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Lichen Mapping in Turkey

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With 5 figures

About 100 papers dealing with lichens from Turkey have been published (John 1988). Only a few of them include noteworthy lists of original records. The majority of these papers are monographs in which species recorded before are revised. Furthermore, information on some species has been distributed by means of exsiccata or in data given to the author. A lot of these papers deal exclusively with „manna" (*Aspicilia esculenta* - group). Contributions in Turkish language are of text-book character in most cases, only a few of them present original records.

Thus the published number of Turkish lichen species does not even reach 700. These records can easily be located and may be used in any kind of grid mapping. The first collections, forming the basis of lichenological work, were made at the beginning of this century. Recently lichen collections have been made in areas surrounding points of touristic interest or at roadside localities close to routes connecting historical sites. Those localities of more important collections mentioned in the literature are indicated by triangles in Fig. 1.

While former collections of lichens in Anatolia were made as parts of large interdisciplinary expeditions to the Orient, the recent ones, starting in 1982, were made during special excursions focussing particularly on lichens. Better investigated localities are indicated by circles in Fig. 1. The most comprehensive collection of Turkish lichens may be found in herbarium V. John which will be deposited at POLL (Pfalzmuseum für Naturkunde, Bad Dürkheim). Additional specimens, partly not studied yet, are distributed throughout several herbaria located mainly in Central Europe, including some private ones. However, the number of specimens in collections in Turkey is rather low, although we are trying to deposit at least the duplicates of determined specimens there.

Fig. 2 shows the better investigated areas, at least with respect to species number per grid square (measuring 1° to 1°), as black dotted grids; areas of lower species number, compiled from literature data in most cases, are indicated by black lines. The lichen flora of Turkey will be mapped using a grid following exactly the longitudinal and latitudinal geographic minutes. Two examples of more intensively investigated regions are given in Fig. 3. The data collected will contribute to an inventory of the whole country's species composition. Subsequently these records can be transferred to any kind of grid system.

The application of very low scale monitoring may serve to distinguish polluted areas in urban environments (John 1989). Based both on species distribution data and coverage ratios of crustose, foliose and fruticose lichens as well as on species numbers and lichen vitality, areas of different pollution levels may be discriminated (Fig. 4). This example shows that lichens may successfully be used as bioindicators for air pollution in urban areas in Turkey. Within larger Turkish towns a decline in species number has already become obvious (e. g. Özdemir 1987).

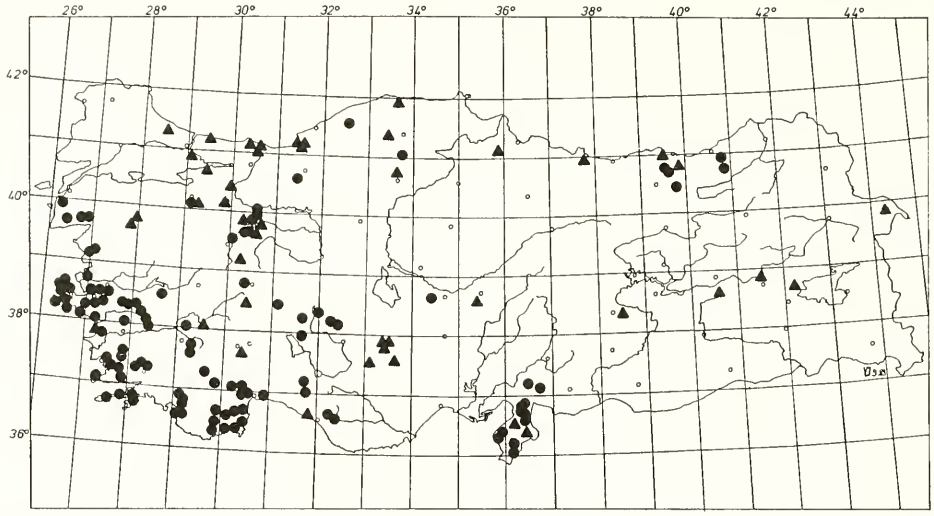


Fig. 1. Survey of collecting localities in Turkey. – *Triangles*: Literature data. *Circles*: collecting sites of the author.

