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E: info@cropwatch.org T: ++44 (0)7771 872 521

Ravensara-Ravintsara Confusion.

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by Tony Burfield.

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Pre-amble.

The situation regarding the exact botanical identification of the source(s) of Ravensara essential oil has previously confused and even lead to arguments amongst some learned and academic researchers (let alone aromatherapists!), and has been the subject of a number of articles. Sylla Sheppard-Hanger (1996) reviewed the literature on Ravensara oils (14 references and much unpublished material). More recently Marge Clarke has reviewed the Ravintsara-Ravensara conundrum at <http://www.naturesgift.com:80/Ravensara-Ravintsara.htm>.

Michel VanHove also supplied information on the history of Ravensara oil (via Internet newsgroup "idma" communication 7.5.2000) following publication of Maria Lis-Balchin's article in the *Journal of the Royal Society for the Promotion of Health* 1999 (Lis-Balchin 1999), which many saw as containing inaccurate & misleading statements about health & safety of natural aromatic materials, including a controversial statement about Ravensara oil. The editor of the Journal mentioned above refused to subsequently publish a full critique of the content of Lis-Balchin article by Janina Sorenson and this author, which was eventually published elsewhere (Burfield & Sorenson 1999).

Michael Vanhove refuted Lis-Balchin's claim that Ravensara was a novel oil introduced via an aromatherapist in an unreferenced book (the book in question being Franchomme P. & Penoel D. "*Aromatherapie Exactement*" 1990). VanHove claimed that "It is not true to state that Ravensara has been introduced by Pierre Franchomme or Dr. Penoel"..., and goes on to show that in fact it had long history of previous use. VanHove offered that the first citation was in 1913 by Ferraud & Bonnafous, and it was mentioned later in 1929 by E. Gildmeister & Fr. Hoffman (also predating the coining of the word 'Aromatherapy' by R.M. Gattefosse in 1937: see Belaiche P. (1991)). Further, the introduction of Ravensara oil into French aromatherapy practice was well before the publication of *l'Aromatherapie Exactement* in 1990 - for example, *Ravensara aromatica* is mentioned by several French Aromatherapy authors: Viaud (1983), Balz (1986), and Roulier (1990).

The Botany of Ravensara and Ravintsara.

Ravensara aromatica was described in 1642 by de Flacourt, who noted local people cut the tree to obtain the seeds which were used for flavouring food. *R. aromatica* was characterised in 1782 by Sonnerat, as the sole member of the *Ravensara* genus. Kostermans mentioned *R. aromatica* in *Flore de Madagascar et des Comores* (Kostermans 1950), but later included *R. aromatica* with nine other *Ravensara* species in a 1958 article (Kostermans 1958). The *Ravensara* genus now contains about 30 endemic Malagasy species (Rohwer 1993), and *Ravensara* species were proposed to be distinguished from *Cryptocaria* spp. in the larger *Cryptocaria* genus (350 species) by their possession of ruminant fruits. However since some *Cryptocaria* spp. growing outside Madagascar also have ruminant fruits, this differentiation protocol was deemed insufficient, and Van der Werff (1992) proposed the conservation of *Cryptocaria* over *Ravensara*, although transfer of all *Ravensara* spp. to *Cryptocaria* was considered premature by Van der Waff (Van der Waff 2008).

Ravensara aromatica is found as aromatic tree growing to a height of 20m. at elevations of 700-1000m in humid evergreen forests in the East of the island with a few stands growing on the Eastern coasts. The tree has fragrant leaves, bark and nuts, the anise-flavoured bark being used for local rum-making. Dangay described the species as *R. anisata* in 1925, based on its aniseed odour character, but Kostermans in 1950 characterised both species as the same plant (Kostermans 1950).

The conservationist and essential oil trader Olivier Behra (as formerly displayed at http://www.olivierbehra.com/us/ess_oil/ravinO.htm, but now seemingly unavailable) maintained that 'Ravintsare' oil - Ravintsara being a Malagasy word meaning "good leaves" - is derived from a naturalised *Cinnamomum camphora* species.

Ravensara Bark Oils.

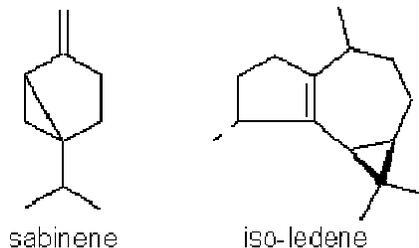
R. anisata listed above, is considered synonymous with *R. aromatica* according to Kostermans (1950), as agreed by Rosoanaivo (1997), Rasoanaivo & De la Gorce (1998) & Juliana *et al.* (2005). The composition of the **stem & bark oils** of *R. aromatica* was confirmed as containing 90% methyl chavicol (estragole) by Rosoanaivo (1997). This is in agreement with de Medici *et al.* (1992) who similarly found up to 90% methyl chavicol as the main component of *R. anisata* oils (where 'R. *anisata* essential oil' is interpreted as *R. aromatica* bark oil). Tucker (1995) found that a commercial oil of *R. anisata* to contain methyl chavicol (61.62%) and (E)-anethole (20.09%).

