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Morphological, Anatomical and Phytochemical Studies on *Commelina Diffusa* Burm F.

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Abstract: ***Characterization of plants plays crucial role in its validation for human welfare. Present study was undertaken with* Commelina diffusa *Burm. f., locally known as "Chhoti Mai". Morphological and anatomical features of vegetative parts, including vessel studies, were undertaken and illustrated in this communication. Whole plant extracts were analyzed for bioactive compounds, free amino acids and mineral contents. The results provided information on ethno-medicinal use of this plant.***

Keywords: Antipyretic, *C. diffusa* Burm f., Chhoti mai, Pharmacognosy

1. Introduction

Commelina diffusa Burm. f. (family: Commelinaceae), commonly called climbing or spreading dayflower, is a pantropical herb distributed across Asia, Africa, and the Americas. The genus *Commelina* comprises (Cabezas et al., 2009; Mohsin et al., 1987). The plants are widely distributed in tropical and subtropical regions. Their medicinal uses range from the treatment of leprosy and leucoderma (Mukerjee, 2006) to diabetes, skin disorders, and atherosclerosis (Ujowundu et al., 2008).

Phytochemical investigations reveal that *C. diffusa* contain minerals, vitamins, alkaloids, saponins, phenols, tannins, phytosterols, terpenoids, and triterpenes. These compounds contribute to its pharmacological potential. In Unani medicinal system *C. diffusa* has been recommended for its antipyretic use (Ahmad, 2004). Mou (2017) reported presence of phenols, sterols and glycosides in *C. diffusa* and. showed that methanol and aqueous extracts of this plant possess mild antimicrobial and antioxidant potential.

During present investigation, plant specimens were collected with the help of local hakims, properly tagged, dried, identified following Naik (1998) and deposited in the Department of Botany, Govt. Vidarbha Institute of Science and Humanities, Amravati, Maharashtra, India.

2. Results and Discussion

Morphology

Procumbent, annual herbs, rooting at nodes; leaves oblong – lanceolate, glabrous, acute to acuminate, sheath ciliate on margins. Inflorescence cymose, bract spathaceous, long, ovate or lanceolate, cordate at base with rounded lobes. Cymes often 2 or bi-forked; upper branch with 2 barren flowers lower with 3 fertile flowers. Sepals -3 transparent, colorless; petals – 3, blue, much exerted. Capsules quadrate – oblong, 5 – seeded. Seeds oblong cylindric, rugose – reticulate (Figs. 1-7).

Anatomy

Root seven to nine arced. Two large water canals emerge forms the pith or medulla. Endodermis and pericycle distinct. Epidermis made up of large cells, cuticle thick. One of two layers following the epidermis becomes lignified. Cortex 7-8 layered, cells arranged in concentric radial files (Fig. 8-9). Root vessels of 3 categories are present. Class A (110 – 115 um x 27-31 um broad), Class B (225 – 231 um x 40-46 um broad) and Class D (395 -404 um x 30-35 um broad). (Fig R1 – R3)

Stem cylindrical in T.S. Epidermis thinly cutinized and cuticularized; cells small; followed by collenchymatous, discontinuous hypodermis interrupted by chlorenchyma at places. Cortex narrow 2-3 lavered, chlorenchymatous when young enclosing large air spaces. Cortex delimited by a distinct endodermis like layer followed by a sclerenchymatous ring. Vascular bundles conjoint, collateral; outer bundles in a ring opposing the sclerenchyma; inner bundles scattered. Xylem either little developed or absent, each bundle with large water canal. Ground tissue parenchymatous, Cells large thin walled. (Fig. 10-13). In nature, stem cells of ground tissue contain abundant raphides and starch grains. Stem vessels of only one category were found Class B – 185 – 192 um x 45 – 50 ums. (Fig. S1).

Leaf base forming a tube around the stem open on one side. Ground tissue of sheath parenchymatous; cells large thin walled arranged to produce large air chambers. Vein bundles surrounded by parenchymatous sheath. Cells of ground tissue containing rod shaped and cuboidal crystals. (Fig.14).

