

Anatomical Studies on Leaf of *Cadaba fruticosa* (L.) Druce

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ABSTRACT

Cadaba fruticosa (L.) Druce is belonging to the family Capparaceae. It is woody, erect, glandular- pubescent shrubs. It is used in the folk system of medicine. Anti rheumatic, anthelmintic and antibacterial properties it is also used in gastrointestinal, urine complaints and as vermicide. Leaves used on boils and the leaf juice of this plant are used as remedy for fevers and is especially used to cure gonorrhea. Laves amphistomatic with anisocytic stomata. Trichomes occur on both surfaces. Leaf surface striated. Mesophyll with palisade and spongy tissues. Ground tissue of midvein consists collenchyma, parenchyma and sclerenchymatous tissues. Hypodermis collenchyma 1 – 2 layered on either sides. Beneath the collenchyma parenchymatous tissue is present with small intercellular spaces. Vascular bundles are surrounded by sclerenchymatous tissue.

Key words *Cadaba fruticosa* (L.) Druce, Capparidaceae, anatomy, stomata

Cadaba fruticosa (L.) Druce is belonging to the family Capparaceae. This family of flowering plants containing 28 genera and about 700 species of annual or perennial herbs, sub shrubs, shrubs or trees¹. It is woody, erect and glandular – pubescent shrub, frequently found around field hedges². Leaves elliptic – oblong 1-5.5 X 0.5 – 3 cm, obtuse, mucronate. Petiole 4 – 6.5 mm long, flowers 2 – 2.5 cm; in terminal corymbs. Pedicels 1 – 2.5 cm long, pubescent, bracts subulate. Sepals ovate to oblong, 1.5 cm long, expanded, toothed. Stamens 4 – 6 exerted; gynophore 2 – 2.5 cm long. Fruit cylindrical; seeds many³ (Fig.1, 1-2).

It is also used in gastrointestinal, urine complaints and as vermicide⁴. Leaves used on boils and leaf juice are used as eye drops by ethnic people of Andhra Pradesh⁵. The plant is used for the treatment of Anti rheumatic, anthelmintic and

antibacterial properties it is also used in gastrointestinal.

MATERIAL AND METHODS

Cadaba fruticosa (L.) Druce was collected from Nalgonda district, Telangana and deposited in Herbarium Hyderabadense, Dept of Botany, Osmania University. Identified through standard Floras. The leaves were boiled, fixed in F.A.A. (Formaldehyde – Acetic acid – Alcohol), dehydrated through xylene – alcohol series, and embedded in paraffin wax. The sections obtained by rotary microtome and stained with crystal violet and Basic fuchsin combination, mounted in Canada balsam⁶. Epidermal cells were obtained by gently scraping by razor blade then peels stained with saffranine and mounted in glycerin. Microphotographs were taken with help of a CCD camera.

RESULTS AND DISCUSSION

Morphology: Erect, glandular, pubescent shrubs, 2 – 5 m., tall, leaves elliptic – oblong, petioles long, flowers in terminal corymbs, stamens 4 – 6, fruit cylindrical, seeds many.

Microscopy

Leaf: In surface view adaxial epidermal cells shallowly sinuate, surface slightly striated with anisocytic stomata. Abaxial epidermal cells deeply sinuate, sinuses ‘U’ – V shaped, surface more striated anisocytic stomata. Two types of peltate trichomes are present on both surfaces. (Fig.1, 3-6). Mesophyll differentiated into palisade and spongy tissues. Palisade single layered, occasionally 2 – 3 layered at some places, cells elongated, squarish, compactly arranged with small intercellular spaces, contents dense with chloroplasts. Spongy tissue is occupying 4 – 5 layers, cells mostly oval – circular, arranged with large intercellular spaces, contents dense with chloroplasts (Fig.2, 1-2).

