

New bryophyte records in the Balkans: 4

Compiled by Rayna Natcheva

Institute of Botany, Bulgarian Academy of Sciences, Acad. Gerorgi Bonchev St., bl. 23,
1113 Sofia, Bulgaria, e-mail: renimoss@bio.bas.bg

Abstract. New chorological data are presented for 51 species of bryophytes from Bulgaria. Five taxa are liverworts (*Marchantiophyta*) belonging to the families *Cephaloziaceae* (report no. 5), *Cephaloziellaceae* (4), *Lophoziaceae* (2), *Ricciaceae* (1), and *Scapaniaceae* (3). Forty-six taxa are mosses (*Bryophyta*) belonging to the families *Amblystegiaceae* (29), *Bartramiaceae* (24), *Brachytheciaceae* (30, 32, 39, 50, 51), *Bruchiaceae* (17), *Bryaceae* (25), *Dicranaceae* (37) *Ditrichaceae* (15, 16), *Encalyptaceae* (7–9), *Grimmiaceae* (10–12), *Hypnaceae* (33), *Mielichhoferiaceae* (26), *Mniaceae* (27, 28), *Neckeraceae* (36), *Orthotrichaceae* (22, 23, 38, 45–49), *Plagiotheciaceae* (35), *Polytrichaceae* (6, 40, 41), *Pottiaceae* (18–21, 43, 44), *Pterigynandraceae* (34), and *Seligeriaceae* (13, 14, 42).

The publication includes contributions by H.J. During (1–36), A. Ganeva (37–39), and R. Natcheva (40–51).

Reports 1–36

Heinjo J. During

Department of Plant Ecology, F.A.F.C. Went Building, P.O.
Box 800.84, NL- 3508 TB Utrecht,
The Netherlands, e-mail: h.j.during@uu.nl

Ricciaceae

1. *Riccia sorocarpa* Bisch.

Bu Rila Mts: near Maritsa chalet, on soil at the trail just below the entrance of the Rila National Park, with sporophytes, 1350 m, GM-17, 17.07.2005, coll./det. *H.J. During* (057117).

Lophoziaceae

2. *Lophozia longidens* (Lindb.) Macoun

Bu Rila Mts: near Maritsa chalet, on a rock along a trail, N exposure, 1300 m, GM-17, 17.07.2005, coll./det. *H.J. During* (057114).

This is the first confirmed location of *L. longidens* for the Rila Mts. It is also known from an old record from Mt Vitosha (Arnaudoff 1914). The species is *Endangered* in Bulgaria (Natcheva & al. 2006).

Scapaniaceae

3. *Diplophyllum obtusifolium* (R.M. Schust.) R.M. Schust.

Bu Rila Mts: Mousala peak S of Borovets, on a steep earth bank along a trail, 1700 m, FM-18, 11.07.2005, coll./det. *H.J. During* (05720).

Cephaloziellaceae

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

Bu Valley of Strouma River: along river Strouma near Kresna town, in a grassland bordering shrubs, 160 m, 21.07.2005, coll./det. *H.J. During* (057145).

Cephaloziaceae

5. *Cephalozia connivens* (Dicks.) Lindb.

Bu Pirin Mts: in a valley NE of Sandanski town, on a rotten log in the Pirin National Park, with sporophytes, 1325 m, FM-90, 22.07.2005, coll./det. *H.J. During* (SOM B-9368).

The only report of this species for Bulgaria was made by Podpéra (1911) from Mt Vitosha. It is evaluated as

Vulnerable in the bryophyte Red Data List of Bulgaria (Natcheva & al. 2006).

Polytrichaceae

6. *Atrichum undulatum* (Hedw.) P. Beauv.

Bu West Frontier Mts: in an old beech forest in Mt Maleshevska, between Stroumyani and Razdol villages, near the national frontier with Macedonia, on dry humus along a forest trail, with sporophytes, 1130 m, FM-71, 21.07.2005, coll./det. H.J. During (057153).

Encalyptaceae

7. *Encalypta ciliata* Hedw.

Bu West Frontier Mts: in an old beech forest in Mt Maleshevska, between Stroumyani and Razdol villages, near the national frontier with Macedonia, on dry humus along a forest trail, with sporophytes, 1130 m, FM-71, 21.07.2005, coll./det. H.J. During (057150).

8. *Encalypta streptocarpa* Hedw.

