

New bryophyte records in the Balkans: 2

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Abstract. New chorological data are presented for 70 species of bryophytes from Bulgaria. Seven taxa are liverworts (*Marchantiophyta*) belonging to the families *Aneuraceae* (reports no. 1, 2), *Calypogeiaceae* (7), *Cephalozellaceae* (6), *Jungermanniaceae* (3), and *Scapaniaceae* (4, 5). Sixty-three taxa are mosses (*Bryophyta*) belonging to the families *Amblystegiaceae* (26-28, 50, 51, 66), *Andreaeaceae* (33), *Anomodontaceae* (70), *Aulacomniaceae* (25), *Bartramiaceae* (17-19), *Brachytheciaceae* (32, 52-55, 67), *Bryaceae* (20-22, 45-49, 63), *Calliergonaceae* (29-31), *Dicranaceae* (11), *Ditrichaceae* (37), *Fissidentaceae* (8, 9), *Grimmiaceae* (34, 36), *Hypnaceae* (56), *Meesiaceae* (16), *Mielichhoferiaceae* (23), *Mniaceae* (64), *Neckeraceae* (68, 69), *Plagiomniaceae* (24, 65), *Pottiaceae* (12-15, 35, 38-44, 60-62), *Rhabdoweisiaceae* (10), and *Sphagnaceae* (57-59).

The publication includes contributions by P. Hájková & al. (1-32), A. Ganeva (33-35), A. Ganeva & D. Sopotlieva (36-56), and R. Natcheva (57-70).

Reports 1–32

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Aneuraceae

1. *Aneura pinguis* (L.) Dumort.

Bu Balkan Range (*Central*): S slopes of peak Rousalka (Maragidik), in a spring, 1685 m, 42°45'09"N, 24°58'38"E, 01.07.2004, coll./det. P. Hájková & M. Hájek.

— West Frontier Mts: Mt Osogovska, N of Koulitsite peak, in a spring, 1821 m, 42°11'14"N, 23°34'44"E, 02.07.2003, coll./det. P. Hájková & M. Hájek.

— Pirin Mts: SE slopes of peak Vihren, in a spring,

2183 m, 42°45'40"N, 23°24'43"E, 04.07.2003, coll./det. P. Hájková & M. Hájek.

— Rila Mts: Malyovitsa valley, 2.8 km N-NE from peak Malyovitsa, in a spring fen, 1910 m, 42°11'40"N, 23°22'39"E, 25.06.2002, coll./det. P. Hájková & M. Hájek; Kostenetski Balkan Mt, between Cherna Mesta village and Vulcha Polyana locality, Boukata, in a spring fen, 1665 m, 42°05'08"N, 23°47'11"E, 06.07.2003, coll./det. P. Hájková & M. Hájek; below Makedonia chalet, W slopes of the Mechi

Prohod saddle, 2120 m, 42°02'50"N, 23°26'13"E, 09.08.2004, coll./det. *P. Hájková & M. Hájek*.

- Mt Sredna Gora (*Western*): Mt Lozenska, near the footpath ca 700 m above Lozen village, in a calcareous spring fen, 935 m, 42°35'29"N, 23°29'01"E, 23.06.2004, coll./det. *P. Hájková & M. Hájek*.

Aneura pinguis grows in various types of wetlands in Bulgaria. It was recorded in both acidic and alkaline fens and fen meadows from 700 m to 2200 m a.s.l.

2. *Riccardia multifida* (L.) Gray

- Bu** Balkan Range (*Central*): 2 km S of Zhultets peak, ca 2 km from Levski chalet along the blue-marked path, in a subalpine spring, 1790 m, 42°42'06"N, 24°52'35"E, 27.06.2004, coll./det. *P. Hájková & M. Hájek*; river Kirovo Dere, below peak Kochmara, in a subalpine spring, 1890 m, 42°40'23"N, 24°52'58"E, 28.06.2004, coll./det. *P. Hájková & M. Hájek*; SE slopes of peak Kochmara, in a subalpine spring fen, 1860 m, 42°40'28"N, 24°52'20"E, 28.06.2004, coll./det. *P. Hájková & M. Hájek*; peak Bolovan, on the N slopes near the red-marked path, in a subalpine poor fen, 1770 m, 42°46'01"N, 24°18'49"E, 07.07.2005, coll./det. *P. Hájková & M. Hájek*; S slopes of peak Orlovets, above Anton village, in a calcareous spring fen, 1280 m, 42°45'01"N, 24°15'28"E, 08.07.2005, coll./det. *P. Hájková & M. Hájek* (Ha06/77).
- Pirin Mts: NW of peak Bezbog (2645 m), near the brook below lake Disilishko, in a spring fen, 2320 m, 41°44'17"N, 23°30'23"E, 01.07.2003, coll./det. *P. Hájková & M. Hájek*; W slopes of peak Pouknatiya Kamuk, on the right bank of river Bunderitsa, in a spring, 2080 m, 41°44'54"N, 23°24'46"E, 03.07.2003, coll./det. *P. Hájková & M. Hájek*; Razlozhka valley, Krousheto locality, between the Predela saddle and Razlog town (in the area below the calcareous part of Pirin Mts), in a calcareous spring fen, 1005 m, 41°51'42"N, 23°23'58"E, 13.08.2004, coll./det. *P. Hájková & M. Hájek*.
 - Rila Mts: Kostenetski Balkan Mt, between Cherna Mesta village and Vulcha Polyana locality, Boukata, in a spring fen, 1665 m, 42°05'08"N, 23°47'11"E, 06.07.2003, coll./det. *P. Hájková & M. Hájek* (Ha06/75); Dobro Pole saddle, in a spring fen, 1920 m, 42°04'14"N, 23°19'49"E, 09.08.2004, coll./det. *P. Hájková & M. Hájek*; on S slopes of peak Markov Kamuk, in a spring fen, 2210 m, 42°03'22"N, 23°23'33"E, 09.08.2004, coll./det. *P. Hájková & M. Hájek*; SW of Makedonia chalet (Mechi Prohod

saddle), S-SW slopes of peak Golyam Mechi Vruh, in a spring fen, 2175 m, 42°03'02"N, 23°25'54"E, 10.08.2004, coll./det. *P. Hájková & M. Hájek*; Samokov plain, 0.5 km SE of Prodanovtsi village, 1–2 km W of Samokov town, along the road, in a rich fen, 925 m, 42°20'22"N, 23°31'52"E, 04.07.2005, coll./det. *P. Hájková & M. Hájek*.

- Rhodopi Mts (*Western*): Batak town, in a spring fen near S margin of the Batak reservoir, 1170 m, 41°56'08"N, 24°09'57"E, 25.06.2004, coll./det. *P. Hájková & M. Hájek*; Beglika locality, in a calcareous fen, 1530 m, 41°50'27"N, 24°08'47"E, 30.06.2005, coll./det. *P. Hájková & M. Hájek*.
- Rhodopi Mts (*Central*): between Smolyan town and Smolyanski lakes, on the left side of the road, in a moderately-rich fen, 1370 m, 41°36'23"N, 24°40'05"E, 02.07.2005, coll./det. *P. Hájková & M. Hájek* (Ha06/76).

