

# **EDITING OF HERBACEOUS FLORA OF MEGHALAYA-VOLUME-1 2020-2021**

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**EASTERN REGIONAL CENTRE**

**SHILLONG**



# BACKGROUND OF HERBACEOUS FLORA OF MEGHALAYA

- It was compiled and submitted in **2010** by me along with our ex-scientists of ERC, Shillong.
- ✓ **Herbaceous flora Volume-1-** comprised of **678 taxa and 340 genera under 88 families**
- **Ranunculaceae-Leeaceae-** 28 families by **B.K.Das**
- **Fabaceae-Primulaceae-**26 families by **Chaya Deori & R. Shanpru**
- **Apocyanaceae-Ceratophyllaceae-**34 families by **Chaya Deori**
- ✓ **Herbaceous Flora Volume-II-**comprised of **950 taxa and 300 genera under 27 families**
- **Hydrocharitaceae-Poaceae-**27 families by **Chaya Deori & Namita Dam**

## NEWLY ADDED TAXA FROM AUTHENTICATED RECENT LITERATURES/ BOOKS

- After the submission in 2010 many new additions were made to the herbaceous flora of both the volumes after consulting authenticated literatures, books, herbariums.
- **431 taxa** were added to 52 families to Volume -1
- **318 taxa** were added to Volume-2



Ranunculus sceleratus L.



Gentiana quadrifaria Blume



Paederia foetida L.



Ceropegia angustifolia Dalzell

**NEWLY ADDED TAXA FROM AUTHENTICATED RECENT  
LITERATURES/ BOOKS**

<b>Families</b>	<b>Species</b>	<b>Genera</b>
RANUNCULACEAE	<b>13(4)</b>	<b>6</b>
MENISPERMACEAE	<b>2(1)</b>	<b>2</b>
NYMPHAEACEAE	<b>3(1)</b>	<b>2</b>
PAPAVERACEAE	<b>2(4)</b>	<b>2(1)</b>
BRASSICACEAE	<b>6(4)</b>	<b>6(-1)</b>
CAPPARACEAE	<b>3(1)</b>	<b>1(1)</b>
VIOLACEAE	<b>9(6)</b>	<b>1</b>
POLYGALACEAE	<b>17(-5)</b>	<b>3(-1)</b>
CARYOPHYLLACEAE	<b>18</b>	<b>11(-1)</b>
HYPERICACEAE	<b>6(2)</b>	<b>2</b>
MALVACEAE	<b>16(5)</b>	<b>6(2)</b>
TILIACEAE	<b>8(1)</b>	<b>2</b>
OXALIDACEAE	<b>7(-3)</b>	<b>2</b>
BALSAMINACEAE	<b>37(4)</b>	<b>1</b>
RUTACEAE	<b>2(1)</b>	<b>1</b>
VITACEAE	<b>7(3)</b>	<b>4</b>
FABACEAE	<b>29(35)</b>	<b>14(5)</b>
CAESALPINACEAE	<b>3(2)</b>	<b>1</b>
ROSACEAE	<b>3(5)</b>	<b>3(2)</b>

**NEWLY ADDED TAXA FROM AUTHENTICATED RECENT  
LITERATURES/ BOOKS**

SAXIFRAGACEAE	<b>1(3)</b>	<b>1(1)</b>
DROSERACEAE	<b>1(2)</b>	<b>1</b>
MELASTOMACEAE	<b>5(4)</b>	<b>2</b>
LYTHRACEAE	<b>2(4)</b>	<b>1(2)</b>
ONAGRACEAE.	<b>3(4)</b>	<b>2</b>
CUCURBITACEAE	<b>15(27)</b>	<b>13(7)</b>
BEGONIACEAE	<b>14(2)</b>	<b>1</b>
AIZOACEAE	<b>1(1)</b>	<b>1</b>
APIACEAE	<b>10(9)</b>	<b>10</b>
RUBIACEAE	<b>36(26)</b>	<b>12(4)</b>
ASTERACEAE	<b>91(79)</b>	<b>46(32)</b>
SPHENOCLEACEAE	<b>1</b>	<b>1</b>
CAMPANULACEAE	<b>21(4)</b>	<b>8</b>
PRIMULACEAE	<b>4(8)</b>	<b>2</b>
APOCYNACEAE	<b>2(1)</b>	<b>1</b>
ASCLEPIADACEAE	<b>5(27)</b>	<b>3(5)</b>
LOGANIACEAE	<b>2(1)</b>	<b>2</b>
GENTIANACEAE	<b>13(8)</b>	<b>7(2)</b>
MENYANTHACEAE	<b>1(1)</b>	<b>2(-1)</b>

