

DIVERSITY OF LIVERWORTS AND HORNWORTS IN PITHORAGARH AND ITS NEIGHBOURING AREAS,
WESTERN HIMALAYA OF INDIA

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ABSTRACT

An enumeration of 30 taxa of liverworts belonging to 13 families and single taxon of hornwort of Pithoragarh and its neighbouring areas (Mayawati-Lohaghat) has been made. One liverwort, *Lejeunea aquatica* Horik. has been recorded as new to India, four liverworts *Frullania neurota* Taylor, *F. companulata* Sde., *Lejeunea brittoniae* (Evans) Grolle, and *L. cavifolia* (Ehrh.) Lindb. were new to western Himalaya, while 6 liverworts and one hornwort were new to Kumaon Himalaya.

Key words : Liverworts, Pithoragarh, Uttarakhand, India.

Introduction

Pithoragarh is known for its natural beauty, bordering in the west district Almora and Garhwal. In the extreme north the Himalayan peaks like Panchachuli separate it from Tibet and Kali river forms the boundary in the east separating it from Nepal. Various workers from time to time made an attempt to provide consolidated account on liverworts of western Himalaya (Kashyap, 1929, 1932; Tewari and Pant, 1994; Singh and Singh, 2007, 2008; Srivastava, 2008). The present study is an outcome of extensive survey and collection of liverworts and Hornworts in Pithoragarh and its neighbouring areas (Mayawati-Lohaghat). During the course of bryological exploration in western Himalaya, the authors came across some interesting findings of bryophytes. An enumeration of liverworts and hornworts of this area is provided with ecology and distribution, range in India and abroad along with details of specimens examined.

Material and Methods

The plants were collected from the area mentioned above have been deposited in the Bryophyte Herbarium, National Botanical Research Institute, Lucknow (LWG). Classifications of Schuster (1984) for liverworts have been followed for identifying the specimens.

ENUMERATION

Hepaticopsida

Family – Aneuraceae

1. *Riccardia tenuicostata* Schiffn. Denkschr. Akad. Wiss., Math.-Naturwiss. Kl. 67: 166 (1898).

Habitat: on wet rock, 1520 m.

Range of Distribution: Eastern Himalaya (Darjeeling), South India (Tamil Nadu), western Himalaya (Himachal Pradesh – GHNP, Uttarakhand); Indonesia, Singapore.

Specimens Examined: India, western Himalaya, Uttarakhand, Lohaghat, near Bajaj Service station 18-3-2007, leg. Vinay Sahu; 247596D (LWG), on way to Mayawati, Lohaghat, 19-3-2007, leg. Vinay Sahu; 247631D, 247634D (LWG).

Family – Aytoniaceae

2. *Asterella wallichiana* (Lehm. et Lindenb.) Grolle, *Untern. Forsch. Unternehmes*, Nepal Himalaya, 1(4): 262 (1966).

Habitat: On wall, 1489 m.

Range of Distribution: Central India (Pachmarhi), eastern Himalaya (Darjeeling), South India (Maharashtra, Pratabgarh), western Himalaya (Mussoorie, Pithoragarh); Myanmar, Nepal.

Specimens Examined: India, western Himalaya, Uttarakhand, Pithoragarh, near Nagar Mahapalika office, 17-03-2007, leg. Vinay Sahu; 247585A (LWG).

3. *Plagiochasma appendiculatum* (Lehm. et Lindenb.) Lehm. et Lindenb., Pag. IV. 14 (1832).

Habitat: On soil covered rock, 1246 - 1398 m.

Range of Distribution: Central India (Amarkantak, Pachmarhi), eastern Himalaya (Assam, Darjeeling, Sikkim), Gangetic Plains (Uttar Pradesh), Punjab and west Rajasthan plain, South India (Maharashtra, Munnar, Tamil Nadu), western Himalaya (Dhanolti, Himachal Pradesh- GHNP, Kangra, Kullu, Simla, Nainital,

Liverwort, *Lejeunea aquatica* collected from Pithoragarh was found to be new to India.

Mussoorie, Ranikhet); Afghanistan, Africa, China, Myanmar, Nepal, Pakistan, Philippines, Vietnam.

