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Producing Marigolds for Profit

A Commercial Grower's Guide

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Marigolds are one of the five leading bedding plants in sales in the U.S. Plant breeders in this country have introduced many new varieties that have greatly increased the popularity of this species. For both new and established growers, this outline should serve as a valuable guide and reference for marigold growing.

I. HISTORY

A. *Marigolds are scented herbs.*
B. *There are more than 30 species.*
C. *They are native from New Mexico and Arizona to Argentina.*
D. *Their tremendous increase in popularity in recent years have been due to the introduction of many new and improved varieties.*

II. SPECIES

A. *Tagetes erecta—African Marigolds, usually 2 feet tall or taller, very photoperiodic species.*
B. *Tagetes patula—French Marigolds, usually 1 to 1½ feet tall or shorter, less photoperiodic.*
C. *Tagetes erecta X tagetes patula—triploid Marigolds, somewhat photoperiodic.*
D. *Tagetes lucida—sweet-scented Marigolds, these are not commonly grown as bedding plants.*
E. *Tagetes tennifolia or tagetes signata var pumila. Dwarf less than 1 foot tall, small flower size, very limited use as bedding plants.*

III. CULTIVARS

A. *Triploids*
   1. *Copper Canyon*
   2. *Gingersnap*
   3. *Honey Bee*
   4. *Red Seven Star*
   5. *Showboat*
B. *French Dwarf Doubles*
   1. *Boy Series*
   2. *Lemondrop*
   3. *Queen Sophia*
   4. *Petite Series*
   5. *Sparky types*
   6. *Bolero*
   7. *Bonita Mixture*
   8. *Matador*
   9. *Spanish Brocade*
   10. *Sparky Improved*
C. *Super Doubles*
   1. *Goldfinch*
   2. *Goldstrike*
   3. *Honeycomb*
   4. *Janie*
   5. *King Tut*
   6. *Mandarin*
   7. *Midas Touch*
   8. *Panther*
   9. *Queen Bee*
   10. *Royal Crested Mix*
D. *French Semidwarf Doubles*
   1. *Firelight*
E. *French Semidwarf Singles*
   1. *Cinnabar*
   2. *Dainty Marietta*
F. *African Dwarf Doubles*
   1. *Dolly Types*
   2. *Guys and Dolls*
   3. *Papaya Crush*
   4. *Pineapple Crush*
   5. *Pumpkin Crush*
   6. *Cupids*
   7. *Apollo*
   8. *Moonshot*
   9. *Viking*
   10. *Spage Age Mixture*
G. *African Semitall Doubles*
   1. *Happy Face*
   2. *Galore Series*
   3. *Jubilee Series*
   4. *Lady Series*
H. *African Tall Doubles*
   1. *Gold Coin Series*
   2. *Climax Series*

IV. PROPAGATION

A. *Marigolds are seed propagated.*
B. *The seeds are approximately 1/2 inch long and are thin and tubular.*
C. *Their odd shape and size forces the grower to rely on simple hand seeders that vibrate or shake the seed into the flat.*

D. Media must be thoroughly moistened before sowing.
E. Sow the seeds in trenches 2 inches apart and 3/4 inch deep and place a fine layer of media over the seeds.
F. Germination conditions—
   1. Humidity should be 80-90%.
   2. Air temperature 70-72°F.
   3. Soil temperature 75°F obtained by bottom heat.
   4. Light is not required for germination.
   5. The seeds will germinate in five days.

V. TRANSPLANTING

A. Marigolds may be transplanted 1 to 2 weeks after germination if seedlings are grown at 60°F.
B. Transplant into trays or flats and water immediately after transplanting.
C. Once the seedlings are transplanted, water only when dry.
D. Water thoroughly to keep soluble salts to a minimum.

VI. SOIL MEDIA

A. For germination, the peat lite mixes are best.
   1. Seedlings can be transplanted into various mixes.
      a. Peat-lite mix:
         .5 cu. yd. Sphagnum Peat
         .5 cu. yd. Hort. Vermiculite
         5 lbs. Dolomitic Limestone
         2 lbs. 0-20-0 Superphosphate
         1 lb. Potassium Nitrate
         2 oz. Fritted Trace Element Mix
         2 lbs. 14-14-14 Osmocote
         3 oz. Wetting Agent
      b. A soil based mix:
         .33 cu. yd. Loam Soil
         .33 cu. yd. Sphagnum Peat
         .33 cu. yd. Perlite
         2 lbs. 0-20-0 Superphosphate
         (Adjust soil pH to 5.5 by adding Dolomitic Limestone to increase pH or $FeSO_4$ to lower pH.)

