



Name: Dr. Mahua Pal, Botanical Assistant, Central National Herbarium
Joined in BSI in May, 1996 as preservation Assistant.

Title of Thesis :

**STUDY ON THE INDIAN MEMBERS OF
CONVOLVULACEAE WITH SPECIAL REFERENCE TO
THEIR ANATOMY AND THEIR TAXONOMIC IMPORTANCE**

**UNIVERSITY OF KALYANI
KALYANI – 741235
NADIA, WEST BENGAL**

Guide: Dr. G.G.Maiti
Professor, Department of Botany,
University of Kalyani

The study carried out for 45 species distributed under 13 genera of the Family Convolvulaceae found in India.

- Morphological study of flowering and fruiting twigs.
- Anatomical study of nodes, petiole from proximal to distal region, specially the nature, behaviour and arrangement of vascular bundle.
- Anatomical study of midrib and lamina.
- Study of leaf venation up to free vein endings and marginal venation.
- Key to the studied genera and species presented based on both morphological and anatomical characters.
- Morphological and anatomical study of fruits and seeds.

The anatomical features are studied to show how these characters are useful for the classification as well as taxonomic delimitation of the family as a whole or for the genera under infrafamiliar classification and whether the anatomical characters can be consider as a taxonomic tool.



Ipomoea triloba



Ipomoea nil



Argyreia daltoni



Ipomoea marginata



Operculina turpethum



Merremia vitifolia



Ipomoea pes-tigridis



Evolvulus alsinoides



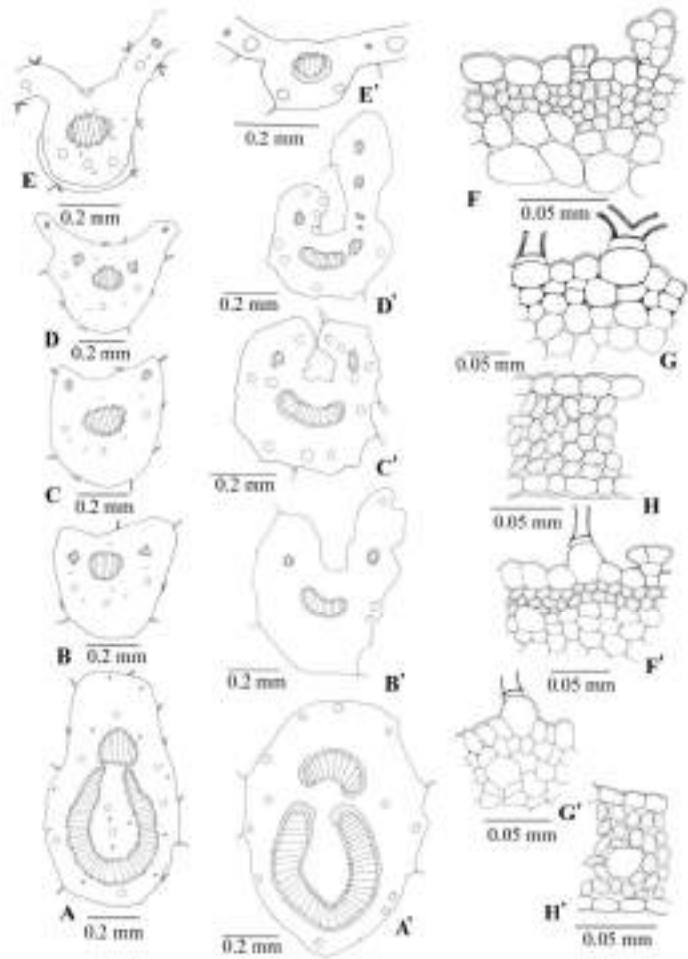
Rivea hypocrateriformis



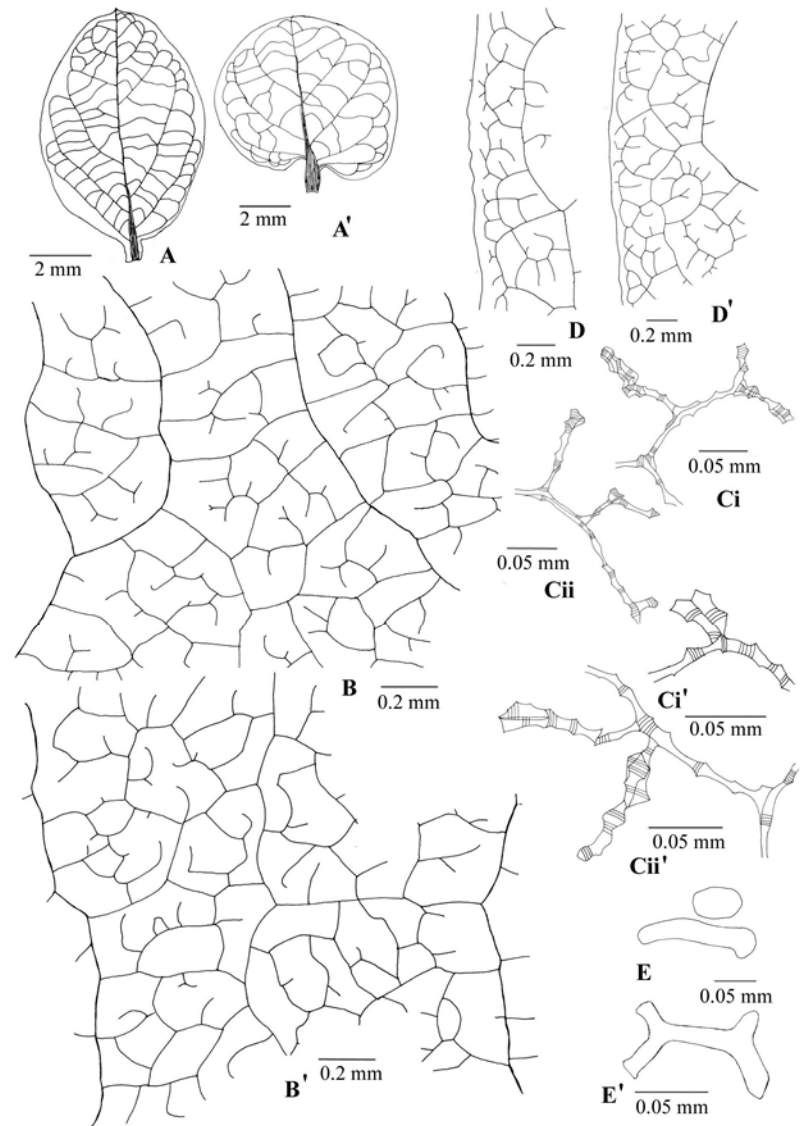
Ipomoea mauritana: A. Portion of the flowering twig; B. Portion of the fruiting twig.



Stictocardia tilifolia: A. Portion of the flowering twig; B. Portion of the fruiting twig.



Anatomy of node, petioles and lamina (in t.s.) of *Evolvulus*: A-H. *E. alsinoides*: A. Node; B-D. Petiole: B. Proximal, C. Middle, D. Distal end; E. Midrib. F-H. Cellular features of: F. Stem at the nodal region; G. Petiole; H. Lamina. A'-H'. *E. nummularius*: A'. Node; B'-D'. Petiole: B'. Proximal, C'. Middle, D'. Distal end; E'. Midrib. F'-H'. Cellular features of: F'. Stem at the nodal region; G'. Petiole; H'. Lamina.



Venation pattern, marginal venation and free vein endings of *Evolvulus*: A-E. *E. alsinoides*: A. Leaf; B. Venation pattern; Ci & Cii. Free vein endings; D. Marginal venation; E. Secretory cells. A'-E'. *E. nummularius*: A'. Leaf; B'. Venation pattern; Ci' & Cii'. Free vein endings; D'. Marginal venation; E'. Secretory cells.