Jungermanniaceae

3. *Jungermannia obovata* Nees

- Bu** Balkan Range (*Central*): Sinite Skali locality, N slopes of peak Kochmara and Ravnets ridge, in a subalpine spring, 1885 m, 42°40'56"N, 24°53'12"E, 28.06.2004, coll. *P. Hájková & M. Hájek*, det. *V. Plášek* (Ha06/86).

Scapaniaceae

4. *Scapania irriqua* (Nees) Nees

- Bu** Balkan Range (*Central*): river Kirovo Dere, below peak Kochmara, in a subalpine spring, 1890 m, 42°40'23"N, 24°52'58"E, 28.06.2004, det. *P. Hájková & M. Hájek*; SE slopes of peak Kochmara, in a subalpine spring, 1845 m, 42°40'25"N, 24°52'19"E, 28.06.2004, coll./det. *P. Hájková & M. Hájek*, conf. *V. Plášek* (Ha06/79); Kafadikildi locality, 2 km SW-W from peak Botev, in a subalpine spring fen, 1975 m, 42°42'45"N, 24°53'35"E, 29.06.2004, coll./det. *P. Hájková & M. Hájek*, conf. *V. Plášek* (Ha06/80); peak Bolovan, N slopes near the red-marked path, in a subalpine poor fen, 1770 m, 42°46'01"N, 24°18'49"E, 07.07.2005, coll./det. *P. Hájková & M. Hájek*, conf. *V. Plášek* (Ha06/81).

5. *Scapania paludicola* Loeske & Müll. Frib.

- Bu** West Frontier Mts: Mt Osogovska, SE of peak Choveka (2047 m), along the track to Osogovo chalet, in a spring fen, 1735 m, 42°11'47"N, 22°35'34"E, 08.06.2003, coll./det. *P. Hájková & M. Hájek*, conf. *V. Plášek* (Ha06/83).

Scapania paludicola is classified as Vulnerable in the Bulgarian bryoflora and is not documented by a herbarium specimen (Ganeva & Natcheva 2003; Nathceva & al. 2006). The species is known from the highest Bulgarian mountains (Vitosha, Rila and Pirin Mts).

Cephaloziellaceae

6. *Cephaloziella divaricata* (Sm.) Schiffn.

Bu Balkan Range (*Central*): S slopes of peak Orlovets, above Anton village, in a calcareous spring fen, 1280 m, 42°45'01"N, 24°15'28"E, 08.07.2005, coll. P. Hájková & M. Hájek, det. V. Plášek (Ha06/85).

— Rila Mts: Topilata saddle, 1.1 km from peak Vurla, in a spring fen, 2435 m, 42°10'22"N, 23°18'52"E, 28.06.2002, coll. P. Hájková & M. Hájek, det. V. Plášek (Ha06/84).

The species typically prefers open sandy to argillaceous soils. Its occurrence in spring fens is surprising.

Calypogeiaceae

7. *Calypogea muelleriana* (Schiffn.) Müll. Frib.

Bu Rila Mts: 1.7 km N-NE of peak Malyovitsa (2729 m), in a subalpine spring, 2095 m, 42°11'06"N, 23°22'22"E, 24.06.2002, coll. P. Hájková & M. Hájek, det. V. Plášek (Ha06/87); lake Yonchevo, 1.6 km NW of peak Golyama Popova Kapa (2704), in a subalpine spring, 2120 m, 42°11'35"N, 23°24'20"E, 25.06.2002, coll. P. Hájková & M. Hájek, det. V. Plášek (Ha06/88).

The species grows on acid soil in coniferous forests, on the banks of small brooks, and occasionally in mires. However, in the Rila Mts it grows in mineral-poor subalpine springs.

Fissidentaceae

8. *Fissidens adianthoides* Hedw.

Bu Balkan Range (*Central*): Vasil Levski village, river Gavrashtitsa, in a Ca-rich fen with seasonally decreasing water level, 715 m, 42°38'18"N, 24°55'25"E, 03.07.2004, coll./det. P. Hájková & M. Hájek (Ha06/64); S slopes of peak Orlovets, above Anton village, in a calcareous spring fen, 1280 m, 42°45'01"N, 24°15'28"E, 08.07.2005, coll./det. P. Hájková & M. Hájek (Ha06/65).

9. *Fissidens crassipes* Wilson ex Bruch & Schimp.

Bu Forebalkan: Devetashko plateau, Kroushouna waterfalls, in a travertine spring with running water, 240 m, 43°14'59"N, 25°01'36"E, 20.06.2004, coll. P. Hájková & M. Hájek, det. Z. Hradílek (Ha05/138).

This species grows in a travertine spring with strongly alkaline and mineral-rich water. Vegetation of this travertine consists of bryophytes, among which *Rhynchostegium riparioides* dominates.

Rhabdoweisiaceae

10. *Oncophorus virens* (Hedw.) Brid.

Bu Balkan Range (*Central*): Sinite Skali locality, N slopes of peak Kochmara and Ravnets ridge, in a subalpine spring, 1885 m, 42°40'56"N, 24°53'12"E, 28.06.2004, coll. P. Hájková & M. Hájek, det. J. Kučera (Ha06/62).

Oncophorus virens is a species of subalpine springs and mires (Frey & al. 2006). In Bulgaria it occurs above the timberline in the Rila, Pirin, and Vitosha Mts.

Dicranaceae

11. *Dicranum bonjeanii* De Not

Bu Balkan Range (*Central*): peak Bolovan, N slopes near the red-marked path, in a subalpine poor fen, 1770 m, 42°46'01"N, 24°18'49"E, 07.07.2005, coll./det. P. Hájková & M. Hájek (Ha06/61).

— West Frontier Mts: Mt Osogovska, N of Koulitsite peak, in a spring, 1821 m, 42°11'14"N, 23°34'44"E, 28.06.2003, coll./det. P. Hájková & M. Hájek (Ha06/58).

— Pirin Mt: NW of Bezbog peak (2645 m), below lake Disilishko, in a spring fen, 2323 m, 41°44'13"N, 23°30'22"E, 01.07.2003, coll./det. P. Hájková & M. Hájek (Ha06/55); N margin of lake Disilishko, 2323 m, 41°44'03"N, 23°30'26"E, 01.07.2003, coll./det. P. Hájková & M. Hájek (Ha06/56); below lake Golyamo Valyavishko, in a spring fen, 2203 m, 41°42'40"N, 23°28'15"E, 02.07.2003, coll./det. P. Hájková & M. Hájek (Ha06/57).

— Mt Sredna Gora (*Central*): 0.6 km SE from peak Golyam Bogdan in the direction to peak Maluk Bogdan, in a poor fen, 1510 m, 42°36'08"N, 24°28'11"E, 02.07.2002, coll./det. P. Hájková & M. Hájek (Ha06/60).

Dicranum bonjeanii was recorded in montane and subalpine poor fens and in springs. The species was accompanied by some *Sphagnum* species: *S. subsecundum*, *S. teres*, *S. palustre*, *S. capillifolium*, and *S. warnstorffii*.

Pottiaceae

12. *Barbula unguiculata* Hedw.

Bu Mt Sredna Gora (*Western*): Mt Lozenska, near the footpath ca 700 m above Lozen village, in a dis-

turbed calcareous spring, 920 m, 42°35'26"N, 23°29'01"E, 27.06.2005, coll. P. Hájková & M. Hájek, det. V. Plášek (Ha06/74).

