Solanaceae Family

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Classification

Bentham & Hooker (1862-83)

Class : Dicotyledons
Subclass : Gamopetalae
Series : Bicarpellatae
Orders : Polemoniales

Characters of Solanaceae

- Plants herbs, shrubs rarely trees; leaves alternate, flowers solitary or in cymes; axillary or terminal; flowers pentamerous, actinomorphic, hypogynous, hermaphrodite, calyx persistent, gamosepalous, corolla gamopetalous, campanulate; stamens epipetalous; gynoecium bicarpellary, syncarpous, ovary obliquely placed, axile placentation; swollen placentae; ovules many in each locules; fruit capsule or berry.

Habit

Plants may be herbs, shrubs or small trees. Some are climbing or even creeping. Largest genus of the family is *Solanum* possessing about 1500 species. *Solanum* shows great variations in habit: *Solanum nigrum*- annual herb, *S xanthocarpum* (kateli) with bluish- purple flowers, *S indicum* (Bhutkataiya)- erect prickly under shrub, *S. verbascifolium*- Ban-tambaku, large shrub/small tree, *S. dulcamara*- climbers, *S. tuberosum* (potato)- the branches arising from the axils of the lowest leaves grow down and enter the soil where they grow into tubers. *Physalis*- annual/ perennial herbs. *Datura*- annual tall herbs. *Withania somnifera*(Askand)- under-shrub. *Lycium*- spiny shrubs. *Cestrum* (Rat ki rani)- shrub.

Leaves & Anatomical Feature

Leaves- in the vegetative parts are mostly alternate. In floral regions, they may become opposite. They are simple, rarely pinnately divided and are always exstipulate.

Anatomy- the chief anatomical character of the family is the presence of bicollateral vascular bundles in the stem.

Inflorescence

Usually cymose type. Flowers- either axillary/ extra- axillary cymes; solitary or clustered together. *Solanum nigrum*- extra- axillary; *S. xanthocarpum*- extra- axillary, shortly peduncled cyme. *Withania somnifera* (askand)- subsessile umbelliform cyme. *Datura*- Large and solitary

