

Arch. Biol. Sci., Belgrade, 58 (1), 61-64, 2006.

CONTRIBUTION TO KNOWLEDGE OF THE BRYOPHYTE FLORA OF THE WESTERN ALPS (ITALY, FRANCE)

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Abstract - The study is a contribution to knowledge of the bryophyte flora of the Alps. The huge bryophyte collection made during 1997 in the Western Alps is presented. A total of 152 bryophyte species were recorded, including 113 mosses and 39 hepatics.

Key words: Mosses, hepatics, Bryophytes, distribution, Western Alps, Italy, France

UDC 582.32(234.31)
582.32(450+44)

INTRODUCTION

The territories of Italy and France are bryologically well known, due to intensive investigation of the bryoflora by domestic and foreign researchers. However, new bryophyte records are often published (O l i v a, 1999; A i e l l o and D i a, 2000; P r i v i t e r a and P u g l i s i, 2000; A l e f f i *et al.*, 2003; A l e f f i *et al.*, 2004; J i m é n e z *et al.*, 2005). Moreover, the Apennine Peninsula is richer in bryophyte species than are the Balkan and Iberian Peninsulas (S a b o v l j e v i ć, 2004).

The Alps are bryologically quite well known compared to some other European regions. However, due to their inaccessibility and wildness some parts remain still uninvestigated. The mountains offer an exceptional natural theater for plant and animal life, due mainly to their varied geological features, impressive altitudinal range, the occurrence of numerous well managed semi-natural habitats as almost undisturbed natural areas and their full protection for a long time.

The inner Western Alps (Italy) are subject to surprising variation in humidity within short geographical distances encompassing dry to relatively humid locations. Also, varied geology, exposure, inclination and hydrology enable this space to have extremely complex ecosystems.

Not too many data are available on bryophyte species of this region. One of the most comprehensive accounts of bryophyte floras of the Piedmont is certainly that given by S c h u m a c k e r and S o l d á n (1997), but many distributional data can also be found in A l e f f i and S c h u m a c k e r (1995), C o r t i n i - P e d r o t t i (2001a, 2001b), and P i s t a r i n o *et al.* (2005).

MATERIALS AND METHODS

During a summer field meeting of the British Bryological Society (1997), the author assembled a huge collection of bryophytes. The bryophyte specimens are deposited in the BEOU herbarium. The transect method was used to cover as many different ecosystems as possible in the region of Western Alps (belonging to Italy and France) (Fig. 1). The nomenclature mainly follows C o r l e y *et al.* (1981), C o r l e y and C r u n d w e l l (1991), C o r t i n i - P e d r o t t i (2001a, 2001b) for mosses; and G r o l l e (1983) and G r o l l e and L o n g (2000) for hepatics.

The following sites were visited:

Italian Alps: Piedmont: Val di Viù: 1a) Lac Falin (1690 m a.s.l.) and 1b) Arnas Superiore (ca. 1600 m a.s.l.)

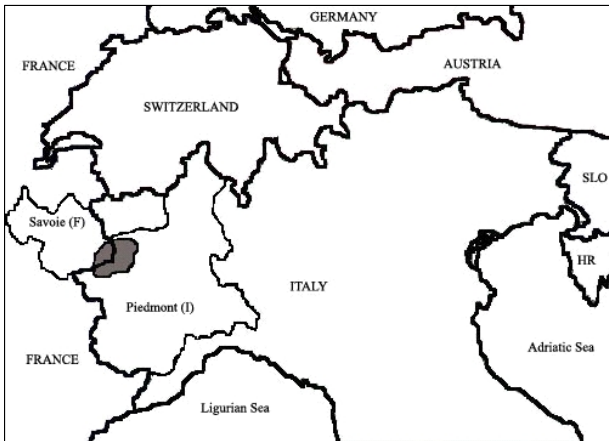


Fig. 1. Map of investigated region in the Western Alps (presented in grey) on the border between France (province of Savoie) and Italy (province of Piedmont). Abbreviations: HR – Croatia, SLO – Slovenia.

Italian Alps: Piedmont: Sagna del Vallone: 2a) Pian Benot (ca. 2170 m a.s.l.) and 2b) Il Vallone (ca. 1900 m a.s.l.)

