

**MAHARAJADHIRAJ UDAY CHAND
WOMEN'S COLLEGE**

MEDICINAL PLANTS OF ACANTHACEAE

DISSERTATION PREPARED BY TAMASA CHAKRABORTY

SEMESTER 6, BOTANY GENERAL, 2023

UNIVERSITY ROLL NO : – 200611610015

REGISTRATION NO :– 202001010209 OF 2020-2021

**UNDER THE GUIDANC OF
DR. MOUMITA BASU
DEPT. OF BOTANY**

CONTENT

	<u>PAGE</u>
• GENERAL INFORMATION -	3
• HABIT AND HABITAT-	4
• SYSTEMATIC POSITION OF THE FAMILY	4
• VEGETATIVE CHARACTERISTICS	5
• REPRODUCTIVE CHARACTERISTICS	5
• DIVISION OF THE FAMILY	7
• MEDICINALLY IMPORTANT PLANTS DEPICTED IN TABLES	8-11
• IMAGES OF SOME MEDICINALLY IMPORTANT PLANTS	12-13
• DISCUSSION	14-15
• REFERENCE	16
• ACKNOWLEDGEMENT	17

GENERAL INFORMATION

- This family consists of dicotyledonous flowering plants.
- The maximum part of this family consists of terrestrial and aquatic herbs and shrubs but vines and trees also occur in some area.
- There are approximately 250 genera and about 2500 species distributed in tropical and subtropical region.
- In India, about 508 species are present .
- The 5 main centres of distribution are Indonesia , Malaysia, Africa , Brazil , Central America .
- Distributed from tropic to temperate region.

HABIT AND HABITAT

- 250 genera and about 2500 species are found.
- Most of them are tropical plants, only a few species are distributed in temperate regions.
- Can be found in variety of habitats including deep forests, scrublands, wet fields, valleys, sea coasts, marine areas, swamps and mangrove areas.
- Mostly herbs and shrubs, a few are climbers.

SYSTEMATIC POSITION OF THE FAMILY ACCORDING

TO BENTHAM & HOOKER, (1862-1883)

KINGDOM – PLANTAE

SUBDIVISION – ANGIOSPERMS

CLASS – DICOTYLEDONS

SUBCLASS – GAMOPETALAE

SERIES – BICARPELLATAE

ORDER – PERSONALES

FAMILY – ACANTHACEAE

VEGETATIVE CHARACTERISTICS

- **Roots** – The representatives of this family mostly have branched tap root system.
- **Stem** – Aerial, erect, underground (*Ruellia tuberosa*), herbaceous or woody, branched, cylindrical, node swollen, climbing or twining (*Thunbergia sp.*), spinous (*Barleria sp.*).
- **Leaves** – Opposite, simple, exstipulate, petiolate, usually entire, acute apex, hairy, cystoliths are present in the epidermal cells of stems and leaves.

REPRODUCTIVE CHARACTERISTICS

- **Inflorescence** – Solitary axillary (*Thunbergia sp.*), spike (*Blepharis sp.*), racemes, dichasial or monochasial chymes.
- **Flower** – Bracteate, bracteolate, bracts and bracteoles conspicuous, pedicellate or sessile and brightly colored, hermaphrodite, complete, zygomorphic, pentamerous or tetramerous, hypogynous, nectariferous disc present below the ovary.

- **Calyx** – Sepals 4 or 5 gamosepalous, variously coloured, imbricate or twisted.
- **Corolla** – petals 2 or 5, bilipped, gamopetalous, variously colored imbricate or twisted.
- **Androecium** – Generally 4 , rarely 5 in some 2fertile stamens and 2 staminodes, epipetalous, filament free, dithecaous, dorsifixed, alternate with corolla lobes, one lobe may be smaller than the other and unequally placed, anthers sometimes spurred .
- **Gynoecium** – Bicarpellary, syncarpous, superior, bilocular, axile placentation, carpels median, one or few ovules per loculus, style simple, stigma bilobed, nectariferous disc present below the ovary.
- **Fruit type** – The fruit is a teo called capsule. In most species, the seeds are attached to a small , hooked stalk (a modified funiculus called a jaculator or a retinaculum) that ejects them from the capsule.

