

A PRELIMINARY SURVEY OF HEPATICAE OF LITTLE ANDAMAN ISLAND

DEVENDRA SINGH*, MONALISA DEY AND GAUTAM KUMAR UPADHYAY
 Botanical Survey of India, Central National Herbarium, Howrah 711 103
 *devenbsi@rediffmail.com

The Little Andaman Island lies a little towards the south of the Great Andaman group (North, Middle and South Andaman) from which it is separated by the Duncan Passage and covers an area of 739 sq. km. It is separated from the Nicobars by the 10° (Ten Degree) Channel. The climate is warm and humid tropical with the temperature ranging between 20°–32° C. The island receives rainfall twice a year, between May – September from the Southwest monsoon and October – December from the Northeast monsoon, resulting in an average annual rainfall of 3000–3500 mm. The mean relative humidity is between 82 – 85% throughout the year (Banerjee & Guha Roy, 2002).

During a recent collection of liverworts from Little Andaman Island, an area which has not so far been investigated for its bryoflora, 12 species were collected belonging to family Lejeuneaceae (11 species) and Marchantiaceae (01) species. This includes *Cololejeunea gottschei* (Steph.) Mizut., *Lejeunea anisophylla* Mont. and *Marchantia linearis* Lehm. & Lindenb. as new records for the bryoflora of Andaman & Nicobar Islands.

All the specimens cited in the text have been deposited in the Cryptogamic section of the Central National Herbarium, Botanical Survey of India, Howrah (CAL).

ENUMERATION

LEJEUNEACEAE

1. **Acrolejeunea fertilis** (Reinw., Blume & Nees) Schiffn. in Engler & Prantl, Nat. Pflanzenfam. 1(3): 128. 1893; Gradst. in Bryophyt. Biblioth. 4: 85. 1975. *Jungermannia fertilis* Reinw., Blume & Nees in Nova Acta Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur. 12: 211. 1824.

Specimen examined: Corticolous. India: Andaman & Nicobar Islands, Little Andaman, South Hut Bay, c.5 m, 25.05.2008, G.K. Upadhyay 47765.

Distribution: India [Andaman & Nicobar Islands (Andaman, Nicobar)], Sri Lanka, Myanmar, Indonesia, Malaysia, Thailand, Philippines, Vietnam, Moluccas, New Guinea (Gradstein, 1975; Tan & Engel, 1986; Lai & al., 2008).

2. **Caudalejeunea recurvistipula** (Gottsche) Schiffn. in Engler & Prantl, Nat. Pflanzenfam. 1(3): 129. 1893; Mizut. in J. Hattori Bot. Lab. 64: 389. 1988. *Lejeunea recurvistipula* Gottsche in Gottsche, Lindenb. & Nees, Syn. hepat. 326. 1845.

Specimens examined: Corticolous. India: Andaman & Nicobar Islands, Little Andaman, Rabindra Nagar, c.10 m, 22.05.2008, G.K. Upadhyay 47761, 47762.

Distribution: India [Andaman & Nicobar Islands (Andaman)], Sri Lanka, China, Indonesia, Malaysia, Thailand, Philippines, New Caledonia, New Guinea, Micronesia, Fiji, Australia (Onraedt, 1981; Mizutani, 1988; Tan & Engel, 1986; Piippo 1990; Zhu & So, 2001; Joshi, 2001; McCarthy, 2006; Lai & al., 2008).

3. **Cololejeunea desciscens** Steph. in Hedwigia 34: 248. 1895; D.K.Singh, Sushil K.Singh & M.Dey in Phytotaxonomy 6: 100. 2006.

Specimens examined: Foliicolous. India: Andaman & Nicobar Islands, Little Andaman, Krishna Nala, c.25 m, 21.05.2008, G.K. Upadhyay 47751.