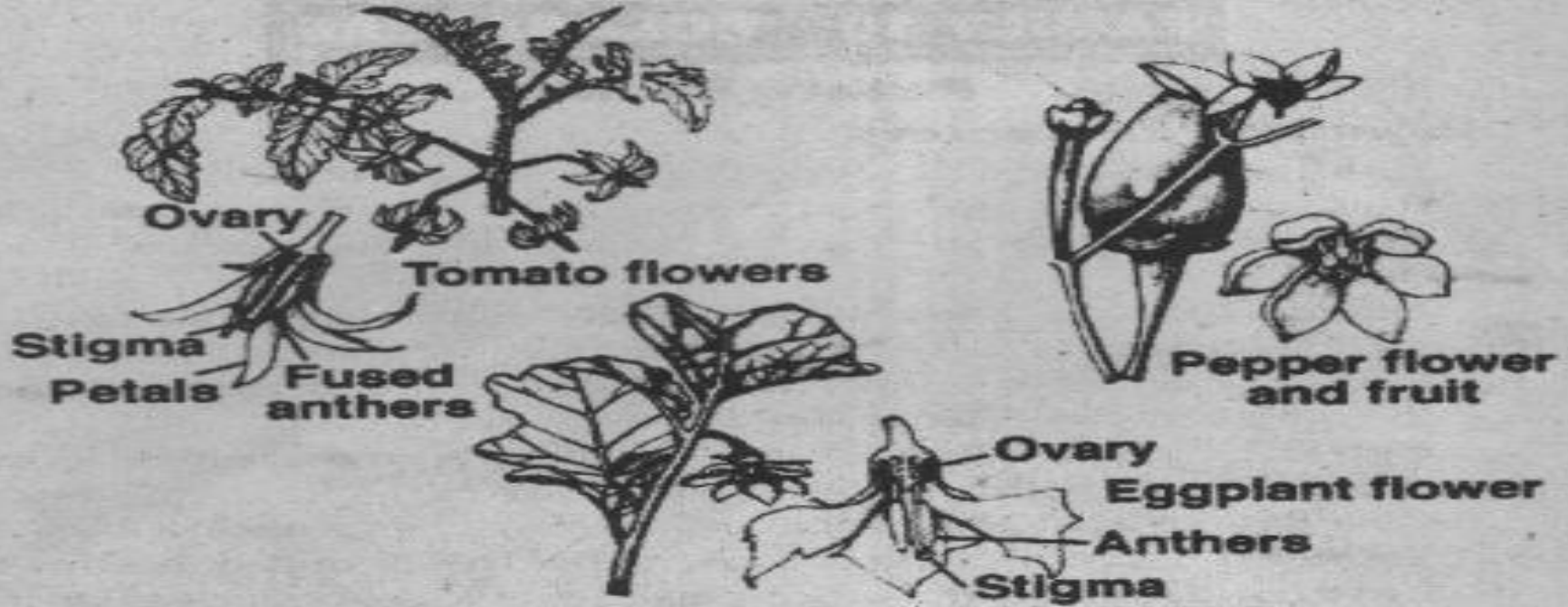


Fig: Different flowers of Solanaceae

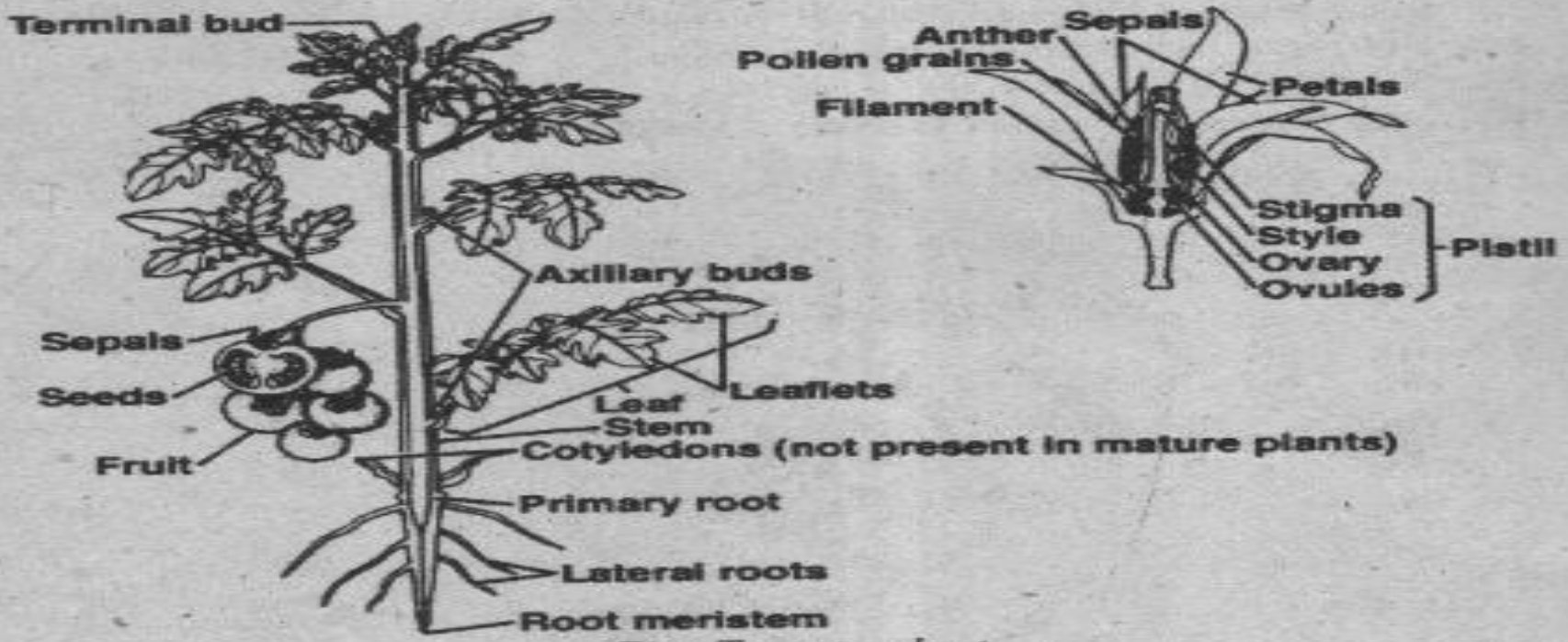


Fig: Tomato plant

Flowers and Details-I

Flowers: Hermaphrodite, actinomorphic, sometimes zygomorphic , e.g. *Salpiglossis*, complete & hypogynous. In *Salpiglossis*, the flowers are also cleistogamic.

Calyx: It consists of 5 sepals, gamosepalous, five- lobed or toothed. They are persistent and often enlarge in the fruit. Sometimes it becomes 4 or 6 lobed.

Flowers and Details-II

Corolla: 5 petals, gamopetalous and of various forms such as rotate e.g. *Solanum*, campanulate: *Atropa*, bilabiate- *Schizanthes*. The aestivation of corolla is contorted, imbricate or valavate, the lobes being folded.

