

MEDICINAL PLANTS OF MORNING GLORY: CONVOLVULACEAE JUSS. OF CENTRAL INDIA (Madhya Pradesh & Chhattishgarh)

Pankaj K. Sahu^{1*} and Sharmistha Gupta²

¹Department of Botany, Dr. C.V. Raman University, Kota Bilaspur (C.G) India.

²WBSCST, Bikash-Bhavan, Kolkata, West Bengal India.

E-mail: sahu.pankaj1@gmail.com

ABSTRACT

The Convolvulaceae are mostly twining herbs or shrubs, sometimes with milky sap, comprising about 85 genera and 2,800 species in the World. The present study focuses into nine species of Convolvulaceae in central India with reference to M.P. & C.G. which have excellent medicinal properties. *Ipomoea* L. (5 species discussed), used to treat arsenic and opium poisoning, under developed femal structures, piles and used as galactogogue, finds application in cardiac debility, sexual debility, hepatosplenomegaly, dyspepsia, hepatopathy etc. *Evolvulus* (2 species) is used in veneral debility, chronic bronchial asthma, epilepsy, brain tonic. Decoctions of *Argyreia nervosa* (Burn. f.) Boj. are used in seminal, nervous weakness, cerebral disorders and sex disorder and *Merremia tridentata* (L.) Hall. f. (whole plant) while *Merremia umbellata* (L.) Hallier. f. useful in uropathy, inflammations and general debility, fistula, pustules and tumors.

Key words: Convolvulaceae, Nervous debility, Sexual debility, Medicinal plants.

INTRODUCTION

Convolvulaceae 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, comprising about 85 genera and 2,800 species in the World. Plants of this family are well distributed in India and found particularly in the state of Chhattisgarh (Ekka et al., 2007). They can be recognized by their funnel-shaped radially symmetrical corolla; the floral formula for the family has 5 sepals, 5 fused petals, 5 epipetalous stamens, and a 2 part syncarpous and superior gynoecium. The stems of these plants are usually winding, hence its Latin name (convolvere = to wind). The leaves are simple and alternate, without stipules. The fruit can be a

capsule, berry, or nut, all containing only two seeds per one locule. The plant *Ipomoea fistulosa* Linn. (Besharam, Behaya) is a large, diffuse or straggling shrub with milky juice, leaf ovate cordate, entire, acuminate, flower large campanulate, pale rose, pink or light violet in lax, dichotomously branched axillary and terminal, pedunculate cymes; Fruits glabrous capsules; Seeds silky, belonging to family Convolvulaceae (Frey et al., 1995; CIMP 1979). Linnaeus (1753) cited the Rheedea name under *Convolvulus reptans*, but the epithet cannot be used because of a typification problem (van Ooststroom 1940, Verdcourt 1963).

The World Health Organization (WHO), 1978 has estimated that 80% of the populations of developing countries rely on traditional medicines, mostly plant drugs, for their primary

health care needs. In India about 65 % of the population relies on ethno medicine which is the only source of their primary health care needs (Rajasekharan *et al.*, 1996). Traditional Health Practices of Raj-Gond (Shukla *et al.*, 2006). *Argyreia nervosa* (Burn. f.) Boj. is used in cardiac and general debility, seminal and nervous weakness, cerebral disorders, diabetes, tuberculosis, leucorrhoea, plasmolysis and obesity. The formulations of genus *Evolvulus* L. used to treat Weakness, Nervous debility, Loss of memory, Syphilis, Scrofula, Skin diseases, Epilepsy, Helminthiasis, falling and graying of hair and Dysentery. Different formulations made in Ayurveda from the different species of *Ipomoea* L. and *Merremia tridentata* (L.) Hall. f. used to treat various diseases i.e. hemiplegic disease, one sided paralysis, uropathy, inflammations and debility and tumours.

