Botany

B.Sc. Sem. III

Paper IV

Angiosperms: Taxonomy

FAMILY APOCYNACEAE

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Tabernaemontana divaricata

Systematic Position of the Family

Bentham & Hooker (1862)	Engler & Prantl (1931)	Hutchinson (1959)
Phanerogams	Phanerogams	Angiospermae
Dicotyledones	Dicotyledones	Dicotyledones
Gamopetalae	Sympetalae	Lignosae
Bicarpellatae	Contortae	Apocynales
Gentianales	Apocynaceae	Apocynaceae
Apocynaceae		

Thevetia peruviana

FAMILY-APOCYNACEAE

There are about approximately 300 genera and 1500 species in this family. It is also known as Dogbane family.

Distribution: The members of this family are found throughout the world, but they are more commonly met within the tropical regions.

Habit: There is a great variation in the habit of the plants of this family. They may be herbs, erect or twining shrubs or trees.

Catharanthus roseus (Verna- Sadabahar) is a perennial herb; *vallaris solanacea* (*Verna- Ramsar*) is a large twining shrub; *Nerium Indicum (N. odorum*) is a large shrub with beautiful red or white flowers.

Thevetia peruviana (*Verna- Pili Kaner*) is a large shrub or a small tree.

Plumeria acutifolia is a small sized tree and *Alstonia scholaris* is a medium sized tree. In some genera, the stem becomes tuber like, e.g., Adenium. The species of Landolphia and Clitandra are climbing shrubs.

Alstonia scholaris

The latex is present in most of the genera.

Root: Tap and branched.

Stem: Usually erect; branched, solid, glabrous rarely tuber-like and thick.

Leaves: The leaves are simple, petiolate, usually opposite decussate. In rare cases the leaves are alternate or even whorled (e.g., in *Nerium odorum*, *Alstonia,* etc.). Usually the leaves are exstipulate and very rarely they may be stipulate.

Inflorescence: Usually the inflorescence is of cymose type. It is very rarely solitary as in *Catharanthus*. In Carissa, the flowers are found to be arranged in corymbose cymes.

Plumeria acutifolia

In *Plumeria*, the flowers are arranged in terminal cymes. In *Alstonia*, the flowers are found to be arranged in umbellate branched panicled cymes. In *Rauvolfia*, the flowers are arranged in umbellate or corymbose cymes.

Flowers: The flowers are pedicellate; bracteate; bracteolate; hermaphrodite, actinomorphic regular, sometimes slightly zygomorphic, complete, hypogynous, and pentamerous.

Calyx: Usually it consists of five sepals. The calyx is generally divided almost to the base. The aestivation is quincuncial.

Corolla: Usually the corolla consists of five petals, gamopetalous. It is generally salver or funnel shaped. The corolla tube usually possesses hairy appendage or scales which are known as coronary appendages. The aestivation is contorted.

Androecium: It consists of five stamens alternating with the petals. The stamens are situated on the tube or the throat of the corolla (i.e., epipetalous). The filaments are short, anthers introrse, polyandrous or connate and often adhere to the stigma. The anther lobes are sometimes empty at their base and prolonged into spines.

Aganosma dichotoma

Gynoecium: It consists of two carpels. The carpels may be free (apocarpous) or connate (syncarpous); superior, sometimes partly inferior as in *Plumeria*. The style is simple and the stigma is thick and often bilobed. Rarely the number of carpels exceeds, i.e., 3 to 5. Usually a nectar secreting disc is situated beneath the gynoecium. In syncarpous gynoecium, the ovary may be unilocular with parietal placentation or marginal.

