PRODUCTION GUIDELINES FOR MARIGOLD FLOWER

Source: http://www.plantinfo.co.za/aphids

PART I: GENERAL ASPECTS

1. CLASSIFICATION

Family name: Asteraceae (also known as Compositae family)
Scientific names: *Tagetes erecta* and *Tagetes patula*
Common names: African marigold and French marigold

2. ORIGIN AND DISTRIBUTION

Marigold flowers are native to North and South America but the first garden plants introduced into Europe came from Northern Africa. Marigold flower is widely cultivated around the world. The African marigold is native to Mexico and other American tropics, where about 50 species occur. The French marigold is native to Mexico, Nicaragua and Guatemala (South America). The major producers of *Tagetes erecta* are Mexico, Peru, Ecuador, Argentina and Venezuela while the minor producers are India (Calcutta region), South Africa and Zambia. Other countries planting marigold flowers include the United State of America, Switzerland, France, Germany, and China.

Most of the South African garden centers featured the marigold flowers. There are two basic species of marigold flowers such as the large-flowered marigold called Africa marigold (*Tagetes erecta*) and the smaller-flowered called French marigold (*Tagetes patula*) dwarf plants.

3. PRODUCTION LEVELS

3.1 INTERNATIONALLY

The leading countries in producing marigold flowers are China, India, and Peru while the major marigold flowers importing countries include the United State of America and Europe. The production level of marigold flower in these countries is not well documented.

3.2 SOUTH AFRICA

Marigold production in South Africa is mostly limited to small gardens with few farms in KwaZulu-Natal producing the flower on a scale average of 2 to 3 hectares.

4. MAJOR PRODUCTION AREAS IN SOUTH AFRICA

The flower is grown within most garden centers, homes and small farms which are mostly found in KwaZulu-Natal. They prefer to grow in disturbed areas, such as old lands on farms, abandoned gardens, roadsides and waste places.

5. DESCRIPTION OF THE PLANT

Both *Tagetes patula* (French marigold) and *Tagetes erecta* (African marigold) are robust, hardy annuals (can be perennial), mostly herbaceous plants. The French type is dwarf and grow up to 30 cm tall compared with 60 cm for African type.

5.1 Leaves

Leaves are pinnately divided and leaflets are lanceolate and serrated. The leaves are dark green in colour with reddish stem.

5.2 Flowers

French marigold flowers appear small, either single or double borne on uniformly long peduncles with the colour varying from orange, yellow, gold, maroon, mahogany, flame red and light creamy-yellow. Floral heads consists of both ray and disc florets.

African marigold features single to fully double with large globular heads flowers and colour varies from lemon yellow to yellow, golden yellow or orange.

6. CULTIVARS

Some of the described names of some of marigold varieties around the world are as follow:

6.1 Africa marigold (*Tagetes erecta*)

Giant Double African Orange, Giant Double African Yellow, Crackerjack, Climax, Doubloon, Golden Age, Chrysanthemum Charm, Crown of Gold and Spun Gold.

6.2 French marigold (*Tagetes patula*)

Red Brocade, Rusty Red, Butter Scotch, Valencia and Succana.

7. CLIMATIC REQUIREMENTS

7.1 TEMPERATURE

Tagetes erecta prefers sunny positions and thrives best in hot, dry as well as humid weather conditions. The plants can survive in almost all seasons except in very cold weather, as they are susceptible to frost. The ideal temperature for seed germination ranges between 18 to 30°C and for optimal growth, 15 to 29 °C temperature is required. Marigold flowers are resistant to hot summer seasons and high temperature above 26°C affects flowering.

7.2 RAINFALL

It is not well documented/specified on how much annual rainfall is suitable for marigold production in South Africa.

8. SOIL REQUIREMENTS

Marigold plant is adaptable to different types of soil conditions but they prefer lightly composted and well-drained soil. However, a deep, fertile and friable soil having good water holding capacity and nearer to neutral in reaction with pH of 7.0 – 7.5 is most desirable. Very rich soil can result in more leaves and fewer flowers.

