

twenty-two accessions of mint germplasm for eight years so far. In an earlier study, the beneficial effect of low temperature and diffused light on conservation of four mint species was reported (Reed 1999). The reduction of light intensity or total darkness in conjunction with low incubation temperature has been reported to effectively slow down the growth rate and enhance conservation period in many medicinal species (Chandel *et al.*, 1996, Sharma 2001). However, cold tolerant level may vary from species to species and accession to accession.

Plant tissue culture technique, besides its advantage in propagation and conservation, also has potential, if needed, to introduce genetic variability in mentha genotypes through somaclonal variations, wide hybridization (embryo rescue), somatic hybrids or transgenic plants. It is very important to conserve exotic germplasm with or without currently identified economically important traits. In India exotic mint germplasm has been utilized for crop improvement programme (Gupta, 1995). In this context, the conserved exotic germplasm of *Mentha* may serve as a nuclear material for utilization for genetic manipulation and crop improvement programme.

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Evaluating Germplasm Introductions of Underutilized Plants

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Key Words: Underutilized, Promising, Evaluation

Germplasm introduction is the key to diversifying the crop composition and broadening the genetic base of existing crops in any area. Germplasm introduction and evaluation has led to introduction of several new crops and improvement of the existing crops in India. 3361 accessions of different underutilized plants have been introduced during the last fifty years (RC Agrawal, Personal Communication). Maximum introductions were made in faba bean (1016), followed by those in amaranth (645), su-babool (488), chenopods (216) and jojoba, in the descending order. Most of the accessions came from USA (1205), Syria (360), Australia (252), UK (180), Bulgaria (188) and Germany (154).

Evaluation of the introductions of underutilized plants under the aegis of All India Coordinated Research Project on Underutilized Crops led to identification of 395 promising lines (Anon. 2004), mainly in adzuki bean (92), winged bean (68), amaranth (72) and rice bean (53). Four of the promising lines were released for cultivation. Two new plants, namely, jojoba and paradise tree were adopted for cultivation. Project on cultivation and oil extraction has been taken up by Government of Rajasthan while paradise tree has been adopted by NOVOD Board and the Departments of Forest of Tamil Nadu, Karnataka, Orissa and Maharashtra for large scale cultivation. Seeds of jojoba contain 45 per cent oil suitable

Table 1. Introductions of underutilized plants and promising lines identified

S.No.	Botanical Name	Total No. of accessions	Sources	Promising lines
1	Amaranth (<i>Amaranthus</i> spp.)	645	Kenya (35), Nigeria (48), Russia (41), USA (342)	72, Suvarna*
2	Buckwheat (<i>Fagopyrum</i> spp.)	134	Hungary (23), Japan (30), Nepal (29), USA (17), USSR (17)	30
3	Chenopods (<i>Chenopodium</i> spp.)	216	Germany (24), Nepal (15), UK (28), USA (89)	17
4	Job's tear (<i>Coix lachryma</i>)	17	Brazil (2), Japan (5), USA (3)	
5	Winged bean (<i>Psophocarpus tetragonolobus</i>)	183	New Papua Guinea (26), Philippines (21), Thailand (59), USA (17)	88
6	Adzuki bean (<i>Vigna angularis</i>)	101	Belgium (7), Colombia (5), Nigeria (11), USA (73)	92
7	Rice bean (<i>Vigna umbellata</i>)	79	Belgium (6), Brazil (5), Colombia (5), Indonesia (8), USA (53)	53
8	Broad bean (<i>Vicia faba</i>)	1016	Bulgaria (155), Germany (130), Italy (120), Syria (360), USA (98)	36
9	Paradise tree (<i>Simarouba glauca</i>)	5	El Salvador (2), Italy (1), UK (1), USA (1)	1
10	Perilla (<i>Perilla frutescens</i>)	2	Japan (1), Hungary (1)	1
11	Bitter apple (<i>Citrullus colocynthis</i>)	12	USA (9)	
12	Water melon (<i>Citrullus lunatus</i>)	138	Denmark (3), Taiwan (13), USA (117)	
13	Salt bush (<i>Atriplex</i> spp.)	36	Australia (5), France (4), Israel (4), USA (15)	3
14	Bamboo (<i>Bambusa</i> spp.)	2	Japan (2)	
15	Horse tail tree (<i>Casuarina equisetifolia</i>)	25	Australia (8), USA (11)	
16	Su-babool (<i>Leucena leucocephala</i>)	488	Australia (139), UK (132), USA (172)	
17	Cuphea (<i>Cuphea wrightii</i>)	32	USA (32)	
18	Euphorbia (<i>Euphorbia</i> spp.)	30	Mexico (3), Spain (8), USA (15)	
19	Jatropha (<i>Jatropha curcas</i>)	2	Ghana (1), Nigeria (1)	
20	Guayule (<i>Parthenium argentatum</i>)	28	USA (28)	1, Arizona-2*
21	Jajoba (<i>Simmondsia chinensis</i>)	170	Australia (1), Israel (2), UK (1), USA (166)	1, EC 33198*
Total		3361		395

* Released for cultivation

for use as a lubricant in high pressure machinery and is a substitute for sperm whale oil. On the other hand, kernels of paradise tree contain 55 to 60 per cent edible oil, quality of which is comparable to that of groundnut.

A summary of germplasm introductions and

promising lines identified for cultivation is presented in the Table 1.

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Quality Evaluation of Some Exotic Lines of *Ocimum* Germplasm

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Key Words: Basil, Volatile Oil, Hydro-distillation, Evaluation

Ocimum belongs to family *Lamiaceae* and is commonly known as basil. It is distributed in the tropical and warm temperate regions of the world. Ten exotic lines of *Ocimum basilicum* have been introduced from various countries.

Ocimum oils are classified on the basis of their chemical composition rather than by their botanical origin. Sweet basil aromatic in nature yields a volatile oil which is used as flavouring agent and also as a perfumery material. The fragrant leaves are used for flavouring sauces, salads and soups.

The above ten accessions have been studied for

their qualitative and quantitative parameters (essential oil content, physico-chemical properties and aroma constituents by GC.). These germplasm were grown in 2003-2004 at Issapur experimental station of NBPGR, New Delhi.

Fresh material of all these accessions was subjected to hydro-distillation using Clevenger's apparatus, at NBPGR, New Delhi. The essential oils so obtained were dried over anhydrous Na_2SO_4 . The oil percentage of ten accessions varied from 0.09 to 0.16 percent on dry weight basis.

These dried oils were studied for their physico-chemical properties and further analysed for their aroma