13. *Didymodon tophaceus* (Brid.) Lisa

Bu Forebalkan: Devetashko plateau, in a travertine near village Gradina, 260 m, 42°58'06"N, 24°58'24"E, 21.06.2004, coll./det. P. Hájková & M. Hájek (Ha05/139).

14. *Eucladium verticillatum* (With.) Bruch & Schimp.

Bu Mt Sredna Gora (*Western*): Mt Lozenska, near the footpath ca 700 m above Lozen village, in a disturbed calcareous spring, 920 m, 42°35'26"N, 23°29'01"E, 27.06.2005, coll./det. P. Hájková & M. Hájek (Ha05/142).

15. *Hymenostylium recurvirostrum* (Hedw.) Dixon

Bu Balkan Range (*Central*): Yasenovo village, on moist rocks in a calcareous canyon NW of the village, 525 m, 42°41'40"N, 25°18'46"E, 29.06.2005, coll. P. Hájková & M. Hájek, det. V. Plášek (Ha06/34).

This species has been known so far only from literature. It is new for the central part of the Balkan Range.

Meesiaceae

16. *Meesia uliginosa* Hedw.

Bu Rila Mts: Kostenetski Balkan Mt, in the spring area S of the Premkata saddle, 2190 m, 42°10'05"N, 23°45'29"E, 07.07.2003, coll./det. P. Hájková & M. Hájek, conf. V. Plášek (Ha06/96).

Meesia uliginosa was found in a subalpine spring fen together with *Meesia longiseta*, which was recorded as a new species for Bulgaria in 2006 (Blockeel & al. 2006). *Meesia uliginosa* was accompanied by *Scorpidium revolvens*, *Scapania irrigua* and *Sphagnum platyphyllum*. The species is red-listed as Vulnerable in Bulgaria (Natcheva & al. 2006).

Bartramiaceae

17. *Philonotis calcarea* (Bruch & Schimp.) Schimp.

Bu Balkan Range (*Central*): Vasil Levski village, river Gavrashtitsa, in a calcareous fen at a spring depression, 720 m, 42°38'20"N, 24°55'23"E, 03.07.2004, coll. P. Hájková & M. Hájek, det. B. Shaw (Ha06/26); Kozyata Stena Nature Reserve, S slopes of peak Kozya Stena, in a calcareous spring, 1535 m, 42°47'11"N, 24°33'07"E, 18.8.2004, coll. P. Hájková & M. Hájek, det. B. Shaw (Ha06/27); Yasenovo village, in a calcareous canyon NW of the village, in a shaded tufa-forming spring,

525 m, 42°41'40"N, 25°18'46"E, 29.06.2005, coll. P. Hájková & M. Hájek, det. B. Shaw (Ha05/143); N of Anton village, near the green-marked path, in a stony calcareous spring fen, 1040 m, 42°44'48"N, 24°16'51"E, 06.07.2005, coll. P. Hájková & M. Hájek, det. B. Shaw (Ha06/28); Shipkovo village, in the valley of Putni Dol brook, SE from the village, in a spring, 750 m, 42°52'23"N, 24°34'52"E, 20.08.2004, coll. P. Hájková & M. Hájek, det. B. Shaw (Ha06/29).

— Rila Mts: Drushlyovitsa river, in the direction to Rila Monastery, 1.3 km S-SW from peak Dodov (2661 m), in a sloping spring fen, 1950 m, 42°09'24"N, 23°19'43"E, 28.06.2002, coll. P. Hájková & M. Hájek, det. B. Shaw (Ha06/23); in the southern part of Kostenetski Balkan Mt, between Cherna Mesta village and Vulcha Polyana locality, in a spring fen, 1400 m, 42°04'16"N, 23°45'31"E, 06.07.2003, coll. P. Hájková & M. Hájek, det. B. Shaw (Ha06/24).

— Mt Sredna Gora (*Western*): Mt Lozenska, 1 km E from peak Lalina Mogila, in a rich fen, 1025 m, 42°34'40"N, 23°30'01"E, 23.06.2004, coll. P. Hájková & M. Hájek, det. B. Shaw (Ha06/25).

Philonotis calcarea shows similar ecological characteristics in Bulgaria as in Central and Western Europe. It is well separated from other *Philonotis* species along the mineral-richness gradient and always occupies the most mineral-rich and alkaline spring fens (Hájková & al. in press.).

18. *Philonotis caespitosa* Jur.

Bu Balkan Range (*Western*): Petrohan pass, a wetland complex, in a stream, 1390 m, 43°07'05"N, 23°07'34"E, 26.06.2003, coll. P. Hájková & M. Hájek, det. B. Shaw (Ha06/33).

— Balkan Range (*Central*): Vasil Levski village – Roshava Mogila peak, 2 km N-NW from the village, between V. Levski and Soushitsa villages, in a fen meadow, 625 m, 42°37'49"N, 24°52'50"E, 03.07.2004, coll. P. Hájková & M. Hájek, det. B. Shaw (Ha06/35); Anton village, ca 400 m E of the railway station, in a moderately rich fen, 795 m, 42°43'47"N, 24°15'01"E, 08.07.2005, coll. P. Hájková & M. Hájek, det. B. Shaw (Ha06/36).

— Mt Sredna Gora (*Central*): 0.6 km from peak Beliya Kamuk, near Koprivshitsa town, in a moderately-rich fen, 1310 m, 42°38'12"N, 24°24'00"E, 01.07.2002, coll. P. Hájková & M. Hájek, det. B.

Shaw (Ha06/30); Kadarski Rut locality, in the spring area of river Kriva, 2 km N-NE of peak Golyam Bogdan, in a sloping spring fen in pasture, 1375 m, 42°37'28"N, 24°27'14"E, 02.07.2002, coll. *P. Hájková & M. Hájek*, det. *B. Shaw* (Ha06/31); at the saddle 1 km SE of peak Golyam Bogdan, in a stream, 1490 m, 42°36'07"N, 24°28'18"E, 02.07.2002, coll. *P. Hájková & M. Hájek*, det. *B. Shaw* (Ha06/32).

Philonotis caespitosa is classified as Vulnerable in Bulgaria (Natcheva & al. 2006). It has been documented in the past from three floristic regions: Rila Mts, Western and Central Rhodopi Mts.

19. *Philonotis marchica* (Hedw.) Brid.

Bu Balkan Range (*Central*): Shipkovo village, Terziysko village – the lateral brook valley, in a petrifying spring in a small grazed orchard, 725 m, 42°52'29"N, 24°36'18"E, 21.08.2004, coll. *P. Hájková & M. Hájek*, det. *B. Shaw* (Ha06/38).

This species has recently become threatened in Central Europe because of the drainage and cultivation of many calcareous wetlands (Grims & al. 1999; Buryova & Hradilek 2006; Frey & al. 2006). It is included in the Bulgarian bryophyte Red List as Endangered (Natcheva & al. 2006).

Bryaceae

20. *Bryum archangelicum* Bruch & Schimp.

Bu Rila Mts: 0.4 km NE of peak Kamilata (2621 m), between peak Malyovitsa and lake Strashnoto, in a subalpine spring, 2245 m, 42°11'12"N, 23°22'59"E, 25.06.2002, coll. *P. Hájková & M. Hájek*, det. *V. Plášek* (Ha06/46); Drushlyovitsa river valley, in the direction to Rila Monastery, 1.5 km S of peak Dodov (2661 m), in a sloping spring fen, 1850 m, 42°09'18"N, 23°19'49"E, 28.06.2002, coll. *P. Hájková & M. Hájek*, det. *V. Plášek* (Ha06/47).

