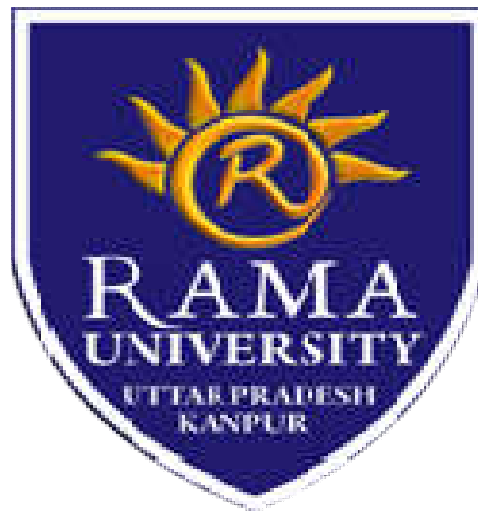


**RAMA UNIVERSITY, KANPUR, UTTAR
PRADESH**

Faculty of Agricultural Sciences & Allied Industries



Mr. Vinay Joseph Silas, Teaching Associate, (Horticulture)

**Course: Production Technology of Ornamental Crops, MAPs, &
Landscaping (HOR-221)**

Lecture 13

Chrysanthemum

Introduction: It is commonly known as Queen of East, Autumn Queen and Guldaudi. It is used as a potted plant, loose flower, cut flower and as border plant in the garden. *Chrysanthemum cinerariifolium* yield pyrethrin insecticides. It belongs to family Asteraceae and are natives of China, Japan, North Africa and southern Europe.

Classification

Large flowered group or Standard form

Incurved: Ray florets are incurved and flower is compact and globular. Eg. Snowball and Chandrama

Reflexed: Ray florets are reflexed outside and bloom is flat. Eg. Sweet Heart and day Dream.

Intermediate: Inner florets are incurved and outer florets are reflexed type. Eg. Sun Flight.

Quilled: Ray florets are elongated and tubular. Eg. Tribhuvan and Green Sensation.

Spider: Ray florets are large, tubular and curved like a spider. Eg. Mahatma Gandhi, Rupasi Bangla.

Ball: Ray florets are radiated in all direction like a ball. Eg. Nigeria and Red Jack.

Irregular: blooms are with irregular overlapping petals. Eg. Mountaineer. Small flowered group or spray form

Korean Single: Blooms are flat with 5 or less than 5 whorls. Eg. Cardinal, Gul-e-Sahir.

Korean Double: Blooms are flat with more than 5 whorls. Eg. Flirt, Man Bhawan.

Decorative: flower is completely double and disc florets completely invisible. Eg. Blue Chip, Alankar.

Anemone: Blooms with flat ray florets and prominent and well developed disc florets. Eg. Baggi, White Bouquet.

Button: Small compact hemi-spherical blooms like buttons are present. Eg. King Fisher, Gold Dust.

Quilled: Florets are fully tubular. Eg. Snow Crystal, Yellow Hector.

Semi-quilled: Florets are tubular upto some length and then are opened. Eg. Golden Crystal.

Cineraria: Flowers very small (less than 3 cm) and flat, perfect for pot culture. Eg. Bindya, Charmis.

Stellate: these are star like flowers with very short disc florets. Eg. Stella, Red Star.

No Stake and No Pinching: Very compact plant which require no staking and no pinching. Eg. Appu and SharadKumar.

Varieties: Some popular released varieties from different institutes are

National Botanical Research Institute, Lucknow: Apsara, Arun Singar, Birbal Sahani, Haldighati, Hemant Singar, Kargil'99, Sadbhavana, Shanti, Sharad Singar and Y2K.

Indian Institute of Horticultural Research, Bangalore: Kirti, Pankaj, Rakhee, Ravikiran and Red Gold.

Punjab Agricultural University: Punjab Gold

Annual chrysanthemum: Primrose Gem, Whity, Flame Shades and John Bright. Large flowered:

White: Snow Ball, Kasturba Gandhi, Beauty and Innocence.

Yellow: Chandrama, Sonar Bangla, Super Giant, Mountaineer, and Evening Star. Mauve:

Mahatma Gandhi, Peacock, Pink Turner, Classic Beauty and Pink Giant. Red:

Diamond Jubilee, Distinction, Alfred Wilson and Autumn Blaze.

Small flowered varieties suited for pot culture:

White: Sharad Shoba, Shweta Singar, Rita and Niharika. Mauve:

Sharad Prabha, Hemant Singar and Fantasy.

Yellow: Indira, Sonali Tara and Sharad

Kanti. Red: Rakhee, Flirt, Jaya and

Arun Singar.