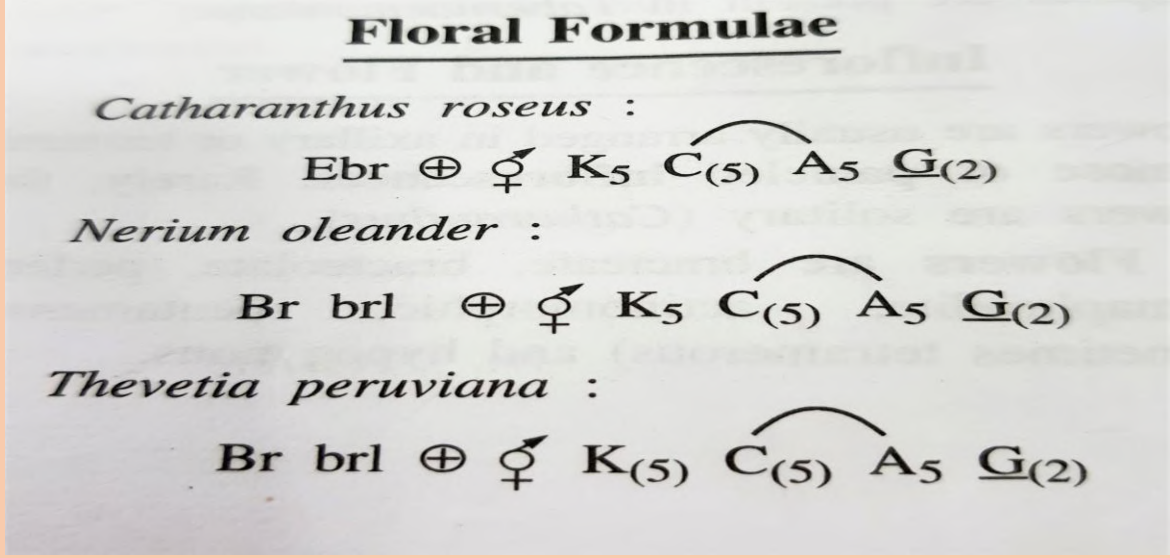
Thevetia Peruviana

Fruit: In the case of free ovaries, the fruit is a pair of follicles. Sometimes the fruits of separate ovaries fleshy and indehiscent, or may be one seeded, e.g., *Cameraria*. In the case of syncarpous ovary, usually the fruit is indehiscent, fleshy and berry-like, i.e., in *Landolphia*. In Cerbera, it may be a drupe. This fruit is coconut like and distributed by means of water currents. In certain genera, possessing syncarpous ovaries a two-valved capsule is found, e.g., in *Aspidosperma* and *Allamanda.*

Seed: In dry fruits the seeds are generally winged, e.g., in *Plumeria*. Sometimes the seed bears a tuft of hairs at the base, e.g., in *Kickxia*, and sometimes at both ends, e.g., in *Stropanthus.* The embryo is straight, with or without endosperm.

Pollination: Flowers are adapted for insect pollination and they are visited by insects for nectar secreted by the hypogynous disc. Presence of stigma at the edge or under surface of the stylar head and the position of the anthers rules out the chances of self pollination.

Winged seeds and presence of crown of hairs favour distribution by wind.



Floral Formulae

Catharanthus roseus :

$$\text{Ebr} \oplus ⚥ \; K_5 \; \overset{\frown}{C_{(5)} \; A_5} \; \underline{G}_{(2)}$$

Nerium oleander :

$$\text{Br brl} \oplus ⚥ \; K_5 \; \overset{\frown}{C_{(5)} \; A_5} \; \underline{G}_{(2)}$$

Thevetia peruviana :

$$\text{Br brl} \oplus ⚥ \; K_{(5)} \; \overset{\frown}{C_{(5)} \; A_5} \; \underline{G}_{(2)}$$

Beaumontia jerdoniana

Economic Importance of The Family

The family is of little economic value. Some plants are grown as ornamentals, while some possess medicinal properties. A list of some important plants is given below:

l. *Alstonia scholaris*; Eng.—Dita bark; Verna. — Satwin. This is a small grown as an ornamental. Its wood is quite light and used for carvings. In Myanmar, the black boards are prepared from its wood. The bark possesses medicinal properties, which is used for diarrhoea and dysentery. Its latex is applied to ulcers.

2.*Beaumontia grandiflora*; Eng.—Nepal trumpet flower—It is a climbing shrub, usually grown as an ornamental for its large. white fragrant flowers. It is native of the Eastern Himalayas.