This is a species of wet or moderately wet places, growing on bare earth, dunes, rocks, and cliffs. It is known from both acid (Dierssen 2001) and alkaline habitats (Frey & al. 2006). In Bulgaria it has been found in stony subalpine springs supplied by acid to neutral groundwater.

21. *Bryum klinggraeffii* Schimp.

Bu Sofia region: Sarantsi village, in an alluvial meadow, 620 m, 42°43'16"N, 23°46'26"E, 25.06.2006, coll. *P. Hájková & M. Hájek*, det. *V. Plášek* (Ha06/49).

— Mt Sredna Gora (*Western*): Mt Lozenska, near

the footpath ca 700 m above Lozen village, in a disturbed calcareous spring, 920 m, 42°35'26"N, 23°29'01"E, 27.06.2005, coll. *P. Hájková & M. Hájek*, det. *V. Plášek* (Ha06/48).

22. *Bryum weigelii* Spreng.

Bu Rhodopi Mts (*Central*): Smolyan town, ca 1 km SE of the Smolyanski ezera chalet, in a fen developed on a former lake, 1490 m, 41°37'01"N, 24°40'31"E, 02.07.2005, coll./det. *P. Hájková & M. Hájek* (Ha05/162).

This species occurs mainly in sub-neutral springs, rills, and soligenous mires, especially in high-mountain locations (Dierssen 2001). In Bulgaria, it has been found in a mineral-poor fen fed by groundwater.

Mielichhoferiaceae

23. *Pohlia wahlenbergii* (F. Weber & D. Mohr) A.L. Andrews

Bu Balkan Range (*Central*): on the ridge between Shipkovo village and Kozyata Stena chalet, below peak Turlata, in a shaded spring disturbed by cattle, 1145 m, 42°50'15"N, 24°31'07"E, 19.08.2004, coll. *P. Hájková & M. Hájek*, det. *V. Plášek* (Ha06/52); in village Shipkovo, near river Golyamata, in an eutrophicated grazed spring wetland in river alluvium, 745 m, 42°52'13"N, 24°33'09"E, 21.08.2004, coll. *P. Hájková & M. Hájek*, det. *V. Plášek* (2004b/53).

— Mt Sredna Gora (*Western*): Mt Lozenska, near the footpath ca 700 m above Lozen village, in a disturbed calcareous spring, 920 m, 42°35'26"N, 23°29'01"E, 27.06.2005, coll. *P. Hájková & M. Hájek*, det. *V. Plášek* (Ha06/54).

— Rhodopi Mts (*Western*): between Batak village and Teheran chalet, in a disturbed shaded spring, 1120 m, 41°54'52"N, 24°11'45"E, 26.06.2004, coll. *P. Hájková & M. Hájek*, det. *V. Plášek* (Ha06/51).

Pohlia wahlenbergii grows in calcareous springs at middle altitudes (about 1000 m a.s.l.) in Bulgaria. It also occurs in Central Europe and often dominates in acidic and mineral-poor subalpine springs (Zechmeister & Mucina 1994). Plants growing in calcareous habitats are identified as *Pohlia wahlenbergii* var. *calcareae* (Warnst.) E.F. Warb. This variety is characterized by dark-green, not pale-green colour of the leaves, and by narrower leaves and leaf cells. These features have not been observed in our specimens from Bulgaria.

*Plagiomniaceae***24. *Plagiomnium ellipticum*** (Brid.) T.J. Kop.

Bu Balkan Range (*Western*): Petrohan pass, a wetland complex below the road, 1380 m, 43°07'11"N, 23°07'22"E, 26.06.2003, coll./det. *P. Hájková & M. Hájek*, conf. *V. Plášek* (Ha06/70).

— Balkan Range (*Central*): Vezhensko-Tetevenska Mt, 2.6 km NW of Klisoura village, Haidoutski Dol locality, in a spring fen, 1265 m, 42°42'54"N, 24°26'05"E, 03.07.2002, coll./det. *P. Hájková & M. Hájek* (Ha06/95); Shipkovo village, the valley of Putni Dol brook SE of the village, in a spring formerly disturbed by cattle, 750 m, 42°52'23"N, 24°34'52"E, 20.08.2004, coll./det. *P. Hájková & M. Hájek*, conf. *V. Plášek* (Ha06/72).

— West Frontier Mts.: Mt Osogovska, below the Osogovo chalet, in a depression in a fen meadow, 1590 m, 42°11'34"N, 22°37'38"E, 28.06.2003, coll./det. *P. Hájková & M. Hájek*.

— Pirin Mts: between the Gotse Delchev chalet and Dobrinishte village, a meadow complex in the alluvium of river Beludu, in a spring fen, 1235 m, 41°46'21"N, 23°32'60"E, 29.06.2003, coll./det. *P. Hájková & M. Hájek*, conf. *V. Plášek* (Ha06/67).

— Rila Mts: Kostenetski Balkan Mt, between the Hristo Smirnenski chalet and Belmeken reservoir, SW slopes of peak Slavov, in a spring fen, 1900 m, 42°07'51"N, 23°47'33"E, 06.07.2003, coll./det. *P. Hájková & M. Hájek*; SW part of the Rila Mts, N slopes of peak Kílero, in a spring fen, 1640 m, 42°05'40"N, 23°13'20"E, 08.08.2004, coll./det. *P. Hájková & M. Hájek*, conf. *V. Plášek* (Ha06/71).

— Mt Sredna Gora (*Central*): Debeli Del locality, 6 km E from Koprivshitsa town, in a sloping spring fen, 1325 m, 42°38'35"N, 24°24'44"E, 02.07.2002, coll./det. *P. Hájková & M. Hájek*, conf. *V. Plášek* (Ha06/73).

— Rhodopi Mts (*Western*): Batak town, in a spring fen near S margin of the Batak reservoir, 1173 m, 41°56'08"N, 24°09'58"E, 25.06.2004, coll./det. *P. Hájková & M. Hájek*, conf. *V. Plášek* (Ha06/68).

— Rhodopi Mts (*Central*): Smolyan town, ca 1 km SE of the Smolyanski ezera chalet, in a poor fen at a former lake, 1490 m, 41°37'01"N, 24°40'31"E, 02.07.2005, coll./det. *P. Hájková & M. Hájek*, conf. *V. Plášek* (Ha06/69).

Our findings of this species were published in the checklist of Natcheva & Ganeva (2005) as a new spe-

cies for Bulgaria, but no localities were given. During our extended research in the last years, we recorded the species in nine floristic regions. It occupies sub-neutral spring fens and fen meadows, mostly in the montane belt.

*Aulacomniaceae***25. *Aulacomnium palustre*** (Hedw.) Schwägr.