DIVISION OF THE FAMILY

❖ The family Acantheceae is divided into two subfamilies depending upon the presence or absence of jaculators which supports the seeds.

Example –

- I. Subfamily *Thunbergia* (seeds without jaculators)
- II. Subfamily *Acanthioideae* (seeds with jaculators)

The family is of considerable medical importance including well known medicinal plants such as *Andrographis*, *Paniculata*, *Adhatoda*, *Vasica* etc.

**A GENERAL ACCOUNT OF A FEW MEDICINALLY IMPORTANT
PLANTS OF ACANTHACEAE IS DEPICTED IN THE FOLLOWING
TABLE :-**

SL NO	COMMON NAME	BOTANICAL NAME	PART USED	MEDICINAL USES	CHEMICAL CONSTITUENTS
1	Bear's breeches	<i>Acanthus mollis</i>	Flower, leaves	Treatment for dislocate joints and for burns	Benzoxazinoids, Ethanol, DIBDA derivatives
2	Barleria	<i>Barleria cristata</i>	Leaves, Stem, Roots, Bark, Flowers	Reduce inflammation, cure for toothache	Alkaloids, Phenols, Steroids, Saponins, Tannins, Flavonoids, Proteins, Amino acids, Triterpens,
3	Malabar nut	<i>Justicia adhoroto</i>	Leaves, Roots, Flowers, Barks	Antibacterial, Antifungal, Antibulcer, Anti-inflammatory	Alkaloids, Tannins, Saponins, Phenols, Flavonoids
4	Chuparosa/Justicia (benth)	<i>Justicia californica</i>	Flowers	Diabetes, Menstrual pain, Asthma	Alkaloids, Flavonoids, Phenols, Saponins
5	Black groove	<i>Avicennia germinans</i>	Bark, resin	Treatment for Tumors, Diarrhoea, Hemorrhage, Swelling, Sore throat	Anthracendion, Tetracosame
6	Dicliptera	<i>Dicliptera chinensis</i>	Whole plant body used as herb	Detoxification, Clearing liver, Improve eyesight, Stomach ache	Polysaccharides, Organic acids, Amino acids
7	Asystasia	<i>Asystasia gangetica</i>	Leaves	Anthelmintic	Flavonoids, Tannins, Saponins, Amino acids, Terpenoids, Carbohydrates

8	Hydrophilla	Hydrophilla auriculata	Roots, Seeds	Treatment for Rheumatic arthritis, Kidney infection, Jaundice, Oedema	Flavonoids, Terpenoids, Fatty acids, Butein, Lupeol
9	Ruellia	Ruellia tuberosa	Leaves, Roots	Antidiabetic, Anti hypertensive	Alkaloids, Flavonoids, Lignans, Phenolic compounds
10	Strobilanthus	Strobilanthus kurthiana	Flower, Leaves	Antioxidant, Antimicrobial, Anti inflammatory	Alkaloids, Flavonoids, Saponins, Tannins, Terpenoids, Phenols,
11	Crossandra	Crossandra infundibuliformis	Flowers	Anti- inflammatory, Analgesic, Aphrodisiac	Flavonoids, Alkaloids, Saponins, Tannins, Phenols
12	Blepharis	Blepharis moderosputensis	Whole plant body	Treatment for snake bite, Wounds, Oedema, Gout	Rutin, Quercetin, Ferulic acid
13	Blue sage	Erythronum pulchellum	Leaves, Stem, Roots	Antimicrobial, Antiseptic	Lupeol, Kaempferol, Benzoic acid, sitosterol
14	Porcupine flower	Borleria prionitis	Leaves, Stem, Root, Flower	Toothache, Whooping cough, Urinary infection, Gastro- intestinal disorder	Barlerin, Acetyl barlerin, Lupinioside, Methyl ester
15	Ganda russa	Justicia gendarussa	Leaves	Fever, Headache, Arthritis, Respiratory disorder, Muscle pain	Alkaloids, Flavonoids, Phenols, Carbohydrates, Saponins
16	Comb rurgia	Rungia pectinata	Leaves	Treatment for small pox,	Alkaloids, Terpenes, Tannins,