Small flowered varieties suitable for cut

flowers: White: Birbal Sahani, Apsara

and Himani. Yellow: Nanako, Jayanti

and Kundan. Mauve: Sharad Prabha,

Nilima and Ajay.

Red: Jaya, Flirt and Jubilee.

No pinch cultivars: Arun Singar, Rangoli, Haldighati, Suhag Singar, Bindiya, Mother

Teresa and Dina.

Climate: The critical day length is 14-15 hours for flower initiation and 13-14 hours for flower development. The best temperature for growing chrysanthemum ranges from 20- 28^oC for day and 15-20^oC for night. Chrysanthemum requires 70-90% relative humidity.

Soil: It requires sandy loam with a pH of 6.2 to 6.7, having good tilth with proper aeration and drainage facility. EC should be 1.0 to 1.5.

Propagation : Chrysanthemum is vegetatively propagated through suckers, cuttings and by micropropagation.

Suckers: Optimum time of separation is, when 5 to 6 green leaves appear. Basal leaves and long roots should be cut before planting.

Terminal cuttings: Cuttings of 5-7 cm length are taken from healthy, disease free stock plants by shearing basal leaves and cutting half of the open leaves. Dipping of basal portion of cuttings in IBA 2500 ppm improves rooting percentage.

Micropropagation: Protocols have been developed by various workers and success has been reported in multiplying chrysanthemum at a faster rate by using shoot apex, peduncle, leaves and other floral parts as explants.

Seed: Treatment of thiourea promotes germination of dormant seeds. Seedlings are transplanted 30 days after seed sowing.

Cultural Operations:

Weed control: Regular hand weeding in early stages should be done. Herbicides like alachlor, oxadizon and oxyfluorfen are also found effective in this crop.

Pinching: Pinching can be performed both in suckers and cuttings. Generally two pinching are required in chrysanthemum plants first at 4 weeks after planting and second at 7 weeks after planting. In spray chrysanthemum regular pinching is done to produce maximum number of flowers per stem. Generally three types of pinching is performed in chrysanthemum, as given below.

Soft pinching: This is done to reduce plant height by removing tips of branches. Shoot along with 2-3 open leaves are kept in initial stages.

Hard pinching: It is done in pot plants. It removes a longer plant portion to keep the plant compact.

Roll out pinching: It is practiced only in short plants.

Disbudding: Disbudding is done to remove the side branches and to control flower number and size. It is usually done in large flowering and Decorative cultivars.

De shooting: It is practiced to reduce number of branches, for improving the size and form of the flower.

Mulching: Mulching discourages weeds and conserves moisture for good growth of root system. Buckwheat hulls, ground corncobs, pine needles, straw, cotton seedsetc. are the common mulches used in the chrysanthemum. De suckering: For preventing improper and vigorous growth of plant, suckers are removed from time to time. Without de suckering, the plant will loose vigour and becomes weak. Manure and fertilizers: Nitrogen 50 kg, phosphorus 160 kg and potassium 80 kg should be provided as basal dose.

Diseases

Fungal: Leaf spot, powdery mildew and flower rot.

Black spot is a serious disease of chrysanthemum caused by *Septoria chrysanthemella* fungus. Grey circular spots appear on leaves which turn yellow and results in leaf fall. Spray of 0.2% Dithane M 45 prevents this disease.

Powdery mildew in chrysanthemum is caused by *Oidium chrysanthemi* fungus. Symptoms, effect and control are same as in rose powderymildew.

Flower rot is caused by *Botrytis cineraria* fungus leading to the appearance of water soaked brown spots on flower petals and flower rot. This disease can be controlled by spray of 0.2% Dithane M 45.

Viral: Chrysanthemum is affected by a number of viral diseases. The flowers of virus infected plants are reduced in size and show varying amounts of distortion and loss of colour. For controlling the spread of viruses, infected plants should be destroyed, vectors like aphids and thrips should be controlled by regular spraying of rogor (0.15%).

Insect pests: Aphids, Hairy caterpillars, Red Spider mite, Thrips and Nematodes.

Harvesting: Standard chrysanthemums are harvested when fully open but before central disc begin to elongate. Spray cultivars are harvested when fully open but before shedding of pollens and pompons are harvested when centre of oldest flower is fully open.

Grading and packaging: Most of the Standard chrysanthemum are placed in poly sleeves and packed in display boxes measuring 91 cm x 43 cm x 15cm. They are placed in the boxes according to the grade. Flowers are generally packed in bamboo basket and polythene bags. Packing in 200 gauge polythene bag enhances freshness, colour and longevity.

Loose flowers can be stored at 3-5 °C for two weeks at higher humidity and proper ventilation.

Yield: In standard type of chrysanthemum, yield of flower stems varies from 15-20. The yield of loose flowers range from 10-15 tonnes flower/ha.

