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MORPHOLOGICAL ANATOMICAL AND PHYTOCHEMICAL STUDIES ON *CLEMATIS HEYNEI* M. A. RAO.

S. T. Chavan

Sopanchavan6567@gmail.com
Rashtramata Indira Gandhi College, Jalna (M. S.) India.

ABSTRACT

Clematis heynei M. A. Raois wild as well as ornamental species abundance occurring in India. These plants have been used in the indigenous system of medicine for a long time. The morphological and anatomical studies reveal that there are not able difference in the plant habit, leaves, stem, root and flowers among this plant. Morphology and anatomical study also helps for correct identification and nomenclature of plant. Anatomical studies included observation of transverse sections of root, stem, leaves and petiole to understand the nature of different cell arrangements in these parts. The chemicals present in root, stem and leaves drugs are analyzed physically as well as chemically by qualitative and quantitative parameters. In present study reveals morphology, anatomy, medicinal properties and phytochemical studies of the plants for the correct identification, authencity of drugs. The details are presented in paper.

Key words:*Clematis heynei*,morphology, anatomy, medicinal uses and phytochemistry.

INTRODUCTION:

The Ayurveda date back around 5,000 years and is widely considered to be the oldest form of health care in the world. India is one of the mega biodiversity countries. There are about 17800 flowering plants species occurs in India out of which about 7500 species are known to have medicinal properties (V.N. Naik.2000).Many medicinal plants with wide distribution have naturally several local names. Some of the well known medicinal plants have more than one Sanskrit name. Descriptive of these plant species is short, imperfect or unscientifically documented. This has naturally led to the confusion or controversy in their genuinely and correct identity. It was revealed that in some drugs,

there is contamination of other non-medicinal plants in the form of small and fine powder in some drugs sold in the local market.

Clematis heynei locally known as Murva, *Devi, Dhanurmala, Dhanurguna; Churahar, Dhantili, Murhari,Moravela, Morvel Moravela, morbel, Ranjani*, *Morvel,Clematis heynei* plant used for various diseases i. e. leprosy, blood diseases, heart trouble, vomiting, boils, itch and to kill parasitic worms. The Morphology studies among root, stem, leaves and flowers. Anatomical studies include observations of transverse section of root, stem, leaves and petiole to understand the nature of different cell arrangement in these parts. The chemicals present in root, stem and leaf drugs are analyzed physically as well as chemically by qualitative and quantitative means. The physical parameters like colour, odour and taste of powdered stem, root, leaf drugs serves as primary data for drug identification. Estimation, qualitative as well as quantitative, of various chemicals taken together is assumed to produce specific data useful in standardizing a particular drug.

Material and Methods:

The samples were collected from the medium sized authentically identified plant species from different localities of Marathwada. The roots, stems and leaves were removed carefully by hand pricking without damaging the plants. In Phytochemical studies, plants powders of root stem and leaves of *clematis heynei* species were under taken for chemical analysis. Each parameter have separate procedure every parameter have different procedure.

Clematis heynei M. A. Rao(MORWEL, RAN JAI)Family - Ranuncunlaceae Juss.

Vernacular names: -Sansk: *Murva, Devashreni, Devi, Dhanurmala, Dhanurguna;*Hindi: *Churahar, Dhantili, Murhari,*Bombay: *Moravela, Morvel,*Marathi: *Moravela, morbel, Ranjani*, Guj:*Morvel.*

Description: - Extensive climber; all parts except the old stem white tomentose. Leaves simple or once ternate, entire or shallowly 1 - 7-lobed; the lobes ovate to orbicular, 3 - 10 × 1.5 - 8 cm, rounded cuneate or cordate at base, mucronate at apex. Petioles, twinning, 3 - 8 cm long;

petiolules 0.5 - 2 cm long. Flowers white, 2 - 4 cm across, in axillary, corymbose panicles; bracts foliaceous, ovate, acute, Sepals 4 - 6, spreading, pubescent on the back, glabrous within, mucronate. Petals absent Stamens many, 1 - 1.2 cm long. Fruit, achenes, ovoid, compressed, silky villous with long feathery styles. Frequent on bushes along gullies in open forest, along stream bank ect. Fls and frts – September to December.

Medicinal Propertes:

The juice of freshly crushed leaves and stem of *Clematis heynei* has vesicant properties, (Chopra *et. al.*, 1940, Behlet *et. al.*, 1966). *Clamatis heynei*, in Roth. Sweet, bitter, astringent not stimulant, laxative, stimulants, secretion of the bile used in leprosy, blood diseases, and fever in thirst, heart troubles, bilious vomiting, externally applied to boils, itch and to kill parasitic worms (Kirtiker and Basu, 1980). Flowers showy and fragrant, plants are used in Ayurvedic medicines for leprosy and fever (Yadav and Sardesai, 2002). Plants are toxic, (Maiti and Singh, 2006).

Anatomical study: The study of gross internal structure of plant organs by the technique of section cutting is called plant anatomy (Pandey, 2002). Interfascicular cambium restricted to these strips of cambium lying between primary bundles which do not in their activity form xylem and phloem but merely parenchyma as in *clamatis.* (Eames and Laurence,1947). Scleroids are widely distributed in the plant body (De Bary, 1884).