3.*Beaumontia jerdoniana*; This is also grown as an ornamental.

Carissa carandas

4.*Anodendron paniculatum*; Its leaves and roots possess medicinal properties.

5.*Carissa carandas*; Eng.—Karanda; Verna. - Karaunda—This is a spiny shrub grows throughout India for its sour edible fruits. The fruits are used as vegetable and pickle is prepared from them. plant makes a good hedge.

6.*Carissa grandiflora*; Eng.—Natal plum. - This is a large spiny shrub usually grown in Maharashtra and Baroda for its edible fruits.

Landolphia kirkii

7.*Carissa spinarum*. This is a shrub or a small tree cultivated throughout India for fragrant flowers and hedge plants.

8.*Carissa arduina*; Syn. C. bispinosa; Eng.—Natal plum—This is a thorny shrub grown for its edible fruits.

9. *Landolphia kirkii*—The rubber is prepared from its latex. They have leaves with hook tendrils.

Ichnocarpus frutescens

10. *Ichnocarpus frutescens*, Eng.—blackcreeper; Verna.—Dudhilata, Siamalata. This is a twining ornamental shrub. It is found in Uttar Pradesh, Madhya Pradesh, Bihar. Assam and the Sundarbans. The stems are used for making ropes. baskets and fishing traps. The leaves possess medicinal properties.

Rauvolfia serpentina

11. *Nerium indicum*; Syn. N. odorum, N. oleander; Eng.— Oleander. Verna. — Kaner It is a shrub. They are grown as hedge plants. The plants possess medicinal properties.

12. *Rauvolfia serpentina*; Syn. Ophioxylon serpentinum; Verna.- Chhotachand is a small shrub found in Assam, Dehradun, Bihar, the Western Ghats and Bengal, the roots possess medicinal properties and used in the treatment of hypertension, mental disorders and related ailments.

Plumeria rubra

13.*Plumeria rubra forma acutifolia*: Syn. P. acutifolia; Verna. - Goburchampa is grown as an ornamental, It possesses several medicinal properties.

14.*Plumeria alba*. - A small tree grown as an ornamental. The latex is applied to ulcers.

15.*Thevetia peruviana*; Syn. Thevetia nerifolia; Eng.—Yellow oleander; Verna. -Pilikaner. It is a shrub The plants are grown as ornamental. They are also grown as hedge plants. The latex is highly poisonous.

Wrightia tinctoria

16.*Wrightia tinctoria*; Verna. - Dudhi—A tree, found in Rajasthan, Madhya Pradesh and Tamil Nadu. A blue dye is obtained from its flowers and fruits The fruits are edible. The bark and seeds possess medicinal properties.

17.*Wrightia tomentosa*; Verna. - Dharauli. The seeds yield a yellow dye. The leaves and fruits are edible. Its soft wood is used for carvings. The bark and roots used as an antidote for snake bite.

Allamanda cathartica

18. *Aganosma dichotoma* —This is a climbing shrub grown as an ornamental in the gardens.

19. *Allamanda cathartica*; Eng, - Allamanda- This is a beautiful climbing shrub, grown as an ornamental in the gardens, It is native of Central America and Brazil.

Description of Some important plants in semi-technical language

Catharanthus roseus

Verna- Sadabahar.

Habit: A perennial herb.

Stem: Erect, cylindrical, branched, solid, reddish green, glabrous.

Leaf: Cauline, simple, opposite, decussate, petiolate, exstipulate, obovate, entire, glabrous, mucronate apex, unicostate reticulate venation.

Inflorescence: Cymose, flowers arranged in axillary pairs.

Flowers: Pedicellate, bracteate, hermaphrodite, actinomorphic, complete, pink, hypogynous.

Catharanthus roseus

Calyx: 5 polypetalous, glandular, green, inferior, quincuncial aestivation.

Corolla: 5 gamopetalous forming corolla tube, throat of corolla tube hairy forming a corona, contorted aestivation.