Specimens Examined: India, western Himalaya, Uttarakhand, Pithoragarh, near DRDO residential complex, 17-3-2007, leg. Vinay Sahu; 247575A (LWG), on way to Lohaghat from Pithoragarh, 18-3-2007, leg. Vinay Sahu; 247589A (LWG), Near Bajaj Service station Lohaghat, 18-3-2007, leg. Vinay Sahu; 247599C, 247601D, 247609C (LWG), on way to Mayawati Lohaghat, 19-3-2007, leg. Vinay Sahu; 247616A, 247617B (LWG).

4. *Plagiochasma intermedium* Ldbg. et G. G. L. and Nees, *Syn. Hep.*, 513 (1846).

Habitat: On soil, 1520 m.

Range of Distribution: Central India (Amarkantak, Bhopal, Pachmarhi, Sagar, Kota, Mount Abu), eastern Himalaya (Meghalaya - Cherrapunji), Gangetic Plain (Lucknow, Ranchi), South India (Nagpur, Panchgani, Purandhar), western Himalaya (Dalhousie, GHNP, Mukteshwar), Punjab & west Rajasthan plain; China, Gautemala, Japan, Korea, Manchuria, Mexico, Philippines, Taiwan.

Specimens Examined: India, western Himalaya, Uttarakhand, Lohaghat, near petrol pump, 18-3- 2007, leg. Vinay Sahu; 247592B (LWG).

5. *Plagiochasma pterospermum* Mass *Mem. Acad. Agric. Verona*, 73: 46 (1897). *Syn. Plagiochasma articulatum* Kashyap, *New Phyt.* Vol 13: 320 (1914).

Habitat: On soil, 1793 m.

Range of Distribution: Central India (Pachmarhi), eastern Himalaya (Darjeeling), Punjab and west Rajasthan plain, South India (Maharashtra - Mahabaleshwar, Mumbai, Nilgiri Hills, Ootacamund, Panchgani), western Himalaya (Dalhousie, Dehradun, Kumaon Himalaya, Ladakh, Leh, Mussoorie, Simla); Bhutan, China, Japan, Korea, Nepal, Pakistan, Philippines.

Specimens Examined: India, western Himalaya, Uttarakhand, Pithoragarh, Thalkedar forest, 16-3-2007, leg. Vinay Sahu; 247568A, 247569A (LWG).

6. *Reboulia hemispherica* (L.) Raddi. *Opusc. Scient. di Bologna*, 11, P. 357 (1818).

Habitat: On soil covered rock and on fallen log, 1246 – 1793 m.

Range of Distribution: Central India (Madhya Pradesh), eastern Himalaya (Darjeeling, Meghalaya), Gangetic plains (Uttar Pradesh), Punjab and west Rajasthan plain, South India (Chennai, Kanghan Valley, Nilgiris, Tinnevely Hills), western Himalaya (Dhanolti, Himachal Pradesh - Dalhousie, GHNP, Kulu, Kyelong, Lahul, Pangi, Simla, Spiti Kausani, Mussoorie); Afghanistan, Africa, Australia, Bermuda, Bhutan, Borneo, China, Europe, Formosa,

Japan, Java, Indonesia, Iran, Macronesia, Melanesia, Mexico, Nepal, Pakistan, Polynesia, South America, Sumatra, Syria, Turkey, West Indies.

Specimens Examined: India, western Himalaya, Uttarakhand, Pithoragarh, Thalkedar forest, 16-3-2007, leg. Vinay Sahu; 247544C, 247546C (LWG), near DRDO residential complex, Pithoragarh, 17-3-2007; 247581A (LWG), on way to Lohaghat from Pithoragarh, 18-3-2007; 247590A (LWG), Near Bajaj Service station, Lohaghat, 18-3-2007; 247596B, 247601D, 247609B (LWG), on way to Mayawati, Lohaghat, 19-3-2007; 247637B (LWG).

Family - Cephaloziellaceae

7. *Cephaloziella magna* Udar et Nath, *Geophytology*, 6(1): 105 (1976).

Habitat: On wet rock, 1520 m.

Range of Distribution: Western Himalaya (Almora).