Distribution: India [Andaman & Nicobar Islands (Andaman)], Bangladesh, Sri Lanka, China, Cambodia, Indonesia, Thailand, Vietnam, Papua New Guinea (Piippo 1990; Zhu & So, 2001; Singh & al., 2006; Lai & al., 2008).

4. *Cololejeunea gottschei* (Steph.) Mizut. in J. Hattori Bot. Lab. 28: 117. 1965; G.Asthana & S.C.Srivast. in Bryophyt. Biblioth. 60: 56. 2003. *Physocolea gottschei* Steph., Sp. hepat. 5: 894. 1916. (Fig. 1: 1 – 3)

Specimens examined: Foliicolous. India: Andaman & Nicobar Islands, Little Andaman, Krishna Nala, c.25 m, 21.05.2008, G.K. Upadhyay 47752, 47753.

Distribution: India [Western Ghats (Karnataka), Andaman & Nicobar Islands (Andaman – present study)], Bangladesh, Sri Lanka, China, Cambodia, Malaysia, Thailand, Vietnam, Philippines, New Guinea (Onraedt, 1981; Zhu & So, 2001; Asthana & Srivastava, 2003; Lai & al., 2008).

5. *Lejeunea anisophylla* Mont. in Ann. Sci. Nat., Bot., Sér. 2. 19: 263. 1843; M.Dey, D.Singh & D.K.Singh in Indian J. Forest. 32: 675. 2009. (Fig. 1: 4 – 6)

Specimens examined: Corticolous. India: Andaman & Nicobar Islands, Little Andaman, South Hut Bay, c.5 m, 25.05.2008, G.K. Upadhyay 47766, 47767.

Distribution: India [Eastern Himalaya (Arunachal Pradesh, Meghalaya, Sikkim), Andaman & Nicobar Islands (Andaman – present study)], Sri Lanka, China, Japan, Indonesia, Malaysia, Thailand, Micronesia, Hawaii, Papua New Guinea, New Caledonia, Philippines, Tahiti, Tonga, Samoa, Vietnam, Australia (Onraedt, 1981; Tan & Engel, 1986; Piippo, 1990; Yamada & Iwatsuki, 2006; Zhu & So, 2001; Singh & Nath, 2007; Lai & al., 2008; Dey & al., 2009).

6. *Lejeunea flava* (Sw.) Nees, Naturgesch. Eur. Leberm. 3: 277. 1838; Sushil K.Singh & D.K.Singh in Geophytology 32: 115. 2004. *Jungermannia flava* Sw., Prodr. 144. 1788.

Specimens examined: Corticolous. India: Andaman & Nicobar Islands, Little Andaman, Rabindra Nagar, c.10 m, 22.05.2008, G.K. Upadhyay 47763.

Distribution: India [Eastern Himalaya (Arunachal Pradesh, Assam, Meghalaya, Sikkim, West Bengal), Western Himalaya (Himachal Pradesh), Western Ghats (Karnataka, Tamil Nadu), Andaman & Nicobar Islands (Andaman)], Nepal, Bhutan, Sri Lanka, China, Indonesia, Philippines, Thailand, Japan, Korea, New Zealand, Jamaica, North & South America, Europe, Africa, Australia (Mizutani, 1971; Schuster, 1980; Onraedt, 1981; Tan & Engel, 1986; Piippo, 1990; Long & Grolle, 1990; Grolle, 1995; Wigginton & Grolle, 1996; Joshi, 2001; Singh & Singh, 2004; McCarthy, 2006; Yamada & Iwatsuki, 2006; Song & Yamada, 2006; Singh & Nath, 2007; Verma & Srivastava, 2008; Singh & al., 2008; Lai & al., 2008; Dey & al., 2009).

7. *Leptolejeunea balansae* Steph. in Hedwigia 35: 105. 1896; U.S.Awasthi in J. Indian Bot. Soc. 65: 119. 1986.