Italian Alps: Piedmont: Susa Valley: 3a) Chianocco (ca. 600 m a.s.l.) and 3b) Ambruna (ca. 900 m a.s.l.)

Italian Alps: Piedmont: Rochemolles Valley (2400 – 2700 m a.s.l.)

French Alps: Savoie/Hautes Alpes: Valle Stretta (la Vallée Étroite) : 5a) from Les Granges to Col des Thuers (1700 – 2000 m a.s.l.) and 5b) from Lac Chavillon to Lac Bellety (up to 2289 m a.s.l.)

Italian Alps: Piedmont: Gran Bosco di Salbertrand (Parco Naturale): 6a) Colle Blegier (2180-2300 m a.s.l.) and 6b) Montagne Seu (up to 1800 m a.s.l.)

Italian Alps: Piedmont: Val Gravio: Orsiera-Rocciavrè Park (up to 2800 m a.s.l.)

RESULTS

A total of 152 bryophyte species were recorded. The list of bryophytes recorded during the expedition to the Western Alps 1997 is as follow:

Liverworts

Anastrophyllum minutum (Schreb.) Schust. – 1a
Aneura pinguis (L.) Dum. – 1a

Anthelia juratzkana (Limpr.) Trev. – 2b, 4
Athalamia hyalina (Sommerf.) S. Hatt. – 1a
Barbilophozia barbata (Schmid ex Schreb.) Loeske – 5
Barbilophozia hatcheri (Evans) Loeske – 1a
Barbilophozia lycopodioides (Wallr.) Loeske – 1a, 2b
Bazzania tricrenata (Wahlenb.) Lindb. – 2a,
Blepharostoma trichophyllum (L.) Dum. – 1a
Cephalozia pleniceps (Aust.) Lindb. – 2a, 2b, 6a
Cololejeunea calcarea (Libert) Schiffn.– 5a
Diplophyllum taxifolium (Wahlenb.) Dum. – 1a
Frullania dilatata (L.) Dum. – 3a
Jungermannia atrovirens Dum. – 1b
Jungermannia obovata Nees – 7
Jungermannia pumila With. – 6a
Leiocolea bantriensis (Hook.) Joerg. – 1b, 4, 5b, 6b
Leiocolea heterocolpos (Thed. ex Hartm.) Buch – 2b, 4, 6a
Lejeunea cavifolia (Ehrh.) Lindb. – 1a, 7
Lophocolea heterophylla (Schrad.) Dum. – 1a
Lophocolea minor Nees – 3a, 5a
Lophozia bicrenata (Schmid. ex Hoffm.) Dum. – 2a, 2b, 4,
Lophozia opacifolia Culm. ex Meylan. – 4, 6a
Marchantia polymorpha L. var. *alpestris* Nees – 6a
Marchantia polymorpha L. var. *montivagans* Nees – 6a
Nardia scalaris S. F. Gray – 1a
Pellia endiviifolia (Dicks.) Dum. – 5a
Pellia epiphylla (L.) Corda – 2b
Pellia neesiana (Gott.) Limpr. – 3b
Plagiochilla porelloides (Torrey ex Nees) Schust. – 3b
Porella platyphylla (L.) Pfeiff. – 3a, 5a
Preissia quadrata (Scop.) Nees – 2a
Sauteria alpina (Nees) Nees – 2b, 7
Scapania aequiloba (Schwägr.) Dum. – 1a, 2b, 7
Scapania calcicola (H. Arn et J. Perss.) Ingham – 7
Scapania cuspiduligera (Nees) K. Müll. – 2b, 4, 5a, 7
Tritomaria execta (Schrad.) Loeske – 2b
Tritomaria polita (Nees) Joerg. – 2b, 4, 5b
Tritomaria scitula (Tayl.) Joerg. – 1a, 1b, 4

