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Convolvulaceae: medicinally important morning glory family

[1]Binu Thomas and **[2]Divya M.S.**

[1]Department of Botany, Centre for PG studies & Research, St. Joseph's College, Devagiri, Kozhikode, Kerala – 673 008, India.

[2]PG Department of Botany, Deva Matha College, Kuravilangad, Kottayam-686 633, Kerala, India.

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Abstract

The present investigation on the diversity of medicinal convolvulacean members, which are distributed in the different locations of Kottayam District, Kerala results that, there are about 32 species belonging to 9 genera of family convolvulaceae was reported to use various human ailments. Hence proper conservation measures are required to protect this valuable icon for future generation.

1. Introduction

Convolvulaceae is derived from a latin name *Convolvere*, meaning "*To wind*". It is commonly known as '*bindweed* or *morning glory family*', This family also known as the morning glory family is widely distributed in tropical, subtropical and temperature regions (Chopra *et al.*, 1995). The Convolvulaceae are mostly twining herbs or shrubs, sometimes with milky sap. Plants of this family are also well distributed in India in various habitats (Ekka *et al.*, 2007). More than one-third of the species are included in two major genera, *Ipomea and Convolvulus* (Carlquist, 1988). The family Convolvulaceae distinguishable by its plicate corolla, axile placentation with few ovules, bicollateral vascular bundles and latex usually present. Some of convolvulacean members may contain many alkaloids that are responsible for the use of these species as ingredients in therapeutic drugs (Sarvalingam and Rajendran, 2014).

About 80% of the world's population still depends solely on traditional or herbal medicine for treatment of various diseases. Most of the potent medicinal plants have relatively no toxic or adverse effects when used by humans, while some plants are very toxic to both humans and animals with the potential of damaging certain organs in the body (Dwivedi, 2008). This calls for caution in the use of medicinal plants of which the use is presently on the increase due to easy availability, affordability, accessibility, and promising efficacy comparable to the often high cost and adverse effects of standard synthetic drug agents (Dwivedi *et al.*, 2013). The present investigation were carried out for the utilization some convolvulacean members by local people for the treatment of various ailments from the study area. The

*Corresponding author
E-mail: binuthomasct@gmail.com

various information regarding these medicinal plants was collected from local inhabitants as well as local practitioners. The results obtained are very interested andare tabulated with their uses.

2. Study area

Kottayam district, Kerala. It is covering an area of 55.40 square kilometres (21.39 sq m) and is located in South-Central region of Kerala with a population of 357,533 according to the 2011 census. The general soil type in the district is alluvial soil. The vegetation is mainly tropical evergreen and moist deciduous type. The climate in this district is moderate and pleasant. The particular location site of Kottayam district results in little seasonal temperature variation, with moderate to high levels of humidity. Annual temperatures range between 20 to 35 °C (68 to 95 °F). From June through September, the South-West monsoon brings in heavy rains. More over this district is lies on the windward side of the Western Ghats. From October to December, Kottayam receives light rain from the Northwest Monsoon. The average annual rainfall is 3, 200 millimetres (130 in). The highest temperature recorded here was 38.5 °C and the lowest was 15 °C. Depending on the location and specific phyto-geographical condition of the district, there are varieties of food crops as well as cash crops are cultivated. Rice is the principal crop extensively cultivated in low lying regions like Vaikom and Upper Kuttanad. The area also suitable for the cultivation of cash crops like rubber plantations . There by it significantly contributes to the overall rubber production in India. Kottayam occupies the first position in the production of rubber in India. Rubber trees provide a stable income for the farmers as well as workers. Apart from these, other crops like tapioca, coconut, pepper, vegetables etc., are also being cultivated in this district (Fig.1).

Fig. 1 Map of Kerala showing Kottayam district

3. Materials and Methods

The present study was based on an extensive survey and field observations during the year 2016 – 2017. In this study an attempts were made to find out diversity of medicinal members of Convolvulaceae, which are distributed in the Kottayam district, Kerala. The documentation was mainly based on the field observation, discussions with local peoples as well as scrutinizing the literature review. During the field visits, the plant specimens were collected at different reproductive stages to prepare herbarium specimens. The collected specimens were identified taxonomically with the help of available floras and literature (Hooker, 1984; Gamble and Fischer, 1915 – 1936; Sasidharan, 2004). The nomenclature of each species has been brought up to data as per the rules given in the International Code of Botanical Nomenclature (ICBN). The specimens were processed for the preparation of Herbarium by standard methods. The vocher specimens were deposited in the Herbaria of PG Department of Botany, Deva Matha College Kuravilangad, Kottayam for future reference.