Specimens examined: Foliicolous. India: Andaman & Nicobar Islands, Little Andaman, Krishna Nala, c.25 m, 21.05.2008, G.K. Upadhyay 47754, 47755.

Distribution: India [Eastern Himalaya (Arunachal Pradesh, Sikkim, West Bengal), Western Ghats (Tamil Nadu), Andaman & Nicobar Islands (Andaman Islands)], Cambodia, China, Indonesia, Laos, Malaysia, Thailand, Vietnam (Awasthi, 1986; Piippo, 1990; Joshi, 2001; Zhu & So, 2001; Daniels & Daniel, 2004; Singh & al., 2006, 2008; Lai & al., 2008; Dey & al., 2009).

8. *Leptolejeunea epiphylla* (Mitt.) Steph., Sp. hepat. 5: 380. 1913; D.K.Singh, Sushil K.Singh & M.Dey in Phytotaxonomy 6: 101. 2006. *Lejeunea epiphylla* Mitt. in J. Proc. Linn. Soc., Bot. 5: 118. 1861.

Specimens examined: Foliicolous. India: Andaman & Nicobar Islands, Little Andaman, Krishna Nala, c.25 m, 21.05.2008, G.K. Upadhyay 47756, 47757, 47758.

Distribution: India [Andaman & Nicobar Islands (Andaman, Nicobar)], China, Sri Lanka, Thailand, Malaysia, Philippines, Japan, Papua New Guinea, Solomon Islands, Laos, Cambodia, New Caledonia, Tahiti, Africa (Herzog, 1942; Onraedt, 1981; Tan & Engel, 1986; Piippo, 1990; Zhu & So, 2001; Yamada & Iwatsuki, 2006; Singh & al., 2006; Lai & al., 2008).

9. *Leptolejeunea maculata* (Mitt.) Schiffn., Consp. Hep. Arch. Ind. 275. 1898. D.K.Singh, Sushil K.Singh & M.Dey in Phytotaxonomy 6: 101. 2006. *Lejeunea maculata* Mitt. in J. Proc. Linn. Soc., Bot. 5: 118. 1861. (Fig. 1: 7 – 10)

Specimens examined. Foliicolous. India: Andaman & Nicobar Islands, Little Andaman, Krishna Nala, c.25 m, 21.05.2008, G.K. Upadhyay 47759, 47760.

Distribution: India [Western Ghats (Karnataka), Andaman & Nicobar Islands (Andaman)], China, Sri Lanka, Indonesia, Thailand, Philippines, New Guinea, Samoa, Australia (Onraedt, 1981; Awasthi, 1986; Tan & Engel, 1986; Zhu & So, 2001; McCarthy, 2006; Singh & al., 2006; Lai & al., 2008).

Note: *L. maculata* is a highly variable species, the leaf margin is usually serrate – sometimes nearly entire, underleaf lobes are uniseriate throughout or biseriate at base and uniseriate above. The ocelli are arranged in non continuous longitudinal series. However, the specimen G.K. Upadhyay 47760 is slightly atypical in having leaves usually with entire margins, rarely very slightly serrate towards apex, with the ocelli arranged in zig-zag row (Fig. 1: 7 – 9) and underleaf lobes always biseriate at base and uniseriate above (Fig. 1: 10).

10. *Lopholejeunea subfusca* (Nees) Schiffn. in Bot. Jahrb. Syst. 23: 593. 1897; R.L.Zhu & Gradst. in Syst. Bot. Monog. 74: 72. 2005. *Jungermannia subfusca* Nees, Enum. Pl. Crypt. Jav. 36. 1830.

Specimens examined: Corticolous. India: Andaman & Nicobar Islands, Little Andaman, Vivekananda Nagar, c.5 m, 23.05.2008, G.K. Upadhyay 47764B.

