

Flowering and Fruiting Behaviour of Cucurbitaceae Family

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ABSTRACT

Prostrate herb bearing tendrils; leaves palmately lobed, surface hispid; flowers pentamerous, unisexual, monoecious or less commonly dioecious; stamens five, usually less, anthers free or connate, ovary inferior, trilobular, parietal placentation, fruit fleshy, pepo. Vascular bundles bicollateral and in two alternating rows.

A. Vegetative characters:

ADVERTISEMENTS:

Habit:

Mostly annual or perennial herbs, rarely shrubs (*Acanthosicyos*) or small trees (*Dendrosicyos*), usually trailing, climbing by means of tendrils.

Root:

Tap root, branched may be thickened due to storage of food and water.

ADVERTISEMENTS:

Stem:

Herbaceous, climbing, angular, fistular, branched.

Leaves:

Alternate, petiolate- petiole long and hollow; simple, lobed, exstipulate, palmately veined; tendrils present in the axil of leaf or opposite to the leaf. In *Acanthosicyos* the leaves are absent but thorns are present.

INTRODUCTION

Inflorescence:

There is great variation in the inflorescence. Flowers are solitary, or racemose or cymose panicles (*Actinostemma*).

Flower:

Regular, mostly unisexual rarely bisexual (*Schizopepon*), incomplete, epigynous, small or large, mostly white or yellow, pentamerous.

Male flower:

Produced in large numbers.

Calyx:

Sepals 5, gamosepalous, sepals pointed, rarely petaloid, campanulate, aestivation imbricate.

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Corolla:

Petals 5, gamopetalous united at the base (Momordica) or through out (Cucurbita, Coccinea), polypetalous (Luffa, Lagenaria), may be campanulate, rotate, imbricate or valvate aestivation.

Androecium:

Stamens 5, sometimes free or combined to form a central column, anthers dithecousextorse, dehiscence longitudinal or in curves; androecium may be modified in one of the following ways:

1. In *Thaladiantha* two pairs of stamens are closely approximated in the lower part of their filaments and the fifth stands apart.
2. In *Sincydium* the pairs of stamens are united below; in *Momordica*, *Citrullus*, the union of pairs of stamens is complete and apparently only three stamens are present.
3. In *Sicyos* and *Sechium* the filaments unite to form a central column and the anthers are very much curved.
4. In *Cyclantliera* the stamens are united into a central column with two ring like pollen chambers running round the top. (Compare with the condition found in *Phyllanthus cyclanthera* of the Euphorbiaceae).
5. In *Fevillea* a polyandrous condition is found with all the five stamens free and alternating to the five free petals. This is a primitive genus.

Gynoecium:

Reduced or rudimentary or absent.

Female flower:

They are fewer in number than the male flowers.

Calyx:

Sepals 5, gamosepalous, calyx tube adnate to the ovary wall; imbricate aestivation, superior.

Corolla:

Petals 5, gamopetalous, inserted on calyx tube; imbricate aestivation, superior.

Androecium:

Staminodes 0, 3, 5.

Gynoecium:

Tricarpellary, syncarpous, ovary inferior, unilocular with parietal placentation, the intruding placentae make the ovary to appear trilobular.

In *Luffa* the ovary is narrow and ultimately 3-4 celled and apparently of the axile type. In *Sechium* the ovary is unilocular with only a single ovule; ovule bitegmic. Style stout and columnar and bears a forked stigma for each carpel.

The stigmas are commissural i.e. stand above the dividing lines between the carpels. This is explained by assuming that each is a joint structure and composed of a branch of the stigmas of two adjacent carpels.

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Fruit:

Soft, fleshy, indehiscent and either a berry or pepo. Fruits sometimes very large in size (*Citrullus* sp. *Benincasa* sp., *Cucurbita* sp.). In *Ecballium* the fruit is highly turgid when ripe and dispersal is by explosion.