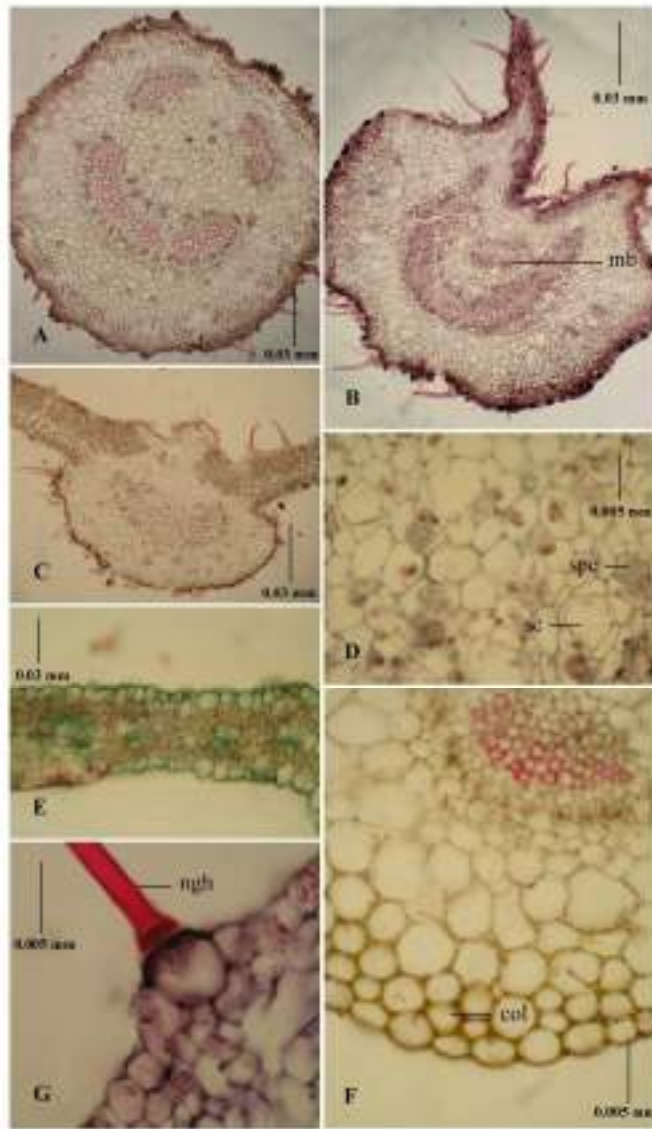


Plate I. Anatomical features in transverse sections (t.s.) of the stems, petioles, midribs and lamina: A-D. *Argyreia cymosa*: A. Middle part of petiole; B. Distal end of petiole; C. Midrib; D. Middle part of petiole with sphaerocrystals and secretory cells. E-F. *Evolvulus alsinoides*: E. Lamina of undifferentiated palisade and spongy tissue; F. Collenchyma on abaxial side of distal end of petiole. G. *Hewittia malabarica* Non-glandular hair in stem on larger epidermal cell.
[mb - medullary bundles; spc - sphaerocrystals; sc - secretory cells; ngh - non-glandular hair; col - collenchyma].