Leaf lamina dorsiventral amphistomatous. Cells of both the epidermis angular (pentagonal or hexagonal). Cells of upper epidermis larger, stomata few tetracytic. Cells of lower epidermis smaller, stomata many, hexacytic; two cells forming the inner cycle parallel to the guard cells, 4 cells forming outer cycle. Mesophyll is differentiated into palisade and spongy tissue. Palisade is single layered and spongy tissue is 2-3 layered (Fig 15-18). Midrib with parenchymatous ground tissue and a single, large, centrally placed bundle surrounded by distinct parenchymatous sheath. Part of lamina flanking the midrib shows two layered upper epidermis (Fig 19).

Phyto-chemistry

The following chemical constituents were found to be present in whole plant of *Commelina diffusa*:

S. No	Phytochemical constituent	Present/Absent
1	ACUBINS AND IRIDOIDS	++
2	CARDENOLIDES	+
3	FLAVANOIDS (FLAVONOLS)	+
4	FLAVONES	+++
5	PHENOLICS (With $FeCl_3$)	+
	PHENOLICS (Addition of NaOH)	CATECHOL
	PHENOLICS (Excess $FeCl_3$)	Hydroquinone
6	HYDROQUINONES	+
7	LEUCOANTHOCYANINS,	+++
8	UNSATURATED STEROIDS	+

The free amino acids and minerals found in the species are given in the table

S. No	Amino Acids	Minerals
1	Serine	Sulphur
2	Tyrosine	Calcium
3	Glucosamine – HCL	Magnesium,
4	Glycine	Iron
5	Threonine	Chlorine,
6	Proline	Phosphorus
7	Valine	Sodium
Ash and Phytochemical Analysis		
8	Yield of the ash	16.88 mg/gm
9	Acid Soluble ash (HCL)	596 mg/ gm
10	Acid Soluble ash (HNO_3)	620 mg/gm
11	Acid Insoluble ash (HCL)	404 mg/gm
12	Acid Insoluble ash (HNO_3)	380 mg/gm
11	Sodium	80 mg/gm
12	Potassium	454.54 mg/gm
13	Calcium	80 mg/gm

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References

[1] Ahmad, S.A. (2004) *"Taxonomic and Pharmacognostic Studies of Some Local Unani Medicinal Plants"* Thesis Submitted to Sant Gadge Baba Amravati University, Amravati.

[2] A.O.A.C. (1975) "*Official and tentative methods of analysis*." Association of Official Agriculture chemists, Washington D.C.

[3] Cabezas, FJ; Estrella, MD; Aedo, C; and Velayos, M (2009). *Checklist of Commelinaceae of Equatorial Guinea (Annobon, Bioko and Rio Muni)*. Botanical Journal of the Linnean Society 159:106-122.

[4] Evans, W.C. (1996). "*Trease and Evans Pharmacognosy* "14th Edition. W.B. Saunders Company Limited, Singapore. Fabricant and Farnsworth, 2001.

[5] Gibbs R. (1974). "*Chemotaxonomy of Flowering Plants*." McGill Queen's University Press. Montreal., Canada.

[6] Harborne J.B (1973) *Phytochemical Methods. A Guide to modern techniques of Plant Analysis* Chapman and Hall, London.

[7] Johannson D. A (1940) "*Plant Microtechnique*." Tata Mc-Grawhill Publishing Company, Ltd. New Delhi.

[8] Kokate, C.K., A.P. Purohit and S.B.Gokhale. (1990) "*Pharmacognosy"* Nirali Prakashan, Pune. .

[9] Lederer E. and Lederer M**.** (1957) "*Chromatography A Review of Principles and Applications*". Elsevier Pub. Co., Amsterdam.

[10] Mohsin, UP; Mirza SH; Zaman MA (1987). *Cytologia* **52:** 175

[11] Mou Rubina Ahem (2017) "*Phytochemical and Biological Investigation of Commelina diffusa"* A project submitted to the Department of Pharmacy in partial fulfillment of the requirements for the degree of Bachelor of Pharmacy (Hons.) Dhaka, Bangladesh.

