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The current state of bryophyte investigation in the Mediterranean area

Abstract

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A concise survey of publications on bryophytes in the European part of the Mediterranean area, plus Turkey and Cyprus, is presented, and recent progress in this field is reported for Portugal, Spain, southern France, Italy, former Yugoslavia, Bulgaria, and Greece. Albania remains more or less unknown to date. Difficulties affecting the study of bryophytes in the Mediterranean countries are highlighted, and proposals to overcome them are made.

Introduction

Bryophytes and lichens are important components of the Mediterranean flora, which in their distribution show interesting relations to the geological history and present ecology of their habitats. Therefore, phanerogamists are well advised to follow with interest and even encourage bryological activities in the various Mediterranean countries.

A first synthesis of our knowledge of the liverworts and mosses of the Mediterranean basin was presented by Hébrard (1982), with a subsequent update for the years 1979-1988 (Hébrard 1991). Some of the relevant papers published since 1988 will be cited here. Countrywise bryophyte distribution is given in Düll (1983) for the liverworts, and Podpěra (1954) updated by Düll (1984-1985, 1992) for the mosses.

As compared to what happens in Central Europe and Great Britain, the activities and rates of progress of bryophyte investigation in southern Europe are in general quite low. Still, large areas are bryologically scarcely investigated or quite unknown, e.g. parts of Greece and the whole of Albania.

Thorough chorological mapping of bryophytes in the way we are used to from Britain and Germany is almost non-existent, except in Spain where such projects are said to be in progress. In northern Italy, I have myself mapped the bryophytes for some 30-km^2 squares around Merano (Trentino-Alto Adige).

Problems hampering progress in Mediterranean bryology include:

- The almost complete lack of national floras or field guides to aid in bryophyte determination. Exceptions (see below) are France, former Yugoslavia and Bulgaria, in part (and with books that are out of press) also Portugal, Spain and Italy. Books from North and Central Europe are available but offer only limited compensation, nor are they inexpensive: Smith (1978, 1990) for Great Britain, Nyholm (1979-1981) and Arnell (1979) for Scandinavia. Husnot's works (1884-1894, mosses, with very useful illustrations; 1922, liverworts) are excellent but difficult to get hold of, as are Limpricht (1885-1904), Roth (1903-1905, with figures for every species) and Müller 1905-1916, 1951-1958, with excellent illustrations). Cheaper, and useful at least for the moist mountain areas in the south, are Frahm & Frey (1992) and Düll (1993).
- The fact that, to use these books and any other, more specialized bryological literature, some knowledge of foreign languages, at least English, is necessary. According to my experience promotion of education in languages is still a weak point in many Mediterranean universities.
- The general decrease in knowledge of "lower plants", which makes endangered disciplines out of bryology and other cryptogamic fields that are judged to be of secondary interest only. This is part of the general adverse trend affecting taxonomic botany, especially the knowledge of species. It is therefore urgent that training courses be organized in every country, to teach the identification of cryptogams and their recognition in the field. Experienced bryologists from abroad could at a first stage be asked to assist. In addition, at least one herbarium in every country should be equipped for critical comparison of difficult bryophyte specimens for determination purposes.

In spite of these difficulties, bryological investigations are in good progress in some Mediterranean regions. The following account is a concise overview of the history and progress of bryology in the various countries of the Mediterranean area.

State of and progress in bryology in the various Mediterranean countries

Hébrard (1991: 209) and Düll (1992) give lists of bryophyte species recently reported as new for Europe, or new to science, from the western part of the Mediterranean area. Jovet-Ast & Bischler (1976) published an enumeration of Iberian liverworts. Illustrated determination books for Iberian bryophytes were published by Casares-Gil (1915, 1919, liverworts; 1932, mosses), and a treatise on Iberian bryogeography by Allorge (1947).

A German, Solms-Laubach (1868), was one of the first bryological explorers of Portugal. Later the basic books of Machado (1925, 1928-1933), Luisier (1924, 1948, mosses), and Allorge (1974, with rich literature) are to be noted. Since 1966 C. Sérgio is actively preparing a new check-list of the Portuguese bryophytes.

The first book on Spanish cryptogams is Colmeiro (1866-1867). Since 1976, Casas-Sicart is very active in Spanish bryology. She discovered several bryophyte species that were new for Spain, and some of them new to science. Her numerous published papers include two check-lists of the mosses of Spain (Casas-Sicart 1981, 1991, with critical notes and a rich bibliography). She has also been successful as a teacher of a whole generation of young bryologists. Some of their papers concern the Balearic Islands, where Koppe (1965) had previously achieved valuable investigations.

France has an excellent old tradition in bryology, Husnot's (1884-1894, 1922) still valuable classics having been complemented by newer identification guides (Augier 1966) and inventories (Boudier & Pierrot 1992). Unfortunately, no special check-list of the bryophytes of France is yet available, but there are many excellent publications by Pierrot, Lecointe, and Hébrard, the latter mainly on topics of bryosociology. Recently published regional treatments include those of Bizot (1952), Pierrot (1982), and Baudoin & al. (1987). Bischler & Jovet-Ast (1973a) published a check-list of the liverworts of Corsica, and Hébrard (1986) a paper on the mosses of that island.