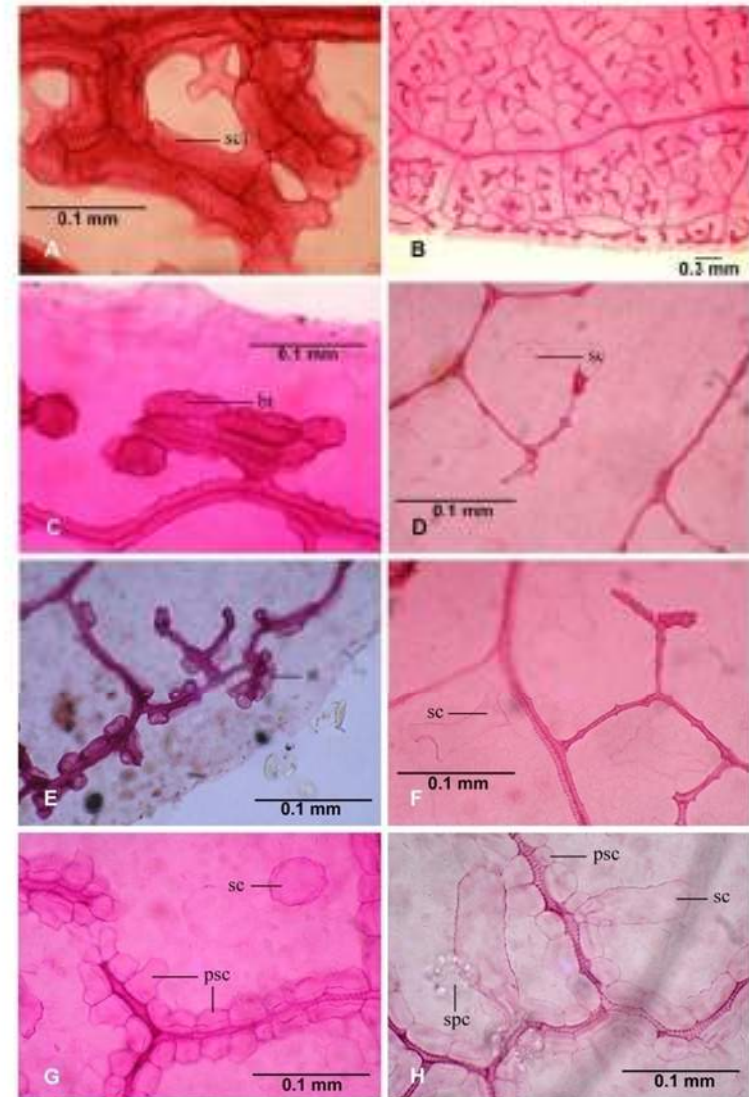
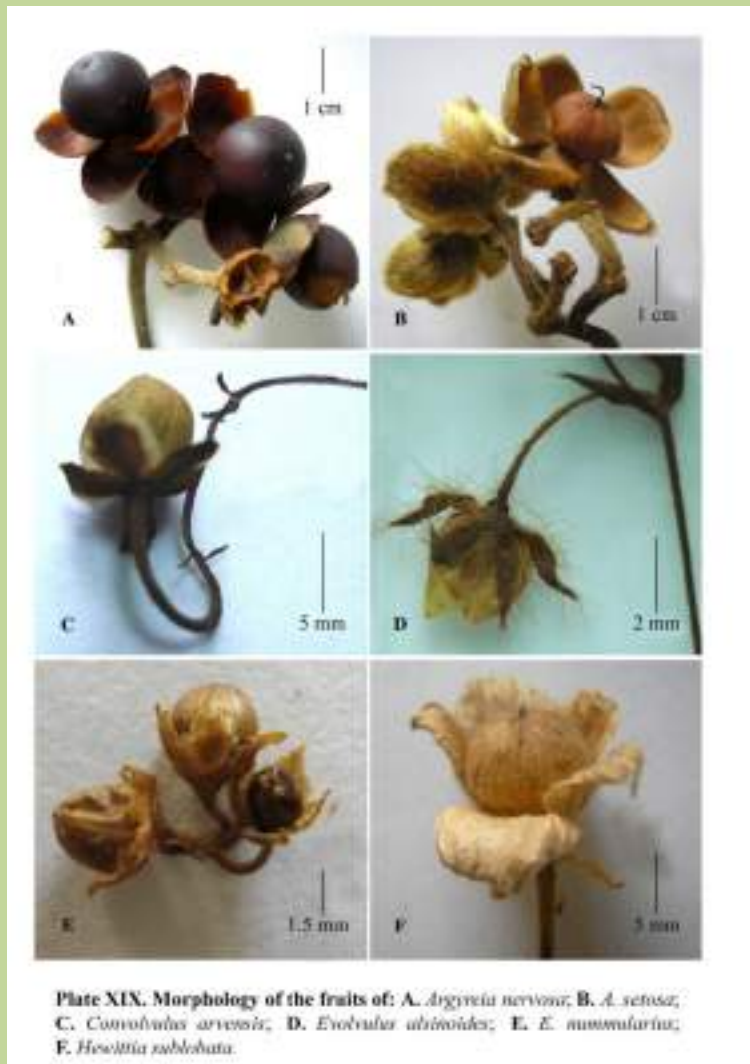
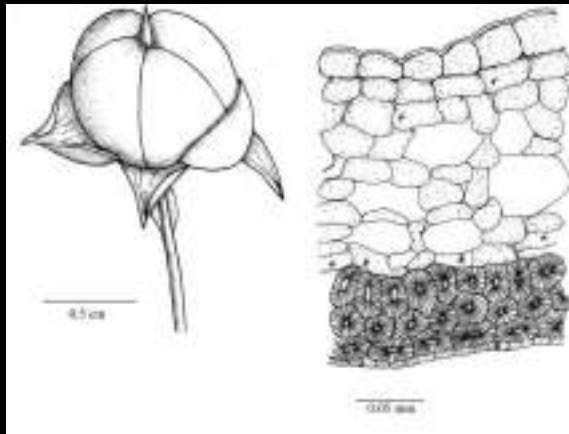


