

# MENTHA (MINT)

**Family:** *Lamiaceae* or *labiatae*

**Indian name:** Pudina

There are four species of Mentha: *Mentha arvensis*, *Mentha piperita*, *Mentha spicata* and *Mentha citrata*

- *Mentha arvensis* (Japanese mint)
- *M.piperita* (Peppermint)
- *M.spicata* (Spearmint)
- *M.citrata* (Bergamot mint)

**Varieties:** Himalaya, Kalka, Shivalik, Kosi, Gomati, EC-41911, Kulkrail, Kiran, MSS-1, MSS-5  
Punjab spearmint-1

**Distribution:** India, Brazil, Paraguay, USA

**Origin:** Mediterranean regions

**Uses:**

- Culinary purposes.
- Mentha oil obtained by distilling the green herb is used in pharmaceutical, flavour, cosmetic and perfume industries.

Mints are a group of perennial herbaceous plants, belonging to the family *Lamiaceae* or *Labiatae*, which yield essential oil on distillation. The various species of mints which are commercially cultivated in different parts of the world are:

- Japanese mint or corn mint or field mint (*Mentha arvensis*)
- peppermint (*M.piperita*)
- spearmint or garden mint or lamb mint (*M.spicata*)
- bergamot mint or orange mint (*M.citrata*)

## **Distribution**

Among the mints, Japanese mint is cultivated on a large scale in Brazil, Paraguay, China and India. Peppermint is grown in USA, Morocco, Argentina, Australia and on a small scale in many European countries. USA is the major producer of peppermint and spearmint. In India, the total area under mint cultivation, which is mostly confined to Uttar Pradesh and the Punjab is around 10,000 ha.

### **Composition and Uses:**

**Japanese mint (*M.arvensis*)-**Japanese mint is a primary source of menthol. The fresh leaves contain 4-6% oil. The main constituents of the oil are menthol (65-75%), menthone (7-10%) and menthyl acetate (12-15%) and terpenes (pipene, limonene and comphene).

### **Peppermint (*M.piperita*)**

The fresh herb contains essential oils ranging from 0.4 to 0.6%. The constituents of peppermint oil are almost similar to Japanese mint oil. However, the menthol content is lower in peppermint oil and varies between 35- 50%.

### **Bergamot mint (*M.citrate*)**

Linalool and linalyl acetate are the main constituents of Bergamot mint oil. The oil is used directly in perfumes. Cosmetic preparations like scents, soaps, after-shave lotions and colognes also contain this oil.

### **Spearmint (*M.spicata*)**

The principal constituent of spearmint oil is carvone (57.71%) and the other minor constituents are phellandrene, limonene,L-pinene and cinelole. The oil is used mostly as a flavouring in toothpastes and as food flavouring in pickles and spices, chewing gum and confectionery, soaps and sauces.

**Climatic requirements:** It can be cultivated both in tropical and sub-tropical areas. The mean temperature between 20-40<sup>0</sup> C during major part of the growing period and rainfall between 100-110 cm. (light showers at planting stage and ample sunshine at the time of harvesting) is ideal for its cultivation.

**Soil:** Well drained loam or sandy loam soils rich in organic matter having pH between 6 and 8.2 are ideally suited for its cultivation. It can also be cultivated on both red and black soil. In case of acidic soil having pH less than 5.5, liming is recommended.

**Land Preparation :** Two or three ploughings followed by planking are necessary to get a fine seedbed. The field should be free from stubbles and weeds.

**Seed Rate :** Mints are propagated through the creeping stolons or suckers. In the case of peppermint and bergamot mint, even runners are planted. Stolon are obtained from the previous year's planting. A hectare of well-established mint, on an average, provides enough planting material for ten hectares. About 400 kg stolons are required for planting one hectare of land. The best time for obtaining stolons is during the months of December and January.

**Planting:** The stolons are cut into small pieces (7-10 cm) and planted in shallow furrows about 7-10 cm deep with a row-to-row distance of 45-60 cm, manually or mechanically. While planting on ridges, the stolons are planted half-way down on the inner sides of the ridges. The plot is irrigated immediately after planting.

**Fertilizer Application:** Generally, nitrogenous fertilizers @ 80-120 kg P and K at 50 kg P<sub>2</sub>O<sub>5</sub> and 40 kg K<sub>2</sub>O/ha is required for a good crop of mint.