PART II: CULTIVATION PRACTICES

1. PROPAGATION

Marigold flowers are propagated by seeds and cuttings. Marigold seeds can be sown directly on the field or in seedling trays, with direct propagation whereby the seeds are broadcasted 2 cm apart on a prepared bed at a depth of 1 cm during spring and summer. Marigold seeds are sown indoors in trays only when there is danger of frost in the area.

The seed germinates between four to seven days after planting, few days after seed emergence, seedlings are thinned to reduce competition for soil nutrients and water. Unlike other plants, marigold flowers are easily grown from seed and grow very fast. The plant starts to flower after 8 to 10 weeks from planting.

The cuttings are mainly used for maintaining purity of varieties and are not commonly used as growers that prefer propagating with seed; the reason for seed preference is probably that the crop raised from seeds is tall, vigorous and heavy bloomer than cuttings raised plant. The presence of adventitious roots along the stem helps in the cutting establishment. The cutting should be about 10 to 15 cm long, treated with a registered rooting powder for simulation of prolific root development and should be planted preferably in the lighter/sand soils to strike root penetration easily.

2. SOIL PREPARATION

For small garden, seedbed can be prepared using hand tools (spade, forks, hoes etc.) while for large scale production mechanised implements can be used to prepare the land before planting.

Soil needs to be prepared thoroughly prior planting. The available vegetation should be killed off by pre-emergence herbicides, removed or smothered before beginning to work on the soil or loosen it and prepare the flower bed area for planting. This can be done with a tiller or by hand, using a spade and garden fork. If the soil is compacted or has never been tilled before, a tractor can be used to plough the field for initial passes. Thereafter, a lightweight tiller or a spade should be sufficient. Ridges and furrow should be made properly.

3. PLANTING

The marigold seedlings can be planted with inter-row and intra-row spacing of 45 and 35 cm respectively. Seeds are sown in a hole with depth of 46 cm in spring after frost has passed. Prior transplanting marigold seedlings, organic compost or well-aged manure should be mixed with the garden soil. This mixture improves the health of marigold plants by giving them the nutrients they need.

Marigold seeds should be planted during warm day. Marigold planting is done in late spring and summer. Thirty days (30) days after planting terminal portion should be tipped/removed to encourage the branching nipping/tipping.

The French (dwarf) marigold is planted within row and inter-row spacings of 20 X 20 cm while African type is planted within row and inter-row spacings of 40 X 30 cm.

4. FERTILISATION

Marigold plants perform best in light organic composted soil, but can survive and produce satisfactory in soil with low nutrition, high fertilisation should be avoided as it encourages vegetative growth on the expense of flowering hence large plants with few/poor flowering. Growth of *Tagetes erecta* is influenced by chemical fertilisers, particularly phosphate fertilisers.

For production of quality flowers and green leaves proper fertilizers application is important. The three major nutrients which are nitrogen, phosphorus, and potassium are essential for plant growth and flowering. These also play a key role in the production of higher quality flowers. Application of balanced fertiliser every six weeks can give good results. Fertilisers such as NPK (200:100:100) kg/ha should be applied to get highest flower yield depending on soil analysis results. NPK (100:100:100) kg/ha

should be applied at time of land preparation and the other 100 kg N/ha should be applied one month after seedlings are transplanted. Addition of potassium fertiliser prolongs flowering.

5. IRRIGATION

Marigold requires constant moisture in the soil starting from bud formation to harvesting stage of flowers. Marigold takes about approximately 55 to 60 days to complete vegetative growth and to enter into reproduction phase depending on the planted cultivar and the area. Sufficient amount of moisture in soil during vegetative and flowering stages is essential. Frequency of irrigation differs with flower growth stages and reduces as flower approaches maturity. Irrigation should be done once or twice in a week and is also depending upon soil and climatic conditions. Initial irrigation should take place immediately after planting in the field and regular irrigation is recommended on every third or fourth day after planting. Marigold plant is sensitive to waterlogging and it should be avoided.