Androecium: 5 free, epipetalous, alternate to petals, almost sessile or short filament anthers dorsifixed, connivant round the stigma, yellowish.

Gynoecium: 2 carpels (bicarpellary), syncarpous, carpels united above in the region of style and stigma, ovaries free (apocarpous below), with single style and stigma, ovaries superior, nectar secreting disc present beneath ovaries, unilocular, marginal placentation, glands present alternating with carpels, style filiform, stigma thickened, dumb-bell shaped.

Fruit: A pair of elongated follicles.

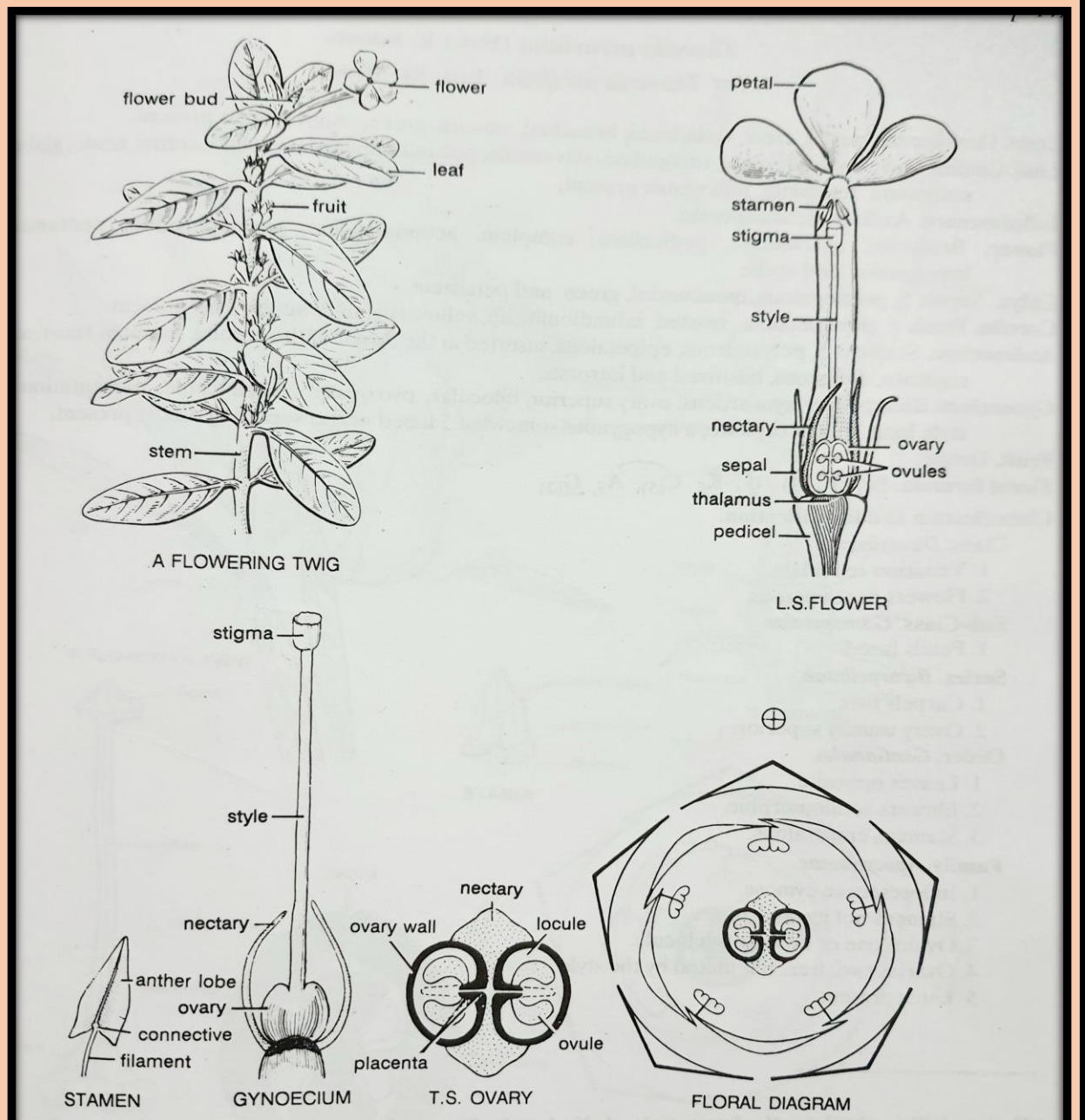


Fig. 47. ***Catharanthus roseus.***

Tabernaemontana divaricata

Verna : Chandni; Eng. Crape jasmine.