Mosses

Amblyodon dealbatus (Hedw.) Bruch et al. – 2b, 4, 6b
Amphidium lapponicum (Hedw.) Schimp. – 4
Amphidium mougeotii (Bruch et Schimp.) Schimp. – 4
Andreaea rupestris Hedw. var. *Alpestris* (Thed.) Sharp. – 2a
Anoetangium aestivum (Hedw.) Mitt. – 2b
Anomodon viticulosus (Hedw.) Hook et J. Tayl. – 7
Aulacomnium palustre (Hedw.) Schwägr. – 1a, 5
Bartramia hallerana Hedw. – 6b, 7
Bartramia ithyphilla Brid. – 4
Blindia caespiticia (Weber et D. Mohr.) Müll. Hal. – 1b, 2b
Brachythecium mildeanum (Schimp.) Milde – 6a
Brachythecium reflexum (F. Weber et D. Mohr) Schimp. – 1a, 4

- Brachythecium velutinum* (Hedw.) Schimp. - 7
Bryum capillare Hedw. - 3a
Bryum elegans Nees- 1a
Bryum flaccidum Brid. -3a
Bryum pseudotriquetrum (Hedw.) P. Gaertn. et al.- 1a, 2b, 7
Bryum schleicheri Lam. et DC.- 4
Calliergon giganteum (Schimp.) Kindb. - 1a, 2b, 5b
Calliergon trifarium (Web. & Mohr) Kindb.- 2b, 5b
Campylium halleri (Hedw.) M. Fleisch. - 1a, 2b, 4
Catoscopium nigratum (Hedw.) Brid. - 2b, 4, 5b, 6b
Ceratodon purpureus (Hedw.) Brid. - 3a
Ciriphyllum cirrosum (Schwägr.) Grout. - 4
Cratoneuron commutatum (Hedw.) G. Roth - 4
Crossidium squamiferum (Viv.) Jur. - 3a
Cyrtomnium hymenophylloides (Hüb.) T. Kop.- 2b, 4
Desmatodon latifolius (Hedw.) Brid. - 4, 5b
Dicranella palustris (Dicks.) Crundw. ex E.F. Warb.- 2b
Dicranum bonjeani De Not. - 1a
Dicranum montanum Hedw. - 6b
Dicranum scoparium Hedw. - 4
Dicranum tauricum Sapehin. - 6a
Distichium capillaceum (Hedw.) Bruch et al., - 1a
Drepanocladus revolvens (Sw.) Warnst. - 1a
Drepanocladus uncinatus (Hedw.) Warnst. - 5b
Encalypta alpina R. Hedw. - 2b, 4
Encalypta ciliata Hedw. - 7
Encalypta microstoma Bals.-Criv. et De Not. -1a,
Encalypta streptocarpa Hedw. - 7
Fissidens taxifolius Hedw. - 3a
Grimmia anomala Hampe ex Schimp.- 1a
Grimmia elatior Bruch ex Bals. et De Not. - 1a, 7
Grimmia funalis (Schwägr.) Bruch et Schimp.- 5b
Grimmia hartmanii Schimp. - 1a
Grimmia ovalis (Hedw.) Lindb. - 1a, 3a, 7
Grimmia pulvinata (Hedw.) Sm. - 3a
Grimmia sessitana De Not. - 1a, 4
Grimmia tergestina Tomm. ex Bruch et Schimp. - 1a, 3a
Gymnostomum calcareum Nees et Hornsch. - 3a
Hedwigia ciliata (Hedw.) P. Beauv. var. *leucophaea* Bruch et al., -1a
Heterocladium dimorphum (Brid.) Bruch et Schimp.- 1a, 2b
Homalothecium lutescens (Hedw.) H. Rob. - 3a, 7
Homalothecium philippeanum (Spruce) Schimp. - 7
Hygrohypnum duriusculum (De Not.) D. W. Jamieson - 2b, 4
Hygrohypnum luridum (Hedw.) Jenn. - 4
Hygrohypnum smithii (Sw.) Broth. - 4
Hylocomium pyrenaicum (Spruce) Lindb. - 1a, 2a
Hylocomium splendens (Hedw.) Schimp. - 6b
Hypnum resupinatum (Hedw.) Tayl.- 3a
Hypnum revolutum (Mitt.) Lindb. - 4, 5a
Isopterygiopsis pulchella (Hedw.) Z. Iwats. -1a, 6a
Meesia uliginosa Hedw. - 2b, 4, 5b
Mnium spinosum (Voit.) Schwägr. - 1b, 7
Mnium thompsonii Schimp.- 1a, 6b, 7
Myurella julacea (Schwägr.) Schimp. - 2b, 4, 7
