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Documentation of medico-potential plants in the riparian zone of Chaliyar River in Malabar region of kerala, India

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Abstract
This study aims at documenting different plants possessing medicinal properties which are found in the riparian zone of Chaliyar river in Malabar region of Kerala. Different plants (about 106 nos.) which are used for treating different ailments belonging to 48 families were collected and studied their medicinal properties. Among them Asteraceae members found to be higher in number, followed by Euphorbiaceae, Malvaceae, Fabaceae and Lamiaceae. Most of the plants are used for the preparation of traditional herbal medicines by local inhabitants along kerala.

Keywords: riparian vegetation, chaliyar, malabar region, medico-potential

1. Introduction
Plant is an important source of medicine and plays a key role in world health [1]. Medicinal herbs or plants have been known to be an important potential source of therapeutics or curative aids. The use of medicinal plants has attained a commanding role in health system all over the world. This involves the use of medicinal plants not only for the treatment of diseases but also as potential material for maintaining good health and conditions. Many countries in the world, that is, two-third of the world's population depends on herbal medicine for primary health care [2]. A large number of plants are used in traditional medical practices, and have been for more than 3000 years, such as in Chinese Traditional Medicine, Ayurvedic Medicine, Unani Medicine, etc., most of which probably exert therapeutic effects and would be proven as such if they were properly evaluated by Western standards [3].

Medicinal plants consider as a rich resources of ingredients which can be used in drug development and synthesis. Besides that these plants play a critical role in the development of human cultures around the whole world. Moreover, some plants consider as important source of nutrition and as a result of that these plants recommended for their therapeutic values [4]. The International Union for Conservation of Nature and the World Wildlife Fund documented that between 50,000 and 80,000 flowering plant species are used for therapeutic purposes worldwide. Among these, approximately 15,000 species are threatened due to extinction from overharvesting and habitat destruction [5].

Plant communities seen along the river margins are commonly referred to as the riparian vegetation. From the beginning to the end of a river, the riparian zone is highly influenced by the quantum and flow of water in the river channel. It is a transitional zone between the aquatic and terrestrial habitats. They have their own unique characteristics like hydric soil, floral and faunal composition, community structure, relationships [6]. The main objective of the Present study is to document the medicinally important plants in the Riparian Zone of Chaliyar River in Malabar region of Kerala.

2. Materials and Methods
2.1 Study Area
The Chaliyar River is originates in the Ilambalari Hills, located near Cherambadi town in Gudalur taluk of Nilgiri district in Tamil Nadu. Chaliyar is the fourth longest river in Kerala. The river flows mainly through two districts in Kerala, Malappuram and Kozhikode. Finally the Chaliyar River enters in the Arabian Sea (Fig. 1).

(***Source:*** Google image)

Fig 1: Map of Chaliyar River flowing through Kozhikode and Malappuram Districts

The Chaliyar river basin has been divided into three different zones based on the elevation from the mean sea level. The high land region at the eastern boundary of the state lying between 2,066 m and 88 m above the mean sea level. The high lands are mostly the reserve forests with the patches of the tea estates in the higher reaches and the coffee estates in the lower reaches. The mid-land region lying between 88 m and 7 m above the mean sea level. In the midland region, coconut, rubber, pepper, etc., are grown on slopes and paddy and arecanut in the valleys. Besides these, vegetables, groundnut, etc., are also cultivated. Banana is the main cash crop in many parts of the basin. The reservoirs in the high lands regions facilitate the production of hydropower with higher operating heads [7]. The low land region lying below 7 m above the mean sea level. The low land region mainly comprises of tropical weeds as well as some cultivated plants. The major tributaries of chaliyar river are cherupuzha (Mavoor), Engappuzha,
Iruthullipuzha, Kadungampuzha, Iruvanjipuzha, Pulingappuzha, Chalipuzha, Muthappanpuzha, Cherupuzha (Areekode), Kutirappuzha, Kottapuzha, Kuruvanpuzha, Kanjirappuza, Karimpuzha, Punnappuzha or Pandiyar, Maruthappuzha or Kalakkanpuzha, Karakkodanpuzha, Pandippuzha and Neerppuzha.

Some of the Chaliyar's tributaries originate from Wayanad District and joins the main river in Malappuram. Near the origin of river are the Meenmutty Falls at coordinate's 11.5277551°N 76.2365341°E by Vaduvanchal, Wayanad. During late 19th century and early 20th century, the Chaliyar was extensively used as a waterway for carrying timber from the forest areas in and around Nilambur to the various saw mills in Kallai of Calicut city. Chaliyar is one of the rivers which never get dried up in the drought season (Fig.2).