				Relief pain , Reduce swelling	Flavonoids, Carbohydrate
17	<i>Carvia callosa</i>	<i>Strobilanthus callosa</i>	Leaves	Treatment for stomach disorders, Antimicrobial, Anti-inflammatory	Terpenoids, Flavonoids, Phytosterol, Carbohydrate
18	Lupulina plant	<i>Barleria lupulina</i>	Leaves	Treatment for snake-bite, dog-bite, Swelling, Bleeding wounds, Rheumatism	Barlerin, Acetyl barlerin, Lupulinoside, Acetoside
19	Sabah snake plant	<i>Clinacanthus nutans</i>	The whole plant body	Treatment for Snake-bite Insect-bite, Skin infection, Antimicrobial	Stigma-sterol, Lupeol, Stosterol, Buletin
20	Api api ludad	<i>Avicennia officinalis</i>	Bark extract	Contraceptive, Diuretic, Antilucer, Antimicrobial	Alkaloids, Phenols, Flavonoids, Terpenoids, Saponins, Tannins
21	Mangrove holy	<i>Acanthus ilicifolius</i>	Leaves	Treatment for snake-bite, Asthma	Triterpenoids, Saponins, Flavonoids, Alkaloids, Tannins,
22	Water wisteria	<i>Hygrophila difformis</i>	Leaves, Roots	Treatment for injury and cuts, Cough	Steroids, Tannins, Saponins, Flavonoids
23	Mexican petunia	<i>Ruellia simplex</i>	Leaves, Roots	Flu, Asthma, Fever, Diabetes, High Blood Pressure, Eczema, Bronchitis	Flavonoids, Lignans, Sterols, Triterpens, Alkaloids, Phenolic glycoside

24	Blepharis plant	<i>Blepharis edulis</i>	Leaves	Tri dosha fever, Cough, Leucoderma, Inflammation of throat, Nasal haemorrhage	Allantoinin, Blepharin, Blepharigenin, Glucosol
25	Clock vines	<i>Thunbergia grandiflora</i>	Leaves, Roots	Injury, Fracture, Skin bolls, Snake- bite, Infection, Deafness	Methyl salicylate, Iso-propyl hexadecanoate
26	Blood root	<i>Justicia secunda</i>	Whole plant body	Heating wound, anwmia and abdominal pain	Flavoids, Phenolic acids, Alkaloids
27	American water willow	<i>Justicia americana</i>	Leaves	Antioxidant, Antibacterial, Antifungal, Antibiotic	Alkaloids, Fluoronoids, Tannins, Saponins
28	Sea holy	<i>Acanthus ebracteatus</i>	Flowers, Roots, Leaves	Cough, Chronic fever, Pralysis, Asthma, Hepatitis and Lymphoma, Treatment for snake-bite	Aliphatic alcohol, Phenolic glycoside, Terpenes, Flavonoids, Lignan glycosides
29	Bell weed	<i>Ruellia prostrata</i>	Leaves, Roots	Anticancer, Antioxidant, Wound healing agent, Treat gonorrhoea	Alkaloids, Flavonoids, Triterpenoids, Phenolic compounds, Steroids
30	Shrimp plant	<i>Justicia brandegeana</i>	Roots, Leaves, Flowers	Treating dysentery, wounds and gastro intestinal disorder	Terpinoids, phenols, fatty acids, ether, aldehydes.