Bu Valley of Strouma River: in the valley E of Kresna town, on limestone rock, N exposure, 350 m, 20.07.2005, coll./det. H.J. During (057127).

9. *Encalypta vulgaris* Hedw.

Bu Valley of Strouma River: in the valley E of Kresna town, on limestone rock, N exposure, with sporophytes, 350 m, 20.07.2005, coll./det. H.J. During (057126).

Grimmiaceae

10. *Grimmia orbicularis* Bruch ex Wilson

Bu Valley of Strouma River: in the valley E of Kresna town, on limestone rock, N exposure, with sporophytes, 350 m, 20.07.2005, coll./det. H.J. During (057128).

11. *Schistidium crassipilum* H.H. Blom

Bu Pirin Mts: near Vihren chalet, on exposed limestone rock along the road, with sporophytes, 1800 m, GM-02, 13.07.2005, coll./det. H.J. During (05755).

12. *Schistidium pruinosum* (Wilson ex Schimp.) G. Roth

Bu Rila Mts: above Rila Monastery at St. Ivan Rilski chapel, on a rock along a trail in a beech forest, with sporophytes, 1200 m, FM-07, 12.07.2005, coll./det. H.J. During (05736).

— Pirin Mts: the valley NE of Sandanski town, on exposed rock along a trail in the Pirin

National Park, with sporophytes, 1300 m, FM-90, 22.07.2005, coll./det. H.J. During (SOM B-9371).

Seligeriaceae

13. *Seligeria acutifolia* Lindb.

Bu Pirin Mts: in the valley E of Kresna town, on shaded limestone rock along a rivulet, with sporophytes, 900 m, 20.07.2005, coll./det. H.J. During (057141).

The species is red-listed in Bulgaria as *Vulnerable* (Natcheva & al. 2006).

14. *Blindia acuta* (Hedw.) Bruch & Schimp.

Bu Pirin Mts: in the valley NE of Sandanski town, on wet rocks in the Pirin National Park, 1470 m, FM-90, 22.07.2005, coll./det. H.J. During (057172).

This is the first confirmed record of the species for the Pirin Mts.

Ditrichaceae

15. *Ditrichum zonatum* (Brid.) Kindb.

Bu Pirin Mts: near Vihren chalet, on a dry trail across a mountain meadow, 2100 m, GM-02, 13.07.2005, coll./det. H.J. During (SOM B-9374).

So far this subarctic-subalpine species was known only from the Rila Mts (Ganeva & Düll 1999). It is red-listed as *Vulnerable* (Natcheva & al. 2006).

16. *Trichodon cylindricus* (Hedw.) Schimp.

Bu Rhodopi Mts (*Central*): Perelik peak above Smolyan town, on disturbed soil in a sloping mire, 1900 m, KG-91, 24.07.2005, coll./det. H.J. During (057176).

In Bulgaria, the species is red-listed as *Vulnerable* (Natcheva & al. 2006).

Bruchiaceae

17. *Trematodon ambiguus* (Hedw.) Hornsch.

Bu Rhodopi Mts (*Western*): at the Shiroka Polyana reservoir, W of the road to Dospat town, on disturbed soil along a mire, with sporophytes, 1500 m, KG 62, 14.07.2005, coll./det. H.J. During (05772).

— Pirin Mts: near Vihren chalet, on bare wet exposed soil, with sporophytes, 2100 m, GM-02, 13.07.2005, coll./det. H.J. During (05762).

Pottiaceae

18. *Didymodon insulanus* (De Not.) M.O. Hill

Bu Pirin Mts: in the valley E of Kresna town, on shaded limestone rock along a rivulet, with

sporophytes, 900 m, 20.07.2005, coll./det. *H.J. During* (SOM B-9363).

19. *Syntrichia montana* Nees

Bu Rila Mts.: above Rila Monastery at St. Ivan Rilski chapel, on an old *Fagus* in a beech forest, 1250 m, FM-07, 12.07.2005, coll./det. *H.J. During* (05738).

20. *Syntrichia ruralis* (Hedw.) F. Weber & D. Mohr

Bu Rila Mts.: above Rila Monastery at St. Ivan Rilski chapel, on a rock on S slope in a beech forest, with sporophytes, 1300 m, FM-07, 12.07.2005, coll./det. *H.J. During* (05749).

