Die Makrophytenvegetation von Flußstauen
am Beispiel der Donau zwischen Fluß-km 2552,0 und 2511,8
in der Bundesrepublik Deutschland

The macrophyte vegetation in impoundments
exemplified by the Danube River between river-km 2552,0 and 2511,8
in the Federal Republic of Germany

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Mit 6 Abbildungen und 1 Tabelle im Text

Abstract

In the Federal Republic of Germany, five successional impoundments are situated at the Danube river between river-km 2552.0 and river-km 2511.8. Sections with a high current velocity downstream of the power-plant and weirs, are followed by sections with low current velocities and with a rather lenitic character upstream of the barrages. As a result of these conditions a variety of different aquatic habitats occurs. This study shows new numerical methods of presenting the differences in the distribution pattern of individual species exemplified by the five impoundments.

The aquatic, amphibious and riparian vegetation was mapped in the summers of 1989 and 1990. Due to unusually high visibility in the water mapping was possible by boat using a mechanical grab and, when necessary, scuba-diving was also used. Each river-bank was mapped separately. The central parts of the river were without any vegetation. Each bank was divided into sections, each 1000 m long, to differentiate the distribution of the vegetation. Due to the positioning of the weirs it can occur that the final and beginning section of an impoundment could be less than 1000 m long.

Within the sections each individual species of higher plants and aquatic mosses was mapped according to Kohler (1978). This method uses river sections as mapping units, estimating the amount or mass of a species on a five-level scale. The amount or mass has to be interpreted as the three-dimensional amount of plant material of a certain species in relation to its distribution within a certain river section. This description therefore uses more than just occurrence, abundance, cover or dominance as criteria. It is a rather good expression of a ranking of true biomass. According to experimental approaches to this problem the five ranks of the estimate (Kohler, 1978), which are expressed by the mass index (MI, see below), are related to the „true biomass“ (PM) by the function $f(x) = x^3$ (Melzer et al., 1986; Janauer et al., 1993). The relative plant mass (RPM) is used to calculate the quantitative significance of individual species in a river section.

A list of all species occurring in the five impoundments is presented (table 1). Figures 1 and 2 show all species (submersed macrophytes, species with floating leaves, helophytes) with RPM larger than 1%, ranked in decreasing order. The RPM is calculated for helophytes and truly aquatic species (submersed macrophytes and species with floating leaves) following: