Zeitschrift: Veröffentlichungen des Geobotanischen Institutes der Eidg. Tech. Hochschule, Stiftung Rübel, in Zürich

Herausgeber: Geobotanisches Institut, Stiftung Rübel (Zürich)

Band: 39 (1967)

Artikel: English summaries : site and vegetation of the forest of Kirchleerau in the Swiss lowland, canton of Aargau

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DOI: https://doi.org/10.5169/seals-308291

Site and vegetation of the forest of Kirchleerau in the Swiss lowland, Canton of Aargau

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A combined pedological and phytosociological method for surveying and mapping forest habitats (sites) is explained and illustrated by an example of 420 hectares in the Swiss Midlands at a height of about 500–700 m above sea level. Geography, geology, phytosociology and forest history of this region provide a basis for the actual ecological survey. Tertiary molasse, Riss-glacial deposits and Würm lateral moraines form the geological substratum. With the exception of parts of exposed slopes these strata are covered by different subsoils, these being formed by solifluction and its effects. Beech forests are dominant among the natural forest associations (*Melampyro-*, *Melico-*, *Carici-Fagetum* and *Fagetum allietosum*); hydromorphic soils are scarce and there grow sycomore-ash- and alder-ash-forests.

A second principal chapter presents the results obtained by mapping the regions. The so-called "site-types", "site-type-groups" and "site-vegetation-types", which are mapped separately, are based on the general survey of the habitat (soil-profile description, soil analysis in the laboratory, vegetation relevés, height measurements of selected trees).

The basic map is the map of the site-types, which should secure a long-termed validity of the mapping. In separated representation it contains the independent parts of the habitat, viz. (1) soil form, (2) mesoclimatic qualities due to relief, such as water economy level, wind-impoverished, wind-sheltered and special thermic sites and (3) humus form as a characteristic for the actual state of the habitat. Soil- and humus-forms are defined by analytical and morphological properties. The soil-forms are named by a short term which is composed of substratum and soil-type, e.g. loamy brown soil, loamy pseudogley-brown soil, loamy lessivé, marly rendsina (para-rendsina) and loamy slope-gley. All the details are expressed by a geographical co-term, the same principle as in geology. Humus forms are only mapped where they show to be of a stronger derivated type.

The macroclimate is humid (1200 mm annual precipitation) and relatively warm (8—9 °C medium annual temperature). There are no essential regional differences which should be accentuated on the map of the site-types. (This map is printed on transparent paper).

The vegetation relevés were grouped into "site-vegetation-types" according to their indicator value, independently from the forest associations which were evaluated by pure phytosociological methods. Near-natural site-vegetation-types may be separated from the more derivated ones. The former are defined by ecological groups of plants with similar indicator value for the more stable site qualities, the latter only by indicator groups for the actual state of humus. The vegetation map presents the (more or less) natural site-vegetation-types with fully covering colours, and by special signs. Where necessary, additional indications are given for the derivated site-vegetation-types. The map of the site-vegetation-types (which is omitted in the present publication) does not reflect that detailed information on the differences between the site-types regarding the more stable site qualities, i.e. 10 near-natural site-vegetation-types are to be opposed to 38 site types (combination of soil form and mesoclimatic qualities due to relief). On the other hand, differences in humus form are always recognizable by floristic changes.

These 38 site-types are compiled into 13 site-type-groups according to their silvicultural relationship, which was judged by the knowledge of the relations amongst the site-vegetation-types and the vitality of the tree species; these groups are shown on the map of the site-type-groups.

By opposing the characteristics for the potential site-quality (site-type and near-natural site-vegetation-type) and the characteristics for the actual site-state (humus form and actual site-vegetation-type) there appear to be considerable differences in actual and potential state

for some of the site-types. The importance of these differences for the method of mapping site-types are explained by two examples.

The regularities in the pattern of different site mosaics and the advantages of this geographical order for the separation of site-types in the field are discussed.

The silvicultural conclusions are based on the map of the site-type-groups. They are restricted to the choice of tree-species, because forest stands which could be ameliorated have no importance in the examined area. The directions for tree-species selection are derived from the natural tree-composition of the vegetation-types, the vitality of the tree species and their influence on the actual state of the habitat.

Mapping of forest vegetation in the Vth forest district of the Canton of Aargau, Switzerland, according to the method of Braun-Blanquet

By H.-K. Frehner

The present investigation is part of a phytosociological site-mapping of some 9000 ha of forests in the north-western region of the Swiss Midlands. The forests around Moosleerau, Kirchleerau and Schöftland, which were chosen for comparing methods for site-investigation, are situated in the center of the examined area and cover slopes and plateaus between 460 to 713 m above sea level. The lower parts of the hills belong to the submontane altitudinal belt, whereas the sites above 700 metres, as well as the steeper slopes exposed to the north, are part of the lower montane belt. In most places the soils are poor in Calcium carbonate. The following nine associations, which differ in a number of differential species, were found (those marked with * are new):

Melico-Fagetum
Milio-Fagetum prov.*
Melampyro-Fagetum
Querco-Abietetum prov.*
Pulmonario-Fagetum prov.*
Carici-Fagetum
Aceri-Fraxinetum
Carici-remotae-Fraxinetum
Alno-Fraxinetum

As a basis for the description of the associations and for the site-mapping the potential natural vegetation of the sites in question was considered most useful. The composition of the tree layer in the potential natural vegetation units was estimated mainly by considering the competitional power of the various tree species. On all sites with normal drainage, and without any thick layer of raw humus, beech (*Fagus silvatica*) would prevail in the natural forest. Therefore, beech may be called the climax species of the investigated area. In the associations of the submontane belt, trees of mixed hardwood forests such as oak (*Quercus robur* and *petraea*), hornbeam (*Carpinus betulus*) and cherry (*Prunus avium*) were found as well as beech. These species are, however, distinctly inferior to beech in competition. Nevertheless, they grow well enough in the submontane belt and oak and cherry may be considered valuable species for the production of timber. Species of the beech-forest, as well as species of the mixed hardwood forest, are also found in the ground vegetation of associations of the submontane belt. Extremely acid soils with a continuous cover of raw humus are stocked with silver fir (*Abies alba*), if they are not too dry (*Querco-Abietetum*). Together with the beech forests the *Querco-Abietetum* is attributed to the *Fagion* alliance. On the other hand ash (*Fraxinus excelsior*), maple (*Acer pseudoplatanus*), and black alder forests (*Alnus glutinosa*), all of them growing on humid or wet soils, are considered to belong to the *Alno-Padion* alliance.

The floristic relationships between the different associations were expressed by a coefficient considering the number of species which two associations have in common, as well as the