

Morphological Study on *Marchantia emarginata* Reinw, Blume et Nees in North Sumatra Indonesia

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Abstract: Morphological characters of *Marchantia emarginata* Reinw., Blume et Nees. from North Sumatra has not been detailed reported. The study aims to describe the morphological variation of *Marchantia emarginata* from North Sumatra. Samples were collected by exploring some areas in North Sumatra. Morphological characters were observed under binocular microscope at Laboratory of Plant Taxonomy, Department of Biology, Universitas Sumatera Utara. Morphological variations were found on dorsal surface of thallus, color of thallus margin, appendix of ventral scale of thallus, and dorsal surface of female receptacles. Detailed morphological description and figures are provided.

1 INTRODUCTION

Marchantia is a genus of complex thalloid liverwort class marchantiopsida. the genus marchantia is easily recognized by some characteristics: 1) gemmae on dorsal of thallus which are developed in cup-like receptacles, 2) many pores on dorsal thallus, 3) ventral scales in 4-10 rows (Gradstein, 2011). The genus is almost cosmopolitan, occurring in regions with humid climates in moist to wet habitats, often occur in anthropogenic habitats (Ho, 2013).

Marchantia has a very important ecological and economical role in life. Ecologically *Marchantia* grows as a pioneer plant on bare soil, reducing erosion with the ability to withstand high rainfall, water storage in tropical ecosystems, pollution indicator, and serve as shelter to other organisms. Economically, *Marchantia* is important for medicine for liver, lung disease, ulcers, and can be used as an antiseptic (Bischler-Causse, 1989; Glime, 2007; Savaroglu *et al.*, 2011).

The genus *Marchantia* is represented by 36 species found in the world, which are 15 of them found in Indonesia; 8 species in Java and 7 species in Sumatra collected from West Sumatra (Bischler-Causse, 1989). The first published record of *Marchantia* in North Sumatra was reported by Siregar *et al.* (2013), who reported 7 species from

Sibayak Forest. One of the species *Marchantia* reported from North Sumatra is *Marchantia emarginata*. The species has a wide morphological variations in vegetative and generative organs (Siregar *et al.*, 2013). However, the variation of morphological characters of *Marchantia emarginata* from North Sumatra has not been detailed reported. This data is needed to know the species concept and delimitation in order to identify the species correctly.

2 METHODS

Explorations were carried out along the tracks of six locations, Sibayak Forest, Brastagi, Taman Hutan Raya Bukit Barisan, Taman Eden 100 Natural Park, Tinggi Raja Conservation Area, Aek Nauli Parapat Natural Forest, Mount Sibuatan Simalungun, and Scিকে-cike National Park. Sample were collected from many substrats including soil, rocks, and river bank. A camera was used for documentation in the field.

Specimens found should be cleaned as well as possible and excessive substrate removed, collected, put into plastic with watered tissue. In order to dry the samples, the field collecting should be placed open on a table or floor in a dry place, the paper replaced daily. Upon returning from the field,

all information gathered on the specimens must be written in the field notebook (Gradstein, 2011). The specimens collected were identified based on morphological characters, using Bischler-Causse (1989) in concept and species delimitation. Trinocular microscope was used to examine the specimens. All specimens are deposited in Herbarium MEDA Department Biology, Universitas Sumatera Utara. Morphological characters observed are: thallus (color, median band of dorsal surface, ventral scales, appendix of ventral scales), gemma cup, female and male receptacle (shape, lobes, margin of lobes).

3 RESULTS

Marchantia emarginata Reinw., Blume et Nees.

Thallus with dichotomous branches, dorsal surface of thallus has variation, some with median band or without median band on the others (Fig.1A-B), small to medium size. Thallus with hyaline margin or reddish to purplish, margins entire, or slightly crisped (Fig. 1C-D). Ventral surface of thallus purplish or reddish, at least in median portion; median scales purplish; appendage purplish, sometimes light red, ovate; apex acute or apiculate, marginal teeth usually 2 (3)-cells long, often curved towards base of appendage, marginal cell often lighter in colour (Fig.2C-D). Cupules (margin of gemma cup) with short cilia, 1-4 (5) cells long, 1-2 cells wide basally (Fig. 2A). Female receptacles are straight or curved toward the base of archegoniophore stalk; lobes varies from 5-13; dorsal surface flat or with indistinct to distinct rounded median projection, slightly asymmetric to symmetric (Fig 3A-C). Apex of receptacle lobes varies from emarginate, truncate or sometimes rounded. Involucres hyaline to reddish; margin entire (Fig.3D). Antheridiophore at apex of main thallus. Male receptacle deeply dissected when mature (Fig. 3E).

