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Essential Oil Yielding Grasses and their Possibilities in Madras State

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Introduction: Most of the food grains which man consumes as food, such as paddy, wheat and millets belong to the family of grasses. There are ,however, certain members of the Gramineae, which are put to other economic uses. Many of the grasses yield oils of different compositions, some of which are credited with medicinal properties while certain others are very useful in perfumery and soap making. The commercially important essential oils are mainly derived from the genus *Cymbopogon*, Hack. There are about 10 species which are common in South India; many of them occur in the wild state, while a few of them are cultivated in limited areas in certain parts of the province. Another valuable grass which yields a scented oil is *Vetiveria zizanioides*, Nash, which is well known in South India. The essential oils exported from our country to Europe and U. S. A. during 1949—1950 amount to one lakh of gallons, fetching about 66 lakhs of rupees; the export reached a peak figure of one crore and 14 lakhs in 1946—'47. The possibilities of developing the trade are enormous, but no systematic efforts are being made to exploit these grasses. There are no large-scale distilleries in South India; but a few enterprising people have started small-scale distilleries and much of the essential oils are the outcome of cottage industries.

Most of these aromatic grasses are indigenous to India and Ceylon and thrive in many parts of South India. Varieties of these grasses are cultivated in Ceylon, Burma, Java, Philippines, Madagascar, West Indies and certain parts of India. The climate of certain parts of our State is very congenial to the proper growth of these grasses. The oil content of individual grasses vary and the yield and composition of even the same species grown in different soils and climatic conditions differs. Attempts have been made to collect some of these grasses and plant them in the Botanic Garden at Coimbatore. This paper deals with some of the important species in the State.

From early times these grasses have been utilised in medicine, in various religious rites and in making perfumes. Of late a taste for these oil grasses has developed and regular industries are developing in small scale in South India as well as Ceylon. There are great possibilities for developing this industry in South India where there are about a dozen species, out of which a few could be worked commercially at present. Others can be made equally serviceable by carrying out trials in different localities, to study the suitability of the grasses to the soils.

Several authors have recorded the trials of these grasses in their countries with details of cultivation, yield, oil content and suitability to the soils. Sudborough (1918) stressed the need for careful experiments regarding growing of economic species, and for evolving an

effective method for extracting the oil. Rhind (1930) examined three *Cymbopogon* species from Burma and discussed the economic importance of these grasses. David (1940) studied the performance of *Cymbopogon nardus*, Rendle, and mentioned that no significant difference seems to occur between the oil content of leaves cut from plants which produced flowers and other plants which had no flowers. George (1924) discussed the soil conditions, yield of oil and cultivation methods of *Lemon grass (Cymbopogon flexuosus*, Wats.) and *Citronella grass (Cymbopogon nardus*, Rendle). Casgrove (1946), Comber and Casgrove (1947) mention the yield and period of cutting lemon grass. Luthra (1941) suggested methods of raising suitable profitable grasses. Menon and Ittyachan (1947) recognised the importance of *Vetiver* grass and urged the need for more intensive work to study the yield, oil content, aroma, etc.

The following paragraphs give an account of seven grasses from which essential oils are extracted. The distribution of these grasses in South India, their soil preferences, the quality of oil and their uses are described, assessing their value and possibilities of development.

1. *Cymbopogon nardus*, Rendle *(Andropogon nardus*, L. Citronella grass): Citronella grass, is extensivelly grown in Ceylon and Java for the extraction of the Citronella oil. In South India it grows wild in the Nilgiris and Salem districts. It is reported to thrive well in sandy loams. The grass is propagated by culms or suckers more easily than by seeds. Harvesting could be done thrice a year; leaves which are neither too old or too young yield the best quality oil. No significant difference has been noticed in the oil content of leaves gathered before and after flowering, but oil extracted from dried leaves was poor in quality.

Citronella for export should contain not less than 85% "geraniol". Java Citronella oil is considered to be of the best quality in the U. S. A.

