



Chrysanthemum : An Ocean of Beauty

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Introduction

The genus *Chrysanthemum* constituting about 30 species belong to family Asteraceae which is largest family of flowering plants in terms of number of species. *Chrysanthemum* is native of Asia and Southeastern Europe. The name *Chrysanthemum* is derived from Greek 'chryos' - Gold and anthos-flower. The chrysanthemums were first cultivated in China about 3500 years ago. It was brought to Japan in 8th century and in 17th century, it was introduced in Europe.

Modern *Chrysanthemum* are much more showy than their wild relatives. The genus contains many hybrids and thousands of cultivars developed for horticultural purposes. Normally, four species of *Chrysanthemum* are grown in northern India for ornamental cut flower. These are *C. multicaule* commonly known as annual chrysanthemum and yellow in colour; *C. coronarium* yellow and white in colour. It is of two types single and double and commonly known as 'bijli'. One more species of *Chrysanthemum* (*C. paludosum*) is common in cultivation with small white flower. The most important hybrid is chrysanthemum x morifolium derived primarily from *C. indicum* but also involving other species. Plant breeders have developed many new and novel cultivars in past years. NBRI has rich collection of chrysanthemum and evolved more than 70 cultivars by seedling selection, mutation (physical and chemical mutagens) and hybridization. In recent years, Institute has released cvs namely Kaul, Khoshoo, Himanshu, Vijay kiran, NBRI Little yellow, NBRI Little kusum, NBRI Little orange, NBRI Little pink, NBRI Little darling, Mother

Teresa, Diana, Shanti, Kargil '99, Y-2k, Mini Jessie, Sadbhavna etc. Most of the improvement work has been carried out with small varieties. In large flower cultivars evolution of new cultivar is not easy due to poor seed setting. Presently, the Institute has about 75 large flowered, 130 small flowered and 20 'no pinch no stake' mini-chrysanthemum.

The older name of family "Compositae" refer to unique inflorescence involucre Capitulum. This flower head is a densely packed cluster of numerous small individual flowers usually called florets meaning small flowers. The outer perimeter of a flower head possessing a long strap like petal termed as ligule- these are ray florets. The inner portion of the flower head is composed of small disc florets, composed of tubular corollas. The ray florets are imperfect flowers, as they only possess the female reproductive organs while disc florets are perfect flowers and possess both male and female reproductive organs.

The *Chrysanthemum* is an ornamental with wide range of morphological and floral diversity. The vegetative and floral characters have wide range such as plant height, leaf size, colour and shape, floral characters- flower head size, type, shape, colour. Further, different proportion, colour and morphological differences in shape of ray and disc florets further provide limitless beauty to the genus.

Types of Plants

Diversity in plant height, bloom size and type of flower

- Diversity in type of bloom :
Large flower : Incurved, Incurving, Reflexed,



Ball, Intermediate, Quilled, Semi-Quilled, Irregular, Spider, Any other type.

Small flower : Single Korean, Double Korean, Anemone, Stripped, Stellate, Incurve, Quilled, Pompon, Cineraria, Decorative, Button.

- **Diversity in size of bloom** : 1.0 cm to 20.0 cm
- **Diversity in plant height** : 15.0cm to 100.0 cm
- **Diversity in leaf size** : Length- 2.0 cm to 15.0 cm; width- 0.5 cm to 10.0 cm; colour- Variegated to lust green.
- **Diversity in flower of colour** : White, Red, Yellow, Purple, and Pink.
 - (a) **Large flowered varieties**:
 - (i) **Standards** : Plants are grown upright with 1-3 blooms (preferably one bloom per shoot). An ideal standard is dwarf, lush green leaves and erect.
 - (ii) **Pot-mums**: It is a modified method of 'Standard' in which 5-6 rooted cuttings are grown in a small (15-20 cm) size pot.
 - (iii) **Sen rin tsukuri**: The plant is trained to dome shape with blooms at equal distance in concentric rings and geometrical fashion.
 - (b) **Small flower varieties**:
 - (i) **Bush form** : A plant is trained into an ideal bush about 60 cm tall with equal diameter of floral heads.
 - (ii) **Cascade form** : The plant instead of growing upward are trained to give an effect of water fall.
 - (iii) **Mini-culture** : A new set of small var. have been developed at NBRI, which naturally produce round, dwarf, compact mound shaped plants.