Ecology: soil, rocks (moist, damp or wet, shaded, semi-exposed places, riversides, creeks)

Geographical distribution: Andaman and Nicobar Island, Borneo (Sabah, Sarawak), China, Guam, India, Indonesia (Sumatra, Java, Lesser Sunda Island, Bali, Moluccas, Irian jaya), Japan, Korea, Malaysia, Marianas, New Guinea, New Britain, Philippines, Sri Lanka, Solomon Island, Thailand (Bischler-Causse, 1989; Bischler-Causse and Piippo,1991; Song and Yamada, 2006; Lai *et al.*, 2008; Chuah-Petiot, 2011; Sinh and Singh, 2012).

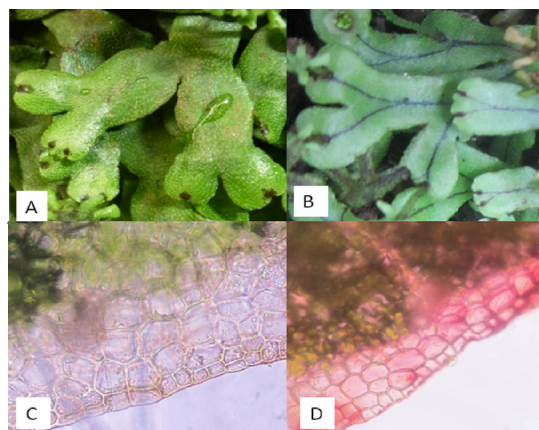


Figure 1. Vegetative organ of *Marchantia emarginata*, A-B: dorsal surface of thallus (A. Without median band, B. With median band, C-D: thallus margin (C. Hyaline, D. Reddish).S

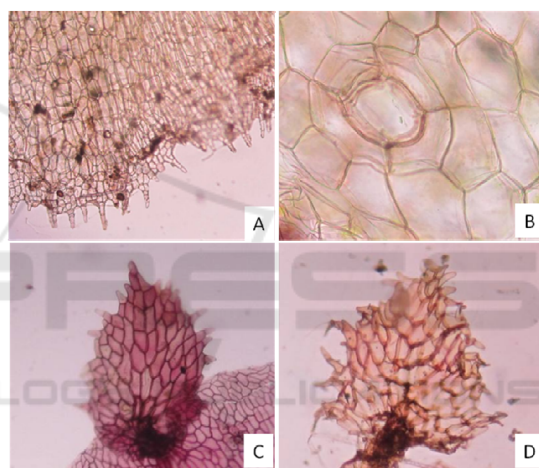


Figure 2. Vegetative organ of *Marchantia emarginata*, A. Cupules of gemma cup, B. Pore of dorsal surface of thallus, C-D. Shows the variation of median scales of ventral scales.

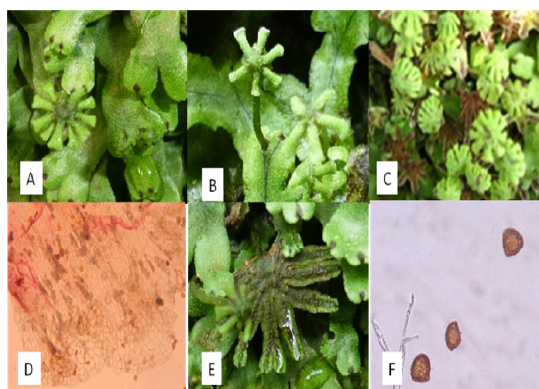


Figure 3. Generative organ of *Marchantia emarginata*, A-C. Shows the variation of female receptacles (A-B. dorsal surface with distinct rounded median projection; C, dorsal surface flat or with indistinct median projection), F. Spores.

4 CONCLUSIONS

Morphological variations were found on dorsal surface of thallus, color of thallus margin, appendix of ventral scale of thallus, and dorsal surface of female receptacles.

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