Bu Balkan Range (*Central*): Vezhensko-Tetevenska Mt, 3.6 km SW of peak Vezhen (2198 m), the brook valley Vurtopa, in a spring fen, 1340 m, 42°43'48"N, 24°22'17"E, 05.07.2002, coll./det. *P. Hájková & M. Hájek*; the spring area of river Selska, 4 km E of peak Botev, in a subalpine spring fen, 1810 m, 42°43'15"N, 24°57'44"E, 30.06.2004, coll./det. *P. Hájková & M. Hájek*; Penchov Chouchour locality ca 5 km NE-E from peak Botev, in a spring fen, 1860 m, 42°43'49"N, 24°58'57"E, 30.06.2004, coll./det. *P. Hájková & M. Hájek*; Kaloferska Mt, Panitsite locality, 500 m S-SE from the farm buildings, in a spring fen, 770 m, 42°39'31"N, 24°59'10"E, 02.07.2004, coll./det. *P. Hájková & M. Hájek* (Ha06/22); peak Bolovan, N slopes near the red-marked path, in a subalpine poor fen, 1770 m, 42°46'01"N, 24°18'49"E, 07.07.2005, coll./det. *P. Hájková & M. Hájek*.

— West Frontier Mts: Mt Osogovska, Begbounar locality, N of Koulitsite peak (1862 m), in a saddle spring, 1820 m, 42°11'14"N, 22°34'44"E, 28.06.2003, coll./det. *P. Hájková & M. Hájek*; Mt Osogovska, SE of peak Choveka (2047 m), along the track to the Osogovo chalet, 1735 m, 42°11'47"N, 22°35'34"E, 08.06.2003, coll./det. *P. Hájková & M. Hájek*; Mt Osogovska, below the Osogovo chalet, in a depression in a fen meadow, 1590 m, 42°11'34"N, 22°37'38"E, 28.6.2003, coll./det. *P. Hájková & M. Hájek*.

— Mt Sredna Gora (*Central*): Beliya Kamuk, 3.8 km E from Koprivshitsa town, on the southern slopes, in a moderately-rich fen, 1260 m, 42°38'02"N, 24°23'54"E, 01.07.2002, coll./det. *P. Hájková & M. Hájek* (Ha06/21); Debeli Del locality, 6 km E of Koprivshitsa town, in a sloping spring fen, 1325 m, 42°38'34"N, 24°24'49"E, 02.07.2002, coll./det. *P. Hájková & M. Hájek*; 0.6 km SE from peak Golyam Bogdan, in a poor fen in pastures, 1510 m, 42°36'08"N, 24°28'11"E, 02.07.2002, coll./det. *P. Hájková & M. Hájek*.

Amblystegiaceae

26. *Hygroamblystegium humile* (P. Beauv.) Vanderp., Goffinet & Hedenäs

Bu Mt Vitosha: Torfeno Branishte Reserve, the central part below peak Cherni Vruh, subalpine in a spring fen, 1850 m, 42°34'58"N, 23°16'34"E, 26.06.2006, coll. P. Hájková & M. Hájek, det. V. Plášek (Ha06/10).

— Pirin Mts: Razlozhka Valley, Krousheto locality, between the Predela saddle and Razlog town (below the calcareous part of the Pirin Mts), in a mineral-rich wet meadow, 1000 m, 41°51'29"N, 23°24'35"E, 13.08.2004, coll. P. Hájková & M. Hájek, det. Z. Hradílek (Ha06/9).

This species has been reported from three floristic regions in Bulgaria (Natcheva & Ganeva 2005; Papp & al. 2006). It is perhaps often overlooked. We recorded it in two more floristic regions during our research. This species apparently shows no ecological preference with respect to mineral-richness in Bulgaria. In one locality it occupied alkaline wet meadows, in the other an acidic subalpine spring fen.

27. *Palustriella commutata* (Hedw.) Ochyra

Bu Vitosha region: Mt Plana, 1 km E of Zheleznitsa village, in a calcareous spring fen, 980 m, 42°32'12"N, 23°22'44"E, 04.07.2005, coll./det. P. Hájková & M. Hájek (Ha06/15).

— West Frontier Mts: Mt Ruy, Filipovtsi village, at the village margin to Sofia, in a calcareous petrifying fen dried up in summer, 780 m, 42°48'51"N, 22°44'12"E, 05.07.2005, coll./det. P. Hájková & M. Hájek (Ha06/16).

— Mt Sredna Gora (*Western*): Mt Lozenska, 1 km E of peak Lalina Mogila, in a rich fen, 1025 m, 42°34'40"N, 23°30'01"E, 23.06.2004, coll./det. P. Hájková & M. Hájek (Ha06/12); Mt Lozenska, near the footpath ca 700 m above Lozen village, in a disturbed calcareous spring, 920 m, 42°35'26"N, 23°29'01"E, 27.06.2005, coll./det. P. Hájková & M. Hájek (Ha06/13); Mt Lozenska, Nenova Cheshma spring, in a calcareous spring fen, 960 m, 42°34'30"N, 23°29'16"E, 27.06.2006, coll./det. P. Hájková & M. Hájek (Ha06/14).

Palustriella commutata is a common species in strongly calcareous springs and fens (Hedenäs 2003), but its distribution in Bulgaria is not entirely known.

28. *Palustriella decipiens* (De Not.) Ochyra

Bu Balkan Range (*Western*): Komshtitsa village, in the

upper part of the valley of river Sreburna, between two small brooks, in a moderately-rich spring fen, 1210 m, 43°09'49"N, 23°00'42"E, 30.6.2006, coll./det. P. Hájková & M. Hájek (Ha06/17).

Palustriella decipiens occupies subalpine springs and fens in Bulgaria and only scarcely occurs at lower altitudes, e.g. in the Rhodopi Mts. It is known from such high mountains as Rila., Pirin, and the Central Balkan Range.

Calliergonaceae

29. *Calliergon giganteum* (Schimp.) Kindb.

Bu Pirin Mts: between Gotse Delchev chalet and Dobrinishte village, in a moderately rich fen meadow complex, in the alluvium of river Beludu, in a spring fen, 1235 m, 41°46'21"N, 23°32'60"E, 29.6.2003, coll./det. P. Hájková & M. Hájek (Ha06/8).

Calliergon giganteum is classified as Endangered in Bulgaria (Natcheva & al. 2006). Hitherto, this species was known only from the western part of the Rhodopi Mts (Gyosheva & Ganeva 2004) and Mt Rila.

30. *Hamatocaulis vernicosus* (Mitt.) Hedenäs

Bu Balkan Range (*Central*): Kaloferska Mt, Panitsite locality, 500 m S-SE of the farm buildings, in a spring fen, 770 m, 42°39'31"N, 24°59'10"E, 02.07.2004, coll./det. P. Hájková & M. Hájek (Ha06/5); Vasil Levski village – Roshava Mogila peak, 2 km N-NW of the village, between V. Levski village and Soushitsa residential district of Karlovo town, in a fen meadow, 625 m, 42°37'49"N, 24°52'50"E, 03.07.2004, coll./det. P. Hájková & M. Hájek (Ha06/7); S slopes of peak Orlovets, above Anton village, in a calcareous spring fen, 1280 m, 42°45'01"N, 24°15'28"E, 08.07.2005, coll./det. P. Hájková & M. Hájek (2005/70); Anton village, ca 400 m E of the railway station, in a moderately rich fen, 795 m, 42°43'47"N, 24°15'01"E, 08.07.2005, coll./det. P. Hájková & M. Hájek (Ha06/6).