**NEWLY ADDED TAXA FROM AUTHENTICATED RECENT  
LITERATURES/ BOOKS**

BORAGINACEAE	<b>7(3)</b>	<b>5</b>
CONVOLVULACEAE	<b>3(15)</b>	<b>2(3)</b>
SOLANACEAE	<b>11(20)</b>	<b>5</b>
SCROPHULARIACEAE	<b>32(10)</b>	<b>15(5)</b>
OROBANCHACEAE	<b>2(6)</b>	<b>2</b>
LENTIBULARIACEAE	<b>11(4)</b>	<b>1</b>
GESNERIACEAE	<b>13(14)</b>	<b>8(6)</b>
ACANTHACEAE	<b>21(15)</b>	<b>15(2)</b>
VERBENACEAE	<b>3(1)</b>	<b>3(1)</b>
LAMIACEAE	<b>58(15)</b>	<b>24(3)</b>
POLYGONACEAE	<b>17(14)</b>	<b>4</b>
NYCTAGINACEAE A	<b>2(1)</b>	<b>2(1)</b>
RAFFLESIACEAE	<b>1</b>	<b>1</b>
ARISTOLOCHIACEAE A	<b>1(1)</b>	<b>1</b>
LORANTHACEAE	<b>1</b>	<b>1</b>
AMARANTHACEAE	<b>11(6)</b>	<b>6(2)</b>
CHENOPODIACEAE	<b>3</b>	<b>2(1)</b>
PODOSTEMONACEAE	<b>4</b>	<b>2(1)</b>
EUPHORBIACEAE A	<b>5(4)</b>	<b>3</b>
URTICACEAE	<b>15(10)</b>	<b>7(2)</b>

# PRESENT STATISTICAL SYNOPSIS OF HERBACEOUS FLORA OF MEGHALAYA Vol-I & II

TAXONOMIC GROUP	FAMILIES	GENERA	TAXA
DICOTYLEDONS (Vol-I)	93	427	1109
MONOCOTYLEDONS (Vol-II)	29	336	1268
TOTAL	122	763	2377

## OBJECTIVE/TARGET

✓ To edit the manuscript already reviewed by publication section, BSI, headquarters.

(April 2020-March 2021)



*Anemone rivularis* Buch.-Ham. ex DC

## ACHIEVEMENTS

1. After the addition of the species the Manuscript now has been finalized comprising of **1109 taxa under 427 genera and 93 families**
2. It is being edited following the format of Flora work of BSI.

1. Presently **431** new additions has been made to the herbaceous flora of Vol-1.
2. **Description of the newly** added taxa completed.
3. The updating of nomenclature of each species were done following Tropicos, IPNI, World flora online.
4. More than **300** photographs have been selected and the remaining is under process.



# ENUMERATION OF HERBACEOUS FLORA

## DICOTYLEDONS

### RANUNCULACEAE Juss.

(B.K.Das & Chaya Deori )

#### Key to the genera

- 1a. Plants woody or climbing, leaves opposite.
- 1b. Plants herbaceous, erect, rarely climbing, leaves in basal rosette and/or alternate along the stem
- 2a. Carpels one ovuled
- 2b. Carpels many ovuled
- 3a. Sepals petaloid, petals absent
- 3b. Sepals and petals differentiated, both present
- 4a. Leaves cauline, compound, flowers in racemes or panicles, sepals not prominently coloured, small
- 4b. Leaves all radical, lobed or dissected, flowers on scapes, sepals brightly coloured
- 5a. Flowers zygomorphic, spurred
- 5b. Flowers actinomorphic

#### 2. Clematis

2

3

5

4

#### 5. Ranunculus

#### 6. Thalictrum

#### 1. Anemone

#### 3. Delphinium

#### 4. Dichrocarpum

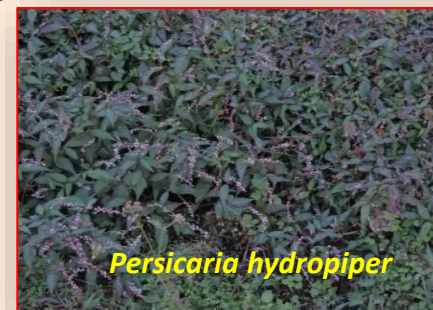
#### 1. Anemone L.

