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Original Article

Morphology and Anatomical study of *Oxalis corniculata* L

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Abstract

The genus Oxalis corniculata L. belongs to family Oxalidaceae found in india. Commonly known as Creeping Oxalis as in English.). This plant is well known for its medicinal value as a good appetizer and as a remover of kapha, vata and pitta. It cures dysentery, diarrhea and skin diseases (Raghvendra et al., 2006) Decoction of roots is useful for worms and giddiness (Kirtikar and Basu,1975). The goal of this study was to examine morphology; the results of the microscopical and epidermal investigations showed that stomata Anomocytic were present. The study's findings were helpful in determining the species' pharmacogenetic characteristics. Decoctions of roots are also employed in the treatment of worms and giddiness. Despite its wide ethnobotanical applications, systematic morphological and anatomical studies on this plant remain limited. The present investigation was undertaken to provide a detailed account of the plant's external morphology and internal anatomical features with a focus on pharmacognostic characterization. Morphological observations included assessments of roots, stems, leaves, stipules, flowers, and fruiting structures, while anatomical analysis was performed through transverse sections, maceration techniques, and epidermal studies using light microscopy. The results revealed key diagnostic features such as creeping, pubescent stems, trifoliate leaves with obovate hairy leaflets, and yellow subumbellate cymes. Microscopical examinations confirmed the presence of anomocytic (Ranunculaceous) stomata on both surfaces (amphistomatic), unicellular trichomes, and distinctive xylem, phloem, and parenchymatous tissues. Epidermal analysis further highlighted variations in stomatal size, index, and subsidiary cell arrangement. These findings provide valuable pharmacognostic markers that may aid in the authentication, identification, and future pharmacological evaluation of Oxalis corniculata L. The study contributes to bridging the gap between traditional medicinal knowledge and modern scientific validation of this important ethnomedicinal species.

Keywords: *Oxalis corniculata, also known as creeping wood sorrel, is a medicinal plant from the family Oxalidaceae. It's a herbaceous plant that generally grows in wet areas and is found in Africa, Asia, America, and Europe.*

Introduction

Oxalis corniculata Linn. is widely distributed in Africa, Asia, America and Europe. It is a herbaceous plant which generally grows in moist places. This plant is well known for its medicinal value as a good appetizer and as a remover of kapha, vata and pitta. It cures dysentery, diarrhea and skin diseases (Raghvendra *et al*., 2006). The juice of the plant is given in jaundice and stomach troubles it is also used as antiseptic, refrigerant, diaphoretic, diuretic and anti-diabetic (Hussain *et al*.,2008). Decoction of roots is useful for worms and giddiness (Kirtikar and Basu.1975). It shows hypoglycemic, antihypertensive, antipsychotic, nervous system stimulant (Achola *et al*., 1995; Raghavendra *et al*., 2006).

Morphology of plants

Oxalis corniculata L. Sp. Pl. 435. 1753 var. corniculata Edg. & Hook. f. Fl. Brit. India 1: 436. 1874; Cooke, Fl. Pres Bombay 1: 177. 1958 (Repr.); Manna in Hajra et al. Fl. India 4: 242. 1997; Naik, Fl. Marathwada 1: 185.

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1998; Kulkarni in Singh et al., Fl. Maharashtra St. Dicot. 1: 437. 2000.

Vernacular name: English: Creeping Wood Sorrel, Creeping Oxalis, Hindi: Amrul, Manipuri: Yensil, Tamil: Paliakiri, Bengali: Amrulshak, Malayalam: Poliyarala

Description

Small perennial herbs; stems creeping brownish red and rooting at the nodes; branches erect, pubescent 9-25 cm tall. Leaves palmetely compound, 3-foliolate: leaflets subsessile, entire margin obovate, 1-2 × 1.5-2 cm hairy; petioles long; stipules oblong, adnate to the petiole. Flowers 2-8, subumbellate cymes, 0.5-7 cm long peduncles. Bracts 3 4 mm long; pedicels 0.5-1.5 cm long. Sepals lanceolate oblong 3-4.5 mm long, obtuse. Petals yellow, oblanceolate, 6-8 mm long. Filaments in two whorls of 5 each long and short alternating connate at base. Ovary oblong; styles distinct hairy. Fruit capsules, cylindrical 1-2 cm long, pubescent. Seeds broadly ovoid traversely striate. Common, in shaded and wet localities.

