

vegetable crops. From historical facts, it is evident that most of the temperate/European vegetable crops were introduced in India by the Portuguese during 18th century followed by English in 19th century. Jenson from Kew introduced cauliflower varieties as early as in 1822 and grew it in botanical garden at Saharanpur. After independence several organizations like NHRDF, DARL, VPKAS, GBPUA&T etc were established and different programmes namely AICRP were implemented at different times to give further fillip to breeding of temperate vegetable crops. In recent times, under open general license (OGL), the private seed companies have introduced lot of seed material and started their own R&D programmes. India has also collaborated with AVRDC, Taiwan, China, USSR and SAVERNET (South Asian Vegetable Research Network) countries for testing of vegetable entries. Some of the research projects on temperate vegetable crops were funded by NATP (National Agriculture Technology Project). A detailed account on utilization of vegetable crops has been highlighted with special reference to cole crops and root crops. Cauliflower being the most important cole crops received maximum attention and lot of varieties of late cauliflower (Group

IV) namely, Pusa Snowball 1, 2, Pusa Snowball K1 were developed using exotic lines. Private seed companies have released F₁ hybrids namely, Himani, Guardian (Indo American), Candid Charm, White Flesh (Sakata), Serrano (Sandoz) using CMS and SI lines developed from exotic lines. In cabbage majority of ruling varieties are through introductions e.g. Golden Acre, Pride of India etc. Pusa Mukta, a black rot resistant variety, was developed by crossing two exotic lines (EC 24855 X EC 10109). Many tropical cabbage hybrids e.g. KK cross, Golden cross etc. were introduced and tropical cabbage lines DTC 50-7-4, 513, 528 etc. were developed. CMS system has also been transferred successfully to all cabbage lines from EC 173419 at Katrain. In other cole crops, majority of the varieties are developed mainly through introductions. In root crops also the improved cultivars are developed either through introduction followed by selection or by hybridization with exotic lines as one of the parent. The sources of pests and diseases resistance in cole crops are mainly exotic lines through introductions. The vast genetic resources of temperate vegetable crops have opened up the prospects of breeding using the introductions made from different countries.

Plant Introduction in Medicinal and Aromatic Plants in India: Achievements and Opportunities

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Human civilization witnessed the origin of a number of Health Tradition Systems through out the world. Each system has developed a number of effective herbal disease cure practices, which spread through out the world. An enormous number of medicinal plants are available in each health care system and are distributed in different parts of the world. Cultivation of medicinal plants is comparatively new phenomenon and domestication is widely prevalent in medicinal plant cultivation directly from the wild material.

The history of plant introduction is associated closely with human civilization. Even though, India is rich in its natural medicinal plant flora, there is a number of medicinal plant introductions occurred within the country from the time immemorial. A number of success stories of achieving the benefit of direct plant introduction are

available within the country such as commercial cultivation of isabgol, opium poppy, cinchona, senna etc.

In the earlier years, plant introduction was made at random by invaders, traders, missionaries and others. There are no records about the exact period of some plant introduction that has happened as in the case of Aloe whose center of origin is Africa, however naturalized in India and at present widely utilized in Indian health care systems and also in industry. It is interesting to record that foxglove introduced as ornamental plant in the hill resorts of Kashmir has become an important medicinal plant and now being cultivated.

Cinchona is the pioneer example of systematic medicinal plant introduction for commercial cultivation in India. Among aromatic crops, geranium, Japanese mint, chamomile and salvia are important examples of

successful introduction. The introduction of safed musli to South Indian states like Andhra Pradesh and Tamil Nadu from Maharashtra is an example of plant introduction within the country.

Narrow genetic base in introduced medicinal plants is the primary constraint for further crop improvement as in isabgol, senna, opium poppy, stevia, mints, citronella, etc. In some of the introduced crops quality and quantity of secondary metabolites are inferior than from where these were introduced due to environmental interaction which plays an important role in secondary metabolite production. Quarantine measures also have to be taken care in medicinal plant introduction as in the case of any other crops.

In the post-CBD era due to introduction of several restrictions and regulations, free exchange of genetic material has become limited. Almost all the introductions made in the past were species based. However, at present the introductions are mainly made to broaden the genetic base with well-defined targets. In medicinal plants, the scope of new species introduction is limited due to the interaction of genotype and environment on quality of secondary metabolite production. However, broadening of the genetic base of the existing endemic or introduced medicinal plants under cultivation needs to be targeted seriously to enhance the productivity of these crops in future.

Integrative Strategies for Genetic Conservation of Asian Medicinal Plants through Participatory Approach for Livelihood and Sustainability

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South-East Asian countries accounts for more than 60% of the global supply of herbs in the trade today. The time has now come when several models of integrative approaches must be devised and be put to test in utilizing our collective traditional knowledge and bio-resources towards the visible emergence of a joint Sector of Asian System of Medicines. The ASEAN model can act as a template to begin with in this direction. Obviously, this would involve equal partnership of various components of the entire value chain, comprising of traditional healers, plant collectors, conservation scientists, farmers, industry, traders and retailers. Exchange of plants and their introduction and quality evaluation/ validation in neighbouring countries will be an intense activity of this proposed model. All strategies aim to be applied in this mission must have three focal deliverables in

sight: IPR interests of the entire region, conservation of the exclusives and, people participation for sustainability and societal benefits. The age old concept and slogan of "Gene rich regions" has to be converted into business by reversing the status of supplier of raw materials to producers of the end products. Sufficient infrastructure and expertise are now in place to move ahead on this collective mission through complementation and synergism. We have to make our herbs quality validated in the backdrop of wider agro-climatic adaptability, cheaper cultivation costs and efficient nutrient utilization. The philosophy of establishing the Bio-villages for plant introduction, pioneered by CIMAP in last three years, will be presented in the symposium to exemplify the proposed model.