

# **Citronella Production**

## **I. GENERAL DESCRIPTION OF THE CROP**

Citronella (*Cymbopogon confertiflorus*), A cogon-grass look-alike which has various industrial uses because of its oil, can be grown here in our country. The oil extracted from citronella is highly valued because it is used in perfumes, mosquito repellants, soaps, spray, disinfectants, paints and polish.

At present, we still import citronella oil for industrial consumption. On the average, this is \$1.5 million yearly.

In the Philippines, citronella production is still in the infant stage. There are only about 20 hectares planted to it in Leyte. Commercial production is feasible in 1,000 has in the towns of Babatngon, Biliran, Javier and Villaba also in Leyte.

The major buyers of citronella oil are the manufacturer if perfumes, laundry and toilet soaps, cigarettes and other allied items. U.S.A. is the world's largest market of citronella oil.

Citronella oil is an indispensable ingredient in the manufacture of soap, perfumes and other industrial products. Our country is importing citronella grass in large quantities although the grass from which this oil is derived can be grown profitably under Philippine conditions. Citronella grass is found to be indigenous in the region. It is planted in backyard scale and used for bathing and other medicinal purposes only.

The recent economic crisis led to the realization that cultivating the crop locally would be more advantageous than importing the oil. The country could save a lot in foreign exchange by promoting the commercial planting of citronella grass.

In 1980's, the government urged the private sector to participate in the program. Himmel Industries, Inc., a private corporation responded favorably to this call by the government. The Ministry of Agriculture and Food (MAF) and Himmel Industries, Inc. (HII) entered into agreement over the program of citronella production, processing and marketing. But because of changing administration in the government, the program was gone.

Recently, Honorable Luis R. Villafuerte introduced the House Resolution No. 734 in which pilot areas for the establishment of experiment stations will be identified to propagate plants with potential

essential oil extracts and one of these is citronella grass. The Committee on Natural Resources of the House of Representatives will be conducting hearings to determine appropriate legislative measures that may be enacted to ensure that development of essential oils industry in the Philippines shall be supported and aided both as an import-substitution and export-oriented industry.

One of the success stories in the implementation of Small Enterprise Technology Upgrading Program (SETUP) in Region VIII is the citronella extraction project in Barangay Bato, Biliran, Biliran. The citronella oil extraction plant is operated by the Biliran Essential Oil Manufacturing Philippines (BEOMP) with office at Ormoc City owned by Mr. Jesus F. Doyon, Sr.

The firm started operation in 2004. The adoptor initially uses the crude design of the citronella oil extraction equipment developed by Engr. Jesus Villamil, who became Mr. Doyon's consultant. Realizing the potential of the citronella oil industry, the company continuously seek the assistance of DOST and other agencies for improvement of the process and expansion of the essential oil venture. Latest addition to the innovativeness of the owner is the adoption of new citronella oil extractor design which can use both LPG and firewood as fuel, and under vacuum condition through the support of DOST. This was conceived because of the desire of the proprietor to improve citronella oil quality for the future needs of buyers who would demand better quality oil. Although ambitious, the proponent was looking in advance for expansion of its local market share and possible foreign market.

The firm's production and sales from citronella oil almost doubled compared to its past levels. Increase of production ranges from 80-100% from its original level in 2004. Gross sales in 2007 approximately reached PhP780,000 which is about 84% increase from 2004 recorded sales (Based on DOST Pre-Implementation Sheet data).

The intervention of the DOST was matched up by the proponent's increased investment with the acquisition of additional equipment, facility improvement, and farm implements reaching about PhP 3.5 M. In an industry level, since BEOM is the only producer in the Region, the investment is a major contribution. The expansion of the plantation from the existing 15-hectare active plantation to another 20 hectares was a big leap to reactivating the 50 hectares used by the earlier companies.

The waste grass was not a problem for the company since it is biodegradable and can be used as organic fertilizer for the plantation and landfill for the remaining uncultivated areas. The waste water was used as spray for the plants to repel insects and pests.

## II. CROP VARIETIES

Citronella belongs to Family Graminae. It is an essential source of citronella oil and is predominantly grown in Java and Ceylon. There are two cultivated types – Mahapengeri and Lenabatu. These two types derived from wild “mana” grass. Cymbopogon coonfertiflorus (Stapf), which is the parent material of all commercially, cultivated citronella grass.

### A. Varieties:

1. Lenabatu (Ceylon type) – Cymbopogon nardus (L) Rendle Adropogon nardus Ceylon de Jong narrow-leafed, hardier and long-lived. It is reported to contain only 15 – 65% of total acetyl sable expressed as geranial.
2. Mahapengari (Java type) – Cymbopogon winterianus Jowitt (Adropogon nardus Java de Jong) broad leafed, requires good soil and much care in growing and cultivating. This variety contains around 85% “total acetyl sable expressed as geranial.