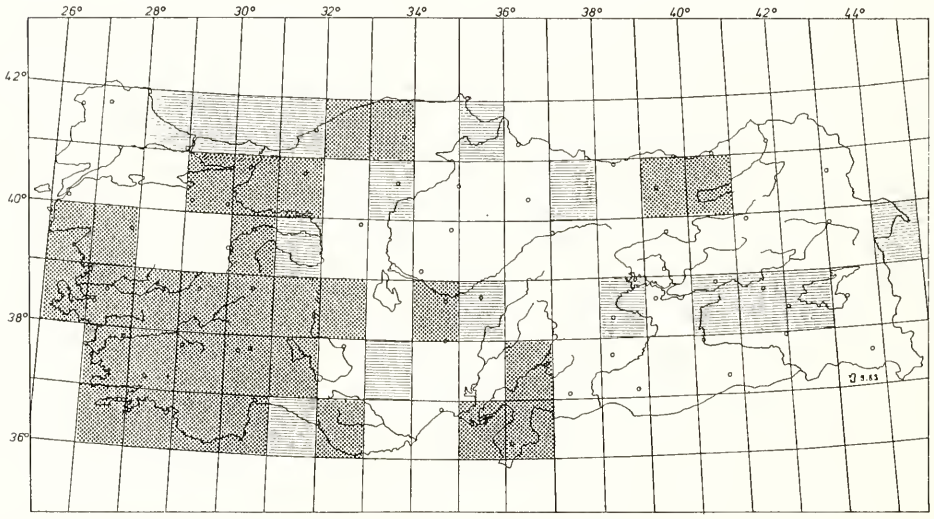
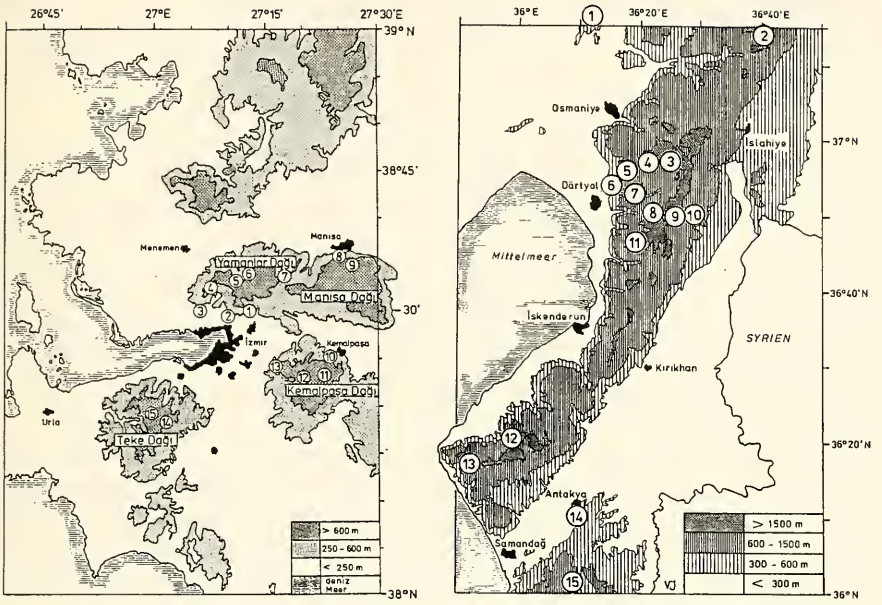


Fig. 2. Investigated areas in Turkey. – *Dotted*: relatively high species number. *Hatched*: relatively low species number.



