SUMMARY

BIODIVERSITY IN THE NETHERLANDS

E.J. VAN NIEUKERKEN & A.J. VAN LOON, EDITORS

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INTRODUCTION

R. DE JONG & E.J. VAN NIEUKERKEN

During the UNCED conference, Rio de Janeiro 1992, 168 countries, including The Netherlands signed the Convention of Biological Diversity. The Netherlands ratified the convention in 1994 and published a strategic plan for implementation. Strangely this plan which stresses the necessity for conservation of biodiversity does not mention the magnitude of this diversity. It is a worldwide phenomenon that interest for biodiversity problems is increasing, while funding of the scientists studying biodiversity, the taxonomists, is decreasing rapidly. Even on the scale of The Netherlands such simple questions as how many species of plants and animals live here cannot be answered easily. This and other questions around biodiversity form the core of this book, which goes back to a symposium, held on 19 November 1993 in Leiden. The text is more than a simple proceedings of this symposium: it gives an overview of Biodiversity in The Netherlands, dealing respectively with the notion of 'Biodiversity', with the actual botanical and zoological diversity of this country and with nature management and policy in relation to biodiversity. The complete text of the Convention of Biological Diversity ends the book.

Summary of biodiversity in The Netherlands, compared with world totals.

group	Netherlands	world
Virus	?	?
Bacteria *	>1.000	4.670
Macrofungi	3.500	>64.000
Microfungi*	1000's	
Protists without algae	1.144	33.000
Algae	3.800	28.000
Mosses and liverworts	507	22.960
Higher plants	1.450	250.400
Invertebrates without Arthropods	3.384	153.450
Arthropods without Insects	3.147	149.600
Insects	17.455	977.000
Vertebrates	457	49.316
total	***ca.* 42.000**	***ca.* 1.800.000**

** no exact data available, figure is a rough estimate*

The number of species in the table above strongly contrasts with the only 600 target species designated by the government (see chapter by Van der Zande & Hoogeveen). We hope that this book helps to increase this number with more ecologically relevant species, and that it will promote scientific work to obtain a better knowledge of biological diversity, in order to better conserve it for the sake of plants, animals and *Homo sapiens*.

PAGE 5 **WHAT IS BIODIVERSITY ?**

E. GITTENBERGER

The popular term biodiversity refers to the immense variation in life forms, from genes and proteins to the level of species and ecosystems. The actual biodiversity results from a largely unpredictable evolutionary process, characterized by extremely asymmetric developments and results. Coincidence has been a most relevant factor in evolution. Extinction, either strict, or by further evolutionary developments, has always been an important part of the natural history of life on earth. This fact, however, cannot and should not be an argument in favour of the acceptance of the actual dramatic decline in biodiversity, caused by human activities, as simply a natural phenomenon. Though a regeneration is possible again, in principle, it would take far too much time to be relevant for mankind.

PAGE 15 **BIODIVERSITY: THEORY AND PRACTICE**

R. HENGEVELD

Biodiversity is a recent and poorly defined concept that is often estimated in two widely different ways. The first way of measurement concerns the mere number of species in an area, irrespective of their biological properties. The second way concerns particularly the diversity in biological properties, but this diversity remains unquantified. In this chapter, the process of fanning out of life through speciation is described. During this process, species respond to more and more different aspects of the total environmental variations. Apart from this search for the nature of biodiversity, its origins and maintenance, it is suggested how to estimate the reduction of biodiversity. To this end, one has to count the number of species, not independent of their properties, but categorised according to the value certain properties may have. Biodiversity reductions in these terms mean that, for example, long-distance migrants decrease alarmingly in number, affecting biodiversity not randomly, but even systematically. Thus, particular types of biological adaptation get lost forever, which is even worse than the loss of a number of species per se. Additional biological information on species properties therefore exhibits the seriousness of a loss of biodiversity. Moreover, because it shows up the process mechanism, it suggests ways to retard or even to stop the process altogether. Biodiversity in this conception does not concern the mere number of species present on earth, but it concerns the diversity of their properties. It is this diversity of properties as adaptive devices that should be preserved.

PAGE 29 **COMPOSITION OF THE DUTCH FLORA IN RELATION TO THE CHANCE OF EXTINCTION OF PLANT SPECIES IN THE 20TH CENTURY**

R. VAN DER MEIJDEN & J.E.M. GILLIS

In The Netherlands, 73 plant species have become extinct (have disappeared) between 1840 and 1990 (table 3) and 14 formerly extinct species have been rediscovered in the last 25 years (table 4). The rate of extinction seems to be constant: in each period of 20 years some 20 species disappear and there is no evidence for an increasing extinction rate in the last decades as a possible result of the increasing threat of many habitat types. There is a clear correlation, however, between the chance of extinction and the type of distribution area of each species. This chance is much greater for those species showing an outpost or marginal area type than for those having a (sub-)central area type. Disappearance of the first group of species seems to be a natural process.

PAGE 43 **BOTANIC DIVERSITY IN THE NETHERLANDS: THE FIGURES**

R. VAN DER MEIJDEN, J.J. VERMEULEN, G.M. LOKHORST, M.E. NOORDELOOS, H. VAN DAM, J.A. SINKELDAM, F.A.C. KOUWETS & P.F.M. COESEL

The major groups of plants occurring in The Netherlands are listed with the number of recorded species, including information on threatened and extinct species. Desmidiaceae and Lichens are the most threatened groups of plants in The Netherlands. Algae and particularly microfungi are still poorly known in our country.

