

Perspectives for the European Lichen Mapping Project in Italy

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1. Introduction

In the last century an important lichenological school originated in Italy, led by G. DE NOTARIS and A. MASSALONGO, who proposed the use of micromorphological characters for the delimitation of taxa (see HALE 1984). In the same period other Italian lichenologists, as F. BAGLIETTO and A. CARESTIA carried out floristic investigations in several parts of the country. The interest in cryptogamic research was so high that in 1858 a group of scientists and amateurs founded in Genova the Società Crittogamologica Italiana. The newborn society published an official paper, the *Commentario* and an important series of exsiccata, the *Erbario Crittogamico Italiano*. Fundamental studies were published in this period, but the death of MASSALONGO, the dispersion of the group working with DE NOTARIS after he went to Rome, and an unfortunate cultural policy of the Italian Government caused a rapid decline of the Italian lichenological school (NIMIS 1989). The result was, that for almost seventy years (from 1911, when JATTA published his *Flora*, to 1980) lichenology in Italy was represented by very few people, most of whom were amateurs. In this period no more than 12.000 specimens were collected in Italy, which is only 6% of the whole number of samples preserved in Italian herbaria (TRETIACH & VALCUVIA PASSADORE 1990). The best lichenologists active in the present century were G. GRESINO, C. SBARBARO and M. CENGIA SAMBO. These authors were not university professors; the absence of an academic tradition was one of the main reasons why lichenology in Italy remained neglected for more than fifty years.

In 1987, under the stimulus of P. L. NIMIS, a small group of lichenologists met at Trieste to found the Società Lichenologica Italiana (S.L.I.), whose main aim is the improvement of lichenological research in Italy. In about two years, the Society has organized 10 introductory courses to Lichenology, one International and one National Symposium, and a good number of excursions in various parts of the Peninsula. The official Society organ is the *Notiziario*, published once a year. Although a young society, the S.L.I. has now grown to more than 180 members. For the first time, since 1988, the Italian Government is funding a National Research Program on Lichens, involving 10 Universities throughout the country.

The recent renaissance of lichenological activity in Italy gives hope that the European Lichen Mapping Project can be extended to this country. Information for lichen mapping in Italy can be gathered from three different sources: herbaria, literature, and direct recording of species in the field.

2. Herbaria

The herbaria are excellent sources of information for phytogeographic studies. In my opinion, distribution maps of species should be based, if possible, on specimens preserved in collections, at least when difficult taxa are concerned. The herbarium

specimens allow validation of the identifications, and can be used for further investigations, such as chemical, ultrastructural or histological analyses for systematic revisions.

All too often the herbaria are considered as dusty, useless warehouses. Many of the Italian lichen herbaria are actually dusty warehouses, even if they preserve about 200.000 samples (most of them collected in the last century).

The main problems in obtaining information from Italian herbaria are: (a) the lack of recent revisions of old specimens; (b) the lack of an efficient herbarium staff, so that the requests of loans remain unanswered; (c) scarcity of updated information on the contents of herbaria. The historical herbaria, for example those of F. BAGLIETTO (MOD), A. JATTA (NAP), G. DE NOTARIS (RO), are particularly affected by these problems.

The results of a recent survey of the Italian herbaria, promoted by the S.L.I., have been edited by TRETIACH & VALCUVIA PASSADORE (1990). The survey concerns all the historical collections, with the exception of the herbarium of V. TREVISAN, and gives an estimate of their holdings. The location of the types of all lichen taxa described by Italian authors is planned for the future.

In the last ten years some new herbaria have been created; a few of them have been computerized, such as the lichen herbarium of the University of Trieste (TSB, Herb. P. L. NIMIS), with more than 14.000 samples, and the Herbarium of the Università della Calabria (CLU, Herb. M. CODOGNO & D. PUNTILLO), with about 8.000 samples. Other new collections, such as those of G. CANIGLIA, R. PIERVITTORI, M. VALCUVIA PASSADORE, D. OTTONELLO, M. GRILLO are inserted within the historical herbaria of PAD, TO, PAV, PAL, CAT, respectively.