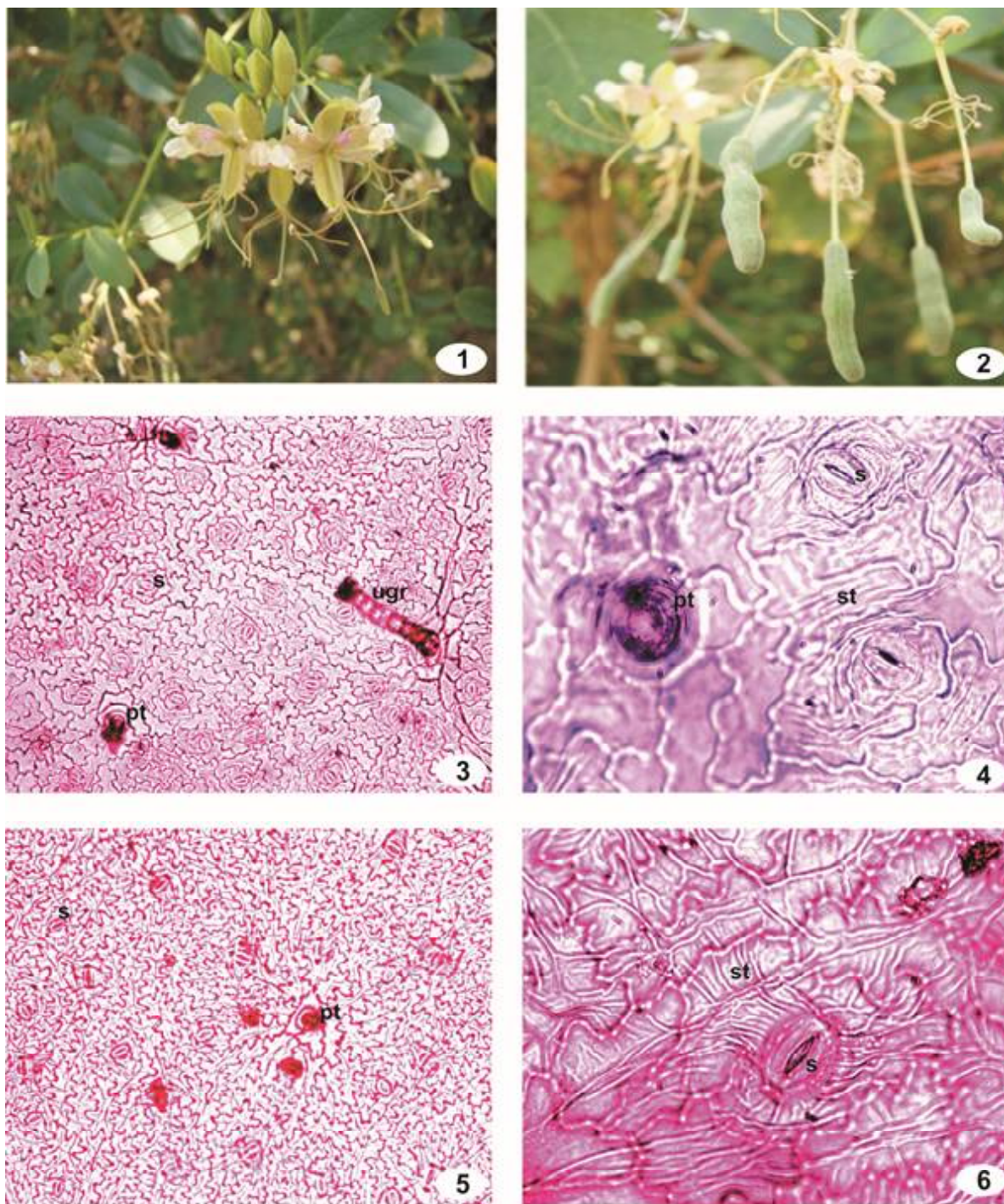


Fig. 1. 1. Plant habitat, 2. Plant habitat with fruit, 3. Adaxial surface, 4. Adaxial surface (enlarged), 5. Abaxial surface, 6. Abaxial surface (enlarged)

Abbreviations: e – epidermal cell; s – stomata; c- cortex ; pl – palisade; sp – spongy tissue; co – collenchyma; p – parenchyma; x – xylem; ph – phloem; pt – peltate trichomes ; St- striated; ugr-;unicriate glandular hair; sl- sclerenchyma; gr- ground tissue

Midvein heterogenous consists of collenchyma, parenchyma and sclerenchyma tissues. Collenchyma is present beneath the epidermis, cells polygonal, oval to circular, walls thick without intercellular spaces. Parenchymatous cells oval to circular contents dense with

chloroplasts, intercellular spaces narrow. Midvein consists 2 vascular bundles placed abaxially and adaxially. The abaxial vascular bundle is larger, surrounded by sclerenchymatous sheath on phloem as well as on xylem side.

