

Acta Bot. Croat. 29 (1970) 233—237

THE MAPPING OF MACROMYCETES IN EUROPE AND THE CURRENT RESULTS IN JUGOSLAVIA

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Received December 3rd 1969.

Our knowledge of the geographical distribution of fungi compares very unfavourably with that of the distribution of higher plants. The mycoflora of even the best investigated countries is still imperfectly known, while in others, whole regions are quite unknown from the mycological point of view. At the Second European Mycological Congress in Prague, 1960, it was therefore decided to make a start at first by mapping for Europe one hundred selected species of macromycetes, and so ascertain the limits of their distribution on this continent. Amongst the first hundred are some of the most common fungi, but, on the other hand, several are very rare and critical species which are not well known and may perhaps represent, in some cases, a mixture of two or more species.

Most of the countries in Europe are co-operating in this project. In each of them, one mycologist, if possible with several helpers, is in charge of arranging the data received, as well as his own or taken from herbaria and the literature, and sending reports to the Committee for mapping in Copenhagen (Institut for Sporeplanter, under the direction of Prof. M. Lange). For each locality, it is necessary to state the longitude, latitude and altitude, also as much ecological data as possible (type of forest, substrate — especially for lignicolous species, etc.) and, of course, the date, names of person or persons who collected and identified the specimen, and finally the herbarium in which the exsiccate is preserved. It is not necessary to preserve specimens of the very common species, although it is well to have some from those localities which lie far apart, but voucher specimens are indispensable for the rare and critical species.

For practical purposes the species were divided into four groups, the data to be sent in four stages, and it was hoped that the project would

be finished by 1969. and a new one started. However, it turned out that this was too short a term, and, whilst it is true that several countries sent the data for all four groups, many were only able to deal with the first or the first and second groups. Now (1969) the committee is working on the first group for the whole of Europe.

On the basis of the data sent some years ago for two species, *Pycnopus cinnabarinus* and *Xeroconus parasiticus*, provisional maps have been made of their distribution in Europe (Hansen and Lange 1966). As some countries have not joined in this project, which, fortunately, are those mostly on the periphery of the continent, the blank areas on these maps do not mean that the species is absent. On the other hand, the localities are more numerous around the larger mycological centres, since the mycoflora was more regularly investigated there, and it has been remarked that the maps show rather the distribution of mycologists than of the fungi... Still, it can be seen, for instance, that *P. cinnabarinus* has an apparently broader range and goes farther north than *X. parasiticus*. Of course, additional localities of these fungi were found later, and the final maps will be more complete.

The results of the mapping can give a reasonably true picture of the distribution of the fungi only in the countries with a long mycological tradition, where there exist herbaria from which older data can be checked, and where the number of present-day mycologists is not too small. Also, the so-called amateurs can contribute much in such a project, especially those with a fairly large knowledge of fungal species, by collecting in out-of-the-way places and sending fresh or properly dried material, with exact descriptions and all other necessary data to the mycologists in charge. One of the best examples is Czechoslovakia, where there are a number of mycologists, although some of them only able to work in their spare time, and where a whole conference (2—5 IX 1969) was devoted to the geographical distribution in their country, not only of the 100 mapped species but also of others, particularly those of some practical importance: wood destroying, poisonous etc. Several papers dealing with the detailed distribution of particular species have already been published in that country and also in some others; a selection of them is listed in the literature.

In Yugoslavia, it was V. Lindtner (Prirodnjački muzej, Beograd) who was first in charge of the mapping, but, after his sudden death, the present author was obliged to take over this duty. The difficulties in collecting the data here are enormous. There is a very small number of collaborators, whilst the herbarium collections are meagre and mainly not well arranged, so that they are hardly usable. Many localities had to be taken from the literature, most of it dating from the end of the last and the beginning of the present centuries, and very often not giving any other data except the name of the locality. In addition, only some small parts of our country have in any way been regularly investigated; in others a mycologist or two has perhaps spent several days, sometimes half a century ago, often not in the best fungal season, while the mycoflora of whole regions is totally unknown. The collections of older investigators are for the most part destroyed or lost, or, when made by foreigners, taken out of the country; also, they were dealing mainly with the micromycetes. Therefore, most of the records could not be checked, but, as the fungi noted were usually common and the workers well-known mycologists, the identifications were probably correct.

Still, after arranging the data collected up to now, an idea can be formed about the distribution of many species and the possibilities of their being found in uninvestigated parts of our country.

For several species, no locality has been ascertained. This may mean that they are really absent, but, on the other hand, some of them grow in special habitats which are rare here and have not yet been investigated mycologically, e. g. moors. Also, some species are generally little known, or have small fruitbodies and so are easily overlooked. The mapping project has helped to turn attention to them. *Sistotrema confluens*, for instance, was not noted earlier for Jugoslavia. However, two localities have now been found, and some collectors, seeing the specimens, recalled having previously found the species but could not identify it then owing to lack of literature. *Hymenochaete mougeotii* was collected only once before, but there now exist five localities, still too few, however, to make conclusions about whether the species is rare or not. (Tortić and Jelić 1970).

Hygrophorus marzuolus was known from only a few places in Slovenia, where it grows in quite large quantities and is collected by the inhabitants in March and April as a good edible fungus. It is, however, rather difficult to find as the fruitbodies are deeply embedded in the detritus. As interest in fungi is very strong in this part of our country, people started to search for this species and many new localities were found. Elsewhere, *H. marzuolus* has been noted from only one locality, in Bosnia. It is possible that its range is larger, but many collectors would be needed to search for it systematically.