Soil type: Wet and shaded soil. Flowers and fruits: Almost throughout the year Locality: In all districts. Exsiccata- University campus, chattrapati sambhaji nagar. SDS 103.

Materials and method

Plant morphology

Roots, rhizomes, stem types, leaf types, leaf margin, petioles, stipule, leaf length, leaf widt, leaf apices, leaf base, inflorescence, flower numbers, flower colors, nodes and internodes, pedicel length, primary bract, secondary bract, calyx, corolla, stamens length, filament, ovary, style, stigma, fruits, and seed types, among other morphological details, were examined and documented in a laboratory.

Anatomy

The stem, leaves of a chosen medicinal plant parts were the subject of anatomical investigations. The transverse sections used in the research were sectioned by hand using blades. These sections' permanent slides were created using various xylol and alcohol grades. Light green and saffranin were utilized as stains. Light microscope observations were made, and image processing software was used to take photographs..

Maceratrion

Using maceration procedures, the stem, were examined. The stem, fragments were cooked in Jeffery fluid, which contained 10% chromic acid and 10% nitric acid in a 1:1 ratio. The Sony Cybershot DSCH70 digital camera was used to take photographs. Micrometry and a microscope were used to measure the cell's dimensions..

Epidermal studies

Using a forcep, the upper and lower epidermis detach from the leaf. kept on the slide after being cleaned with water and stained with saffranin. investigated the presence of stomata (amphistomatic, epistomatic, and hypostomatic) and their type of stomata mounted in diluted glycerin. Using an ocular micrometer, the length of the stoma, guard cell and subsidiary cell diameters, and results were recorded for ten fields.

Result and Discussion

Transverse section of young stem shows circular in outline. Epidermis single layered covered by cuticle composed of thin walled rectangular to oval cell ca 25 - 30 × 20 - 40 µm. Cortex consist of 3 to 4 layers of thin walled parenchymatous cells ca 20 - 40 × 30 - 90 µm below the cortex endodermis distinct single layered composed thin walled rectangular cells ca 25 - 32 × 25 - 30 µm. Pericycle of 2 - 3 layered composed of squarish polygonal sclerenchymatous cells ca 20 - 22 × 20 - 23 µm. Vascular bundles are 6 -7 in number arranged in ring collateral open and endarch. Xylem composed of pitted vessels ca 20 - 35 × 20 - 30 µm surrounded by tracheids, fibres and xylem parenchyma. The phloem composed of thin walled cells ca 10 - 15 × 10 - 20 µm consist of sieve tubes, companion cells, phloem parenchyma. Pith is composed of thin walled parenchymatous cell ca 20 - 90 × 25 -100 µm.

Maceration

Parenchyma cells Cells are thin walled, rectangular, squarish, pits few, circular to oval, distributed along cell wall, cell wall continuous ranges 70 - 200 x 40 - 50 µm and average 81 x 32 µm (fig, a) Fibres - simple Fibres are short to long, slender, tapering and sharply pointed, outline entire ranges 290 -1000 x 20-30 µm and average 545 x 26 µm. (fig, b) Tracheids are of two types I. Shorter than fibres, slender, ends blunt or pointed at one end. Pits few, elongate in one-many rows alternate, outline entire ranges 550- 800 x 20 - 30 µm and average 612 x 26 µm II. Tracheids few, short long, elongate, rectangular, pits few many elongate, in one -many rows, alternate, outline entire ranges 200 - 400 x 20 - 30 µm and average 289 x 24 µm (fig, c.d) Vessels are of two types – I. Pitted- Vessel element short to long, end wall horizontal or oblique or one end shifted to lateral side, with simple perforation, pits elliptic to oval, circular, alternate, beaked at one or both ends or absent ranges 120 - 600 x 20 - 50 µm and average 360 x 41 µm II. Spiral –Vessel element long, end wall horizontal with simple perforation, spiral thickening ranges 440-650 x 20-30 µm and average 331 x25 µm (fig,e,f,g,h)

Epidermal studies

***Oxalis corniculata* L.**

Trichomes unicellular, range of length 100-700 µm and average 486 µm.

