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## Review

Lav i klit og hede – de danske rensdyr- og bægerlaver og deres følgearter

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*Published in:*  
Graphis Scripta

2018

[Link to publication](#)

*Citation for published version (APA):*

Kärnefelt, I., & Thell, A. (2018). Review: Lav i klit og hede – de danske rensdyr- og bægerlaver og deres følgearter. *Graphis Scripta*, 30(3), 20-21.

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## Review

Søchting, U. 2017. *Lav i klit og hede – de danske rensdyr- og bægerlaver og deres følgearter* [*Lichens in dunes and heather – the Danish reindeer lichens and their companion species*]. Biological Association for Norvestjylland [Northwest Jutland] Publishers, Thisted. ISBN 978-87-92100-33-7, 112 pages.

This pocketbook is a popular work on reindeer lichens and their associated species, which occur in landscapes characterized by dunes, open with naked sand or overgrown, and heathlands, often dominated by heather plants, a typical vegetation of western Jutland. The book is aimed primarily for those with special interest in nature, but it can also be used in biology classes in secondary schools. To get a direct taste of the content, the book starts with a recipe – deep fried reindeer lichen with crème fraîche, which is included in the menu of the luxury restaurant Noma in Copenhagen, specializing in Nordic taste – no alternative for the hungry or starving, but an interesting and exotic dish – by the way, this was served at the Teloschistaceae Workshop in Sorø, Denmark in 2012.

Following the preface, general and relevant information on lichens is provided, including their structure, development, growth, proliferation and propagation, both vegetative and sexual. This information does not differ significantly from currently available on the internet, but it offers important basic knowledge on the species, such as anatomical construction, development, growth forms and dispersal; it also emphasizes the importance of different environmental conditions for lichen growth such as light exposure, humidity, minimum temperatures, as well as nutrition, and the need for suitable substrates for their growth and reproduction. These lichens have the ability to endure extreme conditions, long periods of dryness and frost, common on the heaths of western Jutland. On so-called white dunes, where the sand is exposed, the species composition is significantly different compared with the climax stage of grey dunes that have been overgrown with mosses, lichens and grass. Some *Cladonia*-species are fast colonizers, such as *C. humilis* and *C. rangiformis*. As the number of species grows, the competition from mosses and vascular plants becomes more striking. *Cladonia*-species on the heaths in a larger regional and global environmental perspective are also reviewed. A fairly high proportion of the world's vegetation, approximately eight percent of the so-called taiga, the boreal zone of the Northern Hemisphere, is covered by *Cladonia*, which could be interpreted as if they actually play an important role in the balance of the earth's biota and interaction between species.

Some of the *Cladonia*-species are locally threatened, i.e. in Denmark, such as the commonly used *C. stellaris* which has become a rare species in the Danish dune communities. Modern theories about the impact of climate can also be illustrated by the decline of species similar to *C. stellaris*, as well as the snow lichen *Flavocetraria nivalis* and the now probably vanished *F. cucullata*, most recently seen in 1992. The latter species has also disappeared from Skåne, southernmost Sweden, where it used to grow along the coast between Malmö and Landskrona in the beginning of last century, where regionally bare patches still occurred. The effect of nitrogen absorption through air and rain, agricultural products and practices is also mentioned.

The author presents two different keys to the species. The first includes the 33 most prevalent *Cladonia*-species from the dune communities, a key based on simple observable characters in morphology and colour, the presence of soredia and fruiting bodies. The second key encompasses



all species found in Denmark, supplemented with laboratory characters, such as spot tests, compounds detected by thin layer chromatography (TLC), and reactions with UV light.

The genus *Cladonia* is relatively well represented in Denmark with 58 species. Worldwide there are about 500 species, while just 100 are recorded for the Nordic region, and 70 for Germany. At the end of the book, descriptions of all Danish species, listed alphabetically following their Latin names, accompanied by their Danish names, are listed. The species are divided into two groups for the sake of simplicity: the seven species of reindeer lichens with bushy fruticose podetia, among them the above mentioned *C. stellaris*, are followed by the other 51 species, usually summarized as cup lichens, because of their often cup-shaped podetia. The descriptions include the appearance of primary podetia, scales, phyllocladia, thallus shape, occurrence and appearance of the soredia, fruiting bodies and pycnidia. The morphological descriptions are complemented with information on their chemical compounds. Along with the descriptive texts of the species, there are also comments about similar species, that may cause confusion. Furthermore, there are notes about their propagation and ecological conditions, such as choice of substrate. Each species is supplied with a high resolution colour image made by the author, usually of very good quality. The book ends with the description of 18 common species, often found growing together with the *Cladonia* species, including three species belonging to the Iceland 'moss' lichens, *Cetraria*, two species of *Stereocaulon*, and six species of dog lichens in the genus *Peltigera*.

We would strongly recommend this delightful little book by Ulrik Söchting which can be purchased from the publisher: [forlagsbestyrer@bfnsforlag.dk](mailto:forlagsbestyrer@bfnsforlag.dk). Price 75 DKK (10 €) plus shipping.

*Ingvar Kärnefelt and Arne Thell*