

Bibliography, BELGIUM**Kris Vanderkerkhove**

De Cuyper B. (1987): Zonation in the forest reserve Poljsak, Yugoslavia

Silva gandavensis 52, 57-84.

Abstract: The paper describes the results of a M.Sc.-thesis, under the supervision of Professor Mlinsek. Goal was to describe the zonation, species composition, structuration and succession in time in the Slovenian forest reserve of Poljsak. Dominant tree species composition was studied through a systematic survey of the whole area. It results in a detailed map, which allows to work out a zonation model of the reserve, using as a criteria : cripple-line, cripple-zone, treeline, combat-zone and timberline. Moreover different vegetation zones could be delimited concurrent with altitudinal zones.

For further examination of the observed altitudinal distribution of tree species, a line-intersept-transect of over 1300 m was set out, spanning an altitudinal lapse of nearly 465 m. The assessment of the altitudinal transect allowed to distinguish six different forest types. Considering the topic of succession, the assessment of the species composition indicated that the present mosaic of distribution of the primary species (beech, spruce and larch) is static in character. It is mainly determined by the ecological situation of the species in function of altitude. No spectacular modifications of the borderlines between the successive, altitudinal belts must be expected as long as no drastic extrogeous perturbations occur. The fact that the vegetation belts at Poljsak must be considered as units of a spatial succession in altitude, and not as units of a time-linked succession must not be understood as a rejection of Leibundguts forest evolution model. This model remains applicable on all sites where ecological conditions do not impair the manifestation of certain tree species.

Key-words: Slovenia, succession, altitudinal zonation, timberline, beech, spruce, larch

Koop H., Leten M., Boddez P., Tielens T., Hermy M. (1992): Forest structure and species composition of 'Rodebos', 'Walenbos' and 'Hannecartbos'; monitoring of State Nature Reserves in Flanders (Bosstructuur en soortensamenstelling van 'Rodebos', 'Walenbos' en 'Hannecartbos'; monitoring van bosstaatsnatuureservaten in Vlaanderen) IBN-DLO - reports nrs. 92/27, 28 and 29.

Abstract: These papers report the results of a co-operation project between the Flemish Institute for Nature Conservation and the Dutch IBN-DLO, where three partly strict Nature Reserves were investigated using the Silvi-Star Core-sample-method (in each reserve one or two core areas).

The report describes the Silvi-Star method, gives a global description of the reserve and the results of the measurements. This results in a description of the vegetation, the forest structure, and a preliminary prognosis of future development.

Key-words: Silvi-Star, Nature Reserve, vegetation, forest structure

Lust N. (1982): Comparative study on forest reserves in Europe (Vergelijkende studie van bosreservaten in Europa) Groene Band nr. 47, p 1-20.

Abstract: This paper is primarily a literature-study on the state-of-the-art on forest reserves in Europe, in order to provide important suggestions towards the development of an own forest-reserves network.

It describes the terminology, legal position, primary goals, selection criteria and the actual status on forest reserves in different European countries. This allows the author to draw some conclusions. In most European countries a network is already existing. Although motives and terminology are sometimes differ, it mostly covers strict reserves, although areas with special management are also possible. Sizes are mostly small and minimal areas vary between 5 and 50 ha. The author concludes that a similar network of forest reserves is urgently needed in Flanders. They should primarily be situated in state forests. At least 5% of state-owned forests should

become forest reserves; this status must be permanent and timeless, and should be followed and studied very closely. The coordination of the research should be the responsibility of one service.

Key-words: Europe, forestreserves, terminology, legal position, goals, selection criteria.

Vandekerckhove K. (1996): Chances for nature in the Flemish Forest Reserves (Kansen voor natuur in de Vlaamse bosreservaten) *De Wielewaal* 62 (6), 181-187.