**Irrigation :** Mentha requires frequent but light irrigations. Irrigate at 10 days interval till the end of March and at five or six days interval till the onset of the monsoon. During the rainy season, irrigate according to the need.

**Harvesting and Yield :** The crop should preferably be harvested at the flower initiation stage. If the lower leaves of the plants turn yellow and start shedding, harvesting may be done earlier. Two cuttings can be taken, first in June and the second in September. The yield of the crop is 100-125 quintals per acre of fresh herbs which contains 0.5 to 0.75% oil.

**Processing and Marketing :** After harvesting, allow the crop to wilt overnight in the field and subject it to simple distillation. Some private distillation units provide facilities for farmers to extract oil.

**Yield:** A good crop of mint can give as high a yield as 48 t/ha of fresh herb. However, the average yield of mints from three cuttings is 20-25 t/ha. The fresh herb contains 0.4% oil.

# CITRONELLA

(*Cymbopogon winterianus*)

**Family:** Poaceae



**Origin:** Sri Lanka

**Uses:**

- The oil is used mostly in perfumery, both directly and indirectly. Soaps, soap flakes, detergents, household cleansers, technical products, insecticides, etc are often perfumed exclusively with this oil.
- Citronellal (chemical obtained from citronella) is occasionally used in traces in flower compositions of the citrus, cherry, ginger, etc.
- However, the greatest importance of Citronellal lies in its role as a starting material for further derivatives. Hydroxycitronellal can be prepared from citrinellal and it is a key ingredient in compounding. Hydroxycitronellal is one of the most frequently used floralizing perfume materials. It finds its way into almost every type of floral fragrance and great many non-floral ones.

**Soil:** Sandy loam soil with abundant organic matter is the most suitable. Heavy clay soils and sandy soils do not support good growth of the plant. The plant has been found to grow well under a pH range of 5.8-6.0.

**Climate:** Citronella thrives well under the tropical and subtropical conditions. It requires abundant moisture and sunshine for good growth. A good rainfall of about 2000-2500 mm well spread over the year and high atmospheric humidity, appear to influence the growth of the plant, yield and quality of the oil favourably.

**Propagation:** Citronella is a perennial grass, however, it does not produce viable seeds, therefore, the species can be propagated only vegetatively by slips. These slips are the unit of

propagation and on planting establish themselves as plants or bushes. Fibrous roots and leaves should be trimmed off the slips before planting.

**Season of Planting:** Although the plantation of citronella can be initiated anytime during the year, onset of monsoon is the best time. The land should be prepared to fine tilth by discing and tilling. There should be enough moisture in the field at the time of planting.

**Spacing:** The slips should be planted at a distance of 60 cm x 60 cm apart. However, in areas where the soil is very fertile and the climatic conditions support luxurious growth, a spacing of 90 cm x 90 cm may be followed.

**Method of Planting:** The slips are planted vertically, about 10 cm deep. The planting should be done in such a way that the excess water is drained off quickly. This is because plants are extremely sensitive to temporary waterlogging, which adversely affects the growth of the plant. It is better to plant citronella on ridges to avoid waterlogging. The field should be irrigated immediately after planting if there are no rains within next 24 hours.

**Intercultural Operations:** The citronella plantations should be kept weed free. This can be economically accomplished by running cultivator in between the rows.

**Irrigation:** Irrigation is provided twice a week during the first month of planting and thereafter once in 5 days.

**Manuring & Fertilization:** N@ 80-120 kg/ha per year; P and K @ 40 kg/ha each. It is beneficial to apply N in 4 equally split doses, the first about a month after planting and then after each harvest, at an interval of about three months.

**Harvesting:** Citronella is cultivated for essential oil. Although, all the plant parts contain oil, leaves contain the maximum amount of oil. Therefore, only the leaves should be harvested. Harvesting is done by sharp sickle at about 20-45cm above the ground. Under favourable conditions, upto 4 harvests can be obtained in a year. The leaves are ready for first harvest, about 6 months after planting. The second and subsequent harvests can be taken thereafter at 2.5 -3 months interval. Harvesting too soon and too late affects the quality of oil adversely. The delay also causes the leaves to dry up resulting in decrease in yield of oil. Horsegram is a very good rotational crop in south, cowpea or sunhemp (*Crotalaria* species) is recommended for north Indian plains.