T. S. of Root: The transverse section of root of *Clematis heynei* shows that the cork is the outermost layer; it is composed of 5-7 layers. It has squariesh, rectangular or irregular shape with impregnations. It is interrupted at certain places. It measuring 20-25 x 25-75 µ Cortex is undifferentiated and composed of 5-13 layers, cells are large, irregular measuring 30-45 x 55-100 µ. Endodermis is in patches of 1-2 layers, pericycle is not clear. Phloem composed of squariesh or rectangular cells 4-7 layers. It is measuring 15-25 x 20-35 µ. Vessels in patches, 2-3, rarely single circular or oval. It measures 30-60 µ in diameter. Vessels are surrounded by fibers. Ray parenchyma is uni or biseriate. Rest of the space is filled by parenchyma at the

center thick walled treachery element are arranged like a small pith. Because of abnormal secondary growth xylem elements are distributed in patches.

T. S. of stem: The transverse section of *Clematis heynei* stem shows epidermis is outermost layer, it is composed of rectangular or barrel shaped cells. It is interrupted by unicellular trichomes. Epidermis is measuring 20-35 x 30-40 µ. Hypodermis is single layered; cells are barrel shaped, slightly smaller than the epidermal cells. Cortex is composed of 3-5 layers. Cells are circular, ovate, elongate and loosely arranged; it is ranging from 35-90 µ in diameter and 30-50 x 40-70 µ. Endodermis and Pericycle is not prominent. Vascular bundles are bicollateral and arranged sickly in ring. Phloem is composed of 3-5 layers, it having rectangular cells. It is tangentially elongated; it measures 10-25 x 20-30 µ. Metaxylem towards the periphery and protoxylem is towards the center i e endarch. Vessels are single or in pairs. The fibers thick walled radially arranged. Large pith is present at the center. It is composed of large parenchymatous cells, the cells are circular, thin walled, loosely arranged, and their diameter ranges from 40-70 µ.

T. S. Leaf: The transverse section of *Clematis heynei*leaf shows typical dorsiventral structure. The epidermis of both surfaces is single layered. Cells are rectangular and covered externally with cuticle. The upper epidermal cells are 30-40 x 50-60µ in dimension while lower epidermal cells are of 25-30 x 30-35µ. The number of cells of upper epidermis are elongated and covered by mostly confined on bicellular uniseriate hairs (trichomes). Stomata are anomocytic type and present only on lower epidermis.

Mesophyll is differentiated into two layers viz. palisade tissue and spongy tissue. Palisade tissue is in two rows of elongated chloroplast containing cells on upper side cells measures 20-25x30-50µ. Spongy tissue is loosely arranged with intercellular space on the lower side, which measures 30-40 µ in diameter. Strips of transfusion tissue are also present between palisade tissue and spongy tissue. Midrib portion is bulged towards adaxial side of the leaf and epidermis is as in lamina. The strips of collenchymas appear along only the upper epidermis. The cortex is composed of parenchyma. The vascular bundle is surrounded by a parenchymatous bundle

sheath and is conjoint, collateral and closed. Xylem lies towards upper epidermis and phloem lies towards lower epidermis. The protoxylem is facing towards upper epidermis.

T. S. of Petiole: Transverse section of *Clematis heynei*petiole is more or less oval or wavy in outline. The epidermis is single layered composed of compactly arranged squariesh to barrel in shaped cells. The cells of epidermis are small, thick walled with moderate cuticle, which measures 10 - 15 x 20 - 25µ. Just beneath the epidermis there is multilayered cortex which is divided in to outer cortex and inner cortex. Outer cortex is 2 - 4 layered and composed of compactly arranged collenchymatous cells, which measures 20 - 25 x 25 - 35µ. Inner cortex is 5 - 7 layered and made up of loosely arranged parenchymatous cells. The cells are oval to round in shape and varied in size, which measures 30 - 40 x 45 - 70µ.

Vascular bundles are arranged at the each corner region of petiole and are six in number. These are conjoint bicollateral, which is bounded by single layered parenchymatous endodermis. Metaxylem is at the center and protoxylem towards the periphery. Metaxylem consisting vessels, their diameter ranges from 15 to 25µ. Phloem is on either side of xylem, which is in patch. Phloem cells are smaller ones and their diameter is 7 - 13µ (Plate - 6.22).

Phytochemical study: I**) Physical Parameter**:-

Colour – Root of *clematis heynei* is whitish brown, stem – yellowish brown, leaves- green.

Odour: - Root- odorless, stem-specific, leaves- disagreeable.

Taste: Root- tasteless, stem- slightly sweet, leaves, astringent.

II) **Chemical parameter**:- (Table. I)

1) Dry matter: Dry matter value in root is 38.22 %, in stem is 53.88 % and in leaf is 42.70%.