Source: GIS and Google Map

Fig 2: Map of Study Area – Map of India with Kerala State, Kozhikode and Malappuram Districts and River Flowing Area [Suggest to be include here some good images]

2.2 Data collection and analysis

The present study was based on an extensive survey and field observation along the Chaliyar river side in the Malabar region. The documentation was mainly based on the field observation as well as the collection of plant species. The information about the medicinal properties of the collected plants was obtained from the local as well as tribal people of Malabar region of Kerala. The plant specimens were collected at different reproductive stages to prepare herbarium specimens. After the collection, the plants were identified by the use of different Floras like Flora of Presidency of Madras [8]. Flora of Calicut [9]. Flora of Nilambur [10]. Flora of British India by Hooker [11]. and plants were photographed using Nikon D 5300 camera. The nomenclatures of the plants were made up to date as per the rules given in the International Code of Nomenclature for Algae, Fungi and Plants (ICN), the plant list (http://www.theplantlist.org/) and Flowering Plants of Kerala [12]. The specimens were processed for the preparation of Herbarium by standard methods [13, 14, 15]. The voucher specimens are deposited in the Herbaria of Department of Botany, St. Joseph's College (Autonomous), Kozhikode (DEV) for future reference.

3. Results and Discussion

The present survey documents medico-potential members from the study area. There are about 106 plants belonging to 94 genera and 48 families possess various medico-potentialities for curing many ailments. Asteraceae is the dominant family which include 14 plant species which are medicinally important followed by Euphorbiaceae consist of 8 species, Malvaceae, Fabaceae and Lamiaceae consisit of 5 species each.

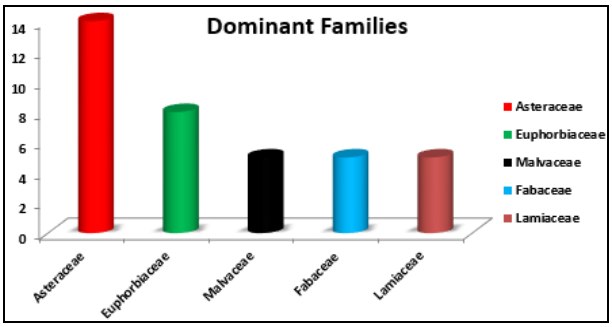

Fig 3: Dominant families of medicinal plants in the study area.

Several regions of riparian zones are the reservoirs of different medicinal plants. The plants in the riparian regions are traditionally used in several Ayurvedic medicines and also it is used by the tribals and locals to cure various diseases. The analysis of different life forms of medicinal plants in the study area reveals that, herbs are dominant (62 in nos.) followed by shrubs (25 in nos.), Climbers (10 in nos.) and Trees (9 in nos.) (Table-1 & Fig. 4).

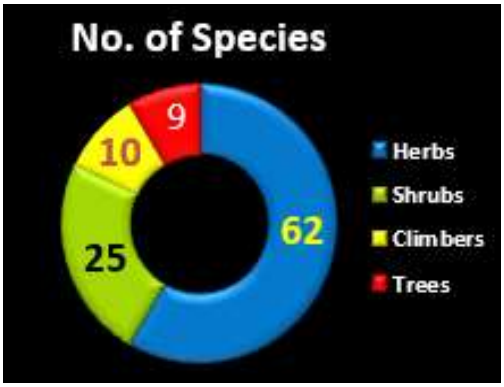

Fig 4: Life form analysis of medicinal plants in the study area

Medicinal trees from riparian foests along Canoas River was studied by [16]. According to them there were 197 species of potential medicinal plants belonging to 22 genera and 15 families. Similarly the studies on the ethnobotany and phenology of plants in and adjacent to two riparian habitats in southeastern Arizona by [17]. reveals that there are two riparian habitats in southeastern Arizona provide the setting for a study of 127 plants useful to human foragers. The Integrating ecological and ethnobotanical priorities into riparian restoration was studied by [18]. and concluded that about 125 herbaceous species (98 genera, 47 families) and 77 woody plant species (58 genera, 36 families) are documented. Out of the woody plants, 37 were known to have one or more human uses.

