



Sustainable Use of Aroma Agro Biodiversity for Aroma Industry and Social Upliftment of Growers

Birendra Kumar*, Himanshi Mali, G. Ram, Garima Sinha, Priyanka Prasad, A.Samad and S.C. Singh

CSIR-Central Institute of Medicinal and Aromatic Plants, P.O. CIMAP, Lucknow-India

*Email : birendrak67@rediffmail.com; b.kumar@cimap.res.in

Introduction

India is the ancient home of medicinal and aromatic plants because of its diverse nature of climate ranging from temperate to tropical with wide variety of soil which supports the enormous plant wealth. Of the 18,000 plants species found in India 8% approximately are known to have odoriferous principles but only about 65 of them have large and consistent demand in the world trade (Duthie, 1903-1923; Singh, 1992, 2004; Singh and Khanuja, 2006). Aromatic plants as a source of natural perfumes, flavours, cosmetics, etc. have always been considered the items of curiosity for mankind since time immemorial. The primitive man must have been struck not only by the elegance and vivid colours of flowers but also by the fragrance of vegetation around him. It is however very difficult to trace the history as to when the man first used the aromatic plant. Pleasant smell of the flowers and nectars attracts the insects and is essential in some plant species for bearing of fruits and seeds. Thus, aromatic plants have played a vital role directly or indirectly in the life of man since its appearance on this planet.

Owing to vast diversity of edapho-climatic condition prevailed in India, a large number of aromatic flora occur in wild habitats. Only a limited number of commercially valued plants both form its rich natural forest vegetation and cultivation are produced. The most important commercially exploited essential oil-bearing plants, presently cultivated in India are menthol mint (*Mentha arvensis*), bergamot mint (*M. citrata*), peppermint (*M. piperita*), spearmint (*M. spicata*), scotch spearmint (*M. cardiaca*), citronella java (*C. winterianus*), palmarosa (*C. martinii* var. *motia*),

lemongrass (*C. flexuosus*), vetiver (*Vetiver zizanioides*), lavender (*Lavandula angustifolia*), geranium (*Pelargonium graveolens*), patchouli (*Pogostemon cablin*), Bulgarian rose (*Rosa damascena*), clary sage (*Salvia sclarea*), rosemary (*Rosmarinus officinalis*), cananga (*Cananga odorata*), jasmine (*Jasminum grandiflorum*), eucalyptus (*E. citriodora*), Indian basil (*Ocimum basilicum*), holy basil (*O. tenuiflorum*), chamomile (*Matricaria chamomilla*), davana (*Artemisia pallens*), nagarmotha (*Cyperus scariosus*), sandal wood (*Santalum album*), dill (*Anethum graveolens*), marigold (*Tagetes patula*), African marigold (*T. minuta*) etc. Uttar Pradesh is well known state of India for cultivation of aromatic crops especially for menthol mint, peppermint, Indian basil, geranium, chamomile, vetiver, lemongrass, palmarosa, citronella Java. Some districts of central and eastern Uttar Pradesh i.e. upper Gangetic plains especially Barabanki, Lucknow, Raebareli, Amethi and Sultanpur are emerged as a hub for mint oil, and aromatic grasses oil.

Profitability in *Mentha*, the natural source of l-menthol is widely used in pharmaceutical and cosmetic industries and motivating farmers in the Indo-Gangetic plain to grow menthol mint or Japanese mint (*Mentha arvensis* L.) at very large scale even at the expense of the conventional crops in India, especially Uttar Pradesh, Bihar, Punjab and Haryana (Kumar *et al.*, 1999; Patra *et al.*, 2001; Ram *et al.*, 2002). The total area under commercial cultivation of menthol mint in India was about 2.1 lakh hectares with an estimated mint oil production is 65,000 tonnes in 2013 (Times of India, 15Feb, 2013; Business Standard, September 17, 2013). Menthol mint has undergone a global



change due to development of high yielding varieties and agro-processing technologies by R&D organizations and progressive cultivation among mint growers leads to India tops the group of menthol mint growing nations. The major districts in upper Indo-Gangetic plains of Uttar Pradesh where menthol mint crop is being commercially cultivated are Barabanki, Raebareli, Amethi (CSJM Nagar), Lucknow, Sultanpur, Sitapur, Shah-jahanpur, Fatehpur, Allahabad, Pratapgarh, Ambedkar Nagar, Azamgarh and Gorakhpur.

The present study was aimed to find out the (i) area under cultivation, production and trade of mint oil among five districts viz. Barabanki, Sultanpur, Amethi, Raebareli and Lucknow (ii) production constrains and suitable policies for promotion of menthol mint cultivation.

Methodology

A survey was conducted in 450 mint growing villages belonging to 30 blocks of Barabanki, Raebareli, Amethi, Sultanpur and Lucknow districts during 2013 and 2014 mint growing season. Atleast 25 farmers from each block were selected purposively. The primary data were collected through personal interview using a prepared questionnaire.

Results and Discussion

After conducting survey of 7 blocks of Lucknow, 8 blocks each of Barabanki and Raebareli, 4 blocks of Sultanpur and 3 blocks of Amethi districts, there are 7 major aromatic crops cultivated by farmers. Among them, *Mentha* has largest area under cultivation and essential oil production followed by Palmarosa (Fig 1).