Specimens Examined: India, western Himalaya, Uttarakhand, Lohaghat, on way to Mayawati, 19-3-2007, leg. Vinay Sahu; 247631C (LWG).

Family - Frullaniaceae

8. *Frullania ericoides* (Nees) Mont., *Ann. Sc. Bot. Ser.* 2, 12: 51 (1839).

Habitat: Epiphytic, 1489 – 1824 m.

Range of Distribution: Central India (Pachmarhi), eastern Himalaya (Assam, Darjeeling, Khasia and Jaintia Hills), South India (Kerala- Waynad, Kodaikanal, Ootacamund, Tamil Nadu – Nilgiris), western Himalaya (Almora, Chamba, Dehradun, Dwali, Garhwal, GHNP, Jammu and Kashmir Hills, Mussoorie, Nainital, Phurkia, Tapovan); Africa, Australia, Bhutan, Borneo, Caledonia, China, Europe, Hawaii, Indonesia, Japan, Java, Korea, Macronesia, Melanesia, Nepal, North, central & South America, Philippines, Sumatra, Sri Lanka, Taiwan.

Specimens Examined: India, western Himalaya, Uttarakhand, Pithoragarh, Thalkedar forest, 16-3-2007, leg. Vinay Sahu; 247538A, 247543A, 247546, 247551C, 247559C, 247563A, 247564E, 247571A, 247573A (LWG), Near Nagar Mahapalika office, Pithoragarh, 17-3-2007; 247584A, (LWG), on way to Mayawati, Lohaghat, 19-3-2007; 247640B, 247642A, 247643A (LWG).

9. *Frullania muscicola* Steph., *Hedwigia* 33: 146 (1894).

Habitat: Epiphytic, 1429 - 1824 m.

Range of Distribution: Central India (Madhya Pradesh), eastern Himalaya (Assam, Meghalaya, Sikkim), South India (Tamil Nadu), western Himalaya (Garhwal- Mussoorie Himachal Pradesh- GHNP); China, Formosa, Japan, Korea, Manchuria, Saghalin.

Specimens Examined: India, western Himalaya, Uttarakhand, Pithoragarh, Thalkedar forest, 16-3-2007,

leg. Vinay Sahu; 247560A (LWG), near Petrol Pump, Lohaghat, 18-3-2007; 247593A, (LWG), on way to Mayawati, Lohaghat, 19-3-2007; 247623B, 247626A, 247636A (LWG). New to Kumaon Himalaya.

10. *Frullania neurota* Taylor in *J. Bot.*, 5: 40(1846); Chopra in *J. Indian Bot. Soc.* 22:249 (1943).

Habitat: Epiphytic, on rock, 1398–1672 m.

Range of Distribution: Eastern Himalaya (Darjeeling, Meghalaya, Sikkim), South India (Tamil Nadu); Bhutan, China, Hawaii, Java, Mexico, Myanmar, Nepal, Sri Lanka, Vietnam.

Specimens Examined: India, western Himalaya, Uttarakhand, Lohaghat, on way to Mayawati, 19-3-2007, leg. Vinay Sahu; 247611A, 247641B (LWG). New to Western Himalaya.

11. *Frullania companulata* Sde. Lac., *Nederl. Kruidk. Arch.* 3: 422 (1854).

Habitat: Epiphytic, 1763 m.

Range of Distribution: South India (Katherin fall, Kodaikanal, Kotagiri, Nilgiri Mont, Tamil Nadu).

Specimens Examined: India, western Himalaya, Uttarakhand, Pithoragarh, Thalkedar forest, 16-3-2007, leg. Vinay Sahu; 247541 A (LWG). New to Western Himalaya.

Family – Geocalycaceae

12. *Chiloscyphus himalayensis* St., *Sp. Hep.*, 3: 209 (1907).

Habitat: on wet soil covered rock and on fallen log, 1520–1793 m.

Range of Distribution: Western Himalaya (Bhowali, Chaubatia, Kausani, Kilbury, Mussoorie, Nainital, Seetlakheth), Himachal Pradesh.

Specimens Examined: India, western Himalaya, Uttarakhand, Pithoragarh, Thalkedar forest, 16-3-2007, leg. Vinay Sahu; 247572B (LWG), on way to Mayawati, Lohaghat, 19-3-2007; 247637A (LWG).