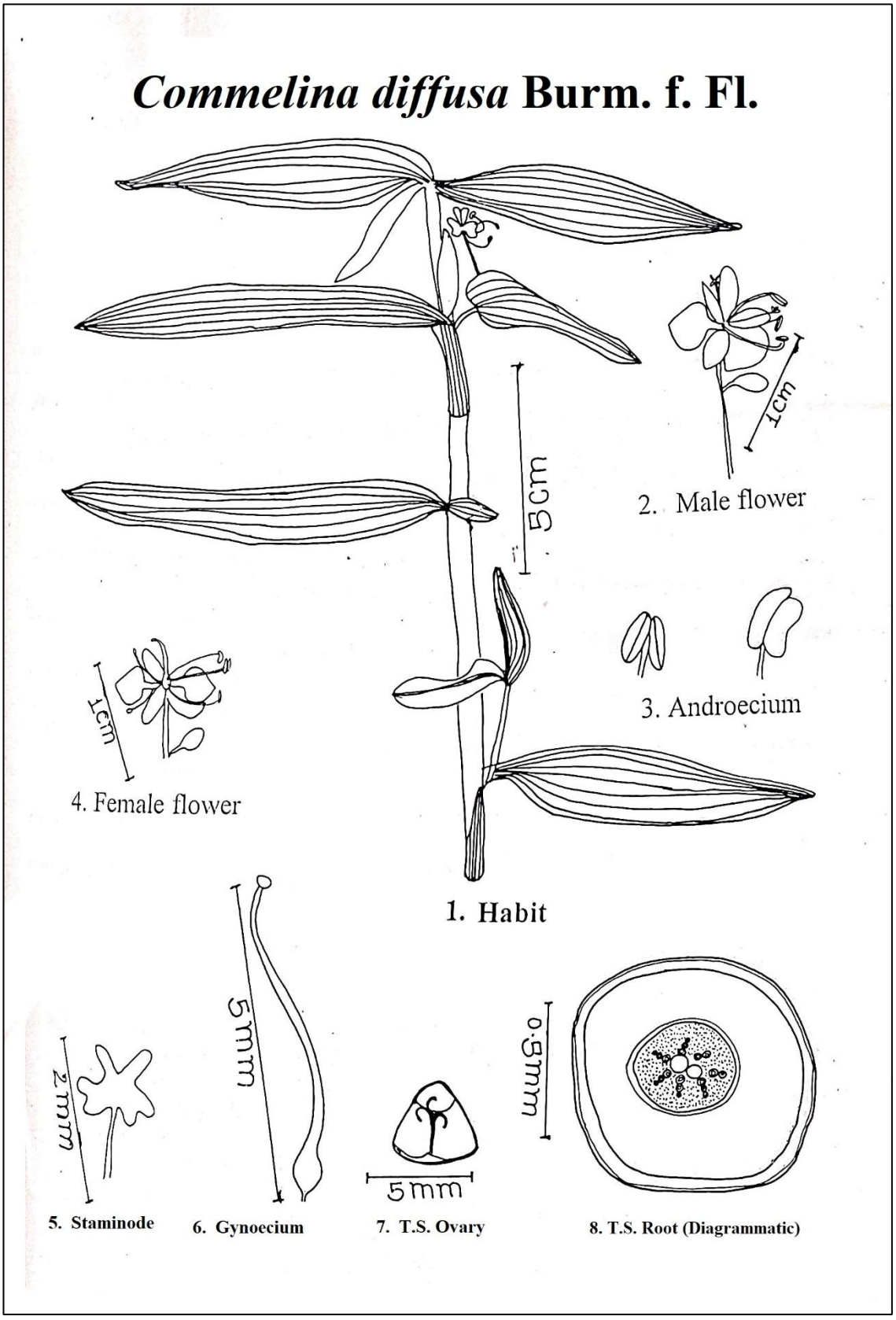
[12] Mukerjee, S. K. (2006) "*College Botany"*. Academy Press, London and New York, pp. 45-57.