#### Key to the species

- 1a. Flowers white. Achenes oval.
- 1b. Flowers white, blue or purplish outside, Achenes oblong.

#### 1.A. elongata

#### 2. A. rivularis



*Persicaria hydropiper*



*Taraxacum officinale*

**1. Anemone elongata** D. Don, Prodr. Fl. Nepal. 194. 1825; Hook. f. & Thoms., Fl. Brit. India 1: 10: 1872; Rau, Fl. India 1: 30.1993.

Perennial herbs with fibrous root stocks. Stems 60–90 cm high, slender, pubescent. Radical leaves orbicular or semicircular in outline, deeply 3-partite, 5–10 cm from base to tip, base cordate; lateral segments deeply 2-lobed, mid-segment 3-lobed; lobes acute, inciso-dentate; petioles long, 2-6 times the length of the lamina, sheathing at base. Scape elongate, twice to thrice divided with few flowered lax umbellate cymes. Flowers 2–4 cm across, white. Sepals 5, obovate, glabrous. Stamens 3–5 mm, glabrous. Achenes 1-6, 0.6–1 cm long, flat, oval, glabrous with a beak.

*Flowering & Fruiting*: June-September

*Habitat*: Terrestrial in subtropical forests from 1500 – 1524 m altitude.

*Distribution*: India: Arunachal Pradesh, Meghalaya, Sikkim and Uttar Pradesh. Nepal and N. Myanmar.

*Specimen examined*: Meghalaya, s.l., fide Rau l.c.

**2. Anemone rivularis** Buch.-Ham. ex DC., Syst. Nat. 1:211.1817; Hook. f. & Thoms., Fl. Brit. India 1: 9. 1872; Rau in Fl.India 1: 35. 1993. *A.wightiana* Wall. ex Wight & Arn., Prodr. 3: 1834; Wight, Icon. 3 : t. 936. 1845; Kanjilal & al., Fl. Assam 1: 7: 1934.

Perennial herbs. Stems upto 1 m high, branched; rootstock stout, woody, sheathed. Radical leaves 3-partite, 10-15 wide, silky pubescent beneath, deeply 3-to 5- lobed; lobes cut and serrate; petioles 10–25 cm long. Scapes stout, 8–32 cm long; involucral leaves similar to leaves; segments linear-oblong, deeply incised serrate. Flowers white, blue or purplish outside, c. 2.5 cm across in compound cymes. Sepals 5-8, elliptic, obovate, obtuse, silky outside; filaments slender; anthers ovoid. Carpels many; style hooked. Achenes oblong, glabrous, hooked beaks.

*Flowering & Fruiting:* June-October

*Habitat:* Terrestrial in subtropical forests from 1500 – 1524 m altitude. Common in shady or dampish places and streamsides.

*Distribution:* India: Common in shady or dampish places, streamsides and clearing in broad leaved forest. Meghalaya, Himachal Pradesh, Uttar Pradesh, Sikkim and Tamil Nadu; Sri Lanka, Myanmar and china.

*Specimen examined:* Shillong, *S.K. Kar* 32986; *D.B. Deb* 32401; Khasi hills, *G.Mann* 9613, 9616, 9617; Jowai, *N.C. Deori* 51349; on way to Cherrapunjee, *R.S.Rao* 2678; Mawsmi, *G.Panigrahi* 24223; Dumpep, *A.S. Rao* 47421; Mawkyrwat, *G.H. Bhowmik* 61823; Mairang, *G.V. Subba Rao* 28024; Nongstoin-Sonapahar Road, *G.V. Subba Rao* 28455.

## 2. *Clematis* Dill. ex Linn.

*Key to the species*

- 1a. Flowers white
- 1b. Flowers 1-2 cm across, white.

**1.C. cadmia**  
**2.C. puberula**

1. ***Clematis cadmia*** Buch.-Ham. ex Hook.f. & Thoms., Fl. Ind. 1:5. 1855 & Hook.f., Fl. Brit. India 1:2.1872; Kanjilal & al., Fl. Assam 1: 2.1932.