13. *Heteroscyphus argutus* (Reinw. et al.) Schiffn., *Oesterr. Bot. Zeitschr.*, 60: 172 (1910). Syn. *Chiloscyphus argutus* (Reinw. et al.) Nees, in Gott. et al., *Syn. Hepat.*: 183 (1845).

Habitat: on soil and on wet rock, 1520–1580 m.

Range of Distribution: Central India (Pachmarhi), eastern Himalaya (Assam, Darjeeling, Khasi and Jaintia Hills, Manipur, Sikkim), South India (Kerala, Kodaikanal, Tamil Nadu- Ootacamund), western Himalaya (Himachal Pradesh); Australia, China, Japan, Java, Nepal.

Specimens Examined: India, western Himalaya, Uttarakhand, Lohaghat, near Bajaj Service station, 18-3-2007, leg. Vinay Sahu; 247597A, (LWG), on way to

Mayawati, Lohaghat, 19-3-2007, leg. Vinay Sahu; 247638B (LWG).

14. *Lophocolea himalayensis* Srivast. et Srivast. *Indian Geocalycaceae (Hepaticae)*, pp. 182–186 (2001).

Habitat: on soil covered rock and on wet rock, 1520 m.

Range of Distribution: Western Himalaya (Ghangaria, Rialkot-Bogdiyar, Valley of Flowers).

Specimens Examined: India, western Himalaya, Uttarakhand, Lohaghat, on way to Mayawati, 19-3-2007, leg. Vinay Sahu; 247630B, 247633G (LWG).

Family – Jungermanniaceae

15. *Solenostoma subrubrum* (Schiffn. ex Steph.) Vana et D. G. Long, *Jungermanniaceae of the Sino-Himalayan region*, *Nova Hedwigia* 89(3-4): 508 (2009). Syn: *Jungermannia subrubra* Schiffn. ex Steph., *Spec. Hepat.* 6: 93 (1924).

Habitat: on wet rock, 1520 m.

Range of Distribution: Eastern Himalaya (Darjeeling, Meghalaya, Sikkim-Kurseong), western Himalaya (Himachal Pradesh – Kullu); Bhutan, Nepal, Taiwan.

Specimens Examined: India, western Himalaya, Uttarakhand, Lohaghat, on way to Mayawati, 19-3-2007, leg. Vinay Sahu; 247630E (LWG). New to Kumaon Himalaya.

16. *Solenostoma comatum* (Nees) C. Gao, *Syn: Jungermannia comata* Nees. in *Jungermanniaceae of the Sino-Himalayan region*, *Nova Hedwigia* 89(3-4): 497 (2009).

Habitat: On soil, 1520 m.

Range of Distribution: Eastern Himalaya (Assam, Darjeeling, Meghalaya, Sikkim), western Himalaya (Himachal Pradesh – Kullu); China, Nepal.

Specimens Examined: India, near Bajaj Service Station, Lohaghat, 18-3-2007, leg. Vinay Sahu; 247595A (LWG). New to Kumaon Himalaya.

Family – Lejeuneaceae

17. *Lejeunea aquatica* Horik. *Sci. Rep. Tohoku Imp. Univ. ser. 4*, 5: 643f.11(1930).-*Lejeunea minutilobula* Horik. *Jour. Sci. Hiroshima Univ. ser. B, div. 2*, 2: 274, f. 58 (1934). (Exsicc.) Hatt. *Hepat. Jap.* 3: 134 (1950); 9: 427 (1958).

Habitat: on fallen log, 1520 m

Range of Distribution: Formosa, Japan.

Specimens examined: India, western Himalaya, Uttarakhand, on way to Mayawati, Lohaghat 19.03.2007, leg. Vinay Sahu, 247635 A (LWG). New to India.

18. *L. brittoniae* (Evans) Grolle, *Bryophyt.. Biblioth.* 48: 81. 1995 (= *Rectolejeunea brittoniae* Evans, *Bull. Torrey Bot. Club* 38: 209, 1911).

Habitat: Epiphytic, 1672 m.