The Ethnobotanical plants used as a curatives for skin diseases in a Cauvery river stretch was studied by [19]. and he reported that 24 riparian plants belongs to 20 families have medicinal properties or these are ethnobotanically important.

The most commonly used families are Solanaceae (2 sps.), Euphorbiaceae (2 sps.), Lauraceae (2 sps.) and Caesalpiniaceae (2 sps.).

Table 1: List of medicinal plants and their medico-potentialities

SI No.	Botanical Name	Family	Useful Parts	Medico-potentiality
1	*Abrus precatorius* L.	Fabacea	Leaves	The crushed leaf extract of the plants are used to cure inflammatory swellings.
2	*Abutilon hirtum* (Lam.) Sweet.	Malvaceae	Leaves	Extracts of the leaves show cytotoxic activities against human breast cancer cells and used to treat ulcers, bladder inflammations and also have demulcent and diuretic properties.
3	*Acacia catechu* (L.f.) Willd.	Mimosaceae	Seeds	The seed extract is used to cure skin diseases and sore throat.
4	*Acalypha indica* L.	Euphorbiaceae	Leaves	Crushed leaves are useful in treating pneumoniae, asthma and rheumatism.
5	*Adiantum raddianum C.Presl*	Adiantaceae	Leaves	Leaf extracts are used to treat fungal infections, diabetics, thyroid related problems and wounds.
6	*Aerva lanata* (L.) Juss.	Amaranthaceae	Leaves	The leaves are used for the treatment of cough, headache and sudden swellings.
7	*Ageratum conyzoides* L.	Asteraceae	Leaves	Crushed leaves used for tooth ache.
8	*Albizia saman* (Jacq.) F.Muell	Mimosaceae	Leaves	Leaf extracts are used in the treatment of stomach pain, diarrhea and other gastric related problems.
9	*Ammannia baccifera* L.	Lythraceae	Leaves	The leaves or the ashes of the plant, mixed with oil, are applied to cure herpetic eruptions. The fresh, bruised leaves have been used in skin diseases as a

