

The IFEAT Socio-Economic Sub-Committee has now finalised its report on the socio-economic impact of geranium oil production in Egypt and China. This is the fifth of twelve reports which will be produced by the Sub-Committee on the importance of specific naturals to the livelihoods of those involved in their production. IFEATWORLD will continue to give updates on the work of the Socio-Economic Sub-Committee in future issues and report on the seven other vital essential oils that are included in the Sub-Committee's remit. This is an important study for IFEAT, as the information gathered can be used by the Federation to support these products in any future legislative/regulatory discussions.

GERANIUM

Pelargonium x spp.

INTRODUCTION

"The name geranium oil itself is a misnomer, since the commercial types of geranium oil are derived not from any Geranium, but from several species, varieties and strains of Pelargonium." (E. Guenther; 1950). Moreover, since the genus *Pelargonium* hybridises so readily it is just about irrelevant to try to specify the name of a species of *Pelargonium*.

Geranium essential oil is widely used as an invaluable floral component in fragrances, cosmetics, household items and many other products where fragrance is needed. It is a major component in the soap industry and is also used in pharmacy, herbal medicine and aromatherapy. There are numerous clinical, scientific publications which prove its antiseptic properties and beneficial influence on human wellbeing and psychological condition.

Geranium oil is extremely complex in its composition, making it very difficult to 'copy' with synthetic materials – undoubtedly from a viable economic point of view.

Pelargoniums are in fact native to South Africa (NB: we'll use the term geranium from now on to reflect the most common naming nowadays). It was probably by the end of the 17th century that cuttings were exported to Europe, and from there geranium was eventually re-exported to the French colonies. In North Africa, rose scented geranium was first introduced in 1847 in Algeria from Grasse (France). In Egypt, it was introduced by a Frenchman, Charles Garnier, by 1930. Egyptian production was interrupted in the aftermath of Nasser's *coup d'état* in 1952, prior to being revived a few years later through the efforts of Ahmed Fakhry amongst others. Since then, Algerian geranium (once the world's leading producer) has disappeared

from the map, leaving Egypt as the quasi sole representative of the 'North African' geranium type besides a minor production in Morocco.

In China, geranium was introduced to the Yunnan Province by a state-owned company in the 1970s. At that time, geranium was planted around Kunming City, in Anning and Chenggong Counties. The scale was small and quantities produced below 10 tonnes per year:

Chinese and Egyptian (North African) geranium oil have substantial oil composition differences, as shown in the table below. It is worthwhile reminding that citronellol and geraniol *ex-geranium* oil are the major constituents of Rhodinol, a very important component in the fine fragrance industry.

Today, the two main producers of geranium oil are China and Egypt. Their combined production has reached, annually over the past 5 years, 280–350 tonnes, compared to a total world production of some 350-400 tonnes. Over the past six years, Egypt has substantially increased its production to reach 200-230 tonnes, whereas production in China has remained at between 80-100 tonnes. India (25-35 tonnes/year), Madagascar (<10 tonnes/year), South Africa (5-10 tonnes/year), Reunion Island (2-6 tonnes/year), Kenya (<1 tonne/year), Morocco (<0.5 tonnes/year) and Congo (<0.5 tonnes/year) are other smaller geranium oil producers and would account for the remaining 20% or less, while projects/trials have been considered/attempted in Uganda, Ethiopia, and Zimbabwe.

In China today, cultivation is concentrated in Yunnan Province, in the district of Binchuan. In Egypt, the main production areas are in Upper Egypt, mainly Beni-Suef and Fayoum.

Oil composition of Chinese and Egyptian geranium oil		
	Chinese type	Egyptian (North African) type
Citronellol	32 – 43%	25 – 36%
Geraniol	5 – 12%	10 – 18%
6,9 – Guaiadiene	3 – 7%	<0.5%
10 – Epi λ Eudesmol	0% (not detectable)	3 – 6.2%

PRODUCTION AND PROCESSING CHARACTERISTICS

In **China**, two distinct harvests were carried out annually in the past. Today, the system has changed to harvesting every month to every two weeks at the height of the season between the months of March and October:

Geranium needs water but not too much, otherwise the water will cause the roots to rot. Therefore it is planted on the hilly side of the river valley. Farmers plant 8,000 geranium plantlets per *mu* (15 *mu* = 1 hectare) and the life cycle is 5 years normally. In some areas farmers need to replant after 3 years because of die-outs impacting agricultural yields. The collected material is wilted for 1-2 days and then it is steam distilled in field distilling factories. The average yield per *mu* is 5-7 kgs (75-105 kg/ha) and the oil yield is 0.2-0.25%.

