

European Cooperative Programme for Conservation and  
Exchange of Crop Genetic Resources

TECHNICAL CONSULTATIVE COMMITTEE  
Nyon, Switzerland, 19-21 December 1983

Survey on Aromatic and Medicinal plants: Size of collections and  
threats of genetic erosion

Summary of replies

Questionnaires were sent at the end of September 1983 to 120 members of the International Society for Horticultural Science, Medicinal and Aromatic plant section with a letter of recommendation from the Section Chairman, and to other known specialists in this field.

This questionnaire asked for (i) estimates of the extent of genetic diversity in situ which is under threat of erosion and which needs to be collected in relation to the following seven genera: Mentha, Digitalis, Matricaria, Salvia, Atropa, Carum carvi and Foeniculum vulgare; (ii) information on the size of collections; and (iii) corresponding information for other species which were important in the opinion of the recipient.

Ten replies were received from ten countries and are summarized on the table attached.

Conclusions

The return of only 8 percent of the Questionnaires is disappointing and may reflect a general lack of information on the occurrence of genetic erosion in aromatic and medicinal plants.

The information that was returned suggested serious erosion only in Mentha (3 countries), Digitalis (2 countries) and Origanum (3 countries). Bearing in mind the wide distribution range of these genera and their constituent species, it may be doubted if the danger is great enough to justify collaborative action through ECP/GR.

Summary of replies to Questionnaire on Aromatic and Medicinal plants

	BEL	DDR	FRA	DEU	GRC	ISR	NLD	SWE	YUG	HUN	
Matricaria		*			*				*	*	Collections insignificant
Mentha		100 acc.	** for cultivars 75 acc.		*		** wild forms	** wild forms	** wild forms * cultivated forms		
Salvia		*		*	*	*					
Digitalis		* - ** 50 acc.		*	*					* - **	
Atropa		*			*				* wild forms		Collections insignificant
Carum		* wild forms			* wild forms					*cultivars	Collections insignificant
Foeniculum					* wild forms				* wild forms	*cultivars	

\* = Some genetic erosion

\*\* = Much genetic erosion



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Aromatic and Medicinal Plants

A synoptic review of available information on important species and on threats of erosion or loss of potentially valuable germplasm in natural populations or in collections.

1. Literature survey

The survey indicates that the following genera are important:

Mentha, Matricaria, Digitalis, Anethum, Foeniculum, Papaver, Lavandula,  
Salvia, Valeriana, Thymus, Atropa, Carum, Achillea, Coriandrum,  
Petroselinum, Satureja, Origanum, Gentiana, and Artemisia. Mentha and

Matricaria appear to be particularly important by this method of assessment. Altogether about 100 genera appear from the survey of 610 literature references. None contained information on genetic erosion and few, if any, referred even indirectly to variation and genetic resources. The majority were concerned with cultural practices, agronomical experiments for maximizing yield of either shoots or roots (involving, for example, studies of planting and harvesting dates, spacing, use of fertilizers, irrigation) or biochemical analysis of constituent substances such as essential oils, alkaloids, steroids and so on.

There are of course serious limitations to the conclusions one can draw from a survey of this kind, but it seems reasonable to assume that there is little general concern for genetic erosion in aromatic and medicinal plants in Europe as expressed in the literature.

2. In the absence of published evidence it is necessary to turn to other sources of information although much of this is anecdotal. This has come partly from discussions between ECP/GR Secretariat members and interested workers in different countries during working visits by the Secretariat, and partly from correspondence and from unpublished reports made available to us:

Greece

Dr. S. Galanopoulou is of the opinion that some 200 species should be collected, conserved, characterized and evaluated in Greece. Dr. B. Skrubis, in response to a request for priorities, defined eight major species in need of attention: Mentha piperita, Rosa damascena, Lavandula vera and L. sticha, Matricaria chamomilla, Origanum spp., Sideritis cretica, Crocus sativus.