A slender subherbaceous climber. Leaves opposite, pinnately compound, biternate; leaflets 3-5, 1.4–4.5 × 0.2–0.8 cm, ovate-lanceolate, acuminate, rounded at base, entire or minutely crenulate. Flowers solitary, axillary, pale bluish-white, c. 6 cm long, pedicelate; bracts 2, leafy. Sepals 2–5 × 0.6–2 cm, elliptic-oblong, acute, spreading, softly tomentose; style 4-6, short without straight hairs. Petals absent. Stamens c. 0.5 cm long. Achenes many, large, ovate with long beak, silky.

*Fl. & Fr.:* Jan.-June

*Hab.:* Terrestrial in subtropical forests from 1500 – 1524 m altitude. Common in shady or dampish places and streamsides.

*Distrib.:* India: Assam, Meghalaya, s.l., fide Hook & Thomson l.c.

## WORK REMAINING.....

1. Correction of **800** taxa completed and **309** taxa remaining
2. Preparation of **keys of families**, newly added **genera** and **species** remaining.
3. Alphabetically arrangement of photographs remaining.
4. Index to Botanical names remaining
5. Correction of introductory portion remaining.

- Request for some time up to  
June, 2021

**2 more months** required for final completion and submission of the corrected manuscript.

**Proposed Annual Action Plan for 2021-2022: Name of the project:**  
**“Editing of Herbaceous Flora of Meghalaya Volume-2 comprising of 1268 taxa**

# ACHIEVEMENTS for 2020-2021

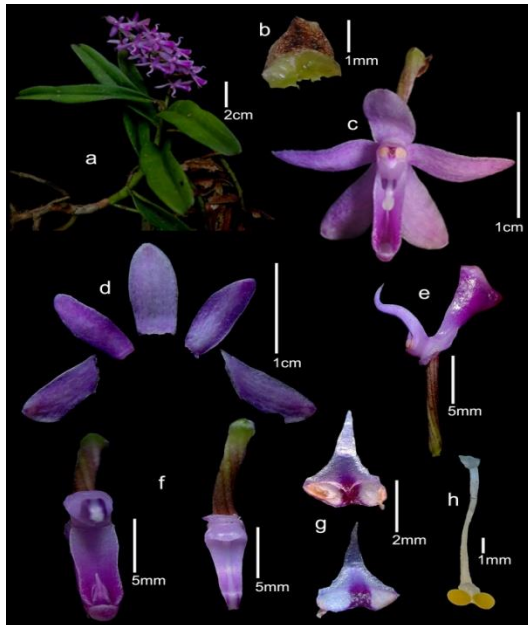
**Name of the Project: Flora of India, Vol. 25** (total *ca* 85 genera & 725 species) & **Vol. 26** (*ca.* 83 genera & 579 spp.)

**Duration of the project:** April, 2019 to December 2020.

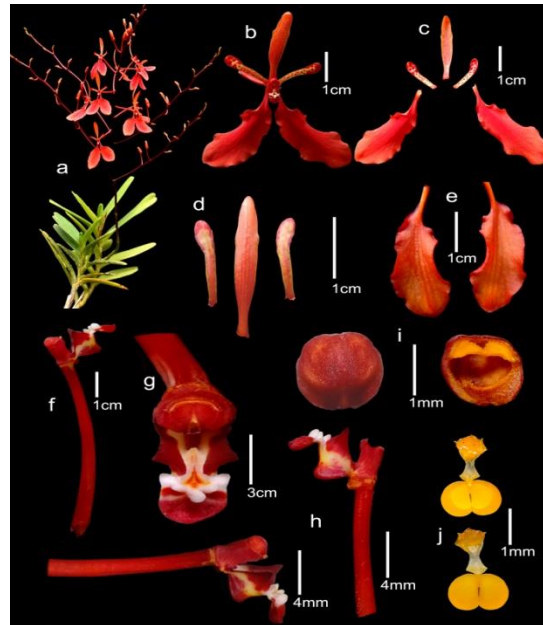
**Executing Scientist (s): Team Leader:** Dr. D. K. Agrawala, Scientist-D; **Team; Members:** Dr. J. S. Jalal, Scientist-E; **Dr. Chaya Deori**, Scientist-E, Dr. Avishek Bhattacharjee, Scientist-C

**Responsibility of Dr. Chaya Deori:** to Work on **36 genera and 236 species** for Sub-family: Apostasioideae (1 genus, 3 species), Sub-family: Vanilloideae (1 genus, 2 species), Sub-family: Cyripedioideae (2 genera, 13 species), Sub-family: Orchidoideae (4 genera 6 species), Sub-family: Epidendroideae (28 genera, 212 species).