The cultivation from Kunming moved to Binchuan in the late 80's and developed fast in the early years of this century with areas increasing from 20,000 *mu* to 40,000 *mu*.

China's annual geranium oil production could be detailed as follows:

1990s:	60-100 tonnes
Early 2000s:	80-230 tonnes
Recent years:	80-120 tonnes

In the early 2000s, farmers started drifting away from geranium to other higher economically yielding plantations like grape, tangerine etc, which provided them choice diversification and higher income. Geranium plantations moved to less developed areas like Shiping County, Yongsheng County and Yuanmo County. Geranium remains planted on more or less 10,000 *mu* in Binchuan, which still remains the most important centre for collection and trade due to its 30 years involvement with the crop.

In **Egypt**, planting is in October until November. It is often intercropped with

garlic which serves collaterally as a pest repellent. In the Beni-Suef and Fayoum areas, where the crop is harvested only once in June, the whole aerial part of the blossoming plant is collected. In other areas the crop is kept semi-perennially in land up to 3 years, in which case two harvests (in June-July and October-November) of the whole aerial part of the plant above three green budding eyes are carried out to allow regeneration. It is thought that the 2015 crop is 8,000 acres (3,500 hectares). The average agricultural yield is 25-30 kg/acre (60-70 kg/ha) – individually reaching 40 kg/acre (95 kg/ha) – and the oil yield is 0.15-0.2%.

The collected material is used for distillation, and the oil is obtained through steam distillation. Some material is used for extraction purposes to produce geranium concrete and absolute, but probably does not represent more than 0.5% of quantities dedicated to distillation and oil production. The processing of the geranium takes place mainly at farm level. Production of both concrete and absolute takes place in dedicated extraction factories.

SOCIAL AND ECONOMIC CHARACTERISTICS

In **China**, 5,000 to 7,000 families are involved in the production of geranium oil. It is estimated that around 25,000-30,000 people – including middlemen, transport workers, factory workers and exporting companies – are involved in the whole supply chain.

In **Egypt**, the production of geranium is increasingly scattered amongst a greater number of growers. However, taking into account the minimum and maximum production figures of these past 5 years and average farm size in the areas concerned, one can safely articulate that up to 8,000 families are involved in the production of geranium oil. This figure does not account for middlemen, intermediaries of all sorts (e.g. transportation), factory workers, exporting companies and other family

dependents, leading probably to some 30,000-35,000 people being involved and benefiting from the whole supply chain.

Geranium is the top selling oil from Egypt accounting for ca. 45% of Egypt's national turnover of 100% pure and natural aromatic raw materials. With 2013 prices hovering (on average) around 120-125 US\$/kg oil, one can argue that a sizeable share of some US\$19 million reached the aforementioned up to 8,000 families. It should be acknowledged that in peak years (e.g. 2010-2011) geranium annual revenues for Egypt probably reached US\$37 million. Since the industry is not penetrated by governmental institutions/enterprises, these amounts are directly benefiting the grower families who, as farmers, and according to Egyptian law, are not subjected to any taxation.

It is easy to understand why the many small farmers that plant it appreciate geranium as a cash crop. The oil is easily stored, and serves as a 'savings' account, allowing families to manage their expenditure when required. The oil doesn't go rancid: as a matter of fact it is bonified with time if properly stored.

CONCLUSIONS

In **China**, 5,000 to 7,000 families are involved in the production of geranium oil and around 25,000-30,000 people are involved in the whole supply chain. Geranium plantations are a real alternative for people's income in economically undeveloped/underdeveloped areas like Shiping County, Yongsheng County and Yuanmo County.

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Globally, one could arguably extrapolate that the economic benefits of geranium oil production (i.e. from agriculture to initial exports) percolate down to a population of some 100,000 – 150,000 people.



Distillation of geranium in Yunnan Province



Geranium cultivation in Egypt