				rubefacient and as an external remedy for ringworm and parasitic skin affection.
10	*Andrographis echioides* (L.)Nees.	Acanthaceae	Seed	Seed extract is used to treat bacterial infections.
11	*Anisochilus carnosus* (L. f.) Wall	Lamiaceae	Entire plant	The plant extract is used for the treatment of gastric ulcer and skin diseases
12	*Biophytum reinwardtii* (Zucc.) Klotzsch.	Oxalidaceae	Leaves	Crushed leaves are applied on cuts and wounds to stop bleeding and quick healing and also used for to treat hypertension, snake bite poisoning etc.
13	*Blumea lacera* (Burm. f.) DC.	Asteraceae	Leaves	Fresh leaf juice is used to expel threadworms, half to one tsp of fresh leaf juice is applied orally to children.
14	*Boerhavia diffusa* L.	Nyctaginaceae	Leaves	The plant extrat used to treat asthma, anascara, gastric disturbances, jaundice, internal inflammation and anaemia.
15	*Calotropis gigantea* (L.) R. Br.	Asclepiadaceae	Plant sap	The milky sap of the plant is used in the treatment of boils, scabies, burns, bruises, cuts, sores and wound healing.
16	*Cardiospermum halicacabum* L.	Sapindaceae	Leaves	The bruised leaves are used as a cooling compress for nervous headaches and leaf juice used to cure earache.
17	*Centrosema molle* Benth.	Fabaceae	Leaves	Crushed leaf extract is used for Scorpion and snake bites and Wound Healing.
18	*Chromolaena odorata* (L.) King & Robins	Asteraceae	Leaves	Crushed leaf extract is used to treat malaria, cuts and wounds.
19	*Cleome burmannii* Wight & Arn.	Cleomaceae	Leaves	The leaf extract of the plant is usually used for worm infections.
20	*Corchorus aestuans* L.	Tiliaceae	Leaves	Leaf extract is used in the treatment of dysentery, fevers, dyspepsia and liver disorders.
21	*Corypha umbraculifera* L.	Arecaceae	Root	The juice of the root is used for curing diarrhea.
22	*Crassocephalum crepidioides* (Benth.) S. Moore	Asteraceae	Leaves	Leaf extract is applied over fore head to cure head ache
23	*Crotalaria pallida* Dryand. in Ait	Fabaceae	Leaves	The leaf extract is used to treat urinary problems.
24	*Croton bonplandianus* Baill.	Euphorbiaceae	Leaves	Leaves extract is used for treatment of cholera, boils, bowel complaints, chicken pox, diarrhoea, dysentry, eye diseases, cold and coughs
25	*Cyanotis cristata* (L.) D. Don.	Commelinaceae	Leaves	Crushed leaves are used in healing of incision, excision, and burn wounds.
26	*Cycas circinalis* L.	Cycadaceae	Bark, Seeds and Leaves	The bark and the seeds are ground to a paste with oil and used as a poultice on sores and swellings. The juice of tender leaves is useful in the treatment of flatulence and vomiting.
27	*Dactyloctenium aegyptium* (L.) P. Beauv	Poaceae	Entire Plant	The plant extract possess antimicrobial, antioxidant, reproductive, cytooxic, antidiabetic and gastointestinal effects.
28	*Datura stramonium* L.	Solanaceae	Leaves	The leaves are applied as a dressing to cure rheumatic pain, swellings, wounds, gout, burns, and fungal infections.
29	*Dryopteris cochleata* (D.Don) C.Chr.	Dryopteridaceae	Leaves	The plant extracts possess antimicrobial, antioxidant property and also used to treat gonorrhea, muscular pain, rheumatic, throat problems and antidote for snake and dog bites.
30	*Eclipta prostrata* (L.) L	Asteraceae	Leaves	The leaves extract used as an appetite stimulant, as a digestive, and as a mild bowel regulator.
31	*Eleusine indica* (L.) Gaertn.	Poaceae	Entire Plant	The whole plant extract, especially the root, is depurative, diuretic, febrifuge and laxative, and hence is used for the treatment of influenza, hypertension, oliguria and urine retention.
32	*Euphorbia hirta* L	Euphorbiaceae	Leaf	The leaf extract of the plant is used for cough, cold and respiratory diseases
33	*Euphorbia thymifolia* L.	Euphorbiaceae	Leaves	Leaf extract is used against dysentery, enteritis, diarrhoea and venereal diseases
34	*Ficus racemosa L*	Moraceae	Fruits, Bark	The plant extract, especially fruit and bark, used to cure diabetes, liver disorders, diarrhea, inflammatory conditions, hemorrhoids, respiratory, and urinary diseases.
35	*Ficus religiosa* L.	Moraceae	Stem, Bark, Fruits	The Plant extract Used in treatment of different diseases like dysentery, mumps, jaundice, heart diseases, constipation, skin diseases.
36	*Flemingia macrophylla* (Willd.) Prain *ex* Merr.	Fabaceae	Leaves	The leaves extract are used for treating postpartum fever and to treat paralysis and pain in the joints.
37	*Glinus oppositifolius* (L.) A. DC.	Molluginaceae	Leaves	*The leaf extract is* used for treating inflammation, joint pains, diarrhea, fever, intestinal parasites, skin disorders and wound healing.
38	*Glycosmis pentaphylla* (Retz.) DC.	Rutaceae	Leaves	The leaf extract is used against diseases like bilious complaints, cough, worms, jauntice, fever, inflammation, rheumatism, anaemia and vermifuge.
39	*Gomphrena celosioides* Mart	Amaranthaceae	Leaves	The leaf extract is used for the treatment of various skin diseases,worm infections and infectious diseases.
40	*Gomphrena serrata* L	Amaranthaceae	Leaves	The crushed leaves are used for the treatment of diarrhea, pains, diabetes, bronchial asthma, hay fever, pile and dermatitis.