Neckera complanata (Hedw.) Huebener- 3b
Neckera pennata Hedw. - 3b
Oncophorus virens (Hedw.) Brid. - 2a, 2b, 4, 6b, 7
Orthothecium rufescens (Bridel) Schimper - 1b, 4
Paraleucobryum longifolium (Hedw.) Loeske - 1a, 2a
Philonotis fontana (Hedw.) Brid. - 4
Philonotis seriata Mitt. - 7
Philonotis tomentella Molendo - 4
Plagiobryum demissum (Hook) Lindb.- 2b
Plagiomnium ellipticum (Brid.) T. J. Kop. - 6a
Plagiopus oederi (Brid.) Limpr. - 4, 6b
Plagiothecium laetum - 6b
Pleurochaete squarrosa (Brid.) Lindb. - 3b
Pogonatum urnigerum P. Beauv. - 2b
Pohlia cruda (Hedw.) Bruch - 1b
Politrichum formosum Hedw. - 1a
Polytrichum alpinum Hedw. - 4
Polytrichum juniperinum Hedw. - 1b, 3b
Pseudoleskeella catenulata (Schrad.) Kindb. - 1a, 5a
Pseudoleskeella nervosa (Brid.) Nyholm - 1b, 3a, 7
Pterigynandrum filiforme Hedw. - 1b, 6a
Ptychodium plicatum (F. Weber et D. Mohr) Schimp. - 1a, 2b, 7
Racomitrium canescens (Hedw.) Brid. - 4
Rhizomnium magnifolium (Horik) T. J. Kop. - 4
Rhizomnium pseudopunctatum (Bruch et Schimp.) T. J. Kop. - 4, 5b
Rhytidium rugosum (Hedw.) Kindb. - 1b
Saelania glaucescens (Hedw.) Brith. - 2a
Scorpidium scorpioides (Hedw.) Limpr. - 5b
Seligeria pusilla (Hedw.) Bruch et al., - 5a, 6a
Sphagnum capillifolium (Ehrh.) Hedw. - 1a
Sphagnum palustre L. -1a
Sphagnum teres (Schimp.) Angstr. - 1a, 2b
Splachnum sphaericum Hedw. - 1a, 2b
Syntrichia norvegica Web. - 1a, 4
Tayloria froelichiana (Hedw.) Mitt. Ex Brith. - 7
Thuidium abietinum (Hedw.) Schimp. - 1a, 5b
Timmia austriaca Hedw. - 2b, 4
Timmia bavarica Hessel. - 1a, 6a
Timmia norvegica J. E. Zetterst. - 4
Tortella fragilis (Drumm.) Limpr. - 1b, 4
Tortella tortuosa (Hedw.) Limpr. - 7
Tortula atrovirens (Sm.) Lindb. - 3b
Tortula laevipila (Brid.) Schwägr. - 3a
Tortula muralis Hedw. - 3a
Tortula subulata Hedw. - 3b
Trichostomum crispulum Bruch. - 3a
Warnstorfia exannulata (Schimp.) Loeske - 1a

CONCLUSIONS

The study gives a recent contribution to knowledge of bryophytes in the region of the Western Alps and confirms some taxa that were doubtful for the province of Piedmont (Cortini-Pedrotti, 2001a). A total of 152 species were recorded, including 113 mosses and 39 hepatics.

Even though the list of bryophytes is extensive and some valuable records are made for the Western Alps, it can be expected that the number of species growing within the investigated region is significantly higher. The number of bryophyte species will probably increase with further investigation.

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ПРИЛОГ ПОЗНАВАЊУ БРИОФИТА ЗАПАДНИХ АЛПА (ИТАЛИЈА И ФРАНЦУСКА)

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У раду је приказан диверзитет бриофлоре, базиран на анализи материјала из западних Алпа, сакупљеном

током 1997. године. Укупно је забележено 152 врсте бриофита, од чега је 113 маховина и 39 јетрењача.