

Lecture IX : Commercial cultivation of marigold

INTRODUCTION

Marigold belongs to family Asteraceae and native from South America (Mexico). There are about 33 species of the genus *Tagetes*. It is one of the most commonly grown flowers for garden decoration and extensively used as loose flowers for making garlands for religious and social functions. It has gained popularity amongst the gardeners on account of its easy culture and wide adaptability. They can be planted in the beds for mass display or grown in pots. The French Marigolds are suitable for hanging basket and edging. The demand for Marigold flowers during Dashara and Diwali is very high. Recently, marigolds has emerged as a source for extraction of carotene pigments (xanthophylls), which are widely used as dietary supplement in poultry industry to enhance chicken skin colour and egg yolk. Lutein which is the major constituent of xanthophylls is used for colouring food stuffs.

Name	Species	Chromosome No.
African Marigold	<i>Tagetes erecta</i>	$2n = 2X = 24$
French Marigold	<i>Tagetes patula</i>	$2n = 4X = 48$
Single signet	<i>Tagetes tunifolia</i>	$2n = 2X = 24$
Sweet scented marigold	<i>Tagetes lucida</i>	$2n = 2X = 22$

Varieties

African marigold: Sunset, Eskimo, Apollo, Climax, First Lady, Gray Ladies, Moon Shot, Orange Lady, Showboat (3 X, sterile), Toreador, Inca Gold, Inca Orange.

French marigold: Legion of Honour, Naughty Marietta, Sunny, Tetra Ruffled Red Single, Disco Red, Marvelous Orange, Lemon Drop, Bonanza Blend

Inter specific hybrids: Burpees Gold, Red Glow, Red Gold, Yellow Nugget

Indian cultivars: Pusa Narangi Gaiinda (Cracker Jack \times Golden Jubilee), Pusa Basanti Gaiinda (Golden Yellow \times Sun Giant), Pusa Arpita (FM), Pusa Bahar, Pusa Deep, Hisar Beauty, Hisar Jaffri-2, Arka Agni, Arka Bangara-2, Bidhan Marigold-1, Bidhan Marigold-2

Nugget: Triploid cultivars

CLIMATE

African and French marigold both are hardy in nature. They can grow well almost throughout the year under tropical and subtropical conditions but requires mild climate for proper plant growth and profuse flowering. Mild climate during growing period (14.5-28.6°C) greatly improves flowering while higher temperature (26.2-36.4°C) adversely affects the flower production. Night temperature range of 15.5-18.3°C and day temperature range 18.3-22.2°C is ideal for producing high quality plants.

SOIL

It can be grown in a wide range of soils except water logged conditions. However, a deep fertile soil (pH 6.0 to 7.5) having good water holding capacity, well drained, sandy loam soil rich in organic matter is best suitable.

PROPAGATION

BY SEEDS

Crop raised from seeds is taller than the vegetatively propagated one and vigorous and heavy bloomer; thus, it is preferred over cuttings. For better seed germination, optimum temperature

range between 18 to 30°C is required. Seed rate of 1.0 kg is required for one hectare area. Seeds of marigold can be sown in pots, seed boxes or on flat or raised nursery beds. Nursery beds of 3 x 1 m size are thoroughly prepared and mixed with 10 kg of well decomposed farmyard manure per sq m.

BY CUTTINGS

This method is commonly followed for maintaining the purity of varieties. Normally, the presence of adventitious roots along the stem helps in the establishment of cuttings. About 10 cm long cuttings are made and treated with seradix No.1. The cuttings are planted in the sand to strike roots easily and plants thus raised are used for bedding and pot planting.

TRANSPLANTING OF SEEDLINGS

Land should be ploughed 2 to 3 times to bring the soil to a fine tilth. One month old seedlings with 3-4 leaves are fit for transplanting. Watering of nursery bed one day prior to uprooting will lessen the damage to root system. Uprooting of seedlings and transplanting should be done in the evening hours for better establishment.

Season	Sowing time	Transplanting time	Suitable cultivars
Rainy	Mid June	Mid July	African giant yellow, Jafri, Laddu Ganda
Summer	Mid Feb	Mid March	Cracker Jack
Winter	Mid Sept	Mid Oct	All commercial varieties

SPACING

Proper spacing between plants is required for better development of plants and for higher flower yield. The following spacing is recommended for marigold. 1) African marigold 60 X 30 cm or 45 X 30cm. 2) French marigold 20 X 20cm or 20 X 15cm.

MANURE AND FERTILIZER

Incorporate 20 tonnes of Farm Yard Manure during the last ploughing. Apply 100 kg N, 80 kg of P₂O₅ and 80 kgs of K₂O per acre. Half of nitrogen, entire dose of phosphorus and potash should be applied as basal dose, preferably one week after transplanting and rest half nitrogen should be applied one month after the first application.

INTERCULTURAL OPERATIONS

In marigold control of weeds is an important operation. If the weeds are not removed in time, a great loss would occur in terms of growth and productivity of marigold particularly during rainy season. Hoeing and weeding should be done 3 to 4 times during the crop period to make the soil loose and weed free.

IRRIGATION

At all stages of vegetative growth (55-60 days) and during flower production sufficient amount of moisture in soil is essential. Moisture stress at any stage affects normal growth and flowering. In lighter soils more frequent irrigations are required than in heavy soils. In sandy loam soil, weekly irrigation is necessary between September to March while during summer months between April to June irrigation at 4-5 days intervals is required.

PINCHING

Removal of apical portion of plant is called pinching. Marigold plants grow straight upwards to their final height and develop into terminal flower buds. If the terminal portion of shoots is removed early, emergence of side branches starts earlier and more number of flowers of good

quality and uniform size are produced. Results of studies on pinching revealed that removal of apical growing point at 40 days after transplanting enabled the plants to yield more flowers. Double pinching i.e. at 40 and 60 days after transplanting have been recommended for higher flower and seed yield.

FLOWERING

Summer season crop: commences by the middle of May with maximum intensity in the month of June and continues till the onset of rains.

Rainy season crop: by the middle of September and the flowering will continue till December.

Winter crop: by the middle of January and will continue till March.

HARVESTING

Marigold flowers are plucked when they attain full size. Harvesting should be done either in the morning or evening hours. Field should be irrigated before harvesting of flowers so that the flowers keep well for longer period after harvest. Productivity of plants increases considerably by regular plucking of flowers and beheading the dried flowers.

YIELD

Species	No of flowers/ha	Fresh flower/ha	Seed kg /ha
French marigold	1.5-2.5 million	11-18 tonnes	300-380 kg
African marigold	6.0-8.0 million	8-12 tonnes	1000 kg

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