MATERIAL AND METHODS

The present survey has been carried out in 2010-11 in different areas of Madhya Pradesh and Chattishgarh i.e. Lamni, Amarkantak, Achanakmar, Kota, Khuria, Khootakhat etc. Collection of plants belonging to the family of Convolvulaceae was done during field tenure of field work. The Plant species were identified with the help of district flora of Bilaspur and Madhya Pradesh and photographic documentation was also done. Noteworthy contribution has been done by many workers (Shukla *et al.*, 2008; Tiware *et al.*, 2013; Chaubey *et al.*, 2007; Dubey *et al.*, 2007; Mudgal *et al.*, 1997; Murti & Panigrahi 1999; Panigrahi and Murti 1989 and Saxena 1970; Chopra *et al.*, 1995).

OBSERVATION

- 1. *Argyreia nervosa* (Burn. f.) Boj.** Synonym: *Argyreia speciosa* Sweet.
English name: Elephant Creeper

Taxonomic description:

Climber shrub, leaves ovate-cordate, acute, basal sinus deep, softly adpressed, white tomentose beneath, bracts large, ovate, deciduous. Flowers in dense heads, corolla densely silky on the fold

externally, usually in many flowered cymose, often capitate. Sepals 5, herbaceous, in fruit leathery, little enlarged, often red within. Petals 5, connate in rose purple, funnel shaped corolla, limb plicate, more or less hirsute externally, shortly lobed. Stamens 5, anther oblong, straight. Disk annular. Carpels connate in a 4 celled ovary; ovules 4; style filiform; stigma 2-globose; fruits dry, hard berry. Seeds 4 or few, embedded in mealy pulp.

Figure-1. *Argyreia nervosa* (Burn.f.) Boj.



Medicinal uses:

Roots are used as tonic, alternatively used in rheumatism and diseases of the nervous system. Seeds show significant effect on hypotension and have sponsmolytic activity.

Active Ingredient:

Flavonoids, Gum, alkaloids, Saponins, Tannins, carbohydrate, steroids.

Locality : Amarkantak, Kabir chabutra

2. *Evolvulus alsinoides* (L.) Linn.

English name: Dwarf Morning Glory, Slender Dwarf Morning Glory

Taxonomic Description:

Prostrate perennial Herbs, 15-20 cm heighted. Leaves alternate, elliptic oblong, hairy. Inflorescence solitary axillary. Flowers small, bract lanceolate hairy. Sepals ovate, lanceolate, sharply acute with silky hairs. Corolla light-blue, lobes 5. Stamens ovate, sagittate base.

Fruits capsule, globose, 2-4 valved. Seeds glabrous, usually 4. Flowering and Fruiting: July to December.

Figure-2. *Evolvulus alsinoides* (L.) Linn.



Medicinal Uses:

The plant paste with mustard oil (3:1) is applied on head for promoting growth of hair and the plant juice administered orally to treat general weakness and loss of memory.

Active Ingredient:

The plant contains betaine, alkaloids, hydrocarbons and β -sitosterol, evolvine, etc.

Locality: Kota, Amarkantak, Ghuntaghat

Means of Propagation : Seeds

3. *Evolvulus nummularius* (L.) L. Synonym: *Convolvulus nummularius* L.; *Volvulopsis nummularius* (L.) Roberty

Taxonomic Description:

A repent herb, generally forming mats. Branches rooting at nodes. Leaves sub-orbicular or broadly oblong, glabrous, undersurface sparsely pubescent, appressed to ground. Flowers 1-2 from axils, white. Style 2, free from base, each cleft into 2 linear stigmas. Fruit capsules 4-valved, less often 3-valved. Seeds usually 2, glabrous.

Medicinal properties:

The whole plant is used to treat amoebic dysentery. Fresh juice obtained from young

twigs is consumed with water (half teaspoonful) twice daily to treat dysentery.

Figure-3. *Evolvulus nummularius* (L.) Linn.