VII. FERTILIZATION

(See MSU Bulletin E-1275, "Chemical Controls for Michigan Commercial Greenhouse and Bedding Plant Production" 55c).

A. Before fertilizing, know the pH and soluble salt content of the soil.
B. Check the pH and soluble salts weekly as these values can change rather rapidly.
C. Soluble salts should not exceed 1.0 or fall below .3.
D. PH should be between 5.5 and 6.2.
E. The peat-lite mix will only need fertilization after 4 to 5 weeks. After this time only a source of Nitrogen and Potassium are needed.
   1. Usually 200 ppm Nitrogen and 200 ppm Potassium are applied.
F. If a soil based media is used, feed regularly with a source of Nitrogen and Potassium.
   1. Usually 200 ppm Nitrogen and 200 ppm Potassium are used.

VIII. TEMPERATURE

A. After transplanting, 55-60° night temperature.
B. Day temperatures should be run 5 to 10° warmer.
C. Plants should be hardened off 2 to 3 weeks before sale by reducing temperatures to 50° days and 45° nights.

IX. LIGHT

A. Most Marigolds will flower faster under short days.
B. The following is a list of flowering times by varieties grown under 9 and 16 hour photoperiods. (See Table 1.)

X. WATERING

A. Under sunny days, Marigolds take up a great deal of water.
B. Water using a fine water breaker in order to cover flat well.
C. Thorough watering also decreases soluble salts buildup.

XI. FLOWER INITIATION

A. Most Marigolds flower faster under short day conditions.
B. Flowering in late February or early March will be faster than flowering in late April or early May.
C. Some growers use black cloth to induce short day conditions on late flowering crops.
D. When following the black cloth system, be cautious to keep temperatures below 85°F.
E. Temperatures above 85°F will inhibit flower bud initiation.

XII. GROWTH RETARDANTS

(See MSU Bulletin E-1275 for details).

A. Marigolds are responsive to B-Nine and A-Rest.
B. A spray of B-Nine 2500 ppm is usually used.
C. A spray of A-Rest 100 ppm can also be used.
D. Late applications of growth retardants will delay flowering.

XIII. MARKETING

A. Most Marigolds are sold in flower.
B. Only the tall African types are sold green.
C. Most Marigolds are sold in flats.
D. Larger types and triploids may be sold in pots.

XIV. PROBLEMS

A. *Insects and Mites (See MSU Bulletin E-1276 "Insect Controls for Michigan Commercial Greenhouse and Bedding Plant Production," 55c).*

1. *Spider mites, especially the 2 spotted spider mite (red spider) suck juices out of plants.*
   a. *The warmer the temperature, the faster the mites reproduce.*
2. *Aphids*
   a. *Cause damage to plants by sucking juices, usually on tender young stem area.*
   b. *The warmer the temperature, the faster the life cycle and more severe the problem.*
3. *Slugs and Snails*
   a. *These feed at night and can cause considerable damage.*
   b. *They leave trails of slime and large holes on leaves where they feed.*

B. *Diseases (See MSU Bulletin E-1275).*

1. *Rhizoctonia - wire stem of seedlings, likes moderate moisture.*
2. *Pythium - root rot, mycelium grows between soil particles, likes very moist conditions.*
3. *Phytophthora - root rot, mycelium grows between soil particles, likes very moist conditions.*

Table 1. Days to Flower of Marigold Varieties Under Short Days (9 hours of light) and Long Days (16 hours of light).[1]