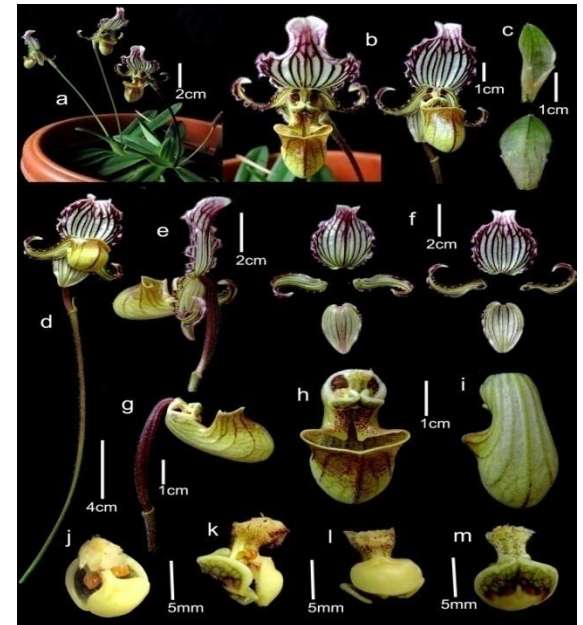
**Achievements: final manuscript submitted for Flora of India, Vol. 25 & 26: (ORCHIDACEAE)** to the team leader Dr. Dinesh Agrawala, Sc-D, comprising of **236 species under 36 genera** along with **29 photographic illustrations and 182 photographs:**



***Micropera rostrata* (Roxb.) N.P.Balacr.**



***Renanthera imschootiana* Rolfe**



***Paphiopedilum fairrieianum* (Lindl.)  
Stein**

## ACHIEVEMENTS

- ✓ Research Publications: **21(twenty one )**
- ✓ Seminar & workshop attended: **1(one)**
- ✓ Co-authored for Oral presentation: **1(one)**
- ✓ Poster presentation: **7(seven)**
- ✓ Webinars attended: **13(Thirteen)**
- ✓ Award and Honour: **1(one)** Received from  
**The Orchid Society of India** during the seminar in **March 2021.**

### **Research paper Publication: 3(three)**

- 1. CHOWLU, K., A. N. RAO AND C. DEORI.** 2020. Synopsis of *Eulophia* R. Br. (Orchidaceae) in Manipur (India) with a new distributional record to the state. *Pleione*. 14(2): 361-366
- 2. GOGOI, R., N. SHERPA, B.B.T. TNAM, C.DEORI AND S.R. TALUKDAR.** 2020. "Recollection of *Impatiens angustiflora* (Balsaminaceae) and notes on its lectotypification. *Nelumbo* 62(2): 154-160
- 3. DEORI, C & S.R. TALUKDAR.** 2020. Checklist of flora of Laokhowa Wildlife Sanctuary, Assam, India. *Journal of advance plant sciences*. 10(1): 10-23

## **AWARD AND HONOUR: 1(one)**

**Dr. Chaya Deori**, Scientist-E, ERC, Shillong **received USHA VIJ memorial award** for the **year 2021** for her outstanding contribution towards orchid Art and science by the Orchid Society of India (TOSI) **during the National Conference cum Workshop** on Interdisciplinary Approaches to Taxonomy, Conservation, and Economic Utilization of Floriculturally and Medicinally Important Orchids and Orchid Show was organized by TOSI (Journal of Orchid Society of India), Chandigarh in collaboration with Botanical Survey of India and NEHU, Shillong held from 5<sup>th</sup> to 6<sup>th</sup> March 2021, ERC, Shillong- 793003, Meghalaya.



## **Book chapters: 2(two)**

4. **DEORI, C.** 2020. *Diversity, Conservation and Sustainable utilization of Orchid Flora of Northeast India*. The herbal Wealth of North East India. Edited by Bapan Banik and Manas Bhowmik, EBH Publisher, India. Chapter 1. Pp.1-8
5. **TALUKDAR, S. R. AND C. DEORI.** 2020. *Sacred grooves for conservation and sustainability of medicinal plants in West and South West Khasi hills districts of Meghalaya* The herbal Wealth of North East India. Edited by Bapan Banik and Manas Bhowmik, EBH Publisher, India. Chapter 4. Pp. 36-45