41	*Grangea maderaspatana* (L.) Poir	Asteraceae	Roots	The root extract is useful in griping, in troubles of the chest and lungs, headache, paralysis, rheumatism in the knee joint, piles, pain in the muscles, diseases of the spleen and the liver
42	*Heliotropium indicum* L.	Boraginaceae	Leaves	Leaf extract have wound healing properties.
43	*Hemidesmus indicus* (L.) R. Br	Periplocaceae	Roots	Root extract is used for dysentery, diarrhea, respiratory disorders, skin diseases, syphilis, fever and leprosy,
44	*Heteropogon contortus* (L.) P. Beauv. *ex* Roem. & Schult.	Poaceae	Entire Plant	Plant exhibits important biological activities such as antiprotozoal, anti-inflammatory and hepatoprotective activities.
45	*Hydrolea zeylanica* (L.) Vahl.	Hydroleaceae	Entire Plant	Plant is used for antiseptic and antidiabetic activities.
46	*Hyptis suaveolens* (L.) Poit	Lamiaceae	Leaves	It has been reported to possess antioxidant, anti-inflammatory, antimicrobial, anti-diarrhoel, anthelmintic, anti-diabetic, anti-cancerous, wound healing and insecticidal properties.
47	*Ipomoea cairica* (L.) Sweet.	Convolvulaceae	Leaves	Crushed leaves are used for the treatment of body rashes, especially those accompanied by fever.
48	*Ipomoea triloba* L	Convolvulaceae	Leaves	The leaves are cooked and eaten as a vegetable and decoction of the leaves is used for wounds.
49	*Lantana camara* L.	Verbenaceae	Leaves	Leaves are used to treat cuts, rheumatisms, ulcers, catarrhal infection, tetanus, rheumatism, malaria, cancer, chicken pox, asthma, ulcer, swelling Leaves are used to treat cuts, rheumatisms, ulcers, catarrhal infection, tetanus, rheumatism, malaria, cancer, chicken pox, asthma, ulcer, swelling Leaves are used to treat cuts, rheumatisms, ulcers, catarrhal infection, tetanus, rheumatism, malaria, cancer, chicken pox, asthma, ulcer, swelling Leaves are used to treat cuts, rheumatisms, ulcers, catarrhal infection, tetanus, rheumatism, malaria, cancer, chicken pox, asthma, ulcer, swelling Leaves extract are used to treat cuts, rheumatism, ulcers, malaria, cancer asthma, chicken pox.
50	*Leea indica* (Burm. f.) Merr.	Leeaceae	Leaves	The plant is used as a remedy for ailments such as diarrhea, dysentery, diabetes, bone fracture, body ache, fever, and wound treatment.
51	*Leucas aspera* (Willd.) Link.	Lamiaceae	Leaves	Leaves are considered useful in chronic rheumatism, psoriasis and other chronic skin eruptions etc.
52	*Lindernia anagallis* (Burm. f.) Pennell.	Scrophulariaceae	Entire plant	Whole plant paste along with black pepper is given for gonorrhea.
53	*Lindernia crustacea* (L.) F.v. Muell	Scrophulariaceae	Entire Plant	The plant extract is used for teating disorders such as dysentery, hepatitis and amenorrhoea. The powder form of plant, mixed with rice water, is used to relieve vomiting, diarrhoea and cholera.
54	*Ludwigia octovalvis* (Jacq.) Raven.	Onagraceae	Leaves	Leaf paste is externally applied to heal ulcer, boil, dermatitis and pimple.
55	*Ludwigia peruviana* (L.) H. Hara.	Onagraceae	Leaves	The leaf extract used for Hepatic pain, diuretic and kidney problem
56	*Luffa cylindrica* (L.) Roem	Cucurbitaceae	Fruits	The fruit pulp is used to induce hemostasis, resolve phlegm and clear fever.
57	*Lygodium flexuosum* (L.) Sw.	Schizaeceae	Leaves	Crushed leaves extract is used in treating jauntice, dysmenorrhea, wound healing and eczema.
58	*Martynia annua* L.	Pedaliaceae	Leaves	Crushed leaves extract used in the treatment of skin affections, inflammation, epilepsy, sore throat, itching, burns and tuberculosis.
59	*Melochia corchorifolia* L	Sterculiaceae	Leaves, Roots	The extracts of leaves and roots are used to treat urinary disorders, abdominal swelling and dysentery.
60	*Merremia hederacea* (Burm. f.) Hall	Convolvulaceae	Leaves	The leaf extract is used to treat colds, febrile disease, sunstroke, oliguria, tonsil inflammation, laryngitis, as well as leukorrhea.
61	*Mikania micrantha* Kunth.	Asteraceae	Leaves	The crushed leaves extract are used to make a poultice for snake bites and scorpion sting, decoction of the leaves is used to bathe rashes, and skin itches.
62	*Mimosa pudica* L.	Mimosaceae	Leaves	Crushed leaf extract is used for the treatment of piles, urogenital disorders, sinus, and dysentery and for wound healing.
63	*Morinda citrifolia* L.	Rubiaceae	Fruits	*Fruit juice are used to treat* diabetes, non alcoholic fatty liver disease, hypertension, and inflammatory bowel disease.
64	*Mussaenda frondosa* L.	Rubiaceae	Roots and Sepals	The juice of the root is used to treat blemishes on the tongue and the sepals are diuretic.
65	*Ocimum americanum* L	Lamiaceae	Leaves	The leaves are made into a paste that is used in the treatment of skin diseases, it is also applied to wounds and burns that are not healing well.
66	*Oldenlandia corymbosa* L	Rubiaceae	Entire Plant	The whole plant extract is used to purifies blood, improves digestion, stimulates the action of liver and cures burning sensation, thirst and skin diseases.
67	*Pancratium triflorum* Roxb.	Amaryllidaceae	Leaf, Rhizome	The extract of Leaves and Rhizome used as a Cardiotonic, diuretic and expectorant.
68	*Passiflora foetida* L.	Passifloraceae	Leaves, Fruits	Leaves and unripe fruits extract is used for treating women infertility, epilepsy, abscess and hysteria. The leaf paste is applied on the head for giddiness and headache.