2. *Cymbopogon citratus*, Stapf. (Lemon grass)

Telugu: *Vasana gaddi, Chippa gaddi.*
Tamil: *Vasana pillu.*
Malayalam: *Vasana pullu.*

Lemon grass is mostly cultivated in tropical countries such as Ceylon, Burma, Java, Mauritius and Malay Peninsula preferably at low altitudes. The grass makes rapid growth on good, well-drained soils. Propagation of the grass is effected by the division of clumps. The spacing and cultural practices differ from place to place, according to soil and climatic conditions. Prior to planting, the land is to be ploughed well and manured and then the culms are planted before the monsoon rains. During the early stages of growth the furrows should be frequently hoed to eradicate weeds, which often give an undesirable odour to the oil. The grass will be fit for harvest after 4 to 5 months, depending on the climatic conditions and fertility of the soil. The number of cuttings per year varies from 5 to 9 and the maximum number of cuttings could be had during the second year of cultivation. After three or four years it is found necessary to replant the area. The lemon grass oil extracted from the grass has a lemon-like odour and taste. The Citral content in the oil varions from 70 to 85%. It is largely employed in perfumery and for the preparation of Ionone.

3. *Cymbopogon flexuosus*, Stapf. (Andropogon nardus, L.)
"The Ginger grass" or "Malabar or Cochin lemon grass".

Tamil : *Chukkunari pul.*
Malayalam : *Chukkunari pullu.*
Kanarese : *Anthi balai*

The grass is indigenous to india and is found growing wild in almost all the districts of the Province. Two main types are recognised in Travancore and Cochin, the red-stemmed variety and the white-stemmed variety. The grass grows best in a well-drained sandy loam or on light, sandy soils. In Travancore State the grass is cultivated in the northern district, in hill slopes and forest clearings. In Nilambur (Malabar) this is grown in an appreciable area and a small distillery is managed by a private owner for extracting the oil.

Propagation is generally done by means of seeds which are scattered at random on ploughed ground in March–April. The grass is ready for harvest by June after which cuttings can be had at intervals of 30–40 days. Replanting has to be done every 6 or 8 years.

The "Malabar or Cochin Lemon-grass oil" is exported to Europe and America and a small quantity is also consumed locally.

Export of Oil from India to Europe and U. S. A. *

Year	Gallons	Value in Rupees
1944—1945	1.21,629	32,12,243
1945—1946	1,50,790	7.013,862
1946—1947	1,33,390	1,07,45,131
1947—1948	84,053	36,56,595
1948—1949	95,824	24,07.677
1949—1950	82,166	42,07,165

*From Wealth of India, Vol. 1., 1950.

India has been the principal country producing this Lemon-grass oil. In the recent years other countries as Gautemala and Honduras have started the cultivation and production of this oil. In India there is great scope for increasing the area under this grass and expanding our exports.

4. *Cymbopogon coloratus*, Stapf.

Telugu : *Botha gaddi*
Tamil : *Manda pillu*
Kanarese : *Badai hullu*

This grass is not known to be in cultivation anywhere. The species is distributed as a wild grass from Tinnevelly to Anamalais. It is highly aromatic and comes up well in dry areas. The oil extracted from this grass is reported to be inferior to that of lemon grass, but the oil yield is more than in lemon grass. Isolation of superior quality strains in this species might be possible, as this grass has a very extensive natural distribution in the dry areas of the South.

5. *Cymbopogon martini*, Wats.
"Rosha grass" or "Geranium grass".

Telugu : *Kache gaddi*
Tamil : *Kavallam pillu*
Kanarese : *Kasi hullu,*

Occurs very commonly in South India and thrives well to an elevation of 5,000 feet. Two varieties are recognised, *Motia* and *Sofia* which are morphologically indistinguishable. The *Motia* variety is not gregarious but *Sofia* variety covers extensive areas. The commercially important *Palmarosa oil* is derived from the *Motia* variety which is also known as *Rusa oil* or *East Indian geranium oil*. *Sofia* variety yields *Ginger grass oil*, which, though not as valuable as the former, is also important commercially. In India *Motia* grass is cultivated in several centres like Lyalpur, Malghat, Betul, Numar, Khandesh and Bombay. The *Sofia* variety is produced in Madras, Punjab and Bengal.