Italy has a very good bryological tradition, too. Bryologists like Raddi, De Notaris, Milde, Venturi, Massalongo, and Sommier have achieved world fame. Many papers have been produced by Bottini and Zodda, the latter's publications including basic works on the liverworts (Zodda 1934). Giacomini (1947) appears to have pioneered the writing of a national check-list of bryophytes, not only for Italy but for the whole of Europe. New progress has for many years been spearheaded by Cortini-Pedrotti, partly together with her husband. Most important are her works on bibliography (Cortini-Pedrotti 1986), the Apuan Alps (Cortini-Pedrotti & al. 1992), and her recent, very useful check-list of Italian mosses (Cortini-Pedrotti 1992), including Sardinia and Sicily and giving province-by-province distributions. A brand-new check-list of the hepatics has been added (Aleffi & Schumacker 1995), and a first identification guide is in preparation. Other authors who published on Italian bryophytes include Tosto and Raffaelli. At my suggestion, Mastracci (1993) keeps working on the bryophytes of the Abruzzi mountains.

The Sardinian mosses had been explored especially by Herzog (1909, 1926), who was my first teacher in bryology. A list of the hepatics was published by Bischler & Jovet-Ast (1971-1972), based on new explorations. Cortini-Pedrotti (1983) and Cortini-Pedrotti & Troiano (1985) produced enumerations of the mosses of Sardinia. For Sicily, a valuable early publication is that by Nicholson (1921). Dia & al. (1985, 1987) published high-quality check-lists of the liverworts and mosses, respectively, with province-by-province distributions and full citation of the sources of their data. Lo Giudice and Privitera have been working on bryocoenological problems. A collection of bryophytes, including some first records for Sicily, was made by myself and others during the OPTIMA-sponsored Iter Mediterraneum III in 1991 (see Bocconea 6, in prep.).

A note on the bryophytes of the Maltese Islands, still under-investigated to date, was published by Gradstein (1972). Dia & al. (1985, 1987) covered the Maltese bryoflora (including some data by the late E. C. Wallace) in their Sicilian lists.

Former Yugoslavia is one of the few Mediterranean countries to have a good book for bryophyte identification, also giving full distributions (Pavletić 1955, 1968). A "Conspectus" was published by Martinčić (1968). Few later publications seem to be noteworthy, except Bischler & Jovet-Ast (1973b, on Dalmatian liverworts) and Hébrard (1975). Some important discoveries on my excursions to this area are included in my "Annotations" (Düll 1992).

Like Yugoslavia, Bulgaria too has a well illustrated bryophyte flora (Petrov 1975). Earlier, Podpěra (1911) had contributed an important publication on the bryophytes of the Bulgarian high mountains. I myself, and L. Meinunger, made valuable collections in

this country, but the results are still unpublished. Recently Ganeva (1996) started work on the Bulgarian bryoflora.

Albania seems to be the most under-investigated country in the Mediterranean area. Publications on Albanian bryophytes include those by Kárpáti & Vajda (1961), Petrov (1961) and Bischler & al. (1980, liverworts). Only very few collections had been made before, e.g. by Unger (1862). Recent political developments may enable a more intensive investigation of this country in the near future.

The *Med-Checklist* area includes the Crimea. All bryophyte records known to me for that area are included in Düll (1983, 1984-1985), except for some additional species reported by Partika & Slobodjan (1989).

The available knowledge on bryophytes of the Greek mainland and islands (except Crete) is very unsatisfactory. This is evident from the literature compilation of Greek bryophyte records by Preston (1981, 1984a-b). Important recent publications on the subject include those by Hararas (1976), Geissler (1977), Gamisans & Hébrard (1979), Townsend (1977, 1986, 1987, 1989), and Blockeel (1991). They show that species new to Greece can be discovered during every visit. I myself explored the islands of Corfu in 1986, Kefallinia in 1991, Rhodes in 1993, Mt Olympus in 1986, and parts of the Athos Peninsula in 1993. E. Sauer of Saarbrücken also collected abundantly on Mt Olympus, E. Damm, Duisburg, explored the island of Thasos, and F. Preuss that of Kefallinia. A new, critical bryophyte check-list for the whole of Greece, to include the results of all of these investigations as well as the important data from literature, has just been published (Düll 1995).

Baumgartner (1943) published a useful compilation of the bryophytes of the Aegean islands, including an important paper by Nicholson (1907) on Crete. This publication prompted me to explore the latter island (Düll 1966, Düll & Düll-Hermanns 1973). Further important contributions are those of Gradstein (1971) and Bischler & Jovet-Ast (1979). An overview of the Cretan bryoflora, by Düll (1979), showed that within 13 years, after my first publication, the number of species known from the island had more than doubled. Curiously, Hébrard (1982) did not take notice of the literature on Crete.

For Cyprus, an interesting bryophyte collection made by Unger and Kotschy in the 19th century was determined by Juratzka (1865). After the second world war Bilewsky (1961), Townsend (1965), and Koppe (1976) published the results of their investigations of the island.

Following Handel-Mazzetti (in Schiffner 1913), Henderson & Prentice (1969) and Crundwell & Nyholm (1979) reported new bryophyte species for Turkey, and Walther (1967, 1970, 1975) published some papers based on his Turkish bryophytes; a huge, mostly unidentified Turkish collection of his is deposited at the Naturkundemuseum Stuttgart (STU). The recent check-lists of Turkish hepatics (Çetin 1988a) and mosses (Çetin 1988b) were useful for my work on the European distribution of bryophytes, although some data are in need of confirmation (Düll 1992). Altogether, especially because of Elsa Nyholm's valuable contribution, these lists represent an immense progress. Besides Çetin, Gökler (1986, 1989) and Gökler & Öztürk (1986, 1991) also published bryological papers in recent years.

Conclusion

From the data of my earlier publications (especially Düll 1984-1985) it would be easy to prepare a "Check-list of Mediterranean Bryophytes", to include about 1500 taxa – but only for the European part plus Turkey and Cyprus. To add SW Asia and N Africa, would take time and cost money, and would require help by specialists of these regions.

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