quantity of materials to be packed into the still, thereby economizing the fuel use.

The mixture of vapours of water and geranium oil passes into condenser. As the distillation proceeds, the distillate collects in the separator. The oil being insoluble and lighter than water, floats on the top of the separator and is continuously drawn off. The oil is then poured out and filtered manually or using chemical.

Packaging and storage:

Essential oils must be kept in dark, air-tight glass bottles, and do not expose to heat or heavy metals. The oil should be stored in a cool, dry area until it is used. Once opened, refrigerating and tightly closing the cap will prolong its shelf-life. Essential oils remain potent for 6 months to 2 years, with proper care.

Marketing:

The market for essential oil in South Africa is divided into local buyers and international buyers. The local buyers include marketing agents and companies from chemical and pharmaceutical, as well as food and flavouring industries. The international buyers are divided into flavor and fragrance houses, cosmetics and personal health care, aromatherapy and food manufactures who buy in large quantities.

Rose Geranium Ermelo, Nooitgedacht Research Farm

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ROSE GERANIUM PRODUCTION

Pelargonium cv. Rose'

MARCH 2012

MPUMALANGA
A Pioneering Spirit

Introduction:

Rose geranium (Pelargonium radens x Pelargonium Capitat) is an essential oil plant that belongs to the Geraniaceae family. Pelargonium species originated around the Southern tip of Africa and were introduced to Britain and Holland through spice trade and medicinal plants collection by sailors (Miller, 2002). Weiss (1997) also indicated that the first Pelargonium (P. cuculatum) was collected from the Table Mountain in 1672, which makes South Africa to be the centre of genus. Out of 25 Pelargonium species, only four species are important in the production of essential oils. The four essential oil species are P. graveolens, P. odoratissium, P. capitatum and P. radens. The prolific essential oil producer is cultivar Rose', a cross between P. capitatum and P. radens, which originated in Reunion and was introduced to other countries as "Bourbon type" (Weiss, 1997). There is some confusion about the use of the name geranium as the correct plant species is Pelargonium. The true geraniums are of a different species which is medicinally and resembles the Pelargoniums. Because of the common name rose geranium has been used so long and its difficult to change it in the trade.

Production levels and areas:

Oils produced in South Africa conform to the Bourbon standard, and therefore a better price can be negotiated on the global market. Yield of rose geranium is depended on management, fertilization,
moisture and climate. In the frost-free Lowveld of Mpumalanga, 3 to 4 harvests are possible. In the cooler areas of the country, 2 to 3 harvests are possible per season. The expected plant mass harvested pelargonium is 15-50 metric tons of fresh material per ha at a density of 30 000-60.000 plants per ha. 5-22.5kg of essential oil per ha at 0.1-0.45% oil recovery from steam distillation from herbage yield of 5 metric tons per ha can be obtained in an extreme dryland. The major production areas of rose geranium in South Africa are Mpumalanga Lowveld, KZN, Western Cape and Limpopo provinces.

Plant description:

Rose geranium is a shrubby perennial plant growing to the height of 1m if left unpruned. It has lobed leaves and typical small pink flowers. Leaves and stalks are the essential part of this plant. The essential oil is extracted from fresh plant material mainly using steam distillation.

Climatic requirements:

It grows well at a temperature range of 10-33ºC, and it needs enough sunshine for the development of oil in the plant. It requires daytime optimum of 20-25ºC. 5ºC above and below is also acceptable. Temperature which is below 6ºC inhibits growth. The favourable rainfall for dryland growing of rose geranium should range from 700 to 1500mm per year, uniformly distributed throughout season. In areas where rainfall is less it can be grown with supplementary irrigation.

Soil requirements:

Rose geranium prefers sandy to loam soils with pH of 5.8-8.5 and sunny, hot frost free conditions. Ideal soil type should be rich in organic matter and have clay content of not more than 40%.

Soil preparation:

Essential oil crops grown on natural soils yield products that are of high quality and in demand globally. Soil samples must be taken to check for mineral deficiencies and excesses, organic status and carbon ratios. Correct the soil pH according to analysis result. Apply suitable soil preparation according to the farming operation. Producers who treat their soil correctly will have the benefit of producing crops of the high value with less input in terms of weed, pest and disease control.

Planting:

Planting of cuttings can be done as soon as the active growing season commences, which is spring. Avoid planting during very hot times of the year and close and during winter time when plants are usually dormant.

Fertilization:

Previous trials showed that the crop responded very well to organic nitrogen supplied at the rate of 100-300kg/ha, and that the organic fertilizer was superior to an inorganic one at the same rates (SAEOPA, database).

Irrigation:

Overhead and drip irrigation can be used. Overhead irrigation should be used with care as it may cause loss of oil at certain stages before harvesting.

Weed control:

2-3 weed sessions are necessary during the year.

Exclusion of sunlight is one of the best weeding practices. Therefore rose geranium should be planted so that it forms canopy quickly. Cover cropping practices with plants that inhibit weed growth are advised. Mulching with compost or grass will inhibit weed growth.

Pest control:

Rose geranium is attacked by many different species of pests belonging mainly to the Hemiptera, Coleopteran and Lepidoptera families. Among the most important pests are the white grubs, cutworms, cockchafers, whiteflies, aphids, mites, termites and white peach scale. Natural pest control measures should be used as first choice. Regular scouting of the crop is needed. Correct identification of pests and natural beneficial predators is essential. Extension officers and researchers from agricultural institutes should be contacted for further information on identification of insects and for the recommended control measures.

Harvesting:

The first harvest can be obtained after 3-6 months, depending on cutting size and locality as well as nutrition and moisture. Harvesting is done 3-4 times per year. The time of harvesting is determined by a large presence of new growth. The scent of the leaves should turn from lemony to a rose scent. Only leaves and young shoots should be harvested as this is where the most oil is located and it must be done on a dry day only. To ensure good oil yield it is better to wait a few days after rain and having at least 3 days of hot sunshine before harvesting. It has shown in trials that oil yields increase with stress factors such as moisture and heat.
Harvesting can be done by hand if operation is small. The entire canopy except for one branch should be harvested. This allows for faster regrowth. When there are enough new branches, the remaining branch may be cut and distilled or left for the following harvest when another shoot is chosen to remain. Ideally the plant is cut frequently as soon as enough new growth is available.

Distillation:

Distillation is done by steam at 96 to 100ºC for 30 to 60 minutes, depending on the oil recovery. The harvested crop can be distilled fresh or stored under shade for up to 3 days without too diverse effect on the yield or quality of oil. Wilting reduces the moisture content and allows a larger