Τo,

The Convener, IQAC, Lady Keane College

# Subject: Students' Minor Project Report

Dear Sir,

Kindly find attached herewith the report of a minor students' project from Botany Department involving only the current 5<sup>th</sup> semester students for your kind consideration through the Biodiversity Cell. Lady Keane College.

K.L. Chaudhary was be the Principal Investigator (P.I.) and Dr. S. Nongbri the co-investigator (Co-P.I.)

Thanking you Yours sincerely

K.L. Chaudhary Botany Department Lady Keane College

# STUDENT'S MINOR PROJECT 2022-2023:

- 1. Title: <u>"Rediscovery and population studies of Sonerila arguta species in Pynursla and adjacent areas"</u>
- 2. Faculty members involved: K.L. Chaudhary (PI)& Dr. S. Nongbri CO-PI), Botany Dept., Lady Keane College
- 3. Students involved: Botany Honours 5<sup>th</sup> & 6<sup>th</sup> Semester, batch of 2022-2023
- **4. Students' names:** Antymary Rani, Daroilin Nongkynrih, Ibanrikordor Syiemlieh, Lawanri Diamai, Leishine Voidumai, Lopon Yeaton, Mrigakshi Sonowal, Pem Yangchin and Tejaswini Vashistha

### 5. Objectives:

- a) Enumeration and photographic documentation of *Sonerila arguta* species.
- b) Search for more sites with population of *Sonerila arguta* and its population studies.

### 5. Introduction:

*Sonerila arguta* R. Br. (Melastomataceae) is a genus of about 184 species with 53 species (Mathew et al, 2019, Salim et al., 2020). The genus has an erect or creeping habit and are terrestrial or low epiphytic herbs or semi-woody shrubs. Flowers trimerous, often arranged in scorpioid cymes with a trilocular and inferior ovary (Lundin 1983; Cellinese 1997).

Sonerila arguta R.Br. ex Naudin is a very rare and endemic species of Meghalaya, found on boulders or rocks either in the stream or on rocks on stream walls at the high water mark. It is a perennial, herbaceous, creeping (repent), obligate lithophytic plant. Since it is endemic to a very small area in Meghalaya, virtually little is known about it.

It was last collected, as per the current information, in 1857 or thereabouts. It is likely to have small populations which are widely dispersed in the area. Hence, it would be interesting to recollect, search for more sites with populations and study the population structure and reproduction in the plant. This study has implication for its conservation, either in-situ or ex-situ or both.

### 6. Methodology and work done:

Field visits were undertaken to Pongtung to determine the population status of the *S. arguta*. Some stream areas of Pongtung were explored and the entire population counts undertaken. The plants were

also divided into the reproductively mature if they were flowering or fruiting or juveniles. This enabled us not only to get an idea of the total population, but how they were reproducing. This would be useful in determining the future survival of the species at the locactions.

## 7. Results:

A small localized population of 156 colonies with 1526 individuals in two streams adjacent to and one being a tributary of the other were located of which 886 (58.1%) were young unreproductive individuals, 507 (33.2%) mature unreproductive individuals and only 133 (8.7%) were reproductive individuals.

Our observation suggests that the population is under substantial direct and indirect anthropogenic disturbance through various types of activities such as human movement, construction activities, washing, stone and sand mining within or near the stream beds. An immediate attention for conservation of species is required.

### 8. Publication:

The results of the study were presented if form of a Poster Presentation in a National Seminar National Seminar on Emerging Trends in Biological Sciences: A North East India Perspective which was organized by Department of Biotechnology & Bioinformatics, North-Eastern Hill University, Shillong-793022, Meghalaya, India in collaboration with Bio-Resources Development Centre (BRDC), Shillong & BioNEST Bioincubator facility, NEHU, Tura campus, Tura, Meghalaya on 28th February - 1st March, 2023.



Rediscovery of Sonerila arguta R. Br. ex Naudin with preliminary population PP 56 studies from Pongtung, Meghalaya and clarification of its distribution status.