4. Results and Discussion

Medico-potentiality of convolvulaceae members

The present survey documents some of the medico-potential Convolvulaceae members from the study area. There are about **32** plants which possessing the medico-potentiality for curing many ailments. The local people inhabited in the study area having very good knowledge of medicinal plants. The discussion with local inhabitants as well as local practioners of the study area reveals that, most of the climbing species in the family Convolvulaceae are used to treat many diseases. Among the various useful parts of these plants includes, Leaves are most used (15 Nos.) followed by Whole plant (6 Nos.), Roots (5 Nos.), Seeds (4 Nos.), Flower (1 No.) and Latex (1No.) respectively (**Table-1 & Fig. 2&3**).

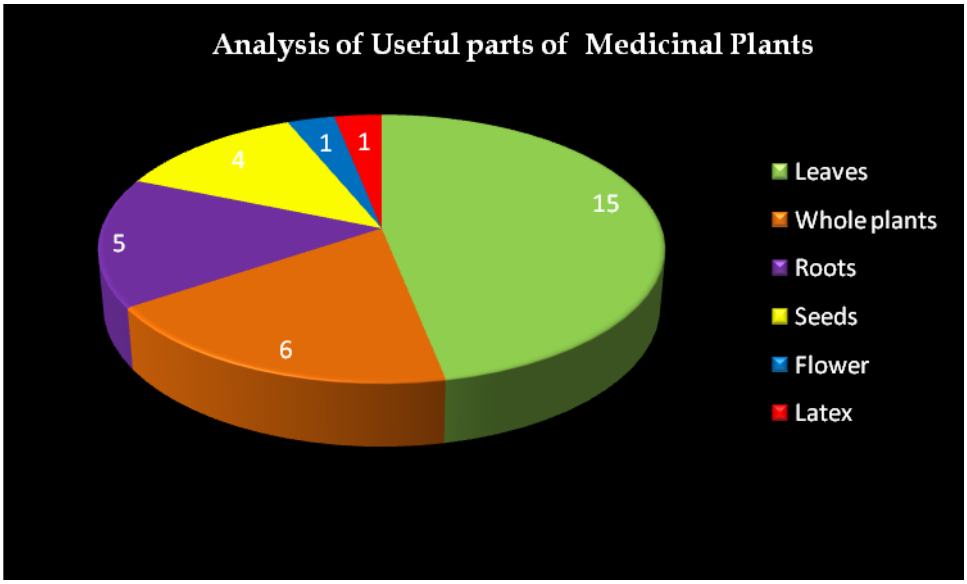

Fig. 2 Analysis of useful parts of documented plants from the stusy area

Similar studies were conducted by Pankaj and Gupta, (2014). According to them there are about 9 species of convolvulaceae in Central India with special reference to Madhya Pradesh and Chattishgarh. They highlighted, these species have excellent medicinal properties to cure various ailments. Taxonomically and medicinally important morning glory family of convolvulaceae at Rajshahi district was studied by Sultana and Rahman, (2016). The present study documented 9 species under 2 genera belonging to the family Convolvulaceae. For each species English name, botanical name, synonyms, local name, status of occurrence, habit, habitat, flowering and fruiting time, chromosome number, distribution taxonomic description and medicinal uses have been mentioned in their publication.

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

SI No.	Botanical Name	Part(s) used	Medico potentiality
1.	***Aniseia martinicensis*** (Jacq.) Choisy	Root	The powdered root is administered with warm water for stomach ailments of children.
2.	***Argyreia cuneata*** (Willd.) Ker-Gawl.	Leaves	The leaves are traditionally used for the treatment of diabetes.
3.	***Argyreia elliptica*** (Roth) Choisy	Leaves	The fresh leaves used externally to cure eye injuries in cattles.
4.	***Argyreia nervosa*** (Burm.f.) Bojer	Root	Roots are used to make a tonic for rheumatism.
5.	***Argyreia pomacea*** (Roxb.) Choisy	Root	Root juice is consumed for the treatment of jaundice.
6.	***Argyreia populifolia*** Choisy	Latex	The latex of the plant externally applied on mad dog bites in order to prevent hydrophobia.