Bondarzewia montana is generally considered as rare. Here it has been found in four widely separated localities (Tortić and Jelić 1969). It is bound to fir, and, as fir forests are wide spread on our mountains, it can therefore be expected that more localities will be found in time (the fifth is almost certain), even if it may not be common.

For several species, a relatively small number of localities is known, mostly from the better investigated republics (Slovenia, Croatia, Serbia). However, they do not seem to be rare in these localities, and, as they are cited as frequent or at least not rare in other countries, it is very probable that they will be found elsewhere. This applies, for instance, to species bound to a particular type of forest (as *Marasmius alliaceus* to beech forest, where it grows, in fact, on bits of beech wood) or growing mainly on a particular genus or genera of trees (as *Oudemansiella mucida* on beech or *Fistulina hepatica* on oak and chestnut). *Marasmius alliaceus*, for instance, has been found in 17 localities. However, whilst many of its fruitbodies can usually be found in a given locality, as they are small and solitary, they may be overlooked. Beech covers large areas in mountainous parts of Jugoslavia, where this species is surely not uncommon, even in these republics where only one locality is so far known (Crna Gora (= Montenegro) and Macedonia). *Oudemansiella mucida*, too, can be also expected, if not frequent, at least not to be rare in these forests, yet only 31 localities are currently known. *Fistulina hepatica* has been found in 30 localities, but is surely more widespread and not uncommon in the old oak and chestnut forests which still exist in various parts of our country.

In contrast, *Boletinus cavipes*, a mycorrhizal species of *Larix*, is apparently restricted to Slovenia, where this tree is autochthonous, alt-

hough, of course, there is always a possibility of its being found under planted larches in some other part of the country.

Some species of fungi can be met in various types of forests, and are among the first which one notices when arriving in a new locality. Such are, for instance, *Clitopilus prunulus*, *Laccaria amethystea*, *Tricholoma sulphureum* etc. and we can be sure that they are common, even if the number of their known localities is still small: about 35 each for the first two and only 13 for the third.

The best known and most frequent species, such as *Armillariella mellea*, *Fomes fomentarius*, *Schizophyllum commune* etc. have, of course, been most often noted or collected, but even the data for these species fails to give a true picture of their distribution. *Schizophyllum commune*, with 118 localities in Jugoslavia, has the largest known distribution, whilst all others have less than 100. This compares very unfavourably with the results in some other countries, where, in some cases, up to 400 localities have been recorded for a single species. Also, if our localities were shown on the map, they would be mostly grouped at some points, with wide blank spaces between. It is, of course, known that the three last named fungi are very frequent in our country, that the first two, and sometimes also the third, are doing much damage either in forests or in plantations, but they are very often listed only as »frequent« or »growing everywhere«. For edible fungi, one receives similar information, with the addition that they are collected and eaten, or are sold in markets in this and that region or town. Such vague data cannot be used, with the result that a species seems to be absent from the major part of the country. A most drastic example is the case of *Amanita caesarea*. This excellent edible fungus is sold regularly in the markets of Ljubljana, Zagreb and probably also in other towns, and, according to popular books and information received from various collectors, it is especially common in parts of Slovenia which are under a mediterranean influence, and in Istria. As a thermophilic species, it is surely widely distributed particularly in the southern regions of our country. Yet, only 32 localities have so far been reported. The northern border of its area runs through the Czechoslovakia, where, whilst the species is considered as »very rare«, 126 localities have already been registered.

Unfortunately, similar examples are many. We are aware that many of the localities, even of the most common species, have not yet been noted, because nobody has ever collected fungi there, or did not go there in the right season. Still, our country has at least made some contribution to the mapping project. Although the results are modest, we can conclude from them which species are probably frequent and in which parts they should be expected. Even a short visit to several uninvestigated areas and the noting of only the most common fungi growing there would considerably enrich the knowledge of the mycoflora of Jugoslavia. This is, of course, difficult with such a small number of workers as exists at present, and we can, therefore, only hope for more interest and more collaborators in future, especially in those regions which are quite unexplored mycologically.

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The author expresses her thanks to Mr. J. T. Palmer (Woodley, Chesh.) for the correction of English text.

Summary

A report is presented on the mapping of the macromycetes in Yugoslavia, as a part of the European project, and its results are discussed. In spite of various difficulties and the relatively small amount of data obtained, some conclusions can be drawn about the distribution of a number of species. A clearer picture also emerges of the mycologically unexplored parts of our country and to which particular attention must be paid in future.

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SADRŽAJ

KARTIRANJE MAKROMICETA EVROPE I DOSADAŠNJI REZULTATI U JUGOSLAVIJI

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Prikazan je rad na kartiranju makromiceta u Jugoslaviji u okviru evropskog projekta. Usprkos različitim poteškoćama i relativno malom broju lokaliteta što su mogli biti sabrani, iz dobivenih se rezultata mogu izvući neki zaključci o rasprostranjenosti većeg broja kartiranih vrsta kod nas. Također se na osnovi tih rezultata dobiva jasnija slika o tome koji su dijelovi zemlje s mikološkog gledišta neistraženi i kojima bi se morala posvetiti u buduće osobita pažnja.

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