K.L. Chaudhary\*, S. Nongbri, Antymary Ram, Daroilin Nongkynrih, Ibanrikordor Syiemlich, Lawanri Diamai, Leishine Voidumai, Lopon Yeaton, Mrigakshi Sonowal, Pem Yangchin and Lady Keane College, Shillong - 793001, Meghalaya

Email: klchaudhary31@gmail.com

# ABSTRACT

Sonerila arguta R.Br. ex Naudin (Family: Melastomaceae) has been collected after about 170 years of its last collection, from Pongtung in Meghalaya. The earlier collections by Robert Brown (1831) and J.D. Hooker and T. Thomson (1851) were labelled as collected from Sillet or Mont. Sillet (now Sylhet), presently in Bangladesh, implying that the species was distributed in both India and Bangladesh. However, no specimens have been collected even after thorough searches in Bangladesh (pers. comm.) and hence, the species distribution can now be confirmed to be limited to East Khasi Hills, Meghalaya, thus effectively making it an endemic species of the state.

It is an obligate rheophytic species found growing on rocks and boulders either within the streams beds or on rocky walls of streams at the high water mark. It is a herbaceous clonal perennial, creeping, lithophytic plant growing in association with Selaginella reticulata, Liparis luteola, Pothox sp. Elatostemma sp. etc. on substratum with sparse soil layer.

A small localized population of 156 colonies with 1526 individuals in two streams adjacent on each other were located of which 886 (58.1%) were young unreproductive individuals, 507 (33.2%) mature unreproductive individuals and only 133 (8.7%) were reproductive individuals. Our observation suggests that the population is under substantial direct and indirect anthropogenic disturbance through various type of activities such as human movement, construction activities, washing, stone and sand mining within or near the stream beds. An immediate attention for conservation of species is required.

# BIOGRAPHY

The author is affiliated to Botany Department, Lady Keane College, Shillong for the last 24 years with interest in Biodiversity.

### Rediscovery of Sonerila arguta R. Br. ex Naudin with preliminary population studies from Pongtung, Meghalaya and clarification of its distribution status

K.L. Chaudhary', S. Nongbri, Antymary Rani, Daroilin Nongkynrih, Ibanrikordor Syiemlich, Lawanri Diamai, Leishine Voidumai, Lopon Yeaton, Mrigakshi Sonowal, Pem Yangchin, Tejaswini Vashistha Lady Keane College, Shillong - 793001, Meghalaya; email: klchaudhary31@gmail.com

#### Abstract

The present paper reports the recent re-discovery of Sonerila arguta R.Br. ex Naudin (Melastomaceae), a rare and endemic species from Pongtung, East Khasi Hills, Meghalaya after a gap of about 170 years. It is a herbaceous clonal perennial, creeping lithophyte and an obligate rheophytic species found growing on rocks within streams beds or on walls at the high water mark. The plant is rare due to its specific habitat requirement and slow growth rates. The immediate threats to the species come from anthropogenic activities in form of disturbance, construction activities, sand and stone mining and water pollution. The plant has not yet been assessed for IUCN red list.

### Introduction, Distribution, Habitat, Habit

### **Botanical Description**



Sonerila arguta R.Br. ex Naudin of the family Melastomaceae (>870 spp in 47 genera; Michelangeli et al 2013). This obligate rheophytic species is a small, creeping, clonal, lithophytic plant which was first collected by F. De Silva for Robert Brown (1831) but validly published by Naudin (1851) based on specimens from Khasi Hills or Sylhet in Bengal (now Bangladesh). No recent collections of the specimen appear to have been made, the last dated collection is by J.D. Hooker & T. Thomson from Khasi Hills in 1851. This plant has been re-discovered from Pongtung in Khasi Hills recently.

### Distribution

Pongtung, East Khasi Hills, Meghalaya, India.