Range of Distribution: South India (Tamil Nadu); Tanzania.

Specimens examined: India, western Himalaya, Uttarakhand, on way to Mayawati, Lohaghat 19.03.2007, leg. Vinay Sahu, 247640D (LWG). New to western Himalaya.

19. *Lejeunea cavifolia* (Ehrh.) Lindb., Acta Soc. Sci. Fenn. 10: 43 (1871).

Habitat: Epiphytic, 1520 m.

Range of Distribution: Eastern Himalaya (Assam, Darjeeling, Meghalaya), western Himalaya (Mussoorie) South India (Kodaikanal); Black sea, Caucasus, Europe, Nepal, North America, Russia, Siberia.

Specimens Examined: India, western Himalaya, Uttarakhand, near Bajaj Service station Lohaghat, 18-3-2007, leg. Vinay Sahu; 247601A (LWG). New to Kumaon Himalaya.

20. *Lejeunea curviloba* Steph., Spec. Hepat. 5: 774 (1915).

Habitat: On soil, on wet rock, 1520 m.

Range of Distribution: Eastern Himalaya (Assam, Darjeeling, Meghalaya); Japan.

Specimens Examined: India, western Himalaya, Uttarakhand, on way to Mayawati, Lohaghat, 19-3-2007, leg. Vinay Sahu; 247611G (LWG). New to Western Himalayas

21. *Lejeunea tuberculosa* Steph., Sp. Hepat. 5: 790 (1915).

Habitat: Epiphytic, 1824 m.

Range of Distribution: Eastern Himalaya (Arunachal Pradesh, Assam, Meghalaya, Sikkim, West Bengal), South India (Kerala, Tamil Nadu), western Himalaya (Uttarakhand); Africa, Bhutan, China, Indonesia, Nepal, Philippines.

Specimens Examined: India, western Himalaya, Uttarakhand, Thalkedar Forest, Pithoragarh, 16-3-2007, leg. Vinay Sahu; 247554D (LWG).

Family - Marchantiaceae

22. *Marchantia paleacea* Bertrol. Opusc. Sci (Bologna) 1: 242 (1817). Syn. *Marchantia nepalensis* Lehm. et Lindenb. in Lehmann, Nov. Strip. Pug. 4: 10 (1832).

Habitat: On soil covered rock, 1246–1824 m.

Range of Distribution: Central India (Pachmarhi), eastern Himalaya (Assam, Darjeeling, Meghalaya, Nagaland, Sikkim), South India (Tamil Nadu), western Himalaya (Dhanolti, Kausani, Mussoorie, Nainital, Ranikhet), Jammu & Kashmir, Himachal Pradesh (Dalhousie, GHNP),

Gangetic plains; Africa, Bhutan, China, Europe, Indonesia, Japan, Macronesia, Melanesia, Nepal, North and Pakistan, Polynesia, south America.

Specimens Examined: India, western Himalaya, Uttarakhand, Thalkedar forest, Pithoragarh, 16-3-2007, leg. Vinay Sahu; 247565A, 247566A (LWG), Near DRDO residential complex, Pithoragarh, 17-3-2007, leg. Vinay Sahu; 247577A, 247578A (LWG), Near Siltha Taxi Stand, 17-3-2007; 247582A (LWG), Near Bajaj Service station Lohaghat, 18-3-2007; 247597B, 247606A (LWG), on way to Mayawati, Lohaghat, 19-3-2007; 247617A, 247620 (LWG).

Family - Pelliaceae

23. *Pellia endiviifolia* (Dicks) Dum. Rec. d' Obs. Jungern. 27(1835); Syn. *Pellia calycina* (Tayl.) Nees. Hep. Eur. Lab. 3: 386 (1838).

Habitat: On wet rock, 1459-1520 m.

Range of Distribution: Eastern Himalaya (Assam, Sikkim), western Himalaya (Himachal Pradesh- Dalhousie, GHNP, Kashmir, Kulu, Nainital, Pangi, Simla); Africa, Bhutan, China, Europe, Japan, Korea, Nepal, North America, Pakistan, Turkey.

