idw - Informationsdienst Wissenschaft
Nachrichten, Termine, Experten

Pressemitteilung

Universität Bayreuth
Christian Wißler

23.08.2023
http://idw-online.de/de/news819472

Forschungsergebnisse, Wissenschaftliche Publikationen
Biologie, Tier / Land / Forst, Umwelt / Ökologie
überregional

Global study on invasive tree species: Bayreuth researcher investigates dynamics of biodiversity on Kilimanjaro

An international study published in „Nature“ shows for the first time on a global scale for what reasons and to what extent tree species invade ecosystems where they are not native. A total of 226 scientists from 54 countries in all continents contributed to this study on invasive tree species. PD Dr. Andreas Hemp from the University of Bayreuth studied 65 plots at different altitudes on Kilimanjaro in Tanzania.

In total, more than 471,000 plots were selected for the representative study. The evaluation of existing international databases, new empirical studies and ecological models formed the basis for determining, in relation to each plot, what proportion of the total number of tree species growing on it is accounted for by immigrant tree species. In addition, the proportion of the total forested area covered by immigrant tree species was calculated for each study area.

As it turned out, the statistical probability of invasive tree species invading existing ecosystems is particularly high in North America, Europe and East Asia. Globally, in all climatic zones, whether a region is colonized by invasive tree species depends primarily on human economic activities. For example, the spatial proximity of ports significantly promotes the introduction of non-native species. The level of species diversity already present plays a crucial role in the degree of subsequent spread of these species: if the number of native tree species is low, invasive species will establish on a large scale in the long term and occupy a large proportion of the forested area. Conversely, if the species diversity of an ecosystem is high, invasive species are less likely to displace native species.

PD Dr. Andreas Hemp from the Plant Systematics research group at the University of Bayreuth contributed the results of many years of empirical field research on Kilimanjaro to the study. He emphasizes that a close look at the conditions on the ground is needed to make concrete statements about the reasons for and extent of the spread of non-native tree species. The most important factor in the immigration of alien tree species at Kilimanjaro is human-induced disturbance of forest ecosystems. Because more and more wood – either for energy supply or as building material – was taken from the existing forests, thinning occurred into which tree species coming from outside could advance. This development is particularly striking in alluvial forests, which extend in narrow strips from an altitude of 1700 meters into the deep regions cultivated by man.

Another factor that promotes the spread of invasive tree species is the proximity of forest plantations. For example, tree species such as Mexican cypress (Cupressus lusitanica) and Pinus patula, a pine species native to Mexico, grow here. The plantations serve as a reservoir for foreign tree species, which invade the natural forest belt at the foot of Kilimanjaro particularly easily. Here, the forests are already heavily disturbed by human intervention.

Forest fires play a central role in changing the forest areas around Kilimanjaro and the wider region. In recent decades, numerous Australian eucalyptus species have spread, as has the acacia species Acacia maernsii, which is also native to Australia. With their foliage that is difficult to decompose, rich in essential oils and accumulates on the forest floor, they increase fire danger, but they can also survive larger fires well and then multiply easily. "In some areas on Kilimanjaro

and also on the neighbouring Pare Mountains, this has led to large areas falling victim to a veritable invasion by the Australian acacia species – with all the negative consequences for the diversity of native tree species," Hemp reports.

With regard to forests in Central Europe, the data obtained in the new study on Scots pine (Pinus sylvestris), which is native here, surprised him: it is, after the false acacia (Robinia pseudoacacia), the most invasive tree species worldwide. "This proves its enormous ecoclimatic adaptability and its ability to assert itself as an important tree species in Central Europe, even under changing climate conditions," explains the plant systematist from Bayreuth.

wissenschaftliche Ansprechpartner:

PD Dr. Andreas Hemp
Plant Systematics
University of Bayreuth
Phone: +49 (0) 921 / 55-2464 or +49 (0)9246 / 980979
E-mail: andreas.hemp@uni-bayreuth.de

Originalpublikation:

Camille S. Delavaux et al.: Native diversity buffers against severity of non-native tree invasions Nature (2023), https://www.nature.com/articles/s41586-023-06440-7 -
DOI: 10.1038/s41586-023-06440-7

Forest belt at the foot of Kilimanjaro.

Photo: Andreas Hemp.

Extensive acacia cover after forest fires in the Pare Mountains.
Photo: Andreas Hemp.