— Mt Sredna Gora (*Central*): Beliya Kamuk, 3.8 km E of Koprivshtitsa town, on the south slopes, in a moderately rich fen, 1260 m, 42°38'02"N, 24°23'54"E, 01.07.2002, coll./det. P. Hájková & M. Hájek (Ha06/1); Kadarski Rut locality, in the spring area of river Kriva, 2 km N-NE of peak Golyam Bogdan, in a sloping spring fen in pasture, 1375 m, 42°37'28"N, 24°27'14"E, 02.07.2002, coll./det. P. Hájková & M. Hájek (Ha06/2).

— Rhodopi Mts (*Western*): Beglika locality, in a cal-

careous fen, 1530 m, 41°50'27"N, 24°08'47"E, 30.06.2005, coll./det. P. Hájková & M. Hájek (Ha06/4).

- Rhodopi Mts (*Central*): Smolyan town, ca 1 km SE of the Smolyanski Ezera chalet, below the road, in a calcareous spring fen, 1495 m, 41°36'58"N, 24°40'08"E, 02.07.2005, coll./det. P. Hájková & M. Hájek (Ha06/3).

Hamatocaulis vernicosus is an endangered and decreasing species in many European countries (Ludwig & al. 1996; Kučera & Váňa 2003; Frey & al. 2006) and is protected under the habitat directive Natura 2000. Nevertheless, *Hamatocaulis vernicosus* is a relatively common bryophyte species in some Bulgarian regions; e.g. in Mt Sredna Gora, where it occupies moderately mineral-rich spring fen meadows in pasture complexes. Most of its localities originated in the Subboreal or Subatlantic Age (Filipovič & Lazarova 1998).

31. *Straminergon stramineum* (Dicks. ex Brid.) Hedenäs

- Bu** Balkan Range (*Western*): Petrohan pass, in a wetland complex, in a stream, 1390 m, 43°07'06"N, 23°07'29"E, 26.06.2003, coll./det. P. Hájková & M. Hájek.
- Balkan Range (*Central*): SE slopes of peak Kochmara, in a subalpine spring fen, 1860 m, 42°40'28"N, 24°52'20"E, 28.06.2004, coll./det. P. Hájková & M. Hájek (Ha06/20); Kafadikildi locality, 2 km SW-W of peak Botev, in a subalpine spring fen, 1975 m, 42°42'45"N, 24°53'35"E, 29.06.2004, coll./det. P. Hájková & M. Hájek; in the spring area of river Selskata, 4 km E of peak Botev, in a subalpine spring fen, 1810 m, 42°43'15"N, 24°57'44"E, 30.06.2004, coll./det. P. Hájková & M. Hájek.
- West Frontier Mts: Mt Osogovska, Begbunar locality, N of peak Koulitsite (1862 m), in a saddle spring fen, 1820 m, 42°11'14"N, 22°34'44"E, 28.06.2003, coll./det. P. Hájková & M. Hájek.

Brachytheciaceae

32. *Brachythecium mildeanum* (Schimp.) Schimp.

- Bu** Balkan Range (*Western*): S slopes of peak Sredni Kom, in a subalpine spring fen, 1815 m, 43°10'16"N, 23°04'19"E, 25.06.2003, coll./det. P. Hájková & M. Hájek; Petrohan pass, in the wetland complex below the road, 1380 m, 43°07'11"N, 23°07'22"E, 26.06.2003, coll./det. P. Hájková & M. Hájek, conf. V. Plášek (Ha06/39).

- Balkan Range (*Central*): Vezhensko-Tetevenska Mt, near the road between Anton and Klisoura villages, in a wet meadow disturbed by cattle, 925 m, 42°44'19"N, 24°17'16"E, 22.06.2004, coll./det. P. Hájková & M. Hájek, conf. V. Plášek (Ha06/40).
- Sofia region: E of Sofia, Simeonovo village, near the cabin lift station, in a wet meadow, 640 m, 42°37'27"N, 23°21'02"E, 23.06.2006, coll./det. P. Hájková & M. Hájek (Ha06/45).
- Vitosha region: Mt Plana, Zheleznitsa village, in a wet meadow, 995 m, 42°32'13"N, 23°22'39"E, 29.06.2006, coll./det. P. Hájková & M. Hájek (Ha06/44).
- Pirin Mts: Razlog Valley, Krousheto locality, near to the Predela saddle, in a grazed spring fen, 1125 m, 41°52'31"N, 23°21'37"E, 13.08.2004, coll./det. P. Hájková & M. Hájek, conf. V. Plášek (Ha06/42).
- Rila Mts: N slopes of peak Kiler, in subalpine tall herb vegetation, 1650 m, 42°05'39"N, 23°13'19"E, 08.08.2004, coll./det. P. Hájková & M. Hájek, conf. V. Plášek (Ha06/41).
- Mt Sredna Gora (*Western*): Mt Lozenska, near the footpath ca 700 m above Lozen village, in a calcareous spring fen, 935 m, 42°35'29"N, 23°29'01"E, 23.06.2004, coll./det. P. Hájková & M. Hájek, conf. V. Plášek (Ha06/43).
- Mt Sredna Gora (*Central*): 0.6 km SE of peak Golyam Bogdan in the direction to peak Maluk Bogdan, in a poor fen, 1510 m, 42°36'08"N, 24°28'11"E, 02.07.2002, coll./det. P. Hájková & M. Hájek.

Brachythecium mildeanum grows in wet meadows and fens, between 640 m and 1800 m a.s.l. in Bulgaria. We recorded this species in several floristic regions, but in a relatively small number of localities (10). The species is usually sterile and grows in small populations.

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Reports 33–35
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Andreaeaceae**33. *Andreaea alpestris*** (Thed.) Schimp.

Bu Mt Vitosha: peak Kamen Del, on the rocks of the peak, 1862 m, FN-81, 29.07.2006, coll./det. A. Ganeva (SOM 9113-B).

The species has subalpine-subarctic distribution and is reported in Bulgaria from the Rila and Pirin Mts and the Balkan Range (Western and Central) (Simon & Vajda 1959; Petrov 1963; Kuc & al. 1965; Petrov 1966; Ganeva & Düll 1999).

Grimmiaceae**34. *Grimmia montana*** Bruch & Schimp.

Bu Mt Vitosha: peak Kamen Del, on the rocks of the peak, 1862 m, FN-81, 29.07.2006, coll./det. A. Ganeva (SOM 9111-B).

A montane species so far reported from the Rila and Pirin Mts (Simon & Vajda 1959; Mickiewicz & al. 1966). After a revision of a specimen of *Grimmia al-*

pestris (F. Weber & D. Mohr) Schleich. collected in the Balkan Range (Central) (Ganeva 2000) by Henk Greven, it was identified as *G. montana*. *Grimmia montana* is a Vulnerable species in Bulgaria (Natcheva & al. 2006).

Pottiaceae**35. *Didymodon ferrugineus*** (Schimp. ex Besch.) M.O. Hill

Bu Balkan Range (*Central*): Malak Ouzan locality, on soil, LH-53, 29.06.2006, coll. V. Roussakova, det. A. Ganeva (SOM 9115-B).

— Rhodopi Mts (*Central*): Bouynovsko Gorge, between Yagodino village and the cave, on rocky soil, KG-71, June 2006, coll. V. Roussakova, det. A. Ganeva (SOM 9114-B)

Subboreal-alpine species reported from the vicinity of Trigrad (Central Rhodopi Mts) by Blockeell (1994) and listed as Vulnerable in Bulgaria (Natcheva & al. 2006).

