

Die Keimungs- und Etablierungsökologie von *Gentiana pneumonanthe* L.



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Abstract

Gentiana pneumonanthe L. is an in Germany nationwide endangered hemicryptophyte which is found in man-made, extensively managed plant associations. The decline of this, in Europe formerly widespread, species is the motive to study in this paper different, germination-relevant environmental factors, which exert influence on the phases of germination and establishment which are critical for its survival. The results of the germination trials are essential for the correct arrangement of preservation management and for effective measures aiming at the revitalisation of its mostly small and isolated remaining populations. In an experiment performed in styrofoam-bowls and a comparative field study, the germination probability of *Gentiana pneumonanthe* L. is analysed on the one hand under different types of substratum and thickness of litter overlay and on the other hand under litter and disturbance. In the bowl-experiment, carried out under idealized environmental conditions, germination probability significantly depends on the thickness of litter and its interaction with the type of substratum, but not on the type of substratum alone. In the field study it becomes clear that, under natural conditions, it is mainly the competition of the surrounding vegetation and insufficient soil moisture that take influence on the germination rate. A lack of small-scale disturbance leads to a significantly reduced success of establishment of the seedlings. It cannot, however, be established in what way the influence of a large-scale removal of the topsoil is to be judged. Contrary to the bowl-experiment, the thickness of litter overlay does not show any significant effect. A present-state analysis of the last remaining *Gentiana pneumonanthe*-populations in the district Steinfurt in NRW, Germany comprises determination of individuals abundance and population structure, the latter being an important basis for future measures. Populations of regularly mown areas with a dense to open vegetation structure are not in danger of overaging. They present an “invasive” or “stable” type of population. Managed adequately, these populations are not endangered. Less intensely cultivated populations on the other hand belong to the “senile” type. That means that they are in urgent need of a seedling and juvenile recruitment, so that also smaller populations can permanently survive.