Plate I. Venational features of: A. *Erycibe paniculata* Free vein endings with sclerenchymatous sheath cells. B-C. *A. setosa*: B. Venation pattern; C. Marginal vein endings with brachytracheids. D-E. *Evolvulus alsinoides*: D. Free vein endings and secretory cells; E. Marginal veins with storied tracheids. F. *E. nummularius*: Free vein endings and secretory cells. G. *Ipomoea alba*: Free vein endings with parenchymatous sheath cells, interconnection of the sheath cells before fusion of the free vein endings and secretory cells. H. *I. aquatica*: Vein with parenchymatous sheath cells, secretory cells and sphaerocrystals.
[scl - sclerenchymatous sheath cells; bt - brachytracheids; sc - secretory cells; st - storied tracheids; psc - parenchymatous sheath cells; spc - sphaerocrystals].

MORPHOLOGICAL AND ANATOMICAL STUDY OF FRUITS AND SEEDS



ANATOMY OF FRUITS



Fruit-wall in transverse section consisting of 3 distinct layers:

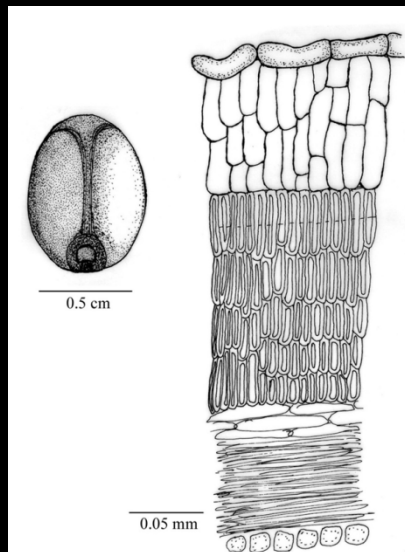
Pericarp of 1-cell-layered thick;

Mesocarp layer occupying the main bulk of the fruit-wall;

Endocarp of 1-cell-layered thick.

Two types of anatomical features of mature fruit-walls considered as i) simple structure Type I and ii) complex structure Type II; in respect to the composition of different types of cellular arrangement of mesocarp Type II can again be subdivided as 9 subtypes.

ANATOMY OF SEEDS



Seed-coat in transverse section consisting of:

1. outermost epidermal layer and

2. hypodermis of 2 distinct zones:

❖ Outer hypodermis and

❖ Inner hypodermis consisting of palisade-like columnar, narrow macrosclereids, with very narrow lumen, arranged in interlocked fashion; light line present near the outer or peripheral edge of the zone.

The parenchymatous cells present below the thick-walled palisade zone.