Specimens Examined: India, western Himalaya, Uttarakhand, near Bajaj Service station Lohaghat, 18-3-2007, leg. Vinay Sahu; 247596A (LWG), on way to Mayawati, Lohaghat, 19-3-2007s; 247627A (LWG).

Family - Plagiochilaceae

24. *Plagiochila uniformis* Mitt., J Proc. Linn. Soc., Bot. 5: 98 (1861); So. Syst. Bot. Monogr. 60 (2001).

Habitat: On soil, on wet rock, 1398-1580 m.

Range of Distribution: Eastern Himalaya (Assam, Darjeeling, Manipur, Meghalaya), western Himalaya (Mussoorie, Simla); Bhutan, Nepal, Pakistan, Thailand.

Specimens Examined: India, western Himalaya, Uttarakhand, near Bajaj Service station Lohaghat, 18-3-2007, leg. Vinay Sahu; 247596C (LWG), on way to Mayawati, Lohaghat, 19-3-2007; 247613C, 247638A (LWG). New to Kumaon Himalaya.

25. *Plagiochila nepalensis* Lindenb., Sp. Hepat. (*Plagiochila* fasc. 2- 4): 93 (1840); Rawat and Srivastava, Genus *Plagiochila* in eastern Himalaya (India) pp 176-183 (2007).

Habitat: Epiphytic, on rock, 2140 m.

Range of Distribution: Eastern Himalaya (Arunachal Pradesh, Assam, Darjeeling, Kurseong, Meghalaya, Sikkim), Punjab and Rajasthan Plains, South India (Karnataka- Nandi Hills, Kerala- Vagavurrai, Kodaikanal, Madurai, Nilgiris, Palni Hills, Periakulam, Shembagnur, Tamil Nadu–Ootacamund), western Himalaya

(Mussoorie, Simla, Valley of Flowers); Bhutan, China, Indonesia, Japan, Myanmar, Nepal, Philippines, Thailand, Vietnam.

Specimens Examined: India, western Himalaya, Uttarakhand, near Bajaj Service station Lohaghat, 18-3-2007, leg. Vinay Sahu; 247604A (LWG), on way to Mayawati, Lohaghat, 19-3-2007, leg. Vinay Sahu; 247612A (LWG).

Family – Radulaceae

26. *Radula complanata* (L.) Dumort. Syll. Jungerm. Europ., 38: (1831).

Habitat: Epiphytic, 1520 m.

Range of Distribution: Eastern Himalaya (Sikkim), western Himalaya (Alwas, Dalhousie, Himachal Pradesh – GHNP, Jalori Pass, Pangri Road, Rohtang Pass, Uttarakhand, Jammu & Kashmir), South India (Tamil Nadu); Afghanistan, China, Central and South America, Europe, Iran, Japan, Macronesia, Nepal, North Africa, North Pakistan.

Specimens Examined: India, western Himalaya, Uttarakhand, near Bajaj Service Station, Lohaghat, 18-3-2007, leg. Vinay Sahu; 247601E (LWG).

27. *Radula grandifolia* Steph., Sp., Hepat. 4: 184 (1910).

Habitat: Epiphytic, 1824 m.

Range of Distribution: Western Himalaya (Himachal Pradesh – GHNP, Shimla, Jalori Pass); Thailand.

Specimens Examined: India, western Himalaya, Uttarakhand, Thalkedar forest, Pithoragarh, 16-3-2007, leg. Vinay Sahu; 247563D (LWG). New to Kumaon Himalaya.

28. *Radula lindbergiana* Gottsche, Scand. Fl., 9: 98 (1864).

Habitat: Epiphytic, 1580 m.

Range of Distribution: Eastern Himalaya (Darjeeling, Sikkim), South India (Tamil Nadu), western Himalaya (Almora, Deoban, Hemkund, Himachal Pradesh – GHNP, Kullu, Manali, Mussoorie, Nainital, on way to Rohtang Pass, Rahla, Jammu & Kashmir, Valley of Flowers); Africa, America, China, Europe, Iran, Korea, Nepal, North Macronesia.

Specimens Examined: India, western Himalaya, Uttarakhand, on way to Mayawati, Lohaghat, 19-3-2007, leg. Vinay Sahu; 247639A (LWG).