Habit: A large shrub.

Stem: Erect, solid, branched, woody, latex present, glabrous, green, cylindrical.

***Leaf:* Cauline and ramal, simple, opposite, petiolate, margin smooth, apex acute, unicostate reticulate venation.**

Inflorescence: Cymose, terminal cyme.

Flower: Pedicellate, bracteate, bracteolate, hermaphrodite, actinomorphic, complete, hypogynous, pentamerous, cyclic, white.

Calyx: 5 gamosepalous, valvate or imbricate aestivation.

Corolla: 5 gamopetalous, forming a corolla tube, twisted aestivation.

Androecium: 5 free, epipetalous, included in the corolla tube, introrse; two-celled, basifixed.

Gynoecium: 2 (bicarpellary) syncarpous, ovary superior or partly inferior, bilocular, axile placentation, style one, stigma simple, bifid, several ovules in each locule.

Floral Formula:

$$\mathrm{Br} \oplus \female\ \mathrm{K}_{(5)}\ \overset{\frown}{\mathrm{C}_{(5)}\ \mathrm{A}_{(5)}}\ \underline{\mathrm{G}}_{(2)}$$

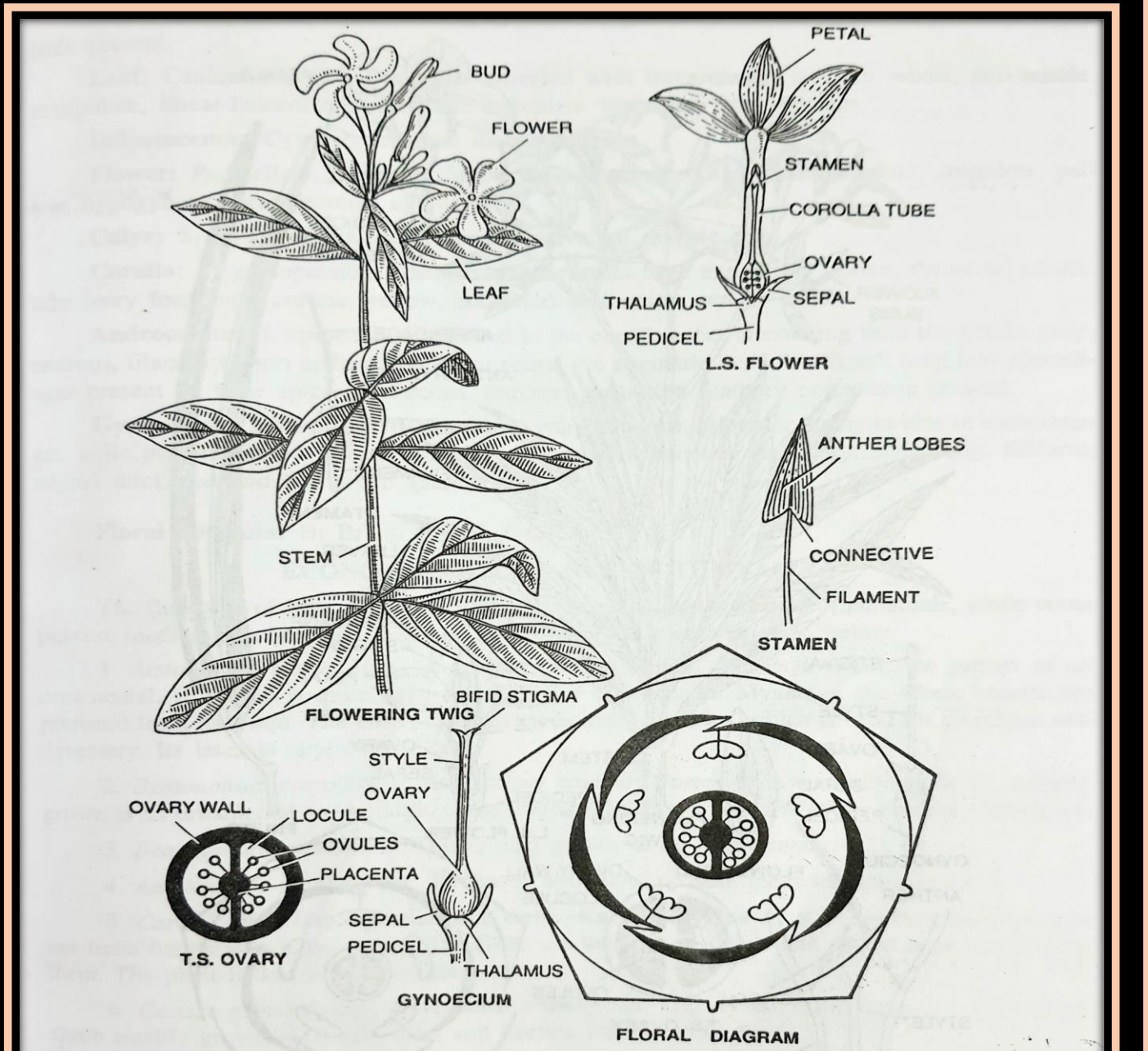


Fig. 16.3. Apocynaceae. *Tabernaemontana divaricata* (Linn), R. Br., Syn. *Ervatamia coronaria* Stapf.; Eng., Crape jasmine; Verna., **chandni**.

Nerium indicum Mill

Verna. Kaner;

Habit: A larger shrub or small tree.