Active Ingredient:

It contains β -sitosterol, glucoside, stigmasterol, d-mannitol, ursolic acid and oleanolic acid have been isolated from the aerial parts. On the basis of their spectroscopic data and chemical study, the structures of the new compounds 1-3 have been established as 3-O (4-stearoyl-Z-coumaroyl)-stigmast-5, E-22 dien-3 β -ol; 16-(E-coumaroyloxy)-palmitic acid and 3 β -hydroxy-urs-12-en-29 β -oic acid.

Locality: Marwahi, Khuria

Means of propagation: Seeds

4. *Ipomoea aquatica* Forssk. Synonyms: *Ipomoea reptana*, Poir.

English name: River spinach, Water morning glory, Swamp Cabbage

Taxonomic Description:

An annual herb with milky latex. Stems hollow, glabrous, prostrate on mud or floating in water, rooting nodes. Leaves ovate-hastate, entire. Flowers axillary, moderate-sized, bract usually at base of pedicel. Sepals sub equal. Corolla purple or purplish-white, bell shaped. Filaments densely hairy at base. Fruit capsules ovoid, glabrous, seeds 2 or 4.

Medicinal properties:

Whole plant is blood purifier, mild purgative, emetic, used as antidote for opium and arsenic poisoning, improves nervous and general debility.

Figure-4. *Ipomoea aquatica* Forssk.



Whole plant extract is applied on the affected sites to treat poisonous insect bite. Soup prepared from the aerial parts taken as sedative.

Active Ingredient:

The leaves are a good source of minerals (2.1%), vitamins (especially, carotene and tocopherol). Plant is given for nervous and general debility. Whole plant gave beta-carotene, xanthophyll, traces of taraxanthin, hentriacontane, betasitosterol and its glucoside.

Locality : Amarkantak, Kota

Mode of propagation: Seed

5. *Ipomoea quamoclit* L. Syn. *Quamoclit pennata* (Desr.) Bojer, *Quamoclit vulgaris* Choisy.

English name: Cyperus vine, Indian Pink, Star Glory

Taxonomic Description:

The leaves are 2-9 cm long, deeply lobed (nearly pinnate) with 9-19 lobes on each side of the leaf. The flowers are 3-4 cm long and 2 cm diameter, trumpet-shaped with five points, and can be red, pink or white; Flowering & fruiting time- March to June.

Medicinal properties:

The whole plant is crushed and applied externally on carbuncles. The juice is used along with other ingredients in case of blood dysentery, piles and body weakness.

Figure-5. *Ipomoea quamoclit* L



Active Ingredient:

Leaves and stems contain small amounts of alkaloids and cyanogenetic glycosides. Seeds have been reported to contain the resin glycosides, quamoclins I-IV and jalapin. Total alkaloid in seeds was found 0.012%.

Locality: Amarkantak, Kota

Mode of propagation: Seed

6. *Ipomoea carnea* Jacq. ssp. *fistulosa* (Mart. ex Choisy) D. Austin

English name: Bush Morning Glory

Taxonomic Description:

Stem terete, hollow, milky latex present, leaves oblong – ovate in shape, apex acute, base deeply cordate, margin entire. Flowers large, showy in panicles and cymes, purple in colour. Sepals concave. Corolla tubular, funnel shaped. Fruits small, capsules, glabrous, apiculate. Seeds 4, silky hairy above, broadly elliptic in shape.

Medicinal uses / properties: Leaves are used as purgative. Leaves paste is applied on ‘Haja’ (a

kind of sore between toes and fingers due to fungal infection).

Active Ingredients: Not known

Locality : Kota, Ghuntaghat

Mode of propagation: Stem cutting & seeds

Figure-6. *Ipomoea carnea* Jacq. ssp. *fistulosa* (Mart. ex Choisy) D. Austin



7. *Ipomoea nil* (L.) Roth. Synonym: *Ipomoea hederacea* auct. non (L.)Jacq.
English name: Japanese morning-glory

Taxonomic Description:

Climber, stems twining with hirsute and spreading hairs. Leaves oval-cordate, palmately 3-lobed. 7-9 nerved, hirsute. Flowers showy, usually two on the peduncle. sometimes more, petiole pubescent, flowers in umbellate or axillary cymes. Sepals pubemlous. linear-lanceolate. Corolla pink, tubular -funnel shaped. Fruits capsule subglobose. glabrous. Seed glabrous.