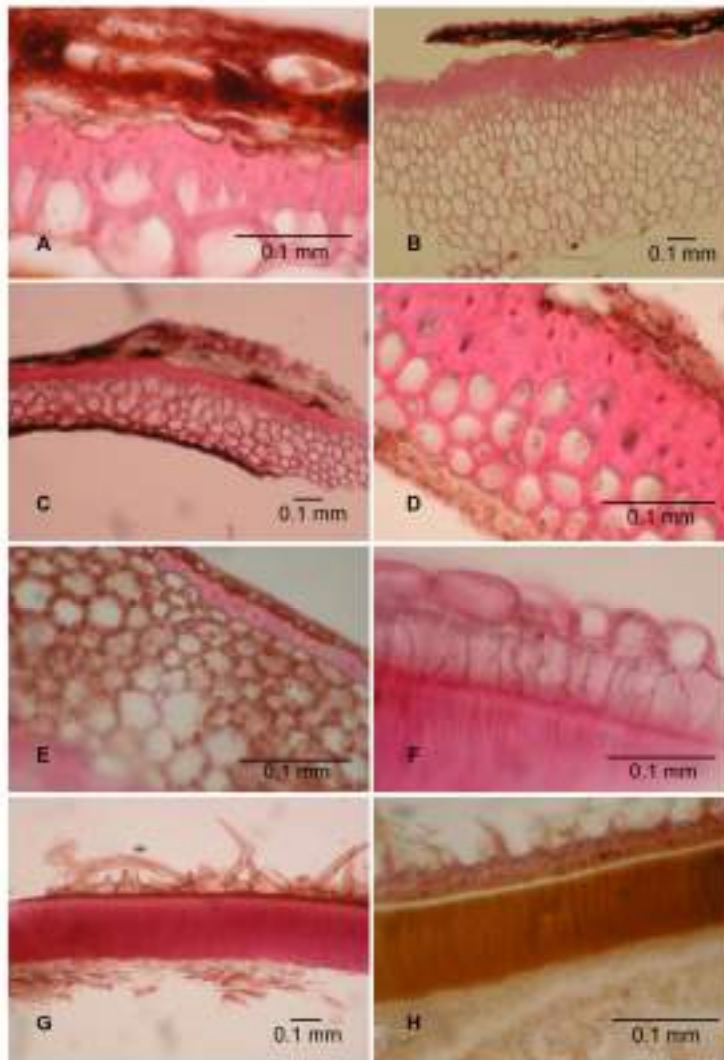


Plate XXII. Anatomical features in transverse section (t.s.) of the fruit-walls of: A. *Ipomoea alba*; B. *I. cornuta* subsp. *fistulosa*; C. *I. parasitica*; D. *I. pes-caprae*; E. *Merremia hederacea*.

Anatomical features in transverse section (t.s.) of the seed-coats of: F. *Argemone rosburghii*; G. *Ipomoea pes-caprae*; H. *Jacquemontia paniculata*.