The P. L. NIMIS Herbarium (TSB) contains personal collections from Alaska, Svalbard, Canary Island, Tierra del Fuego and Italy; the Italian samples were collected mainly in Friuli-Venezia Giulia, Sardinia, Latium, with a mean annual increase rate of 1.400 samples. This herbarium constitutes the basis for a databank, the basic archives (list of species and localities with ecological data) of which is printed once a year, and is available upon request. The software of this databank is described by LAGONEGRO et al. (1982). For each herbarium specimen, the following information is stored: (a) progressive number of herbarium envelope; (b) geographic sectors; (c) quadrant number, with the grid adopted in the Project of Floristic Cartography of Central Europe; (d) substrate type, as follows: 1) rock type; 2) soil type; 3) tree species or genus; (e) elevation. Such information is integrated with those obtained by WIRTH (1980), concerning the ecological range of the species, as follow: pH-range; eutrophication range; moisture range; light range, and with the area diagnosis in Europe, also taken from WIRTH (1980). It is possible to obtain species lists for localities or quadrants, frequencies of species with respect to elevation or substrate-type and distribution maps from this databank. The software allows obtaining matrices with the frequencies of species with the same distribution patterns, or with the same ecological requirements, within geographic sectors, quadrants, or different localities. These matrices can be processed by methods of multivariate analysis. Examples of such an approach are given in NIMIS & DE FAVERI (1980), NIMIS & LOSI (1983), NIMIS et al. (1987). Although the floristic investigation is far from being completed, the publication of a first distribution atlas covering Northeastern Italy is planned within the next few years. The software of the databank will be changed in 1990 in

correspondence with the substitution of the hardware at the Centro di Calcolo of the Trieste University.

Other computerized lichen collections are those of PAL and CLU, the basic archives of which can be requested from the authors.

3. Literature

Literature may be a good source of floristic information, but its use may be dangerous, above all when it is not possible to check dubious identifications. Moreover, old literature records are sometimes inadequate for mapping purposes, since they often require a critical reappraisal of old nomenclature.

In Italy good floristic investigations were carried out by BAGLIETTO (1863), BAGLIETTO & CARESTIA (1863, 1865, 1867, 1880) in the Valsesia (Western Alps), MORIS & DE NOTARIS (1839) on the Isle of Capraia (Tuscan Archipelago), by BAGLIETTO in Tuscany (1871) and Sardinia (1879), ANZI in the Rhaetian Alps (1860), etc.

All these publications are usually based on samples preserved in the Italian herbaria, so that it is possible to check the identifications if necessary. NIMIS & POELT (1987), for example, critically discuss the species cited by BAGLIETTO (1879) for the flora of Sardinia. VALCUVIA PASSADORE & VITTADINI ZORZOLI (1982) compiled all the available information on lichens reported by previous authors (F. BAGLIETTO, M. L. J. BOULY DE LESDAIN, G. DE NOTARIS, A. JATTA, C. SBARBARO, M. J. SERVIT) from Liguria, without attempting a critical revision.

The Flora of JATTA (1909–1911) remains the most complete work on the lichen flora of Italy, but it can hardly be used for mapping purposes, since the locality records are extremely vague.

The S.L.I. is organizing a documentation center to improve the availability of old literature. The reprint of rare articles of the Masters of Italian lichenology is also in progress: the first volume will be published in 1990 with a selection of papers by A. MASSALONGO.