**IMAGES OF SOME MEDICINALLY IMPORTANTS
PLANTSOF ACANTHACEAE**



Ruellia tuberosa



Justicia brandegeana



Justicia secunda



Barleria prionitis



Barleria lupulina



Barleria cristata



Avicennia officinalis



Rungia pectinata



Thunbergia grandiflora



Blepharis edulis



Justicia adhatoda

DISCUSSION

- The family includes several plants of considerable medicinal importance.
- The largest genus *Justicia* (with ca. 600 members) includes several medicinally important species, such as *J. adhatoda*, *J. gendarussa*, *J. californica*, *J. secunda*, *J. americana*, *J. brandegeana*, etc.
- The leaves, roots, flowers and bark of *J. adhatoda* are used as antibacterial , antifungal, anti-ulcer and anti-inflammatory agent while the flowers of *J. californica* are used to cure diabetes and asthma and reduce menstrual pain. The entire plant body *J. secunda* is used for healing wounds and for curing anemia and relieving abdominal pain . Leaves of *J. americana* are used as an antioxidant and as an antibacterial and an antifungal agent . *J. brandegeana* , a plant with showy flowers, is also of no less medicinal importance. Its roots, leaves and flowers are used in the treatment of dysentery, wounds and gastro intestinal disorder.

- Similarly, several species of *Barleria* such as *B. cristata*, *B. prionitis*, *B. lupulina* etc. are also of no less medicinal importance. Leaves, stem, roots, bark and flowers of *B. cristata* reduce inflammation and toothache. *B. prionitis* helps to cur whooping cough , urinary infection , gastro intestinal disorders and in reducing toothache because its leaves, stem, roots and flowers contain bioactive compounds. Leaves of *B. lupulina* are used in the treatment of snake-bites, dog- bites, inflammation, bleeding wounds and also rheumatism.
- Even the common herb *Ruellia tuberosa* deserves special mention as a medicinally important plant as its leaves and roots show ant-diabetic and anti-hypertensive properties.
- To conclude one may say that the family has tremendous potential to be commercially exploited for the preparation of herbal drugs, More detailed study is required for the purpose.

REFERENCE

- https://practicalplants.org/wiki/acantus_mollis/
- <https://pubmed.ncbi.nlm.gov/29441576/>
- <https://www.sciencedirect.com/science/article/pii/S1874390008001109>
- <https://lakshmicreationstv.com/justicia-adhatoda-uses-adhatoda-vasica-uses-adhatoda-medicinal-uses/>
- <https://coresholar.libraries.wright.edu/egi/viewcontact.cgi?article=1044&context=jbm>
- https://en.wikipedia.org/wiki/Justicia_brandegeana
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4032030/>
- https://ayurwiki.org/Ayurwiki/Blepharis_edulis
- Ethnobotany and medical uses of folklore medicinal plants belonging to family acanthaceae: An updated review by MedCrave. Link given below –
- <https://medcraveonline.com/MOJBM/ethnobotany-and-medicinal-uses-of-folklore-medicinal-plants-belonging-to-family-acanthaceae-an-updated-review.html>
- <https://www.britannica.com/plant/Acanthaceae>

ACKNOWLEDGEMENT

I AM GRATEFUL TO DR. MOUMITA BASU, DEPARTMENT OF BOTANY, M. U. C. WOMEN'S COLLEGE, BURDWAN, FOR SUGGESTING THE TOPIC OF THIS REVIEW AND FOR HER GUIDANCE DURING THE COURSE OF THE WORK. I AM ALSO GRATEFUL TO ALL OTHER FACULTY MEMBERS OF THE DEPARTMENT OF BOTANY, M. U. C. WOMEN'S COLLEGE FOR THEIR CONSTANT INSPIRATION AND ENCOURAGEMENT. I WOULD ALSO LIKE TO EXTEND MY SINCERE THANKS TO ALL MY FRIENDS WHOSE ASSOCIATION IN VARIOUS WAYS HAS BEEN A SOURCE OF PLEASURE. MOREOVER, I WOULD LIKE TO EXPRESS MY HEARTFELT GRATITUDE TO THE AUTHORITIES OF M. U. C. WOMEN'S COLLEGE, BURDWAN, FOR PERMITTING ME TO USE THE LIBRARY FACILITIES.

THANK YOU