CHAPTER 13

Development of lichen-rich communities

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The pioneer vegetation of inland dunes is known for its lichen diversity. The development of lichen-rich vegetation may take several decades after the first pioneer stage with *Corynephorus canescens* and *Polytrichum piliferum*. The neophytic moss *Campylopus introflexus* and atmospheric nitrogen deposition form serious threats to lichen vegetation.

**Introduction**

Large areas of non-calcareous and nutrient-poor sands of Pleistocene origin especially occur in the central part of the Netherlands, the Veluwe, but can also be found in the southern, northern and eastern parts of the Netherlands. The area of these so-called inland dunes includes Germany and Poland (see also chapter 2). In the Netherlands, these mesohemerobic (semi-natural) landscapes were for a large part afforested with *Pinus sylvestris* from the late 19th century onwards (Riksen *et al.* 2006). Many small inland dune sites and a small number of larger sites remained open as a nature reserve. The sand dunes and blown-out plains became gradually covered, not only by forest encroachment, but also by pioneer vegetation, mainly consisting of short grasses, bryophytes and lichens. Lichen diversity of drift sands and blown-out gravel-rich depressions in the Netherlands was not studied before the 1950s. However, in the late 1950s Stoutjesdijk (1959) included lichens in the first vegetation survey of heaths and inland dunes of the Veluwe. In this study much attention was paid to the relation between landscape structure, vegetation, soil and microclimate. On the denuded plains, lichen-diversity and lichen cover appeared to be higher when succession was much further developed than on partly still active dune systems, where erosion prevented vegetation to develop. Until well into the 1970s, mats of reindeer lichens (*Cladonia portentosa* and *C. arbuscula*) locally covered the transition belt between the sand dune ecotope and the recently planted afforestations (Leijs 1964).

Since the mid 1960s, interest in the botany of inland and coastal heath and sand dunes increased; vegetation surveys have been published with detailed descriptions of the richness (mosses, liverwort and lichens) of these ecotopes (Cleef & Kers 1968; van Embden & Verwey 1968; de Smidt 1977).

In the 1980s, Masselink (1994) studied the syntaxonomy and synecology of the inland sand dune communities in the central and northern parts of the Netherlands. Although, especially in the northern provinces only small remnants of former sandy landscapes were left, the diversity in cryptogams was substantial due to the mixing of sand with boulder clay (‘keileem’) near the surface.