Stem: Erect, aerial, solid, woody, cylindrical, glabrous, branched, nodes swollen, milky latex present.

Leaf: Cauline and Ramal, simple, whorled with three leaves in each whorl, sub-sessile, exstipulate, linear-lanceolate; unicostate reticulate venation, latex present.

Inflorescence: Cymose, terminal dichasial cyme.

Flower: Pedicellate, bracteate, bracteolate, hermaphrodite, actinomorphic, complete, yellow, hypogynous, pentamerous, cyclic, pink.

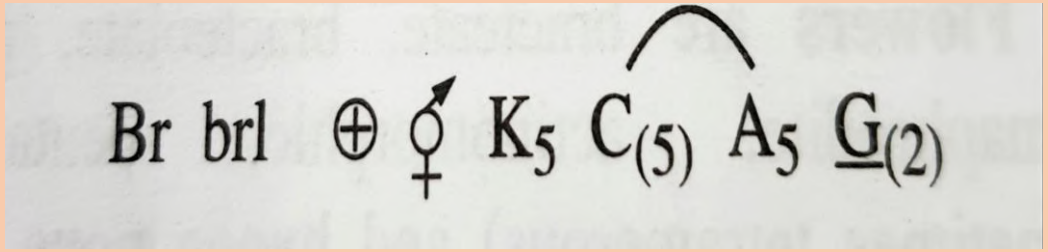
Calyx: 5, polypetalous, quincuncial aestivation, purple red.

Corolla: 5 gamopetalous, campanulate, corolla tube expanding above, throat of corolla tube hairy forming a corona, yellow, contorted aestivation, red or white.

Androecium: 5 epipetalous included in the corolla tube, alternating with the petals, polyandrous, filaments short anthers connivant round the stigmatic head, basifixed, long hair appendages present on their apices, dithecous, introrse, protruded feathery connective present.

Gynoecium: Bicarpellary, syncarpous, ovary superior, bilocular, many ovules in each loculus, axile placentation, a nectar secreting disc present beneath the ovary, style long, filiform, stigma thickened and dumb-bell shaped.