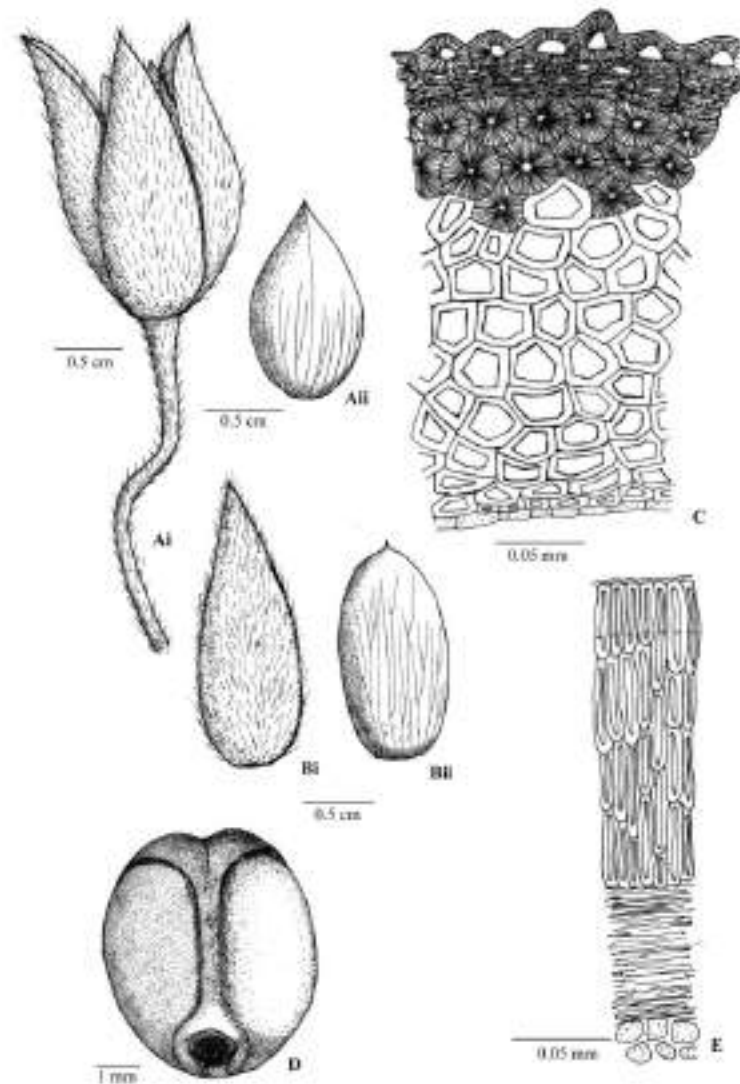


Figure 164. Morphology and anatomy of fruit and seed: *Merremia aegyptica*. AI-AII. Fruits: AI. Enclosed by sepals, AII. Sepals removed; BI-BII. Sepals: BI. Outer, BII. Inner; C. T.S. of fruit-wall; D. Seed; E. T.S. of seed-coat.

Paper published on anatomical works:

- i) Foliar anatomy of Indian *Evolvulus* L. (Convolvulaceae) and its systematic value. ----- In Phytotaxonomy.**

- ii) Foliar anatomy of Indian *Merremia* Dennst. (Convolvulaceae) and its systematic value. ----- In Proceedings of IAAT Seminar, 2008, Kalyani University.**

- iii) Morphological study of fruits and Anatomical study of fruit-walls of some Indian members of Convolvulaceae and their taxonomic importance.**
In the Proceedings of UGC sponsored National Seminar, 2012, on Plant Science Research in Human Welfare organized by Department of Botany, Bidhannagar College, Kolkata .

Paper presented in IAAT Conference:

- I. Foliar Anatomy of Indian *Argyreia* Lour. (Convolvulaceae) and its Systematic Value"**
- II. Morphological and Foliar Anatomical study of some Indian members of Convolvulaceae and their Taxonomic importance**

Flora of West Bengal

- Family **Boraginaceae** having 13 genera 32 species, 1 subspecies and 1 variety published in **West Bengal flora Vol. 3.**
- **Manuscript submitted and edited for West Bengal flora Vol. 4.**
- Family **Convolvulaceae** having 72 species under 17 genera to be published in Family **Platanaceae** having 1 species *Platanus orientalis* L.
- Family **Podostemaceae** having 1 species *Hydrobryum griffithii* (Griff.) Tulasne
- Family **Casuarinaceae** having 1 species *Casuarina equisetifolia* L. submitted.
- **New report for West Bengal-3 species.** *Ipomoea triloba* L. and *Merremia quinquefolia* (L.) Hallier f. , *Argyreia cymosa* (Roxb.) Sweet
- **Manuscript to be submitted:**
- Family **Liliaceae** - Total no. of species-78 (including 13 cultivated species) under 24 genera.
- Family **Arecaceae** Total no. of species 174 including 140 cultivated species along with Dr. Hamid, scientist, AJCBIBG.