21. *Tortella nitida* (Hedw.) F. Weber & D. Mohr

Bu Valley of Strouma River: in the valley E of Kresna town, on limestone rock, N exposure, 350 m, 20.07.2005, coll./det. *H.J. During* (SOM B-9358).

The species is *Critically Endangered* in Bulgaria (Natcheva & al. 2006) and is known so far from a single location along the Northern Black Sea Coast that needs confirmation (Stefanoff & Petrov 1962).

Orthotrichaceae

22. *Orthotrichum cupulatum* Hoffm. ex Brid.

Bu Rila Mts: above Rila Monastery at St. Ivan Rilski chapel, on a rock on S slope in a beech forest, with sporophytes, 1300 m, FM-07, 12.07.2005, coll./det. *H.J. During* (05750).

— Rhodopi Mts (*Central*): Trigrad gorge, north of the caves, on limestone rocks, with sporophytes, 800 m, KG-81, 14.07.2005, coll./det. *H.J. During* (05780).

23. *Orthotrichum stramineum* Hornsch. ex Brid.

Bu Rila Mts: above Rila Monastery at St. Ivan Rilski chapel, on a young *Fagus* on S slope in a beech forest, with sporophytes, 1300 m, FM-07, 12.07.2005, coll./det. *H.J. During* (05752).

— Pirin Mts: valley NE of Sandanski town, on an old *Fagus* along a rivulet, with sporophytes, 980 m, FM-90, 22.07.2005, coll./det. *H.J. During* (057160).

— West Frontier Mts: in an old beech forest in Mt Maleshevska, between Stroumyani and Razdol villages, near the national frontier with Macedonia, on a *Fagus* in a forest, with sporophytes, 1130 m, FM-71, 21.07.2005, coll./det. *H.J. During* (057155).

Bartramiaceae

24. *Bartramia ithyphylla* Brid.

Bu West Frontier Mts: in an old beech forest in Mt Maleshevska, between Stroumyani and

Razdol villages, near the national frontier with Macedonia, on dry humus along a forest trail, with sporophytes, 1130 m, FM-71, 21.07.2005, coll./det. *H.J. During* (057148).

Bryaceae

25. *Bryum capillare* Hedw.

Bu West Frontier Mts: in an old beech forest in Mt Maleshevska, between Stroumyani and Razdol villages, near the national frontier with Macedonia, on dry humus along a forest trail, with sporophytes, 1130 m, FM-71, 21.07.2005, coll./det. *H.J. During* (057149).

— Valley of Strouma River: along river Strouma near Kresna town, in grassland bordering shrubs, with sporophytes, 160 m, 21.07.2005, coll./det. *H.J. During* (057144).

Mielichhoferiaceae

26. *Pohlia filum* (Schimp.) Martensson

Bu Rhodopi Mts (*Central*): Perelik peak above Smolyan town, between stones in a mountain grassland, with sporophytes, 1950 m, KG-91, 24.07.2005, coll./det. *H.J. During* (057177).

Mniaceae

27. *Mnium spinosum* (Voit) Schwägr.

Bu Mt Vitosha: in the Vitosha Nature Park, along the trail between Zvezditsa and Koumata chalets, in a coniferous forest, sterile, 1600 m, FN-81, 10.07.2005, coll./det. *H.J. During* (0573).

28. *Mnium stellare* Hedw.

Bu West Frontier Mts: in an old beech forest in Mt Maleshevska, between Stroumyani and Razdol villages, near the national frontier with Macedonia, on dry humus along a forest trail, 1130 m, FM-71, 21.07.2005, coll./det. *H.J. During* (057151).

Amblystegiaceae

29. *Campyliadelphus elodes* (Lindb.) Kanda

Bu Rhodopi Mts (*Central*): at Dyavolski Bridge near Ardino town, on a sheltered rock near the river, 400 m, LG-41, 25.07.2005, coll./det. *H.J. During* (057180).

This is the second locality of *C. elodes* after its first discovery on the territory of Bulgaria at Dounavtsi village (Blockeel & al. 2006).

Brachytheciaceae

30. *Brachytheciastrum velutinum* (Hedw.) Ignatov & Huttunen

Bu West Frontier Mts: in an old beech forest in Mt Maleshevska, between Stroumyani and Razdol villages, near the national frontier with Macedonia, on dry humus along a forest trail, with sporophytes, 1130 m, FM-71, 21.07.2005, coll./det. *H.J. During* (057152).

