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Geobotanical assessment of forest habitat types of the Habitats Directive in northwestern Turkey

– Helge Walentowski & Erwin Bergmeier –

Abstract

This contribution exemplifies the identification process of forest and scrub habitat types in northwestern Turkey, thereby following, and geographically extending, the vision of the Pan-European Biological and Landscape Diversity Strategy (PEBLDS) to achieve conservation and sustainable use of biological and landscape diversity for the whole of Europe.

Zusammenfassung: Geobotanische Bewertung von Wald-Lebensraumtypen der Fauna-Flora-Habitat-Richtlinie in der Nordwest-Türkei

Der Beitrag veranschaulicht das Vorgehen zur Identifizierung von Wald- und Buschwald-Lebensraumtypen in der Nordwest-Türkei als Grundlage für eine räumliche Erweiterung der gesamteuropäischen strategischen Vision zur Erhaltung und nachhaltigen Nutzung biologischer und landschaftlicher Vielfalt (PEBLDS).

Keywords: Eco-regions, Euxine biogeographical region, favourable conservation status, geobotanical transects, NATURA 2000, PEBLDS, Turkey.

1. Introduction

The cross-border implementation of the NATURA 2000 philosophy is a crucial contribution to maintaining the stability and functionality of the enormous biodiversity of Turkey facing the economic and ecological challenges of global change. Main requirements for the successful implementation of the NATURA 2000 network in Turkey are:

- Identification of the characteristic habitats and key species of flora and fauna representative of the natural heritage of the biogeographical regions
- Identification of the factors that control biodiversity and are crucial for sustainable landscape management.

In the frame of the EU Twinning Project TR02-EN01 "Capacity Building in the Field of Environment, Component Nature" (http://www.twinning-project.org/) 49 habitat types of woodland (39) and scrub (10) have been identified for Turkey on the basis of geobotanical parameters (BERGMEIER & WALENTOWSKI 2008). Of these, 25 are established Annex I habitat types which were partly amended to fit more precisely the Turkish environmental and biogeographical conditions. Almost as many, 24 in total, have been recognized as new and were added. The latter group comprises habitat types exclusive to Turkey or extending to other non-EU countries chiefly in the Caucasus or Near East, and others which extend to EU-member states but have been neglected hitherto. Apart from the identification of habitat types, geobotany provides a proper foundation for the assessment of the conservation status of plant species and habitats.

2. Universal concept of maintaining biodiversity in times of global change

At least since Kyoto 1997 and Rio 1992 / Johannesburg 2002 climate protection and conservation of biological diversity have been identified as crucial global challenges to the world community. Both topics which are closely related to each other demand urgent, immediate, rapid and concerted actions (EU 2020 climate target, 2010 biodiversity target). In both subject areas Europe plays a pioneer role (EU 5th and 6th Environmental action programme). The **Habitats Directive** (Directive 92/43/EEC) and the **NATURA 2000 network** are the most important contributions to halt the loss of biological diversity in Europe. The network operates at different spatial and topical scales:

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i) Spatial relevance: Biogeographical regions and their subunits.
ii) Responsibility concept: Identification of characteristic habitat types (Annex I of the Habitats Directive), bird taxa (Article 4 of the Birds Directive), animal and plant taxa (Annex II of the Habitats Directive) for designation of responsibility. These selected habitats and species of Community interest have to be maintained at a favourable conservation status or restored to regain such a status.
iii) Network concept: Biogeographically important and representative occurrences of listed taxa and habitats will be protected in **Special Protection Areas** (SPA's) under the Birds Directive and in proposed **Sites of Community Importance** (pSCI's) under the Habitats Directive.
iv) Ecological coherence: Even outside the NATURA 2000 sites interconnectedness of habitats has to be ensured by suitable landscape structures widely believed to be essential for migration, dispersal and genetic exchange of wild species.

The Habitats Directive is focused on a wide range of habitat types typical for each biogeographical region, with their characteristic, ecologically adapted species and the genetic diversity as acquired by natural selection. The **Pan-European Biological and Landscape Diversity** Strategy (PEBLDS) provides „an innovative and proactive approach to stop and reverse the degradation of biological and landscape diversity values in Europe" (http://www.peblds.org/). On landscape level (eco-regions) the decisive criteria are range, area size and connectivity of the habitat types. Maintaining diverse landscapes with space-time patterns of open, semi-open and forest vegetation proves to be beneficial for biodiversity, functionality and ecological sustainability. Key requisites for biotope tradition and habitat continuity are to be provided in magnitudes regarded quantitatively and qualitatively sufficient. The crucial instrument to accomplish the objectives is an appropriate national list of pSCIs, carefully selected to include key occurrences of all habitat types that are relevant for biodiversity at landscape level. The second instrument is the assessment and surveillance of the favourable conservation status (FCS) of the habitats and species. The NATURA 2000 network concept must be open for progressive vegetation dynamics, for migration and dispersal of species, caused by changes in land use or by climate change. But at the same time it should work as an early warning-system in case of significant biodiversity loss (caused, e.g., by increased intensity of land use, isolation, habitat fragmentation etc).