2) Bulk density: Bulk density in root is 0.387%, in stem is 0.344 % and in leaf is 0.282%

3) Total ash: Total ash in root is 09.80%, in stem is 11.60% and in leaf is 08.45%

4) Acid insoluble ash in root is 0.15%, in stem is 1.50% and in leaf is 08.45%.

5) Acid soluble ash in root is 09.65%, in stem is 10.10% and in leaf 07.20%.

6) Water soluble ash in root is 3.0% such as in stem is 5.5% and in leaf is 2.2%.

7) Water insoluble ash in root is 06.80 % in stem is 06.10 % and in leaf is 06.25%.

8) Nitrogen: 1.95% of nitrogen is in root and in stem is 3.08% such as in leaf is 3.33%.

9) Water soluble nitrogen present in root is 1.875%, in stem is 2.190% and in leaf is 1.560%.

10) Crude proteins in root is 14.00% and in stem is 22.87% therefore in leaf is 14.58 %

11) Reducing sugar present in root is 3.444%, in stem is 2.949% and in leaf is 3.466%

12) Total sugar present in root is 2.354%, in stem is 1.412% and in leaf is 2.646%

13) Non reducing sugar present in root is 1.090%, in stem is 1.536% and in leaf is 0.822%

14) Crude fat is in root is 0.60 % s in stem is 12.35% and in leaf is 13.09%

15) Crude fiber in root is 14.65 % in stem is 25.75% and leaves are 20.555.

16) Cellulose present in root is 13.25% in stem is 14.85% and in leaf is 23.38%.

17) Gross energy in root is 3.88% in stem is 3.10% and in leaf is 4.38%

18) Calcium present in root is 1.458% in stem is 2.224% and in leaf is 1.763%

19) Phosphorus present in root is 0.28% in stem is 0.35% and in leaf is 0.20%

Extractive values: (Table No. 2)

I) Extractive value in water in root is 12.2% in stem is 10.2% and in leaf is 11.18%
II) Extractive value in Acetone in root is 3.05% in stem is 3.4% and in leaf is 4.8%
III) Extractive value in Butanol in root is 3.0%, in stem is 3.4% and in leaf is 4.8%
IV) Extractive value in chloroform in root is 4.2% in stem is 3.2% and in leaf is 4.2%
V) Extractive value in Diethyl ether in root is 1.8%, in stem is 2.6% and in leaf is 3.2%
VI) Extractive value in ethyl alcohol in root is 8.2%, in stem is 8.8% and in leaf is 8.4%

VII) Extractive value in methanol in root is 15.3%, in stem is 13.8% and in leaf is 15.7%

VIII) Extractive value in petroleum ether in root is 1.8 %, in stem is 3.2% and in leaf is 3.2%

IX) Extractive value in Propanol ether in root is 3.5%, in stem is 3.7% and in leaf is 3.3%

Chemical parameter Table No. 1

Sr.No.	Chemical parameter	Root	Stem	Leaf
1	Dry matter	38.22 %	53.88%	42.70%.
2	Bulk density	0.387%	0.344%	0.282%
3	Total ash	09.80%	11.60%	08.45%
4	Acid insoluble ash	0.15%	1.50%	1.25%.
5	Acid soluble ash	09.65%,	10.10%	07.20%.
6	Water soluble ash	3.0%	5.5%	2.2%.
7	Water insoluble ash	06.80 %	06.10%	61.22%.
8	Nitrogen	1.95%	3.8%	3.33%.
9	Water soluble nitrogen	1.875%	2.190%	1.560%.
10	Crude proteins	14.06%	22.87%	14.56 %
11	Reducing sugar	3.444%	2.949%	3.466%
12	Total sugar	1.354%	1.412%	2.646%
13	Non reducing sugar	1.090792%	1.537%	0.822%
14	Crude fat	0.60.%	12.3%	13.09%
15	Crude fiber	14.65%	25.75%	20.55%.
16	Cellulose	13.25%	14.85%	23.38%
17	Gross energy	3.82%	3.10%	4.38%
18	Calcium	1.458%	2.224%	1.763%
19	Phosphorus	0.28%	0.35%	0.26%

Extractive values: Table No. 2

Sr. No.	Extractive value	Root	Stem	Leaf

1	Extractive value in water	12.2%	10.2%	11.8%
2	Extractive value in Acetone	3.05%	3.1%	4.8%
3	Extractive value in Butanol	3.0%	3.4%	4.8%
4	Extractive value in chloroform	4.2%	3.2%	4.2%
5	Extractive value in Diethyl ether	1.8%	2.6%	3.2%
6	Extractive value in ethyl alcohol	8.2%	8.8%	8.4%
7	Extractive value in methanol	15.5%	13.8%	15.7%
8	Extractive value in petroleum ether	1.8 %	3.2%	3.2%
9	Extractive value in propanol ether	3.5%	3.7%	3.3%

Qualitative Analysis: Alkaloids: Alkaloids are present in all plant parts of *clematis heynei.*

Anthraqinone present in stem of *clematis heynei.* Iridoids present in *clematis heynei* root. Saponins present in *clematis heynei* root, stem and leaves. Steroids present in all plant parts of *clematis heynei*.

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