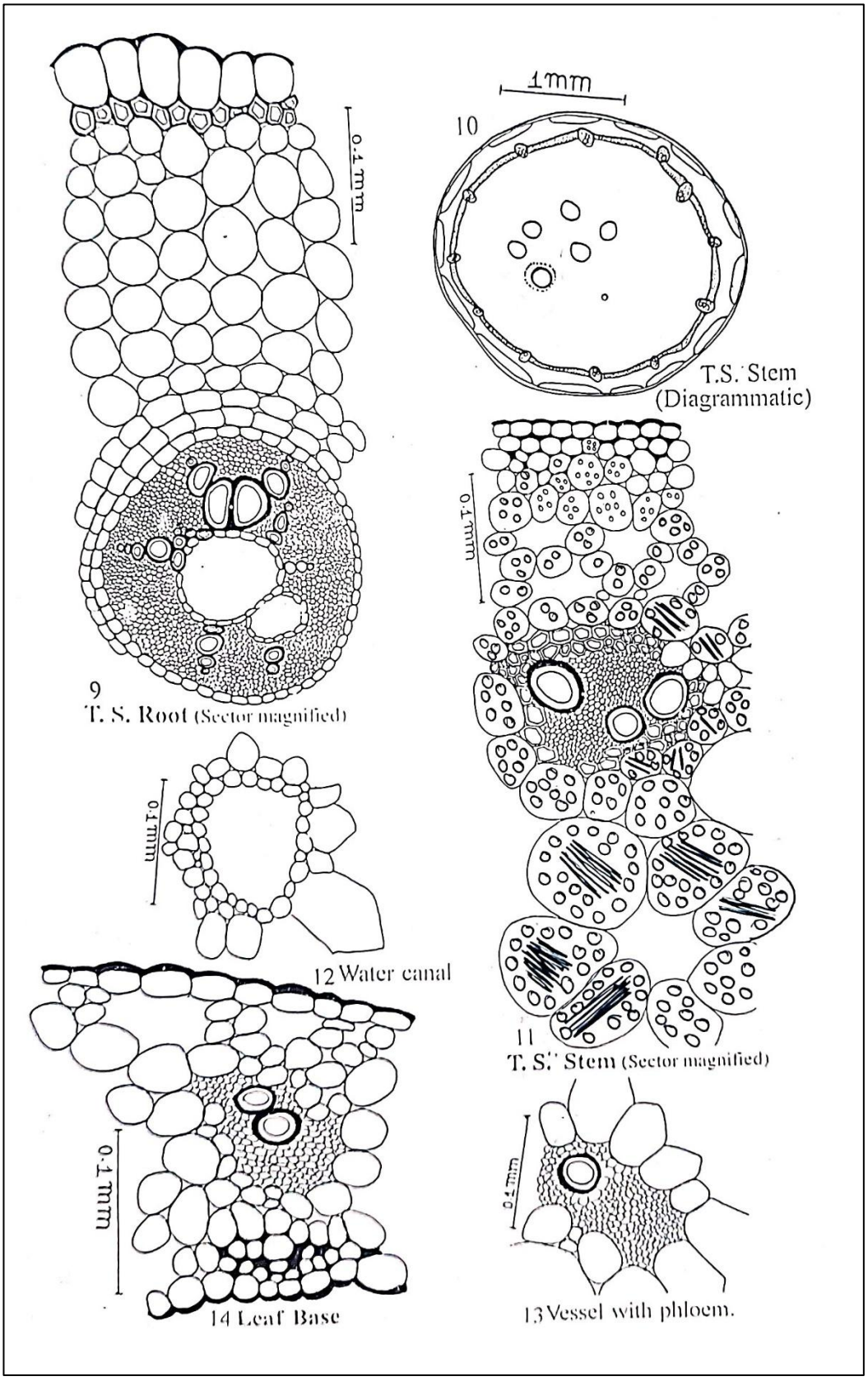
[13] Naik, V.N. (1998) "*Flora of Marathwada Vol I and II"*Amrut Prakashan, Aurangabad. India.

