich our germplasm.

Introduction of genetic diversity from the centres of diversity is much needed in crops like paprika, nutmeg, clove, allspice and vanilla.

In addition introduction of specific genotypes with special characters especially like high quality lines and lines resistant to biotic and abiotic stresses will augment our future breeding programmes. Some important aspects worth considering are introduction of resistance source to *Phytophthora capsici* from the primary centre of diversity for genus *Piper i.e.* Central and South America and some of the pepper selections with resistance to *Phytophthora capsici* and *Radopholus similis;* introduction of Srilankan wild cardamom *Elettaria ensal* (Abheyv) (syn. *E. major* Thw.) which is reported to be tolerant to stem borer and recently reported 7 species of *Elettaria* from the Malaysian-Indonesian region; introduction of low fibre and vegetable varieties of ginger from China, Jamaica, Nigeria and Australia. This will help in improving our genetic stocks for future utilisation.