Androecium: 5 stamens alternating with petals, epipetalous, more or less equal in length. In zygomorphic flowers, the number of stamens often gets reduced. *Salpiglossis*- 4 stamens, *Schizanthes*-2 stamens. Missing stamens may be present as staminodes. Anthers-2 celled, dehisce longitudinally or by apical pores (*Solanum*).

Flowers and Details-III

Gynoecium: 2 carpels, syncarpous, the capels situated obliquely- posterior carpel placed to the right, anterior capel to the left.

Ovary: Superior, typically bilocular, but sometimes 4 celled, rarely 3-5 celled by the development of false partition walls. The placentation is axile with a very large number of shining ovules being placed on usually swollen placenta. In *Henoonia*, the ovule is also only one. In *Capsicum*, it is unilocular in the apical portion. There is single style ending in a bilobed stigma.

Fruit: Berry or capsule

Seeds: Either smooth/ pitted, endospermic with straight/ curved embryo.

Pollination: Entomophilous, Species of *Nicotiana* are visited by *Lepidoptera*.

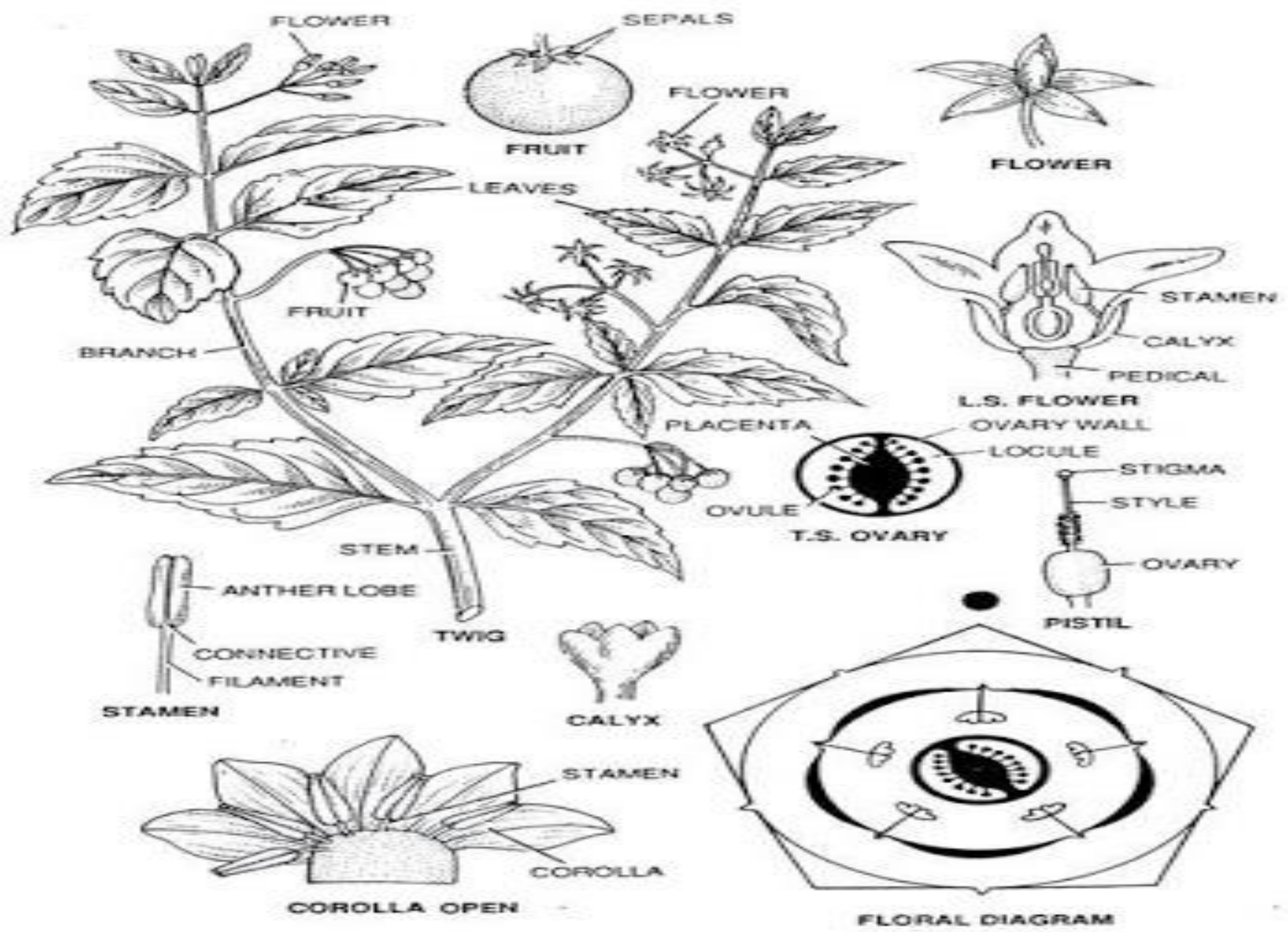
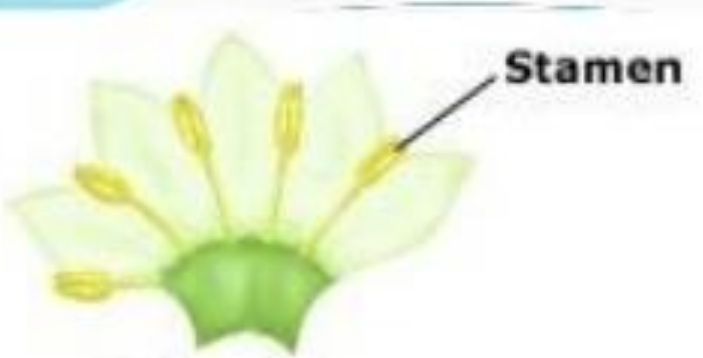
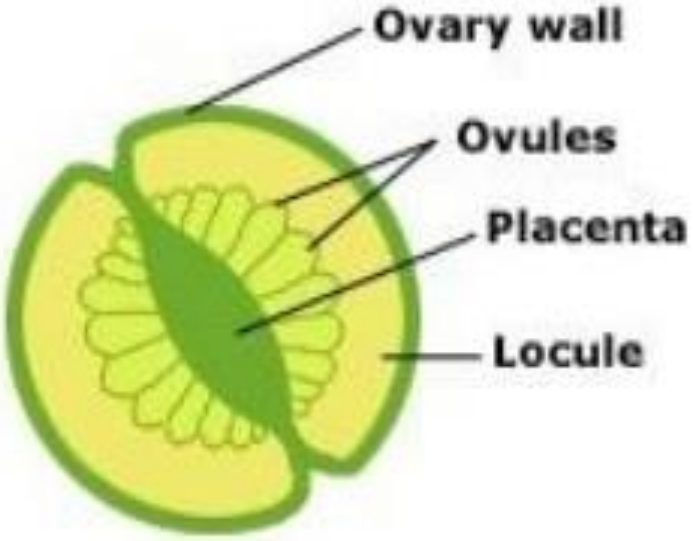