Abstract: This paper presents the program on forest reserves in Flanders. It provides better insight of the legal position of forest reserves, compared to nature reserves, describes the legal procedure for determination and main goals of forest reserves. It also gives an overview of the actual network of forest reserves. Covering the management of the forest reserves, it provides scientific and natureconservation arguments in favour of strict reserves.

Key-words: forest reserve, legal position, goals, overview, strict reserve.

Vandekerckhove K. (1998): Research on Forest ecology in Belgium.

In: Parviainen J., Kettunen M. (eds.), *Forestry related research in Forest Reserves and natural forests in European countries - country reports for the Cost action E4 : forest reserves research Network - EFI-proceedings no. 16*, pp.

Abstract: This report provides a global overview of forest history and forest-ecology-related research in Belgium. It also provides an overview of protected forest areas and a list of contact addresses of researchers.

Key-words: Belgium, forest history, forest ecology, research.

Vandekerckhove, K. (1998): Criteria for selection of forest reserves, in function of a better co-ordination of the Flemish forest reserves in a European network (Criteria voor de selectie van bosreservaten in functie van een betere kadering van de Vlaamse bosreservaten in een Europees netwerk) *Mededelingen van het Instituut voor Bosbouw en Wildbeheer* 1998/3, 114 pp.

Abstract: Based on national and international literature, a clear set of criteria is formulated for the selection of forest-reserves in Flanders. A difference is made between reserves that can be integrated in a European Network of Strict Reserves on the one hand, and Forest Reserves 'senso latu', that do not comply with the prerequisites of 'strictness' and size, but have other important nature conservation values. The Flemish network of strict reserves should cover all major forest types of Flanders, with special attention to specific atlantic forest types. The paper therefore also provides a first attempt to compile all literature on forest typology in Flanders, in order to produce a complete overview of Flemish forest vegetation types.

The minimum-size-criterium is primarily based on the Dutch concept of Minimum Structural Area.

The other forest reserves that cannot be included in this European network can be classified into four types : 1. Very small strict reserves (cfr. 'Naturwaldzellen') that are too small for scientifically reliable studies of forest dynamics, but have an important value for nature conservation. 2. Spontaneously afforested areas, which had the opportunity to develop for several decades without human interference. 3. Essential areas for the protection of rare species; 4. Forest areas with special management (e.g. coppice-forests). For each of these categories, a clear set of criteria is also given.

As a conclusion a synthesis is given of the existing forest reserves and nature reserves within the developed concept. This allows to point out the existing gaps in the current network.

Key-words: selection-criteria, forest typology, Minimum Structural area, nature conservation.

Van den Berge K., Roskams P., Verlinden A., Quataert P., Muys B., Maddelein D, Zwaenepoel J. (1990): Structure and dynamics of a 215-years old broadleaved forest stand recently installed as a total forest reserve *Silva gandavensis* 55, 113-152.

Abstract: Since 1983, a 215-years old broadleaved stand in the state owned Zoniën Forest (Flanders, Belgium) has been withdrawn from all silvicultural treatments. Thanks to the completely reviewed forest law in Flanders of 1990, the stand is now officially proposed as a strict forest reserve.

This paper presents an overview of the principal site characteristics, and then focuses on the woody component of the ecosystem. Stand structure analysis starts from the situation of 1986, this is dating from before the spring tempests of 1990. Subsequently the impact of those gale forces is evaluated as a driving factor in the forest dynamics. In this particular stand, it was found that an abrupt change-over took place from mature phase to a real decaying phase, resulting in a mosaic pattern with remnants of the old stand, regeneration, canopy gaps and windfall areas of different size. The standing volume decreased from 710 to 630 m³/ha, while the total amount of necromass increased from about 30 to 110 m³/ha. Windthrow was not in clusters, but scattered throughout the area. It was also found that a steady structural change is still going on, there is considerable diameter growth of the upper storey trees.

Key-words: Forest dynamics, beech forest, gales, necromass.