6. WEED CONTROL

The suitable time to control weeds is when doing soil preparation. Weeding should be done to avoid competition for nutrients and water between marigold plants and weeds. Weeds can be controlled manually in marigold gardens. Pre-emergence herbicides can be applied to control weeds that appear before planting but herbicides instructions should be followed to avoid contamination. Registered chemicals should be preferably used for effective weed control. Add a layer of mulch between marigold plants to suppress weeds and conserve soil moisture, especially when plants are young.

6. PEST AND DISEASE CONTROL

6.1 Pests

(a) Red spider mite (*Tetranycus sp.*)

Mites appear on the plants near flowering stage which show dusty appearance.

Control measure: Mites are controlled by application of registered pesticides.

(b) Hairy caterpillar (*Diacrizai obliqua*)

This pest infests foliage of marigold plant.

Control measure: The pest is controlled by application of registered pesticides.

6.2 Diseases

The diseases that infect the plants include dumping off, leaf spots and blight and powdery mildew.

(a) Damping off (*Rhizoctonia solani*)

Brown necrotic spots appear on young seedlings, girdling the radical which later on extend to plumule and cause pre-emergence mortality. Post-emergence symptom appears as water soaked brown necrotic ring, leading to collapse of seedlings/plants.

Control measure: proper drainage and ventilation should be provided in the nursery beds.

(b) Leaf spots and blight (*Alternaria*, *Cercospora* and *Septoria*)

Minute brown circular spots on lower leaves and enlarge at later stage of infection leading to premature defoliation and ultimate death of the plant.

Control measure: Spraying infected marigold plant with registered fungicide following the label instruction is recommended starting from the first appearance of disease symptoms.

(c) Powdery mildew (*Oidium sp* and *Leveillula taurica*)

The whitish tiny superficial spots appeared on leaves which later on result in the coverage of whole aerial parts of plant with whitish powder.

Control measure: Spraying infected marigold plant with registered fungicide following the label instructions is recommended.

8. OTHER CULTIVATION PRACTICES

The bud pinch technique works very well in marigold production to contribute to higher flower yields. The technique is where one cut or pinch the very top of buds to stimulate further vertical growth of buds which will would provide more scope to bear flowers. Pinch off tops or the terminal parts of the plants flower to encourage branching /bushier growth to promote high flowering points. Flower head that start to bloom should be

removed to give a way for new flowering heads. Pinch off the first flowers before they open.

9. HARVESTING

Marigold flowers can be picked up once in 03 days after 60 days of planting. French marigold starts flowering in 45 days after transplanting seedlings. African marigold starts flowering in 60 days after transplanting seedlings. The number of days are given as guidelines as the maturity size and date rare dependent on the planted variety. Harvesting should take place in cool hours of the day that is either in the morning or evening. To strengthen better flower quality, it is important to irrigate the field before harvesting. A basket can be used to collect the flowers.

PART III: POST-HARVEST HANDLING

Flowers are transported to market immediately after harvesting in basket or buckets.

PART IV: PRODUCTION SCHEDULES

ACTIVITIES	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Planting												
weed control												
fertilization												
irrigation												
pest control												
disease control												
harvesting												
marketing												
transport												

PART V: UTILISATION

Marigold flower is popularly used for decoration in gardens, bedding, potting and house ornamental. African marigold is very good bedding plants with globe shaped large flower. Flowers can be used as fresh and cut flower bunched in bouquet. Marigold is naturally used as companion plant to deter pests, so planting marigold flowers next to vegetable garden is essential. Marigold flowers are also used as summer border in the flower garden. The dwarf varieties make excellent edging plants and combine beautifully with other annuals in containers.

Marigold flower oil is extracted and used in the perfume manufacturing industry. They have phytochemical and medicinal benefits which can be used in various ceremonies and rituals depending on beliefs of the consumers. It is widely used in making garlands, floral decorations, flower baskets and in different kinds of spiritual rites and rituals.

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