Types of flower blooms

Chrysanthemum blooms are divided into 13 different bloom forms by the US National Chrysanthemum Society, which is in keeping with

the international classification system. The bloom forms are defined by the way in which the ray and disc florets are arranged. In some varieties, the disc florets are completely concealed, while in others the disc flowers are completely exposed.

Irregular Incurve: These are the giants of the chrysanthemum world. Quite often disbudded to create a single giant bloom (ogiku), the disc florets are completely concealed, while the ray florets curve inwardly to conceal the disc and also hang down to create a "skirt." also called, "japs."

Reflex: The disc florets are concealed and the ray florets reflex outwards to create a mop like appearance.

Regular Incurve: Similar to the irregular incurves, only usually smaller blooms, with nearly perfect globular form. Disc florets are completely concealed. They used to be called "Chinese."

Decorative: Similar to reflex blooms without the mop like appearance. Disc florets are completely concealed, ray florets usually do not radiate at more than a 90 degree angle to the stem.

Intermediate Incurve: These blooms are in-between the irregular and regular incurves in both size and form. They usually have broader florets and a more loosely composed bloom. Again, the disc florets are completely concealed.

Pompon: The blooms are fully double, of small size, and almost completely globular in form. Note the spelling, it is not pompom.

Single/Semi-Double: These blooms have completely exposed disc florets, with between one and seven rows of ray florets, usually radiating at not more than a 90 degree angle to the stem.

Anemone: The disc florets are prominently featured, quite often raised and overshadowing the ray florets.

Spoon: The disc florets are visible, and the ray florets are spatulate.

Quill: The disc florets are completely concealed, and the ray florets are tube like.



Some good varieties of Chrysanthemum showing range of characters

Sl. No.	Name of Variety	Plant height (cm.)	Flower size (cm.)	Flower type	Flower Colour
1	Changes Khan	45.50	13.00	Incurved	Bronze & Orange
2.	White Cloud	41.21	15.20	Incurving	White
3	William Turner	38.50	14.92	Incurving	White
4	Pink parasol	33.70	14.50	Incurved	Pink Lavender
5	S.L. Andreauffard	43.17	17.80	Incurved	Red
6	Dignity	45.20	6.50	Incurving	Red
7	House stone	43.10	18.20	Spider	Yellow
8	Doridge Queen (W)	46.70	18.70	Incurved	White
9	Kokka Souzan	49.50	16.50	Incurved	Red
10	Boldeora	46.10	17.20	Incurved	Yellow
11	Cossa Grande (W)	44.20	16.31	Incurved	White
12	Silk Brocade Pink	47.00	15.20	Incurved	Pink
13	S.S. Arnold (Y)	36.21	15.37	Incurved	Yellow
14	Mountaineer	43.30	18.30	Incurved	Deep Yellow
15	Do ridge Queen (Y)	46.30	16.50	Incurved	Yellow
16	Cossa Grande (Y)	46.21	16.60	Incurved	Yellow
17	Super Giant	44.10	15.30	Incurved	Light Yellow
18	Pink Lady	45.20	15.00	Incurved	Pink
19	Eva Turner	38.00	14.50	Intermediate	Pink
20	Silk Brocade White	46.30	15.30	Incurved	White
21	Casa Grande Pink	45.30	16.50	Incurved	Pink
22	Miss Universe	46.20	17.20	Spider	Terracotta
23	Cotton Ball	36.20	03.12	Pompon	White
24	Grape Bowl	47.15	16.20	Incurved	Pink
25	Shin-me-getsu	44.20	15.00	Incurved	Yellow
26	Mahatma Gandhi	44.20	19.80	Spider	Light pink
27	Senkyo no Ray	46.20	17.23	Spider	Yellow
28	Beatrice May	44.00	14.30	Reflexed	White
29	Diamond Jubilee	46.31	16.50	Spider	Yellow