## **Articles Published: 3(three)**

6. **DEORI, C.** 2020. Obituary, Tynjuh Mawbor Hynniewta. *Nelumbo* 62(1): 107-110
7. **LAKSHMINARASIMHAN, P., N. ODYUO, C. DEORI, D. VIJAYAN, D. L. BIATE, AND K. N. GANDHI.** 2020. "A report on the fourth Botanical Nomenclature course organized by the Botanical Survey of India at Shillong". *Harvard Papers in Botany* 25(1): 75-78
8. **LAKSHMINARASIMHAN, P., N. ODYUO, C. DEORI, D. VIJAYAN, D. L. BIATE AND K. N. GANDHI.** 2020. A Report on the Fourth Botanical Nomenclature Course Organized by the Botanical Survey of India at Shillong. *J. Jpn. Bot.* 95(5): 315–317

**Abstracts published: 8(eight):** In the souvenir of National Conference cum Workshop (hybrid mode) on "Interdisciplinary Approaches to Taxonomy, Conservation and Economic Utilization of Floriculturally and Medicinally Important Orchids" and Orchid Show held at Botanical Survey of India (BSI), Eastern Regional Centre, Woodlands, Laitumkhrah, Shillong, Meghalaya during March 5-7. 2021

9. AGRAWALA, D.K., J.S.JALAL, **C.DEORI** AND A. BHATTACHARJEE. 2021. Taxonomic studies on Indian Orchidaceae.Pg. 4
10. CHAKRABORTY, S., D.K.AGRAWALA, J.S.JALAL, **C. DEORI** AND A. BHATTACHARJEE. 2021. The genus *Epipactis* Zinn (Orchidaceae) in India Pg. 135
11. CHAKRABORTY, O., D.K. AGRAWALA, J.S. JALAL, **C.DEORI** AND A. BHATTACHARJEE. 2021. Taxonomic studies on the genus *Stereochilus* Lindl.(Orchidaceae) in India. Pg. 131
12. **DEORI, C.** AND S. R. TALUKDAR. 2021. Diversity, conservation and sustainable utilization of orchid flora of community forests of west and south –west khasi hills districts of Meghalaya, India. Pg. 72
13. NAYAK, S., D.K. AGRAWALA, J.S. JALAL, **C.DEORI** AND A. BHATTACHARJEE. 2021. Notes on the *Bulbophyllum odoratissimum* complex in India. 2021. Pg. 132
14. ROY, RIJUPALIKA, D.K. AGRAWALA, J.S. JALAL, **C.DEORI** AND A. BHATTACHARJEE. 2021. *Galeola* Lour.(Orchidaceae)-A myco-heterotrophic genus in India. Pg. 134
15. SARKAR, S., D.K.AGRAWALA, J.S. JALAL, **C.DEORI** AND A.BHATTACHARJEE. 2021. Taxonomic studies on the genus *Acanthephippium* Blume (Orchidaceae) in India. Pg. 136
16. SENGUPTA, S., D.K. AGRAWALA, J.S. JALAL, **C.DEORI** AND A. BHATTACHARJEE. 2021. Species with confusing identity within the genus *Phalaenopsis* Blume (Orchidaceae) in India. Pg. 133



**Abstracts communicated & Accepted: 5 (five)** for the National seminar on Plant Taxonomy and Traditional Knowledge in the Himalayas and North-East India and Annual Conference of East Himalayan Society for Spermatophyte Taxonomy (Taxo-Club) on 24- 25th April, 2021 organized by Dept. of Botany, Rajiv Gandhi University, Arunachal Pradesh, India

**17.** TUDU, D., K. CHAKRABORTY, H. SINGH, VIJAY, L. I. CHANU, **C. DEORI** and N. ODYUO. 2021. Herbarium specimens of the family Zingiberaceae conserved in ASSAM.

