CHrysanthemum
Guldaudi

Botanical Name: Dendranthema grandiflora

Family: Asteraceae

Origin: Northern hemisphere in China

National flower of Japan

Area in HP during
2012-13: 315 ha  2011-12: 209 ha
Uses of chrysanthemum

- Cut flowers
- Loose flowers
- Pot mum
- Hanging baskets
- Bedding
- Border plant
Classification of chrysanthemum

- Inflorescence
- Temperature
- Photoperiod
Classification based on inflorescence

- Single
- Anemone
- Korean
- Double
- Decorative
- Pompon
- Incurved
- Incurving
- Reflexed
- Quill
- Fuji
- Spider
Classification based on Temperature

- **Thermo-positive**: low temperature between 10-27°C inhibit or delay bud initiation which occur more consistently at 16°C. High temperature over 27°C accelerates bud initiation but delay flowering.

- **Thermo-negative**: Bud initiation occurs at low to high temperature (10-27°C) but high temperature delays development of buds.

- **Thermo-zero**: Flowering occurs at any temperature between 10-27°C, more consistently at 17°C night temperature.
Classification based on Photoperiod

- Based on short days requirement cultivars are classified as 6 weeks to 16 weeks
Important cultivars

**Standard:** Snow ball, Snow Don White, Mountaineer, Sonar Bangla, Bright golden, Anne, Lehmans, Sonali Tara, Poornima, Tata Century, Thai Ching Queen, etc.

**Spray:** Ajay, Birbal Sahni, Chandrama, Flirt, White Bouquets, Nanako, Surf, etc.
Off-season cultivars

- April-June: Himanshu, Jawala, Jyoti
- July-Aug.: Phuhar
- Sep.-Oct.: Ajay, Sharda
- Oct.-Nov.: Makhmal, Megami, Mohini, Sharad har
- Nov.-Dec.: Normal season cultivars
- Jan.-Feb.: Jaya, Lilith, Suneel, Vasantica.
- Feb.-Mar.: Maghi.
Factors affecting growth and flowering

- Genotype
- Soil: Sandy-loam, pH: 6.2-6.7
- Light (Intensity: 1.2-1.6 MJ/m²/day, Quality: 600-800nm, Photoperiod: less than 9.5 hours)
- Temperature (night: 10-16°C, day: 18-21°C)
- CO₂: 500-1000ppm
- Nutrients
- Pinching (Twice after 4 and 8 weeks of transplanting)
- De-shooting (retain 4-5 shoots in standard and 8-12 shoots in spray cultivars)
- Disbudding (remove lateral buds in standard and terminal bud in spray cultivars)
Propagation

- Terminal stem cuttings (4-5 cm) during June-July
- Suckers during February to April
- Micro-propagation
- Seeds (Problems of self-incompatibility and heterogeneity)
Optimum planting density and spacing

- Greenhouse cut flowers: 40-54 plants/m²
- Loose flowers: 30 x 20 cm or 20-25 plants/m²
- Standards: 20 x 20 cm
- Sprays: 30 x 30 cm
- Pot mums: 3-5 cuttings/pot (15 cm)
Optimum level of nutrients

- N (4.5-6%), P (0.26-1.2%), K (3.5-10%), Ca (0.5-4.6%), Mg (0.14-1.5%), S (0.30-0.75%), Mn (195-260ppm), B (25-200ppm), Cu (10ppm) and Zn (7.3ppm).
Optimum dose of nutrients

- FYM: 3-5 kg/m²
- N:P:K::30:10:15 (50-60g/m²)
- Loose flowers: FYM: 10-15 ton, N: 150kg, P: 100kg, K:120 kg/ha
- Spray of light solution of cake + SSP at bud developing stage is very beneficial.
- Apply nitrogen through CAN source as urea causes phyto-toxicity.
Important Diseases

- Wilt (*Fusarium oxysporum f. sp. chrysanthemi*)
- Stem and foot rot (*Rhizoctonia solani*)
- Root rot (*Pythium, Phytophthora spp.*)
- Bacterial rot (*Erwinia chrysanthemi*)
- Powdery mildew (*Oidium chrysanthemi*)
- Leaf spot and flower blight (*Alternaria, Septoria spp.*)
- Gray mould (*Botrytis cinerea*)
- Viral diseases (chrysanthemum stunt, tomato spotted wilt, tomato aspermy, flower distortion, chrysanthemum mosaic and chrysanthemum rosette)
## Important Insect-pests

- Aphids
- Red spider mites
- Hairy caterpillars
- Thrips
- Grubs
- Leaf miners
- Nematodes
Aphids most serious pest
Important Disorders

- Premature budding
- Quilling of florets
- Crown bud formation
- Heat delay
- Petal burn
Stages of Harvesting

- **Standards**: When outer row of florets start unfurling for distant market and for local market half opened flowers.

- **Sprays**: Harvested for local market when two flowers have opened and others have shown colour, while for distant market when 50% flowers have shown colour.

- **Loose flowers**: Fully open flowers

- **Pot mums**: 50% buds have developed colour.
## Grades of Chrysanthemum Flowers

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Grade</th>
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<tbody>
<tr>
<td>Blue</td>
<td>Red</td>
<td>Green</td>
<td>Yellow</td>
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<tr>
<td>Stem length (cm)</td>
<td>75</td>
<td>75</td>
<td>60</td>
<td>60</td>
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<tr>
<td>Flower diameter (cm)</td>
<td>15</td>
<td>12.5</td>
<td>10</td>
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<tr>
<td>Stem strength</td>
<td>Strong</td>
<td>Strong</td>
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<td>Strong</td>
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Packaging of Cut flowers

- In bunches of 10, 20 or 25.
- In corrugated card board boxes of 91 x 43 x 15 cm (L x W x H) accommodates about 80-100 cut flowers of chrysanthemum.
- Wrap flower bunches in cellophane sleeves.
Optimum yield of chrysanthemum

- Standard: 2.5 to 4.5 lakh/ha
- Spray: 1.5-1.75 lakh/ha
- Loose flowers: 8-15 ton/ha
- Greenhouse yield 150-250 flower stems/m²/year.