3. Case study: Northwestern Turkey

This contribution exemplifies the cross-border implementation of the Pan-European Biological and Landscape Diversity Strategy for the case of northwestern Turkey. Based on geobotanical parameters the example illustrates the forest habitat diversity and its key factors at the convergence of three biogeographical regions (Mediterranean, Euxine, Irano-Turanian) and along the climatic and topographical gradients (i.e., the altitudinal gradient in the northwest Anatolian Mountains and the severe continentality gradient between the warm-humid maritime climate of the Black Sea and the semi-arid climate of Central Anatolia). The sequence of forest habitat types in this area includes (Figs. 1 and 2):
• Mediterranean deciduous forests (9280 – *Quercion frainetto* woods)
• Deciduous forests of temperate Europe (91x1 – Euxine *Fagus orientalis* forests, 91x3 – Sub-Euxine deciduous mixed oak forests) (Fig. 3)
• Temperate montane coniferous forests (94x1 – Montane *Abies* forests of the Black Sea Region, 94x3 – Montane *Pinus sylvestris* forests with Euxine distribution) (Fig. 4)
• Mediterranean montane coniferous forests (9530 – *(Sub-) Mediterranean pine forests with endemic black pines)

Another key factor for biodiversity is the human impact, particularly within semi-arid environments with a fragile balance between climate, soil and vegetation (precipitation, evapo-transpiration, interception storage, soil moisture storage, groundwater storage, soil development processes, soil erosion and land degradation, biomass and vegetation patterns / dynamics) (e.g. RODRIGUEZ-ITURBE 2000). The following habitat types are more or less influenced by historical or present land use:

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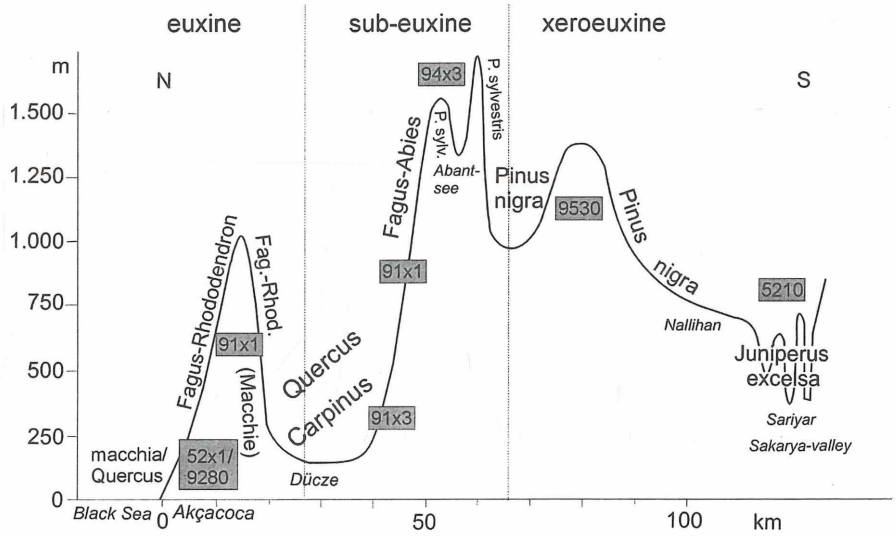


Fig. 1: Vegetation profile along approximately the 31st to 32nd degree of eastern longitude from the Black Sea to the Sakarya Valley (after WALTER 1956, supplemented). Four-digit codes of habitat types are highlighted in grey. We suggest to add certain habitat types, here coded with x, to Annex I of the Habitats Directive (BERGMEIER & WALENTOWSKI 2008).

Abb. 1: Vegetationsprofil etwa längs des 31.–32. Grades östlicher Länge vom Schwarzen Meer bis zum Sakarya-Tal (nach WALTER 1956, ergänzt). Die vierstelligen Codierungen der Lebensraumtypen sind grau unterlegt. Codierungen mit einem x werden als neu in den Anhang I der FFH-Richtlinie aufzunehmende Lebensraumtypen vorgeschlagen (BERGMEIER & WALENTOWSKI 2008).

