

Studies on the bryophyte flora of Vanuatu. 8. *Heteroscyphus* (Geocalycaceae, Hepaticae)

Kohsaku Yamada¹ and Masanori Hayashi²

¹Funaeyama 941–47, Seta-cho, Ise, Mie, 516–0035 Japan; the Hattori Botanical Laboratory,
Obi, Nichinan, Miyazaki, 889–2535 Japan

²Shinto 2385, Yuu-cho, Kuga-gun, Yamaguchi, 740–1432 Japan

Abstract Five species of *Heteroscyphus* (Geocalycaceae, Hepaticae) are reported from Vanuatu based on the collections made by M. Higuchi in 1996 and by K. Sugimura in 1997. *Heteroscyphus acutangulus* and *H. aselliformis* are new additions to the known hepatic flora of Vanuatu.

Key words: *Heteroscyphus*, Geocalycaceae, hepatics, bryophytes, Vanuatu.

This paper deals with the genus *Heteroscyphus* (Geocalycaceae, Hepaticae) occurring in Vanuatu, based on the collections made by M. Higuchi in 1996 and by K. Sugimura in 1997 (cf. Higuchi, 2002). The specimens examined are kept in the herbarium of the Department of Botany, National Science Museum (TNS), and the duplicates in the herbarium of the Department of Forestry, Republic of Vanuatu (PVNH).

Heteroscyphus Schiffn., Österr. Bot. Zeitschr. 60: 171 (1910).

Five species of *Heteroscyphus*, *H. argutus*, *H. coalitus*, *H. communis*, *H. decurrens* and *H. hebridensis*, have been recorded from Vanuatu. Grolle & Piippo (1984) reduced *H. communis* and *H. decurrens* to synonym of *H. coalitus* and *H. splendens* respectively. By the examination of above collection, five species of the genus were recognized. Among them, two species, *Heteroscyphus acutangulus* and *H. aselliformis*, are new records for the hepatic flora of Vanuatu.

Key to the species of *Heteroscyphus* in Vanuatu

1. Underleaves connate with lateral leaves on both sides. 2
1. Underleaves connate with lateral leaves on one side *H. argutus*

2. Underleaves imbricate. 3
2. Underleaves distant *H. coalitus*
3. Stem leaves narrowly ovate, apices obtuse, margins entire. *H. splendens*
3. Stem leaves ovate to broadly ovate, apical portions 1–(2) lobed 4
4. Stem leaves ovate, dorsal margins not strongly arched, ventral margins not incurved and undulate, apices bilobed with wide sinus *H. acutangulus*
4. Stem leaves broadly ovate, dorsal margins strongly arched, ventral margins incurved and undulate, apices (1–)2 lobed with narrow sinus *H. aselliformis*

1. ***Heteroscyphus acutangulus*** (Schiffn.) Schiffn., Österr. Bot. Zeitschr. 60: 172 (1910).

Specimen examined. Espiritu Santo Isl., Mt. Tabwemasana, 1000 m alt., on base of tree, Nov. 6, 1996 (Higuchi 31547).

Distribution. Java, New Guinea (cf. Piippo, 1985). New to Vanuatu.

Notes. This species is characterized by (1) stem leaves ovate, dorsal margins not strongly arched, ventral margins not incurved and undulate, 2–3 toothed on both dorsal and ventral margins, the apices bilobed with wide sinus, and (2) underleaves round, imbricate, connate with the lateral leaves on both sides, 4–5 times as wide as the stem, and the apices 1/3–1/4 bilobed, 2–3

toothed on both lateral margins.

Plants of the specimen (*Higuchi 31547*) agree well with the Stephani's drawing of *Heteroscyphus acutangulus* (Icones Hepaticarum Inedit., 619. *Heteroscyphus acutangulus*, Sch. Java, 300–1740 m, Schiffner). *Heteroscyphus acutangulus* is one of the rare hepatics and has been known only from Java and New Guinea. The known range of *H. acutangulus* was extended southwards to Vanuatu.

2. ***Heteroscyphus argutus*** (Reinw., Blume & Nees) Schiffn., Österr. Bot. Zeitschr. **60**: 171 (1910).

Specimen examined. Espiritu Santo Isl., 2nd Camp~Mt. Vutimena, 870 m alt., on branch at steep slope, Oct. 18, 1997 (*Sugimura 1660*).

Distribution. Widely distributed in SE Asia and Oceania.

Notes. This species is characterized by (1) stem leaves rectangular, the apices round with 5–10 small toothed on apical portions, (2) underleaves quadrate, distant, the apices 1/2 bilobed, with two small teeth on both margins, and connate with lateral leaves on one side.

3. ***Heteroscyphus aselliformis*** (Reinw., Blume & Nees) Schiffn., Österr. Bot. Zeitschr. **60**: 172 (1910).