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Grimmiaceae**36. *Grimmia pulvinata*** (Hedw.) Sm.

Bu Toundzha Hilly Country: Karabair hill, near Binkos village, Sliven district, 245 m, 42.65061°N, 26.09136°E, 15.07.2005, coll. D. Sopotlieva, det. A. Ganeva (SOM 9182-B); Golina hill, Tvarditsa town, Sliven district, 185 m, 42.68245°N, 25.92630°E, 09.06.2005, coll. D. Sopotlieva, det. A. Ganeva (SOM 9183-B); Mt Surnena Sredna Gora, N of Asenovets village, 255 m, 42.54326°N, 25.94406°E, 12.07.2005, coll. D. Sopotlieva, det. A. Ganeva (SOM 9181-B).

Ditrichaceae**37. *Ceratodon purpureus*** (Hedw.) Brid.

Bu Balkan Range (*Eastern*): S slopes above the old

lime-kiln, Shivachevo town, Sliven district, 269 m, 42.63709°N, 26.03591°E, 19.07.2005, coll. D. Sopotlieva, det. A. Ganeva (SOM 9179-B); between Sudievo and Dryankovets villages, Bourgas district, 180 m, 42.67654°N, 27.32114°E, 22.07.2005, coll. D. Sopotlieva, det. A. Ganeva (SOM 9180-B).

Pottiaceae**38. *Didymodon acutus*** (Brid.) K. Saito

Bu Balkan Range (*Eastern*): S slopes above the old lime-kiln, Shivachevo town, Sliven district, 269 m, 42.63709°N, 26.03591°E, 19.07.2005, coll. D. Sopotlieva, det. A. Ganeva (SOM 9187-B).

— Toundzha Hilly Country: Golina hill, Tvarditsa town, Sliven district, 350 m, 42.68375°N,

25.92518°E, 09.06.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9186-B).

39. *Phascum cuspidatum* Hedw.

Bu Balkan Range (*Eastern*): E of Venets village, Bourgas district, 199 m, 42.64110°N, 26.84054°E, 29.06.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9189-B).

— Toundzha Hilly Country: NE of Bozadzhi village, Yambol district, 210 m, 42.48268°N, 26.33966°E, 16.07.2004, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9188-B).

40. *Pleurochaete squarrosa* (Brid.) Lindb.

Bu Toundzha Hilly Country: Karabair hill, S of Shivachevo town, Sliven district, 298 m, 42.65076°N, 26.03798°E, 19.07.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9190-B); Karabair hill, near Binkos village, Sliven district, 245 m, 42.65061°N, 26.09136°E, 15.07.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9191-B).

41. *Pterygoneurum ovatum* (Hedw.) Dixon

Bu Balkan Range (*Eastern*): NW of the Peshtersko village, Bourgas district, 355 m, 42.75153°N, 27.33362°E, 22.07.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9027-B).

42. *Tortella flavovirens* (Bruch) Broth.

Bu Toundzha Hilly Country: Golina hill, Tverditsa town, Sliven district, 185 m, 42.68245°N, 25.92630°E, 09.06.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9192-B).

43. *Weissia controversa* Hedw.

Bu Toundzha Hilly Country: Svetiiliyski Hills, Dyadovo village, Sliven district, 185 m, 42.43958°N, 26.03478°E, 11.06.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9193-B); S of Skobelevo village, Sliven district, 148 m, 42.48134°N, 26.31369°E, 16.07.2004, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9194-B).

44. *Weissia wimmeriana* (Sendtn.) Bruch & Schimp.

Bu Balkan Range (*Eastern*): S slopes above the old lime-kiln, Shivachevo town, Sliven district, 269 m, 42.63709°N, 26.03591°E, 19.07.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9195-B);

— Toundzha Hilly Country: Karabair hill, near Binkos village, Sliven district, 245 m, 42.65061°N, 26.09136°E, 15.07.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9196-B)

The species was reported from Mt Vitosha (Podpéra

1911) and from the Rila Mts (Stefanoff & Petrov 1962) and was listed as Vulnerable in the Red List of Bryophytes in Bulgaria (Natcheva & al. 2006).

Bryaceae

45. *Bryum argenteum* Hedw.

Bu Balkan Range (*Eastern*): S slopes above the old lime-kiln, Shivachevo town, Sliven district, together with *Grimmia pulvinata*, 269 m, 42.63709°N, 26.03591°E, 19.07.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9172-B).

46. *Bryum caespitium* Hedw.

Bu Toundzha Hilly Country: Marashka Mogila hill, N of Mezhdia village, Yambol district, together with *Ceratodon purpureus*, 264 m, 42.36735°N, 26.25332°E, 29.06.2004, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9173-B).

47. *Bryum capillare* Hedw.

Bu Toundzha Hilly Country: N of Bratya Kunchevi village, Stara Zagora district, 258 m, 42.50638°N, 25.86973°E, 22.06.2004, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9174-B).

48. *Bryum elegans* Nees

Bu Toundzha Hilly Country: NE of Bozadzhi village, Yambol district, 210 m, 42.48268°N, 26.33966°E, 16.07.2004, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9175-B).

49. *Bryum rubens* Mitt.

Bu Balkan Range (*Eastern*): E of Venets village, Bourgas district, 199 m, 42.64110°N, 26.84054°E, 29.06.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9176-B).

Amblystegiaceae

50. *Leptodictyum riparium* (Hedw.) Warnst.

Bu Toundzha Hilly Country: Beglishki Livadi locality, Shivachevo town, Sliven district, in a wet lowland meadow, together with *Sanionia uncinata* and *Calliergonella cuspidata*, 261 m, 42.67585°N, 26.01189°E, 10.06.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9167-B); S of Kozarevo village, Tverditsa town, Sliven district, in a wet lowland meadow, 320 m, 42.68856°N, 25.87527°E, 06.06.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9166-B).

51. *Sanionia uncinata* (Hedw.) Loeske.

Bu Toundzha Hilly Country: S part of the Delivanovi Livadi locality, Tverditsa town, Sliven

district, 320 m, 42.67820°N, 25.94726°E, 10.06.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9177-B); S of Tvarditsa town, near the microdam, Sliven district, 330 m, 42.68321°N, 25.92111°E, 09.06.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9178-B)

Brachytheciaceae

52. *Brachythecium albicans* (Hedw.) Schimp.

Bu Toundzha Hilly Country: N slopes of Mt Surnena Sredna Gora, S of Tvarditsa town, Sliven district, 345 m, 42.64839°N, 25.92273°E, 14.06.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9168-B).

53. *Brachythecium rutabulum* (Hedw.) Schimp.

Bu Toundzha Hilly Country: S of Malenovo village, Yambol district, 150 m, 42.55194°N, 26.76805°E, 22.06.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9171-B).

54. *Homalothecium lutescens* (Hedw.) Robins.

Bu Toundzha Hilly Country: S of Purvenets village, Yambol district, 189 m, 42.41991°N, 26.85475°E,

02.07.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9170-B).

55. *Oxyrrhynchium hians* (Schimp.) Warnst.

Bu Toundzha Hilly Country: SE of Zhitosvyat village, Bourgas district, 228 m, 42.45625°N, 26.98731°E, 02.07.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9169-B).

Hypnaceae

56. *Calliergonella cuspidata* (Hedw.) Loeske.

