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Lichen Mapping in Denmark

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With 5 figures

Denmark is a small country on the European map, but nevertheless a number of natural distribution limits of lichens lie within the area of this country. This is particularly the case for many epiphytes of beech, e. g. *Enterographa crassa* (Fig. 1). But also epiphytes as *Parmelia laciniatula* (Fig. 2) and *Parmelia revoluta* have their northern limit in Denmark and in the southern parts of Sweden.

Some terrestrial lichens such as *Cladina stellaris* and *Cladonia bellidiflora* are at their limit of distribution in Denmark.

In recent years Denmark and Schleswig-Holstein have attained the dubious quality of being the northern fringe of the "Central European lichen desert" (Fig. 3). The frequency of many lichens has decreased dramatically during this century.

Lichens at their natural distribution limit are often rare and vulnerable. A recent Danish red list of lichens (Alstrup & Søchting 1989) thus lists 88 of the about 900 recorded Danish lichens as extinct and about 220 to be endangered or vulnerable. There is thus an urgent need for increased surveillance and improved measures to protect sensitive lichen rich habitats.

In Denmark such habitats are old trees in ancient woodland, road side trees, twigs, lichen-rich heathland and dunes, and stone fences. Primary threats are increased woodland management, air pollution and shading due to decreased grazing.

In order to identify changes in lichen distribution baseline distribution studies are a prerequisite. Fortunately there has been a tradition for such studies in Scandinavia, primarily carried out by Swedish lichenologists (Degelius 1935, Almborn 1948, Hasselrot 1953). The Danish lichenologist Paul Gelting mapped the occurrence of about 100 Danish lichens during the thirties and fourties. However, none of these maps were published.

Subsequent mapping has focussed on specific genera (Alstrup 1978), certain interesting species (Baldursdottir et al. 1982, Søchting & Christensen 1989) or the lichens of particular substrates, e. g. road side trees (Fig. 3). (Søchting & Ramkær 1982).

Recent mapping studies in Denmark include a fourth remapping of epiphytes in Copenhagen (Søchting & Ramkær 1987) and remapping of epiphytes on countryside road-side trees (Søchting 1989).

Distribution data for Danish lichens have previously not been stored in a standardized way so they can be accessed by other persons, and no computer programs have been available for preparation of distribution maps. In recent projects, however, data are stored in dBASE files.

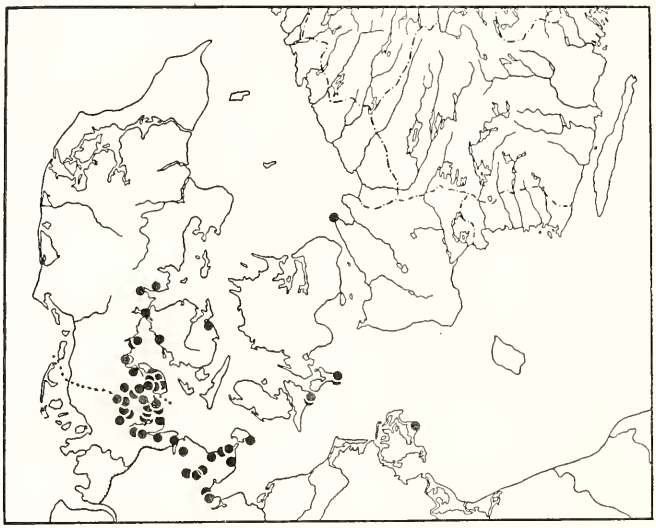
Denmark has no national grid system, but UTM is indicated on the ordnance survey maps and as blue print on special maps (Fig. 4). Undoubtedly future mapping in Denmark will be based on the UTM grid system.

There is an urgent need for a formalized way of storing data on occurrence of lichens. However, it is important that this can be done with a minimum of labour, as

the data may not readily lead to conclusions or publications, and very little immediate scientific credit is associated with the effort.

It is highly desirable that national data can be transformed to cover a European scale, which means that a variety of quadrat sizes can be used, e. g. 10, 25, 50 km.

Mapping is a laborious task. This can be illustrated by a recent example, which can serve as a warning. It was decided at the first meeting of the Nordic Lichen Society in



Figs. 1–2. Distribution of 2 lichen species in southern Scandinavia (from Almborn 1948). – 1. (above) *Enterographa crassa*; – 2. (below) *Parmelia laciniatula*.

1975 to initiate mapping of *Lobaria pulmonaria* in the Nordic countries. Only after a substantial effort a map of this single species was presented at the meeting in 1985 (Fig. 5).