Family – Scapaniaceae

29. *Scapania parva* Steph. in Mem. Soc. Sci. nat. Cherbourg, 29: 226 (1894).

Habitat: on wet rock and soil covered rock, 1398-1520 m.

Range of Distribution: Eastern Himalaya (Darjeeling,

Sikkim), western Himalaya (Himachal Pradesh – Kullu, Jammu & Kashmir, Uttarakhand); China, Hawaii, Japan, Polynesia.

Specimens Examined: India, western Himalaya, Uttarakhand, on way to Mayawati, Lohaghat, 19-3-2007, leg. Vinay Sahu; 247615D, 247618C, 247619D, 247630A, 247631A (LWG).

Family – Targioniaceae

30. *Targionia hypophylla* L., Sp. pl., 2: 1136 (1753).

Habitat: On soil, 1824 m.

Range of Distribution: Central India (Madhya Pradesh), eastern Himalaya (Darjeeling, Meghalaya, Sikkim), western Himalaya (Dhanolti, Himachal Pradesh, Kausani, Mussoorie), Punjab and west Rajasthan, South India (Karnataka, Tamil Nadu); Africa, Australia, Bhutan, China, Europe, Japan, Korea, Macronesia, North and South America, Polynesia.

Specimens Examined: India, western Himalaya, Uttarakhand, Thalkedar forest, Pithoragarh, 16-3-2007, leg. Vinay Sahu; 247561A (LWG).

Anthocerotopsida

1. *Phaeoceros kashyapii* Asthana et Srivastava, Bryophytorum Bibliotheca, 42: 129 (1991).

Habitat: on wet rock. 1520 m.

Range of Distribution: Eastern Himalaya (Darjeeling), western Himalaya (Uttarakhand-Deoban and Vyas Shikhar). New to Kumaon Himalaya.

Specimens Examined: India, western Himalaya, Uttarakhand, on way to Mayawati, Lohaghat, 19-3-2007, leg. Vinay Sahu; 247634A (LWG).

Discussion

During the present investigation on the bryophytes of Pithoragarh and its neighbouring areas (Mayawati-Lohaghat) 30 taxa of liverworts belonging to 13 families and one taxa of hornwort have been identified and enumerated. During the study one liverwort *Lejeunea aquatica* Horik. has been reported as new to India, four liverworts (*Frullania neurota*, *F. companulata*, *Lejeunea brittoniae* and *L. cavifolia*) were new to western Himalaya, while 6 liverworts and one hornwort were new to Kumaon Himalaya. It has been observed that terricolous forms were more than epiphytic ones. Among leafy liverworts *Frullania ericoides* and thalloid liverworts *Plagiochasma appendiculatum*, *Reboulia hemispherica* and *Marchantia paleacea* have been frequently found in the area. As far as the leafy liverworts are concerned, families

Lejeuneaceae exhibited maximum number 5 taxa, while Frullaniaceae is represented by 4 taxa. Family Aytoniaceae was represented by a maximum of 5 taxa among thalloid liverworts, however, Aneuraceae,

Marchantiaceae, Pelliaceae, and Targioniaceae were represented by single taxon each. Genus *Lejeunea* has maximum number (5) of species, followed by *Frullania* with 4 species.

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विनय साहू तथा ए.के. अस्थाना

सारांश

तेरह कुलों से संबद्ध लिवरओर्ट के तीस टक्सा तथा पिथौरागढ़ और उसके आसपास के क्षेत्रों में मायावती-लोहाघाट के एकल टक्सोन हार्नबोर्ट की गणना की गई। भारत में पहली बार एक लिवर ओर्ट, लेज्यूनिया अक्वाटिका हार्लिक रिकार्ड किया गया। चार लिवरओर्ट्स पश्चिमी हिमालय के लिये नये थे, यथा: *फ्रूलेनिया न्यूरोटा टेलर*, *एफ. कोम्पानुलाटा* एस डी ई, *लेज्यूनिया ब्रिटोनाई* ईवान्स, *ग्रोल्ली* तथा *एल. केवीफोलिया* ई एच आर एच लिनडीबी। 6 लिवरओर्ट्स तथा एक हार्नओर्ट कुमाँ हिमालय के लिए नये थे।

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