Flora of Bihar and Jharkhand

Manuscript submitted:

- **Flora of Bihar Vol. 1:** Family Fabaceae: **Tribe Sophoreae** having 1 species of *Sophora*, **Dalbergiae** having 6 species of *Dalbergia* and 1 species of *Pterocarpus* and **Indigofereae** having 16 species of *Indigofera*
- **Flora of Jharkhand Vol.1:** Family Fabaceae: **Tribe Sophoreae** having 2 species of *Sophora*, **Dalbergiae** having 6 species of *Dalbergia* and 1 species of *Pterocarpus* and **Indigofereae** having 17 species of *Indigofera*.

Project going on:

- **Family Verbenaceae for Flora of Bihar and Jharkhand Vol.3** having about 46 species under 17 genera.

Paper published-13

Chapter of Book published:1

New report for West Bengal-3 species. *Ipomoea triloba* L., *Merremia quinquefolia* (L.) Hallier f. , and *Argyreia cymosa* (Roxb.) Sweet



New report for Andhra Pradesh and Chhattisgarh –

***Ipomoea parasitica* (Kunth) G. Don**

New taxa described-1

Award received-

International Association for Plant Taxonomy (IAPT) Award for Best Poster Presentation in 25-th Annual Conference of Indian Association of Angiosperm Taxonomy (IAAT) on paper entitled “A Contribution to the Family Convolvulaceae (*sensu lato*) in West Bengal” .

Seminar,attended:

National seminar attended and presented paper-5

International seminar attended and presented paper-5

Participated in Botanical Nomenclature Course organized by Botanical Survey of India and ENVIS Centre on Floral Diversity, Howrah from 11.1.13 to 13.1.13.

Participated in the workshop on Conservation Methodology of Archival Documents at ISIM, BSI, Kolkata on 9.1.14 and 10.1.14

Seminar cum Workshop attended: 10

Exhibition participated -7

Workshop participated as resource person - 8



**Attend Visitors and research students coming to consult General and Type herbarium II .
Regularly Attend School, College and University students coming to visit Herbarium for
educational purpose**



MAINTENANCE OF HERBARIUM

- Sorting out of herbarium sheets and sent to different Halls
- Incorporation of herbarium sheets
- Species cover changed
- Genus cover changed
- Making right arrangement of herbarium sheets
- Identification

MAINTENANCE OF TYPE HERBARIUM II

Receiving Type sheet, maintaining register, incorporation, Indexing, listing and labeling of cupboards containing Botanical paintings, plates, Wallich's Correspondence and old literature in type section II.

Public service rendered

- Sorting out herbarium sheets for sending on loan
- Assisted the visiting researchers coming to consult the Herbarium in Handling the Herbarium Sheets
- Provide information about any query regarding general herbarium sheet, Monocot Type sheet, Roxburgh Icon and also send xerox copy or scanned image of any literature, general herbarium sheet, Type sheet, Roxburgh Icon

Miscellaneous

- Assisted senior scientist in field survey and identification for the Flora of Chapramai Wildlife Sanctuary, Jalpaiguri Dist. West Bengal.
- Assisted senior scientist in field survey and identification for the Flora of Ballavpur Wildlife Sanctuary, Birbhum Dist. West Bengal.
- Listing of sheets of Family Orchidaceae for scanning and barcoding-2000.
- Sorted out 350 sheets of Zingiberaceae for scanning and barcoding.
- Listing of Family Araceae 250 sheets.
- Prepared the write up for the brochure of Central National Herbarium.
- Prepared the poster of Regional Circle of BSI for displaying in CNH Building.
- Indexing, labelling, listing of cupboards containing Roxburgh Icon and other large Icons, Wallich Correspondences and old literature in Type Section II.
- Making proper arrangement of the herbarium sheets –Family Convolvulaceae, Orchidaceae, Liliaceae.
- Passed Hindi Praveen and Pragya Exam.

**FUTURE PLAN - Family Boraginaceae and Family Convolvulaceae
for the Flora of Bihar and Jharkhand.**



THANK YOU