Dr. Skrubis kindly provided a copy of a typescript report "Aromatic Plants in Greece" from which the following data were abstracted:

- There are more than 1000 species of aromatic and medicinal plants in the Greek flora.
- Some 65 species are listed as 'important'.
- Twelve species are cultivated on areas ranging from 1700 ha. (Crocus sativus) to 10 ha. (Salvia officinalis) with a total cultivated area of 4500 ha.
- Three species are dominant in cultivation: Crocus sativus (1700 ha.), Foeniculum vulgare (1000 ha.) and Mentha piperita (700 ha.).

- Other species, for example Origanum dictamnus and Sideritis cretica are thought to have commercial potential.

Hungary

Information from Dr. L. Banyai, Institute for Agrobotany, Tápíószele, names five species of economic importance in Hungary, as follows:

<u>Papaver somniferum</u>	3500 ha.	Cultivated
<u>Matricaria chamomilla</u>	200-300 ha.	Cultivated and wild
<u>Digitalis lanata</u>	250-400 ha.	Cultivated and wild
<u>Foeniculum vulgare</u>	400-700 ha.	Cultivated and escapes
<u>Mentha piperita</u>	150-200 ha.	Cultivated and wild relatives

In addition, eight other species are listed as wild forms of minor economic importance, namely Adonis vernalis, Atropa belladonna, Filipendula ulmaria, Marrubium vulgare, Inula helenium, Colchicum autumnale, Pulmonaria officinalis, and Galium odoratum.

Professor P. Tétény, Budapest, has stressed the importance of Papaver bracteatum a species rich in codein and which, unlike P. somniferum, is of no value for the preparation of illegal drugs. Genetic variation of P. bracteatum is said to occur in Israel.

Israel

Dr. E. Putievski, Research Station Neve Ya'ar, lists eight species of which there are significant collections in Israel, namely Origanum vulgare, Marjorana syrica, Salvia officinalis, S. fruticosa, Laurus

nobilis, Coridothymus capitatus, Satureja spp. and Micromeria serpyllifolia. These collections may indicate economic significance as well as academic interest.

German Democratic Republic

The Gatersleben Genebank collection includes about 2000 accessions of more than 100 species of aromatic and medicinal plants. The Genebank is willing to supply material and data as available, but they do not wish to participate in any active work on Aromatic and Medicinal plants within the ECP/GR.

Bulgaria

In addition to the species listed in the Questionnaire (see below) Datura, Glaucium and Valeriana are considered to be important species by the staff of the Research Institute for Roses Aromatic and Medicinal Plants.

Poland

Prof. Ruminska, University of Agriculture and Medicinal Plants, Warsaw, and Mrs. Zabanska, Poznan Institute for Medicinal Plants, are of the opinion that the following species should be added to those listed on the Questionnaire because of their economic importance:

Valeriana, Datura, Ocimum basilicum, Satureja hortense, Origanum majorana and Coriandrum sativum.

The Polish flora is said to contain high genetic diversity for Digitalis, Matricaria, Carum carvi, Atropa, Papaver, Valeriana, and Mentha. They think there is little danger of genetic erosion except

perhaps from the use of herbicides; presumably to species which are weeds of arable crops such as Matricaria.

International Society for Horticultural Science

Section: Medicinal and Aromatic Plants

With the active support of the section Chairman, Prof. P. Tétény, all members of the section have been circulated with a Questionnaire - in October 1983, requesting information on economic importance and genetic erosion of Aromatic and Medicinal Plants. Replies are awaited (copy Questionnaire attached).

AGRIMED

The AGRIMED programme committee of the EEC has formed a new group called "Spices, Aromatic and Medicinal plants. It held its first meeting at Angers in May 1983. Its interest seems to be in the development of new crops. A second meeting is proposed in 1984 at Bari to discuss which species should be included in their programme. There is no evidence at the moment of an active interest by this group in genetic resources.

International Union for the Conservation of Nature and Natural Resources

(IUCN)

In its draft proposal for "A framework for cooperative action.... ....1985-87", the IUCN proposes to set up a project, in collaboration with WHO, to promote the conservation of medicinal plants, beginning 1984. (Copy of relevant text is attached).