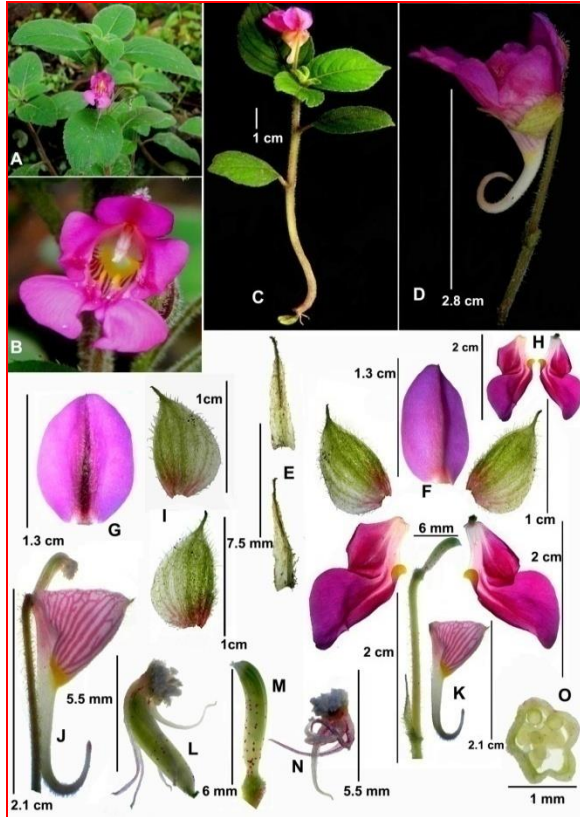
**18.** CHAKRABORTY, K., A. GHOSH, H. SINGH, D. TUDU, VIJAY, L. I. CHANU, **C. DEORI**, N. ODYUO. 2021. Diversity of the family Orchidaceae conserved in ASSAM Herbarium, Botanical Survey of India

**19.** SARMA, N., S.R. TALUKDAR, **C. DEORI** AND N. ODYUO. 2021. Endemic and economically important preserved specimens present in the Museum of Botanical Survey of India, Eastern Regional Centre, Shillong-793003, Meghalaya

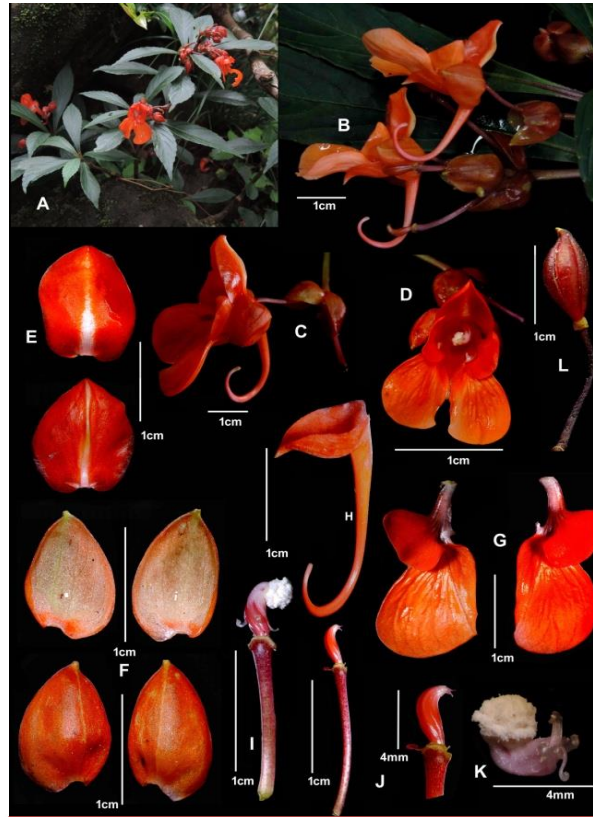
**20.** SENSARMA, S. AND **C. DEORI**. 2021. Genus : *Ficus* Subgenus: *Sycomorus* in Northeast India: Taxonomy, Distribution and Economic importance

**21.** VIJAY, S. R. TALUKDAR, L. I. CHANU, D. TUDU, K. CHAKRABORTY, **C. DEORI** AND N. ODYUO. 2021. Classification, Species Diversity and Economic Importance of Poaceae present in ASSAM Herbarium

# INTERESTING FINDINGS TO THE HERBACEOUS FLORA OF MEGHALAYA-Vol-1



***Impatiens khasiana***  
 Endemic and rediscovered  
 after a period of 129 years



***Impatiens acuminata***  
 Rediscovered after a gap of  
 36 years from Meghalaya



***Impatiens angustiflora***  
 (Balsaminaceae)-  
 Recollection and  
 lectotypification-67 years  
 from khasi hills

Fig.1. A. Habit; B. Flower; C. Lateral sepals, dorsal and ventral views; D. Lateral united petals dorsal and ventral views; E. Lower sepal dorsal, side and ventral views; F. Pedicel and ovary encircled with stamens; G. Stamens; H. Pedicel and ovary (close view).



THANKYOU

Sapria himalayana Griff.