The major producer of mint oil is district Barabanki followed by Lucknow (Fig 2). Barabanki has 13,424 ha area among 170 village of 8 blocks followed by 6833 ha of Lucknow and 3826 ha of Raebareli district. Growers of said areas are cultivating many improved varieties of mints like Kosi, CIM-Saryu, Himalaya, Saksham and Kushal, CIM-Vridhi of vetiver, PRC-1 and CIM-Harsh of

palmarosa, CIM-Saumya of Indian basil, Krishna of lemongrass, etc. developed by CSIR-CIMAP. About 95 percent area of mint cultivation is occupied by only Kosi in India. The variety Kosi has been widely adopted by large as well as small farmers and as a result about 5 lakhs mandays/day is being regularly generated towards rural employment from the cultivation of Kosi and marketing of its essential oils. Undoubtedly, such outcomes from the cultivation of Kosi variety have motivated large section of rural people not to leave their villages for seeking employment in urban areas. The favourable socio-economic impact of the variety Kosi is also reflected by the attendant significant change in the recorded daily life of the marginal farmers growing menthol mint. The upgraded menthol mint oil production from variety Kosi has enabled even the very small farmers to procure ready money from the sales of the essential oil and meet expenditure for their school going children who otherwise used not to regularly go to school due to financial problem before the cultivation of menthol mint. Infact, after cultivation of the variety Kosi, the marginal farmers have been able to cater their family in every aspect of daily life by the help of ready money from sales of stored oil. In other words, the stored oil of mentha in their houses is as if serving as a banker's cheque for daily life. Coming to the medium and large farmers, it is well marked that their large commercial cultivation of mentha has enabled them not only to be able to purchase improved farm machineries such as tractors, pumping set etc., but to upgrade their housing from mud-built houses to cemented house and improve their social status by arranging marriage of their children in socially and economically high families. In regard to the concurrent changes in trades of the mint oil after cultivation of variety Kosi, the following scenario is quite visible. The oil marketing that used to be done by carrying through bicycles or scooters is now being done by scooters and cars, respectively. Some of the farmers being much resourceful after cultivation of mentha, they could create their own distillation and processing provisions for essential oil; not



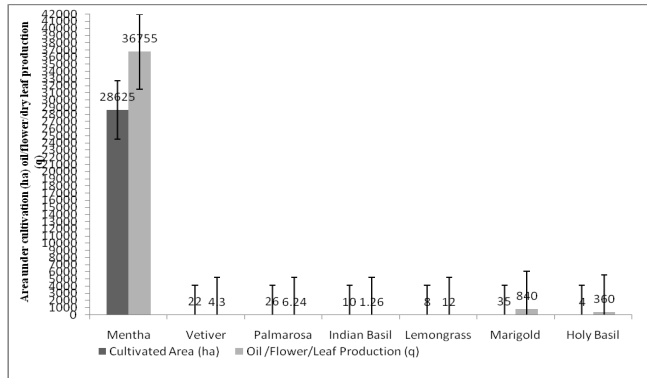


Fig. 1: Area under cultivation of major aromatic plants

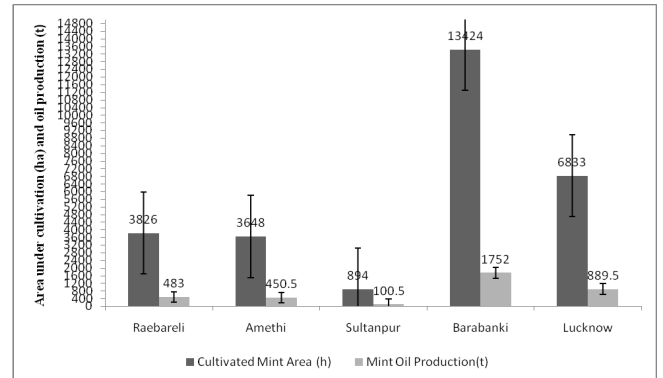


Fig. 2: District wise area under cultivation (ha.) and oil production (t)



Interaction with mint farmer by CSIR-CIMAP scientist



Interaction with mint sucker trader by CSIR-CIMAP scientist at planting material trading centre, Salon, Amethi.



Interaction with vetiver farmer by CSIR-CIMAP scientist



Interaction with Indian basil farmer by CSIR-CIMAP scientist





Interaction with Holy basil farmer by CSIR-CIMAP scientist

only they have been able to use sophisticated distillation equipments for oil extraction but they have been able to even install chilling units and fractionation column. Regarding the success of Kosi variety, the erstwhile organization like EOAI, New Delhi opined that this variety has indeed, given a revolutionary changes in the rural life as well as mint industry in the country as a whole.

Production constraints faced by growers

The major constraints faced by the growers in the Raebareli, Amethi and Lucknow area were lack of minimum support price, high cost of cultivation, highly fluctuating market price of essential oil, unavailability of quality planting material, lack of

awareness on improved varieties and their agro and process-technologies, climate change, and inadequate market information about its demand and supply.

Conclusions

The study has revealed that the mentha and aromatic grasses are the major aromatic crops cultivating in the study area. The inputs like manpower, fertilizers, irrigation, inter-culture operation, pre- and post- harvest processing for herb distillation have been observed to directly affect the production as well as income of the growers. The major production constraints being faced by the growers have been reported as lack of regulated marketing system for planting material and essential oil, high input costs, lack of awareness about demand and supply of essential oil, lack of minimum support price and poor quality of distillation units. It is recommended that the government should take initiative to promote its cultivation where food crops are unable to grow and help in the fixation of support price for its essential oil.

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