Van Den Meersschaut, D., De Cuyper, B., Vandekerckhove, K., Lust, N. (1998): Required Sample Size for Monitoring Stand Dynamics in Strict Forest Reserves: a Case Study
Proceedings of the Conference 'Integrated Tools for Natural Resources Inventories in the 21st Century-An International Conference on the Inventory and Monitoring of Forested Ecosystems', Boise, Idaho. USDA Forest Service-Technical Report (in press).

Abstract: In Europe, the natural development of the woody vegetation in strict forest reserves is usually monitored by means of systematic grids of circular plots, covering up to 15 % of the total surface. This method should provide representative information on the development of important parameters such as stem number and basal area.

This case study submits this assumption to a critical analysis. In 1986 a grid of permanent circular plots was laid out on a strict forest reserve in Liedekerke (Flanders, Belgium) and tree diameters were recorded. In 1996 these measurements were repeated. Based on these results the required sample size for mean stem number and mean basal area in function of a number of combinations of accuracy and probability levels was determined using a formula for simple random sampling. For a generally accepted accuracy level for mean basal area of 5 % a sample size of 15 to 20 % is required. For mean stem number such a sample size guarantees an accuracy level of only 10 % while almost half of the total surface needs to be sampled if an accuracy level of 5 % is required. Obtaining a representative image of the forest reserve by inventorying up to 15% of the total surface is therefore questionable considering an accuracy level of 5 %. Specification is necessary when dealing with representativeness. The evaluation of the representativeness of each parameter after a forest reserve inventory should therefore be implemented. The method applied in this case study can hereby serve as a useful tool.

Key-words: systematic grid, monitoring, sample size

Van Den Meersschaut, D., Lust N. (1997): Development of a methodology for monitoring of Forest Reserves in Flanders : Monitoring of forest structure and species composition in the RTT-Domain of Liedekerke. (Ontwikkeling van een methodiek voor de monitoring van de bosreservaten in Vlaanderen: Monitoring van de bosstructuur en de soortensamenstelling in het RTT-domein van Liedekerke) Research Report Laboratory of Forestry, University of Ghent, 35 p. + annex.

Abstract: In 1986 a grid of permanent circular plots and transects where tree diameters were measured, was laid out on a strict forest reserve in Liedekerke (Flanders, Belgium), a young forest, developed through undisturbed spontaneous succession over 50 years on former heathland. In 1996 these measurements were repeated. Based on these results the required sample size for mean stem number and mean basal area in function of a number of combinations of accuracy and

probability levels was determined using a formula for simple random sampling. Moreover the development of the stand during the last 10 years was studied. There was an important change of species composition, and structural parameters. Stem number decreased dramatically from 1800 to 1100 stems/ha, while basal area increased from 23 to 28 m²/ha. Oak and birch are still the dominant trees, together covering 65 % of the basal area, although there's a clear shift towards oak. American red oak, rowan, elder, hawthorn and sweet chestnut increased, while aspen, alder, alder buckthorn and willow drastically decreased.

Key-words: spontaneous afforestation, species composition, forest dynamics, oak, birch.

Van Den Meererschaut D., Lust N. (1997): Development of a methodology for monitoring of Forest Reserves in Flanders : Comparative study of Monitoring Methodology of Forest Reserves in the Netherlands and Bavaria - Reference-study (Ontwikkeling van een methodiek voor de monitoring van de bosreservaten in Vlaanderen: Vergelijking van de monitoringsmethodiek voor bosreservaten in Nederland en Beieren (Duitsland) - Literatuurstudie) Labor voor Bosbouw, University of Ghent, 32 pp. + annex.

Abstract: This paper provides a detailed description of monitoring methodologies in the Netherlands and Bavaria. The authors compare both methods, give an overview of the essential aspects, major opportunities and drawbacks, in order to provide some very usefull and practical advice for the development of the Flemish monitoring system.

Key-words: monitoring, forest dynamics, the Netherlands, Bavaria.