Medicinal uses:

Seeds are used in anti-inflammatory, carminative, depurative, Purgative, Vermifuge, Inflammations, Constipation. Dyspepsia. Bronchitis, Fever, Skin diseases, Scabies and splenopathy, also used as purgative.

Active Ingredients:

Seeds contain alkaloids. e.g. lysergol, chanoclavine, penniclavine and clymoclavine.

Locality: Lamni, Amarkantak, Achanakmar, Shivtarai

Mode of propagation: Seed

Figure-7. *Ipomoea nil* (L.) Roth



8. *Ipomoea pestigridis* L. Synonyms: *Ipomoea biloba* Forsk., *Convolvulus pes-caprae* L.
English name: Tiger-foot morning glory.

Figure 8. *Ipomoea pestigridis* L.



Taxonomic Description:

Twining annual. Stems slender with dense spreading hairs. Leaves broad. deeply pal match-5-9 lobed, sometimes 3-lobcd. elliptic-lanceolate, hirsute. Flowers in axillary cymes, moderate-sized, sessile. peduncle densely hirsute. Sepals long. hairy, outer 2 obovate. Corolla tubular. companulate. purple. Fruits

capsules globose, glabrous enclosed by calyx.
Seeds minutely velvety.

Medicinal uses / properties:

Root: used as purgative and antidote to dog bites. Roots are used in boils and carbuncles. Leaves are used to cure boils, sore and pimples in Poultice.

The whole plant is used in hemiplegia and used to treat gripe and malarial fever, also.

Active Ingredients:

The aerial parts contain the flavonoids, diometin, luteolin and their 7- O-beta-D-glucosides.

Locality: Khunttaghat

Mode of propagation: Seeds.

Active Ingredients: Not known

Locality: Achanakmar, Khudia

RESULTS AND DISCUSSION

During the survey, 9 herbs belonging to 5 genera in single family Convolvulaceae were identified with medicinal uses. The major plant Genera which contributed were *Ipomoea* (5 spp.), *Evolvulus* (2spp.), while remaining 2 genera had one species each. All the plants are alphabetically arranged. For each species, botanical name; plant family; Local name; status; medicinal uses, locality in the surveyed site and photographs of plant species. *Ipomoea* L. (5 species discussed), used to treat arsenic and opium poisoning, under developed female structures, piles and used as galactogogue, cardiac debility, sexual debility, hepatosplenomegaly, dyspepsia, hepatopathy etc.

Evolvulus (2 species) is used in veneral debility, chronic bronchial asthma, epilepsy, as brain tonic. Decoction of *Argyreia nervosa* is used in seminal, nervous weakness, cerebral disorders and sex disorder and *Merremia tridentata* (L.) Hall. f. (whole plant) while *Merremia umbellata* (L.) Hallier. f. is useful in Hemiplegia, Uropathy, inflammations and general debility, fistula, pustules and tumours. The constant pressure of exploitation on some of the highly important medicinal plant species as those recorded here is rapidly carrying them to the verge of extinction. Their further research and conservation measures are thus recommended.

ACKNOWLEDGEMENTS

Authors are thankful to CCF, Forest Department of Chattisgarh and Madhya Pradesh for providing permission to visit the areas. One of author is thankful to Dr. Moni Thomas, Senior Scientist Directorate of Research Services



Medicinal Uses:

JNKVV, Jabalpur for encouragement and appreciation.