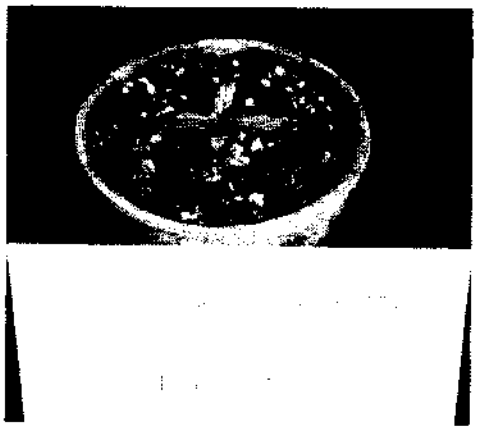
Variety	Short Days	Long Days	Variety	Short Days	Long Days
Petite Orange	44	45	Brownie Scout	60	62
Petite Mixed	46	50	Bright Yellow Climax	61	76
Petite Spry	48	49	Gold Corns Mixed	61	74
King Tut	47	53	Gold Lady	61	NO
Gold Nuggett	47	49	Sunsouffle	63	NO
Orange Nuggett	48	50	Double Eagle	63	NO
Triple Orange	48	52	All Double Gold	63	NO
Triple Gold	49	54	Sun Spot	64	76
Gypsy Sunshine	49	54	Sovereign	65	77
Gypsy Dancer	49	57	Dolly	65	NO
Bolero	49	55	Cracker Jack	65	73
Spanish Brocade	50	59	Aztec Mixed	65	67
Red Brocase	50	59	Aztec Gold	65	70
Petite Gold	50	54	Orange Lady	65	NO
Matador	50	59	Sovereign Pure Gold	66	NO
Honeymoon	50	58	Pumpkin Crush	66	NO
Dainty Merietta	50	55	Climax Golden	66	NO
Petite Yellow	50	54	All Double Orange	67	NO
Yellow Nuggett	51	55	Happy Face	67	77
Sunkist	51	58	Aztec Yellow	67	70
Harvest Moon	51	58	Aztec Orange	67	69
Bonita Mixed	51	63	Diamond Jubilee	68	78
Yellow Brocade	52	57	Mariner	68	NO[2]
Sparky	53	59	Guys and Dolls	68	NO
Show Boat	53	58	Golden Jubilee	69	NO
Fiesta	53	59	First Lady	69	NO
Tangerine	54	63	Climax Mixed	69	NO
Golden Boy	54	60	Cupid Yellow	70	NO
Rusty Red	55	67	Cupid Mixed	70	NO
Honeycomb	56	59	Primrose Climax	70	NO
Lemon Drop	58	63	Orange Jubilee	70	NO
Naughty Marietta	58	64	Moonshot	70	NO
Toreador	59	NO[1]	Gold Galore	70	NO
Golden Age	59	NO	Apollo	71	NO
Doubloom	60	NO	Cupid Orange	71	NO

[1]*This data is part of an experiment conducted at Michigan State University, Department of Horticulture, on the evaluation of marigold varieties.*

[2]*All NO's: Not in flower at termination of experiment, 85 days from sowing.*

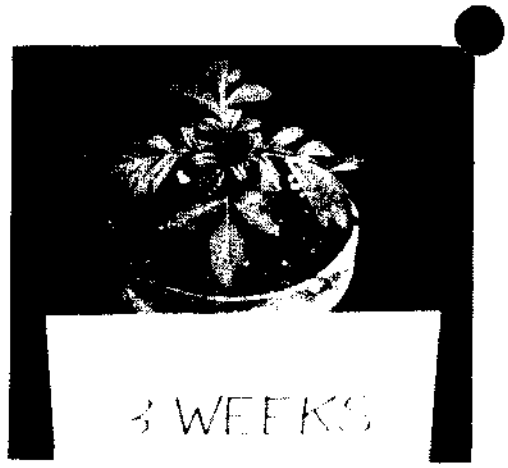
Development of Moonshot Marigold

(Seed sown and transplanted in one week.)



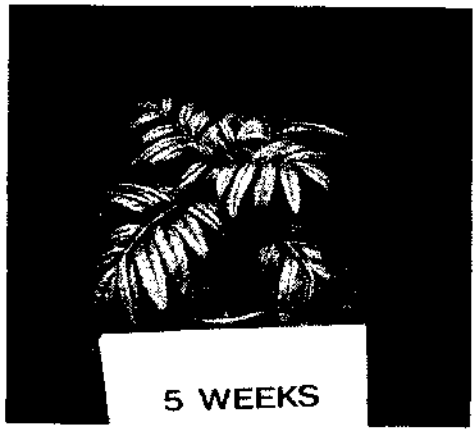
One week after transplant.

Two weeks after transplant.



Three weeks after transplant.

Four weeks after transplant.

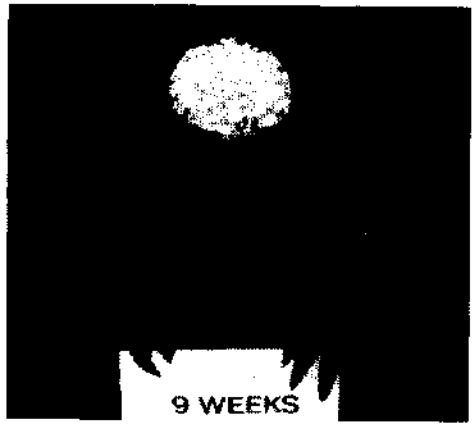


Five weeks after transplant.

Six weeks after transplant.

Seven weeks after transplant.

Eight weeks after transplant.



Nine weeks after transplant or 10 weeks from seeding (70 day old plant).

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