UFZ-Bericht Nr. 18/2004

11th Magdeburg Seminar on Waters in Central and Eastern Europe: Assessment, Protection, Management

Proceedings of the international conference
18-22 October 2004 at the UFZ

Walter Geller, Jan Blachuta, Šarka Blažková, Evelyn Claus, Alfred Dubicki, Hildegard Feldmann, Helmut Guhr, Edeltrauda Helios-Rybicka, Hubert Holzmann, Wiwiana Szalinska, Wolf von Tümpling, Gulay Záray (Eds.)

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Ancient and recent woodland species composition in the floodplain forest in the Middle Elbe area

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1. Introduction

Today cover of European woodland includes many secondary stands of formerly open areas. Plants of stable habitats such as woodlands generally have seeds with low persistence in the seed bank. The most of typical woodland species use mechanisms of short-distance dispersal (myrmechores and autochores) and rarely colonize recent woodland.

In this study we compared the species composition between ancient and recent woodlands in our study area which is located in Saxony-Anhalt. Floodplain forest in the Middle Elbe area has continuously existed for at least 200 years. According to the definition of Wulf (1994) it is ancient woodland. Parts of the floodplain forest and their adjacent areas have been afforested during the last 100 years.

2. Methods

Vegetation sampling was carried out on randomly located plots with a size of 3 x 3 m in the year 2001. Because of the high amount of geophytes the vegetation cover was estimated in spring and summer with the Londo-scale. 50 plots of ancient and 108 plots of adjacent recent woodlands were studied.

We studies three types of species, namely typical woodland, indifferent and non-woodland species as defined by Ellenberg et al. (1992). Differences between types of species in ancient and recent parts of the woodlands were tested with the Mann-Whitney U-Test.
Dispersal mode according to Müller-Schneider (1986).

3. Results

3.1. Frequency of species

Compared to recent woodland, ancient woodland has a significant higher frequency of typical woodland species. Recent woodlands are characterised by a higher abundance of indifferent species and non-woodland species (Table 1).

Table 1: Frequency of species in ancient and recent woodland in floodplain forest in the Middle Elbe (n $_{ancient\ woodland}$ = 50; n $_{recent\ woodland}$ = 108) (Mann-Whitney U-Test).

types of species	Frequency of species in ancient woodland	Frequency of species in recent woodland	p-value
typical woodland species	24	21	p = 0.009
indifferente species	11	13	p = 0.310
non-woodland species	17	18	p = 0.313
	$\sum 52$	$\sum 52$	

Taking into account the abundance of species demonstrate typical woodland species are significant more abundant in ancient woodlands (p < 0.031). No differences show indifferent (p = 0.834) and non-woodland species (p = 0.156) between ancient and recent woodlands.

3.2. Dispersal mode

The hemerochores is by far the most frequent dispersal mode in both types of woodland with a proportion of about 47% in the ancient woodland and about 43% in recent woodland. Zochores are the second prominent group with values from 31% in both types of woodlands. In total, the group of species with low abilities of dispersal over long distances (myrmechores and autochores) reach values between 5 and 8% in ancient and recent woodlands. All types of dispersal modes don't show significant differences between both types of woodlands (Table 2).

Table 2: Proportion of different dispersal modes in ancient and recent woodlands.

Dispersal mode	ancient woodland	recent woodland	p-value
Anemochores	9.9 %	10.3 %	$p = 0.430$
Hemerochores	46.9 %	43.4 %	$p = 0.345$
Zoochores	31.1 %	31.5 %	$p = 0.475$
Hydrochores	0.1 %	0.5 %	$p = 0.848$
Myrmechores	5.1 %	6.4 %	$p = 0.889$
Autochores	6.9 %	7.9 %	$p = 0.920$

It seems that lack of differences between dispersal modes in ancient and recent woodlands can not explain the difference in species composition in these two types of woodland.

4. Discussion

The ancient and recent woodland in the Floodplain forest in the Middle Elbe show significant differences in frequency and abundance of typical woodland species but do not differences for indifferent, non-woodland species and dispersal mode. This conclusion is different by the recent study of Wulf (1997), Brunet and Oheimb (1998) and Kühn (2000).

Often important reason for the absence of typical woodland species in recent woodlands was meant to be linked to dispersal abilities (Brunet and Oheimb 1998). Most of the typical woodland species use myrmecochorous or autochorous dispersal mechanisms of short-distance dispersal. In this study was the proportion of species with myrmecochorous or autochorous dispersal very low. It seems that these types of dispersal mechanisms are very unsuitable in a floodplain forest; it dominated mechanisms with long-distance dispersal in both woodlands. The reason is the annual flooded. This situation is very unsuitable for example ants (Schlaghamersky 2003).

5. Literature

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