BIBLIOGRAPHY

1. **Chaubey, O.P., Bahadur, V. and Singh, J. 2007.** Threats to plant diversity of Achanakmar- Amarkantak Biosphere Reserve. Paper presented in workshop on *Research Needs for Achanakmar-Amarkantak Biosphere Reserve on 30th April 2007*, Tropical Forest Research Institute, Jabalpur.
2. **Chopra R.N., Nayar S. L. and Chopra I.C. 1995.** Glossary of Indian medicinal plants, *Council of Scientific and Industrial Research*, New Delhi, 330.
3. **Compendium of Indian Medicinal Plant. 1979.** Central Drug Research Institute. Publication and Information Directorate. New Delhi. 2: 390-391.
4. **Dubey, P.C., Sikarwar, R.L.S. and Tiwari, A.P. 2007.** Threat assessment of important medicinal plants in Amarkantak area. *Paper presented in workshop on Research Needs for Achanakmar-Amarkantak Biosphere Reserve*, Tropical Forest Research Institute, Jabalpur.
5. **Ekka R. Neeli and Dixit V.K. 2007.** Ethno-pharmacognostical studies on medicinal plants of Jashpur district Chattisgarh. *International Journal of Green Pharmacy*, 1(1): 2-4.
6. **Frey R. 1995.** *Ipomoea carnea* sp. *fistulosa* (Martius ex Choisy) Austin: Taxonomy. *Biology and Ecology Reviewed and Inquired*. 36(1): 21-48.
7. **Geetha G. Nair. 2012.** Taxonomic Relationships and Ethnobotany of family Convolvulaceae. *International Journal of Basic and Applied Chemical Sciences*, 2 (3): 56-81.
8. **Mudgal, D., Khanna, K.K. and Hajra, P. K. 1997.** The Flora of Madhya Pradesh. Vol. II, *Botanical Survey of India*, Kolkata, 681.
9. **Murti, S. K. and Panigrahi, G. 1999.** Flora of Bilaspur Vol. II. *Botanical Survey of India*, Kolkata, 396 - 906.
10. **Panigrahi, G., Murti, S. K. 1989.** Flora of Bilaspur. Vol. I, *Botanical Survey of India*, 396.
11. **Rajasekharan S., Pushpangadan P. and Biju S. D. 1996.** *Folk Medicines of Kerala – A Study on Native Traditional Folk Healing Art and its Practitioners*. New Delhi: Deep Publications, New Delhi (ed. S. K. Jain).
12. **Saxena, H.O. 1970.** The flora of Amarkantak, M. P. *Bulletin of Botanical Survey of India*, 12 (1-4): 37-66.
13. **Shukla R., Chakravarty M. and Gautam M. P. 2008.** Indigenous medicine used for the treatment of Gynecological Disorders by the tribal of Chhattisgarh, India. *Journal of Medicinal Plant Research*, 2 (12):356-360.
14. **Singh, L., Sharma, B. and Agarwal, R. 2003.** Species composition and plant diversity of representative tropical moist deciduous forest of Achanakmar Sanctuary. *Journal of Tropical Forestry*, 19 (I & II), 25-34.
15. **Tiwary C.B. and Singh M.K. 2013.** Approaches To Classifying And Restoring Degraded Tropical Forests For The Climate Change Mitigation Mechanisms. *Biolife* 1(4), 177-183.
16. **Van Wyk, B. E. 2005.** Food Plants of the World. An Illustrated Guide. *Timber Press, Inc., Portland, Oregon*.
17. **Verdcourt, B. 1963.** Convolvulaceae. In Flora of Tropical East Africa. Edited by C.E. Hubbard & E. Milne-Redhead. *Crown Agents for Oversea Governments and Administrations, London*, 120-121.
18. **World Health Organization. 1978.** The Promotion and Development of Traditional Medicine. *Technical Report Series 622*, Geneva.

DOI:<http://dx.doi.org/10.5281/zenodo.7203582>

Received: 2 April 2014;

Accepted: 19 May 2014;

Available online : 6 June 2014