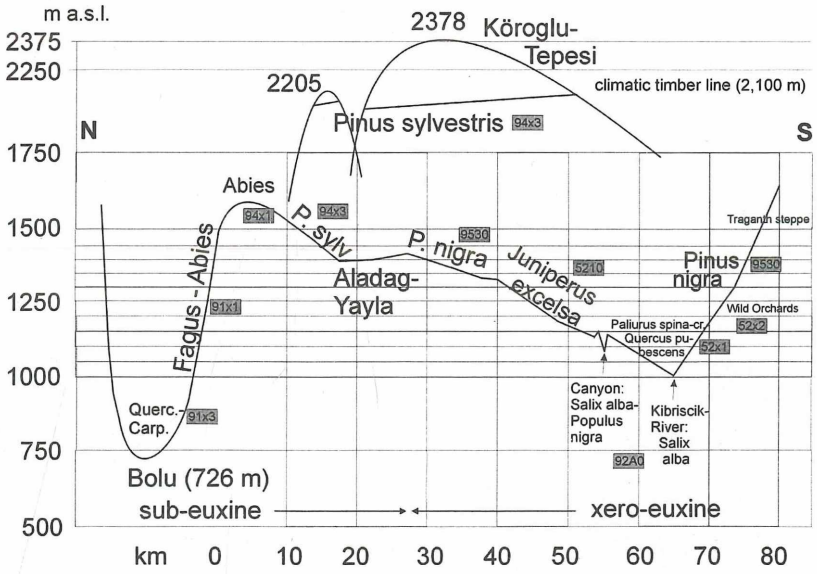


Fig. 2: Vegetation profile through the Köroğlu Dağları from Bolu southwards in the direction of Beypazarı. The core area of the Aladağ Yayla (summer pasture with 6,000 sheep) is located on a high plateau. Here are the summer villages of the shepherds.

Abb. 2: Vegetationsprofil durch die Köroğlu Dağları von Bolu aus nach Süden in Richtung Beypazarı. Das Kerngebiet der Aladağ-Yayla (Almweide mit 6.000 Schafen) befindet sich auf einem hochgelegenen Flachrelief. Hier liegen auch die Sommerdörfer der Hirten.

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Fig. 3: Oriental beech forest (*Fagus orientalis*) in the Yedigöller National Park (Northwest Turkey). Photo: U. Hauke, June 2005.

Abb. 3: Orientbuchenwald (*Fagus orientalis*) im Nationalpark Yedigöller (Nordwest-Türkei). Foto: U. Hauke, Juni 2005.



Fig. 4: *Abies bornmuelleriana* forest near timberline at 1700 m in the Ilgaz mountain range (province of Kastamonu, northern Turkey). Photo: U. Hauke, June 2005.

Abb. 4: Tannenwald (*Abies bornmuelleriana*) bei 1700 m nahe der Baumgrenze im Ilgaz-Gebirge (Provinz Kastamonu, Nord-Türkei). Foto: U. Hauke, Juni 2005.

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Fig. 5: *Juniperus excelsa* pasture woodlands in Central Anatolia, province of Sivas. Photo: U. Hauke, August 2005.

Abb. 5: Offene Weidewälder mit *Juniperus excelsa* in der Provinz Sivas, Zentralanatolien. Foto: U. Hauke, August 2005.

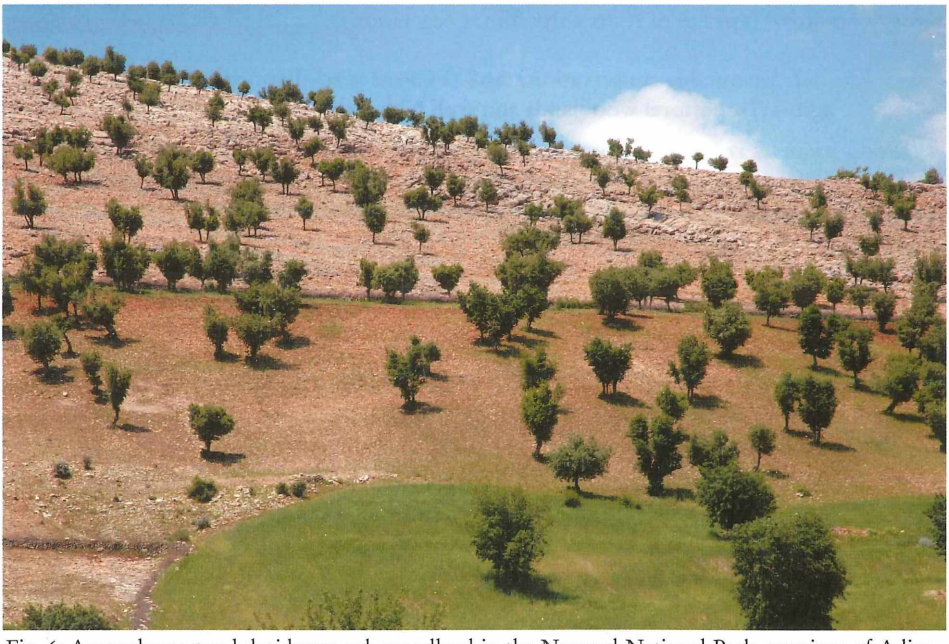


Fig. 6: Agrosylvopastoral deciduous oak woodland in the Nemrud National Park, province of Adiyaman, eastcentral Turkey. Photo: U. Hauke, June 2005.