### B. Economic Importance

VARIETY	USES
Mahapengari Type	- Used as starting materials for the preparation of industrially important perfumery compounds derived from “geranial” citronella.
Lenabatu Type	- Used as deodorant for mosquito repellent. Scent for soaps, sprays, disinfectants, paints and polish.

## III. CULTURE AND MANAGEMENT

1. Soil - a suitable area for citronella plantation could be a young field, virgin or regenerated (green-fertilized) soils. The grass thrives in any type of soil provided they are sufficiently fertile. However, a deep sandy soil offers the natural recondition for good quality oil. Although the growth of the plants on sand is meager and equally not large, the proportion of oil in relation to weight of leaves is more favorable.

2. Climate - a humid climate with regular rainfalls would probably offer the most favorable condition for good yield and quality of oil. It likewise guarantees longevity of plantings.
3. Elevation - grows in low and high altitude up to 2,000 ft. and more, but thrives best from 600 to 700 ft. altitude.
4. Plant Materials - Use tillers of citronella grass obtained by dividing old clumps. Each clump could yield about ten sturdy divisions.
5. Plant Materials Requirements - Place about two sturdy divisions or tillers to each hole.
6. Distance of Planting- Plant at a distance of 3 x 3 ft. But in poorer soil the interval may be less. A 2x2 interval is sufficient in the planting period intended to last for only a short time
7. Planting Time - Citronella requires fairly large amounts of moisture for proper establishment. Planting should be during the rainy season.
8. Land Preparation and Planting - If possible prepare the field thoroughly. However, under coconut areas, and in some other cases, just underbrush the area, dig hole and insert the plant materials vertically. Bury the tillers fairly deep, otherwise the clumps will easily work themselves out of the ground.
9. Cultivation and Weeding - Hill-up (loosen the soil) and weed to improve the yield and for proper maintenance of the plantation.

However, it is advisable to practice hilling-up right after every harvest to hasten the recovery and growth of the plants.
10. Fertilization - The use of chemical fertilizers increases the grass yield, however, higher yield of oil is obtained on fresh soil as compared to chemically fertilized soil. Green fertilization makes the soil loose and has a favorable influence upon the oil content of the citronella. Apply urea or 16-20-0 at 2-3 bags/ha. either basal or as side dressing.

11. Pest and Diseases - In their natural habitat these plants are not prone to pests or disease. Also this plant is largely free from pest and diseases because of aromatic smell.

## **VI. HARVESTING**

1. Time of Harvest - The usual practice is to harvest 9 months after planting. However, under Leyte condition, harvest eight months after planting. Three to four harvests could be done a year under favorable conditions. The rainy season harvest is usually larger than the dry season harvest.
2. Proper Time for Cutting - It is very important to choose the most appropriate time of harvesting the grass. A too short growing period decreases the productivity of the plants to such extent that a field can perish within a short time. Along growing period permits the plant to develop its full root system, which is important for longer life span. However, definite cutting period cannot always be indicated in a climate where the rainy and dry seasons are quite irregular. Proper timing for cutting is advisable in order to prevent the grass from flowering. The best time for cutting seems to be when the stem has six adult leaves with the seventh leaf in rolled up position.
3. Proper way of Cutting - Cut the leaves about 6-8 inches above ground level. Too low cutting results to the inclusion of many nearly oil-free parts of the blades which, when distilled, diminish oil yield. After the grass is cut, remove the old, dry leaves from the fresh leaves before the leaf bundles are hauled prior to processing.
4. Life Span of Citronella in the Field - Short intervals between growing periods of ratoons shorten the life span of citronella in the field. The plantation will be productive for only slightly more than two years. However, in fertile soils where greater care is taken during the growing period the plantation may last from four to five years.

Less productive fields should be discontinued because of citronella is rather a soil exhausting crop and prolonged growth of the grass

in it may be detrimental to the soil, the plants, the yield and quality of oil.

5. Yield of Oil – It is difficult to express the yield of oil on a per hectare basis in definite figures because it depends on so many factors: climate, fertility of the soil, age of plantation and method of distillation.

The average yield of oil is about 0.7%. It fluctuates from 0.5% in the rainy season to 1.2% during the dry season. The estimated yield of grass range from 12 – 35 metric ton/ha. with 0.7% average yield of oil or 84 –247 kg. of oil per hectare.

## **REFERENCES**

1. DOST Biliran, Provincial Science and Technology Center
2. Citronella, [assamagribusiness.nic.NEDFi/map7.pdf](http://assamagribusiness.nic.NEDFi/map7.pdf)