

M.Sc. Botany (Semester II)
Course Title : Systematics and Evolution

Unit II: Asteraceae (Compositae)

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Asteraceae (Compositae) : Sunflower Family

- Large and well-known family of flowering plants
- About 10% of the total flower among angiosperms
- Compositae, the original name for Asteraceae, first described by Paul Dietrich Giseke, German botanist in 1792
- Genus name comes from Classical Latin word aster, "star"

Scientific classification:

- Kingdom : Plantae
- Phylum : Angiosperms
- Class : Dicotyledons
- Order : Asterales
- Family : Asteraceae

13- subfamilies

- Genera : 950
- Species : 20,000

Morphological characters

Habit: Usually herbaceous annuals or shrubs. Outer surface of plants is covered with hairs.

Root: The roots constitute a branched, tap-root system

Stem: Herbaceous or woody and erect. Tuberosus (*Helianthus tuberosus*) and leaf-like (Baccharis)

Leaves: Usually alternate, simple, petiolate and exstipulate. Leaves are opposite (eg. *Helianthus*) or whorled (eg. *Eupatorium*).

Inflorescence: Capitulum. A capitulum consists of disc florets in the centre surrounded by ray florets.

Reproductive characters

Flower: Bisexual or unisexual or polygamous. Generally, pentamerous, bracteates, sessile and epigynous tubular (actinomorphic) or ligulate (zygomorphic),

Two types of flowers: Ray floret and Disc floret

Ray FLORET : Bracteate, Zygomorphic, Unisexual, Sessile

Calyx: pappus like structure

Corolla: Petals 5, Gamopetalous, aestivation- 3 or 4 valvate

Androecium: Absent

Gynoecium: Absent or bicarpellary, syncarpous, inferior, unilocular with basal placentation, one anatropous ovule

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Reproductive characters

DISC FLORET : Bracteate, Actinomorphic, bisexual, Inferior ovary

Calyx: pappus like structure

Corolla: 5 Gamopetalous, valvate Aestivation

Androecium: 5 epipetalous, Syngenesious stamens.

Gynoecium: Bicarpellary, syncarpous, unilocular unilocular with single anatropous ovule, basal placentation, style, slender and branched, inferior ovary.

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Fruits: Cypsela

Seed: Dicotyledonous and exalbuminous

Pollination: Entomophilous.

Asteraceae is the most economically important family of angiosperms.

Tagetes erecta



Helianthus annuus



Calendula officinalis



Parthenium hysterophorus



Artemisia



Chrysanthemum



Cichorium



Lactuca sativa

Economic Importance

This family has greater importance than all other families of the flowering plants. It has importance humankind.

- **Food:** Leaves of *Cichorium intybus* are used in salads. Leaves *Lactuca sativa* (Lattuce) is used in salads.
- **Dye:** Some plants yield dyes for coloring different materials. Flower heads of *Carthamus tinctorius* (safflower) gives a red dye and *Tagetes erecta* (yellow dye)

- **Ornamental plants:** Many plants are used in lawns, e.g. *Tagetes erecta* (marigold); *Helianthus annuus* (sunflower); *Calendula officinalis* (skotch marigold); *Parthenium hysterophorus* (guayule)
- **Oils:** Many plants gives oil seeds. The oil is used for cooking, soapmaking, varnish, lubricant. Examples: *Helianthus annuus* (Seed); *Carthamus tinctorius* (Flower); *Guizotia abyssinica* (Seed)
- **Medicines:** Whole plant extract of *Artemisia absinthium* is given for fever and inflammation of liver.

Artemisia vulgaris is used for round worms, fever, asthma and nervous disorders.

Acknowledgements

- Barnhart JH (1985) Family nomenclature. Bulletin of the Torrey Botanical Club 22(1): 1-24
- Pandey BP (2010) A Textbook of Botany: Angiosperms. S. Chand & Co. Ltd. (ISBN: 9788121904049, 9788121904049)
- Stussy TF (1990) Plant taxonomy. Columbia University Press, USA
- <https://en.wikipedia.org/wiki/Asteraceae>
- I apologize to all authors whose findings could not be substantiated or cited in our presentation due to reasons of brevity

Thank you for your attention