Bu Toundzha Hilly Country: in a meadow S of Kozarevo village, Tvarditsa town, Sliven district, 334 m, 42.69394°N, 25.87542°E, 06.06.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9184-B); in a meadow between Shivachevo and Banya villages, Sliven district, 342 m, 42.68292°N, 25.99462°E, 10.06.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9185-B); S part of Deliiyanovi Livadi locality, Tvarditsa town, Sliven district, 315 m, 42.67799°N, 25.94708°E, 10.06.2005, coll. *D. Sopotlieva*, det. *A. Ganeva* (SOM 9198-B).

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Sphagnaceae

57. *Sphagnum subsecundum* Nees.

Bu West Frontier Mts: Mt Osogovska, in a spring fen on the SE slopes, about 2 km NW of the Osogovo chalet, above the coniferous belt, 1750 m, FM-37, 28.06.2000, coll. *M. Anchev*, det. *R. Natcheva* (SOM-B 8383, 8379)

58. *Sphagnum squarrosum* Crome

Bu West Frontier Mts: Mt Osogovska, in a spring fen on the SE slopes, about 2 km NW of the Osogovo chalet, above the coniferous belt, sterile, 1750 m, FM-37, 28.06.2000, coll. *M. Anchev*, det. *R. Natcheva* (SOM-B 8380)

59. *Sphagnum teres* (Schimp.) Ångstr.

Bu West Frontier Mts: Mt Osogovska, in a spring fen on the SE slopes, about 2 km NW of the Osogovo chalet, above the coniferous belt, sterile, 1750 m, FM-

37, 28.06.2000, coll. *M. Anchev*, det. *R. Natcheva* (SOM-B 8382).

No member of the genus *Sphagnum* has been reported so far for the West Frontier Mts region (Natcheva & Ganeva 2005).

Pottiaceae

60. *Microbryum floerkeanum* (F. Weber & D. Mohr) Schimp.

Bu Black Sea Coast (*Northern*): Zlatni Pyasatsi Nature Park, at the NE border of the park, on a dry hill E of the road to Varna, on semi-open loess soil, with sporophytes, associated with *Bryum bicolor* and *Barbula unguiculata*, 105 m, 28°20'06.5"N, 28°03'43.8"E, NH-89, 20.03.2007, coll./det. *R. Natcheva* (SOM-B 8883).

61. *Pterygoneurum ovatum* (Hedw.) Dixon

Bu Black Sea Coast (*Northern*): Zlatni Pyasatsi Nature

Park, at the NE border of the park, on a dry hill E of the road to Varna, on semi-open loess soil, with sporophytes, associated with *Bryum bicolor* and *Barbula unguiculata*, 105 m, 28°20'06.5"N, 28°03'43.8"E, NH-89, 20.03.2007, coll./det. R. Natcheva (SOM-B 8884).

62. *Pterygoneurum subsessile* (Brid.) Jur.

Bu Black Sea Coast (*Northern*): Zlatni Pyasatsi Nature Park, at the NE border of the park, on a dry hill E of the road to Varna, on semi-open loess soil, with sporophytes, associated with *Barbula unguiculata*, 105 m, 28°20'06.5"N, 28°03'43.8"E, NH-89, 20.03.2007, coll./det. R. Natcheva (SOM-B 8882).

Bryaceae

63. *Bryum moravicum* Podp.

Bu Black Sea Coast (*Northern*): Zlatni Pyasatsi Nature Park, between the Akademika chalet and the highway to Varna, at the bases of trees along a temporary pool in a broadleaf forest (*Carpinus betulus*, *Alnus glutinosa*), sterile, ca. 100 m, 43°16'24.1"N, 28°01'26.1"E, NH-89, 19.03.2007, coll./det. R. Natcheva (SOM-B 8885).

Mniaceae

64. *Mnium marginatum* (Dicks.) P. Beauv.

Bu Black Sea Coast (*Northern*): Zlatni Pyasatsi Nature Park, Boukov dol locality, on damp soil in a shady forest of *Fagus orientalis*, sterile, ca. 196 m, 43°17'58.2"N, 28°00'52.3"E, NH-89, 19.03.2007, coll./det. R. Natcheva (SOM-B8886).

Plagiomniaceae

65. *Plagiomnium cuspidatum* (Hedw.) T.J. Kop.

Bu Black Sea Coast (*Northern*): Zlatni Pyasatsi Nature Park, between Aladzha Monastery and the Katakombite locality, on shaded calcareous rocks in a forest of *Carpinus betulus* – *C. orientalis*, with sporophytes, ca. 200 m, 43°16'29.0"N, 28°00'41.5"E, NH-89, 19.03.2007, coll./det. R. Natcheva (SOM-B 8887).

Amblystegiaceae

66. *Campylium protensum* (Brid.) Kindb.

Bu Black Sea Coast (*Northern*): Zlatni Pyasatsi Nature Park, between the Akademika chalet and the

road to Varna, at the bases of trees and on damp soil along a temporary pool in a broadleaf forest (*Carpinus betulus*, *Alnus glutinosa*), with sporophytes, ca. 100 m, 43°16'24.1"N, 28°01'26.1"E, NH-89, 19.03.2007, coll./det. R. Natcheva (SOM-B 8888).

Brachytheciaceae

67. *Cirriphyllum crassinervium* (Taylor) Loeske & M. Fleisch.

Bu Black Sea Coast (*Northern*): Zlatni Pyasatsi Nature Park, between Kovshak and Youbileyna springs, on shaded calcareous rocks in a forest of *Carpinus betulus* – *C. orientalis*, sterile, ca. 200 m, 43°16'10.2"N, 28°00'49.3"E, NH-89, 19.03.2007, coll./det. R. Natcheva (SOM-B8889).

Neckeraceae

68. *Neckera besseri* (Lobarz.) Jur.

Bu Black Sea Coast (*Northern*): Zlatni Pyasatsi Nature Park, between the Akademika chalet and the road to Varna, on shaded calcareous rocks along a temporary pool in a broadleaf forest (*Carpinus betulus*, *Alnus glutinosa*), sterile, ca. 100 m, 43°16'24.1"N, 28°01'26.1"E, NH-89, 19.03.2007, coll./det. R. Natcheva (SOM-B 8890).

69. *Thamnobryum alopecurum* (Hedw.) Gangulee

Bu Black Sea Coast (*Northern*): Zlatni Pyasatsi Nature Park, between Aladzha Monastery and the Katakombite locality, on damp shaded calcareous rocks in a *Carpinus betulus* – *C. orientalis* forest, sterile, ca. 200 m, 43°16'29.0"N, 28°00'41.5"E, NH-89, 19.03.2007, coll./det. R. Natcheva (SOM-B 8891).

Anomodontaceae

70. *Anomodon longifolius* (Schleich. ex Brid.) Hartm.

Bu Black Sea Coast (*Northern*): Zlatni Pyasatsi Nature Park, between Kovshak and Youbileyna springs, on shaded calcareous rocks in a forest of *Carpinus betulus* – *C. orientalis*, sterile, associated with *Anomodon viticulosus*, *Radula complanata*, and *Homalothecium sericeum*, ca. 200 m, 43°16'10.2"N, 28°00'49.3"E, NH-89, 19.03.2007, coll./det. R. Natcheva (SOM-B 8892).

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