Fig. 26.2. Solanaceae. *Solanum nigrum* Linn. Eng. black nightshade; (Verna. **Makoi**)



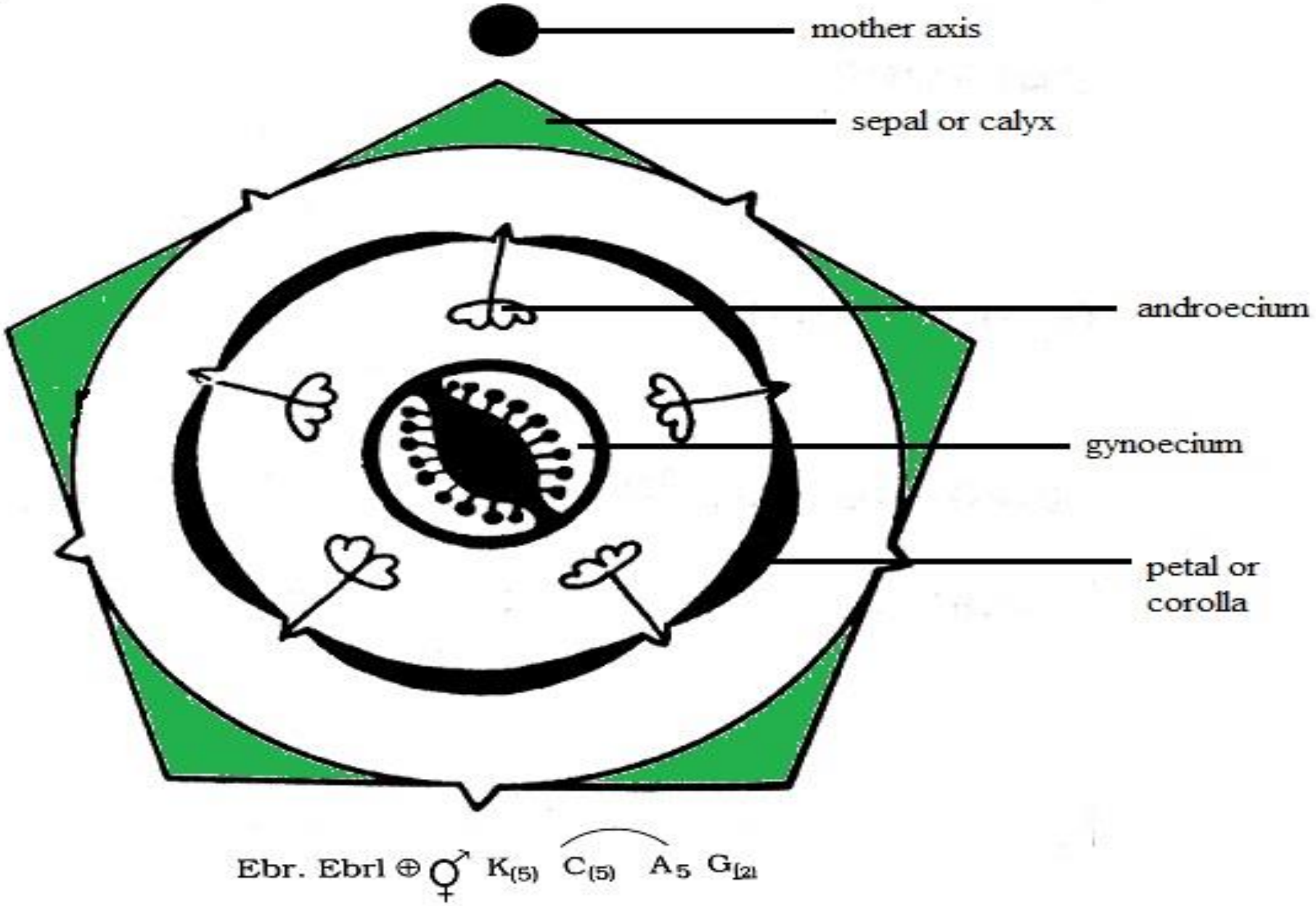
Epipetalous stamens

A stamen



T.S. of ovary

Floral diagram



Floral diagram with floral formula

Economic Importance

Economic importance of the family solanaceae				
S.No	**Economic importance**	**Binomial**	**Useful part**	**Uses**
1.	Food plant	*Solanum tuberosum* (potato)	Underground stem tubers	Used as vegetables and also used for the production of starch.
		Lycopersicon esculentum (tomato)	Ripened fruits	Used as delicious vegetable and eaten raw.
		Solanum melongena (brinjal)	Tender fruits	Cooked and eaten as vegetable.
		Capsicum annuum (bell peppers & chilli papers)	Fruits	Used as vegetables and powdered chilli is the dried pulverized fruit which is used as spice to add pungency or piquancy and flavour to dishes .
		C. frutescens (மிளகாய்)		
		Physalis peruviana (cape gooseberry / சொடக்கு தக்காளி)	Fruit	Used as delicious fruit.

Economic Importance

Economic importance of the family solanaceae				
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2.	Medicinal plant	*Atropa belladonna* (deadly nightshade)	Roots	A powerful alkaloid 'atropine' obtained from root is used in belladona plasters, tinctures etc. for relieving pain and also for dialating pupils of eyes for eye –testing.
		Datura stramonium (ஊமத்தை)	Leaves and roots	Stramonium drug obtained from the leaves and roots of this is used to treat asthma and whooping cough.
		Solanum trilobatum (தூதுவளை)	Leaves, flowers and herries	Used to treat cough.
		Withania somnifera (Ashwagandha / அமுக்கரா)	Roots	Used in curing cough and rheumatism.
3.	Tobacco	*Nicotiana tabaccum* (tobacco / புகையிலை)	Leaves are dried and made into tobacco.	Used in cigarette, beedi, hukkah, pipes as well as for chewing and snuffing, alkaloids like nicotine, nornicotine and anabasin are present in tobacco.
4.	Ornamental plants	*Cestrum diurnum* (Day Jasmine) *Cestrum nocturnum* (Night Jasmine) *Nicotiana alata* *Petunia hybrida*, *Schizanthus pinnatus* *Brugmansia* species (Angel trumpet)	Plant	Grown in garden as ornamental plants for their aesthetic nature.

Do tomatoes come from a tree?

Solanum betaceum (Tree tomato)