Distribution: India [Eastern Himalaya (Assam, Meghalaya, Sikkim, West Bengal), Western Ghats (Karnataka, Kerala, Tamil Nadu), Andaman & Nicobar Islands (Andaman)], Bangladesh, Nepal, Bhutan, China, Sri Lanka, Thailand, Indonesia, Philippines, Malaysia, Japan, Cambodia, Vietnam, Tahiti Islands, Papua New Guinea, New Caledonia, Caroline Islands, Africa, Australia (Mizutani, 1961; Onraedt, 1981; Long & Grolle, 1990; Awasthi & al., 2000; Joshi, 2001; Zhu & Long, 2003; Zhu & Gradstein, 2005; Singh & al., 2006; McCarthy, 2006; Lai & al., 2008).

11. *Mastigolejeunea auriculata* (Wilson) Schiffn. in Engler & Prantl, Nat. Pflanzenfam. 1(3): 129. 1895. *Jungermannia auriculata* Wilson in Drumm., Musci Amer. Exsic. no. 170. 1841. *Mastigolejeunea humilis* (Gottsche) Schiffn. in Engler & Prantl, Nat. Pflanzenfam. 1(3): 129. 1895; U.S.Awasthi & Udar in Proc. Indian Acad. Sci. (Plant Sci.) 93: 485. 1984.

Specimens examined: Corticolous. India: Andaman & Nicobar Islands, Little Andaman, Vivekananda Nagar, c.5 m, 23.05.2008, G.K. Upadhyay 47764A.

Distribution: India [Western Ghats (Kerala), Andaman & Nicobar Islands (Andaman, Nicobar)], Nepal, Bhutan, China, Sri Lanka, Thailand, Indonesia, Philippines, Malaysia, Japan, Tahiti Islands, New Guinea, New Caledonia, Caroline Islands, Moluccas, Australia (Onraedt, 1981; Awasthi & Udar, 1984; Tan & Engel, 1986; Piippo, 1990; Long & Grolle, 1990; Joshi, 2001; Zhu & Long, 2003; Yamada & Iwatsuki, 2006; McCarthy, 2006; Lai & al., 2008).

MARCHANTIACEAE

12. *Marchantia linearis* Lehm. & Lindenb. in Lehm., Nov. stirp. pug. 4: 8. 1832; V.B.Singh in Bull.Lucknow Natl. Bot. Gard. 125: 13. 1966. (Fig. 1:11 – 14)

Specimens examined: Terricolous. India: Andaman & Nicobar Islands, Little Andaman, 4 km from Nanjappa Nagar towards Water fall, c.20 m, 16.05.2008, G.K. Upadhyay 47750.

Distribution: India [Eastern Himalaya (Assam, Meghalaya, Sikkim, West Bengal), Central India (Madhya Pradesh), Punjab & Rajasthan Plains (Punjab), Western Ghats (Kerala), Andaman & Nicobar Islands (Andaman – present study)], Pakistan, Nepal, Indonesia (Mitten, 1861; Chopra, 1943; Singh, 1966; Nair & al., 2005; Asthana & Nath, 2007; Singh & al., 2008).