#### Habitat

The species is usually restricted to larger stones or boulders or stones walls (preferably rough sandstone) at the banks of the streams, under full or partial shade, usually at or near the high water-mark levels of these streams which get inundated, at least partially, by fast-flowing waters during heavier stream flows. The substratum usually is either almost bereft of soil deposits or has a very thin layer of it. Thicker soil layer seems to favour the other associates to the disadvantage of Sonerila areuta.



#### Habit

Perennial, herbaceous, branched clonal plant Shoots creeping, usually 1.5-4 cm, growing upto 15 cm long Colonies with upto 67 ramets; average colony size: 9.8 ramets





#### Description

Stem: creeping, perennial; stem short, cylindrical, upto 15 cm, with elevated tubercles

Leaves: 4 cm x 0.65 cm, petiolate, crowded at apex, lanceolate to spathulate, denticulate, 2-4 rows of hair on upper surface, glabrous below, petiole and vein brownish-purplish, midvein impressed above, prominent below, petiole attached to tubercle

Stipules: two, axillary, opposite Tubercle: supported by two inoffensive bristles

Inflorescence: 1-flowered; peduncles sub-terminal, jointed ca. 3 -3.5

cm long Flowers: trimerous, bisexual, complete, purpulish, showy, ca. 2

cm across Calvx: calvx tube campanulate, 0.8 cm x 0.3 cm, glabrous, teeth three

Corolla: 1 cm x 0.6 cm, ovate, acute, base white upper parts purpulish Androecium: three, filaments 0.6 cm, erect, curved; anthers yellow, elongate 0.5 cm, curved, broad at base, narrowed at tip

Gynoecium: ovary inferior, ovules numerous, style ca. 2.3 cm long stigma small

Capsule: glabrous, funnel-shaped, subtrigonous 7mm x 2.5mm Seeds: yellowish-brown, 0.55 mm x 0.2 mm.















#### Population

Only two populations have been observed by us in Meghalaya in two, streams, one a tributary of the other. The population comprises of only 156 colonies and 1526 individuals in total, with an average number of 9.78 rametes per colony. A total of 887 plants were young and unreproductive (57.7%), 505 were mature but unreproductive (32.8%), with only 144 plants being reproductive (9.4%).

The clonal nature of the species appears to aid in both better attachment to the substratum and survival under inhospitable conditions through local spreading by vegetative means. Though seeds are produced, they do not appear not be able to find good sites easily with enough time to germinate and establish before rain water washes them out as observed from the colony growth.



No. of reproductive and unreproductive plants in population



Threats

 Small, localized populatio Low reproductive population

High levels of anthropogenic disturbance including construction activities including check-dam construction, washing, stone and sand mining within or near the stream beds

### References

Michelangeli, F.A., Guimaraes, P.J.F., Penneys, D.S., Almeda, F. and Kriebel, R. 2013. Phylogenetic relationships and distribution of New World Melastomeae (Melastomataceae). Botanical Journal of the Lin Society, 171 (1): 38-60. https://doi.org/10.1111/j.1095-8339.2012.01295.x

Resmi, S. & Nampy, S. 2019. Lectotypification of the names of four species in Sonerila (Melastomataceae). Rheedea 29(4): 331–334. https://dx.doi.org/10.22244/rheedea.2019.29.4.08

Wallich, N. (1820) Sonerila squarrosa. In: Carey, W. and Roxburgh, W. (Eds.) Flora Indica or, Descriptions of Indian plants 1: 182-183. Mission Serampore

Catalogue des herbiers de Genève (CHG), Conservatoire & Jardin botaniques de la Ville de Genève. 24-02-2023<http://www.ville-ge.ch/musinfo/bd/cjb/chg>

http://specimens.kew.org/herbarium/K001038121

#### Acknowledgements

We thank the Principal, Lady Keane College, Shillong, for kind permission and financial assistance through the Biodiversity Cell, Lady Keane College. We also thank the Headman, Pongtung village for permission for field work.