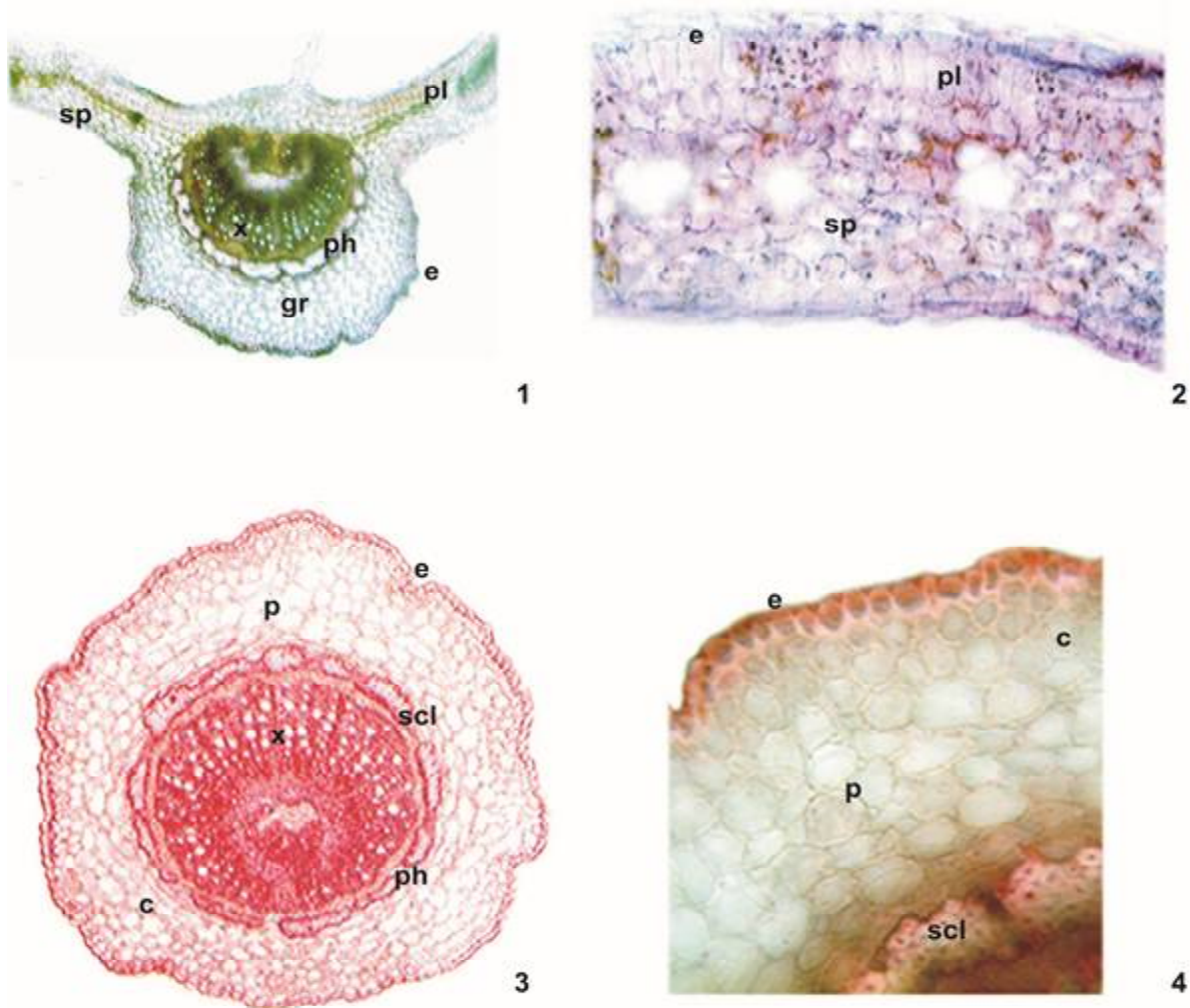


Fig. 2. 1. T.S of leaf midvein, 2. T.S of leaf lamina, 3. T.S of petiole, 4. T.S of petiole enlarged

Abbreviations: e – epidermal cell; s – stomata; c- cortex ; pl – palisade; sp – spongy tissue; co – collenchyma; p – parenchyma; x – xylem; ph – phloem; pt – peltate trichomes ; St- striated; ugr-;unicriate glandular hair; sl- sclerenchyma; gr- ground tissue

Petiole:

Petiole cylindrical. The trace enters petiole base as 'C' shaped arc whose arms are very close. Higher above, only in the base, these arms incurve and meet each other. Later the ends of the arm get detached from the main vasculature get fused to each other and as a result a vascular trace enclosed within arc is produced. Ends of arc remain separate by sclerenchyma. Higher above arms of vasculature meet to form a ring around the central enclosed vascular bundle. At the same time central bundle develops fibrous sheath. Main vasculature surrounded by pericyclic sclerenchyma , Cortex parenchymatous . Again at the base of lamina the

medullary bundle divides into two. The traces are pushed on upper side and join the main cylinder which opens to form a 'C' shaped arc with incurved arms (Fig.2, 3-4).

Little anatomical data is available for comparison. Findings of present investigation are discussed in the light of data given by Metcalfe and Chalke (1972)⁷. Peltate glandular trichomes found in *Cadaba fruticosa* are reported in species of *Cadaba* by earlier authours also. Emergences resembling hairs reported earlier in *Cadaba* species are absent from present species. Trichomes with bulbous base are reported for the first time. Capparaceae are with anomocytic stomata,

however, here anisocytic stomata are present. Both centric and dorsiventral mesophyll reported in the family. In the present species palisade is either distinct, single layered or 2-3 layered or may be homogeneous⁸. Such a varied type of mesophyll appears to be the characteristic feature of *Cadaba fruticosa*. The transition in vascular architecture of petiole is also an interesting feature. Petiole structure varies in Cappariaceae. Petiole architecture of *C. fruticosa* appears to be a combination of *Cadaba linniaris* Jacq. and *Stereophoma elipticum* (DC) Spreng.

This study will help for the identification of *Cadaba fruticosa* (L) Druce in fresh and powder form; it can also be useful for standardization purpose.

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