Cymbopogon martinii (Roxb.) Wats.

Family : Poaceae
Parts Used : Leaf, Flowering tops
Vernacular Names
English : Palmarosa, Rosha grass
Malayalam : Palmarosa
Hindi : Gandhabei
Sanskrit : Dhyamakah
Gujarathi : Rauns
Tamil : Munkilppul

Distribution and Habitat : It grows wild in India, particularly in Madhya Pradesh, Maharashtra, Andhra Pradesh, Karnataka, Uttar Pradesh and Orissa. Palmarosa oil is distilled in India for more than 50 years, mostly from wild growths. Plant was successfully introduced into Java, Seychelles, Guatemala and Brazil where commercial production was undertaken to a limited extent. About 60-70 tonnes of palmarosa oil is produced in India annually both from cultivated and natural sources.
Botany: A perennial grass growing up to 2-3 m **.**

• ***Leaves***: Lanceolate, 50 cm long, 1-3 cm broad.

• ***Inflorescence***: Panicles 10-30 cm long, turning reddish, often very bright when mature. Racemes 15-19 mm long, in pairs, each consisting of many pairs of spikelets. In each pair, one is sessile and hermaphrodite and other is pedicelled and male. Sessile spikelets 3.5 mm long. Glumes 3.3- 4.0 mm long. Awns 11.4-14.0 mm long. Lower glume of fertile spikelets deeply channeled**.**

Chemical constituents: Motia oil contains limonene, *p*-cymene, methyl heptanone, 2-nonanol, linalool, citronellol, farnesene, β-terpineol, β-humulene, α-terpineol, geraniol, geranyl acetate and farnesol
Uses: In perfumery
Agro technology:
***Soil and climate*:** Palmarosa grass is a tropical plant and it grows in warm humid areas. It is susceptible to frost and hence frost-prone areas are not suitable for its cultivation. Although it grows best on soils having neutral pH, it survives and gives economic yields on alkaline soils of pH upto 9. The variety Motia prefers well drained soils and it grows in separate clumps on open dry hill sides with a rainfall of 800-900 mm. It cannot tolerate stagnant water. The variety Sofia grass grows densely and abundantly at lower altitudes in moist and poorly drained soils in areas of higher rainfall.
Propagation: It is propagated through seeds and also through slips. Seeds are sown on nursery beds prepared in May. Healthy and established seedlings, about 15 cm tall are carefully removed from nursery and transplanted in rows, 20-60 cm apart with plants spaced at 20-60 cm. Spacing can be increased on fertile soils.
***Manures and Fertilizers*:** Farm yard manure is given at 10 tonnes/ ha before planting. Fertilizers at 20 kg N, 50 kg P2O5 and 40 kg K2O/ ha are given at planting as basal dose. About 40 kg N/ ha is applied in two splits during growing season. NPK application should be repeated each year at time of appearance of fresh leaves. Application of micronutrients like iron (as FeSO4) and manganese (as MnSO4) improve growth, herbage and oil yield.
***Irrigation*:** Palmarosa plantations are to be irrigated at 10-14 days interval during summer
***Harvesting*:** Optimum stage of harvest is initial seed setting stage about 10-15 days after flowering. Grass is cut at a height of about 10 cm from ground level and whole plant is used for distillation. During first year one or two cuttings can be obtained depending upon climatic conditions. After first harvest, subsequent harvests can be made at 70-80 days interval and 3-4 cuttings can be taken a year. Plantation remains productive for 4-6 years. Yield of grass and oil starts decreasing from third or fourth year onwards. Grass yield is 6-10 tonnes/ cut/ ha.
Pests

• Aphids: Adults and nymphs of *Aphis gossypii* (Hemiprera: Aphididae) suck sap from inflorescence of plants. Attack is maximum during summer from January-April. Spraying dimethoate at 0.3-0.7 kg a.i/ha is effective to control pest.

• Thrips: Adults and nymphs of yellowish brown thrips namely *Haplothrips sp*. (Thysanoptera: Thripidae) damage young shoot tips and leaves and also feed on floral parts affecting seed setting. Attack is more severe during February-April and July-August. Dimethoate spraying will suppress pest damage.

• White grub: Grubs of *Holotrichia consanguinea* (Coleoptera: Melolonthidae) feed on roots of palmarosa. Grub is dirty white or brown coloured and severe damage is during June-November. Chlorpyriphos 20EC at 600-800 ml/ha with irrigation water effectively controls pest damage.

• Termite: *Microtermis sp*. (Isoptera: Termitidae) is the major termite, attacking palmarosa. Whitish coloured adults damage crop throughout year. Newly planted seedlings are more vulnerable and plants die when basal portion of stem is eaten away. Chlorpyriphos 20EC with irrigation water controls pest.

Diseases
Palmarosa cultivation in large scale sometimes attracts two major fungal diseases viz. Ellisiella blight and Curvularia blotch.

• Ellisiella blight: It is one of the serious diseases of Palmarosa caused by *Ellisiella caudate*. Small grey necrotic spots appear as initial symptom on the surface of infected leaves. In severe cases lesions get enlarged and coalesce resulting in premature drying of infected leaves. Fungus produces masses of spores on dried necrotic lesions. Disease can be effectively controlled by foliar spraying captafol or chlorothalonil @ 0.3% at 15 days interval.

• Curvularia blotch: This disease is prevalent in Palmarosa growing areas of UP, MP, Bihar, Karnataka and J&K and is caused by *Curvularia andrographis* and *C. trifolii*. Disease occurs in epiphytotic form during August and October. Small eye shaped, orange/brick red necrotic lesions appear and coalesce together resulting in premature drying of leaves. Foliar application of mancozeb @0.3% at 15 days interval at initial stages of infection effectively controls the disease.

• *Dreschlera cymmartinii* also infects palmarosa. Application of a suitable fungicide can be resorted to, if attack is severe.

Processing: Harvested herbage is allowed to wilt in shade for 24-48 hours for draining off excess moisture from leaves. This reduces bulk and cost of distillation. Oil can be obtained either by hydrodistillation or by steam distillation. Steam distillation yields more of better quality oil. Oil content and yield depend upon climatic conditions, harvesting time, maturity of grass, extent of wilting and distillation process. Oil yield is low in first year and it increases with age but gradually decreases after fourth year. All parts of plant contain essential oil, the maximum being present in flowers(0.45-0.52%) and the least in stalks (0.01-0.03%). Average annual oil yield is 100-125 kg/ha though a yield of 250 kg/ha is not uncommon.