69	*Pedalium murex* L.	Pedaliaceae	Entire Plant	Extract of different parts of the plant are used to treat various ailments like, cough, cold and as an antiseptic etc.
70	*Persicaria barbata (L.)* Hara	Polygonaceae	Seed, Stem	Seed extract is used to relieve colic pain, shoot extract can be used for washing ulcer wounds, plant juice is used for itchiness.
71	*Persicaria glabra* (Willd.) Gomez.	Polygonaceae	Leaves, Stem	Juice of this herb is used to reduce pain as analgesic agent, Leaf paste used as anti-cancer agent, Fever can also reduced using juice of this herb, Colic pain can be revealed by using infusion of leaves.
72	*Phyllanthus amarus* Schum. & Thonn.	Euphorbiaceae	Entire plant	The Whole plant extract is used in gonorrhoea and other genital affections.
73	*Phyllanthus reticulatus* Poir.	Euphorbiaceae	Bark, Leaves	Dried bark and leaves decoction are as a diuretic, alterative and for cooling effect and also used for smallpox.
74	*Pilea microphylla* (L.) Liebm.	Urticaceae	Entire plant	The crushed leaves are applied commonly to sores and bruises to heal them.
75	*Pogostemon purpurascens* Dalz	Lamiaceae	Leaves	Crushed leaf extract is used as a stimulant, antidote to scorpion sting, snake bite, as a cure for burns, to clean wounds and for promoting granulation.
76	*Portulaca oleracea* L.	Portulacaceae	Entire Plant	The whole plant extract is used to treat asthma, abnormal uterine bleeding etc. It is also used as an astringent, remedy for headaches, inflammation of the eyes and other organs, dysentery.
77	*Pouzolzia zeylanica* (L.) Bennett.	Urticaceae	Entire Plant	The plant sap is used to treat fevers, urinary problems, dysentery, boils and toothaches.
78	*Premna serratifolia* L.	Verbenaceae	Leaves, Roots	Leaves extract of this plant are used to treat indigestion, dysuria, and dysentery. The roots extract are also employed against indigestion, stomachache, and fever Prashant.
79	*Pteris confuse* T.G.Walker	Pteridaceae	Leaves	The leaf extract has many pharmacological activity such as antioxidant, anti-inflammatory, anti-cancer, antidiabetic, antiviral, antimicrobial and anti-alzheimer properties.
80	*Rauvolfia tetraphylla* L.	Apocyanaceae	Leaves	Leaves extract are used for treatment of cholera, eye disease and fever.
81	*Ricinus communis* L.	Euphorbiaceae	Leaf, Fruit	The leaf extract is effective against mosquitoes, rust mites, repelling aphids and flies. The castor oil obtained from this plant has wide medicinal uses.
82	*Rotula aquatica* Lour.	Boraginaceae	Entire Plant	The plant extract is an important traditional medicine for kidney and bladder stone. The extract of root tuber is astringent, bitter, diuretic and also useful in treating coughs, heart diseases, dysuria, blood disorders, fever, poisonings, ulcers and uterine disease.
83	*Scoparia dulcis* L	Scrophulariaceae	Root	The root is boiled with water and having this in empty stomach to cure kidney stone.
84	*Senna occidentalis* (L.) Link.	Caesalpiniaceae	Leaves	Leaf extract used to treat diabetes, pains, rheumatism, venereal diseases, fevers, haematuria and convulsion
85	*Senna tora* (L.) Roxb.	Caesalpiniaceae	Leaves	Leaves extract is useful for treatment of leprosy, ringworm infection, ophthalmic, skin diseases and liver disorders.
86	*Sida acuta* Burm. F.	Malvaceae	Leaves	Crushed leaf extract is used for curing joint pain.
87	*Sida cordifolia* L	Malvaceae	Roots	Plant extract used for heart disease, stroke, facial paralysis, tissue pain and swelling (inflammation), sciatic nerve pain, psychiatric conditions such as schizophrenia, nerve pain.
88	*Sida fryxellii* Sivar. & Pradeep	Malvaceae	Roots	Antibacterial activity present against common human pathogenic bacteria.
89	*Solanum aculeatissimum* Jacq	Solanaceae	Fruits	Plant juice is used to cure liver disorders, chronic skin ailments.
90	*Solanum virginianum* L	Solanaceae	Seeds, Fruits	The seeds extract are used for the treatment of coughs, asthma and control excess mucous secretion.
91	*Spermacoce hispida* L.	Rubiaceae	Entire Plant	Plant extract have significant effect on inflammation and markedly reduce swellings.
92	*Sphaeranthus indicus* L.	Asteraceae	Leaves	Leaf extract is used for the treatment of rheumatic arthritis.
93	*Spilanthes radicans* Jacq	Asteraceae	Entire Plant	whole plant is boiled in water and the liquid as well as the solid are administered against dysentery etc,
94	*Stemodia verticillata* (Mill.) Sprague.	Scrophulariaceae	Entire Plant	Whole plant extract used as a sedative
95	*Sterculia guttata* Roxb. ex DC	Sterculiaceae	Bark	The juice obtained from the bark used in folk medicine to cure fever and diarrhea.
96	*Tephrosia pumila* (Lam.) Pers.	Fabaceae	Root, seed	The root extract is useful for piles and hydrocoel. Seed oil is used in ringworm& cough.
97	*Trewia nudiflora* L.	Euphorbiaceae	Entire Plant	The leaves extract is used for various diseases including blood and neuronal disorders. Bark extract is used for the treatment of enlarged thyroid.
98	*Trianthema portulacastrum* L.	Aizoaceae	Entire Plant	The whole plant extract is used in asthma, bronchitis, jaundice and oedema.
99	*Tridax procumbens* L.	Asteraceae	Leaves	The juice extracted from the leaves is directly applied on cuts and *wounds.*
100	*Urena lobata* L.	Malvaceae	Leaves, Roots	Extracts of leaves and roots are used in herbal medicine to treat such diverse aliments as colic, malaria, gonorrhea, fever, wounds, toothache and