I think a prudent initial approach to European lichen mapping would be to establish a common frame to be used by mappers, who for different personal reasons are interested in specific taxonomic groups or ecological problems. Such a frame, which should be compatible with national databases, could make it possible for professional as well as amateur lichenologists to supply data to colleagues in other countries, and could eventually result in coordinated European mapping of species of particular interest.

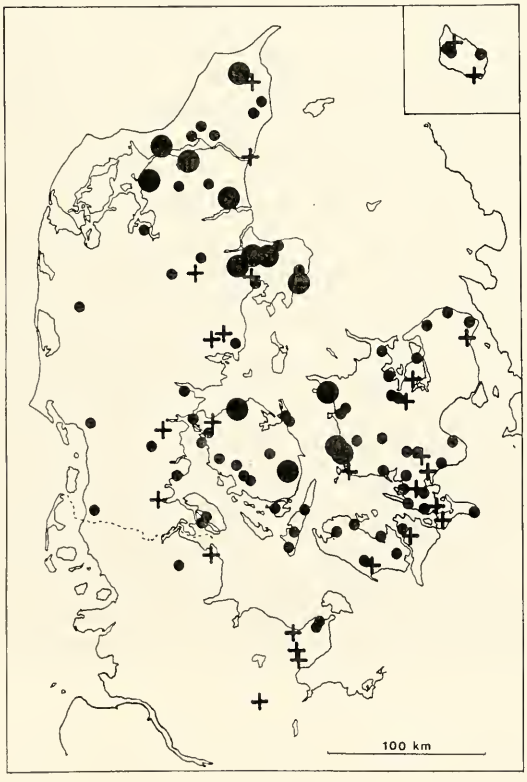


Fig. 3. Occurrence and vitality of *Anaptychia ciliaris* in Denmark and Schleswig-Holstein. – *Big dot*: Fertile specimen; *small dot*: healthy, sterile specimen; *cross*: unhealthy specimen.

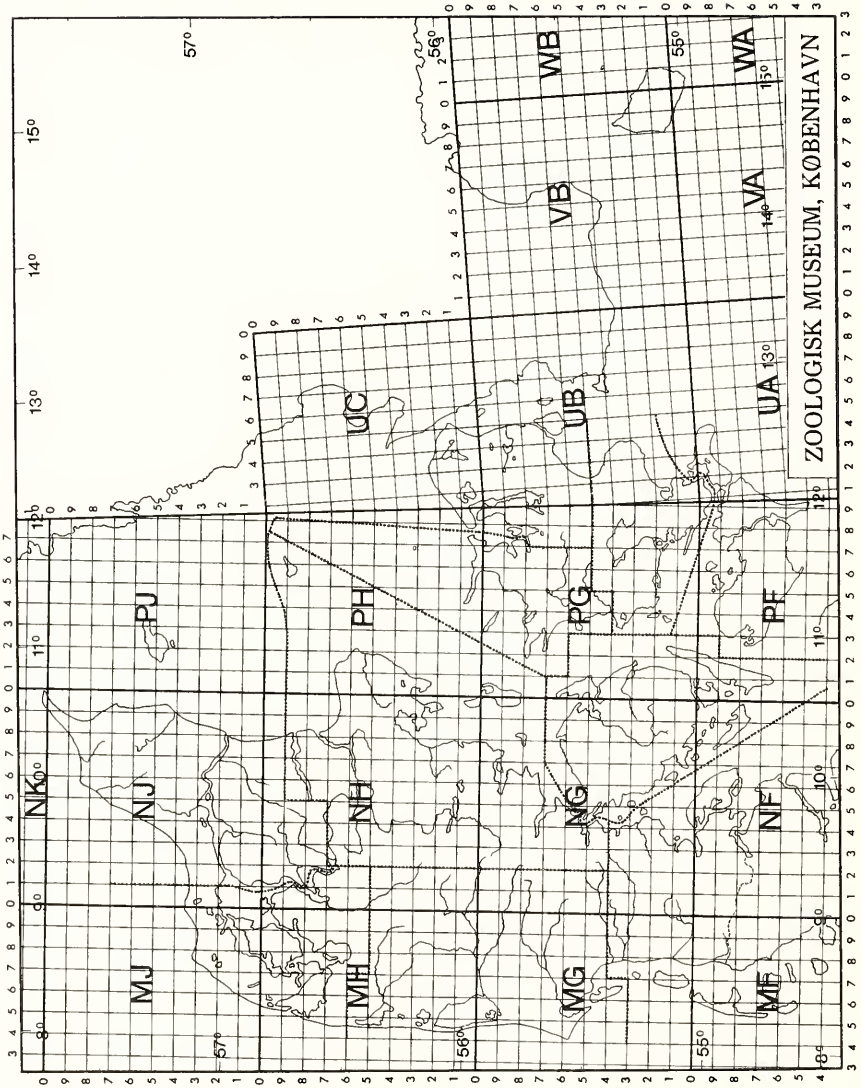


Fig. 4. UTM-grid map of Denmark.