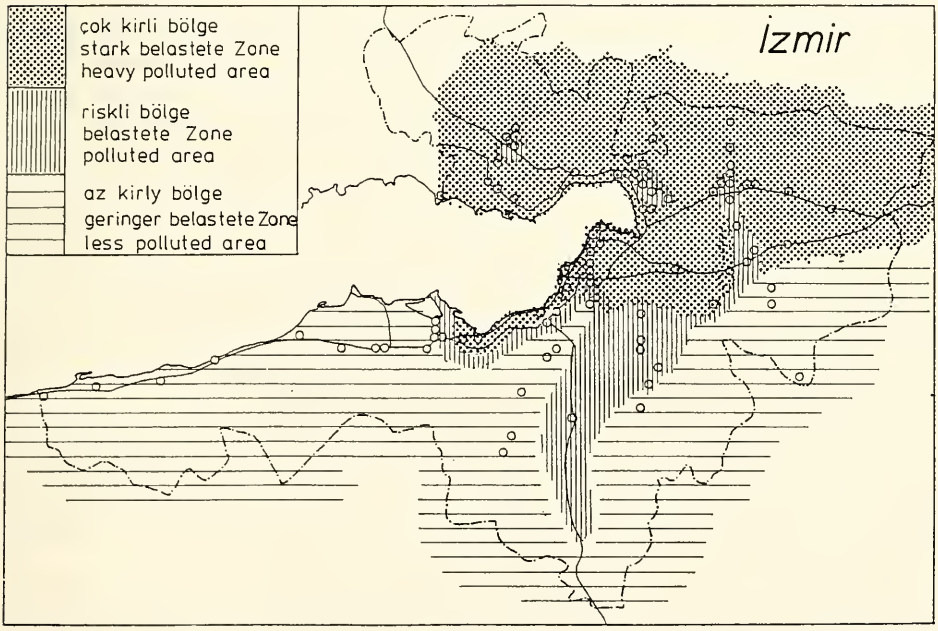


Fig. 3. (above) Two more intensively investigated areas in Turkey. – *Left*: City of Izmir and surrounding mountains. *Right*: Amanos mountains in Prov. Hatay.
Fig. 4. (below) Different lichen zones in the city of Izmir reflecting polluted areas.

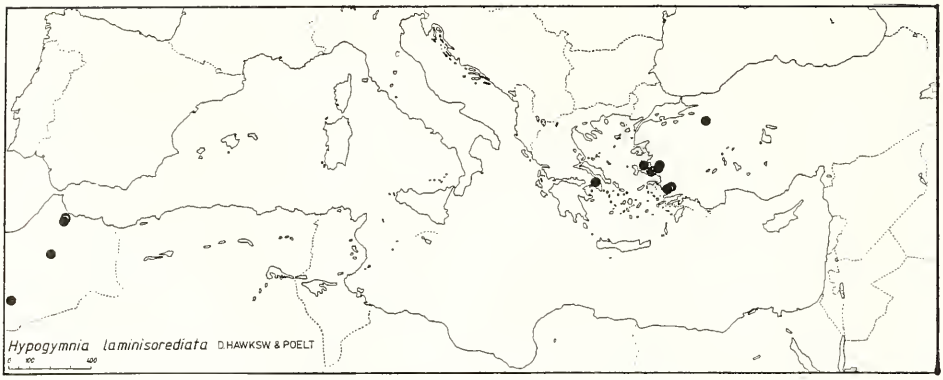


Fig. 5. Distribution of *Hypogymnia laminisorediata* D. Hawksw. & Poelt.

Lichens can also be used for research projects on topics beyond urban ecology. Many species of oceanic distribution face extinction in Central Europe. Several of them can be found no longer in large areas where they recently occurred. It is possible that due to increasing air pollution, use of pesticides, tourism, etc. such species are threatened in Turkey as well. For that reason an inventory of the present situation is extremely urgent.

A survey covering a larger area may of course result in an enlargement of the known distribution areas of certain species (Fig. 5), or in filling gaps on distribution maps. Additional information on the species ecology contribute to a better understanding of the biology of many species as well. *Hypogymnia laminisorediata* (Fig. 5) has only been encountered on bark until recently (Hawksworth 1973). At Manisa Mountain near Izmir, however, this species could also be found on siliceous rock. *Lethariella intricata*, which usually occurs on siliceous rock (Krog 1976), was recorded on bark at Besparmak Mountain near Milas. In this case the species becomes a valuable indicator of old forests (Sérusiaux 1988). An extraordinarily large number of lichen species, known to fruit rarely, has often been recorded with apothecia developed on many thalli. Results of research on Turkish lichens are also of general scientific interest. Numerous species may be new to science. Even from the mountains surrounding Izmir six new species were described from a total of 250 taxa, and at least 75% of them were new records for Turkey.

Further emphasis in Turkish research is given to lichen chemistry (e. g. Huneck & John 1987). New chemical strains as well as new lichen substances have been detected. Accumulation of the radioactive fallout of ^{137}Cs following the Tchernobyl disaster was found in several lichen species, showing different levels in different regions in Anatolia.

Although it is a relatively pure scientific undertaking, analysis of lichen distribution becomes a commercial and political problem as soon as the question of financial support of special research projects appears. This problem is less severe in some countries which regard nature and environment protection as necessary. In a geographical sense only part of Turkey, i. e. Thrakia, belongs to Europe. The state itself, however, is a member of the Council of Europe and associated to the European Community. Possibly it will only be a matter of time for Turkey to become a full member of the EC. It will be necessary then to pay attention to Turkish lichens in an equal manner, e. g. to compile a Red Data Book on lichens, revising the one pu-

blished by SÉRUSIAUX (1988) for the present EC members. Already VITIKAINEN (1987) has included records from Turkey in his distribution maps (50 km × 50 km UTM grid) of *Peltigera* in Europe.

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