Specimen examined. Espiritu Santo Isl., 2nd Camp~Mt. Vutimena, 1340 m alt., on trunk at steep slope, Oct. 16, 1997 (*Sugimura 1568*); Mt. Tabwemasana, 1000 m alt., on trunk, Nov. 6, 1996 (*Higuchi 31548*).

Distribution. Sumatra, Java, Borneo, Sumbava, Amboina, New Guinea, Philippines, Taiwan, Japan, New Caledonia, Fiji (cf. Miller *et al.*, 1983). New to Vanuatu.

Notes. This species is characterized by (1) stem leaves broadly ovate, dorsal margins strongly arched, ventral margins incurved and undulate, the apices (1–)2 lobed with narrow sinus, and (2) underleaves widely round, imbricate, connate with the lateral leaves on both sides, 5–6 times wide as the stem, and the apices 1/5 bilobed, 5–6 toothed on both lateral margins.

Heteroscyphus aselliformis is a new record for the hepatic flora of Vanuatu.

4. ***Heteroscyphus coalitus*** (Hook.) Schiffn., Österr. Bot. Zeitschr. **60**: 172 (1910).

=*Heteroscyphus communis* (Steph.) Schiffn., Österr. Bot. Zeitschr. **60**: 171 (1910). (fide Grolle & Piippo 1984).

Specimens examined. Espiritu Santo Isl., Mt. Tabwemasana, 1000 m alt., on rock-cliff, Nov. 8, 1996 (*Higuchi 31806*), on soil (*Higuchi 31820*); Peavot~Mt. Vutimele (49 km N of Mt. Tabwemasana), 750 m alt., on trunk of tree fern, Nov. 21, 1996 (*Higuchi 31998*); Mt. Vutimele, 1100 m alt., on living leaves of fern, Nov. 25, 1996 (*Higuchi 32280*); 1st Camp~2nd Camp, along Pialapg River, 150 m alt., on rock (*Sugimura 1475*), 510 m alt., Oct. 19, 1997 (*Sugimura 1680*); Butmas, 560 m alt., on fallen tree in lower montane forest, Oct. 23, 1997 (*Sugimura 1737*).

Distribution. Widely distributed in SE Asia, Oceania, Australasia.

Notes. This species is characterized by (1) stem leaves rectangular, the apices truncate, with two long toothed on both ends, (2) underleaves quadrate, distant, the apices 1/2–2/3 bilobed, with small two teeth on both margins, and connate with lateral leaves on both sides.

This species has been reported by Jovet-Ast (1950) as *Chiloscyphus coalitus* from Futuna Isl. of Vanuatu. *Heteroscyphus coalitus* seems to be one of the commonest hepatics in Vanuatu. Grolle & Piippo (1984) reduced *H. communis* to a synonym of *H. coalitus*.

5. ***Heteroscyphus splendens*** (Lehm. & Lindenb.) Grolle in Grolle & Piippo, Acta. Bot. Fennica **125**: 68 (1984)

=*Heteroscyphus decurrens* (Reinw., *et al.*) Schiffn., Österr. Bot. Zeitschr. **60**: 171 (1910). (fide Grolle & Piippo, 1984).

Specimens examined. Espiritu Santo Isl., Mt. Vutimele (40 km north of Mt. Tabwemasana), 1400 m alt., on trunk, Nov. 23, 1996 (*Higuchi 32126*).