31. *Eurhynchium angustirete* (Broth.) T.J. Kop.

Bu Mt Vitosha: in the Vitosha Nature Park, along the trail between Zvezditsa and Koumata chalets, at the base of a rotten log in *Picea* forest, sterile, 1650 m, FN-81, 10.07.2005, coll./det. *H.J. During* (05717).

32. *Plasteurhynchium striatulum* (Spruce) M. Fleisch.

Bu Rhodopi Mts (*Central*): in the Klouviata valley at Bachkovo Monastery, on shaded calcareous rocks, 530 m, LG-24, 15.07.2005, coll./det. *H.J. During* (057104).

Hypnaceae

33. *Callicladium haldanianum* (Grev.) H.A. Crum

Bu Rhodopi Mts (*Central*): Persenk peak N of Zabardo, at Choudnite Mostove locality, on a shaded rock face near a rivulet, 1350 m, KG-93, 15.07.2005, coll./det. *H.J. During* (SOM-B-9359).

The species is evaluated as *Vulnerable* in Bulgaria (Natcheva & al. 2006) and is *Regionally Threatened* in the European Bryophyte Red Data Book (ECCB 1995).

Pterigynandraceae

34. *Pterigynandrum filiforme* Hedw.

Bu West Frontier Mts: in an old beech forest in Mt Maleshevska, between Stroumyani and Razdol villages, near the national frontier with Macedonia, on *Fagus* in a forest, 1130 m, FM-71, 21.07.2005, coll./det. *H.J. During* (057154).

Plagiotheciaceae

35. *Plagiothecium cavifolium* (Brid.) Z. Iwats.

Bu West Frontier Mts: in an old beech forest in Mt Maleshevska, between Stroumyani and Razdol villages, near the national frontier with Macedonia, on dry humus along a forest trail, with sporophytes, 1130 m, FM-71, 21.07.2005, coll./det. *H.J. During* (057147).

Neckeraceae

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

Bu Rila Mts: above Rila Monastery at St. Ivan Rilski chapel, on a big shaded rock in a beech forest,

1300 m, FM-07, 12.07.2005, coll./det. *H.J. During* (05745).

— Forebalkan: at the roadside near Preobrazenski Monastery, N of Veliko Turnovo town, on shaded rock in a forest, 200 m, LH-87, 28.07.2005, coll./det. *H.J. During* (057183).

Reports 37–39

Anna Ganeva

Institute of Botany, Bulgarian Academy of Sciences, Acad. Georgi Bonchev St., bl. 23, 1113 Sofia, Bulgaria, e-mail: animoss@bio.bas.bg

Dicranaceae

37. *Dicranum viride* (Sull. & Lesq.) Lindb.

Bu Balkan Range (*Western*): Along river Stakevska, near the building of the Midzhour State Game Farm, about 5–10 m away from the fish-breeding ponds, on the bark of an old beech tree, sterile, 804 m, 43.49029N, 22.55292E, near the FP-22, 25.07.2007, coll./det. *A. Ganeva* (SOM-B 9809).

The species was reported from the Balkan Range, without a precise location (Stefanoff & Petrov 1962). Still earlier, Simon & Vajda (1959) reported *D. viride* var. *papillosa* Warnst. from the Pirin Mts. Since then the species distribution in Bulgaria has not been confirmed. *Dicranum viride* is a species of conservation value, covered by the *Habitat Directive* (92/43/EEC), *Bern Convention*, *Red Data Book of European Bryophytes* (ECCB 1995), and *Bulgarian Biological Diversity Act*. Its conservation status in Bulgaria is *Endangered* (Natcheva & al. 2006).

Orthotrichaceae

38. *Ulota crispa* (Hedw.) Brid.

Bu Balkan Range (*Western*): along river Stakevska, near the building off the Midzhour State Game Farm, about 5–10 m away from the fish-breeding ponds, on the bark of an old beech tree, 804 m, 43.49029N, 022.55292E, FP-22, 25.07.2007, coll./det. *A. Ganeva* (SOM-B 9804).

The species was known from Mt Vitosha (Podpera 1911; Arnaudoff 1914) and subsequently, in 1964 herbarium specimens from the Central Balkan Range (above Ribaritsa village) were deposited by S. Petrov. *Ulota crispa* is an *Endangered* species in Bulgaria (Natcheva & al. 2006).