Seed:

Exalbuminous, flattened, numerous, embryo straight, cotyledons large and oily.

Pollination:

Entomophilous.

Floral formulae:

Male flower : $\oplus \delta K(5) C5$ or $(5) A5$ or $(5) G0$

Female flower : $\oplus \ominus K(5) C5$ or $(5) A O$ or 3–5 staminodes $G(3)$.

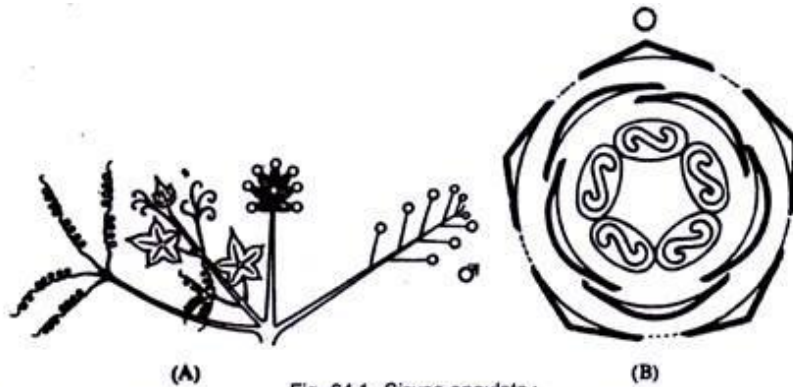


Fig. 64.1. *Sicyos angulata* :
(A) diagram of an inflorescence along with tendril and shoot. (B) F.D. Male flower (after Eichler).

Distribution of Cucurbitaceae:

It is commonly called gourd family. The family has 110 genera and 850 species out of which 86 species are found in India. The members are chiefly inhabitants of tropical regions; a few in temperate regions. The members are wanting in the colder regions.

Economic Importance of Cucurbitaceae:

This family is particularly important economically because its fruits are edible.

I. Vegetables and fruits:

1. Cucumismelo (Hindi – Kharbuza):

The fruits are edible and a number of varieties are known. *C. melo* var. *momordica* is Phut and *C. melo* var. *utilissimus* is Kakri. *Cucumis sativus* is Khira.

2. *Citrullus vulgaris* (Hindi – Tarbuz):

The fruits are large and ripen during summers; it is cultivated on the sandy beds of rivers. *C. vulgaris* var. *fistulosus* is Tinda which is used as vegetable.

3. *Cucurbita maxima* is Kaddu:

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Cucurbita maxima is Kaddu while C. pepo is Safed Kaddu; both are used as vegetable.

4. Benincasaheipida is Petha:

Benincasaheipida is Petha. It is used as vegetable; PETHE-KI-MITHAI is also prepared from the fruits.

5. Lagenaria vulgaris is Lauki:

Lagenaria vulgaris is Lauki; the fruit is commonly used as a vegetable. From ripe fruit-shells sitar is made.

6. Trichosanthesdioca is Parwal:

Trichosanthesdioca is Parwal whose fruits are also used in vegetable preparations. T. anguina is Chachinga which is also used as vegetable.

7. Luffa acutangula is Torai:

Luffa acutangula is Torai. This is also a popular vegetable.

8. Momordicacharantia is Karela:

Momordicacharantia is Karela. The fruits are bitter but used in vegetable preparations. It is said to be useful in gout and rheumatism.

II. Medicine:

There are a few plants also important medicinally.

9. Citrulluscolocynthis – produces the alkaloid colocynthin from its fruits. The fruits and roots are used against snake bite. The alkaloid is also used in other diseases.

10. Ecballiumelatarium fruits produce elaterium of medicine which has narcotic effect and useful in hydrophobia.

III. Ornamental:

Some plants viz., Ecballium, Sechium, Sicyos are grown in gardens.

Primitive characters:

1. Leaves simple and alternate.
2. Flowers actinomorphic.
3. Petals and stamens are free in some genera.
4. Ovules bitegmic.