In the last years, floristic contributions were published in the series "Contributions to lichen floristics in Italy", with the papers on the M.te Ventasso (Northern Apennines; NIMIS 1985a), on the Tremiti Islands (Southern Adriatic Sea; NIMIS 1985b), on the Presidential Estate of Castelporziano (Latium; NIMIS 1988), on the Caronte Valley (Calabria; PUNTILLO 1987), and on the Isle of Capraia (Tuscan Archipelago; NIMIS et al. 1990). The main aim of the series is to study the floras of small, well delimited areas such as islands, single mountains or old forests. Other floristic lists have been published by CANIGLIA et al. (1985) and CANIGLIA & DE BENETTI (1987) on the Cansiglio Plateau (NE Italy); CASTELLO et al. (1989) on the epiphytic flora of the upper Torre Valley (Julian Prealps); GRILLO & ROMANO (1988) on the National Park of Abruzzi (Central Italy), GRILLO & CANIGLIA (in press) on the flora of Etna Volcano; NIMIS & LOI (1982a) on the Val Rosandra, near Trieste; NIMIS & LOI (1982b) on the epiphytic flora of the Trieste Karst; NIMIS et al. (1987), on the epilithic flora of archeological sites in Latium; NIMIS & POELT (1987) on the lichen flora of Sardinia; OTTONELLO & MERLO (in press) on the Isle of Marettimo (Egadi Islands). By comparing the results of these studies it will be possible to study the correlations between climatical factors and distribution patterns, floristic diversity and structural features of the floras. These species lists will be a good source of information for mapping projects.

The best distributional data which can be obtained from the literature are those contained in taxonomic revisions of given taxa, or in studies specifically devoted to the analysis of distribution patterns, which summarize the analysis of several herbarium specimens, field collections and literature data. In the last few years some revisions of Italian material were published by COASSINI-LOKAR et al. (1986, 1987) on the *Cladonia chlorophaea-pyxidata* complex and on the genus *Parmotrema*, CODOGNO et al. on the *Umbilicaria hirsuta* complex in Europe (1989), and CODOGNO & PUNTILLO on the Pannariaceae of Calabria (in prep.). Phytogeographic contributions are those of TRETJACH & NIMIS (1988) on the distribution of *Normandina pulchella* in Europe, CODOGNO & PUNTILLO on the Umbilicariaceae in Calabria (in press), CODOGNO & SANCHO on the Umbilicariaceae in the W-Mediterranean basin (in press).

4. Field investigation

The relatively high number of S.L.I. members could allow extension of lichen mapping to the whole peninsula, at least for easily recognizable species. At present, the S.L.I. and the Italian W.W.F. have launched a national project for the introduction of a simplified method for monitoring air pollution with lichens in the Italian schools, inspired by the method proposed by HERZIG et al. (1989). In 1989, 30 schools, in different towns throughout the country have been involved; in the next year they should be almost 200. There is a S.L.I. specialist in each region to assist the teachers in the identification of lichens. This project could be a good source of information on the distribution and behaviour of species endangered by air pollution, because the data will be collected at the national level and published in the *Notiziario* of the S.L.I. The rapid increase of applied research in biomonitoring with lichens could also be of interest for mapping purposes; at the moment there are several projects in progress in different parts of Italy, which include the mapping of all epiphytic lichen species around towns, industrial areas, or over relatively vast regions. The most important project is the study of the whole Veneto region commissioned by the local authorities to the University of Trieste. More than 500 localities have been visited, and in each locality the frequency of all epiphytic species on several trees (*Tilia*) have been recorded. The results have been processed by programs of automatic mapping, producing the distribution maps of more than 100 species; the maps report also their frequency distribution in the survey area. These data could be directly used for the European Lichen Mapping Project.

The S.L.I. organizes common excursions in the Italian Peninsula every year, like those in Calabria (1988), Capraia and Castel Porziano (1989), to study areas with lichen floras not well known. The data gathered at these occasions could also be used for mapping purposes.

Finally, in 1989, a Lichen Commission was established within the International Organization for the Phyto-Taxonomic Investigation of the Mediterranean Area, whose first meeting will be held in Trieste in April 1990. The main aim of this commission is the compilation of a first check-list of Mediterranean lichens. Field studies will be organized by the Commission in the least explored parts of the Mediterranean Region, including Italy; these should provide very important distributional data to fill the apparent distributional gaps of some species in some poorly investigated parts of Southern Europe.

5. Conclusions

The loss of the old lichenological tradition caused a major delay in the development of floristics and phytogeography of lichens in Italy. Nowadays, lichenological studies are rapidly increasing after more than half a century of almost complete neglect. Floristic mapping projects not only have a scientific importance in themselves; they also provide a framework to organize the activity of people working in the same country. In this sense I think that the involvement of the Italian Lichen Society in the European Lichen Mapping Program could be very fruitful.

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7. Literature

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