However Franchomme & Peneol (1995) regarded *R. anisata* and *R. aromatica* as two distinct species, and Mollinbeck *et al.* (1997) found the rodent carcinogen methyl eugenol to be the main component of Ravensara oil.

Ravensara Leaf Oils.

It is the Ravensara **leaf oils** sourced from Madagascar, or perhaps occasionally from Mauritius, distilled from the heavily exploited evergreen tree 'havoza', which are invariably sold by essential oil / aromatherapy essential oil sellers. Where

distilled from *Ravensara aromatica* (syn. *Agatophyllum aromaticum*) as discussed above) the essential oil has been described as being principally composed of the monoterpene hydrocarbons α -pinene, sabinene, myrcene, limonene, & iso-ledene.



This is not the end of the story. Five *Ravensara aromatica* leaf oils were analysed by Ramanoelina *et al.* (2006) which were found to contain mainly methyl chavicol (79.7%), methyl eugenol (8.5%) & limonene (3.1%). Andrianoelisoa *et al.* (2008) analysed 28 samples of formally identified *R. aromatica* leaf oils and divided the leaf oils into 4 types: a <90% methyl chavicol type, a 74-92% methyl eugenol type, a terpinene (25-28%) and limonene (15-22%) type, and a sabinene (25-34%), linalool (7-21%) and terpinen-4-ol (6-12%) type. The possibility then, of the existence of *R. aromatica* chemotypes is difficult to dismiss from this evidence. Even more worrying is the fact that many aromatherapists regard Ravensara oils as safe (even for children) whereas the existence of the rodent carcinogens / suspected human carcinogens methyl chavicol and methyl eugenol in these bark and leaf oils would suggest that this blind assumption needs further urgent examination and discussion.

Ravintsara Oil.

An introduced species of *Cinnamomum camphora* (L.) Presl. from Formosa (Behra *et al.* 2001; others say Taiwan) introduced into the highlands and South Madagascar in the mid 19th Century (Jeannot *et al.*) initially grown as an ornamental, is / was also confusingly called “ravensara” by many essential oil sellers, and even worse, has often been incorrectly described as *Ravensara aromatica*. It is this species which corresponds to Behra’s “ravintsare” above, according to information previously available at http://www.olivierbehra.com/us/ess_oil/ravinO.html. Behra *et al.* (2005), Jeannot *et al.* 2007) & Juliana *et al.* (2005) have characterised the composition of the oil; it appears that as the plant has become adapted to the Malagasy climate, it has seemingly lost the ability to produce camphor, and the oil is mainly composed of sabinene (13-15%), α -terpineol and over 50% of 1,8-cineol. This Malagasy essential oil is (or certainly should be) a different oil to the white camphor oil (*Cinnamomum camphora*) of commerce, which is invariably the front distillation fractions of camphor oil Chinese (cineol type). Juiana *et al.* (2006) report that they analysed two commercial essential oils labelled as *Ravinsara aromatica* oil which actually derived from *Cinnamomum camphora*.

Conclusion.

Cropwatch has some concerns that the indiscriminate selling of Ravensara essential oils with notable estragole & methyl eugenol contents, may be risking the health of end-users. There has been little concern expressed in aromatherapy circles to date about any toxicological risks from Ravensara bark/leaf oils, although Tisserand & Balacs (1995) warn against the use of 'Ravensara anisata oils' because the carcinogenic potential of their high estragole content.

Threatened Status.

Behra *et al.* (2001) admit to numbers of trees of *Ravensara aromatica* Sonnerat declining due to deforestation in some areas, and sparse numbers occurring in Eastern coastal regions (but trees 'still abundant' in the humid central Eastern rainforest). Rosoanaivo (1997) describes *Ravensara aromatica* Sonnerat as a rare aromatic plant and describes one Malagasy company that exports 1 ton of essential oils of *R. aromatica* stem bark (can you guess this company's identity?). The total amount of stem bark destructively harvested was estimated by Rosoanaivo at 100 tons per year. Collection of bark to distil these bark oils was injuring and thereby threatening the ecological status of the tree in Madagascar, and is hopefully being actively discouraged by the Forestry Department. However there is no clear indication that this is happening, and there are reports that Government sustainability policies are not enforced at local level. Further, since demand for Ravensara leaf oil outstrips demand, cutting trees to quickly access the gathering of higher leaves is commonplace. Western demand for Ravensara leaf oil represents some potential threat to the future ecological viability of the tree in Madagascar.

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