PAGE 49 **ZOOLOGICAL DIVERSITY IN THE NETHERLANDS**

P. KOOMEN, E.J. VAN NIEUKERKEN & J. KRIKKEN

Based on an inquiry amongst zoological specialists a survey is given of the present knowledge of multicellular animals in The Netherlands (table 1). The Protozoans are summarised in an appendix. To date the Dutch fauna counts 25.200 species, from which about 24.400 are indigenous species. When expected but not yet recorded species are included the total is almost 35.000 species. The 'most unknown' groups are listed in table 3. Further more than 1.100 protozoans are known. There are a few endemic subspecies, but no endemic species. Currently the fauna is changing much faster than can be explained by natural causes alone. About 600 species are known to have disappeared from The Netherlands (table 4), but we assume many more actually have. The decline is especially severe amongst water-insects, but also in bees, butterflies and moths, beetles and fishes. The decline is caused by large scale changes, waterpollution, acidification, dessication, fertilization, etc. Further the number of exotic species is increasing, in particular in the larger rivers, the sea and the terrestrial habitats which are influenced by man (towns, coniferous forests etc.). Knowledge of our fauna is disproportionate: there are many more specialists for groups such as birds and mammals than for the speciose groups of invertebrates. Also nature conservancy and policy focuss on vertebrates and few conspicuous invertebrates as butterflies and dragonflies. This disproportionate attention for a minor part of our biodiversity neglects the key-role of invertebrates in the ecosystem. To conserve the Netherlands biodiversity it is therefore necessary to shift the attention from vertebrates to invertebrates.

PAGE 75 HET NEDERLANDSE DIERENRIJK - THE NETHERLANDS ANIMAL KINGDOM

In this part all groups (fyla, classes and/or orders) of the animal kingdom are treated inasfar as they occur in The Netherlands. The following headings are used: **NL** (number of species in The Netherlands), **veranderingen** (information about changes in the number of species and possible causes: 'soort(en)' = species; 'inheems' = indigenous; 'verwacht' = expected), **diversiteit** (areas with largest diversity in The Netherlands), **milieu** (main habitats), **dichtheden** (maximum densities known in this group), **wereld** (worldtotal of described species with reference), **determinatie** (references to major identification literature) and **verspreiding** (references to distribution atlasses). Per group references are given, but references followed by an asterisk* were listed in the main list of references on page 70.

BIODIVERSITY IN DUTCH NATURE CONSERVATION POLICY

PAGE 137 A.N. VAN DER ZANDE & Y.R. HOOGEVEEN

Implementation of the Biodiversity Convention of Rio is an important aspect of Dutch nature conservation policy. In 1990, the Ministry of Agriculture, Nature Management and Fisheries issued the Nature Policy Plan. Its main aim is to safe-

guard biodiversity by establishing an ecological network. The network consists of core areas, nature development areas and ecological corridors. This strategy is in fact an optimization of land use. It offers better spatial conditions for nature management and a perspective for sustainable development. At this stage, the ecological network is a spatial concept rather than an operational goal. Explicit management goals for the areas within the network are needed to operationalize the strategic concept. To define the term biodiversity properly, both a unit and scale of measurement must be specified. Since ecosystems are essentially arbitrary units, diversity is in our case defined in terms of species. The scale of interest is both national and global. Conserving biodiversity is thus interpreted as preventing species from going extinct in The Netherlands with special attention for species of international interest. To set priorities at the species level, target species are selected, using a comprehensive and unequivocal set of criteria. Crucial for safeguarding the target species is the conservation of their natural habitats. For managing these, four strategies have been defined, varying in the degree of human interference. For each of these strategies, a number of nature target types has been defined on the basis of plant communities and natural reference systems. Each target type is defined in terms of target species, corresponding abiotic circumstances and range requirements. The abiotic requirements are derived from the individual tolerances of the plant species involved. Range indications are based on studies of home-ranges and population dynamics of the mammals and birds among the target species. The system of target types is a powerful tool for regional planning , ensuring cosistency with national priorities and enabling policy evaluation at both the national and local level. It also offers a basis for coordination of nature and environmental policies. The target species are listed at the end of this chapter.

PAGE 153 BIODIVERSITY IN NATURE MANAGEMENT

E.P.L. HESSELS & B.F. VAN TOOREN

The management of the nature reserves of the -Vereniging Natuurmonumenten- (Society for the Preservation of Nature in the Netherlands) is primarily aimed at the restoration and development of the largest possible diversity of landscapes, with their related ecological communities. It is argumented that this approach results also in the highest possible biodiversity. Three types of landscapes are distinguished: (sub)natural, semi-natural and cultural lanscapes. As a consequence, Natuurmonumenten distinguishes three strategies (or a combination) for the managements of its sites, which differ in the degree of human intervention in the natural processes. In the long run, this will give the best possibilities for the preservation, restoration and enhancement of the present variation in landscapes and biodiversity. However, at present the diversity within nature is strongly threatened, by a large number of causes. To stop a further decline, frequently management activities are performed to preserve concrete communities or species, even when this is not in concordance with the general management strategy for the nature reserve, for example when this strategy is primarily aimed at the restoration of natural processes.