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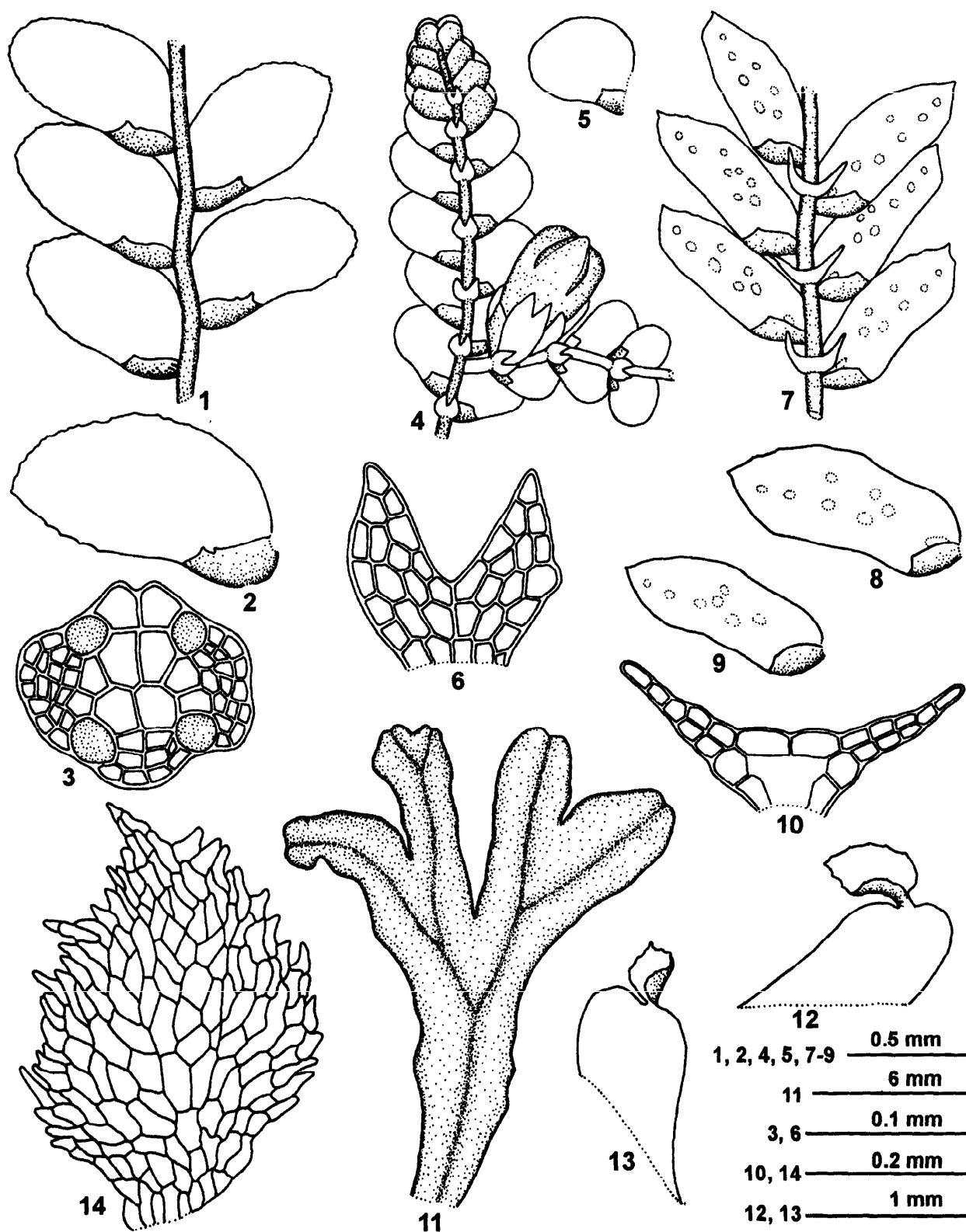


Fig 1. *Cololejeunea gottschei* (Steph.) Mizut. : 1. a portion of plant in ventral view (rhizoids not drawn); 2. a leaf; 3. a gemma; *Lejeunea anisophylla* Mont. 4. a portion of plant in ventral view (rhizoids not drawn); 5. a leaf; 6. an underleaf; *Leptolejeunea maculata* (Mitt.) Schiffn. 7. a portion of plant in ventral view (rhizoids not drawn); 8, 9. leaves; 10. an underleaf; *Marchantia linearis* Lehm. & Lindenb. 11. a portion of thallus in dorsal view; 12, 13. ventral scales; 14. an appendage (Figures 1 – 3 from G.K. Upadhyay 47752; 4 – 6 from G.K. Upadhyay 47767; 7 – 10 from G.K. Upadhyay 47760; 11 – 14 from G.K. Upadhyay 47750).

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