Distribution. Malaya (Singapore), Java, Bor-

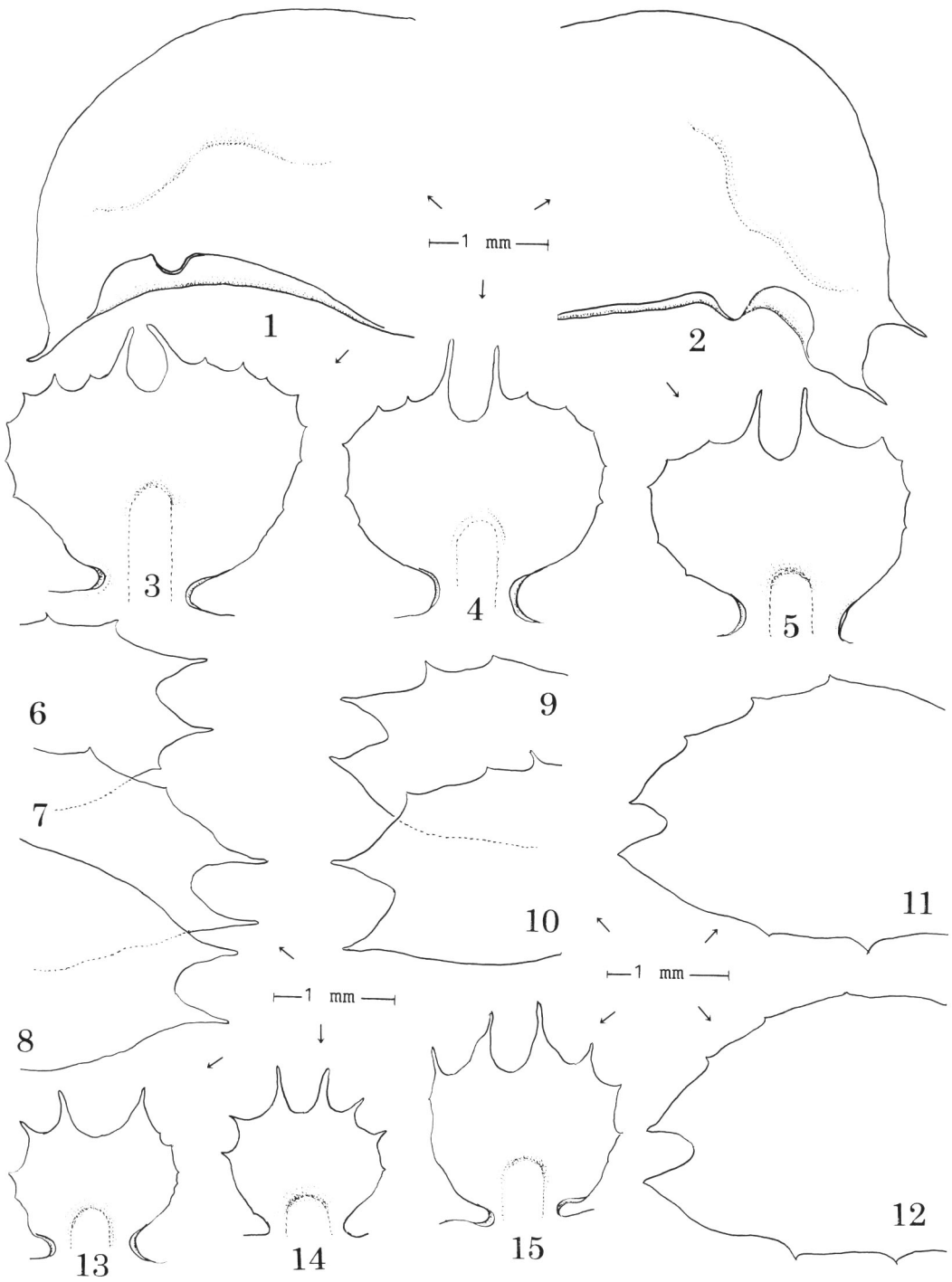


Fig. 1. *Heteroscyphus aselliformis* (1–5) and *Heteroscyphus acutangulus* (6–15). 1, 2. Stem leaves. 3–5. Underleaves. 6–12. Apical portions of stem leaves. 13–15. Underleaves. Figs. 1–5 drawn from Sugimura 1568 and 6–15 drawn from Higuchi 31547.

neo, Amboina, Ceram, New Guinea, Solomon Islands, East Africa, Mauritius, Seychelles. (cf. Miller *et al.*, 1983).

Notes. This species is characterized by (1) stem leaves narrowly ovate, apices obtuse, margins entire, and (2) underleaves quadrate, imbricate, apices 1/3–1/5 bilobed, with small and short teeth on both margins, and connate with lateral leaves on both sides. This species is easily distinguished from known other species by only one character of narrowly ovate stem leaves with obtuse apices and entire margins.

This species has been reported by Miller *et al.* (1983) as *Heteroscyphus decurrens* from Vanuatu. Grolle & Piippo (1984) reduced *H. decurrens* to a synonym of *H. splendens*.

Acknowledgements

We wish to express our sincere thanks to Dr.

M. Higuchi of National Science Museum, Tokyo, for loan of the specimens. The material was collected with aid of a Grant-in-Aid for Scientific Research Program (no. 08041165 to Dr. T. Iwashina) of the Ministry of Education, Culture, Sports, Science and Technology in Japan.

References

- Grolle, R. & S. Piippo, 1984. Annotated catalogue of Western Melanesian bryophytes, I. Hepaticae and Anthocerotae. *Acta Bot. Fennica*, **125**: 1–86.
- Jovet-Ast, S., 1950. Hépatiques des Nouvelles-Hébrides. Récoltes de E. Aubert de la Rüe, 1934. *Rev. Bryol. Lichénol.*, **20**(1–2): 96–98.
- Miller, H. A., H. O. Whittier & B. A. Whittier, 1983. Prodromus Florae Hepaticarum Polynesiae with a key to genera. 423 pp. J. Cramer Vaduz.
- Piippo, S., 1985. Bryophyte flora of the Huon Peninsula, Papua New Guinea. XII. Geocalycaceae (Hepaticae). *Acta Bot. Fennica*, **131**: 129–167.