Floral Formula:



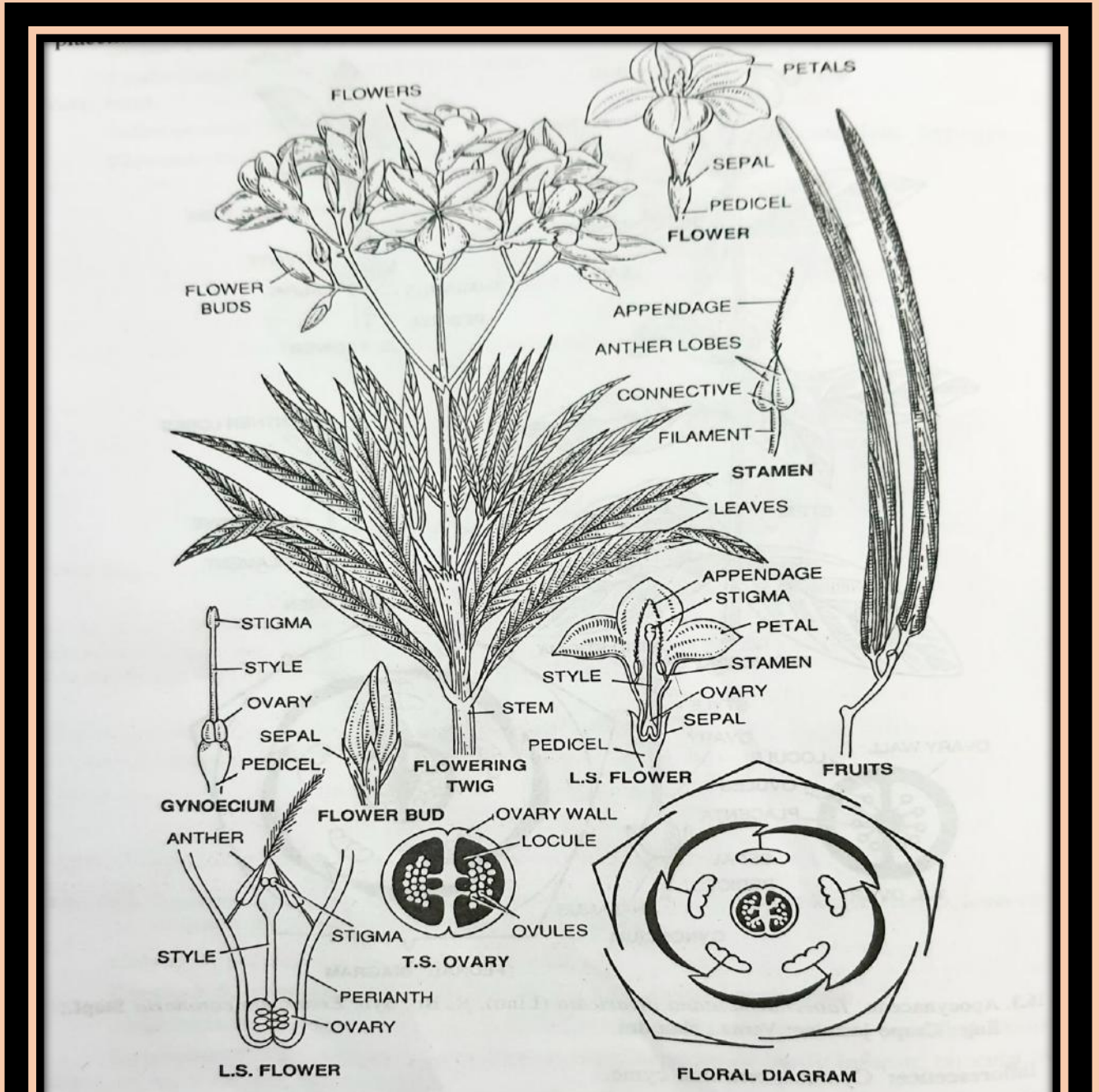


Fig. 16.4. Apocynaceae. *Nerium indicum* Mill.; Eng., oleander; Verna. **kaner.**