Abb. 6: Agrosylvopastoral genutzter Wald aus laubwerfenden Eichen im Nemrud-Nationalpark (Provinz Adiyaman, östliche Zentral-Türkei). Foto: U. Hauke, Juni 2005.

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• Mediterranean arborescent matorral (52x1 – East Mediterranean maquis or arborescent matorral with *Arbutus andrachne*; 5210 – Arborescent matorral with *Juniperus* spp.) (Fig. 5)
• Sub-Mediterranean and temperate scrub (51x1 – (Agro-)silvopastoral open deciduous oak woodland and buschwald; 51x2 – Wild orchards and other wild fruit woodlands) (Fig. 6)

(Agro-)sylvopastoral woodland habitat types influenced by, or depending on, traditional land use are particularly common on inland declivities of the Northwest-Anatolian mountains (Köroğlu Dağları) in transition to Central Anatolia (Upper Sakarya region). Extensive areas of such habitat types are of great significance for regional biodiversity. For example, in Turkey more than 1.1 Million hectares of arborescent *Juniper* stands are recorded, as well as enormous areas of agro-silvopastoral open deciduous oak woodland and scrub.

3.1. Consideration for maintaining biodiversity within semi-natural habitat complexes in semiarid regions

Central Anatolia and the Near East are the cradle of cultural landscape. The beginnings of neolithic settlement, agriculture and livestock breeding date back to the period from 8th to 5th century BC (BITTEL 1950, MAYER & AKSOY 1986). The postglacial vegetation history was continuously linked with human interference (e.g. Neolithic settlements, Protohittites, Hittite Empire, Phrygian Empire, Kimmarians, Seldshuks, Ottoman Empire). The land-use, though varying in intensity and at times soil degrading, was rather extensive particularly with respect to grazing, and has supported species diversity (intermediate disturbance hypothesis). While GRADMANNs (1933) 'Steppenheide' theory of was rightly abolished for Central Europe, it seems to be rather better applicable for the semi-arid environment of Central Anatolia. This conclusion leads to some exciting questions:
• what are appropriate parameters for the favourable conservation status of matorral and 'buschwald'?
• What is the ideal model for managing biodiversity on landscape level (to maintain the agrosylvopastoral types or to restore the climax vegetation)?

3.2. Favourable conservation status (FCS) of xero-thermophytic and agro-sylvopastoral woodlands and srub within the xero-euxine Region

Wood pastures represent an essential part of both the cultural and natural heritage of Europe, the Near East, and in fact major parts of the Old World. Due to long habitat continuity, structural diversity, ecotone density and medium disturbance frequency many wooded pastures display high species densities and are important habitats for numerous and rare species of fauna and flora. Habitats of wooded pastures deserve the attention of the Habitats Directive in quite the same way as non-woody semi-natural habitats such as grasslands and heathlands (BERGMEIER 2008). In certain biogeographical regions, within Europe particularly in the Mediterranean and the Black Sea region, outside Europe for instance in Inner Anatolia, wooded pastures harbour a great deal of the regional biodiversity, including species depending on structures not offered by dense forests. This being generally accepted there should also be consensus that any efforts are justified to conserve the remnants of old dense forests and to restore forests impacted by overgrazing. In our opinion, both aims, the conservation of natural forests and that of semi-natural, some would say devastated, wood pastures, should be achieved, and the Habitats Directive should be a tool to provide a suitable basis for this.

In Turkey, as in the European Mediterranean and elsewhere, there are examples of natural forest and its sylvopastoral counterparts. The latter are more common in most regions but they lack commonly legal conservation status. Obviously, the FCS criteria for the two categories are different. In wooded pastures disturbance and removal of phytomass are common practice while forests are the more natural the less impacted by human interference. Suggestions for FCS criteria for wooded pastures are provided by BERGMEIER (2008).

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Links

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http://www.natura.org/
www.coe.int/biodiversity

PAN-European ecological Network:
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http://portal.unesco.org/en/files/24197/111580678915PWP_GS_PEEN_UNESCO_Venise_12_May_2005.ppt/PWP_GS%2BPEEN_UNESCO%2BVenise%2B12%2BMay%2B2005.ppt

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