Brachytheciaceae

39. *Sciuro-hypnum latifolium* (Kindb.) Ignatov & Huttunen

Bu Mt Vitosha: Kapaklivets locality in the Torfeno Branishte Reserve, in moist places near the tourist trail in the northern part of Kapaklivets, 1882 m, 42.58744N, 023.28399E, FN-81, 06.07.2007, coll. A. Ganeva, det. R. Natcheva (SOM-B 9811).

This is the second locality of the species in Bulgaria, after the publication of Vajda (1960). It was found in the Rila Mts growing on soil between rocks on the northern slopes of Sivrichal peak at 2440 m a.s.l. The species is evaluated as *Vulnerable* in Bulgaria (Natcheva & al. 2006).

Acknowledgements. The author's special thanks are due to Dr R. Natcheva for identification of the specimen of *Sciuro-hypnum latifolium*, and to Dr Beata Papp (Hungarian Natural History Museum) and Dr Kai Vellak (University of Tartu) for confirmation the identity of *Dicranum viride*.

Reports 40–51**Rayna Natcheva**

Institute of Botany, Bulgarian Academy of Sciences,
23 Acad. G. Bonchev St., 1113 Sofia, Bulgaria, e-mail:
renimoss@bio.bas.bg

Polytrichaceae

40. *Polytrichastrum formosum* (Hedw.) G.L. Sm.

Bu West Frontier Mts: Mt Vlahina, west of Kroupnik village (Blagoevgrad district), near the old frontier post, on soil, with sporophytes, FL-63, 17.07.2004, coll. Z. Cherneva, det. R. Natcheva (SOM-B 9303).

41. *Polytrichum juniperinum* Hedw.

Bu West Frontier Mts: Mt Vlahina, west of Kroupnik village (Blagoevgrad district), near the old frontier post, on soil, sterile, FL-63, 17.07.2004, coll. Z. Cherneva, det. R. Natcheva (SOM-B 9302).

Seligeriaceae

42. *Seligeria pusilla* (Hedw.) Bruch & Schimp.

Bu Danubian plain: in the valley of river Chernelka, close to Kapchouka chalet (Pleven district), on shaded limestone rocks, sterile, 100 m, 43°20'06"N, 24°33'02"E, LH-09,

27.03.2005, coll./det. R. Natcheva (SOM-B 9235).

The species is red-listed in Bulgaria as *Vulnerable* (Natcheva & al. 2006).

Pottiaceae

43. *Gymnostomum calcareum* Nees & Hornsch.

Bu Danubian Plain: in the valley of river Chernelka, close to Kapchouka chalet (Pleven district), in crevices of limestone rocks, with sporophytes, 100 m, 43°20'06"N, 24°33'02"E, LH-09, 27.03.2005, coll./det. R. Natcheva (SOM-B 9230).

44. *Gymnostomum viridulum* Brid.

Bu Northeast Bulgaria: at Orlova chouka cave (Rouse district), on damp shaded limestone rocks, sterile, 274 m, 43°35'39"N, 25°57'31"E, MJ-12, 28.07.2005, coll./det. R. Natcheva (SOM-B 9263).

This is the second record of *G. viridulum* in Bulgaria. It was found for the first time by R. Düll in the Central Rhodopi Mts (in Ganeva & Düll 1999). The species is probably more widely distributed in the country but overlooked.

Orthotrichaceae

45. *Orthotrichum affine* Schrad. ex Brid.

Bu Danubian Plain: south of Cherni vruch village (Montana district), on *Populus alba* along river Tsibritsa flowing by the village, with sporophytes, 115 m, 43°38'17" N, 23°22'48" E, FP-93, 26.03.2005, coll./det. R. Natcheva (SOM-B 9206); on *Juglans regia* along the road connecting Lubenovo village with Belene town (Pleven district), with sporophytes, LJ-32, 28.03.2005, coll./det. R. Natcheva (SOM-B 9208).

46. *Orthotrichum anomalum* Hedw.

Bu Danubian Plain: in the valley of river Chernelka, close to Kapchouka chalet (Pleven district), on dry limestone rocks, with sporophytes, 100 m, 43°20'06"N, 24°33'02"E, LH-09, 27.03.2005, coll./det. R. Natcheva (SOM-B 9241).