				rheumatism.
101	*Vernonia cinerea* (L.) Less	Asteraceae	Entire Plant	Whole plant juice cures diseases caused by round worms and thread worms, coughs, flatulence, intestinal colic, dysuria, leucoderma, psoriasis and other chronic skin-diseases.
102	*Vicoa indica* (L.) Ling.	Asteraceae	Leaves	Leaf decoction used for stomach ache and dysentery.
103	*Wedelia chinensis* (Osbeck) Merr.	Asteraceae	Leaves	Externally, it is used with mustard oil as massage in neuralgia, paralysis and muscular rheumatism.
104	*Xanthium indicum* Koenig	Asteraceae	Leaves, Fruits	Extracts of leaves and fruits used to cure malarial fever, asthma, leprosy, rheumatism, migraine, small pox and cancer.
105	*Xenostegia tridentata* (L.) Austin & Staples	Convolvulaceae		The root extract of used against candida infections.
106	*Ziziphus mauritiana* Lam.	Rhamnaceae	Fruits, Roots	The dried fruits are used as refrigerant, sedative, stomachache, styptic and tonic. They are considered to purify the blood and aid digestion. The root is used in the treatment of dyspepsia. A decoction of the root has been used in the treatment of fevers.

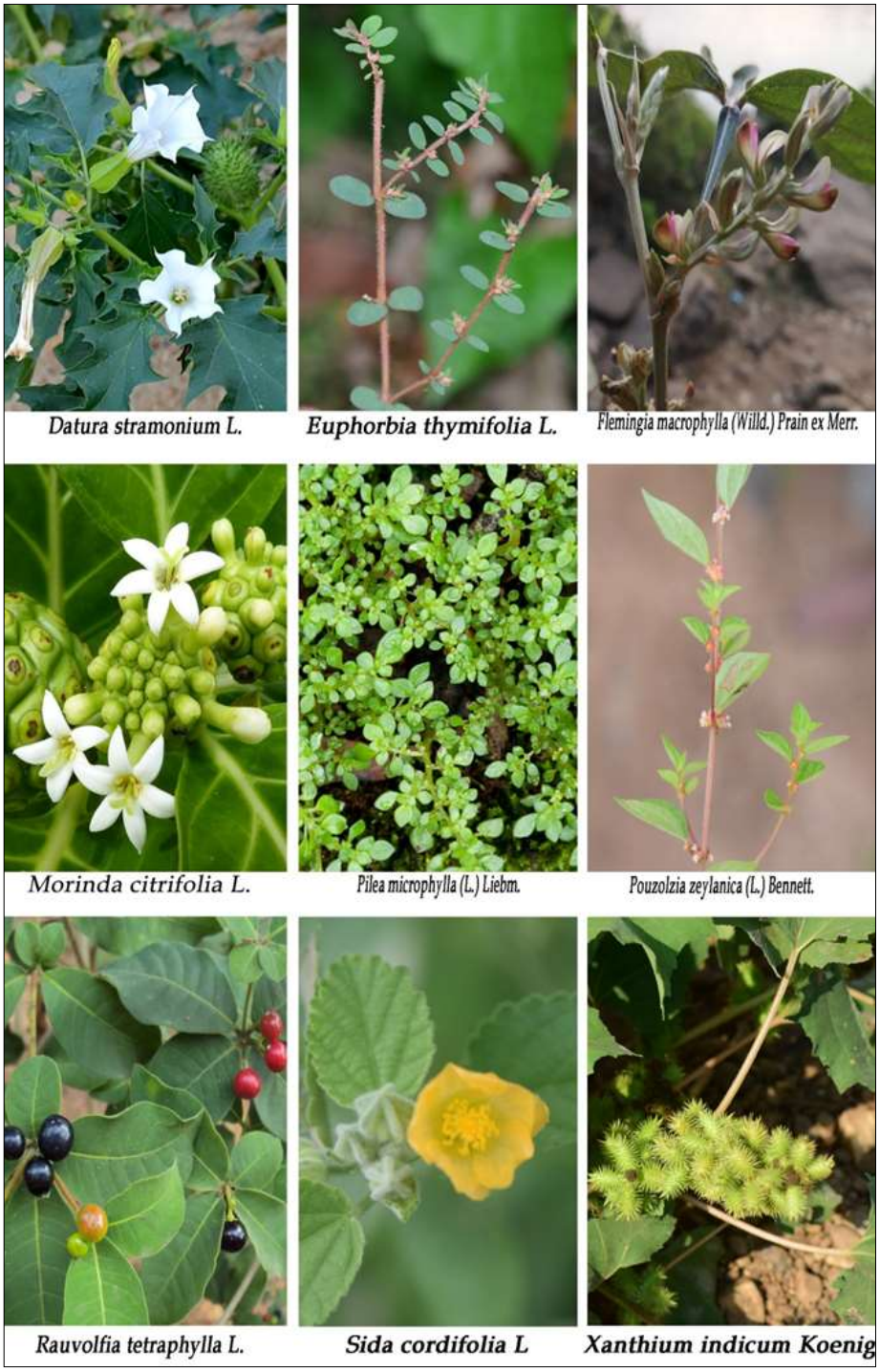

Fig 5: Selected images of medicinal plants in the study area

4. Conclusion

The Riparian zones are most diverse, dynamic and complex biophysical habitats on the terrestrian portion on the planet. The present study reveals the same. The area under study consist of about 106 plants belonging to 94 genera and 48 families possess various medico-potentialities for curing many ailments. Asteraceae is the dominant family which include 14 plant species which are medicinally important followed by Euphorbiaceae consist of 8 species, Malvaceae, Fabaceae and Lamiaceae consisit of 5 species each. The analysis of different life forms of medicinal plants in the study area also reveals that, herbs are dominant (62 in nos.) followed by shrubs (25 in nos.), Climbers (10 in nos.) and Trees (9 in nos.).

Various factors that affect the diversity and distribution of several medicinally important plants in the study area. Major threat factors includes anthropogenic activities that destruct the natural habitats, fast rate of biotic interference, various natural calamities like flood, drought etc. also play a crucial role in the destruction of existing vegetation. So conservation of these plants in the riparian zones has great importance. Medicinal plants are boon to nature so awareness about the traditional knowledge and sustainable use of the plants must be highlighted for the betterment of future generations.

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