7.	***Argyreia sericea*** Dalz.	Root	The root infusion is used for the treatment of various diseases such as skin diseases, cuts and wounds, diuretic, fever, respiratory troubles, hair loss, ear problems, toothache, night blindness, eye problems.
8.	***Cuscuta chinensis*** Lam.	Seed	The seed powder is also used for improving sperm health.
9.	***Cuscuta reflexa*** Roxb.	Whole plant	The whole plant extract is used externally for the treatment of body pains and itchy skin.
10.	***Erycibe paniculata*** Roxb.	Leaves	The leaf juice is used for the treatment of kidney stone. It also used to treat inflammation of the prostrate gland.
11.	***Evolvulus alsinoides*** L.	Whole plant	The whole plant infusion is used to improve memmory.
12.	***Ipomoea alba*** L.	Leaves	The leaf extract is applied on boils and wounds.
13.	***Ipomoea aquatica*** Forssk.	Leaves	The consumption of leaf juice along with water is used to treat piles and body weakness.
14.	***Ipomoea cairica*** (L.) Sweet	Flowers	Flowers are reported for its anticancer properties.
15.	***Ipomoea carnea*** Jack	Leaves	Leaves are used as purgative. It is reported to have stimulant.
16.	***Ipomoea horsfalliae*** Hook.f.	Leaves	The leaf juice is used for the treatment of inflammations, abdominal diseases,

			fever, headache and bronchitis.
17.	***Ipomoea marginata*** Desr.	Whole plant	The whole plant paste is applied over inflammatiory swellings.
18.	***Ipomoea obscura*** (L.) Ker-Gawl.	Leaves	The paste of the leaves applied over cuts and wounds.
19.	***Ipomoea pileata*** Roxb.	Leaves	The leaf paste is used for the treatment of skin diseases
20.	***Ipomoea purpurea*** (L.) Roth.	Seed	The seed is used in the treatment of oedema, oliguria, ascariasis and constipation.
21.	***Ipomoea tricolor*** Cav.	Seed	The seed contain small quantity of the hallucinogen LSD. This has been used medicinally in the treatment of various mental disorders.
22.	***Ipomoea triloba*** L.	Leaves	The decoction of the leaves used for the treatment for stomach ache.
23.	***Ipomoea turbinata*** Laga.	Seed	Seeds are athartic
24.	***Ipomoea violacea*** L.	Root	The tea is prepared from the roots are diuretic, laxative, expectorant and also used for coughs.
25.	***Ipomoea wightii*** (Wall.) Choisy	Leaves	The leaf extracts are used to treat liver complaints as well as stomach-ache.
26.	***Merremia aegyptia*** (L.) Urban	Leaves	The dried leaf powder is used for dressing for burns.

27.	***Merremia hirta*** (L.) Merr.	Whole plant	The plant juice is given for dysentery, bowel complaints, cough and bronchial affections.
28.	***Merremia tridentata*** (L.) Hall.	Leaves	Leaf juice is used for increasing renal function and urinary problems.
29.	***Merremia umbellata*** (L.) Hall.	Whole plant	A decotion of the plant is said to act as diuretic. It is also used for rheumatic pain and headache.
30.	***Porana racemosa*** Roxb.	Whole plant	The whole plant paste is used to apply for swelling.
31.	***Porana paniculata*** Roxb.	Leaves	Leaf paste is applied on sores.
32.	***Rivea hypocrateriformis*** (Desr.) Choisy	Leaves	Leaf extract is used for the treatment of piles.

5. Conclusion

The present study enumerates the diversity of medicinal convolvulacean members, which are distributed in the different locations of Kottayam District, Kerala. As a result of the present investigation, there are about 32 species, which are belonging to 9 genera of family convolvulaceae was documented. The dominant genera, which are documented from the study area are *Ipomoea* (14 species), *Argyreia* (6 species) and *Merremia* (4 species). The others have represented by 2 or 1 species respectively. The curative efficacy of such plants are mainly based on their useful parts like Leaves, Whole plant, Roots, Seeds, Flower and Latex respectively.

We can surmise that, there are two major general threats to the medicinal plants which are distributed in the present study area are: first, the loss of habitat (through land use conversion, agricultural expansion and so on) which results in the loss of both known and unknown species; and second, the overexploitation of known species as a result in increased demand. Related to these two is the associated loss of indigenous knowledge and expertise. In this scenario, conservation of natural resources are highly valuable for future generation.

Fig. 3. Selected images of medicinal plants from the study area.

Aniseia martinicensis (Jacq.) Choisy

Argyreia elliptica (Roth) Choisy

Argyreia pomacea (Roxb.) Choisy

Argyreia sericea Dalz.

Erycibe paniculata Roxb.

Ipomoea alba L.

Ipomoea aquatica Forssk.

Ipomoea carnea Jack.

Ipomoea horsfalliae Hook.f.

Ipomoea obscura (L.) Ker-Gawl.

Ipomoea purpurea (L.) Roth.

Ipomoea triloba L.

Ipomoea violacea L.

Merremia aegyptia (L.) Urban

Merremia hirta (L.) Merr.

Merremia umbellata (L.) Hall.

Porana racemosa Roxb.

Rivea hypocrateriformis (Desr.) Choisy

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