— Northeast Bulgaria: at the Cherven fortress (Rouse district), on exposed concrete walls, with sporophytes, 250 m, 43°32'N, 26°03'E, MJ-23, 28.03.2005, coll./det. R. Natcheva (SOM-B 9251).

47. *Orthotrichum cupulatum* Hoffm. & Brid.

Bu Danubian Plain: the valley of river Chernelka, close to Kapchouka chalet (Pleven district), on dry limestone rocks, with sporophytes, 100 m,

43°20'06"N, 24°33'02"E, LH-09, 27.03.2005, coll./det. *R. Natcheva* (SOM-B 9245).

- Northeast Bulgaria: at the Cherven fortress (Rouse district), on exposed concrete walls, associated with *Grimmia pulvinata* (Hedw.) Sm., with sporophytes, 250 m, 43°32'N, 26°03'E, MJ-23, 28.03.2005, coll./det. *R. Natcheva* (SOM-B 9253).

48. *Orthotrichum pallens* Bruch & Brid.

- Bu** Northeast Bulgaria: at the rock monastery near Ivanovo village, in the valley of river Rousenski Lom (Rouse district), on the bark of an old *Juglans regia* tree, 150 m, MJ-13, 26.03.2005, coll./det. *R. Natcheva* (SOM-B 9258).

49. *Orthotrichum stramineum* Hornsch. ex Brid.

- Bu** Danubian plain: south of Cherni vruch village (Montana district), on *Populus alba* along river Tsibritsa flowing through the village, 115 m, 43°38'17"N, 23°22'48"E, FP-93, 26.03.2005, coll./det. *R. Natcheva* (SOM-B 8633).

Brachytheciaceae

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

- Bu** Forebalkan: at the Mezdra train station (Vratsa district), on soil, sterile, 214 m, 43°08'34"N, 23°43'10"E, GN-17, 06.10.2006, coll./det. *R. Natcheva* (SOM-B 8867).

51. *Rhynchostegiella tenella* (Dicks.) Limpr.

- Bu** Northeast Bulgaria: at the cave Orlova chouka (Rouse district), on damp shaded limestone rocks, 274 m, 43°35'39"N, 25°57'31"E, MJ-

12, 28.07.2005, coll./det. *R. Natcheva* (SOM-B 9266).

The species is red-listed in Bulgaria as *Vulnerable* (Natcheva & al. 2006).

References

- Arnaudoff, N.** 1914. Neue Materialien über die Moosflora des Vitoschaberges. – Trav. Soc. Bulg. Sci. Nat., **6**: 29-39 (in Bulgarian).
- Blockeel, T.L., Ochyra, R., Chlebicki, A., Hájková, P., Hájek, M., Hradílek, Z., Kürschner, H., Parolly, G., Plášek, V., Quandt, D. & Vanderpoorten, A.** 2006. New national and regional records, 12. – J. Bryol., **28**: 68-70.
- ECCB.** 1995. Red Data Book of European Bryophytes. European Committee for Conservation of Bryophytes (ECCB), Trondheim.
- Ganeva, A. & Düll, R.** 1999. A contribution to the Bulgarian bryoflora. Checklist of Bulgarian bryophytes. – In: **Düll, R., Ganeva, A., Martinčić, A. & Pavletič, Z.** 1999. Contributions to the bryophyte flora of former Yugoslavia and Bulgaria. Pp. 111-199. IDH-Verlag, Bad Munstereifel. IDH-Verlag Bad Munstereifel.
- Natcheva, R., Ganeva, A. & Spiridonov, G.** 2006. Red Data List of the Bryophytes in Bulgaria. – Phytol. Balcan., **12**(1): 55-62.
- Podpéra, J.** 1911. Ein Beitrag zu der Kryptogamenflora der bulgarischen Hochgebirge. – Beih. Bot. Centralbl., **28**: 173-224.
- Simon, T. & Vajda, L.** 1959. Beiträge zur Moosflora Bulgariens. – Ann. Univ. Sci. Budapest. Rolando Eötvös, Sect. Biol., **2**: 259-272.
- Stefanoff, B. & Petrov, S.** 1962. Über die Moose und die Moosflora Bulgariens. – Izv. Inst. Gorata, **11**: 5-38 (in Bulgarian).
- Vajda, L.** 1960. Beitrag zur Moosflora Bulgariens. – Izv. Bot. Inst. (Sofia), **7**: 317-319 (in Bulgarian).
-