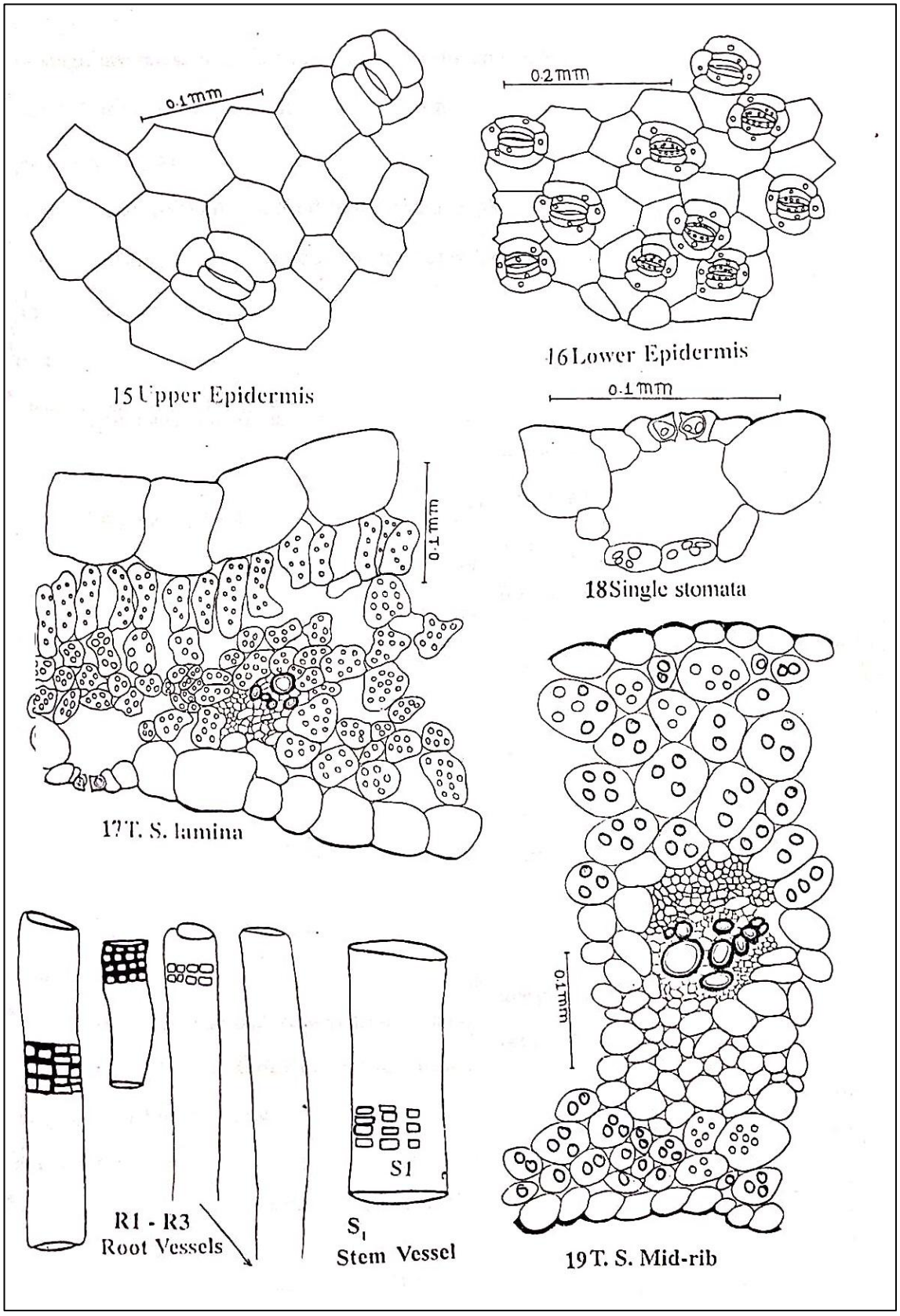
[14] Peach, K. and M.V. Tracey. (1979). "*Modern Methods of plant Analysis."* Vol. I- VII. Narosa Publications, New Delhi. (PlantzAfrica.com)

[15] Radford E, A. Dickson, C. William, R. Massey, J. Bell and C. Ritcha. (1974). "*Vascular Plant systematic"*. Harper and Row Publishers, New York.

[16] Ujowundu, CO; Igwe, CU; Enemor, VHA; Nwaogu, LA; and Okafor, DE. (2008). *Pak. J. Nutr.* **7:** 90


Commelina diffusa Burm. f. Fl.
5cm
1cm
2. Male flower
3. Androecium
1cm
4. Female flower
1. Habit
2mm
5mm
5mm
0.5mm
5. Staminode
6. Gynoecium
7. T.S. Ovary
8. T.S. Root (Diagrammatic)


0.1 mm
9
T. S. Root (Sector magnified)
1mm
10
T.S. Stem
(Diagrammatic)
0.1 mm
11
T. S. Stem (Sector magnified)
0.1 mm
12 Water canal
0.1 mm
14 Leaf Base
0.1 mm
13 Vessel with phloem.


0.1mm
15 Upper Epidermis
0.2mm
16 Lower Epidermis
0.1mm
18 Single stomata
0.1mm
17 T. S. lamina
0.1mm
19 T. S. Mid-rib
R1 - R3
Root Vessels
S1
S_1
Stem Vessel