The critical issue of evidence for erosion or destruction of genetic resources of aromatic and medicinal plants was discussed with Mr. Hugh Synge (who is also Head of the Threatened Plants Unit, Kew Gardens) and Dr. G. McNeely, IUCN H.Q., Gland, Switzerland. The latter had no information. Mr. Synge offered to send one or two items, the total available to IUCN.

Mr. Synge reported that the OECD arranged a meeting in Paris on 15 November 1983 on the conservation of medicinal plants.

Individuals who have been approached for information

- (1) Mr. Norman Myers, ecologist, writer and author of "The sinking ark. A new look at the problem of disappearing species", although aware of a general public and professional interest in medicinal plants, and having been invited to the O.E.C.D. meeting, was unable to find any evidence of threat of erosion, either from the literature or elsewhere.
- (2) Dr. Ian Hedge, Curator of the Herbarium, Royal Botanic Garden, Edinburgh and a recognized authority on the flora of Turkey, particularly the Labiatae, was unable to provide information on genetic erosion but commented in passing on the need for precision when attempting to quantify the problem. He points out that in the genus Salvia there are 86 species in Turkey alone and that to be meaningful, questions should be posed in relation to particular species.

(3) Professor Sven Snogerup and his group at the University of Lund, Sweden, have made extensive field studies of the flora of Greece.

He draws attention to the following genera of importance:

Labiatae: Origanum, Sideritis, Satureja, Thymus, Rosmarinus and Melissa

Umbelliferae: Myrrhis, Pimpinella, Aegopodium, Foeniculum, Anethum,  
Conium, Apium, Angelica, Levisticum, Peucedanum, Pastinaca  
and Daucus.

Compositae: Cichorum, Arnica, Artemisia, Tanacetum, Tussilago and  
Asteriscus.

He refers to the serious situation of much destruction of natural plant associations but does not provide evidence of species or associations at risk.

#### Conclusions

In addition to the interest of some of the member countries of ECP/GR, three other organizations, namely ISHS, IUCN and OECD, are known to have an active interest in the conservation of aromatic and medicinal plants. The exact nature of this concern and of the plans for action have yet to be determined but it is clear that there is a widespread belief that action is necessary in either conservation or exploitation or both.

In contrast, it emerges with equal clarity from the enquiries and studies made by the Secretariat, that there is little or no firm detailed evidence of erosion or destruction of genetic resources.

Without such evidence in relation to particular species of actual or potential economic significance, no sensible programme of collection, conservation (whether as seed or ex situ) and evaluation can be developed for 'natural' medicaments spices or flavourings.

It is possible that good evidence on which a programme can be rationally based may emerge in the responses to the ECP/GR/LSHS Questionnaire but the prospects do not look encouraging.

In the event that adequate evidence is not obtained, the question arises whether other strategies can be used which do not require such precision. For example, conservation in situ in nature reserves could be considered. This approach would have the merit of preserving plant associations entire which would seem to be particularly appropriate to Aromatic and Medicinal plants which, though taxonomically diverse, show some degree of ecological homogeneity. It would appear to be at least possible to select several plant associations which would include several or even many of the species and genera listed above. However, for this approach to be effective and justifiable the requirement for selectivity must be satisfied. It requires prior information on which species of economic importance, or potential economic importance, are under threat of erosion or destruction before suitable plant associations and areas can be selected. Therefore, the ability to define species and areas at risk is inescapable and an essential prerequisite to

any rationally planned conservation programme. Without this there exists the probability of the wasteful use of resources in the conservation of forms which are not at risk, to the detriment of those that are.

It has to be said that at the time of writing there is no rationally justifiable basis for the allocation of ECP/GR funds and Secretariat resources to a Working Group on aromatic and medicinal plants. There remains, nevertheless the widespread general belief that with changes in agricultural practice, the reclamation of land, industrial development and similar events with cataclysmic effects on natural populations the gene pool of a number of these valuable species could be at risk and we should continue to seek evidence, as a basis for action, from experienced field botanists, taxonomists and ecologists.