**Yield:** On an average, the oil content is about 1% on the basis of fresh weight of leaves. Depending upon the nature of growth, the yield of fresh leaves is about 15-20 tonnes/ha in the

first year and 20-25 tonnes/ha in the second as well as in the third year, after which the yield declines. The yield of oil obtained during the first year is about 100 kg/ha and 150 kg/ha during second and third years. Under very favourable conditions, yield of 200-250 kg oil/ha can be obtained.

# LEMONGRASS

(*Cymbopogon flexuosus* and *Cymbopogon citratus*)

**Family:** Poaceae

**Origin:** India

**Area under cultivation:** At present it is grown in Thiruvananthapuram, Cochin, Assam, Maharashtra and parts of Uttar Pradesh.

**Uses**

- In India, oil of lemongrass is primarily used for the isolation of citral for manufacturing Vitamin A. Citral is the starting material for the manufacture of ionones (**Ionones** are aroma compounds found in a variety of essential oils) and is also used in flowers, cosmetics and perfumes.
- A small amount of oil is used, as such in soaps, detergents and other preparations.
- The spent lemongrass is suitable for making paper.
- It is also used as fuel for the distillation of the grass.
- It is an excellent source of manure. It is applied either after composting or in the form of ash by burning.
- It may be used for mulching coffee.
- It is a good crop for checking soil erosion.

**Soil:** Well drained sandy-loam soil is best suited for lemongrass cultivation.

**Climate:** Lemongrass requires warm and humid climate with sufficient sunshine and rainfall, ranging from 250-300 cm, uniformly distributed throughout the year. In the hilly areas of Kerala receiving heavy rainfall, the plant grows luxuriantly and is harvested more frequently but the oil and citral content are less as compared to the plants growing in the regions of less rainfall. Temperature range of 10-33 °C and sunshine is conducive to the development of oil in the plant.

**Varieties:** Sugandhi (OD 19), Pragati (LS48), Praman (Clone 29), RRL 16

**Propagation:**

- By Seeds- The crop flowers during November-December and seeds are collected during January-February. On an average, a healthy plant gives about 100-200 g of seeds.
- By Rooted Slips- For better quality and yield of oil it is recommended to grow lemon grass by slips

**Planting:** Seedlings are planted at a distance of 45 cm in rows, 60 cm apart. It is better to plant on ridges in areas receiving high rainfall. In case of rooted slips one or two slips are placed into each hole, about 15 cm deep. Deeper planting is dangerous as the plants may develop root-rot during the rainy season. Slips are transplanted firmly into the ground. This is done at the beginning of the rainy season. In northern India, planting by slips may be done in February if irrigation is available. In such cases, field is irrigated immediately after planting.

### **Irrigation**

Lemongrass has a high water requirement and frequent irrigations are essential for getting optimum yield in those areas where rainfall is restricted only to the monsoon. In northern India, 4-5 irrigations are required during February- June. As the plant cannot withstand any amount of water-logging, planting on ridges or open hill slopes is recommended.

### **Manuring & Fertilization**

It is recommended to apply 30 kg nitrogen, 30 kg P O and 30 kg K O per ha basal dose at the time of planting. Remaining nitrogen (60 kg) can be applied as top-dressing in 3 split doses during the growing season. In soils having low fertility levels, the dose of nitrogen should be increased.

### **Weed Control:**

Weeding and hoeing are very important as they affected the yield and quality of oil. Generally, 2-3 weedings are necessary during the year. Among herbicides, Diuron @ 1.5 kg ai/ha and Oxyfluorfen @ 0.5 kg ai/ha are effective for weed control. Lemongrass has been found to be a weed smoothing crop. After it is established, it may inhibit weeds.

**Harvesting:** The time of harvesting affects the yield and quality of the oil. The first harvest is generally obtained after 4 to 6 months of transplanting. Subsequent harvests take place at intervals of 50-60 days depending upon the fertility of the soil and seasonal factors. Under normal conditions, 2-3 harvests are possible during the first year and 3-4 in subsequent years, depending on the management practices followed. Harvesting is done with the help of sickles, the plants being cut close to their bases about 10 cm above ground-level.

### **Yield**

Depending upon soil and climatic conditions, plantation lasts on an average, for six years. The yield of oil is less during the first year. It increases in the second year and reaches a maximum in the third and fourth years, after which it declines.. On an average, 25 to 30 tonnes of fresh



herbage are harvested per hectare per annum from 4 to 5 cuttings, which yields about 80 kg of oil. Under irrigated conditions an oil yield up to 150 kg/ha has been recorded. The percentage yield based on fresh weight varies between 0.2 to 0.4.