Advanced characters:

1. Plants herbaceous and climbers.
2. Leaves exstipulate and palmately lobed.
3. Flowers unisexual and epigynous.
4. Calyx gamosepalous.
5. Stamens 3 to 5 in number.

6. Stamens show tendency towards fusion.
7. Anther lobes curved and controlled.
8. Gynoecium syncarpous.
9. Ovules campylotropuous.
10. Fruit simple.
11. Seeds non-endospermic.

DISCUSSION

Common plant of the family:

1. Cucurbita:

Cultivated for vegetables.

2. Trichosanthes:

Scandent herb cultivated for delicious vegetable.

3. Lagenaria (H. Lauki):

Cultivated for common man vegetable.

4. Luffa aegyptcia (H. Tori):

Cultivated for vegetable.

5. Momordicacharantia (H. Karela):

Fruits are slightly bitter in taste.

6. Ecballium elaterium:

It has a special method for the dispersal of seeds.

Division of the family and chief genera:

Muller and Pax divided the family Cucurbitaceae into 5 tribes viz., Fevilleae, Melothrieae, Cucurbiteae, Sicyocae and Cyclanthereae.

Jeffrey (1962) divided the family into two sub-families and 9 tribes.

A. Cucurbitoideae:

Tendrils proximally 2-7 fid or simple; seed winged.

(a) Receptacle tube usually relatively short; if long in male flowers than short in female flowers.

1. Jolifeieae:

Petals fringed or with ventral scales. Momordica, Telfairia.

(b) Petals without fringe or ventral scales.

2. Benincaseae:

Ovules many horizontal; pollen reticulate, tricolporate. Citrullus, Luffa, Bryonia, Lagenaria, Ecballium.

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3. Schizopeponeae:

Ovules 1-2 pendulous, pollen reticuloid, tricolporate. Schizopepon.

4. Cyclanthereae:

Ovules 1 to many, ascending; pollen smooth, mostly polycolporate. Echinocystis, Cyclanthera.

5. Sicyocae:

Ovule solitary, pendulous; pollen spinulose, polycolporate. Sicyos, Sechium.

6. Cucurbiteae:

Ovules many, horizontal or 1 to few, ascending, pollen spinose: pentaporate. Cucurbita, Cayaponia, Sicana.

(c) Receptacle tube relatively long, alike in male and female flower.

7. Melothrieae:

Pollen usually reticulatae, flower small, stamens usually free and with simple thecae. Melothria, Cucumis, Gurania.

8. Tichosantheae:

Pollen striate, smooth verrucose; flower large, stamens united, with triplicate thecae. Trichosanthes, Peponium.

B. Zanonioideae:

Tendrils distally bifid; seed mostly winged.

9. Zanonieae:

One tribe. Zanonina, Fevillea.

Floral formulae:

Male flower – Br ⊕ ♂ K (5) C (5) A (2) + (2) + 1 G0

Female flower – Br ⊕ ♀ K (5) C (5) A 3std G (3).

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REFERENCES

1. Angiosperm Phylogeny Group (2009). "An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG III" (PDF). Botanical Journal of the Linnean Society. 161 (2): 105–121. doi:10.1111/j.1095-8339.2009.00996.x. Retrieved 2013-07-06.
2. Christenhusz, M. J. M. & Byng, J. W. (2016). "The number of known plant species in the world and its annual increase". Phytotaxa. Magnolia Press. 261 (3): 201–217. doi:10.11646/phytotaxa.261.3.1.

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3. "Cucurbits". Purdue University. Retrieved August 26,2013.
4. "Angiosperm Phylogeny Website". mobot.org.
5. Revisions to Roland Brown's North American Paleocene Flora by Steven R. Manchester at Florida Museum of Natural History, University of Florida, Gainesville, Florida, USA. Published in Acta MuseiNationalisPragae, Series B - Historia Naturalis, vol. 70, 2014, no. 3-4, pp. 153-210.

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