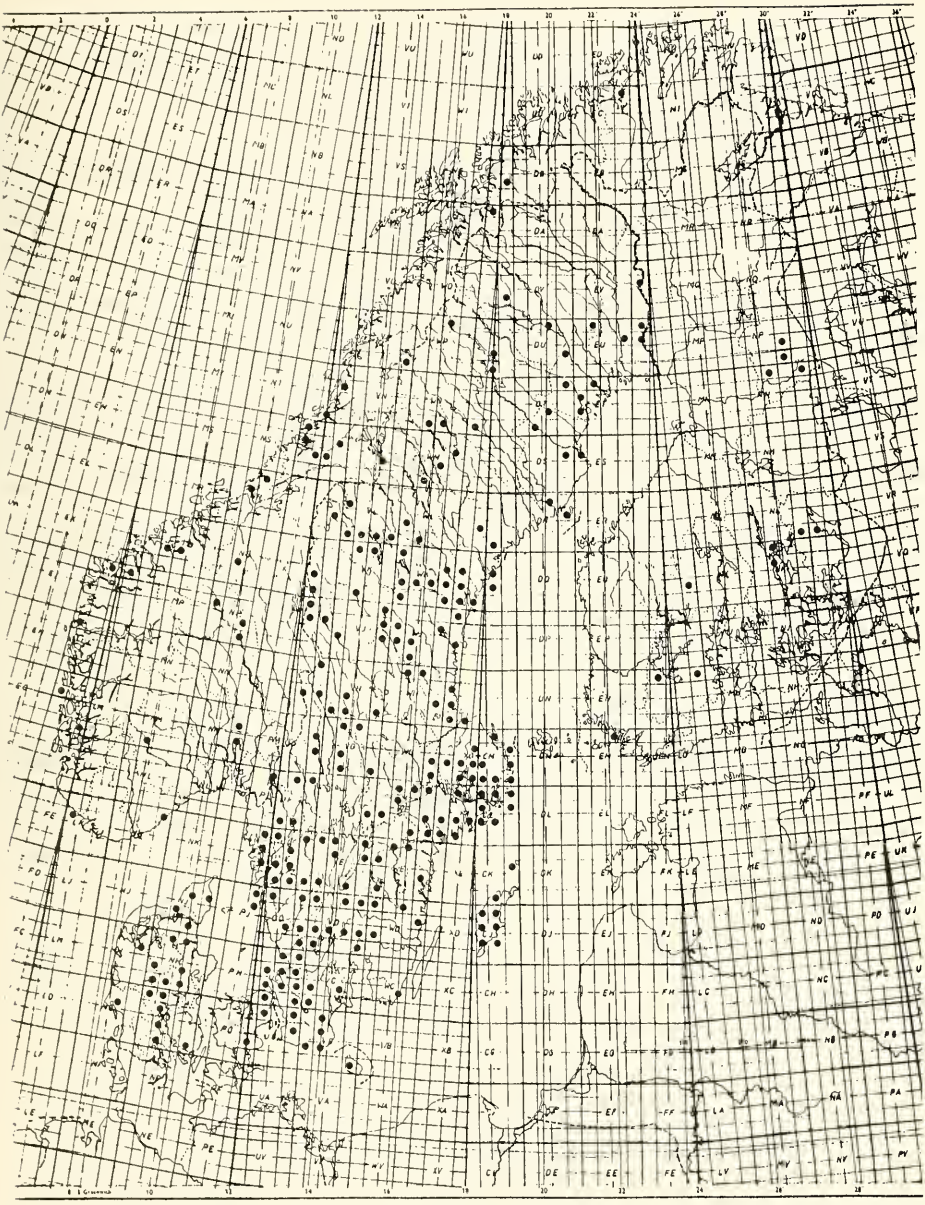


Fig. 5. Distribution of *Lobaria pulmonaria* in the Nordic countries. Compiled for the Nordic Lichen Society in 1985 by P. M. Jørgensen, R. Moberg, U. Søchting & O. Vitikainen.

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