30	Flirtation	45.20	15.40	Spider	Pink
31	J.S. Loyed	44.50	14.50	Incurving	Creamy Yellow
32	Great Way Yellow	42.57	17.50	Incurved	Yellow
33	Jennifer Pink	46.20	15.45	Reflexed	Pink
34	Red Wine	44.50	14.00	Incurving	Red
35	Alfred Wilson	46.20	15.17	Incurving	Crimson Red
36	Mrs. W.A.Reid	44.20	14.50	Reflexed	Deep Scarlet
37	Yellow Rayonet	46.50	16.70	Spider	Yellow
38	Kikubiori	43.20	17.67	Incurved	Deep Yellow
39	Snow Ball	47.30	16.80	Incurved	White
40	Sonar Bangla	48.10	16.87	Incurved	Yellow
41	Ajina Purple	47.00	15.20	Incurved	Purple
42	Kelvin Tatto	44.30	03.41	Pompon	Pink with red center
43	Apsara	48.16	03.90	Pompon	White with pink blush
44	Birbal Sahini	55.21	04.89	Pompon	White
45	Mother teresa	15.0	2.80	Anemone	White
46	Sharad har	58.0	5.10	Double korean	Yellow
47	Vijay	28.0	3.7	DoubleKorean	Yellow Orange
48	Vajay kiran	23.00	04.0	Double Korean	Yellow
49	Chandrama	48.56	14.60	Incurved	Sulphur yellow
50	Yellow Baby	27.20	0.15	Pompon	Yellow

Spider: The disc florets are completely concealed, and the ray florets are tube like with hooked or barbed ends, hanging loosely around the stem.

Brush and Thistle: The disc florets may be visible. The ray florets are often tube like, and project all around the flower head, or project parallel to the stem.

Exotic: These blooms defy classification as they possess the attributes of more than one of the other twelve bloom types.

Chrysanthemum growing centres for commerce

Chrysanthemum are mainly grown for selling loose flowers of yellow and white small flowered varieties. The main centers of loose flower production are :

- Bihar....Madhupur, Deoghar
- Karnataka....Chickballapur, Malur and Devanhalli
- MadhyaPradesh...Ratlam, Indore, Ujjain
- Maharashtra....Ahmednagar, Pune



Starting from top left to bottom right : Diamond Jubilee (Spider type large flower variety), Birbal sahani (Pompon type small flower variety), Oto-Me-Zakura (Ball type large flower variety), Poncho (Anemone type No pinch no stake variety), Royal Price (Quilled type) large flower variety, Sadhbhavana (Double Korean small flower variety), Shyamal (Decorative type small flower variety), Snow Ball (Incurved type large flower variety)



- Rajasthan.....Pushkar
- Tamil Nadu.....Madurai, Coimbatore and Chingleput

Importance of plants / flowers

Beautification

In large flower varieties single flower is taken in each plant and flower attracts due to their diversity in size, shape, colour and type of flower. The exhibition varieties can be used to create many amazing plant forms; Large disbudded blooms, spray forms as well as many artistically trained forms, such as: Thousand Bloom, Standard (trees), Fans, Hanging Baskets, Topiary, Bonsai, and Cascades. No pinch no stake cultivars are attractive because of small size of plant (20 cm) with half the height is full of flowers. The unlimited morphological variations in vegetative and floral characteristics bless the genera amazing beauty.

Symbolic importance of Flowers

	Countries	Symbol
1	Europe (France, Italy, Spain, Poland)	Symbol of sorrow, used for funerals
2	China, Japan, Korea	Symbol of lamentation and or grief
3	United States	Symbol of Cheerfulness and positive thinking

Medicinal uses

Chrysanthemum flowers have reputation for reducing high blood pressure, improving eyesight, relieving eye fatigue, aiding liver functions and treating cases of wind-heat syndrome that are

accompanied by sore throat and fever. The herb is recommended for cooling the body in hot environments, relieving headaches in the presence of fever, and aiding deafness in some cases. It is also used to promote menstrual flow, as an antidote to depression and nervous disorders, and as a general tonic.

Drinks

Chinese teas are made from a variety of plants for a variety of reasons. Chrysanthemum flower tea is one very common type. Drunk with meals it helps to aid digestion, especially of greasy foods. It is also commonly taken to help strengthen the lungs and relieve head congestion. When made from fresh flowers, the flowers can be applied to the eyes to relieve dryness and itching.

Insecticidal property

This is commonly known as insect powder due to its insecticide properties. An advantage is that the powder is completely harmless to humans, and so does not have side effects (as is the case with all chemical insecticides), and can be used as a lotion and applied to the skin as an insect repellent. If the flowers are burned, the smoke that is given off can be valuable in exterminating insects.

The chrysanthemum is an ornamental with lot of hopes in commercial floriculture. The technoeconomics calculated by NBRI reveals that net profit from crop cultivated in one hectare is approximately 2.5 lakhs. The Institute is engaged for the last 25 years in collection, conservation and improvement of chrysanthemum germplasm. It also organizes a flower show of Chrysanthemum and Coleus in the month of December to create societal awareness.