Upper epidermis (Adaxial)

Stomata Anomocytic (Ranunculaceous) Amphistomatic, range of pore length12.5-22.5µm and average 16. 5µm.Guard cells range27.5-30.×8.5-11.25µm and average 30-25×9.75µm. Epidermal cell irregular range 75 -100 × 50 -100 µm and average 81.50× 71.75 µm. Anticlinal wall undulate, stomata no. 3-10 range of stomata index is 8-12 and average 10.29.

Lower epidermis (Abaxial)

Stomata Anomocytic, (Ranunculaceous) Amphistomatic, range of pore length 12.5 - 20 µm and average 15-75µm. Guard cell range 25 - 35 × 8.25 -10 µm and average 29.5 × 9.75 µm. Epidermal cell irregular range 50-87.5×50-67.5µm. Anticlinal wall undulate, stomata no.10-17 rang of stomata index is 24-35 and average 29.

Morphology and Anatomy

Oxalis corniculata L., also known as Creeping Wood Sorrel, is a perennial herb that belongs to the family Oxalidaceae. It has creeping, brownish-red stems that root at the nodes. The plant is characterized by its trifoliate leaves with three heart-shaped leaflets. The leaflets are obovate and hairy, and the plant has yellow subumbellate cymes for flowers. The study found that the plant has Anomocytic (Ranunculaceous) stomata on both the upper (adaxial) and lower (abaxial) surfaces of the leaves, meaning it is amphistomatic. The document also details anatomical features of the stem, including the epidermis, cortex, pericycle, vascular bundles, and pith.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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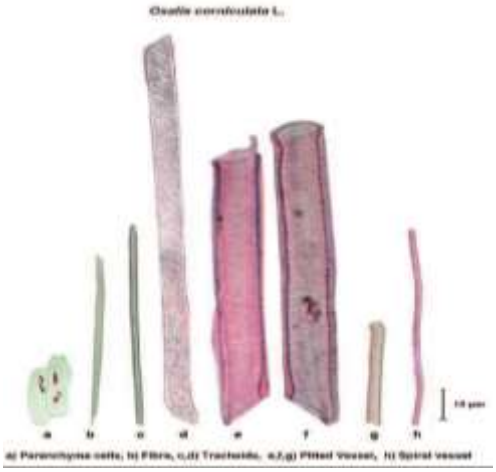

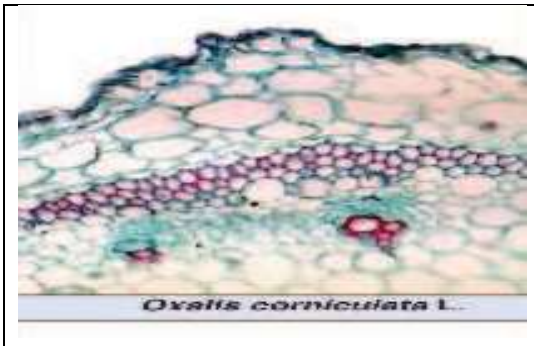	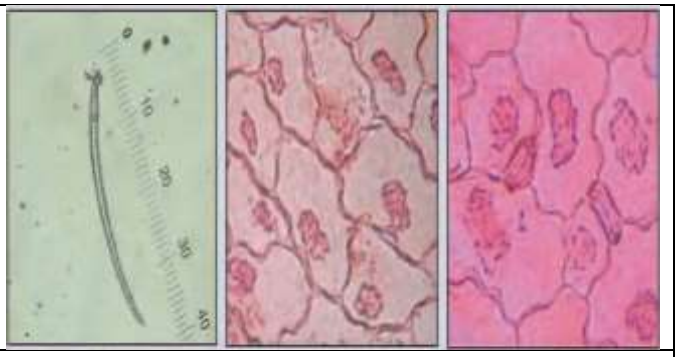		
T.S of Stem of Oxalis Corniculata L.	Tracheid	Stomata (Adaxial)	Stomata(Abaxial)