The *Palmarosa oil* is extensively used in India in adulterating Attar. Large quantities are, exported to Europe for use in perfumery. The grass is valued as a remedy for lumbago, skin diseases and stiff joints.

Export of Palmarosa oil *

Year	Quantity. (gallons)	Value (Rupees)
1944—'45	7,061	12,10,883
1945—'46	9,263	12,97,433
1946—'47	3,802	7,19,438
1947—'48	2,708	9,93,385
1948—'49	7,950	10,05,473
1949—'50	14,075	23,88,279

* From Wealth of India, 1950, Vol. 1.

6. *Cymbopogon caesius*, Stapf (Kachi grass)

Telugu : *Kamanchi gaddi*
Tamil : *Kamakshi pull*
Kanarese : *Kamancha hullu*
Malayalam : *Inchipul*

It resembles ginger grass in fragrance and properties. More than the leaves the flower heads are rich in oil content. The grass is found wild in South India and is not cultivated. It is distributed throughout the State upto an elevation of 2,500 feet. A small quantity of the oil is exported from India.

There are three more species of *Cymbopogon* occuring in South India, viz. *C. Confertiflorus*, stapf., *C. polyneuros*, stapf. and *C. gidarba*, Haines, which are not very common. But these grasses also yield similar oils and can be tried on a larger scale to study their suitability in the essential oil industry.

Vetiveria zizanioides, Stapf.

Vetiver grass, Khus-khus grass.

Telugu : *Veltiveru*
Tamil : *Vetiveru*
Kanarese : *Lavancha*
Malayalam : *Ramecham*

This well-known grass is cultivated in parts of Tanjore, South Arcot District and Malabar for their aromatic roots. Besides the extraction of essential oil the roots are used for making fans and window mats. This gives a pleasant cool fragrance in the hot summer months.

The cultivation of this grass differs from place to place; but it comes up in all soils, particularly in well-drained soils and sandy loams. The rooted slips are planted 18" apart on raised bunds which are 3' apart. Harvesting is done after 14—16 months when the roots are dug out of the soil, and sent for distillation. The oil is highly valued in perfumery and the soap industry. Medicinally the oil is regarded as a stimulant, diaphoretic and refrigerant. The grass covers large tracts in Punjab and Cuttack; and is cultivated in Rajaputana, Chota Nagpur and in South India in Tanjore, South Arcot and Malabar.

Summary and Conclusions: No development of essential oil industry is possible in India, until as a first step a systematic search is carried out on the available resources in aromatic raw materials. The identification and classification is difficult, as a number of forms are met with. Morphologically indistinguishable grasses yield oils differing in oil content and quality. Regarding the nomenclature of these grasses, some difficulty is experienced due to the uncertainty of specific characters. A detailed investigation of the taxonomy of this genus (Cymbopogon) is therefore essential, in the interest of the grass oil industry.

To establish the industry on a firm basis it is also necessary to cultivate the grasses in different climatic conditions, to select economic and profitable strains.

Till recently Travancore and Cochin were the principal producers in the world of oils like the *Palmarosa oil* and *Lemon grass oil.* But of late other countries have taken to the cultivation of these grasses and before they become our competitors, the cultivation of these in India has to be taken up on a large scale. At present small distilleries are owned in certain parts of Travancore, Cochin and Malabar and the oils that are exported do not appear to be as pure as those received from other countries; it is essential that purity of the oil must be aimed at for creating a market in foreign countries. Large distilleries have to be installed for extracting the oils. By systematic surveys, trials, cultivation and scientific distillation methods, the industry can be developed much more extensively.

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