

Heavily endangered plant species in Hesse – habitat analysis and climate change

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Several studies have already dealt with general consequences of climate change for the German flora. However, until now analyses on a regional scale are missing, especially for rare and endangered species. This study fills this gap. Using species distribution models we predict distribution patterns of rare or endangered plant species in Hesse (Germany) caused by a moderate climate change until 2100 (A1B scenario). The implications for the conservation of 65 species of the Red List with categories 1 (threatened with extinction) or 2 (critically endangered) are discussed.

Land use might mask the effects of climate change. The survival of many of the investigated species depends on special types of land use. Therefore, we included both types of information in our modelling. Based on environmental information, recent and future, we modelled the respective distribution. We used Maxent, version 3.3.3e for modelling. Maxent generates robust models even with few plant locations. In the last step of the modelling process we introduced expert knowledge. This helped us to formulate suggestions for the conservation of the investigated species.

According to our results, one quarter of the investigated species will disappear until 2100. This exceeds the species loss of 15-19 percent for the A1B scenario in Germany predicted by Pompe et al. (2008). However, we investigated species relevant for nature conservation, already with a high risk of extinction. Our results strengthen the necessity to preserve these species. As land use has a greater influence on the investigated species than climate change many of the analysed species need a special management of their habitats.