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Short Communication

Introduction and Collection of Plant Genetic Resources of Medicinal and Aromatic Plants and their Utilization

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The Division of Germplasm Exchange successfully introduced a broad spectrum of genetic diversity comprising well over 1160 accessions in 96 genera and 275 species of different medicinal and aromatic plants (1976-1986) from 38 countries of the world, under phytosanitary conditions.

The entire range of exotic medicinal and aromatic materials imported was not used and conserved by any single agency. Collections were maintained to the extent possible at different institutions and locations by the specialists/scientists concerned with these crops throughout the country. The pharmaceutical industries were dependent on the collections of raw materials from wild sources both in India as well as abroad. As such, several of the plant collections under cultivation were introduced from countries like USA, USSR, Hungary, GDR, FDR, Japan, Poland, United Kingdom, Bulgaria, Portugal, Czechoslovakia, France, Italy and Australia. Some of the important plant genetic resources introduced included *Anethum graveolens*, *Atropa* sp., *Glaucium flavum*, *Lavandula vera*, *L. angustifolia*, *Matricaria Chamomila*, *Pyrethrum* sp. and *Salvia sclarea* from Bulgaria; *Aconitum nepallus*, *Chrysanthemum cinerarifolium*, *Glycyrrhiza glabra* and *Plantago* sp. from Czechoslovakia; *Papaver bracteatum* (2n = 14), *P. orientale* (2n = 28) and *P. somniferum* (2n = 22) from Finland; *Pogostemon cablin* from Indonesia; and *Apium graveolens*, *Artemisia annua*, *Datura* sp., *Glycyrrhiza glabra*, *Gentiana* sp., *Hypericum perforatum*, *Hyssopus officinalis*, *Lavandula angustifolia*, *Mentha* sp., *Ocimum* sp., *Plantago psyllium*, *Salvia officinalis*, *Satureja hortensis*, *Silybum marianum*, *Solanum laciniatum* and *Valeriana officinalis* were introduced from Hungary and Germany.

Utilization of germplasm collections

The main recipients of germplasm collected/introductions made by the NBPGR were the network of All India Co-ordinated project on Medicinal and Aromatic Plants and scientists handling medicinal and aromatic plants in agricultural universities and other centres. Besides, the Bureau too evaluated and conducted performance trials of such materials at its Headquarters and some of its regional stations. These efforts culminated in the identification of several promising genotypes, some of which were released as primary introductions.

Promising introductions of importance

Introduction activities resulted in selection of promising material in different medicinal and aromatic plants. In this context, mention may be made of

Artemisia annua, a native of Indo-china, with the active constituent artemisinine. This drug could be used for controlling malaria, where existing antimalarial drugs failed, leaves of EC 172510 (USA) at the flowering stage yielded artemisinine content of 0.02 per cent. Artemisinine and Arteannuim are used for cerebral thrombosis in China (Duke, 1983).

Catharanthus roseus. G. Don (Syn. *Vinca rosea*), a native of the carribean islands in the West Indies, and naturalised all over the tropics was found to grow wild along the coastal area of Tamil Nadu, Andhra Pradesh, Karnataka, Assam and West Bengal. The leaves, rich in vincristine (VCR) and vincaleuco-blastine (VLB) could be used in the treatment of cancer. Ajmalicine and serpentine from roots are used for controlling high blood pressure. There are two other constituents, viz, vindoline and catharanthine in leaves, which could be used in synthesis of VLB analogs. An exotic introduction, EC 120837 (USSR), rich in alkaloids was identified as promising at NBPGR, rich in alkaloid content (Mandal and Maheshwari, 1987).

In pyrethrum (*Chrysanthamum cinerariifolium*), promising introductions were EC 138836-37 (Malawi) with white and pink flowers and several accessions procured from Kenya, particularly EC. 145650 was a promising type with prolific flowering.

EC. 115996 of foxglove (*Digitalis lanata*) from Poland was selected for higher content of glycoside in the foliage at Solan in 1983. Seventeen accessions of *Glycryrrhiza glabra* and other related species were received from various countries. Though no significant differences among accessions were recorded for root yield, EC. 128587 (Pakistan) and EC 114304 (USSR) gave significantly higher glycyrrihizic acid percentage than others. *Glycyrrhiza foetidissima* (EC 144048, ex. USSR) contained a very high amount of glycyrrhizic acid (14.87 per cent).

In *Hyoscyamus muticus,* among others, EC 93928 (Germany) showed high alkaloid content of 0.122—0.59% (Mital and Saxena, 1977). *H. albus,* EC 85759 (Germany), showed high herbage yield of 400-500g/plant on a fresh weignt basis and 0.085-0.1065 per cent alkaloid content (Saxena *et al.*, 1978).

Among *Lavandula* sp. *L. stoechas* ssp. luisieri (EC 120176) from portugal and *L. angustifolia* (EC 165432) and (EC. 154023) from UK were found to establish well at Kodaikanal and flowering twigs gave an oil yield of 0.30 per cent on distillation.

In *Mentha piperita,* EC 41911 (USSR) showed promise for higher herbage yield, essential oil content (0.5%) and menthol (60%) (Maheshwari *et al.*, 1983). This accession was recommended for release for cultivation.

Thirteen accessions in *Matricaria chamomila* gave promising results at Kodaikanal centre and were put for multiplication.

In anise (*Pimpinella anisum*) anethole rich collection, EC 22091 (France) was evaluated and one plant was identified best which is rich in anethole content (Pareek *et al.*, 1980).

Ocimum oil is used in perfumery and food flavouring industry. *Ocimum basilicum* (EC. 176934 from France) with the highest percentage of oil (0.43%) and linalool (76.86%), *Papaver somniferum* (EC 196429) containing considerable amount of morphine (0.40-0.82%) and noscapine (0.12-0.27%) were promising. EC 196430 with high percentage of morphine (0.33-0.77%); papavarine 0.00-0.20% and moscapine-0.03-0.04% and EC. 196433 (morphine-0.31-0.67%) and papavarine-0.06-0.19%; (Wickstrom *et al.* 1982 and 1984 were introduced from Finland. In *Papavar bracteatum*, EC 196437 and EC 196438 were chemotypes varying in thebaine-alpinigenine (Nyman and Bruhn, 1979; Philipson, 1983) and rich in thebaine content of 30.50 per cent and 0.48 per cent (Pyysalo *et al.* 1987).

In hops (*Humulus lupulus* L), promising varieties like late cluster (EC. 38868, USA), Tardifde bourgigyne (EC 38804, Japan), Hybrid-2 (EC 3496, S. Africa) and F 51 (EC 39993, S. Africa) were identified in trials conducted at Simla. Other promising materials were *Rosemarinus* sp. EC. 154021 from UK with 0.10 per cent essential oil, *Solanum khasianum* and *S. laciniatum* (EC. 113464, USA) with high solasidine content in aerial parts (0.05%) and in dry berries 6.6%).

The efforts made by the Bureau in the introduction and collection of genetic resources of medicinal and aromatic plants during the last decade include species of *Artemisia, Catharanthus, Chrysanthemum cinerariafolium, Digitalis, Glycyrrhiza, Hyoscyamus, Lavandula, Matricaria, Rosemarinus, Solanum* and *Humulus lupulus*. This has helped the country in augmenting the capacity for production of alkaloids and essential oils much required in drug pharmaceutical and essential oil industries.

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